

**LIMITED LIABILITY COMPANY AGREEMENT
OF
CAT NMS, LLC
a Delaware Limited Liability Company**

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Exhibit A: Participants

Appendix A: Consolidated Audit Trail National Market System Plan Request for Proposal, issued February 26, 2013, version 3.0 updated March 4, 2014

Appendix B: Participant Rule Template

Appendix C: Discussion of Considerations

**LIMITED LIABILITY COMPANY AGREEMENT
OF
CAT NMS, LLC
a Delaware Limited Liability Company**

This Limited Liability Company Agreement (this “Agreement”) of CAT NMS, LLC, a Delaware limited liability company (the “Company”), dated as of the __ day of _____, ____ (the “Agreement Date”), is made and entered into by and among the Participants.

RECITALS

A. Prior to the formation of the Company, in response to SEC Rule 613 requiring specified national securities exchanges and national securities associations to submit a national market system plan to the SEC to create, implement and maintain a consolidated audit trail, such national securities exchanges and national securities associations, pursuant to SEC Rule 608(a)(3), which authorizes them to act jointly in preparing, filing and implementing national market system plans, developed the National Market System Plan Governing the Process for Selecting a Plan Processor and Developing a Plan for the Consolidated Audit Trail (the “Selection Plan”). The Selection Plan was approved by the SEC on February 27, 2014 and, by its terms, will automatically terminate upon the SEC’s approval of this Agreement.

B. The Participants have now determined that it is advantageous and desirable to conduct in a limited liability company the activities they have heretofore conducted as parties to the Selection Plan, and have formed the Company for this purpose. This Agreement, which takes the place of the Selection Plan, is a National Market System Plan as defined in SEC Rule 600(b)(43). The Participants will jointly own the Company, which will create, implement and maintain the CAT and the Central Repository pursuant to SEC Rule 608 and SEC Rule 613.

ARTICLE I

DEFINITIONS

Section 1.1. Definitions. As used throughout this Agreement (including, for the avoidance of doubt, the Exhibits, Appendixes, Attachments, Recitals and Schedules identified in this Agreement):

“Advisory Committee” has the meaning set forth in Section 4.12(a).

An “Affiliate” of a Person means any Person controlling, controlled by, or under common control with such Person.

“Affiliated Participant” means any Participant controlling, controlled by, or under common control with another Participant.

“Agreement” has the meaning set forth in the preamble to this Agreement.

“Agreement Date” has the meaning set forth in the preamble to this Agreement.

“Bid” means a proposal submitted by a Bidder in response to the RFP.

“Bidder” means any entity, or any combination of separate entities, submitting a Bid.

“Bidding Participant” means a Participant that: (a) submits a Bid; (b) is an Affiliate of an entity that submits a Bid; or (c) is included, or is an Affiliate of an entity that is included, as a Material Subcontractor as part of a Bid.

“Business Clock” means a clock used to record the date and time of any Reportable Event required to be reported under SEC Rule 613.

“Capital Account” has the meaning set forth in Section 7.1(a).

“CAT” means the consolidated audit trail contemplated by SEC Rule 613.

“CAT Data” means Participant Data, Industry Member Data and SIP Data.

“CAT NMS Plan” means the plan set forth in this Agreement, as amended from time to time.

“CAT-Order-ID” has the same meaning provided in SEC Rule 613(j)(1).

“CAT Reporter” means each national securities exchange, national securities association and Industry Member that is required to record and report information to the Central Repository pursuant to SEC Rule 613(c).

“CAT-Reporter-ID” has the same meaning provided in SEC Rule 613(j)(2).

“CAT System” means all data processing equipment, communications facilities and other facilities, including equipment, utilized by the Company or any third parties acting on the Company’s behalf in connection with operation of the CAT and any related information or relevant systems pursuant to this Agreement.

“Central Repository” means the repository responsible for the receipt, consolidation, and retention of all information reported to the CAT pursuant to SEC Rule 613 and this Agreement.

“Certificate” has the meaning set forth in Section 2.2.

“Chief Compliance Officer” means the individual then serving as the Chief Compliance Officer pursuant to Section 6.1(b) and Section 6.2(a).

“Code” means the Internal Revenue Code of 1986.

“Company” has the meaning set forth in the preamble to this Agreement.

“Company Interest” means any limited liability company interest in the Company at any particular time, including the right to any and all benefits to which a Participant may be entitled

under this Agreement and the Delaware Act, together with the obligations of such Participant to comply with this Agreement.

“Commission” or “SEC” means the United States Securities and Exchange Commission.

“Compliance Rule” means the rule contemplated by Section 3.11 as adopted by a Participant.

“Compliance Subcommittee” has the meaning set forth in Section 4.11(b).

“Customer” has the same meaning provided in SEC Rule 613(j)(3).

“Customer Account Information” has the same meaning provided in SEC Rule 613(j)(4), but excluding, for the avoidance of doubt, Customer-ID.

“Customer-ID” has the same meaning provided in SEC Rule 613(j)(5).

“Delaware Act” means the Delaware Limited Liability Company Act.

“Disclosing Party” has the meaning set forth in Section 9.6(a).

“Effective Date” means the date this Agreement becomes effective pursuant to Section 2.1.

“Eligible Security” includes (a) all NMS Securities and (b) all OTC Equity Securities.

“Exchange Act” means the Securities Exchange Act of 1934.

“FINRA” means Financial Industry Regulatory Authority, Inc.

“Fiscal Year” means the fiscal year of the Company determined pursuant to Section 9.2(a).

“GAAP” means United States generally accepted accounting principles.

“Independent Auditor” has the meaning set forth in Section 6.2(a)(v)(B).

“Industry Member” means a member of a national securities exchange or a member of a national securities association.

“Industry Member Data” has the meaning set forth in Section 6.4(d)(ii).

“Information” has the meaning set forth in Section 9.6(a).

“Initial Plan Processor” means the Person chosen by the Participants in accordance with Article V to perform the processing functions contemplated by the Selection Plan, as those provisions are incorporated into this Agreement.

“Last Sale Report” means any last sale report reported pursuant to the Plan for Reporting of Consolidated Options Last Sale Reports and Quotation Information filed with the SEC pursuant to, and meeting the requirements of, SEC Rule 608.

“Majority Vote” means the affirmative vote of at least a majority of all of the members of the Operating Committee or any Subcommittee, as applicable, authorized to cast a vote with respect to a matter presented for a vote (whether or not such a member is present at any meeting at which a vote is taken) by the Operating Committee or any Subcommittee, as applicable (excluding, for the avoidance of doubt, any member of the Operating Committee or any Subcommittee, as applicable, that is recused or subject to a vote to recuse from such matter pursuant to Section 4.3(d)).

“Material Amendment” has the meaning set forth in Section 6.9(c).

“Material Contract” means any (a) contract between the Company and the Plan Processor, (b) contract between the Company and the Chief Compliance Officer, (c) contract, or group of related contracts, resulting in a total cost or liability to the Company of more than \$900,000, (d) contract between the Company, on the one hand, and a Participant or an Affiliate of a Participant, on the other, (e) contract containing other than reasonable arms-length terms, (f) contract imposing, or purporting to impose, non-customary restrictions (including non-competition, non-solicitation or confidentiality (other than customary confidentiality agreements entered into in the ordinary course of business that do not restrict, or purport to restrict, any Participant or any Affiliate of any Participant)) or obligations (including indemnity, most-favored nation requirements, exclusivity, guaranteed minimum purchase commitments) on the Company or any Participant or Affiliate of a Participant, (g) contract containing terms that would reasonably be expected to unduly interfere with or negatively impact the ability of the Company, any Participant or any Affiliate of any Participant to perform its regulatory functions (including disciplinary matters), to carry out its responsibilities under the Exchange Act or to perform its obligations under this Agreement, (h) contract providing for a term longer than twelve (12) months or the termination of which would reasonably be expected to materially and adversely affect the Company, any Participant or any Affiliate of a Participant, (i) contract for indebtedness, the disposition or acquisition of assets or equity, or the lease or license of assets or properties or (j) joint venture or similar contract for cost or profit sharing.

“Material Subcontractor” means any entity that is known to the Participant to be included as part of a Bid as a vendor, subcontractor, service provider, or in any other similar capacity and, excluding products or services offered by the Participant to one or more Bidders on terms subject to a fee filing approved by the SEC, (a) is anticipated to derive 5% or more of its annual revenue in any given year from services provided in such capacity; or (b) accounts for 5% or more of the total estimated annual cost of the Bid for any given year. An entity will not be considered a “Material Subcontractor” solely due to the entity providing services associated with any of the entity’s regulatory functions as a self-regulatory organization registered with the SEC.

“Material Systems Change” means any change or update to the CAT System made by the Plan Processor which will cause a significant change to the functionality of the Central Repository.

“Material Terms of the Order” includes the NMS security symbol; security type; price (if applicable); size (displayed and non-displayed); side (buy/sell); order type; if a sell order, whether the order is long, short, short exempt; open/close indicator; time in force (if applicable); if the order is for a listed option, option type (put/call), option symbol or root symbol, underlying symbol, strike price, expiration date, and open/close; and any special handling instructions.

“National Best Bid” and “National Best Offer” have the same meaning provided in SEC Rule 600(b)(42).

“NMS Plan” has the same meaning as “National Market System Plan” provided in SEC Rule 613(a)(1) and SEC Rule 600(b)(43).

“NMS Security” means any security or class of securities for which transaction reports are collected, processed, and made available pursuant to an effective transaction reporting plan, or an effective national market system plan for reporting transactions in listed options.

“Non-SRO Bid” means a Bid that does not include a Bidding Participant.

“Operating Committee” means the governing body of the Company designated as such and described in Article IV.

“Order” means any (a) order received by an Industry Member or Participant from any Person; (b) order originated by an Industry Member or Participant; or (c) bid (as defined under SEC Rule 600(b)(8)) or offer (as defined under SEC Rule 600(b)(8)), in the case of each of the foregoing clauses (a), (b) and (c), for an Eligible Security.

“OTC Equity Security” means any equity security, other than an NMS Security, subject to prompt last sale reporting rules of a registered national securities association and reported to one of such association’s equity trade reporting facilities.

“Participant” means each Person identified as such on Exhibit A hereto and any Person that becomes a Participant as permitted by this Agreement, in such Person’s capacity as a Participant in the Company (it being understood that the Participants shall comprise the “members” of the Company (as the term “member” is defined in Section 18-101(11) of the Delaware Act)).

“Participant Data” has the meaning set forth in Section 6.3(d).

“Participation Fee” has the meaning set forth in Section 3.3(a).

“Payment Date” has the meaning set forth in Section 3.7(b).

“Permitted Legal Basis” means the Participant has become exempt from, or otherwise has ceased to be subject to, SEC Rule 613 or has arranged to comply with SEC Rule 613 in some manner other than through participation in this Agreement, in each instance subject to the approval of the Commission.

“Permitted Person” has the meaning set forth in Section 4.8.

“Permitted Transferee” has the meaning set forth in Section 3.4(c).

“Person” means any individual, partnership, limited liability company, corporation, joint venture, trust, business trust, cooperative or association and any heirs, executors, administrators, legal representatives, successors and assigns of such Person where the context so permits.

“PII” means personally identifiable information.

“Plan Processor” means the Initial Plan Processor or any other Person selected by the Operating Committee pursuant to SEC Rule 613 and Section 6.1 to perform the CAT processing functions required by SEC Rule 613 and set forth in the RFP.

“Pledge” and any grammatical variation thereof means, with respect to an interest, asset, or right, any pledge, security interest, hypothecation, deed of trust, lien or other similar encumbrance granted with respect to the affected interest, asset or right to secure payment or performance of an obligation.

“Prime Rate” means the prime rate published in The Wall Street Journal (or any successor publication) on the last day of each month (or, if not a publication day, the prime rate last published prior to such last day).

“Proceeding” has the meaning set forth in Section 4.7(b).

“Qualified Bid” means a Bid that is deemed by the Selection Committee to include sufficient information regarding the Bidder’s ability to provide the necessary capabilities to create, implement, and maintain the CAT so that such Bid can be effectively evaluated by the Selection Committee. When evaluating whether a Bid is a Qualified Bid, each member of the Selection Committee shall consider whether the Bid adequately addresses the evaluation factors set forth in the RFP, and apply such weighting and priority to the factors as such member of the Selection Committee deems appropriate in his or her professional judgment. The determination of whether a Bid is a Qualified Bid shall be determined pursuant to the process set forth in Section 5.2.

“Qualified Bidder” means a Bidder that has submitted a Qualified Bid.

“Quotation Information” means all bids (as defined under SEC Rule 600(b)(8)), offers (as defined under SEC Rule 600(b)(8)), displayed quotation sizes, and market center identifiers and, in the case of FINRA, the FINRA member that is registered as a market maker or electronic communications network or otherwise utilizes the facilities of FINRA pursuant to applicable FINRA rules, that entered the quotation, withdrawals and other information pertaining to quotations in Eligible Securities required to be reported to the Plan Processor pursuant to this Agreement and SEC Rule 613.

“Received Industry Member Data” has the meaning set forth in Section 6.4(d)(ii).

“Receiving Party” has the meaning set forth in Section 9.6(a).

“Recorded Industry Member Data” has the meaning set forth in Section 6.4(d)(i).

“Reportable Event” includes the original receipt or origination, modification, cancellation, routing, execution (in whole or in part) and allocation of an Order, and receipt of a routed Order.

“Representatives” has the meaning set forth in Section 9.6(a).

“RFP” means the “Consolidated Audit Trail National Market System Plan Request for Proposal” published by the Participants on February 26, 2013 attached as Appendix A, as amended from time to time.

“Securities Information Processor” has the same meaning provided in Section 3(a)(22)(A) of the Exchange Act.

“Selection Committee” means the committee formed pursuant to Section 5.1.

“Selection Plan” has the meaning set forth in Recital A.

“Shortlisted Bid” means a Bid submitted by a Qualified Bidder and selected as a Shortlisted Bid by the Selection Committee pursuant to Section 5.2(b).

“Shortlisted Bidder” means a Qualified Bidder that has submitted a Bid selected as a Shortlisted Bid.

“SIP Data” has the meaning set forth in Section 6.5(a)(ii).

“Small Industry Member” means an Industry Member that qualifies as a small broker-dealer as defined in SEC Rule 613.

“SRO” means any self-regulatory organization within the meaning of Section 3(a)(26) of the Exchange Act.

“Subcommittee” has the meaning set forth in Section 4.11.

“Supermajority Vote” means the affirmative vote of at least two-thirds of all of the members of the Operating Committee or any Subcommittee, as applicable, authorized to cast a vote with respect to a matter presented for a vote (whether or not such a member is present at any meeting at which a vote is taken) by the Operating Committee or any Subcommittee, as applicable (excluding, for the avoidance of doubt, any member of the Operating Committee or any Subcommittee, as applicable, that is recused or subject to a vote to recuse from such matter pursuant to Section 4.3(d)).

“Transfer” and any grammatical variation thereof means any sale, exchange, issuance, redemption, assignment, distribution or other transfer, disposition or alienation in any way (whether voluntarily, involuntarily or by operation of law). Transfer shall specifically include any (a) assignment or distribution resulting from bankruptcy, liquidation or dissolution or (b) Pledge.

“Technical Specifications” has the meaning set forth in Section 6.9(a).

“Voting Senior Officer” means the senior officer of a Participant chosen to serve on the Selection Committee pursuant to Section 5.1.

Section 1.2. Principles of Interpretation. In this Agreement (including, for the avoidance of doubt, the Exhibits, Appendixes, Attachments, Recitals and Schedules identified in this Agreement), unless the context otherwise requires:

- (a) words denoting the singular include the plural and vice versa;
- (b) words denoting a gender include all genders;
- (c) all exhibits, schedules and other attachments to the document in which the reference thereto is contained shall, unless the context otherwise requires, constitute an integral part of such document for all purposes;
- (d) a reference to a particular clause, section, article, exhibit, schedule or other attachment shall be a reference to a clause, section or article of, or an exhibit, schedule or other attachment to, this Agreement;
- (e) a reference to any statute, regulation, amendment, ordinance or law includes all statutes, regulations, proclamations, amendments or laws varying, consolidating or replacing the same from time to time, and a reference to a statute includes all regulations, policies, protocols, codes, proclamations, interpretations and ordinances issued or otherwise applicable under that statute unless, in any such case, otherwise expressly provided in any such statute or in the document in which the reference is contained;
- (f) a reference to a “SEC Rule” refers to the correspondingly numbered Rule promulgated under Regulation NMS under the Exchange Act;
- (g) a definition of or reference to any document, instrument or agreement includes an amendment or supplement to, or restatement, replacement, modification or novation of, any such document, instrument or agreement unless otherwise specified in such definition or in the context in which such reference is used;
- (h) a reference to any Person includes such Person’s permitted successors and assigns in that designated capacity;
- (i) a reference to “\$”, “Dollars” or “US \$” refers to currency of the United States of America;
- (j) unless otherwise expressly provided in this Agreement, wherever the consent of any Person is required or permitted herein, such consent may be withheld in such Person’s sole and absolute discretion;
- (k) words such as “hereunder,” “hereto”, “hereof” and “herein” and other words of similar import shall, unless the context requires otherwise, refer to the whole of the applicable document and not to any particular article, section, subsection or clause thereof; and
- (l) a reference to “including” (and grammatical variations thereof) means “including without limitation” (and grammatical variations thereof).

ARTICLE II

EFFECTIVENESS OF AGREEMENT; ORGANIZATION

Section 2.1. Effectiveness. This Agreement shall become effective upon approval by the SEC and execution by all Participants identified on Exhibit A and shall continue until terminated. Notwithstanding any provision in this Agreement to the contrary and without the consent of any Person being required, the Company's execution, delivery and performance are hereby authorized, approved and ratified in all respects.

Section 2.2. Formation. The Company was formed as a limited liability company under the Delaware Act by filing a certificate of formation (the "Certificate") with the Delaware Secretary of State.

Section 2.3. Name. The name of the Company is "CAT NMS, LLC." The name of the Company may be changed at any time or from time to time with the approval of the Operating Committee. All Company business shall be conducted in that name or such other names that comply with applicable law as the Operating Committee may select from time to time.

Section 2.4. Registered Office; Registered Agent; Principal Office; Other Offices. The registered office of the Company required by the Delaware Act to be maintained in the State of Delaware shall be the office of the initial registered agent named in the Certificate or such other office (which need not be a place of business of the Company) as the Operating Committee may designate from time to time in the manner provided by law. The registered agent of the Company in the State of Delaware shall be the initial registered agent named in the Certificate or such other Person or Persons as the Operating Committee may designate from time to time in the manner provided by law. The principal office of the Company shall be at such place as the Operating Committee may designate from time to time, which need not be in the State of Delaware. The Company may have such other offices as the Operating Committee may designate from time to time.

Section 2.5. Certain Filings. The Company shall cause to be filed such certificates and documents as may be necessary or appropriate to comply with the Delaware Act and any other applicable requirements for the organization, continuation and operation of a limited liability company in accordance with the laws of the State of Delaware and any other jurisdiction in which the Company shall conduct business, and shall continue to do so for so long as the Company conducts business therein. Each member of the Operating Committee is hereby designated as an "authorized person" within the meaning of the Delaware Act.

Section 2.6. Purposes and Powers. The Company may engage in (a) the creation, implementation, and maintenance of the CAT and the Central Repository pursuant to SEC Rule 608 and SEC Rule 613, and (b) any other business or activity that now or hereafter may be necessary, incidental, proper, advisable or convenient to accomplish the foregoing purpose and that is not prohibited by the Delaware Act, the Exchange Act or other applicable law. The Company shall have and exercise all of the powers and rights conferred upon limited liability companies formed pursuant to the Delaware Act.

Section 2.7. Term. The term of the Company commenced on the date the Certificate was filed with the office of the Secretary of State of Delaware, and shall be perpetual unless dissolved as provided in this Agreement.

ARTICLE III

PARTICIPATION

Section 3.1. Participants. The name and address of each Participant are set forth on Exhibit A. New Participants may only be admitted to the Company in accordance with Section 3.5. No Participant shall have the right or power to resign or withdraw from the Company, except (a) upon a Transfer of record ownership of all of such Participant's Company Interest in compliance with, and subject to, the provisions of Section 3.4 or (b) as permitted by Section 3.6. No Participant may be expelled or required to resign or withdraw from the Company except upon a Transfer of record ownership of all of such Participant's Company Interest in compliance with, and subject to, the provisions of Section 3.4, or as provided by Section 3.7(a)(ii) or Section 3.7(a)(iii).

Section 3.2. Company Interests Generally.

(a) All Company Interests shall have the same rights, powers, preferences and privileges, and shall be subject to the same restrictions, qualifications and limitations. Additional Company Interests may be issued only as permitted by Section 3.3.

(b) Without limiting Section 3.2(a), each Participant shall be entitled to (i) one vote on any matter presented to the Participants for their consideration at any meeting of the Participants (or by written action of the Participants in lieu of a meeting) and (ii) participate equally in any distribution made by the Company (other than a distribution made pursuant to Section 10.2, which shall be distributed as provided therein).

(c) Company Interests shall not be evidenced by certificates.

(d) Each Participant shall have an equal Company Interest as each other Participant.

Section 3.3. New Participants.

(a) Any Person approved by the SEC as a national securities exchange or national securities association under the Exchange Act after the Agreement Date may become a Participant by submitting to the Company a completed application in the form provided by the Company. As a condition to admission as a Participant, said Person shall (i) execute a counterpart of this Agreement, at which time Exhibit A shall be amended to reflect the status of said Person as a Participant (including said Person's address for purposes of notices delivered pursuant to this Agreement), and (ii) pay a fee to the Company in an amount determined by a Majority Vote of the Operating Committee as fairly and reasonably compensating the Company and the Participants for costs incurred in creating, implementing and maintaining the CAT System (including such costs incurred in evaluating and selecting a Plan Processor) and for costs the Company incurs in

providing for the prospective Participant's participation in the Company, including after consideration of the factors identified in Section 3.3(b) (the "Participation Fee"). The amendment to this Agreement reflecting the admission of a new Participant shall be effective only when (x) it is approved by the SEC in accordance with SEC Rule 608 or otherwise becomes effective pursuant to SEC Rule 608 and (y) the prospective Participant pays the Participation Fee. Neither a prospective Participant nor any Affiliate of such prospective Participant that is already a Participant shall vote on the determination of the amount of the Participation Fee to be paid by such prospective Participant. Participation Fees paid to the Company shall be added to the general revenues of the Company and shall be allocated as provided in Article VIII.

(b) In determining the amount of the Participation Fee to be paid by any prospective Participant, the Operating Committee shall consider the following factors:

(i) the portion of costs previously paid by the Company for the development, expansion and maintenance of the Company's facilities which, under GAAP, would have been treated as capital expenditures and would have been amortized over the five (5) years preceding the admission of the prospective Participant;

(ii) an assessment of costs incurred and to be incurred by the Company for modifying the CAT System or any part thereof to accommodate the prospective Participant, which are not otherwise required to be paid or reimbursed by the prospective Participant;

(iii) Participation Fees paid by other Participants admitted as such after the Agreement Date;

(iv) elapsed time from the Effective Date to the anticipated date of admittance of the prospective Participant; and

(v) such other factors, if any, as may be determined to be appropriate by the Operating Committee and approved by the SEC.

In the event the Company (following the vote of the Operating Committee contemplated by Section 3.3(a)) and a prospective Participant do not agree on the amount of the Participation Fee, such amount will be subject to review by the SEC pursuant to § 11A(b)(5) of the Exchange Act.

(c) An applicant for participation in the Company may apply for limited access to the CAT System for planning and testing purposes pending its admission as a Participant by submitting to the Company a completed Application for Limited Access to the CAT System in a form provided by the Company, accompanied by payment of a deposit in the amount established by the Company, which shall be applied or refunded as described in such application.

Section 3.4. Transfer of Company Interest.

(a) No Participant may Transfer any Company Interest except in compliance with this Section 3.4. Any Transfer or attempted Transfer in contravention of the foregoing sentence or any other provision of this Agreement shall be null and void *ab initio* and ineffective to Transfer any Company Interest and shall not bind or be recognized by or on the books of the

Company, and any transferee in such transaction shall not, to the maximum extent permitted by applicable law, be or be treated as or deemed to be a Participant (or an assignee within the meaning of § 18-702 of the Delaware Act) for any purpose.

(b) No Participant may Transfer any Company Interest except to a national securities exchange or national securities association that succeeds to the business of such Participant as a result of a merger or consolidation with such Participant or the transfer of all or substantially all of the assets or equity of such Participant.

(c) Notwithstanding anything to the contrary contained in this Agreement, no Participant may Transfer any Company Interest to any transferee as permitted by Section 3.4(b) (a “Permitted Transferee”) unless (i) such Permitted Transferee executes a counterpart of this Agreement, at which time Exhibit A shall be amended to reflect the status of said Permitted Transferee as a Participant (including said Permitted Transferee’s address for purposes of notices delivered pursuant to this Agreement), and (ii) the amendment to this Agreement reflecting the Transfer of a Company Interest to a Permitted Transferee is approved by the SEC in accordance with SEC Rule 608 or otherwise becomes effective pursuant to SEC Rule 608. Subject to compliance with this Section 3.4, such amendment and such Transfer shall be effective only when it is approved by the SEC in accordance with SEC Rule 608 or otherwise becomes effective pursuant to SEC Rule 608, as applicable.

(d) The Company shall not be required to recognize any Transfer of any Company Interest until the instrument conveying such Company Interest, in form and substance satisfactory to the Company, has been delivered to the Company at its principal office for recordation on the books of the Company and the transferring Participant or Permitted Transferee has paid all costs and expenses of the Company in connection with such Transfer. The Company shall be entitled to treat the record owner of any Company Interest as the absolute owner thereof in all respects, and neither the Company nor any Participant shall incur liability for distributions of cash or other property made in good faith to such owner until such time as the instrument conveying such Company Interest, in form and substance satisfactory to the Company, has been received and accepted by the Company and recorded on the books of the Company.

(e) Notwithstanding anything to the contrary contained in this Agreement, without prior approval thereof by the Operating Committee, no Transfer of any Company Interest shall be made if the Company is advised by its counsel that such assignment (i) may not be effected without registration under the Securities Act, (ii) would result in the violation of any applicable state securities laws, (iii) would require the Company to register as an investment company under the Investment Company Act of 1940 or modify the exemption from such registration upon which the Company has chosen to rely, (iv) would require the Company to register as an investment adviser under state or federal securities laws or (v) if the Company is taxed as a partnership for U.S. federal income tax purposes, (A) would result in a termination of the Company under § 708 of the Code or (B) would result in the treatment of the Company as an association taxable as a corporation or as a “publicly-traded limited partnership” for tax purposes.

Section 3.5. Admission of New Participants. Any Person acquiring a Company Interest pursuant to Section 3.3, or any Permitted Transferee acquiring a Participant’s Company Interest pursuant to Section 3.4, shall, unless such acquiring Permitted Transferee is a Participant

as of immediately prior to such acquisition, be deemed to have been admitted to the Company as a Participant, automatically and with no further action being necessary by the Operating Committee, the Participants or any other Person, by virtue of, and upon the consummation of, such acquisition of a Company Interest and compliance with Section 3.3 or Section 3.4, as applicable.

Section 3.6. Voluntary Resignation from Participation. Any Participant may voluntarily resign from the Company, and thereby withdraw from and terminate its right to any Company Interest, only if (a) a Permitted Legal Basis for such action exists and (b) such Participant provides to the Company and each other Participant no less than thirty (30) days prior to the effective date of such action written notice specifying such Permitted Legal Basis, including appropriate documentation evidencing the existence of such Permitted Legal Basis, and, to the extent applicable, evidence reasonably satisfactory to the Company and other Participants that any orders or approvals required from the SEC in connection with such action have been obtained. A validly withdrawing Participant shall have the rights and obligations provided in Section 3.7.

Section 3.7. Termination of Participation.

(a) The participation in the Company of a Participant, and its right to any Company Interest, shall terminate as of the earliest of (i) the effective date specified in a valid notice delivered pursuant to Section 3.6 (which date, for the avoidance of doubt, shall be no earlier than the date that is thirty (30) days after the delivery of such notice), (ii) such time as such Participant is no longer registered as a national securities exchange or national securities association or (iii) the date of termination pursuant to Section 3.7(b).

(b) Each Participant shall pay all fees or other amounts required to be paid under this Agreement within thirty (30) days after receipt of an invoice or other notice indicating payment is due (unless a longer payment period is otherwise indicated) (the “Payment Date”). If a Participant fails to make such a required payment by the Payment Date, any balance in the Participant’s Capital Account will be applied to the outstanding balance. If a balance still remains with respect to any such required payment, the Participant will pay interest on the outstanding balance from the Payment Date until such fee or amount is paid at a per annum rate equal to the lesser of (i) the Prime Rate plus 300 basis points or (ii) the maximum rate permitted by applicable law. If any such remaining outstanding balance is not paid within thirty (30) days after the Payment Date, the Participants agree that the Participants shall file an amendment to this Agreement requesting the termination of the participation in the Company of such Participant, and its right to any Company Interest, with the SEC. Such amendment shall be effective only when it is approved by the SEC in accordance with SEC Rule 608 or otherwise becomes effective pursuant to SEC Rule 608.

(c) In the event a Participant becomes subject to one or more of the events of bankruptcy enumerated in § 18-304 of the Delaware Act, that event by itself shall not cause the termination of the participation in the Company of the Participant so long as the Participant continues to be registered as a national securities exchange or national securities association. From and after the effective date of termination of a Participant’s participation in the Company, profits and losses of the Company shall cease to be allocated to the Capital Account of the Participant in accordance with Article VIII below. A terminated Participant shall be entitled to receive the balance in its Capital Account as of the effective date of termination adjusted for profits

and losses through that date, payable within ninety (90) days of the effective date of termination, and shall remain liable for its proportionate share of costs and expenses allocated to it pursuant to Article VIII for the period during which it was a Participant, for obligations under Section 3.8(c), for its indemnification obligations pursuant to Section 4.7, and for obligations under Section 9.6, but it shall have no other obligations under this Agreement following the effective date of termination. This Agreement shall be amended to reflect any termination of participation in the Company of a Participant pursuant to this Section 3.7; provided that such amendment shall be effective only when it is approved by the SEC in accordance with SEC Rule 608 or otherwise becomes effective pursuant to SEC Rule 608.

Section 3.8. Obligations and Liability of Participants.

(a) Except as may be determined by the unanimous vote of all the Participants or as may be required by applicable law, no Participant shall be obligated to contribute capital or make loans to the Company, and the opening balance in the Capital Account of each Participant that is established in accordance with Section 7.1(a) shall be zero. No Participant shall have the right to withdraw or to be repaid any capital contributed by it or to receive any other payment in respect of any Company Interest, including as a result of the withdrawal or resignation of such Participant from the Company, except as specifically provided in this Agreement.

(b) Except as provided in this Agreement and except as otherwise required by applicable law, no Participant shall have any personal liability whatsoever in its capacity as a Participant, whether to the Company, to any Participant or any Affiliate of any Participant, to the creditors of the Company or to any other Person, for the debts, liabilities, commitments or any other obligations of the Company or for any losses of the Company. Without limiting the foregoing, the failure of the Company to observe any formalities or requirements relating to exercise of its powers or management of its business or affairs under this Agreement or the Delaware Act shall not be grounds for imposing personal liability on any Participant or Affiliate of a Participant for any liability of the Company.

(c) In accordance with the Delaware Act, a member of a limited liability company may, under certain circumstances, be required to return amounts previously distributed to such member. It is the intent of the Participants that no distribution to any Participant pursuant to Article VIII shall be deemed a return of money or other property paid or distributed in violation of the Delaware Act. The payment of any such money or distribution of any such property to a Participant shall be deemed to be a compromise within the meaning of the Delaware Act, and the Participant receiving any such money or property shall not be required to return any such money or property to any Person. However, if any court of competent jurisdiction holds that, notwithstanding the provisions of this Agreement, any Participant is obligated to make any such payment, such obligation shall be the obligation of such Participant and not of the Operating Committee, the Company or any other Participant.

(d) A negative balance in a Participant's Capital Account, in and of itself, shall not require such Participant to make any payment to the Company or any other Participant.

Section 3.9. Loans. If the Company requires additional funds to carry out its purposes, to conduct its business, to meet its obligations, or to make any expenditure authorized by this

Agreement, the Company may borrow funds from such one or more of the Participants, or from such third party lender(s), and on such terms and conditions, as may be approved by a Supermajority Vote of the Operating Committee.

Section 3.10. No Partnership. The Company is not intended to be a general partnership, limited partnership or joint venture for any purpose, and no Participant shall be considered to be a partner or joint venturer of any other Participant, for any purpose, and this Agreement shall not be construed to suggest otherwise.

Section 3.11. Compliance Undertaking. Each Participant shall comply with and enforce compliance, as required by SEC Rule 608(c), by its Industry Members with the provisions of SEC Rule 613 and of this Agreement, as applicable, to the Participant and its Industry Members. Each Participant shall file, on or prior to the day that is 60 days after the date of approval of this Agreement by the SEC, a rule with the SEC, substantially in the form set forth as Appendix B, requiring compliance by its Industry Members with the provisions of SEC Rule 613 and of this Agreement.

ARTICLE IV

MANAGEMENT OF THE COMPANY

Section 4.1. Operating Committee. Except for situations in which the approval of the Participants is required by this Agreement or by non-waivable provisions of applicable law, the Company and the CAT System shall be managed by the Operating Committee, which shall have general charge and supervision of the business of the Company and shall be constituted as provided in Section 4.2. The Operating Committee (a) acting collectively in accordance with this Agreement, shall be the sole “manager” of the Company within the meaning of § 18-101(10) of the Delaware Act (and no individual member of the Operating Committee shall (i) be a “manager” of the Company within the meaning of Section 18-101(10) of the Delaware Act or (ii) have any right, power or authority to act for or on behalf of the Company, to do any act that would be binding on the Company, or to incur any expenditures on behalf of the Company), (b) shall have the right, power and authority to exercise all of the powers of the Company except as otherwise provided by applicable law or this Agreement and (c) except as otherwise expressly provided herein, shall make all decisions and authorize or otherwise approve all actions taken or to be taken by the Company. Decisions or actions relating to the Company that are made or approved by the Operating Committee, or by any Subcommittee within the scope of authority granted to such Subcommittee in accordance with this Agreement (or, with respect to matters requiring a vote, approval, consent or other action of the Participants hereunder or pursuant to non-waivable provisions of applicable law, by the Participants) in accordance with this Agreement shall constitute decisions or actions by the Company and shall be binding on the Company and each Participant. Except to the extent otherwise expressly provided to the contrary in this Agreement, no Participant shall have authority to act for, or to assume any obligation or responsibility on behalf of, the Company, without the prior approval of the Operating Committee, and each Participant shall indemnify and hold harmless the Company and each other Participant for any breach of the provisions of this sentence by such breaching Participant. Without limiting the generality of the foregoing, except as otherwise expressly provided in this Agreement, the Operating Committee shall make all policy decisions on behalf of the Company in furtherance of

the functions and objectives of the Company under the Exchange Act, any rules thereunder, including SEC Rule 613, and under this Agreement. Notwithstanding anything to the contrary, the Operating Committee may delegate all or part of its administrative functions under this Agreement, but not its policy making (except to the extent determinations are delegated as specifically set forth in this Agreement) authority, to one or more Subcommittees, and any other Person. A Person to which administrative functions are so delegated shall perform the same as agent for the Company, in the name of the Company. Each Person who performs administrative functions on behalf of the Company (including the Plan Processor) shall be required to (i) agree to be bound by the confidentiality obligations in Section 9.6(a) as a “Receiving Party” and (ii) agree that any nonpublic business information pertaining to any Participant or Affiliate of such Participant that becomes known to such Person shall be held in confidence and not shared with the other Participants or any other Person, except for information that may be shared in connection with joint activities permitted under this Agreement.

Section 4.2. Composition and Selection of Operating Committee; Chair.

(a) The Operating Committee shall consist of one voting member representing each Participant and one alternate voting member representing each Participant who shall have a right to vote only in the absence of that Participant’s voting member of the Operating Committee. Each of the voting and alternate voting members of the Operating Committee shall be appointed by the Participant that he or she represents, and shall serve at the will of the Participant appointing such member and shall be subject to the confidentiality obligations of the Participant that he or she represents as set forth in Section 9.6. One individual may serve as the voting member of the Operating Committee for multiple Affiliated Participants.

(b) No later than the date the CAT System commences operations, the Operating Committee shall elect, by Majority Vote, one member thereof to act as the initial chair of the Operating Committee (the “Chair”). Such initial Chair, and each successor thereto, shall serve in such capacity for a two (2)-year term or until the earliest of his death, resignation or removal in accordance with the provisions of this Agreement. The Operating Committee shall elect, from the members thereof, a successor to the then serving Chair (which successor, subject to the last sentence of this Section 4.2(b), may be the person then serving in such capacity) no later than three (3) months prior to the expiration of the then current term of the person then serving as Chair. The Operating Committee, by Supermajority Vote, may remove the Chair from such position. In the case of any death, removal, resignation, or other vacancy of the Chair, a successor Chair shall be promptly elected by the Operating Committee, by Majority Vote, from among the members thereof. The Chair shall preside at all meetings of the Operating Committee, shall designate a person to act as Secretary to record the minutes of each such meeting, and shall perform such other duties and possess such other powers as the Operating Committee may from time to time prescribe. The Chair shall not be entitled to a tie-breaking vote at any meeting of the Operating Committee. Notwithstanding anything in this Agreement to the contrary, (i) no person shall serve as Chair for more than two successive full terms and (ii) no person then appointed to the Operating Committee by a Participant that then serves, or whose Affiliate then serves, as the Plan Processor shall be eligible to serve as the Chair.

Section 4.3. Action of Operating Committee.

(a) Except as otherwise provided herein, each of the members of the Operating Committee, including the Chair, shall be authorized to cast one (1) vote for each Participant that he or she represents on all matters voted upon by the Operating Committee, and action of the Operating Committee shall be authorized by Majority Vote, subject to the approval of the SEC whenever such approval is required under applicable provisions of the Exchange Act and the rules of the SEC adopted thereunder. Action of the Operating Committee authorized in accordance with this Agreement shall be without prejudice to the rights of any Participant to present contrary views to any regulatory body or in any other appropriate forum. Without limiting the generality of the foregoing, the Company shall not take any of the following actions unless the Operating Committee, by Majority Vote, authorizes such action:

- (i) select the Chair pursuant to Section 4.2(b);
- (ii) select the members of the Advisory Committee pursuant to Section 4.12;
- (iii) interpret this Agreement (unless otherwise noted herein);
- (iv) approve any recommendation by the Chief Compliance Officer pursuant to Section 6.2(a)(v)(A);
- (v) determine to hold an Executive Session of the Operating Committee pursuant to Section 4.4(a); or
- (vi) any other matter specified elsewhere in this Agreement as requiring a vote, approval or other action of the Operating Committee (other than those matters requiring a Supermajority Vote or a different vote of the Operating Committee).

(b) Notwithstanding Section 4.3(a) or anything else to the contrary in this Agreement, the Company shall not take any of the following actions unless such action shall have been authorized by the Supermajority Vote of the Operating Committee, subject to the approval of the SEC whenever such approval is required under applicable provisions of the Exchange Act and the rules of the SEC adopted thereunder:

- (i) select a Plan Processor, other than the Initial Plan Processor selected in accordance with Article V;
- (ii) terminate a Plan Processor without cause in accordance with Section 6.1(m);
- (iii) approve the Plan Processor's appointment or removal of the Information Security Officer, the Chief Compliance Officer or any Independent Auditor in accordance with Section 6.1(b);
- (iv) enter into, modify or terminate any Material Contract (if the Material Contract is with a Participant or an Affiliate of a Participant, such Participant and Affiliated Participant shall be recused from any vote under this Section 4.3(b)(iv));

- (v) make any Material Systems Change;
- (vi) approve the initial Technical Specifications pursuant to Section 6.9 or any Material Amendment to the Technical Specifications proposed by the Plan Processor in accordance with Section 6.9;
- (vii) amend the Technical Specifications on its own motion; or
- (viii) any other matter specified elsewhere in this Agreement as requiring a vote, approval or other action of the Operating Committee by a Supermajority Vote.

(c) Any action required or permitted to be taken at any meeting of the Operating Committee or any Subcommittee may be taken without a meeting, if all of the members of the Operating Committee or Subcommittee, as the case may be, then serving consent to the action in writing or by electronic transmission. Such written consents and hard copies of the electronic transmissions shall be filed with the minutes of proceedings of the Operating Committee or Subcommittee, as applicable.

(d) A member of the Operating Committee or any Subcommittee may recuse himself or herself from voting on any matter under consideration by the Operating Committee or such Subcommittee if such member determines that voting on such matter raises a conflict of interest. The Operating Committee or any Subcommittee may have a member thereof recused from voting on a matter under consideration by the Operating Committee or such Subcommittee if the members thereof (excluding the member thereof proposed to be recused) determine that voting on such matter raises a conflict of interest. No member of the Operating Committee or any Subcommittee shall be automatically recused from voting on any matter, except as provided in Section 4.3(b)(iv) or as otherwise specified elsewhere in this Agreement, and except as provided below:

(i) if a Participant is bidding to be the Plan Processor or is an Affiliate of a Person bidding to be the Plan Processor, members appointed to the Operating Committee or any Subcommittee by such Participant or any of its Affiliated Participants shall be recused from any vote (A) described in Section 5.1(b)(ii) or Section 5.1(b)(iii) or (B) concerning any contract to which such Participant or any of its Affiliates is a party in its capacity as Plan Processor; or

(ii) if a Participant is then serving as Plan Processor or is an Affiliate of the Person then serving as Plan Processor, members appointed to the Operating Committee or any Subcommittee by such Participant or any of its Affiliated Participants shall be recused from any vote concerning (A) the proposed removal of such Participant or any of its Affiliates as Plan Processor or (B) any contract to which such Participant or any of its Affiliates is a party in its capacity as Plan Processor.

Section 4.4. Meetings of the Operating Committee.

(a) Meetings of the Operating Committee may be attended by each Participant's voting representative and its alternate voting representative and by a maximum of two (2) nonvoting representatives of each Participant, by members of the Advisory Committee, by

the Chief Compliance Officer, by other representatives of the Company and the Plan Processor, by representatives of the SEC, and by such other persons that the Operating Committee may invite to attend; provided that the Operating Committee may, where appropriate, determine to meet in an Executive Session, during which only voting members of the Operating Committee shall be present; provided, that the Operating Committee may invite other representatives of the Participants or of the Company, or SEC staff to be present during an Executive Session. Any determination of the Operating Committee to meet in an Executive Session will be made upon a Majority Vote and shall be reflected in the minutes of the meeting. Regular meetings of the Operating Committee shall be held not less than once each calendar quarter at such times as shall from time to time be determined by the Operating Committee, on not less than ten (10) days' notice. Special meetings of the Operating Committee may be called upon the request of two or more Participants on not less than two (2) days' notice; provided that each Participant, collectively with all of such Participant's Affiliated Participants, shall be deemed a single Participant for purposes of this sentence. Emergency meetings of the Operating Committee may be called upon the request of two (2) or more Participants and may occur as soon as practical after calling for such meeting; provided that each Participant, collectively with all of such Participant's Affiliated Participants, shall be deemed a single Participant for purposes of this sentence. In the case of an emergency meeting of the Operating Committee, in addition to those persons otherwise entitled to attend such meeting, (i) each Participant shall have the right to designate a reasonable number of its employees or representatives with substantial knowledge or expertise relevant to the subject matter of such meeting to attend such meeting and (ii) each Participant shall use commercially reasonable efforts to designate an employee or representative of such Participant with substantial knowledge or expertise relevant to the subject matter of such meeting to attend such meeting; provided, for the avoidance of doubt, that no person attending any such meeting solely by virtue of this sentence shall have the right to vote on any matter submitted for a vote at any such meeting. The Chair, or in his or her absence, a member of the Operating Committee designated by the Chair or by members of the Operating Committee in attendance, shall preside at each meeting of the Operating Committee, and a person in attendance designated by the Chair (or the member of the Operating Committee presiding in the Chair's absence) shall act as Secretary to record the minutes thereof. The location of the regular and special meetings of the Operating Committee shall be fixed by the Operating Committee, provided that in general the location of meetings shall be rotated among the locations of the principal offices of the Participants. Members of the Operating Committee may be present at a meeting by conference telephone or other electronic means that enables each of them to hear and be heard by all others present at the meeting. Whenever notice of any meeting of the Operating Committee is required to be given by law or this Agreement, a written waiver, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before, at or after the time stated in such notice, shall be deemed equivalent to notice. Attendance at a meeting of the Operating Committee by a member thereof shall constitute a waiver of notice of such meeting, except when such member of the Operating Committee attends any such meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

(b) Any Person that is not a Participant, but has a published Form 1 Application or Form X-15AA-1 Application on file with the SEC to become a national securities exchange or a national securities association, respectively, will be permitted to appoint one primary

representative and one alternate representative to attend regularly scheduled Operating Committee meetings in the capacity of a non-voting observer but will not be permitted to have any representative attend a special meeting, emergency meeting or meeting held in Executive Session of the Operating Committee. If such Person's Form 1 Application or Form X-15AA-1 Application is withdrawn or returned for any reason, then such Person will no longer be eligible to be represented in regularly scheduled Operating Committee meetings. The Operating Committee shall have the discretion, in limited instances, to deviate from this policy if it determines, by Majority Vote, that circumstances so warrant.

(c) Nothing in this Section 4.4 or elsewhere in this Agreement shall authorize any Person other than the Participants, their representatives, members of the SEC staff, and members of the Advisory Committee to participate in a meeting of the Operating Committee in any manner other than as a non-voting advisor or observer.

Section 4.5. Interpretation of Other Regulations. Interpretive questions arising during the operation or maintenance of the Central Repository with respect to applicable laws, rules or regulations will be presented to the Operating Committee, which will determine whether to seek interpretive guidance from the SEC or other appropriate regulatory body and, if so, in what form.

Section 4.6. Interpretation of Certain Rights and Duties of Participants, Members of the Operating Committee and Officers. To the fullest extent permitted by the Delaware Act and other applicable law:

(a) the respective obligations of the Participants, and the members of the Operating Committee, to each other and to the Company are limited to the express obligations set forth in this Agreement;

(b) the Participants hereby expressly acknowledge and agree that each member of the Operating Committee, individually, is serving hereunder solely as, and shall act in all respects hereunder solely as, an agent of the Participant appointing such member of the Operating Committee;

(c) no Participant or member of the Operating Committee, in such Person's capacity as such, shall have any fiduciary or similar duties or obligations to the Company or any other Participant or member of the Operating Committee, whether express or implied by the Delaware Act or any other law, in each case subject only to the implied contractual covenant of good faith and fair dealing, and each Participant and the Company, to the fullest extent permitted by applicable law, waives any claim or cause of action against any Participant or member of the Operating Committee that might otherwise arise in respect of any such fiduciary duty or similar duty or obligation; provided, however, that the provisions of this Section 4.6(c) shall have no effect on the terms of any relationship, agreement or arrangement between any member of the Operating Committee and the Participant appointing such member of the Operating Committee or between any Participant (other than solely in its capacity as a Participant) and the Company such as a contract between such Participant and the Company pursuant to which such Participant serves as the Plan Processor;

(d) subject to Section 4.6(c), each Participant and each member of the Operating Committee may, with respect to any vote, consent or approval that such Person is entitled to grant or withhold pursuant to this Agreement, grant or withhold such vote, consent or approval in its sole and absolute discretion, with or without cause; and

(e) for the avoidance of doubt, no Participant shall be entitled to appraisal or dissenter rights for any reason with respect to any Company Interest.

Section 4.7. Exculpation and Indemnification.

(a) Except for the indemnification obligations of Participants under Section 4.1, no Participant or member of the Operating Committee shall be liable to the Company or to any Participant for any loss suffered by the Company or by any other Participant unless such loss is caused by (i) the fraud, gross negligence, willful misconduct or willful violation of law on the part of such Participant or member of the Operating Committee, or (ii) in the case of a Participant, a material breach of this Agreement by such Participant. The provisions of this Section 4.7(a) shall have no effect on the terms of any relationship, agreement or arrangement between any member of the Operating Committee and the Participant appointing such member to the Operating Committee or between any Participant (other than solely in its capacity as a Participant) and the Company such as a contract between such Participant and the Company pursuant to which such Participant serves as the Plan Processor.

(b) Subject to the limitations and conditions as provided in this Section 4.7(b), the Company shall indemnify any Participant and any member of the Operating Committee (and may indemnify any employee or agent of the Company) who was or is made a party or is threatened to be made a party to or is involved in any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative, arbitral (hereinafter a “Proceeding”), or any appeal in such a Proceeding or any inquiry or investigation that could lead to such a Proceeding, by reason of the fact that such Person is or was a Participant, a member of the Operating Committee or any Subcommittee, or an employee or agent of the Company against judgments, penalties (including excise and similar taxes and punitive damages), fines, settlements and reasonable expenses (including, but not limited to, attorneys’ fees) actually incurred by such Person in connection with such Proceeding, if and only if the Person seeking indemnification is entitled to exculpation pursuant to Section 4.7(a). Indemnification under this Section 4.7(b) shall continue as to a Person who has ceased to serve in the capacity which initially entitled such Person to indemnification hereunder. As a condition precedent to an indemnified Person’s right to be indemnified pursuant to this Section 4.7(b), such indemnified Person must notify the Company in writing as soon as practicable of any Proceeding for which such indemnified Person will or could seek indemnification. With respect to any Proceeding of which the Company is so notified, the Company will be entitled to participate therein at its own expense and/or to assume the defense thereof at its own expense, with legal counsel reasonably acceptable to the indemnified Person. If the Company does not assume the defense of any such Proceeding of which the Company receives notice under this Section 4.7(b), reasonable expenses incurred by an indemnified Person in connection with any such Proceeding shall be paid or reimbursed by the Company in advance of the final disposition of such Proceeding upon receipt by the Company of (i) written affirmation by the indemnified Person of such Person’s good faith belief that such Person has met the standard of conduct necessary for such Person to be entitled to indemnification by the Company, and (ii) a

written undertaking by such Person to repay such expenses if it shall ultimately be determined by a court of competent jurisdiction that such Person has not met such standard of conduct or is otherwise not entitled to indemnification by the Company. The Company shall not indemnify an indemnified Person to the extent such Person is reimbursed from the proceeds of insurance, and in the event the Company makes any indemnification payments to an indemnified Person and such Person is subsequently reimbursed from the proceeds of insurance, such Person shall promptly refund such indemnification payments to the Company to the extent of such insurance reimbursement. The rights granted pursuant to this Section 4.7(b) shall be deemed contract rights, and no amendment, modification or repeal of this Section 4.7(b) shall have the effect of limiting or denying any such rights with respect to actions taken or Proceedings arising prior to any amendment, modification or repeal. It is expressly acknowledged that the indemnification provided in this Section 4.7(b) could involve indemnification for negligence or under theories of strict liability. For Persons other than Participants or members of the Operating Committee, indemnification shall only be made upon the approval of the Operating Committee. Notwithstanding anything to the contrary in this Section 4.7 or elsewhere in this Agreement, no Person shall be indemnified hereunder for any losses, liabilities or expenses arising from or out of a violation of federal or state securities laws or any other intentional or criminal wrongdoing. Any indemnification under this Section 4.7 shall be paid from, and only to the extent of, Company assets, and no Participant shall have any personal liability on account thereof in the absence of a separate written agreement to the contrary.

Section 4.8. Freedom of Action. Each Participant and such Participant's Affiliates, and their respective employees, officers, directors, managers, equity holders trustees, partners, agents and representatives (collectively, the "Permitted Persons") may have other business interests and may engage in any business or trade, profession, employment or activity whatsoever (regardless of whether any such activity competes, directly or indirectly, with the Company's business or activities), for its own account, or in partnership with, or as an employee, officer, director, manager, equity holders, trustee, partner, agent or representative of, any other Person, and no Permitted Person shall be required to devote its entire time (business or otherwise), or any particular portion of its time (business or otherwise) to the business of the Company. Neither the Company nor any Participant nor any Affiliate thereof, by virtue of this Agreement, shall have any rights in and to any such independent venture or the income or profits derived therefrom, regardless of whether or not such venture was initially presented to a Permitted Person as a direct or indirect result of such Permitted Person's relationship with the Company. No Permitted Person shall have any obligation hereunder to present any business opportunity to the Company, even if the opportunity is one that the Company might reasonably have pursued or had the ability or desire to pursue, in each case, if granted the opportunity to do so, and no Permitted Person shall be liable to the Company or any Participant (or any Affiliate thereof) for breach of any fiduciary or other duty relating to the Company (whether imposed by applicable law or otherwise), by reason of the fact that the Permitted Person pursues or acquires such business opportunity, directs such business opportunity to another Person or fails to present such business opportunity, or information regarding such business opportunity, to the Company. Each Participant and the Company, to the fullest extent permitted by applicable law, waives any claim or cause of action against any Permitted Person for breach of any fiduciary duty or other duty (contractual or otherwise) by reason of the fact that the Permitted Person pursues or acquires any opportunity for itself, directs such opportunity to another Person, or does not present such opportunity to the Company. This

Section 4.8 shall have no effect on the terms of any relationship, agreement or arrangement between any Participant (other than solely in its capacity as a Participant) and the Company such as a contract between such Participant and the Company pursuant to which such Participant serves as the Plan Processor.

Section 4.9. Arrangements with Participants and Members of the Operating Committee. Subject to the terms of this Agreement, including Section 4.3(b)(iv) and Section 4.3(d), and any limitations imposed on the Company and the Participants under applicable law, rules, or regulations, the Company may engage in business with, or enter into one or more agreements, leases, contracts or other arrangements for the furnishing to or by it of goods, services, technology or space with, any Participant, any member of the Operating Committee or any Affiliate of any Participant or member of the Operating Committee, and may pay compensation in connection with such business, goods, services, technology or space.

Section 4.10. Participant Action Without a Meeting. Any action required or permitted to be taken by Participants pursuant to this Agreement (including pursuant to any provision of this Agreement that requires the consent or approval of Participants) may be taken without a meeting, by unanimous consent in writing, setting forth the action so taken, which consent shall be signed by Participants entitled to consent and sufficient to take such action.

Section 4.11. Subcommittees.

(a) The Operating Committee may, by Majority Vote, designate by resolution one (1) or more subcommittees (each, a “Subcommittee”) it deems necessary or desirable in furtherance of the management of the business and affairs of the Company; provided that (i) subject to clause (ii) of this proviso, any member of the Operating Committee desiring to serve on any Subcommittee (other than the Compliance Subcommittee) shall be permitted to so serve, and such member may designate no more than two (2) representatives of the Participant that appointed such member to attend meetings of the Subcommittee, (ii) no more than one (1) member of the Operating Committee appointed thereto by Affiliated Participants may serve on any Subcommittee (including, for the avoidance of doubt, the Compliance Subcommittee) and (iii) the Operating Committee may permit an individual who is not then a member of the Operating Committee to serve on a Subcommittee. Any Subcommittee, to the extent provided in the resolution of the Operating Committee designating it and subject to Section 4.1 and non-waivable provisions of the Delaware Act, shall have and may exercise all the powers and authority of the Operating Committee in the management of the business and affairs of the Company as so specified in the resolution of the Operating Committee. Each Subcommittee shall keep minutes and make such reports as the Operating Committee may from time to time request. Except as the Operating Committee may otherwise determine, any Subcommittee may make rules for the conduct of its business, but unless otherwise provided by the Operating Committee or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided in this Agreement for the Operating Committee.

(b) The Operating Committee shall maintain a compliance Subcommittee comprised of five (5) members of the Operating Committee or other individuals appointed by the Operating Committee to serve on such subcommittee (the “Compliance Subcommittee”) to aid the Chief Compliance Officer as needed, including regarding issues involving:

(i) the maintenance of the confidentiality of information submitted to the Plan Processor or Central Repository pursuant to SEC Rule 613, applicable law, or this Agreement by Participants and Industry Members;

(ii) the timeliness, accuracy, and completeness of information submitted pursuant to SEC Rule 613, applicable law, or this Agreement by Participants; and

(iii) the manner in and extent to which each Participant is meeting its obligations under SEC Rule 613, Section 3.11, and as set forth elsewhere in this Agreement and ensuring the consistency of this Agreement's enforcement as to all Participants.

Section 4.12. Advisory Committee.

(a) An advisory committee to the Company (the "Advisory Committee") shall be formed and shall function in accordance with SEC Rule 613(b)(7) and this Section 4.12.

(b) No member of the Advisory Committee may be employed by or affiliated with any Participant or any of its Affiliates or facilities. The SEC's Chief Technology Officer (or individual then currently employed in a comparable position providing equivalent services) shall serve as an observer of the Advisory Committee (but shall not be a member thereof). The Operating Committee shall select one (1) member to serve on the Advisory Committee from representatives of each category identified in Sections 4.12(b)(i) through 4.12(b)(xii) to serve on the Advisory Committee on behalf of himself or herself individually and not on behalf of the entity for which the individual is then currently employed; provided that the members so selected pursuant to Sections 4.12(b)(i) through 4.12(b)(xii) must include, in the aggregate, representatives of no fewer than three (3) broker-dealers that are active in the options business and representatives of no fewer than three (3) broker-dealers that are active in the equities business; and provided further that upon a change in employment of any such member so selected pursuant to Sections 4.12(b)(i) through 4.12(b)(xii) a Majority Vote of the Operating Committee shall be required for such member to be eligible to continue to serve on the Advisory Committee:

(i) a broker-dealer with no more than 150 registered persons;

(ii) a broker-dealer with at least 151 and no more than 499 registered persons;

(iii) a broker-dealer with 500 or more registered persons;

(iv) a broker-dealer with a substantial wholesale customer base;

(v) a broker-dealer that is approved by a national securities exchange (A) to effect transactions on the trading floor of such exchange as a specialist, market maker or floor broker or (B) to act as an institutional broker on such exchange;

(vi) a proprietary-trading broker-dealer;

(vii) a clearing firm;

(viii) an individual who maintains a securities account with a registered broker or dealer but who otherwise has no material business relationship with a broker or dealer or with a Participant;

(ix) a member of academia with expertise in the securities industry or any other industry relevant to the operation of the CAT System;

(x) an institutional investor trading on behalf of a public entity or entities;

(xi) an institutional investor trading on behalf of a private entity or entities; and

(xii) an individual with significant and reputable regulatory expertise.

(c) Four of the twelve initial members of the Advisory Committee, as determined by the Operating Committee, shall have an initial term of one (1) year. Four of the twelve initial members of the Advisory Committee, as determined by the Operating Committee, shall have an initial term of two (2) years. All other members of the Advisory Committee shall have a term of three (3) years. No member of the Advisory Committee may serve thereon for more than two consecutive terms.

(d) The Advisory Committee shall advise the Participants on the implementation, operation, and administration of the Central Repository. Members of the Advisory Committee shall have the right to attend meetings of the Operating Committee or any Subcommittee, to receive information concerning the operation of the Central Repository (subject to Section 4.12(e)), and to submit their views to the Operating Committee or any Subcommittee on Agreement matters prior to a decision by the Operating Committee on such matters; provided that members of the Advisory Committee shall have no right to vote on any matter considered by the Operating Committee and that the Operating Committee or any Subcommittee may meet in Executive Session if, by Majority Vote, the Operating Committee determines that such an Executive Session is advisable. The Operating Committee may solicit and consider views on the operation of the Central Repository in addition to those of the Advisory Committee.

(e) Members of the Advisory Committee shall have the right to receive information concerning the operation of the Central Repository; provided that the Operating Committee retains the authority to determine the scope and content of information supplied to the Advisory Committee, which shall be limited to that information that is necessary and appropriate for the Advisory Committee to fulfill its functions. Any information received by members of the Advisory Committee in furtherance of the performance of their functions pursuant to this Agreement is to remain confidential unless otherwise specified by the Operating Committee.

ARTICLE V
INITIAL PLAN PROCESSOR SELECTION

Section 5.1. Selection Committee. The Participants shall establish a Selection Committee in accordance with this Article V to evaluate and review Bids and select the Initial Plan Processor.

(a) Composition. Each Participant shall select from its staff one (1) senior officer (“Voting Senior Officer”) to represent the Participant as a member of the Selection Committee. In the case of Affiliated Participants, one (1) individual may be (but is not required to be) the Voting Senior Officer for more than one or all of the Affiliated Participants. Where one (1) individual serves as the Voting Senior Officer for more than one Affiliated Participant, such individual will have the right to vote on behalf of each such Affiliated Participant.

(b) Voting.

(i) Unless recused pursuant to Sections 5.1(b)(ii) or Section 5.1(b)(iii), each Participant shall have one vote on all matters considered by the Selection Committee.

(ii) No Bidding Participant shall vote on whether a Shortlisted Bidder will be permitted to revise its Bid pursuant to Section 5.2(d)(i) below if a Bid submitted by or including the Participant or an Affiliate of the Participant is a Shortlisted Bid.

(iii) No Bidding Participant shall vote in the second round set forth in Section 5.2(e)(iv) below if a Bid submitted by or including the Participant or an Affiliate of the Participant is part of the second round.

(iv) All votes by the Selection Committee shall be confidential and non-public. All such votes will be tabulated by an independent third party approved by the Operating Committee, and a Participant’s individual votes will not be disclosed to other Participants or to the public.

(c) Quorum.

(i) Any action requiring a vote by the Selection Committee can only be taken at a meeting in which all Participants entitled to vote are present. Meetings of the Selection Committee shall be held as needed at such times and locations as shall from time to time be determined by the Selection Committee. Meetings may be held by conference telephone or other acceptable electronic means if all Participants entitled to vote consent thereto in writing or by other means the Selection Committee deems acceptable.

(ii) For purposes of establishing a quorum, a Participant is considered present at a meeting only if the Participant’s Voting Senior Officer is either in physical attendance at the meeting or is participating by conference telephone or other acceptable electronic means.

(iii) Any Participant recused from voting on a particular action pursuant to Section 5.1(b) above shall not be considered “entitled to vote” for purposes of establishing whether a quorum is present for a vote to be taken on that action.

(d) Qualifications for Voting Senior Officer of Bidding Participants. The following criteria must be met before a Voting Senior Officer is eligible to represent a Bidding Participant and serve on the Selection Committee:

(i) the Voting Senior Officer is not responsible for the Bidding Participant’s market operations, and is responsible primarily for the Bidding Participant’s legal and/or regulatory functions, including functions related to the formulation and implementation of the Bidding Participant’s legal and/or regulatory program;

(ii) the Bidding Participant has established functional separation of its legal and/or regulatory functions from its market operations and other business or commercial objectives;

(iii) the Voting Senior Officer ultimately reports (including through the Bidding Participant’s CEO or Chief Legal Officer/General Counsel) to an independent governing body that determines or oversees the Voting Senior Officer’s compensation, and the Voting Senior Officer does not receive any compensation (other than what is determined or overseen by the independent governing body) that is based on achieving business or commercial objectives;

(iv) the Voting Senior Officer does not have responsibility for any non-regulatory functions of the Bidding Participant, other than the legal aspects of the organization performed by the Chief Legal Officer/General Counsel or the Office of the General Counsel;

(v) the ultimate decision making of the Voting Senior Officer position is tied to the regulatory effectiveness of the Bidding Participant, as opposed to other business or commercial objectives;

(vi) promotion or termination of the Voting Senior Officer is not based on achieving business or commercial objectives;

(vii) the Voting Senior Officer has no decision-making authority with respect to the development or formulation of the Bid submitted by or including the Participant or an Affiliate of the Participant; however, the staff assigned to developing and formulating such Bid may consult with the Voting Senior Officer, provided such staff members cannot share information concerning the Bid with the Voting Senior Officer;

(viii) the Voting Senior Officer does not report to any senior officers responsible for the development or formulation of the Bid submitted by or including the Participant or by an Affiliate of the Participant; however, joint reporting to the Bidding Participant’s CEO or similar executive officer by the Voting Senior Officer and senior staff developing and formulating such Bid is permissible, but the Bidding Participant’s CEO or similar executive officer cannot share information concerning such Bid with the Voting Senior Officer;

(ix) the compensation of the Voting Senior Officer is not separately tied to income earned if the Bid submitted by or including the Participant or an Affiliate of the Participant is selected; and

(x) the Voting Senior Officer, any staff advising the Voting Senior Officer, and any similar executive officer or member of an independent governing body to which the Voting Senior Officer reports may not disclose to any person any non-public information gained during the review of Bids, presentation by Qualified Bidders, and selection process. Staff advising the Voting Senior Officer during the Bid review, presentation, and selection process may not include the staff, contractors, or subcontractors that are developing or formulating the Bid submitted by or including a Participant or an Affiliate of the Participant.

Section 5.2. Bid Evaluation and Initial Plan Processor Selection.

(a) Initial Bid Review to Determine Qualified Bids.

(i) The Selection Committee shall review all Bids in accordance with the process developed by the Selection Committee.

(ii) After review, the Selection Committee shall vote on each Bid to determine whether such Bid is a Qualified Bid. A Bid that is deemed unqualified by at least a two-thirds (2/3rds) vote of the Selection Committee will not be deemed a Qualified Bid and will be eliminated individually from further consideration.

(b) Selection of Shortlisted Bids.

(i) Each Qualified Bidder shall be given the opportunity to present its Bid to the Selection Committee. Following the presentations by Qualified Bidders, the Selection Committee shall review and evaluate the Qualified Bids to select the Shortlisted Bids in accordance with the process in this Section 5.1(b).

(ii) If there are six (6) or fewer Qualified Bids, all such Qualified Bids shall be Shortlisted Bids.

(iii) If there are more than six (6) Qualified Bids but fewer than eleven (11) Qualified Bids, the Selection Committee shall select five (5) Qualified Bids as Shortlisted Bids, subject to the requirement in Section 5.2(d) below. Each Voting Senior Officer shall select a first, second, third, fourth, and fifth choice from among the Qualified Bids.

(A) A weighted score shall be assigned to each choice as follows:

(1) First choice receives five (5) points;

(2) Second choice receives four (4) points;

(3) Third choice receives three (3) points;

(4) Fourth choice receives two (2) points; and

(5) Fifth choice receives one (1) point.

(B) The five (5) Qualified Bids receiving the highest cumulative scores will be Shortlisted Bids.

(C) In the event of a tie to select the five Shortlisted Bids, all such tied Qualified Bids will be Shortlisted Bids.

(D) To the extent there are Non-SRO Bids that are Qualified Bids, the Shortlisted Bids selected pursuant to this Section 5.2(b)(iii) must, if possible, include at least two Non-SRO Bids. If, following the vote set forth in this Section 5.2(b)(iii), no Non-SRO Bid was selected as a Shortlisted Bid, the two Non-SRO Bids receiving the highest cumulative votes (or one Non-SRO Bid if a single Non-SRO Bid is a Qualified Bid) shall be added as Shortlisted Bids. If one Non-SRO Bid was selected as a Shortlisted Bid, the Non-SRO Bid receiving the next highest cumulative vote shall be added as a Shortlisted Bid.

(iv) If there are eleven (11) or more Qualified Bids, the Selection Committee shall select fifty percent (50%) of the Qualified Bids as Shortlisted Bids, subject to the requirement in Section 5.2(d) below. If there is an odd number of Qualified Bids, the number of Shortlisted Bids chosen shall be rounded up to the next whole number (*e.g.*, if there are thirteen Qualified Bids, then seven Shortlisted Bids will be selected). Each Voting Senior Officer shall select as many choices as Shortlisted Bids to be chosen.

(A) A weighted score shall be assigned to each choice in single point increments as follows:

(1) Last receives one (1) point;

(2) Next-to-last choice receives two (2) points,

(3) Second-from-last choice receives three (3) points,

(4) Third-from-last choice receives four (4) points;

(5) Fourth-from-last choice receives five (5) points; and

(6) Fifth-from-last choice receives six (6) points.

For each additional Shortlisted Bid that must be chosen, the points assigned will increase in single point increments.

(B) The fifty percent (50%) of Qualified Bids (or, if there is an odd number of Qualified Bids, the next whole number above fifty percent

(50%) of Qualified Bids) receiving the highest cumulative scores will be Shortlisted Bids.

(C) In the event of a tie to select the Shortlisted Bids, all such tied Qualified Bids will be Shortlisted Bids.

(D) To the extent there are Non-SRO Bids that are Qualified Bids, the Shortlisted Bids selected pursuant to this Section 5.2(b)(iv) must, if possible, include at least two Non-SRO Bids. If, following the vote set forth in this Section 5.2(b)(iv), no Non-SRO Bid was selected as a Shortlisted Bid, the two Non-SRO Bids receiving the highest cumulative votes (or one Non-SRO Bid if a single Non-SRO Bid is a Qualified Bid) shall be added as Shortlisted Bids. If one Non-SRO Bid was selected as a Shortlisted Bid, the Non-SRO Bid receiving the next highest cumulative vote shall be added as a Shortlisted Bid.

(c) Formulation of the CAT NMS Plan.

(i) The Selection Committee shall review the Shortlisted Bids to identify optimal proposed solutions for the consolidated audit trail and provide descriptions of such proposed solutions for inclusion in this Agreement. This process may, but is not required to, include iterative discussions with Shortlisted Bidders to address any aspects of an optimal proposed solution that were not fully addressed in a particular Bid.

(ii) The Participants shall incorporate information on optimal proposed solutions in this Agreement, including cost-benefit information as required by SEC Rule 613.

(d) Review of Shortlisted Bids Under the CAT NMS Plan.

(i) A Shortlisted Bidder will be permitted to revise its Bid only upon approval by a majority of the Selection Committee, subject to the recusal provision in Section 5.1(b)(ii) above, that revisions are necessary or appropriate in light of the content of the Shortlisted Bidder's initial Bid and the provisions in this Agreement. A Shortlisted Bidder may not revise its Bid unless approved to do so by the Selection Committee pursuant to this Section 5.2(d)(i).

(ii) The Selection Committee shall review and evaluate all Shortlisted Bids, including any permitted revisions thereto submitted by Shortlisted Bidders. In performing the review and evaluation, the Selection Committee may consult with the Advisory Committee established pursuant to paragraph (b)(7) of SEC Rule 613 and Section 4.12.

(e) Selection of Plan Processor Under this Agreement.

(i) There will be two rounds of voting by the Selection Committee to select the Plan Processor from among the Shortlisted Bidders. Each round shall be scored independently of prior rounds of voting, including the scoring to determine the Shortlisted Bids under Section 5.2(b).

(ii) Each Participant shall have one vote in each round, except that no Bidding Participant shall be entitled to vote in the second round if the Participant's Bid, a Bid submitted by an Affiliate of the Participant, or a Bid including the Participant or an Affiliate of the Participant is considered in the second round. Until the second round, Bidding Participants may vote for any Shortlisted Bid.

(iii) First Round Voting by the Selection Committee.

(A) In the first round of voting, each Voting Senior Officer shall select a first and second choice from among the Shortlisted Bids.

(B) A weighted score shall be assigned to each choice as follows:

(1) First choice receives two (2) points; and

(2) Second choice receives one (1) point.

(C) The two Shortlisted Bids receiving the highest cumulative scores in the first round will advance to the second round.

(D) In the event of a tie that would result in more than two Shortlisted Bids advancing to the second round, the tie will be broken by assigning one point per vote, with the Shortlisted Bid(s) receiving the highest number of votes advancing to the second round. If, at this point, the Shortlisted Bids remain tied, a revote will be taken with each vote receiving one point. If the revote results in a tie, the Participants shall identify areas for further discussion and, following any such discussion, voting will continue until two Shortlisted Bids are selected to advance to the second round.

(iv) Second Round Voting by the Selection Committee.

(A) In the second round of voting, each Voting Senior Officer, subject to the recusal provisions in Section 5.2(e)(ii) above, shall vote for one Shortlisted Bid.

(B) The Shortlisted Bid receiving the most votes in the second round shall be selected, and the proposed entity included in the Shortlisted Bid to serve as the Plan Processor shall be selected as the Plan Processor.

(C) In the event of a tie, a revote will be taken. If the revote results in a tie, the Participants shall identify areas for further discussions with the two Shortlisted Bidders. Following any such discussions, voting will continue until one Shortlisted Bid is selected.

ARTICLE VI

FUNCTIONS AND ACTIVITIES OF CAT SYSTEM

Section 6.1. Plan Processor.

(a) The Initial Plan Processor shall be selected in accordance with Article V and shall serve as the Plan Processor until its resignation or removal from such position in accordance with this Section 6.1.

(b) The Plan Processor may appoint such officers of the Plan Processor as it deems necessary and appropriate to perform its functions under this Agreement and SEC Rule 613; provided that the Plan Processor shall, at a minimum, appoint, in accordance with Section 6.2, (i) a Chief Compliance Officer, (ii) an Information Security Officer and (iii) an Independent Auditor. Notwithstanding anything to the contrary, the Operating Committee, by Supermajority Vote, shall approve any appointment or removal of the Information Security Officer, the Chief Compliance Officer or any Independent Auditor.

(c) The Plan Processor shall use the policies, procedures, control structures and real time tools including standards, set forth in, or otherwise contemplated by, this Agreement to perform those duties contemplated to be performed by it pursuant to SEC Rule 613(e)(4).

(d) The Plan Processor shall develop and, with the prior approval of the Operating Committee, implement policies, procedures, control structures and real time tools including standards related to the CAT System that are consistent with SEC Rule 613(e)(4).

(e) The Plan Processor shall:

(i) comply with applicable provisions of 15 U.S. Code §78u-6 (Securities Whistleblower Incentives and Protection) and the recordkeeping requirements of SEC Rule 613(e)(8);

(ii) ensure the effective management and operation of the Central Repository;

(iii) ensure the accuracy of the consolidation of the CAT Data reported to the Central Repository pursuant to Section 6.3 and Section 6.4; and

(iv) design and implement appropriate policies and procedures (A) to provide for the escalation of reviews of proposed technological changes and upgrades (including as required by Section 6.1(i) and Section 6.1(j) or as otherwise appropriate) to the Operating Committee and (B) with respect to the handling of surveillance (including coordinated, 17d-2 or RSA surveillance) queries and requests for data.

(f) Any policy, procedure or standard (and any material modification or amendment thereto) applicable primarily to the performance of the Plan Processor's duties as the Plan Processor (excluding, for the avoidance of doubt, any policies, procedures or standards

generally applicable to all of the Plan Processor's operations and employees) shall become effective only upon approval thereof by the Operating Committee.

(g) The Plan Processor may enter into, comply with and periodically review appropriate service level agreements with third parties applicable to the Plan Processor's functions related to the CAT System. Such agreements are subject to the periodic review of the Chief Compliance Officer and/or the Independent Auditor.

(h) The Plan Processor shall, on an ongoing basis and consistent with any applicable policies and procedures, evaluate and implement potential system changes and upgrades to maintain and improve the normal day to day operating function of the Central Repository.

(i) The Plan Processor shall, on an as needed basis and consistent with any applicable operational and escalation policies and procedures, and subject to the prior approval of the Operating Committee, implement such material system changes and upgrades as may be required to ensure effective functioning of the Central Repository (i.e., those system changes and upgrades beyond the scope contemplated by Section 6.1(h)).

(j) The Plan Processor shall, on an as needed basis, subject to the prior approval of the Operating Committee, implement system changes and upgrades to the Central Repository to ensure compliance with any applicable laws, regulations or rules (including those promulgated by the SEC or any SRO).

(k) The Plan Processor's performance under this Agreement is subject to formal review by the Operating Committee as further described in this Section 6.1(k).

(i) During the first four (4) years of the Plan Processor's performance in such capacity, the Plan Processor's performance under this Agreement is subject to formal review by the Operating Committee at least once each year, or from time to time upon the request of two Participants that are not Affiliated Participants. The Operating Committee will notify the SEC of any determination made by the Operating Committee concerning the continuing engagement of the Plan Processor as a result of the Operating Committee's review of the Plan Processor and will supply the SEC with a copy of any reports that may be prepared in connection therewith.

(ii) Following the completion of the first four (4) years of the Plan Processor's performance in such capacity, the Plan Processor's performance under this Agreement is subject to formal review at least once each two (2) year period, or from time to time upon the request of two Participants that are not Affiliated Participants, but not more frequently than once each year. The Operating Committee will notify the SEC of any determination made by the Operating Committee concerning the continuing engagement of the Plan Processor as a result of the Operating Committee's review of the Plan Processor and will supply the SEC with a copy of any reports that may be prepared in connection therewith.

(l) Upon the request of the Operating Committee or any Subcommittee, the Plan Processor shall attend any meeting of the Operating Committee or such Subcommittee

(m) The Plan Processor shall provide the Operating Committee regular reports on the CAT System's operation and maintenance. The reports shall address:

(i) operational performance management information regarding the capacity and performance of the CAT System as specified by the Operating Committee;

(ii) data security issues for the Plan Processor and the Central Repository;

(iii) Participant usage statistics for the Plan Processor and the Central Repository;

(iv) business continuity planning and disaster recovery issues for the Plan Processor and the Central Repository;

(v) system improvement issues with the Plan Processor and the Central Repository;

(vi) financial statements of the Plan Processor prepared in accordance with GAAP (1) audited by an independent public accounting firm or (2) certified by the Plan Processor's Chief Financial Officer (which financial statements contemplated by this Section 6.1(l)(vi) shall be provided no later than 90 days after the Plan Processor's fiscal year end);

(vii) continued solvency of the Plan Processor;

(viii) budgetary status of any items subject to Section 6.2(a)(ii);

(ix) internal audit analysis and the status of any internal audit related deliverables; and

(x) additional items as requested by the Operating Committee, any Subcommittee, the Chief Compliance Officer or the Independent Auditor.

(n) The Operating Committee, by Supermajority Vote, may remove the Plan Processor from such position at any time.

(o) The Operating Committee may remove the Plan Processor from such position at any time if it determines that the Plan Processor has failed to perform its functions in a reasonably acceptable manner in accordance with the provisions of this Agreement or that the Plan Processor's expenses have become excessive and are not justified. In making such determination, the Operating Committee shall consider, among other factors: (i) the reasonableness of the Plan Processor's response to requests from Participants or the Company for technological changes or enhancements; (ii) results of any assessments performed pursuant to Section 6.6; (iii) the timeliness of conducting preventative and corrective IT system maintenance for reliable and secure operations; and (iv) such other factors related to experience, technological capability, quality and reliability of service, costs, back-up facilities, failure to meet service level agreement(s) and regulatory considerations as the Operating Committee may determine to be appropriate.

(p) The Plan Processor may resign from such position; provided that no such resignation shall be effective earlier than two (2) years (or such other period as may be determined by the Operating Committee by Supermajority Vote) after the Plan Processor provides written notice of such resignation to the Company.

(q) The Operating Committee, by Supermajority Vote, shall fill any vacancy in the Plan Processor position, and shall establish a Selection Subcommittee in accordance with Section 4.11 to evaluate and review bids and make a recommendation to the Operating Committee with respect to the selection of the successor Plan Processor; provided, for the avoidance of doubt, the Initial Plan Processor shall be selected in accordance with the provisions of Article V.

Section 6.2. Chief Compliance Officer and Information Security Officer.

(a) Chief Compliance Officer.

(i) The Plan Processor shall designate an employee of the Plan Processor to serve, subject to the approval of the Operating Committee by Supermajority Vote, as the Chief Compliance Officer. Any person designated to serve as the Chief Compliance Officer shall be appropriately qualified to serve in such capacity based on the powers, privileges, duties and responsibilities provided to the Chief Compliance Officer under this Agreement and shall dedicate such person's entire working time to such service (except for any time required to attend to any incidental administrative matters related to such person's employment with the Plan Processor that do not detract in any material respect from such person's service as the Chief Compliance Officer). The Plan Processor may, in its discretion, (i) designate another employee previously approved by the Operating Committee by Supermajority Vote to serve in such capacity to temporarily serve as the Chief Compliance Officer if the employee then serving as Chief Compliance Officer becomes unavailable or unable to serve as Chief Compliance Officer (including by reason of injury or illness) for a period not in excess of thirty (30) days, or (ii) designate another employee of the Plan Processor to replace, subject to approval of the Operating Committee by a Supermajority Vote, the Chief Compliance Officer. The Plan Processor shall promptly designate another employee of the Plan Processor to replace, subject to the approval of the Operating Committee by Supermajority Vote, the Chief Compliance Officer if the Chief Compliance Officer's employment with the Plan Processor terminates or the Chief Compliance Officer is otherwise unavailable or unable to serve as Chief Compliance Officer (including by reason of injury or illness) for a period in excess of thirty (30) days.

(ii) The Plan Processor, subject to the oversight of the Operating Committee, shall ensure that the Chief Compliance Officer has appropriate resources to fulfill the obligations of the Chief Compliance Officer set forth in SEC Rule 613 and in this Agreement.

(iii) In respect of all duties and responsibilities of the Chief Compliance Officer (including those set forth in this Agreement), the Chief Compliance Officer shall report to the Operating Committee.

(iv) The compensation (including base salary and bonus) of the Chief Compliance Officer shall be subject to review and approval by the Operating Committee, and the Operating Committee shall render the Chief Compliance Officer's annual performance review.

(v) The Chief Compliance Officer shall:

(A) regularly review the operation of the Central Repository to ensure its continued effectiveness based on market and technological developments and make any appropriate recommendations for enhancements to the nature of the information collected and the manner in which it is processed;

(B) identify and assist the Company in retaining an appropriately qualified independent auditor of national recognition (subject to the approval of the Operating Committee by Supermajority Vote, the “Independent Auditor”) and, in collaboration with such Independent Auditor, create and implement an annual audit plan (subject to the approval of the Operating Committee) which shall at a minimum include a review of all Plan Processor policies, procedures and control structures;

(C) in collaboration with the Information Security Officer, and consistent with applicable requirements related to data security and Customer Account Information, identify and assist the Company in retaining an appropriately qualified independent auditor (which, based on specialized technical expertise, may be the Independent Auditor or, subject to the approval of the Operating Company by Supermajority Vote, another appropriately qualified independent auditor) to create and implement an annual audit plan (subject to the approval of the Operating Committee) to review the policies, procedures, standards, control structures and real time tools that monitor and address data security issues for the Plan Processor and the Central Repository;

(D) perform reviews with respect to the matters referenced in Section 4.11(b) and report periodically, and on an “as needed” basis, to the Operating Committee concerning the findings of any such review;

(E) report to the Operating Committee and conduct any relevant review of the Plan Processor or the Central Repository requested by the Operating Committee, including directing internal or external auditors, as appropriate, to support any such review;

(F) perform and provide the regular written assessment to the SEC required by Section 6.6 and SEC Rule 613;

(G) regularly review the information security program developed and maintained by the Plan Processor pursuant to Section 6.12 and determine the frequency of such reviews;

(H) report in a timely manner to the Operating Committee any instances of non-compliance by the Plan Processor with any of the Central Repository’s policies or procedures with respect to information security;

(I) conduct regular surveillance of the CAT System for compliance by Industry Members with SEC Rule 613 and this Agreement and provide the results of such surveillance to the Participants with oversight of such Industry Member or to such Participants' agent pursuant to a regulatory services agreement, or to the Participant responsible for enforcing compliance by such Industry Member pursuant to an agreement entered into by the applicable Participant pursuant to Rule 17d-2 under the Exchange Act;

(J) develop a mechanism to conduct regular surveillance of the CAT System for compliance by each Participant with SEC Rule 613 and this Agreement;

(K) develop and implement a notification and escalation process to resolve and remediate any alleged noncompliance by a Participant with the rules of the Plan Processor, up to and including notification to the Commission or a SRO;

(L) develop and conduct an annual assessment of Business Clock synchronization as specified in Section 6.8(c);

(M) have access to the Operating Committee, including attending all regular, special and emergency meetings of the Operating Committee as a non-voting observer; provided, however, that the Chief Compliance Officer shall not have the right to attend any Executive Session that the Operating Committee may hold; and

(N) oversee the Plan Processor's compliance with applicable laws, rules and regulations related to the CAT System.

(b) Information Security Officer.

(i) Consistent with Section 6.12, the Information Security Officer shall be responsible for creating and enforcing appropriate policies, procedures, standards, control structures and real time tools to monitor and address data security issues for the Plan Processor and the Central Repository.

(ii) The Plan Processor shall designate an employee of the Plan Processor to serve, subject to the approval of the Operating Committee by Supermajority Vote, as the Information Security Officer. Any person designated to serve as the Information Security Officer shall be appropriately qualified to serve in such capacity based on the powers, privileges, duties and responsibilities provided to the Information Security Officer under this Agreement and shall dedicate such person's entire working time to such service (except for any time required to attend to any incidental administrative matters related to such person's employment with the Plan Processor that do not detract in any material respect from such person's service as the Information Security Officer). The Plan Processor may, in its discretion, (i) designate another employee previously approved by the Operating Committee by Supermajority Vote to serve in such capacity

to temporarily serve as the Information Security Officer if the employee then serving as Information Security Officer becomes unavailable or unable to serve as Information Security Officer (including by reason of injury or illness) for a period not in excess of thirty (30) days, or (ii) designate another employee of the Plan Processor to replace, subject to approval of the Operating Committee by a Supermajority Vote, the Information Security Officer. The Plan Processor shall promptly designate another employee of the Plan Processor to replace, subject to the approval of the Operating Committee by Supermajority Vote, the Information Security Officer if the Information Security Officer's employment with the Plan Processor terminates or the Information Security Officer is otherwise unavailable or unable to serve as Information Security Officer (including by reason of injury or illness) for a period in excess of thirty (30) days.

Section 6.3. Data Recording and Reporting by Participants. This Section 6.3 shall become effective on the first anniversary of the Effective Date and shall remain effective thereafter until modified or amended in accordance with the provisions of this Agreement and applicable law.

(a) Format. Each Participant shall report Participant Data to the Central Repository for consolidation and storage in a format or formats specified by the Plan Processor, approved by the Operating Committee and compliant with SEC Rule 613.

(b) Timing of Recording and Reporting.

(i) Each Participant shall record Participant Data contemporaneously with the applicable Reportable Event.

(ii) Each Participant shall report Participant Data to the Central Repository by 8:00 a.m. Eastern Time on the trading day following the day the Participant records such Participant Data. A Participant may voluntarily report Participant Data prior to the 8:00 a.m. Eastern Time deadline.

(c) Applicable Securities.

(i) Each Participant that is a national securities exchange shall report Participant Data for each NMS Security registered or listed for trading on such exchange or admitted to unlisted trading privileges on such exchange.

(ii) Each Participant that is a national securities association shall report Participant Data for each Eligible Security for which transaction reports are required to be submitted to such association.

(d) Participant Data. Subject to Section 6.3(c), each Participant shall record and electronically report to the Central Repository the following details for each Order and each Reportable Event, as applicable ("Participant Data"):

(i) for original receipt or origination of an Order:

- (A) Customer-ID(s)¹ for each Customer;
 - (B) CAT-Order-ID;
 - (C) CAT-Reporter-ID² of the Industry Member receiving or originating the Order;
 - (D) date of Order receipt or origination;
 - (E) time of Order receipt or origination (using timestamps pursuant to Section 6.8);
 - (F) Material Terms of the Order as described in the Technical Specifications;
 - (G) other information as may be prescribed in the Technical Specifications;
- (ii) for the routing of an Order:
- (A) CAT-Order-ID;
 - (B) date on which the Order is routed;
 - (C) time at which the Order is routed (using timestamps pursuant to Section 6.8);
 - (D) CAT-Reporter-ID of the Industry Member or Participant routing the Order;
 - (E) CAT-Reporter-ID of the Industry Member or Participant to which the Order is being routed;
 - (F) if routed internally at the Industry Member, the identity and nature of the department or desk to which the Order is routed;
 - (G) Material Terms of the Order as described in the Technical Specifications;
 - (H) other information as may be prescribed in the Technical Specifications;
- (iii) for the receipt of an Order that has been routed, the following

information:

¹ The Participants plan to request an exemption from the requirement to report Customer-ID under Section 613(c)(7) and, instead, authorizing the use of a Customer Information Approach.

² The Participants plan to request an exemption from the requirement to provide the CAT-Reporter-ID.

- (A) CAT-Order-ID;
 - (B) date on which the Order is received;
 - (C) time at which the Order is received (using timestamps pursuant to Section 6.8);
 - (D) CAT-Reporter-ID of the Industry Member or Participant receiving the Order;
 - (E) CAT-Reporter-ID of the Industry Member or Participant routing the Order; and
 - (F) Material Terms of the Order as described in the Technical Specifications;
 - (G) other information as may be prescribed in the Technical Specifications;
- (iv) if the Order is modified or cancelled:
- (A) CAT-Order-ID;
 - (B) date the modification or cancellation is received or originated;
 - (C) time the modification or cancellation is received or originated (using timestamps pursuant to Section 6.8);
 - (D) price and remaining size of the Order, if modified;
 - (E) other changes in the Material Terms of the Order, if modified;
 - (F) CAT-Reporter-ID of the Industry Member or Customer-ID of the Person giving the modification or cancellation instruction;
 - (G) other information as may be prescribed in the Technical Specifications;
- (v) if the Order is executed, in whole or in part:
- (A) CAT-Order-ID;
 - (B) date of execution;
 - (C) time of execution (using timestamps pursuant to Section 6.8);
 - (D) execution capacity (principal, agency or riskless principal);
 - (E) execution price and size;

(F) CAT-Reporter-ID of the Participant or Industry Member executing the Order; and

(G) whether the execution was reported pursuant to an effective transaction reporting plan or the Plan for Reporting of Consolidated Options Last Sale Reports and Quotation Information;

(H) other information as may be prescribed in the Technical Specifications;

(vi) for an allocation event:

(A) account number for any subaccounts to which the execution is allocated (in whole or in part);

(B) CAT-Reporter-ID of the clearing broker or prime broker, if applicable;

(C) Customer Account Information;

(D) fill size;

(E) fill price; and

(vii) other information or additional events as may be prescribed in the Technical Specifications.

(e) Means of Transmission. Each Participant may utilize such methods as may be provided by the Plan Processor and approved by the Operating Committee to transmit Participant Data to the Central Repository.

Section 6.4. Data Reporting and Recording by Industry Members. The requirements for Industry Members under this Section 6.4 shall become effective on the second anniversary of the Effective Date (in the case of Industry Members other than Small Industry Members), or the third anniversary of the Effective Date (in the case of Small Industry Members), and shall remain effective thereafter until modified or amended in accordance with the provisions of this Agreement and applicable law.

(a) Format. Each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to report Industry Member Data to the Central Repository for consolidation and storage in a format or formats specified by the Plan Processor, approved by the Operating Committee and compliant with SEC Rule 613.

(b) Timing of Recording and Reporting.

(i) Each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to record Recorded Industry Member Data contemporaneously with the applicable Reportable Event.

(ii) Each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to report (A) Recorded Industry Member Data to the Central Repository by 8:00 a.m. Eastern Time on the trading day following the day the Industry Member records such Recorded Industry Member Data, and (B) Received Industry Member Data to the Central Repository by 8:00 am Eastern Time on the trading day following the day the Industry Member receives such Received Industry Member Data. Each Participant shall, through its adoption of its Compliance Rule, permit its Industry Members to voluntarily report Industry Member Data prior to the applicable 8:00 a.m. Eastern Time deadline.

(c) Applicable Securities.

(i) Each Participant that is a national securities exchange shall, through its adoption of its Compliance Rule, require its Industry Members to report Industry Member Data for each NMS Security registered or listed for trading on such exchange or admitted to unlisted trading privileges on such exchange.

(ii) Each Participant that is a national securities association shall, through its adoption of its Compliance Rule, require its Industry Members to report Industry Member Data for each Eligible Security for which transaction reports are required to be submitted to such association.

(d) Required Industry Member Data.

(i) Subject to Section 6.4(c), each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to record and electronically report to the Central Repository for each Order and each Reportable Event the information referred to in Section 6.3(d), as applicable (“Recorded Industry Member Data”).

(ii) Subject to Section 6.4(c), each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to record and report to the Central Repository the following, as applicable (“Received Industry Member Data” and collectively with the information referred to in Section 6.4(d)(i) “Industry Member Data”):

- (A) if the Order is executed, in whole or in part:
1. account number for any subaccounts to which the execution is allocated (in whole or in part);
 2. CAT-Reporter-ID of the clearing broker or prime broker, if applicable; and
 3. CAT-Order-ID of any contra-side order(s);
- (B) if the trade is cancelled, a cancelled trade indicator;
- (C) for original receipt or origination of an Order:

Customer; and

1. information of sufficient detail to identify the

2. Customer Account Information as further described in requirements approved by the Operating Committee.

- (iii) Each Participant shall, through its adoption of its Compliance Rule, require its Industry Members to record and report to the Central Repository other information or additional events as may be prescribed in the Technical Specifications.

- (e) Means of Transmission. Each Industry Member may utilize such methods as may be provided by the Plan Processor and approved by the Operating Committee to transmit Industry Member Data to the Central Repository.

Section 6.5. Central Repository.

- (a) Collection of Data.

- (i) The Central Repository, under the oversight of the Plan Processor, shall receive, consolidate, and retain all CAT Data.

- (ii) The Central Repository shall collect (from a Securities Information Processor or pursuant to a NMS Plan) and retain on a current and continuing basis, in a format compatible with the Participant Data and Industry Member Data, the following (collectively, "SIP Data"):

- (A) information, including the size and quote condition, on the National Best Bid and National Best Offer for each NMS security;

- (B) transaction reports reported pursuant to an effective transaction reporting plan filed with the SEC pursuant to, and meeting the requirements of, SEC Rule 601;

- (C) Last Sale Reports.

- (b) Retention of Data.

- (i) The Central Repository shall retain the information collected pursuant to paragraphs (c)(7) and (e)(7) of SEC Rule 613 in a convenient and usable standard electronic data format that is directly available and searchable electronically without any manual intervention by the Plan Processor for a period of not less than six (6) years.

- (ii) The Plan Processor shall implement and comply with the records retention policy contemplated by Section 6.1(d)(i) (as such policy is reviewed and updated periodically in accordance with Section 6.1(d)(i)).

- (c) Access to the Central Repository

(i) The Plan Processor shall provide Participants and the SEC access to the Central Repository (including all systems operated by the Central Repository), and access to and use of the CAT Data stored in the Central Repository, solely for the purpose of performing their respective regulatory and oversight responsibilities pursuant to the federal securities laws, rules and regulations or any contractual obligations.

(ii) The Plan Processor shall create and maintain a method of access to CAT Data stored in the Central Repository that includes the ability to run searches and generate reports. The method in which the CAT Data is stored in the Central Repository will allow the ability to return results of queries that are complex in nature, including market reconstruction and time based order book states.

(iii) The Plan Processor shall, promptly following request by the Operating Committee (which request shall be made at least annually), certify to the Operating Committee that only Participants and the SEC have access to the Central Repository (other than access provided to any Industry Member for the purpose of correcting CAT Data previously reported to the Central Repository by such Industry Member).

(iv) Section A.4 of Appendix C describes the security and confidentiality of the CAT Data, including how access to the Central Repository is controlled.

(d) Data Accuracy

(i) The Operating Committee shall adopt policies and procedures, including standards, requiring CAT Data reported to the Central Repository be timely, accurate, and complete, and ensuring the integrity of such CAT Data (e.g., that such CAT Data has not been altered and remains reliable). The Plan Processor will be responsible for implementing such policies and procedures.

(ii) The Technical Specifications will describe the mechanisms and protocols for Participant Data and Industry Member Data submission for all key phases, including at a minimum:

- (A) file transmission and receipt;
- (B) validation of CAT Data; and
- (C) validation of linkage.

(iii) The Technical Specifications will describe the mechanisms and protocols for managing and handling corrections of CAT Data. The Plan Processor will require an audit trail for corrected CAT Data in accordance with mechanisms and protocols approved by the Operating Committee.

(e) Data Confidentiality

(i) The Plan Processor shall, without limiting the obligations imposed on Participants by this Agreement and in accordance with the framework set forth in Appendix C,

be responsible for the security and confidentiality of all CAT Data received and reported to the Central Repository. Without limiting the foregoing, the Plan Processor shall:

(A) require all individuals who have access to the Central Repository (including the respective employees and consultants of the Participants and the Plan Processor) to agree (1) to use appropriate safeguards to ensure the confidentiality of CAT Data stored in the Central Repository and (2) not to use CAT Data stored in the Central Repository for purposes other than surveillance and regulation in accordance with such individual's employment duties; provided that a Participant will be permitted to use the CAT Data it reports to the Central Repository for regulatory, surveillance, commercial or other purposes permitted by applicable law, rule, or regulation;

(B) require all individuals who have access to the Central Repository (including the respective employees and consultants of the Participants and the Plan Processor) to execute a personal "Safeguard of Information Affidavit" in a form approved by the Operating Committee providing for personal liability for misuse of data;

(C) develop and maintain a comprehensive information security program for the Central Repository that employs state of the art technology, which program will be reviewed regularly by the Chief Compliance Officer; and

(D) implement and maintain a mechanism to confirm the identity of all individuals permitted to access the CAT Data stored in the Central Repository and maintain a record of all instances where such CAT Data was accessed.

(ii) Each Participant shall adopt and enforce policies and procedures

that:

(A) implement effective information barriers between such Participant's regulatory and non-regulatory staff with regard to access and use of CAT Data stored in the Central Repository;

(B) permit only persons designated by Participants to have access to the CAT Data stored in the Central Repository; and

(C) impose penalties for staff non-compliance with any of its or the Central Repository's policies or procedures with respect to information security.

(iii) Each Participant shall as promptly as reasonably practicable, and in any event within 24 hours, report to the Chief Compliance Officer any instance of noncompliance with the policies and procedures adopted by such Participant pursuant to Section 6.5(e)(ii).

(iv) The Plan Processor shall:

(A) ensure data confidentiality and security during all communications between CAT Reporters and the Plan Processor, data extractions, manipulation and transformation, loading to and from the Central Repository and data maintenance by the Central Repository;

(B) require the establishment of secure controls for data retrieval and query reports by Participant regulatory staff and the Commission; and

(C) otherwise provide appropriate database security for the Central Repository.

Section 6.6. Regular Written Assessment.

(a) Requirement.

(i) At least every two (2) years, or more frequently in connection with any review of the Plan Processor's performance under this Agreement pursuant to Section 6.1(k), the Participants shall provide the SEC with a written assessment of the operation of the CAT that meets the requirements of SEC Rule 613 and this Agreement.

(ii) The Chief Compliance Officer shall oversee the assessment contemplated by Section 6.6(a)(i) and shall provide the Participants a reasonable time to review and comment such assessment prior to its submission to the SEC. In no case will the written assessment be changed or amended in response to a comment by a Participant; rather, any comment by a Participant will be provided to the SEC at the same time as the written assessment.

(b) Contents of Written Assessment. The written assessment required by this Section 6.6 shall include:

(i) an evaluation of the performance of the CAT, including the items specified in SEC Rule 613(b)(6)(i) and other performance metrics identified by the Chief Compliance Officer, and a description of such metrics;

(ii) a detailed plan, based on the evaluation conducted pursuant to Section 6.6(b)(i), for any potential improvements to the performance of the CAT with respect to the items specified in SEC Rule 613(b)(6)(ii) and any other items identified and described by the Chief Compliance Officer;

(iii) an estimate of the costs associated with any potential improvements to the performance of the CAT, including an assessment of the potential impact on competition, efficiency, and capital formation; and

(iv) an estimated implementation timeline for any potential improvements to the performance of the CAT, if applicable.

Section 6.7. Implementation.

(a) Unless otherwise ordered by the SEC:

(i) within two (2) months after the Effective Date, the Participants will jointly select the winning Shortlisted Bid and the Plan Processor pursuant to the process set forth in Section VI of the Selection Plan as incorporated into this Agreement. Following the selection of the Plan Processor, the Participants will file with the Commission a statement identifying the Plan Processor and including the information required by SEC Rule 608.

(ii) within four (4) months after the Effective Date, each Participant shall, and through its adoption of its Compliance Rule shall require its Industry Members to, synchronize its Business Clocks as required by Section 6.8 and certify to the Chief Compliance Officer (in the case of Participants) or the applicable Participant (in the case of Industry Members) that such Participant has met this requirement;

(iii) within one (1) year after the Effective Date, each Participant shall report to the Central Repository Participant Data;

(iv) within fourteen (14) months after the Effective Date, each Participant shall implement a new or enhanced surveillance system(s) in accordance with Section 6.10;

(v) within two (2) years after the Effective Date, each Participant shall, through its adoption of its Compliance Rule, require its Industry Members (other than Small Industry Members) to report to the Central Repository Industry Member Data; and

(vi) within three (3) years after the Effective Date, each Participant shall, through its adoption of its Compliance Rule, require its Small Industry Members to report to the Central Repository Industry Member Data;

(vii) the Chief Compliance Officer will appropriately document objective milestones to assess progress toward the implementation of this Agreement; and

(b) Industry Members and Participants will be required to participate in testing with the Central Repository on a schedule to be determined by the Operating Committee.

(c) Section C.9 of Appendix C sets forth additional implementation details concerning the elimination of rules and systems.

Section 6.8. Timestamps and Synchronization of Business Clocks.

(a) Each Participant shall:

(i) synchronize its Business Clocks at a minimum to within 50 milliseconds of the time maintained by the National Institute of Standards and Technology, consistent with industry standards; and

(ii) through the adoption of its Compliance Rule, require its Industry Members to synchronize their respective Business Clocks at a minimum to within fifty (50)

milliseconds of the time maintained by the National Institute of Standards and Technology, consistent with industry standards.

(b) Each Participant shall, and through its adoption of its Compliance Rule shall require its Industry Members to, report information required by SEC Rule 613 and this Agreement to the Central Repository in milliseconds.³ To the extent that any Participant or Industry Member utilizes timestamps in increments finer than the minimum required in this Agreement, such Participant shall, and through its adoption of its Compliance Rule shall require its Industry Members to, utilize such finer increment when reporting CAT Data to the Central Repository so that all Reportable Events reported to the Central Repository can be accurately sequenced.

(c) The Chief Compliance Officer shall annually evaluate and make a recommendation to the Operating Committee as to whether industry standards have evolved such that (i) the synchronization standard in Section 6.8(a) should be shortened, or (ii) the required time stamp in Section 6.8(b) should be in finer increments.

Section 6.9. Technical Specifications.

(a) Publication. The Plan Processor shall publish technical specifications, and updates thereto as needed, providing detailed instructions regarding the submission of CAT Data by Participants and Industry Members to the Plan Processor for entry into the Central Repository (collectively, the “Technical Specifications”). The Technical Specifications will be made available on a publicly available web site to be developed and maintained by the Plan Processor. The initial Technical Specifications will be provided to the Operating Committee for approval by Supermajority Vote.

(b) Content. The Technical Specifications shall include a detailed description of the following:

- (i) the specifications for the layout of files and records submitted to the Central Repository;
- (ii) the process for the release of new data format specification changes;
- (iii) the process for industry testing for any changes to data format specifications;
- (iv) the procedures for obtaining feedback about and submitting corrections to information submitted to the Central Repository;
- (v) each data element, including permitted values, in any type of report submitted to the Central Repository;

³ The Participants plan to request an exemption from the requirement to report information to the Central Repository in milliseconds for manual order events – order events that involve non-electronic communication of information. The exemption would, instead, permit the reporting of such order events using time stamps at the granularity of a second.

validating the data;

- (vi) any error messages generated by the Plan Processor in the course of
- (vii) the process for file submissions (and re-submissions for corrected files);
- (viii) the storage and access requirements for all files submitted;
- (ix) metadata requirements for all files submitted to the CAT System;
- (x) any required secure network connectivity;
- (xi) data security standards, which shall, at a minimum, (A) satisfy all applicable regulations regarding database security, including provisions of Regulation Systems Compliance and Integrity under the Exchange Act proposed by the Commission on March 7, 2013, as finally adopted, (B) to the extent not otherwise provided for under this Agreement (including Appendix C hereto), set forth such provisions as may be necessary or appropriate to comply with SEC Rule 613(e)(4) and (C) comply with industry best practices; and
- (xii) any other items reasonably deemed appropriate by the Plan Processor.

(c) Amendments. Amendments to the Technical Specifications may be made in accordance with this Section 6.9(c). For purposes of this Section 6.9(c), an amendment to the Technical Specifications will be deemed “material” if it would require a Participant or an Industry Member to engage in significant changes to the coding necessary to submit information to the Central Repository pursuant to this Agreement (“Material Amendment”).

(i) Except for Material Amendments to the Technical Specifications, the Plan Processor shall have the sole discretion to amend and publish interpretations regarding the Technical Specifications as needed in furtherance of the purposes and requirements of this Agreement. All non-Material Amendments made to the Technical Specifications and all published interpretations will be provided to the Operating Committee in writing at least ten (10) days before being published. Such non-Material Amendments and published interpretations shall become effective ten (10) days following provision to the Operating Committee unless two (2) unaffiliated Participants call for a vote to be taken on the proposed amendment or interpretation. If an amendment or interpretation is called out for a vote by two or more unaffiliated Participants, the proposed amendment must be approved by Majority Vote of the Operating Committee.

(ii) The Operating Committee, by Supermajority Vote, shall approve any Material Amendments to the Technical Specifications.

(iii) The Operating Committee, by Supermajority Vote, may amend the Technical Specifications on its own motion.

Section 6.10. Surveillance.

(a) Surveillance Systems. Each Participant shall develop and implement a surveillance system, or enhance existing surveillance systems, reasonably designed to make use of the consolidated information contained in the Central Repository. Unless otherwise ordered by the SEC, within fourteen (14) months after the Effective Date, each Participant shall initially implement a new or enhanced surveillance system(s) as required by SEC Rule 613 and the preceding sentence.

(b) Coordinated Surveillance. Participants may, but are not required to, coordinate or share surveillance efforts through the use of regulatory services agreements and agreements adopted pursuant to Rule 17d-2 under the Exchange Act.

(c) Use of CAT Data by Regulators.

(i) The Plan Processor shall provide Participants and SEC regulatory staff with access to all CAT Data stored in the Central Repository. Regulators will have access to processed CAT Data through two different methods; an online targeted query tool, and user-defined direct queries and bulk extracts.

(A) The on-line targeted query tool will provide authorized users with the ability to retrieve CAT Data via an online query screen that includes the ability to choose from a variety of pre-defined selection criteria. Targeted queries must include date(s) and/or time range(s), as well as one or more of a variety of fields.

1. For targeted search criteria, the minimum acceptable response times would be measured in time increments of less than one minute. For the complex queries that either scan large volumes of CAT Data (e.g., multiple trade dates) or return large result sets (>1,000,000 records), the response time should generally be available within 24 hours of the submission of the request. Regardless of the complexity of the criteria used within the online query tool, any query request for CAT Data within one trade date of the most recent 12 months should return results within three (3) hours.

2. Online query tool searches that include trade data only in the search criteria should meet the following requirements:

a. a search for all trades in a single security for a specific Customer or CAT Reporter in a specified time window for a single date should return results within one (1) minute;

b. a search for all trades for a specific Customer or CAT Reporter in a specified time window for a single date should return results within one (1) minute;

c. a search for all trades for a specific Customer or CAT Reporter in a specified date range (maximum one (1) month) should return results within 30 minutes; and

d. a search for all trades for a specific Customer or CAT Reporter in a specified date range (maximum 12 month duration from the most recent 24 months) should return results within six (6) hours.

(B) The user-defined direct queries and bulk extracts will provide authorized users with the ability to retrieve CAT Data via a query tool or language that allows users to query all available attributes and data sources.

1. For user-defined direct queries and bulk extracts, the minimum acceptable response times would be measured in time increments of less than one minute. For complex queries that either scan large volumes of CAT Data (e.g., multiple trade dates) or return large result sets (>1,000,000 records), the response time should generally be available within 24 hours of the submission of the request.

2. User-defined queries that include trade data only in the search criteria should meet the following requirements:

a. a search for all trades in a single security for a specific Customer or CAT Reporter in a specified time window for a single date should return results within one (1) minute;

b. a search for all trades for a specific Customer or CAT Reporter in a specified time window for a single date should return results within one (1) minute;

c. a search for all trades for a specific Customer or CAT Reporter in a specified date range (maximum one (1) month) should return results within 30 minutes; and

d. a search for all trades for a specific Customer or CAT Reporter in a specified date range (maximum 12 month duration from the most recent 24 months) should return results within six (6) hours.

(ii) Extraction of CAT Data shall be consistent with all permission rights granted by the Plan Processor. All CAT Data returned shall be encrypted, and PII data shall be masked unless users have permission to view the CAT Data that has been requested.

(iii) The Plan Processor shall implement an automated mechanism to monitor direct query usage. Such monitoring shall include automated alerts to notify the Plan Processor of potential issues with bottlenecks or excessively long queues for queries or CAT Data extractions. The Plan Processor shall provide the Operating Committee or its designee(s) details as to how the monitoring will be accomplished and the metrics that will be used to trigger alerts.

(iv) The Plan Processor shall reasonably assist Participants and regulatory staff (including those of Participants) with creating queries.

(v) Without limiting the manner in which regulatory staff (including those of Participants) may submit queries, the Plan Processor shall submit queries on behalf of a regulatory staff (including those of Participants) as reasonably requested.

(vi) The Plan Processor shall staff a CAT help desk to provide technical expertise to assist regulatory staff (including those of Participants) with questions about the content and structure of the CAT Data.

Section 6.11. Debt Securities and Transactions. Within six (6) months after the Effective Date, the Participants shall jointly provide to the SEC a document outlining how the Participants could incorporate into the consolidated audit trail information with respect to debt securities, including primary market transactions in debt securities, which includes details for each Order and Reportable Event that may be required to be provided, which market participants may be required to provide the data, the implementation timeline, and a cost estimate.

Section 6.12. Information Security Program. The Plan Processor shall implement and maintain technology policies and procedures (including policies and procedures implementing the requirements of Section A.4 of Appendix C) that will safeguard CAT Data reported to the Central Repository and comply with (1) all provisions of the regulation Systems Compliance and Integrity under the Exchange Act proposed by the Commission on March 7, 2013, as finally adopted, applicable to database security, (2) industry best practices for database security and (3) the standards and requirements set forth in the following Special Publications of the National Institute of Standards and Technology, in each case as such standards and requirements may be replaced by successor publications or modified, amended, supplemented: 800-23 (Guidelines to Federal Organizations on Security Assurance and Acquisition/Use of Tested/Evaluated Products); 800-115 (Technical Guide to Information Security Testing and Assessment); 800-133 (Recommendation for Cryptographic Key Generation); and 800-137 (Information Security Continuous Monitoring for Federal Information Systems and Organizations). Such policies and procedures shall be subject to periodic review and audit by, or at the direction of, the Operating Committee.

ARTICLE VII

CAPITAL ACCOUNTS

Section 7.1. Capital Accounts.

(a) A separate capital account (“Capital Account”) shall be established and maintained by the Company for each Participant in accordance with § 704(b) of the Code and Treasury Regulation § 1.704-1 (b)(2)(iv). There shall be credited to each Participant’s Capital Account the capital contributions (at fair market value in the case of contributed property) made by such Participant (which shall be deemed to be zero for the initial Participants), and allocations of Company profits and gain (or items thereof) to such Participant pursuant to Article VIII (excluding those allocated in Section 8.3). Each Participant’s Capital Account shall be decreased by the amount of distributions (at fair market value in the case of property distributed in kind) to such Participant, and allocations of Company losses to such Participant pursuant to Article VIII (including expenditures which can neither be capitalized nor deducted for tax purposes, organization and syndication expenses not subject to amortization and loss on sale or disposition of Company property, whether or not disallowed under §§ 267 or 707 of the Code). Capital Accounts shall not be adjusted to reflect a Participant’s share of liabilities under § 752 of the Code.

(b) If, following the date hereof, money or property is contributed to the Company in other than a de minimis amount in exchange for an equity interest in the Company (which shall not include the Participation Fee paid by a new Participant pursuant to Section 3.3, which is not treated as a contribution to capital), or money or property is distributed to a Participant in exchange for an interest in the Company but the Company is not liquidated, the Capital Accounts of the Participants shall be adjusted based on the fair market value of Company property at the time of such contribution or distribution and the unrealized income, gain, loss, or deduction inherent in the Company property which has not previously been reflected in the Capital Accounts shall be allocated among the Participants as if there had been a taxable disposition of the Company property at its fair market value on such date. The fair market value of contributed, distributed, or revalued property shall be approved by the Operating Committee or, if there is no such agreement, by an appraisal by an independent third party valuation firm selected by the Operating Committee by Majority Vote.

(c) The foregoing provisions and the other provisions of this Agreement relating to the maintenance of Capital Accounts are intended to comply with Treasury Regulation § 1.704-1(b) promulgated under § 704(b) of the Code, and shall be interpreted and applied in a manner consistent with such Regulations.

Section 7.2. Interest. Except as otherwise provided herein, no Participant shall be entitled to receive interest on amounts in its Capital Account.

ARTICLE VIII

ALLOCATIONS OF INCOME AND LOSS; DISTRIBUTIONS

Section 8.1. Periodic Allocations. As of the end of each calendar quarter or such other period selected by the Operating Committee, the net profit or net loss of the Company (and each item of income, gain, loss, deduction, and credit for federal income tax purposes) for the period shall be determined, and in the event the book value of any Company property is adjusted pursuant to Treasury Regulation § 1.704-1 (b)(2)(iv)(f), net profit, net losses and items thereof shall be determined as provided in Treasury Regulation § 1.704-1(b)(2)(iv)(g). Except as provided in Section 8.2, such net profit or net loss (and each item of income, gain, loss, deduction, and credit) shall be allocated equally among the Participants.

Section 8.2. Special Allocations. Notwithstanding Section 8.1, this Agreement shall be deemed to contain, and the allocations of net profit and net loss as set forth in Section 8.1 shall be subject to, each of the following: (a) a “qualified income offset” as described in Treasury Regulation § 1.704-1(b)(2)(ii)(d); (b) a “partnership minimum gain chargeback” as described in Treasury Regulation § 1.704-2(f); and (c) a “partner non-recourse debt minimum gain chargeback” as described in Treasury Regulation § 1.704-2(i)(4). The Participants intend that the allocations required to be made pursuant to Section 8.1 and this Section 8.2 shall satisfy the requirements of Code § 704(b) and the Treasury Regulations promulgated thereunder. Without the consent of the Participants, the Operating Committee shall have the power to interpret and amend the provisions of Section 8.1 and this Section 8.2 in the manner necessary to ensure such compliance provided that such amendments shall not change the amounts distributable to a Participant pursuant to this Agreement.

Section 8.3. Allocations Pursuant to § 704(c) of the Code. In accordance with § 704(c) of the Code and the Treasury Regulations promulgated thereunder, income, gain, loss, and deduction with respect to any property contributed to the capital of the Company shall, solely for tax purposes, be allocated among the Participants so as to take account of any variation between the adjusted basis of such property to the Company for federal income tax purposes and its initial fair market value. In the event the book value of any Company property is adjusted pursuant to Treasury Regulation § 1.704-1 (b)(2)(iv)(f), allocations of income, gain, loss, and deduction with respect to such asset shall take account of any variation between the adjusted basis of such asset for federal income tax purposes and its adjusted book value in the same manner as under § 704(c) of the Code and the Treasury Regulations promulgated thereunder. Such allocations shall be made by the Operating Committee using the “traditional method” set forth in Treasury Regulation § 1.704-3(b). Allocations pursuant to this Section 8.3 are solely for purposes of federal, state, and local taxes and shall not affect, or in any way be taken into account in computing, any Participant’s share of distributions pursuant to any provision of this Agreement.

Section 8.4. Changes in Participants’ Interests. If during any fiscal period of the Company there is a change in any Participant’s Company Interest as a result of the admission or withdrawal of one or more Participants, the net profit, net loss or any other item allocable to the Participants under this Article VIII for the period shall be allocated among the Participants so as to reflect their varying interests in the Company during the period. In the event that the change in the Company Interests of the Participants results from the admission or withdrawal of a Participant,

the allocation of net profit, net loss, or any other item allocable among the Participants under this Article VIII shall be made on the basis of an interim closing of the Company's books as of each date on which a Participant is admitted to or withdraws from the Company; provided that the Company may use interim closings of the books as of the end of the month preceding and the month of the admission or withdrawal, and prorate the items for the month of withdrawal on a daily basis, unless the Operating Committee determines that such an allocation would be materially unfair to any Participant. In the event that the change in the Company Interests of the Participants results from a transfer of all or any portion of a Company Interest by a Participant, the net profit, net loss, or any other items allocable among the Participants under this Article VIII shall be determined on a daily, monthly, or other basis, as determined by the Operating Committee using any permissible method under § 706 of the Code and the Treasury Regulations promulgated thereunder.

Section 8.5. Distributions.

(a) Cash and property of the Company shall be distributed to the Participants only as approved by the Operating Committee by Supermajority Vote (subject to § 18-607 of the Delaware Act). Except as otherwise provided in Section 10.2, all Participants shall participate equally in any such distribution.

(b) No Participant shall have the right to require any distribution of any assets of the Company in kind. If any assets of the Company are distributed in kind, such assets shall be distributed on the basis of their fair market value net of any liabilities as reasonably determined by the Operating Committee. Any Participant entitled to any interest in such assets shall, unless otherwise determined by the Operating Committee, receive separate assets of the Company and not an interest as a tenant-in-common with other Participants so entitled in any asset being distributed.

Section 8.6. Tax Status.

(a) The Operating Committee by Supermajority Vote, without the consent of any Participant, may cause the Company to (i) make an election to be treated as a corporation for U.S. federal income tax purposes by filing Form 8832 with the Internal Revenue Service or (ii) be treated a "trade association" as described in § 501(c)(6) of the Code.

(b) If the Company so elects to be taxed as a corporation or is treated as a "trade association" as described in § 501(c)(6) of the Code, it shall continue to maintain Capital Accounts in the manner provided in this Agreement, consistent with provisions of § 704 of the Code, to determine the economic rights of the Participants under this Agreement, notwithstanding that it is not taxed as a partnership for U.S. federal income tax purposes, as interpreted by the Operating Committee and the Company's counsel in a manner to preserve the economic rights and obligations of the Participants under this Agreement. Sections 8.2, 8.3 and 9.5 shall not be applicable with respect to any period during with the Company is treated as a corporation for U.S. federal income tax purposes; provided, however, if the Company is initially treated as a partnership for U.S. federal income tax purposes and has made allocations under Section 8.2, it shall adjust the Capital Accounts to reflect the amount the Capital Accounts would have been had all allocations been made pursuant to Section 8.1.

ARTICLE IX

RECORDS AND ACCOUNTING; REPORTS

Section 9.1. Books and Records. The Company shall maintain complete and accurate books and records of the Company, which shall be maintained and be available, in addition to any documents and information required to be furnished to the Participants under the Act, at the office of the Plan Processor and/or such other location(s) as may be designated by the Company for examination and copying by any Participant or its duly authorized representative, at such Participant's reasonable request and at its expense during ordinary business hours for any purpose reasonably related to such Participant's Company Interest in the Company and in compliance with such other conditions as may be reasonably established by the Operating Committee. Except as provided in this Section 9.1 or required by non-waivable provisions of applicable law, no Participant shall have any right to examine or copy any of the books and records of the Company.

Section 9.2. Accounting.

(a) Except as provided in Section 9.2(b) and Section 9.3, the Operating Committee shall maintain a system of accounting established and administered in accordance with GAAP (or other standard if determined appropriate by the Operating Committee), and all financial statements or information that may be supplied to the Participants will be prepared in accordance with GAAP (except that unaudited statements will be subject to year-end adjustments and need not include footnotes) (or other standard if determined appropriate by the Operating Committee). To the extent the Operating Committee determines it advisable, the Company will prepare and provide to each Participant (1) within 30 days after the end of each calendar month, an unaudited balance sheet, income statement, statement of cash flows and statement of changes in each Participant's Capital Account for, or as of the end of, (x) such month and (y) the portion of the then current Fiscal Year ending at the end of such month and (2) as soon as practicable after the end of each Fiscal Year, an audited balance sheet, income statement, statement of cash flows and statement of changes in each Participant's Capital Account for, or as of the end of, such year. The Fiscal Year shall be the calendar year unless otherwise determined by the Operating Committee.

(b) Assets received by the Company as capital contributions shall be recorded at their fair market values, and the Capital Account maintained for each Participant shall comply with Treasury Regulations § 1.704-1 (b)(2)(iv) promulgated under § 704(b) of the Code. In the event fair market values for certain assets of the Company are not determined by appraisals, the fair market value for such assets shall be reasonably agreed to among the Participants as if in arm's-length negotiations.

(c) All matters concerning accounting procedures shall be determined by the Operating Committee.

Section 9.3. Tax Returns. The Operating Committee shall cause federal, state, provincial, and local income tax returns for the Company to be prepared and timely filed with the appropriate authorities. If the Company is taxed as a partnership, it shall arrange for the timely delivery to the Participants of such information as is necessary for such Participants to prepare their federal, state and local tax returns.

Section 9.4. Company Funds. Pending use in the business of the Company or distribution to the Participants, the funds of the Company shall be held and/or invested in accordance with the then effective cash management and investment policy adopted by the Operating Committee.

Section 9.5. Tax Matters Partner.

(a) A Participant designated by the Operating Committee shall serve as the “Tax Matters Partner” of the Company for all purposes pursuant to §§ 6221-6231 of the Code. As Tax Matters Partner, the Tax Matters Partner shall (i) furnish to each Participant affected by an audit of the Company income tax returns a copy of each notice or other communication received from the Internal Revenue Service or applicable state authority (except such notices or communications as are sent directly to the Participant), (ii) keep such Participant informed of any administrative or judicial proceeding, as required by § 6623(g) of the Code, (iii) allow each such Participant an opportunity to participate in all such administrative and judicial proceedings, and (iv) advise and consult with each such Participant as to proposed adjustments to the federal or state income tax returns of the Company.

(b) The Tax Matters Partner, as such, shall not have the authority to (i) enter into a settlement agreement with the Internal Revenue Service that purports to bind any Participant, without the written consent of such Participant, or (ii) enter into an agreement extending the period of limitations as contemplated in § 6229(b)(1)(B) of the Code without the prior approval of the Operating Committee.

(c) The Company shall not be obligated to pay any fees or other compensation to the Tax Matters Partner in its capacity as such, but may pay compensation to the Tax Matters Partner for services rendered to the Company in any other capacity. However, the Company shall reimburse the Tax Matters Partner for any and all out-of-pocket costs and expenses (including reasonable attorneys and other professional fees) incurred by it in its capacity as Tax Matters Partner. The Company shall indemnify, defend and hold the Tax Matters Partner harmless from and against any loss, liability, damage, costs or expense (including reasonable attorneys’ fees) sustained or incurred as a result of any act or decision concerning Company tax matters and within the scope of such Participant’s responsibilities as Tax Matters Partner, so long as such act or decision does not constitute gross negligence or willful misconduct.

Section 9.6. Confidentiality.

(a) For purposes of this Agreement, “Information” means information disclosed by or on behalf of the Company or a Participant (the “Disclosing Party”) to the Company or any other Participant (the “Receiving Party”) in connection with this Agreement or the CAT System, but excludes any CAT Data or information otherwise disclosed pursuant to the requirements of SEC Rule 613. The Receiving Party agrees to maintain the Information in confidence with the same degree of care it holds its own confidential information (but in any event not less than reasonable care). A Receiving Party may only disclose Information to its Representatives (as defined below) on a need-to-know basis, and only to those of such Representatives whom shall have agreed to abide by the non-disclosure and non-use provisions in this Section 9.6. Each Receiving Party that is a Participant agrees that he, she or it will not use for

any purpose, other than in connection with the operation of the Company, and the Company agrees not to use for any purpose not expressly authorized by the Disclosing Party, any Information. The “Representatives” of a Person are such Person’s Affiliates and the respective directors, managers, officers, employees, consultants, advisors and agents of such Person and such Person’s Affiliates; provided, however, that a Participant is not a Representative of the Company. The obligations set forth in this Section 9.6(a) shall survive indefinitely (including after a Participant ceases to hold any Company Interest) but shall not apply to: (i) any Information that was already lawfully in the Receiving Party’s possession and, to the knowledge of the Receiving Party, free from any confidentiality obligation to the Disclosing Party at the time of receipt from the Disclosing Party; (ii) any Information that is, now or in the future, public knowledge through no act or omission in breach of this Agreement by the Receiving Party; (iii) any Information that was lawfully obtained from a third party having, to the knowledge of the Receiving Party, the right to disclose it free from any obligation of confidentiality or (iv) any Information that was independently developed by the Receiving Party prior to disclosure to it pursuant hereto and without recourse to or reliance upon Information disclosed to it pursuant hereto as established by its written records or other competent evidence. The obligations set forth in this Section 9.6(a) shall not restrict (x) disclosures that are, in the opinion of the Receiving Party after consultation with counsel, required to be made by applicable laws and regulations, stock market or exchange requirements or the rules of any self-regulatory organization having jurisdiction, (y) disclosures required to be made pursuant to an order, subpoena or legal process or (z) disclosures reasonably necessary for the conduct of any litigation or arbitral proceeding among the Participants (and their respective Representatives) and/or the Company; provided that the Receiving Party shall, to the extent not prohibited by applicable law, notify the Disclosing Party prior to making any disclosure permitted by the foregoing clause (x) or clause (y), and, in the case of a disclosure permitted by the foregoing clause (y), shall consult with the Disclosing Party with respect to such disclosure, and prior to making such disclosure, to the extent not prohibited by applicable law, shall permit the Disclosing Party, at such Disclosing Party’s cost and expense, to seek a protective order or similar relief protecting the confidentiality of such information.

(b) The Company shall not, and shall cause its Representatives not to, disclose any Information of a Participant to any other Participant without the prior written approval of the disclosing Participant.

(c) A Participant shall be free, in its own discretion, to share Information of such Participant to other Participants without the approval of the Company.

ARTICLE X

DISSOLUTION AND TERMINATION

Section 10.1. Dissolution of Company. The Company shall, subject to the SEC’s approval, dissolve and its assets and business shall be wound up upon the occurrence of any of the following events:

(a) unanimous written consent of the Participants to dissolve the Company;

- (b) an event that makes it unlawful or impossible for the Company business to be continued;
- (c) the termination of one or more Participants such that there is only one remaining Participant; or
- (d) the entry of a decree of judicial dissolution under Section 18-802 of the Delaware Act.

Section 10.2. Liquidation and Distribution. Following the occurrence of an event described in Section 10.1, the Operating Committee shall act as liquidating trustee and shall wind up the affairs of the Company by (a) selling its assets in an orderly manner (so as to avoid the loss normally associated with forced sales), and (b) applying and distributing the proceeds of such sale, together with other funds held by the Company: (i) first, to the payment of all debts and liabilities of the Company; (ii) second, to the establishments of any reserves reasonably necessary to provide for any contingent recourse liabilities and obligations; and (iii) third, to the Participants in proportion to the balances in their positive Capital Accounts (after such Capital Accounts have been adjusted for all items of income, gain, deduction, loss and items thereof in accordance with Article VII through the date of the such distribution) at the date of such distribution.

Section 10.3. Termination. Each of the Participants shall be furnished with a statement prepared by the Company's independent accountants, which shall set forth the assets and liabilities of the Company as of the date of the final distribution of the Company's assets under Section 10.2 and the net profit or net loss for the fiscal period ending on such date. Upon compliance with the distribution plan set forth in Section 10.2, the Participants shall cease to be such, and the liquidating trustee shall execute, acknowledge, and cause to be filed a certificate of cancellation of the Company. Upon completion of the dissolution, winding up, liquidation and distribution of the liquidation proceeds, the Company shall terminate.

ARTICLE XI

FUNDING OF THE COMPANY

Section 11.1. Funding Authority.

(a) On an annual basis the Operating Committee shall approve an operating budget for the Company. The budget shall include the projected costs of the Company, including the costs of developing and operating the CAT for the upcoming year, and the sources of all revenues to cover such costs, as well as the funding of any reserve that the Operating Committee reasonably deems appropriate for prudent operation of the Company.

(b) Subject to Section 11.2 below, the Operating Committee shall have discretion to establish funding for the Company, including: (i) establishing fees that the Participants shall pay; and (ii) establishing fees for Industry Members that shall be implemented by Participants. The Participants shall file with the SEC under Section 19(b) of the Exchange Act any such fees on Industry Members that the Operating Committee approves, and such fees shall be labeled as "Consolidated Audit Trail Funding Fees."

(c) To fund the initial development and implementation of the CAT, the Company shall time the imposition and collection of all fees on Participants and Industry Members in a manner reasonably related to the timing when the Company expects to incur such initial development and implementation costs.

Section 11.2. Funding Principles. In establishing the funding of the Company, the Operating Committee shall seek:

(a) to create transparent, predictable revenue streams for the Company that are aligned with the anticipated costs to build, operate and administer the CAT and the other costs of the Company;

(b) to establish an allocation of the Company's related costs among Participants and Industry Members that is consistent with the Exchange Act, taking into account the timeline for implementation of the CAT and distinctions in the securities trading operations of Participants and Industry Members and their relative impact upon Company resources and operations;

(c) to provide for ease of billing and other administrative functions;

(d) to avoid any disincentives such as placing an inappropriate burden on competition and a reduction in market quality; and

(e) to build financial stability to support the Company as a going concern.

Section 11.3. Recovery. The Company will recover its operating costs as follows:

(a) The Operating Committee may establish fixed fees to be payable by Participants and Industry Members, with the Operating Committee having discretion, but not the obligation, to establish categories of fixed fees, depending on the securities trading operations of the Participant or Industry Member, the type of business in which the Participant or Industry Member engages and any other factors the Operating Committee reasonably determines appropriate.

(b) The Operating Committee may establish Industry Member and Participant activity fees based on the aggregate dollar amount of trading volume, share or contract trading volume, message traffic, or any other factors that the Operating Committee reasonably determines appropriate, with the Operating Committee having discretion, but not the obligation, to establish differing levels of such fees depending on factors the Operating Committee reasonably determines appropriate.

(c) The Operating Committee may establish any other fees ancillary to the operation of the CAT that it reasonably determines appropriate, including: fees for the late or inaccurate reporting of information to the CAT; fees for correcting submitted information; and fees based on access and use of the CAT for regulatory and oversight purposes (and not including any reporting obligations).

(d) For the avoidance of doubt, notwithstanding anything to the contrary in any of Sections 11.3(a), 11.3(b) or 11.3(c), the Operating Committee may establish, as it reasonably

determines appropriate, any fixed fee, any variable fee, any combination of a fixed fee and a variable fee, or any other fee.

(e) The Company shall make publicly available a schedule of effective fees and charges adopted pursuant to this Agreement as in effect from time to time. The Operating Committee shall review such fee schedule on at least an annual basis and shall make any changes to such fee schedule that it deems appropriate. The Operating Committee is authorized to review such fee schedule on a more regular basis, but shall not make any changes on more than a semi-annual basis unless, pursuant to a Supermajority Vote, the Operating Committee concludes that such change is necessary for the adequate funding of the Company.

Section 11.4. Collection of Fees. The Operating Committee shall establish a system for the collection of fees authorized under this Article XI. The Operating Committee may include such collection responsibility as a function of the Plan Processor or another administrator. Alternatively, the Operating Committee may use the facilities of a clearing agency registered under Section 17A of the Exchange Act to provide for the collection of such fees. Each Industry Member shall pay all applicable fees authorized under this Article XI within thirty (30) days after receipt of an invoice or other notice indicating payment is due (unless a longer payment period is otherwise indicated). If an Industry Member fails to pay any such fee when due (as determined in accordance with the preceding sentence), such Industry Member shall pay interest on the outstanding balance from such due date until such fee is paid at a per annum rate equal to the lesser of (a) the Prime Rate plus 300 basis points or (b) the maximum rate permitted by applicable law. Each Participant shall pay all applicable fees authorized under this Article XI as required by Section 3.7(b).

Section 11.5. Fee Disputes. Disputes with respect to fees charged to Participants or Industry Members pursuant to this Article XI shall be determined by the Operating Committee. Decisions by the Operating Committee on such matters shall be binding on Participants and Industry Members, without prejudice to the rights of any Participant or Industry Member to seek redress from the SEC pursuant to SEC Rule 608 or in any other appropriate forum.

ARTICLE XII MISCELLANEOUS

Section 12.1. Notices And Addresses. All notices required to be given under this Agreement shall be in writing and may be delivered by certified or registered mail, postage prepaid, by hand, or by any private overnight courier service. Such notices shall be mailed or delivered to the Participants at the addresses set forth on Exhibit A to this Agreement or such other address as a Participant may notify the other Participants of in writing. Any notices to be sent to the Company shall be delivered to the principal place of business of the Company or at such other address as the Operating Committee may specify in a notice sent to all of the Participants. Notices shall be effective (i) if mailed, on the date three (3) days after the date of mailing or (ii) if hand delivered or delivered by private courier, on the date of delivery.

Section 12.2. Governing Law; Submission to Jurisdiction. This Agreement shall be governed by and construed in accordance with the Delaware Act and internal laws and decisions of the State of Delaware without giving effect to any choice or conflict of law provision or rule

(whether of the State of Delaware or any other jurisdiction) that would cause the application of laws of any jurisdictions other than those of the State of Delaware; provided that the rights and obligations of the Participants, Industry Members and other Persons contracting with the Company in respect of the matters covered by this Agreement shall at all times also be subject to any applicable provisions of the Exchange Act and any rules and regulations promulgated thereunder. Each of the Company and the Participants (a) consents to submit itself to the exclusive personal jurisdiction of the Court of Chancery of the State of Delaware, New Castle County, or, if that court does not have jurisdiction, a federal court sitting in Wilmington, Delaware in any action or proceeding arising out of or relating to this Agreement or any of the transactions contemplated by this Agreement, (b) agrees that all claims in respect of such action or proceeding shall be heard and determined only in any such court, (c) agrees that it shall not attempt to deny or defeat such personal jurisdiction by motion or other request for leave from any such court, and (d) agrees not to bring any action or proceeding arising out of or relating to this Agreement or any of the transaction contemplated by this Agreement in any other court. Each of the Company and the Participants waives any defense of inconvenient forum to the maintenance of any action or proceeding so brought and waives any bond, surety or other security that might be required of any other Person with respect thereto. The Company or any Participant may make service on the Company or any other Participant by sending or delivering a copy of the process to the party to be served at the address and in the manner provided for the giving of notices in Section 12.1. Nothing in this Section 12.2, however, shall affect the right of any Person to serve legal process in any other manner permitted by law.

Section 12.3. Amendments. Except as provided by Section 3.3, Section 3.4 and Section 3.7, this Agreement may be amended from time to time only by a written amendment authorized by the affirmative vote of not less than two-thirds of all of the Participants or with respect to Section 3.8 by the affirmative vote of all of the Participants, in each case that has been approved by the SEC pursuant to SEC Rule 608 or has otherwise become effective under SEC Rule 608. Notwithstanding the foregoing or anything else to the contrary, to the extent the SEC grants exemptive relief applicable to any provision of this Agreement, Participants and Industry Members shall be entitled to comply with such provision pursuant to the terms of the exemptive relief so granted at the time such relief is granted irrespective of whether this Agreement has been amended.

Section 12.4. Successors and Assigns. Subject to the restrictions on Transfers set forth herein, this Agreement (a) shall be binding upon, and inure to the benefit of, the Company and the Participants, and their respective successors and permitted assigns, and (b) may not be assigned except in connection with a Transfer of Company Interests permitted hereunder.

Section 12.5. Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which shall constitute one instrument. Any counterpart may be delivered by facsimile transmission or by electronic communication in portable document format (.pdf) or tagged image format (.tif), and the parties hereto agree that their electronically transmitted signatures shall have the same effect as manually transmitted signatures.

Section 12.6. Modifications to be in Writing; Waivers. This Agreement constitutes the entire understanding of the parties hereto with respect to the subject matter hereof, and no

amendment, modification or alteration shall be binding unless the same is in writing and adopted in accordance with Section 12.3. No waiver of any provision of this Agreement shall be valid unless the same shall be in writing and signed by each Person granting the waiver. No waiver by any Person of any default or breach hereunder, whether intentional or not, shall be deemed to extend to any prior or subsequent default or breach or affect in any way any rights arising by virtue of any prior or subsequent such occurrence.

Section 12.7. Captions. The captions are inserted for convenience of reference only and shall not affect the construction of this Agreement.

Section 12.8. Validity and Severability. If any provision of this Agreement shall be held invalid or unenforceable, that shall not affect the validity or enforceability of any other provisions of this Agreement, all of which shall remain in full force and effect. If the final judgment of a court of competent jurisdiction declares that any term or provision hereof is invalid or unenforceable, each of the Company and the Participants agrees that the body making the determination of invalidity or unenforceability shall have the power to reduce the scope, duration or area of the term or provision, to delete specific words or phrases, or to replace any invalid or unenforceable term or provision with a term or provision that is valid and enforceable and that comes closest to expressing the intention of the invalid or unenforceable term or provision, and this Agreement shall be enforceable as so modified.

Section 12.9. Third Party Beneficiaries. Except to the extent provided in any separate written agreement between the Company and another Person, the provisions of this Agreement are not intended to be for the benefit of any creditor or other Person (other than a Participant in its capacity as such) to whom any debts, liabilities or obligations are owed by (or who otherwise has any claim against) the Company or any Participants. Moreover, notwithstanding anything contained in this Agreement (but subject to the immediately following sentence), no such creditor or other Person shall obtain any rights under this Agreement or shall, by reason of this Agreement, make any claim in respect of any debt, liability or obligation (or otherwise) against the Company or any Participant. Notwithstanding the foregoing provisions of this Section 12.9, each Person entitled to indemnification under Section 4.7 that is not a party to this Agreement shall be deemed to be an express third party beneficiary of this Agreement for all purposes relating to such Person's indemnification and exculpation rights hereunder.

Section 12.10. Expenses. Except as may be otherwise specifically provided to the contrary in this Agreement or determined by the Operating Committee, each of the Company the Participants shall bear its own costs and expenses (including legal and accounting fees and expenses) incurred in connection with this Agreement, including those incurred in connection with all periodic meetings of the Participants or the Operating Committee, and the transactions contemplated hereby.

Section 12.11. Specific Performance. Each of the Company and the Participants acknowledges and agrees that one or more of them would be damaged irreparably in the event any of the provisions of this Agreement are not performed in accordance with their specific terms or otherwise are breached. Accordingly, each such Person agrees that each other such Person may be entitled to an injunction or injunctions to prevent breaches of the provisions of this Agreement and to enforce specifically this Agreement and the terms and provisions hereof in any action instituted

in any court having jurisdiction over the Parties and the matter, in each case with no need to post bond or other security.

Section 12.12. Waiver of Partition. Each Participant agrees that irreparable damage would be done to the Company if any Participant brought an action in court to partition the assets or properties of the Company. Accordingly, each Participant agrees that such Person shall not, either directly or indirectly, take any action to require partition or appraisal of the Company or of any of the assets or properties of the Company, and notwithstanding any provisions of this Agreement to the contrary, each Participant (and such Participant's successors and permitted assigns) accepts the provisions of the Agreement as such Person's sole entitlement on termination, dissolution and/or liquidation of the Company and hereby irrevocably waives any and all right to maintain any action for partition or to compel any sale or other liquidation with respect to such Person's interest, in or with respect to, any assets or properties of the Company. Each Participant agrees not to petition a court for the dissolution, termination or liquidation of the Company.

Section 12.13. Construction. The Company and all Participants have participated jointly in negotiating and drafting this Agreement. If an ambiguity or a question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the Company and all Participants, and no presumption or burden of proof shall arise favoring or disfavoring any Person by virtue of the authorship of any provision of this Agreement.

Section 12.14. Incorporation of Exhibits, Appendixes, Attachments, Recitals and Schedules. The Exhibits, Appendixes, Attachments, Recitals and Schedules identified in this Agreement are incorporated herein by reference and made a part hereof.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Participants have executed this Limited Liability Company Agreement as of the day and year first above written.

PARTICIPANTS:

BATS EXCHANGE, INC.

By: _____

Name: _____

Title: _____

BATS Y-EXCHANGE, INC.

By: _____

Name: _____

Title: _____

BOX OPTIONS EXCHANGE LLC

By: _____

Name: _____

Title: _____

C2 OPTIONS EXCHANGE, INCORPORATED

By: _____

Name: _____

Title: _____

CHICAGO BOARD OPTIONS EXCHANGE, INCORPORATED

By: _____

Name: _____

Title: _____

CHICAGO STOCK EXCHANGE, INC.

By: _____

Name: _____

Title: _____

EDGA EXCHANGE, INC.

By: _____

Name: _____

Title: _____

EDGX EXCHANGE, INC.

By: _____

Name: _____

Title: _____

FINANCIAL INDUSTRY REGULATORY AUTHORITY, INC.

By: _____

Name: _____

Title: _____

ISE GEMINI, LLC

By: _____

Name: _____

Title: _____

INTERNATIONAL SECURITIES EXCHANGE, LLC

By: _____

Name: _____

Title: _____

MIAMI INTERNATIONAL SECURITIES EXCHANGE LLC

By: _____

Name: _____

Title: _____

NASDAQ OMX BX, INC.

By: _____

Name: _____

Title: _____

NASDAQ OMX PHLX LLC

By: _____

Name: _____

Title: _____

THE NASDAQ STOCK MARKET LLC

By: _____

Name: _____

Title: _____

NATIONAL STOCK EXCHANGE, INC.

By: _____

Name: _____

Title: _____

NEW YORK STOCK EXCHANGE LLC

By: _____

Name: _____

Title: _____

NYSE MKT LLC

By: _____

Name: _____

Title: _____

NYSE ARCA, INC.

By: _____

Name: _____

Title: _____

EXHIBIT A

PARTICIPANTS IN CAT NMS, LLC

BATS Exchange, Inc. 8050 Marshall Drive, Lenexa, KS 66214 USA	BATS Y-Exchange, Inc. 8050 Marshall Drive, Lenexa, KS 66214 USA	BOX Options Exchange LLC 101 Arch Street, Suite 610 Boston, MA 02110
C2 Options Exchange, Incorporated 400 South LaSalle Street Chicago, IL 60605	Chicago Board Options Exchange, Incorporated 400 South LaSalle Street Chicago, IL 60605	Chicago Stock Exchange, Inc. 400 South LaSalle Street Chicago, IL 60605
EDGA Exchange, Inc. 545 Washington Boulevard, 6th Fl. Jersey City, NJ 07310	EDGX Exchange, Inc. 545 Washington Boulevard, 6th Fl. Jersey City, NJ 07310	Financial Industry Regulatory Authority, Inc. 1735 K Street Washington DC, 20006
ISE Gemini, LLC 60 Broad Street New York, New York 10004	International Securities Exchange, LLC 60 Broad Street New York, New York 10004	Miami International Securities Exchange LLC 7 Roszel Road, 5th floor Princeton, NJ 08540
NASDAQ OMX BX, Inc. One Liberty Plaza 165 Broadway New York, NY 10006	NASDAQ OMX PHLX LLC 1900 Market Street Philadelphia, PA 19103	The NASDAQ Stock Market LLC One Liberty Plaza 165 Broadway New York, NY 10006
National Stock Exchange, Inc. 101 Hudson Street Suite 1200 Jersey City, NJ 07302	New York Stock Exchange LLC 11 Wall St, New York, NY 10005	NYSE MKT LLC 11 Wall St, New York, NY 10005
NYSE Arca, Inc. 11 Wall St, New York, NY 10005		

APPENDIX A

**Consolidated Audit Trail National Market System Plan Request for Proposal, issued
February 26, 2013, version 3.0 updated March 4, 2014**

APPENDIX B

PARTICIPANT RULE TEMPLATE

Rule [XXX]. Each member shall comply with, as applicable,

- (a) the requirements of SEC Rule 613 (17 CFR 242.613, including, but not limited to, paragraphs (c)(2)-(c)(7), (d)(1) and (d)(2) thereof), and
- (b) the requirements of the NMS Plan Governing the Consolidated Audit Trail.

APPENDIX C

DISCUSSION OF CONSIDERATIONS

SEC RULE 613(A)(1) CONSIDERATIONS

SEC Rule 613(a) requires the Participants to discuss the following “considerations” to detail how the Participants propose to implement the requirements of the CAT NMS Plan, cost estimates for the proposed solution, and a discussion of the costs and benefits of alternate solutions considered but not proposed.⁴ This Appendix C discusses the considerations laid out in SEC Rule 613(a). The first section below provides a background of the process the Participants have undertaken to develop and draft the CAT NMS Plan. Section A below addresses the requirements in SEC Rule 613(a)(1)(i) through (a)(1)(vi) that the Participants specify and explain the choices they made to meet the requirements specified in SEC Rule 613 for the CAT.⁵ In many instances, the requirements themselves (i.e., the specific technical requirements that the Plan Processor must meet) will be set forth the Plan Processor Functional Requirements document (“PPFR”). Relevant portions of the PPFR are outlined and described throughout the considerations set forth in this Appendix C.

Section B below discusses the requirements in SEC Rule 613(a)(1)(vii) and SEC Rule 613(a)(1)(viii) that the CAT NMS Plan include detailed estimates of both the costs, and the impact on competition, efficiency, and capital formation, for creating, implementing, and maintaining the CAT. The information in Section B below is intended to aid the Commission in its economic analysis of the CAT and the CAT NMS Plan.⁶

Section C below, in accordance with SEC Rule 613(a)(1)(x), establishes objective milestones to assess the Participants’ progress toward the implementation of the CAT in accordance with the CAT NMS Plan. This section includes a plan to eliminate existing rules and systems (or components thereof) that will be rendered duplicative by the CAT, as required by SEC Rule 613(a)(1)(ix).

Section D below addresses how the Participants solicited the input of their members and other appropriate parties in designing the CAT NMS Plan as required by SEC Rule 613(a)(1)(xi).

Capitalized terms used and not otherwise defined in this Appendix C have the respective meanings ascribed to such terms in the Limited Liability Company Agreement of CAT NMS, LLC to which this Appendix C is attached.

⁴ Securities Exchange Act Release No. 67457 (July 18, 2012), 77 FR 45722, 45789 (Aug. 1, 2012) (“Adopting Release”).

⁵ See Adopting Release, at 45790. Section A below also includes discussions of reasonable alternatives to approaching the creation, implementation, and maintenance of the CAT that the Participants considered. See SEC Rule 613(a)(1)(xii).

⁶ See Adopting Release, at 45793.

BACKGROUND

SEC Rule 613 requires the Participants to jointly file a national market system plan to govern the creation, implementation, and maintenance of the CAT and the Central Repository. Early in the process, the Participants concluded that the publication of a request for proposal soliciting bids from interested parties to serve as the plan processor for the CAT was necessary prior to filing the CAT NMS Plan to ensure that potential alternative solutions to creating the CAT can be presented and considered by the Participants and that a detailed and meaningful cost/benefit analysis can be performed, both of which are required considerations to be addressed in the CAT NMS Plan. To that end, the Participants published the RFP on February 26, 2013,⁷ and 31 firms formally notified the Participants of their intent to bid.

The Participants filed a national market system plan with the Commission on September 3, 2013, to govern the process for Participant review of the bids submitted in response to the RFP, the procedure for evaluating the bids, and, ultimately, selection of the plan processor (the “Selection Plan”). Several critical components of the Participants’ process for formulating and drafting the CAT NMS Plan were contingent upon approval of the Selection Plan, which occurred on February 21, 2014. Bids in response to the RFP were due four weeks following approval of the Selection Plan, on March 21, 2014. Ten Bids were submitted in response to the RFP.

The Participants considered each Bid in great detail to ensure that the Participants can address the considerations enumerated in SEC Rule 613, including analysis of the costs and benefits of the proposed solution(s), as well as alternative solutions considered but not proposed, so that the Commission and the public will have sufficiently detailed information to carefully consider all aspects of the CAT NMS Plan the Participants ultimately submit. Soon after receiving the Bids, and pursuant to the Selection Plan, the Participants determined that all ten Bids were “qualified.”⁸ On July 1, 2014, after the Participants had hosted bidder presentations to learn additional details of aspects of Bids and conducted an analysis and comparison of the Bids, the Participants voted to determine the six Shortlisted Bidders.

Under the terms of the Selection Plan, and as incorporated into the CAT NMS Plan, the Plan Processor for the CAT has not been selected and will not be selected until after approval of the CAT NMS Plan.⁹ Any one of the six remaining Shortlisted Bidders could be selected as the Plan Processor, and because each Shortlisted Bidder has proposed different approaches to various issues, the CAT NMS Plan does not generally mandate specific technical approaches; rather, it mandates specific requirements that the Plan Processor must meet, regardless of approach. Where possible, this Appendix C discusses specific technical requirements the Participants have deemed necessary for the CAT; however, in some instances, provided the Plan Processor meets certain general obligations,

⁷ The initial RFP was amended in March 2014. See Consolidated Audit Trail National Market System Plan Request for Proposal (March 3, 2014) at <http://catnmsplan.com/process/>

⁸ See Selection Plan § I(Q) (defining “Qualified Bid”), VI(A) (providing the process for determining whether bids are determined to be “Qualified Bids”).

⁹ See Selection Plan §6; NMS Plan §5.

the specific approach is unknown and will be dependent upon the Shortlisted Bidder ultimately selected as the Plan Processor.

Following multiple discussions between the Participants and both the Development Advisory Group (DAG) and the bidders, as well as among the Participants themselves, the Participants recognized that some provisions of Rule 613 would not permit certain solutions to be included in the Plan that the Participants determined advisable to effectuate the most efficient and cost-effective consolidated audit trail. Consequently, the Participants also plan to submit a request for exemptive relief from certain provisions of SEC Rule 613 regarding (1) options market maker quotes; (2) Customer ID; (3) CAT-Reporter-ID; (4) CAT-Order-IDs on Allocation Reports¹⁰; and (5) timestamp granularity. As will be described in more detail in the request letter, the Participants will request that the Commission grant an exemption from:

- SEC Rule 613(c)(7) to relieve options market makers from the obligation to report quotation information pursuant to SEC Rule 613(c)(7), and permit the options exchanges to provide to the Central Repository all market maker quotes received by the options exchange as well as any cancels, modifications or executions related to those quotes.
- SEC Rule 613(c)(7)(i)(A), (c)(7)(iv)(F), and (c)(8) to permit the inclusion of the “Customer Information Approach” in the CAT NMS Plan. Under the Customer Information Approach,¹¹ the CAT NMS Plan would require each broker-dealer reporting to the Central Repository to assign a unique firm-designated identifier to each trading account, rather than Customer IDs.
- SEC Rule 613(c)(7)(ii)(D), (c)(7)(ii)(E), (c)(7)(iii)(D), (c)(7)(iii)(E), (c)(7)(iv)(F), (c)(7)(v)(F), and (c)(8) to permit each broker-dealer reporting information to the Central Repository to provide to the Central Repository existing Participant-assigned market participant identifiers (e.g., FINRA MPID, Nasdaq MPID, NYSE Mnemonic, CBOE User Acronym, CHX Acronym) used in the routing or execution of any Reportable Event along with information to identify the CAT Reporter itself (e.g., CRD number, Legal Entity Identifier), rather than CAT-Reporter-IDs.
- SEC Rule 613(c)(7)(vi)(A) and (C) to permit the use of a firm designed-identifier as an identifier on allocation reports, rather than the CAT-Order-ID and sub-account numbers.
- The provisions in SEC Rule 613(d)(3) that require manual order event¹² information in SEC Rules 613(c)(7)(i)(E), 613(c)(7)(ii)(C), 613(c)(7)(iii)(C) and

¹⁰ Rule 613(c)(7)(vi)(A) requires CAT Reporters to record and report “the account number for any subaccounts to which the execution is allocated (in whole or in part)”. 17 CFR 242.613(c)(7)(vi)(A).

¹¹ The Customer Information Approach to the reporting of customer information by CAT Reporters was first detailed in the RFP Concepts Document published by the Participants in January 2013 and is available on the catnmsplan.com website.

¹² Manual order events include events that involve non-electronic communication of information (“Manual Order Events”).

613(c)(7)(iv)(C) to be reported to the millisecond, thereby allowing the Participants to include the Manual Order Event time stamp requirements in the CAT NMS Plan to the second.

The Participants believe that the above described relief is critical to the development of a cost-effective approach to the CAT.

A. FEATURES AND DETAILS OF THE CAT NMS PLAN

1. Reporting Data to the CAT

As required by SEC Rule 613(a)(1)(i), this section describes the reporting of data to the Central Repository, including the sources of such data and the manner in which the Central Repository will receive, extract, transform, load, and retain such data. As a general matter, the data reported to the Central Repository is of two distinct types: (1) reference data (e.g., data concerning CAT Reporters and customer information, issue symbology information, and data from the securities information processors (“SIPs”)) and (2) Order and trade data submitted by CAT Reporters, including exchanges, national securities associations and broker-dealers. Each of these types of data is discussed separately below.

(a) Sources of Data

In general, data will be reported to the Central Repository by national securities exchanges, national securities associations, broker-dealers, the SIPs for the CQS, CTA, UTP and OPRA Plans, and certain other vendors or appropriate third parties (“Data Submitters”).¹³ Specifically, in accordance with SEC Rule 613(c)(5) and Sections 6.3 and 6.4 of the CAT NMS Plan, each national securities exchange and its members must report to the Central Repository the information required by SEC Rule 613(c)(7) for each NMS Security registered or listed for trading on such exchange or admitted to unlisted trading privileged on such exchange.¹⁴ Similarly, in accordance with SEC Rule 613(c)(6), each national securities association and its members must report to the Central Repository the information required by SEC Rule 613(c)(7) for each NMS Security for which transaction reports are required to be submitted to the association. Additionally, the Participants, in consultation with the DAG and with industry support, have determined to include OTC Equity Securities in the initial phase-in of the CAT; thus, CAT Reporters must also include

¹³ See Adopting Release, at 45748 n.278 (noting that “the Rule does not preclude the NMS plan from allowing broker-dealers to use a third party to report the data required to the central repository on their behalf”). The Participants note that CAT Reporters using third-party service providers to submit information on their behalf would still be responsible for all the data submitted on their behalf. Thus, for example, the CAT Reporter would be liable for any incorrect data or late submissions. The term “CAT Reporters” is generally used to refer to those parties that are required by SEC Rule 613 and the CAT NMS Plan to submit data to the CAT (i.e., national securities exchanges, national securities associations, and members thereof). The term “Data Submitters” includes those third-parties that may submit data to the CAT on behalf of CAT Reporters as well as outside parties that are not required to submit data to the CAT but from which the CAT may receive data (e.g., SIPs). Thus, all CAT Reporters are Data Submitters, but not all Data Submitters are CAT Reporters.

¹⁴ As noted, the Participants plan to request exemptive relief from various requirements of SEC Rule 613 that is designed to facilitate compliance with the goals and purposes of the rule while minimizing the impact on existing market practices and reducing burdens on both Participants and broker-dealers.

order and trade information regarding orders for OTC Equity Securities in addition to those involving NMS Securities.¹⁵

In addition to Order and execution data, Industry Members are also required to report customer information to the CAT so that order and execution data can be associated with particular customers, and, as discussed more fully below, the Participants and broker-dealers must report CAT-Reporter-IDs. The Participants, however, plan to request exemptive relief that would permit CAT Reporters to provide information to the Central Repository using Participant-assigned market participant identifiers for purposes of reporting information to the CAT. In addition, Industry Members are permitted to use Data Submitters that are not national securities exchanges, national securities associations, or members thereof to report the required data to the Central Repository on their behalf. The proposed exemptive relief also would permit Data Submitters to provide information to the Central Repository using Participant-assigned market participant identifiers for purposes of reporting information to the CAT.

The Central Repository also is required to collect National Best Bid and National Best Offer information, transaction reports reported to an effective transaction reporting plan filed with the SEC pursuant to SEC Rule 601, and last sale reports reported pursuant to the OPRA Plan.¹⁶ Consequently, the Plan Processor must receive information from the SIPs for those plans and incorporate that information into the CAT. Lastly, under the planned PFR, the Plan Processor must maintain a complete symbology database, including historical symbology. CAT Reporters will submit data to the CAT with the listing exchange symbology format, and the CAT must use the listing exchange symbology format in the display of linked data. The Participants will be responsible for providing the Plan Processor with issue symbol information, and issue symbol validation must be included in the processing of data submitted by CAT Reporters.

After reviewing the Bids and receiving industry input, the Participants do not believe there is a need to dictate that the Plan Processor adopt a particular format for submitting data in order to be received by the Central Repository. Rather, regardless of the format(s) adopted, the CAT must be able to monitor incoming and outgoing data feeds and be capable of performing the following functions:

- Support daily files from each CAT Reporter;
- Support files that cover multiple days (for re-transmission);
- Support error correction files;
- Capture operational logs of transmissions, success, failure reasons etc.; and

¹⁵ See SIFMA Industry Recommendations, at 70. Section 1.1 of the CAT NMS Plan includes OTC Equity Securities as “Eligible Securities.” As discussed in Section C.9 of this Appendix C, inclusion of OTC Equity Securities in the initial phase of the CAT should facilitate the retirement of FINRA’s Order Audit Trail System (“OATS”) and reduce costs to the industry.

¹⁶ SEC Rule 613(e)(7).

- support real-time and batch feeds.

The Plan Processor will be required to ensure that all CAT Reporters are able to access for error correction purposes and transmit their data to the CAT System on a daily basis. The Plan Processor must have capabilities of a robust file management tool that is commercially available, including key management. In addition, at a minimum, the Plan Processor must be able to accept data from CAT Reporters and Data Submitters via automated means (e.g., Secure File Transfer Protocol (“SFTP”)) as well as manual entry means (e.g., GUI interface).

The Plan Processor will be required to ensure that all file processing stages are handled correctly. This will include the start and stop of data reception, the recovery of data that is transmitted, the retransmission of data from CAT Reporters, and the resynchronization of data after any data loss. At a minimum, this will require the Plan Processor to have logic that identifies duplication of files. If transmission is interrupted, the Plan Processor must specify:

- data recovery process for partial submissions;
- operational logs/reporting;
- operational controls for receipt of data; and
- managing/handling failures.

The Plan Processor is required to establish a method for developing an audit trail of data submitted and received by the CAT Central Repository. This must include a validation of files to identify file corruption and incomplete transmissions. As discussed more fully below, an acknowledgement of data receipt and information on rejected data must be transmitted to CAT Reporters.

(i) Customer and Account Information

In addition to daily submission of order and trade data, CAT Reporters must provide customer information to the Central Repository so that order and trade data can be associated with particular customers.¹⁷ The Plan Processor must maintain information of sufficient detail to uniquely and consistently identify each customer across all CAT Reporters, and associated accounts from each CAT Reporter. The Plan Processor must document and publish, with the approval of the Operating Committee, the minimum list of attributes to be captured to maintain this association.

¹⁷ See SEC Rule 613(c)(7). The term “customer” means the account holder(s) of the account at a broker-dealer originating an order and any person from whom the broker-dealer is authorized to accept trading instructions for such account, if different than the account holder(s). See SEC Rule 613(j)(3).

The CAT Processor must maintain valid Customer and Account information for each trading day and provide a method for Participant and SEC regulatory staff to easily obtain historical changes to that information (e.g., name changes, address changes).

The CAT Processor will design and implement a robust data validation process for submitted customer and account information.

The Plan Processor must be able to link accounts that move from one CAT Reporter to another due to M&A, divestitures, and other events. Under the approach proposed by the Participants, broker-dealers will initially submit full account lists for all active accounts to the Plan Processor and subsequently submit updates and changes on a daily basis.¹⁸ In addition, the Plan Processor must have a process to periodically receive full account lists to ensure the completeness and accuracy of the account database.

In the RFP, the Participants asked for a description of how customer and account information will be captured, updated and stored with associated detail sufficient to identify each customer.¹⁹ All bidders anticipated customer and account information to be captured in an initial download of data. The precise method(s) by which CAT Reporters submit customer data to the Central Repository will be set out in the Technical Specifications provided by the Plan Processor in accordance with Section 6.9 of the CAT NMS Plan. Data capture would occur using both file-based and entry screen methods. Data validation would occur to check for potential duplicates with error messages being generated for follow-up by CAT Reporters. Data Reporters can update data as needed or on a predetermined schedule.

(ii) Data Submission for Orders and Reportable Events, including Manual Submission

Sections 6.3 and 6.4 of the CAT NMS Plan requires CAT Reporters to provide details for each order and each reportable event to the Central Repository.²⁰ In the RFP, the Participants requested that the Bidders describe the following:

- how customer and account information will be captured, updated and stored with associated detail sufficient to identify each customer;²¹ the system interfaces, including data submission, data access and user interfaces;²²
- the proposed messaging and communication protocol(s) used in data submission and retrieval and the advantage(s) of such protocol(s);²³
- the process and associated protocols for accepting batch submissions; and²⁴

¹⁸ “Active accounts” are defined as accounts that have had activity within the last six months.

¹⁹ RFP, Question 1.

²⁰ See SEC Rule 613(c)(7).

²¹ RFP, Question 1.

²² RFP, Question 49.

²³ RFP, Questions 59-60.

²⁴ RFP, Question 62.

- the process and any associated protocols for supporting manual data submissions.²⁵

(iii) The Timing of Reporting Data

Pursuant to SEC Rule 613(c)(3), Sections 6.3 and 6.4 of the CAT NMS Plan require that CAT Reporters report most order and transaction information recorded pursuant to SEC Rule 613 or the CAT NMS Plan to the central repository by 8:00 a.m. Eastern Time on the trading day following the day such information is recorded.²⁶ SEC Rule 613(c)(3) notes, however, that the CAT NMS Plan “may accommodate voluntary reporting prior to 8:00 a.m. Eastern Time, but shall not impose an earlier deadline on the reporting parties.” Sections 6.3 and 6.4 of the CAT NMS Plan explicitly permits, but does not require, CAT Reporters to submit information to the CAT throughout the day. Because of the amount of data that will ultimately be reported to the CAT, the Participants have decided to permit Data Submitters to report data to the CAT as end of day files (submitted by 8:00 a.m. Eastern Time the following trading day) or throughout the day. The Participants believe that permitting Data Submitters to report data throughout the day will reduce the total amount of bandwidth the Plan Processor must have to receive data files and will allow CAT Reporters and other Data Submitters to determine which method is most efficient and cost-effective for them. However, the Plan Processor will be required to have the capacity to handle two times the historical peak daily volume to ensure that, if CAT Reporters choose to submit data on an end-of-day basis, the Plan Processor can handle the influx of data.²⁷

(iv) Customer and Account Information

In addition to the submission of order and trade data, broker-dealer CAT Reporters must also submit customer information to the CAT so that the order and trade data can be matched to the specific customer.²⁸ SEC Rule 613(c)(7) of Regulation NMS sets forth data recording and reporting requirements that must be included in the CAT NMS Plan. Under SEC Rule 613(c)(7)(i)(A), the CAT NMS Plan must require each CAT Reporter to record and report “Customer-ID(s) for each customer” when reporting to the CAT order receipt or origination information.²⁹ When reporting the modification or cancellation of an order, the rule further requires the reporting of “the Customer-ID of the person giving the modification or cancellation instruction.”³⁰ In addition, SEC Rule 613(c)(8) mandates that all CAT Reporters “use the same Customer-ID . . . for each customer and broker-dealer.”³¹ For purposes of SEC Rule 613, “Customer-ID” means, “with respect to a customer, a code

²⁵ RFP, Question 63.

²⁶ SEC Rule 613 and Sections 6.3 and 6.4 of the CAT NMS Plan permit certain other information to be reported by 8:00 a.m. Eastern Time on the trading day following the day the CAT Reporter receives the information. See SEC Rule 613(c)(4); (c)(7)(vi) – (viii).

²⁷ SIFMA’s recommendations to the Participants regarding the CAT indicates support for the ability of Data Submitters to submit data in batch or near-real-time reporting. See SIFMA Recommendations, at 55.

²⁸ As noted above, the term “customer” means the account holder(s) of the account at a broker-dealer originating an order and any person from whom the broker-dealer is authorized to accept trading instructions for such account, if different than the account holder(s). See SEC Rule 613(j)(3).

²⁹ 17 CFR 242.613(c)(7)(i)(A).

³⁰ 17 CFR 242.613(c)(7)(iv)(F).

³¹ 17 CFR 242.613(c)(8).

that uniquely identifies such customer for purposes of providing data to the central repository.”³² Also, Rule 613(c)(7)(viii) requires that, for original receipt or origination of an order, CAT Reporters report “customer account information,” which is defined as including, but not limited to, “account number, account type, customer type, date account opened, and large trader identifier (if applicable).”³³

After considering the requirements of SEC Rule 613 with respect to recording and reporting Customer-IDs, customer account information, and information of sufficient detail to identify the customer as well as industry input and the Commission’s reasons for adopting these requirements, the Participants requested that broker-dealers and other industry members provide ideas on implementing the Customer-ID requirement. After careful consideration, including numerous discussions with the CAT DAG, the Participants concluded that the CAT NMS Plan should use a reporting model that requires broker-dealers to provide detailed account and customer information to the Central Repository, including the specific identities of all customers, as defined in SEC Rule 613, associated with each account, and have the Central Repository correlate the customer information across broker-dealers, assign a unique customer identifier to each customer (i.e., the Customer-ID), and use that unique customer identifier consistently across all CAT data (hereinafter, the “Customer Information Approach”).

Under the Customer Information Approach, the CAT NMS Plan would require each broker-dealer to assign a unique firm-designated identifier to each customer, as that term is defined in SEC Rule 613. For the firm-designated identifier, broker-dealers would be permitted to use an account number or any other identifier defined by the firm, provided each identifier is unique across the firm for each business date (i.e., a single firm may not have multiple separate customers with the same identifier on any given date). Under the Customer Information Approach, broker-dealers must submit an initial set of customer information to the central repository, including, as applicable, the firm-designated identifier for the customer, name, address, account identifier, date of birth, account effective date, Individual Tax ID (“ITIN”)/social security number (“SSN”), Employer Identification Number (“EIN”)/Legal Entity Identifier (“LEI”),³⁴ and Large Trader ID.³⁵ Under the Customer Information Approach, broker-dealers would be required to submit to the Central Repository daily updates for reactivated accounts, newly established or revised firm-designated identifiers, or associated reportable customer information.³⁶

³² 17 CFR 242.613(j)(5).

³³ 17 CFR 242.613(j)(4).

³⁴ Where a validated LEI is available for a customer or entity, it may obviate the need to report other identifier information (e.g., customer name, address, EIN).

³⁵ The Participants anticipate that customer information that is initially reported to the CAT could be limited to only customer accounts that have, or are expected to have, CAT-reportable activity. For example, accounts that are considered open, but have not traded eligible securities in a given timeframe may not need to be pre-established in the CAT, but rather could be reported as part of daily updates after they have CAT-reportable activity.

³⁶ Because reporting to the CAT is on an end-of-day basis, intra-day changes to information could be captured as part of the daily updates to the information. *See* 17 CFR 242.613(c)(3). To ensure the completeness and accuracy of customer information and associations, in addition to daily updates, broker-dealers would be required to submit periodic full refreshes of customer information to the CAT. The scope of the “full” customer information refresh would need to be further defined, with the assistance of the Plan Processor, to determine the extent to which inactive or otherwise terminated accounts would need to be reported.

Within the Central Repository, each customer would be uniquely identified by TIN/SSN and, as applicable, LEI and Large Trader ID. The Plan Processor would be required to use these unique identifiers to map orders to specific customers across all broker-dealers. Broker-dealers would therefore be required to report only firm-designated identifier information on each new order submitted to the Central Repository rather than the “Customer-ID” as set forth in SEC Rule 613(c)(7), and the Plan Processor would associate specific customers and their Customer-IDs with individual order events based on the reported firm-designated identifier.

The Customer ID Approach is strongly supported by the industry as they believe that to do otherwise would interfere with existing business practices and risk leaking proprietary order and customer information into the market.³⁷ To adopt such an approach, however, would require certain exemptions from the requirements of SEC Rule 613. Therefore, the Participants propose to request an exemption from certain sections of Rule 613 so that this approach could be included in the CAT NMS Plan.

(v) Error Reporting

SEC Rule 613(e)(6) requires the prompt correction of data to the Central Repository. As discussed in Section A.2.a of this Appendix C, initial validation, lifecycle linkages, and communications of errors to CAT Reporters will be required to occur by 12:00 p.m. Eastern Time T+1 and that corrected data be resubmitted to the Central Repository by 8:00 a.m. T+3. Each of the Bidders indicated that it was able to meet these timeframes.

However, the industry expressed concern that reducing the error repair window will constitute a significant burden to Data Submitters and they even question whether it is possible.³⁸ Financial Information Forum (“FIF”) supports maintaining the current OATS Error Handling timelines, which allows for error correction within five OATS business days from the date of original submission.³⁹ Securities Industry and Financial Markets Association (“SIFMA”) also recommends a five-day window for error correction.⁴⁰ Nevertheless, the Participants believe that it is imperative to the utility of the Central Repository that corrected data be available to regulators as soon as possible and recommend the three-day window for corrections to balance the need for regulators to access corrected data in a timely manner while considering the industry’s concerns.

(b) The Manner in which the Central Repository will Receive, Extract, Transform, Load and Retain Data

The Central Repository must receive, extract, transform, load, and retain the data submitted by CAT Reporters and other Data Submitters. In addition, the Plan Processor is responsible for ensuring that the CAT contains all versions of data submitted by a CAT

³⁷ SIFMA Recommendations, at 30-31; FIF Response, at 12.

³⁸ Financial Industry Forum (FIF) Consolidated Audit Trail (CAT) Working Group Response to Proposed RFP Concepts Document, at 35 (January 18, 2013) (“FIF Response”).

³⁹ FIF Response, at 35.

⁴⁰ SIFMA Recommendations, at 62.

Reporter or other Data Submitter (i.e., the Central Repository must include different versions of the same information, including such things as errors and corrected data).⁴¹

In the RFP, the Participants requested that each Bidder perform a detailed analysis of current industry systems and interface specifications in order to propose and develop its own format that will address all respective data types collected from the data sources and address all of the requirements outlined in the RFP, as well as its ability to develop, test and integrate this interface with the CAT system.⁴² In addition, the Participants sought input from the industry regarding different data submission mechanisms and whether there needs to be a manual transmission method.⁴³

As noted above, since the Central Repository is required to collect and transform customer, reporter, and trade information from multiple sources, the RFP requested that Bidders describe:

- how customer and account information will be captured, updated and stored with associated detail sufficient to identify each customer;⁴⁴
- the system interfaces, including data submission, data access and user interfaces;⁴⁵
- the proposed messaging and communication protocol(s) used in data submission and retrieval and the advantage(s) of such protocol(s);⁴⁶
- the process and associated protocols for accepting batch submissions; and⁴⁷
- the process and any associated protocols for supporting manual data submissions.⁴⁸

Various Bidders proposed multiple methods by which Data Reporters can report information to the Central Repository. Bidders proposed secure VPN, direct line access through TCP/IP or at co-location centers, and web-based manual data entry.

The RFP also requested that Bidders describe:

- the overall technical architecture;⁴⁹ and
- the network architecture and describe how the solution will handle the necessary throughput, processing timeline and resubmissions.⁵⁰

⁴¹ Data retention requirements by the Central Repository are discussed more fully in Sections III and IV below.

⁴² RFP, Section 2.3. at 19.

⁴³ Questions for Consideration at <http://catnmsplan.com/QuestionsforIndustryConsideration>.

⁴⁴ RFP, Question 1.

⁴⁵ RFP, Question 49.

⁴⁶ RFP, Questions 59-60.

⁴⁷ RFP, Question 62.

⁴⁸ RFP, Question 63.

⁴⁹ RFP, Question 43.

⁵⁰ RFP, Question 50.

There are two general approaches by which the Central Repository could receive information. Under the first approach, all CAT Reporters (or third-party vendors submitting information on behalf of a CAT Reporter(s)) would be required to submit information to the Central Repository in a uniform format pursuant to detailed technical specifications established by the CAT Plan Processor. This approach, in essence, requires each submitting party to format and deliver its data in accordance with the technical specifications; data that is not appropriately formatted is rejected by the Central Repository.⁵¹ The second approach would allow submitting parties to submit data to the Central Repository in a variety of formats permitted by the technical specifications, and the Central Repository would then convert the various formats into a single format for linkage purposes. With the second approach, some Bidders would accept a more limited number of formats while other Bidders would permit a broader range of formats for submitting data.⁵²

Following receipt of data files, the Plan Processor will be required to send an acknowledgement of data received to CAT Reporters and third party Data Submitters. This acknowledgement will enable CAT Reporters to create an audit trail of their data submissions and allow for tracing of data breakdowns if data is not received. The PPR requires the receipt acknowledgement to include, at a minimum:

- CAT-Reporter-ID;
- Date of receipt;
- Time of receipt;
- File Identifier; and
- A value signifying the acknowledgement of receipt, but not processing, of the file.

Once the Central Repository has received the data from the CAT Reporters, it will extract individual records from the data, and validate the data through a review process that must be described in the Technical Specifications involving context, syntax, and matching. The Plan Processor will need to validate data and report back to any CAT Reporter any data that has not passed validation checks. To ensure the accuracy and integrity of the data in the Central Repository, data that does not pass the basic validation checks performed by the Plan Processor must be rejected until it has been corrected by the CAT Reporter responsible for submitting the data/file. The validation checks performed by the Plan Processor must include:

⁵¹ This approach is essentially the approach firms use to report information to OATS today. The OATS Technical Specifications lays out the specific technical requirements firms must use to report information to OATS.

⁵² The Participants note that SIFMA has indicated that its members support the use of multiple transmission mechanisms to ease the transition to the Central Repository. See SIFMA Industry Recommendations for the Creation of the Consolidated Audit Trail (CAT) dated March 28, 2013, at 55 (“SIFMA Recommendations”).

- data format validation to ensure that the submitted data meets the requirement set forth in the Technical Specifications (e.g., field lengths are appropriate; syncing dependencies);
- syntax checks to ensure the value(s) in any field is permitted;
- data context checks to validate that the report links to other necessary reports (e.g., that there is a report for the origination of an order if a cancellation report is submitted);
- identification of unlinked lifecycle events;⁵³
- identification of records submitted after the submission deadline; and
- identification of unknown accounts or market participant identifiers.

After the Plan Processor has processed the data, it must provide daily statistics to each CAT Reporter, including at a minimum, the following information:

- CAT-Reporter-ID;
- date of submission;
- number of files received;
- number of files accepted;
- number of files rejected;
- number of total order events received;
- number of total order events accepted;
- number of total order events rejected;
- number of each type of report received;
- number of each type of report accepted;
- number of each type of report rejected;
- number of total customer records accepted;

⁵³ In the case of unmatched lifecycle events from two different CAT Reporters, both reports must be initially be marked as unmatched because the Plan Processor will not know which report is erroneous; however, breaks in intermittent lifecycle linkages should not cause the entire lifecycle to break.

- number of total customer records rejected;
- Order-IDs rejected;
- reason for rejection;
- number of records attempted to be matched;
- number of records matched; and
- percentage of records matched.

The Plan Processor also will be required to capture rejected records for each CAT Reporter and make them available to the CAT Reporter. The “rejects” file must be accessible via an electronic file format, and the rejections and daily statistics must also be available via a Web interface. The Plan Processor must provide functionality for CAT Reporters to amend records that contain exceptions. The Plan Processor must also support bulk error correction so that rejected records can be resubmitted as a new file with appropriate indicators for rejection repairs. The Plan Processor must, in these instances, reprocess repaired records. In addition, a Web GUI must be available for CAT Reporters to make updates, including corrections, to individual records or attributes. The Plan Processor must maintain a detailed audit trail capturing corrections to and replacements of records.

The Plan Processor must provide CAT Reporters with documentation that details the process how to amend/upload records that fail the required validations, and if a record does not pass basic validations, such as syntax rejections, then it must be rejected and sent back to the CAT Reporter as soon as possible, so it can be repaired and resubmitted.⁵⁴ In order for regulators to have access to accurate and complete data as expeditiously as practicable, the Plan Processor will provide CAT Reporters with their error reports as they become available, and daily statistics must be provided after all data has been uploaded and validated. The reports will include descriptive details as to why each data record was rejected by the Plan Processor.

In addition, on a monthly basis, the Plan Processor should produce and publish reports detailing error rates by CAT Reporters, similar to the report cards published for OATS today. These reports should include data to enable CAT Reporters to assess their performance in comparison to the rest of their industry peers and to help them assess the risk related to their reporting of transmitted data.

CAT Reporters will report data to the Central Repository either in a uniform electronic format, or in a manner that would allow the Central Repository to convert the data to a uniform electronic format, for consolidation and storage. The Technical

⁵⁴ The industry supports receiving information on reporting errors as soon as possible to enable CAT Reporters to address errors in a timely manner. See FIF Response, at 36.

Specifications will describe the required format for data reported to the Central Repository. A study conducted of members of Participants did not reveal a strong cost preference for using an existing file format (e.g. FIX) for reporting vs. creation of a new format⁵⁵, although an FIF “Response to Proposed RFP Concepts Document” dated January 18, 2013 did indicate a preference for use of the FIX protocol.

As noted above, the specific formats of data submission and loading will depend upon the Shortlisted Bidder chosen as the Plan Processor. Regardless of the ultimate Plan Processor, however, data submitted to the CAT will be loaded into the Central Repository in accordance with procedures that are subject to approval by the Operating Committee.⁵⁶ The Central Repository will retain all data, including the raw data, linked data, and corrected data, for at least six years. All data submitted to the Central Repository, including rejections and corrections, must be stored in native data repositories designed to hold information based on the classification of the CAT Reporter (e.g, whether the CAT Reporter is a Participant, a broker-dealer, or a third party Data Submitter). The native data repositories should not be used for report generation or data querying exercises. After ingestion by the Central Repository, the native data should be transformed into a format appropriate for data querying and regulatory output.

Rule 613 reflects the fact that the Participants can choose from alternative methods to link order information to create an order lifecycle from origination or receipt to cancellation or execution.⁵⁷ After review of the Bids and discussions with industry representatives, the CAT NMS Plan reflects the fact that the Participants have determined that the “daisy chain” approach to CAT-Order-ID that requires linking of order events rather than the repeated transmission of an order ID throughout an order’s lifecycle is appropriate. This approach is widely supported by the industry, and using the daisy chain approach should minimize impact on existing OATS reporters, since OATS already uses this type of linking.⁵⁸ The RFP asked Bidders to propose any additional alternatives to order lifecycle creation; however, all of the Bidders indicated that they would use the daisy chain approach to link transactions.⁵⁹

In the daisy chain approach, a series of unique order identifiers assigned by CAT Reporters to individual order events are linked together by the CAT and assigned a single CAT-generated CAT-Order-ID that is associated with each individual order event and used to create the complete lifecycle of an order. Under this approach, each CAT Reporter generates its own unique Order ID but can pass a different identifier as the order is routed to another CAT Reporter, and the CAT will link related order events from all CAT Reporters involved in the life of the order.⁶⁰

⁵⁵ See Section B.7 of this Appendix C for additional details on cost studies.

⁵⁶ See Section 6.1(f) of the CAT NMS Plan.

⁵⁷ See SEC Rule 613(j)(1).

⁵⁸ See SIFMA Recommendations, at 13, 39-42; FIF Response, at 19-20.

⁵⁹ See RFP Questions 11 and 12.

⁶⁰ A detailed example of the application of the daisy chain approach to an order routed to an exchange on an agency basis can be found on page 26 of the Proposed RFP Concepts document published on the <http://www.catnmsplan.com> website.

The Participants believe that the daisy chain approach can handle most common order handling scenarios, including aggregation and disaggregation, and generally apply to both equities and options. The Participants created a subcommittee of DAG members and Participant representatives to walk through multiple complex order-handling scenarios to ensure that the daisy chain approach can handle even the most complex of order handling methods.⁶¹

Additionally, the daisy chain approach can handle representative order reporting scenarios⁶² and order handling scenarios sometimes referred to as “complex orders” that are specific to options and may include an equity component and multiple option components (e.g., buy-write, straddle, strangle, ratio spread, butterfly and qualified contingent transactions). Typically, these orders are referenced by exchange systems on a net credit/debit basis, which can cover between two and twelve different components. Such “complex orders” must also be handled and referenced within the CAT. The Bidder must develop, in close consultation with industry participants, a linking mechanism that will allow the CAT to link the option leg(s) to the related equity leg or the individual options components to each other in a multi-leg strategy scenario.

Once a lifecycle is assembled by the CAT, individual lifecycle events must be stored so that each unique event (e.g., origination, route, execution, modification) can be quickly and easily associated with the originating customer(s) for both targeted queries and comprehensive data scans. For example, an execution on an exchange must be linked to the originating customer(s) regardless of how the order may have been aggregated, disaggregated, and routed through multiple broker-dealers before being sent to the exchange for execution.

The Plan Processor must transform and load the data in a way that provides the Participants with the ability to build and generate targeted queries against data in the central repository across product classes submitted to the Central Repository. The regulatory staff at the Participants and the SEC must be able to create, adjust, and save any ad-hoc queries to provide data to the regulators that can then be used for their market surveillance purposes. All data fields may be included in the result set from targeted queries. Because of the size of the Central Repository and its use by multiple parties simultaneously, online queries will require a minimum set of criteria, including data or time range as well as one or more of the following:⁶³

- symbol(s), call, put, strike price, expiration date;

⁶¹ This subcommittee included 21 industry representatives and 16 Participant representatives. It met 11 times over the course of 13 months to discuss order handling and CAT reporting requirements. Examples of order handling scenarios that must be addressed include, in addition to the agency scenario referenced above: orders handled on a riskless principal basis, orders routed out of a national securities exchange through a broker-dealer router to another national securities exchange, orders executed on an average price basis and orders aggregated for further routing and execution. Detailed examples of these types of scenarios can be found on pages 27 through 30 of the Proposed RFP Concepts document published on the <http://www.catnmsplan.com> website.

⁶² These scenarios and how the daisy chain approach could be applied, can be found in the Representative Order Proposal document published on the <http://www.catnmsplan.com> website.

⁶³ Although the Plan Processor must account for multiple simultaneous queries, the Central Repository must also support the ability to schedule when jobs are run.

- CAT-Reporter-ID(s);
- Customer-ID(s);
- CAT-Order-ID(s);
- LTID;
- product type (equities, options, or any other product classes available in the Central Repository);
- all orders, quotes, BBOs or trades above or below a certain size within a date or time range;
- all orders, quotes, BBOs or trades within a range of prices within a date or time range;
- all orders or trades canceled within a specified time range; or
- all CAT Reporters exceeding specified volume or percentage of volume thresholds in a single symbol or market-wide during a specified period of time.

Because of the potential size of the results sets, the Plan Processor must have functionality to create an intermediate result count of records before running the full query so that the query can be refined if warranted. The Plan Processor must include a notification process that informs users when reports are available, and there should be multiple methods by which query results can be obtained (e.g., Web download, batch feed). Regulatory staff also must have the ability to create interim tables for access / further investigation. In addition, the Plan Processor must provide a way to limit the number of rows from a result set on screen with full results being created as a file to be delivered via a file transfer protocol.

The Plan Processor will be reasonably required to work with the regulatory staff at the Participants and other regulators to design report generation screens that will allow them to request on-demand pre-determined report queries. These would be standard queries that would enable regulators quick access to frequently-used information and could include standard queries that will be used to advance the retirement of existing reports, such as Large Trader reporting.

The Central Repository must, at a minimum, be able to support approximately 3,000 active users, including Participant regulatory staff and SEC staff, authorized to access data representing market activity (excluding the PII associated with customers and accounts).

2. Time and Method by which CAT Data will be Available to Regulators (SEC Rule 613(a)(1)(ii))

SEC Rule 613(a)(1)(ii) requires the Participants to discuss the “time and method by which the data in the Central Repository will be made available to regulators to perform surveillance or analyses, or for other purposes as part of their regulatory and oversight responsibilities.”⁶⁴ As the Commission noted, “[t]he time and method by which data will be available to regulators are fundamental to the utility of the Central Repository because the purpose of the repository is to assist regulators in fulfilling their responsibilities to oversee the securities markets and market participants.”⁶⁵

(a) Time Data will be Made Available to Regulators

The “Established Timeframes” for reporting and processing Cat Data in the Central Repository are as follows:

- Order events to be reported to the Central Repository pursuant to Sections 6.3 and 6.4 and SEC Rule 613(c) must be received by 8 a.m. Eastern Time on the trade day following the day the CAT Reporter received such information;
- by 12:00 p.m. Eastern Time T+1 (transaction date + one day) the Plan Processor must complete initial validation, lifecycle linkages and communicate errors to CAT Reporters;
- by 8 a.m. Eastern Time T+3 (transaction date + three day) CAT Reporters must resubmit corrected data; and
- by 8 a.m. Eastern Time T+5 (transaction date + five days) corrected data must be available to Participant regulatory staff and regulators.

At any point after data is received by the Central Repository and passes basic format validations, it will be available to the Participants and the SEC, which may be before Noon Eastern Time T+1. The Plan Processor must ensure that regulators have access to corrected and linked data by 8 a.m. Eastern Time T+5.

As noted above, SEC Rule 613(e)(6) requires the prompt correction of data reported to the Central Repository, and the Participants believe that the Established Timeframes meet this requirement. Additionally, each of the Bidders indicated that it would be able to process the reported data within the Established Timeframes. However, the Financial Industry Forum, an industry trade group, expressed concern that the error repair window will constitute a significant burden to CAT Reporters and questioned whether the error repair window “can be reasonably met.”⁶⁶ FIF supports maintaining the current OATS Error Handling timelines, which allow for error correction within five OATS-business days from the date of original submission.⁶⁷ SIFMA also recommends a

⁶⁴ 17 CFR 242.613(a)(1)(ii).

⁶⁵ Adopting Release at 45790.

⁶⁶ Financial Industry Forum (FIF) Consolidated Audit Trail (CAT) Working Group Response to Proposed RFP Concepts Document, at 35 (January 18, 2013) (“FIF Response”).

⁶⁷ FIF Response, at 35.

five-day window for error correction.⁶⁸ Nevertheless, the Participants believe that it is imperative to the utility of the Central Repository that corrected data be available to regulators as soon as possible, and therefore the Participants do not support adopting the five-day repair window permitted under OATS, but instead are providing a three-day repair window for the Central Repository.⁶⁹

(b) Method by which Data will be Available to Regulators

As required by SEC Rule 613(a)(1)(ii), this section describes the ability of regulators to use data stored in the Central Repository for investigations, examinations and surveillance, including the ability to search and extract such data.⁷⁰ The utility of the Central Repository is dependent on regulators being able to have access to data for use in market reconstruction, market analysis, surveillance and investigations.⁷¹ The Participants anticipate that the Plan Processor will adopt policies and procedures with respect to the handling of surveillance (including coordinated, 17d-2 or RSA surveillance) queries and requests for data. In the RFP, the Participants asked that the Bidders describe:

- the tools and reports that would allow for the extraction of data search criteria;⁷²
- how the system will accommodate simultaneous users from Participant regulatory staff and the SEC submitting queries;⁷³
- the expected response time for query results, the manner in which simultaneous queries will be managed and the maximum number of concurrent queries and users that can be supported by the system;⁷⁴
- the format in which the results of targeted queries will be provided to users;⁷⁵
- the methods of data delivery that would be made available to Participant regulatory staff and the Commission;⁷⁶
- any limitations on the size of data that can be delivered at onetime, such as number of days or number of terabytes;⁷⁷ and
- how simultaneous bulk data requests will be managed to ensure fair and equitable access.⁷⁸

⁶⁸ SIFMA Recommendations, at 62.

⁶⁹ One example of why the Participants believe a five day repair window is too long is that regulators may need access to the data as quickly as possible in order to conduct market reconstruction.

⁷⁰ 17 CFR 242.613(a)(1)(ii).

⁷¹ Adopting Release at 45790.

⁷² RFP, Question 81.

⁷³ RFP, Question 82.

⁷⁴ RFP, Question 83.

⁷⁵ RFP, Question 84.

⁷⁶ RFP, Question 85.

⁷⁷ RFP, Question 86.

⁷⁸ RFP, Question 87.

All Bidders provide means for off-line analysis⁷⁹ and dynamic search and extraction. The Bids described a variety of tools that could be used for providing access and reports to the Participants and the SEC, including: Oracle Business Intelligence Experience Edition, SAS Enterprises Business Intelligence, and IBM Cognos. The Bids proposed data access via direct access portals and via Web-based applications. In addition, the Bids proposed various options for addressing concurrent users and ensuring fair access to the data, including: processing queries on a first in, first out (FIFO) basis; monitoring to determine if any particular user is using more systems resources than others and prioritizing other users' queries; or evaluating each users' demands on the systems over a predetermined timeframe and, if there is an imbalance, working with users to provide more resourced needed more efficiently.

The Bids included a multitude of options for formatting the data provided to regulators in response to their queries, including FIX, Excel, .zip, Binary, SAS data sets, PDF, XML, XBRL and CSV. Some Bidders would provide Participants and the Commission staff with a "sandbox" in which the user could store data and upload its own analytical tools and software to analyze the data within the Central Repository, in lieu of performing off-line analyses.

The Participants anticipate that they will be able to utilize Central Repository data to enhance their existing regulatory schemes. The Participants do not endorse any particular technology or approach, but rather set forth standards below which the Plan Processor must meet. By doing so, the Participants are seeking to maximize the utility of the data from the Central Repository without burdening the Plan Processor to comply with specific format or application requirements which will need to be updated over time. In addition, the Participants wanted to ensure that the Bidders have the ability to put forth the ideas they believe are the most effective.

(c) Report Building – Analysis Related to Investigations and Examinations

It is anticipated that the Central Repository will provide regulators with the ability to more efficiently conduct investigations and examinations. The Participants and other regulators will frequently need to be able to perform queries on large amounts of data. The Plan Processor must provide the Participants and other regulators the access to build and generate targeted queries against data in the Central Repository. The Plan Processor must provide the regulatory staff at the Participants and regulators with the ability to create, adjust, and save any ad-hoc queries they run for their surveillance purposes via online or direct access to the Central Repository.⁸⁰ Queries will require a minimum set of criteria that will be detailed in the Plan Processor Functional Requirements.⁸¹ The Plan Processor will have controls to manage load, cancel queries, if needed, and create a request process

⁷⁹ The SEC defined "off-line" analysis as "any analysis performed by a regulator based on data that is extracted from the [CAT] database, but that uses the regulator's own analytical tools, software, and hardware." Adopting Release, at 45798 n.853,

⁸⁰ *Id.*

⁸¹ *Id.*

for complex queries to be run.⁸² The Plan Processor must have a notification process to inform users when reports are available, provide such reports in multiple formats, and have the ability to schedule when queries are run.⁸³

In addition, the Plan Processor will be required to reasonably work with the regulatory staff at the Participants and other regulators⁸⁴ to design report generation screens that will allow them to request on-demand pre-determined report queries.⁸⁵ These would be standard queries that would enable regulators quick access to frequency-used information. This could include standard queries that will be used to advance the retirement of existing reports, such as Large Trader.⁸⁶

The Plan Processor should meet the following response times for different query types. For targeted search criteria, the minimum acceptable response times would be measured in time increments of less than one minute. For the complex queries that either scan large volumes of data (e.g., multiple trade dates) or return large result sets (>1M records), the response time should generally be available within 24 hours of the submission of the request.

The Central Repository, at a minimum, should be able to support at least 3,000 active users who are authorized to access data representing market activity, including regulatory staff at the Participants and other regulators. It must contain a permission structure assigning data access rights to all users whereby CAT Reporters will only have access to their own reported data, the regulatory staff at the Participants and other regulators will have access to all data, except for PII.⁸⁷ Regulators that are authorized to access PII will be required to complete additional authentications. The Central Repository will be able to provide access to the data at Participants' regulatory staff and SEC working locations as well as other non-office locations. The Central Repository must be built with operational controls to control access to make requests and to track all data requests to support an event-based and time-based scheduler for queries that allows Participants to rely on the data generated.

(d) Bulk Extraction of Data – Analysis Related to Monitoring, Surveillance and Reconstruction

In addition to targeted analysis of data from the Central Repository, regulators will also need access to bulk data for analysis. The Participants and other regulators will need the ability to do bulk extraction and download of data, based on a specified date or time range, market, security, Customer-ID, and the size of the resulting data set may require the ability to feed data from the Central Repository into analytical “alert” programs designed to detect potentially illegal activity.⁸⁸ “For example, the Commission is likely to use data

⁸² *Id.*

⁸³ *Id.*

⁸⁴ Initially, only the SEC and Participants will have access to data stored in the Central Repository.

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ As documented in the Plan Processor Functional Requirements. CAT Reporters will be issued a public key pair (PKI) which it can use to submit data, and access confirmation that their data has been received.

⁸⁸ Adopting Release, at 45798. See also RFP Section 2.8.2.

from the Central Repository to calculate detailed statistics on order flow, order sizes, market depth and rates of cancellation, to monitor trends and inform Participant and SEC rulemaking.”⁸⁹

The Plan Processor must provide for bulk extraction and download of data in industry standard formats. In addition, the Plan Processor is required to generate data sets based on market event data to the Participants and other regulators. The Central Repository must provide the ability to define the logic, frequency, format, and distribution method of the data. It must be built with operational controls to track all data requests to oversee the bulk usage environment and support an event-based and time-based scheduler for queries that allows Participants to rely on the data generated. Extracted data should be encrypted, and PII data should be masked unless users have permission to view the data that has been requested.

The Plan Processor must have the capability and capacity to provide bulk data necessary for the Participants and the other regulators to run and operate their surveillance processing. Such data requests can be very large; therefore, the Plan Processor must have the ability to split large requests into smaller data sets for data processing and handling. All reports should be generated by a configurable workload manager that is cost based, while also ensuring that no single user is using a disproportionate amount of resources for query generation.

(e) System Service Level Agreements (SLAs)

The Participants and the Plan Processor will enter into SLAs in order to establish system performance requirements regarding the Participants’ and other regulators’ access to data within the Central Repository. SLAs for system performance will be established, including: response times on queries (including bulk data extractions); the number of queries that can run at a single time; a description of the level of concurrency that the system will support (e.g., X terabytes of data per second); and the speed to grow capacity. In addition, the Plan Processor must react to a market event and increase their ingestion, processing, and storage capacity to meet deadlines within 12 weeks and will incur penalties if the time frames are not met.

3. The Reliability and Accuracy of the Data (SEC Rule 613(a)(1)(iii)):

As required by SEC Rule 613(a)(1)(iii), this section discusses the reliability and accuracy of the data reported to and maintained by the Central Repository throughout its lifecycle, including: transmission and receipt from CAT Reporters; data extraction, transformation and loading at the Central Repository; data maintenance at the Central Repository; and data access by the Participants and other regulators. In the Adopting Release, the Commission noted that the usefulness of the data to regulators would be significantly impaired if it is unreliable or inaccurate and as such, the Commission requested that the Participants discuss in detail how the Central Repository will be

⁸⁹ Adopting Release, at 45798.

designed, tested and monitored to ensure the reliability and accuracy of the data collected and maintained in it.⁹⁰

(a) Transmission, Receipt and Transformation

The initial step in ensuring the reliability and accuracy of data in the Central Repository is the validation checks made by the Plan Processor when data is received and before it is accepted into the Central Repository. In the RFP, the Participants stated that validations must include checks to ensure that data is submitted in the required formats and that lifecycle events can be accurately linked by 12:00pm on T+1, 4 hours following the submission deadline for CAT Reporters.⁹¹ Once errors are identified, they must be efficiently and effectively communicated to CAT Reporters on a daily basis. CAT Reporters will be required to correct and resubmit identified errors within the Established Timeframes.

The Plan Processor must develop specific data validations in conjunction with development of the Central Repository which must be published in the Technical Specifications. The objective of the data validation process is to ensure that data is accurate, timely and complete at or near the time of submission, rather than to identify submission errors at a later time after data has been processed and made available to regulators. To achieve this objective, a comprehensive set of data validations must be developed that addresses both data quality and completeness. For any data that fails to pass these validations, the Plan Processor will be required to handle data correction and resubmission within the Established Timeframes both in a batch process format and via manual Web-based entry.

To assess different validation mechanisms and integrity checks, the RFP required Bidders to provide information on the following:

- how data format and context validations for order and quote events submitted by CAT Reporters will be performed and how rejections or errors will be communicated to CAT Reporters;⁹²
- a system flow diagram reflecting the overall data format, syntax and context validation process that includes when each types of validation will be completed and errors communicated to CAT Reporters, highlighting any dependencies between the different validations and impacts of such dependencies on providing errors back to CAT Reporters;⁹³
- how related order lifecycle events submitted by separate CAT Reporters will be linked and how unlinked events will be identified and communicated to CAT Reporters for correction and resubmission, including a description of how unlinked records will be

⁹⁰ Adopting Release at 45790-91, 45799.

⁹¹ RFP § 2.2.4.

⁹² RFP, Question 14.

⁹³ RFP, Question 15.

provided to CAT Reporters for correction (e.g., specific transmission methods and/or Web-based downloads);⁹⁴

- how account and customer information submitted by broker-dealers will be validated and how rejections or errors will be communicated to CAT Reporters;⁹⁵
- the mechanisms that will be provided to CAT Reporters for the correction of both market data (e.g, order, quotes, and trades) errors, and account and customer data errors, including batch resubmissions and manual web-based submissions;⁹⁶

Most bidders indicated that customer account information including SSN, TIN or LEI will be validated in the initial onboarding processing. Additional validation of customer account information, such as full name, street address, etc., would occur across CAT Reporters and potential duplications or other errors would be flagged for follow-up by the CAT Reporters.

All bidders recommended that order data validation be performed via rules engines, which allow rules to be created and modified over time in order to meet future market data needs. Additionally, all bidders indicated that data validations will be real-time and begin in the data ingestion component of the system. Standard data validation techniques include format checks, data type checks, consistency checks, limit and logic checks, or data validity checks. Some bidders mentioned the ability to schedule the data validation at a time other than submission, because there may be a need to have rules engines perform validation in a batch mode or customized schedule during a different time. All bidders indicated that when errors are found, the raw data will be stored in an error database and notifications would be sent to the CAT Reporters. Most bidders permitted error correction to be submitted by CAT Reporters at any time.

Section 6.3(f) of the CAT NMS Plan sets forth the policies and procedures for ensuring the timeliness, accuracy and completeness of the data provided to the Central Repository as required by SEC Rule 613(e)(4)(ii) and the accuracy of the data consolidated by the Plan Processor pursuant to SEC Rule 613(e)(4)(iii).⁹⁷ It also mandates that each Participant and its Industry Members that are CAT Reporters must ensure that the data it reports to the Central Repository is accurate, timely, and complete. Each Participant and its Industry Members that are CAT Reporters must correct and resubmit such errors within the Established Timeframes. In furtherance thereof, all data related to a particular Order will be reported accurately and sequenced from order receipt or origination, to routing, modification, cancellation and/or execution. Additionally each Participant and its Industry Members that are CAT Reporters must test their reporting systems thoroughly before beginning to report data to the Central Repository and the Plan Processor Functional Requirements sets forth that the Plan Processor must make testing facilities available for such testing.

⁹⁴ RFP, Question 16.

⁹⁵ RFP, Question 17.

⁹⁶ RFP, Question 18.

⁹⁷ 17 CFR 613(e)(4)(ii) and (iii).

Pursuant to SEC Rule 613(e)(4)(iii), the Plan Processor will design, implement and maintain (1) data accuracy and reliability controls for data reported to the Central Repository and (2) procedures for testing data accuracy and reliability during any system release or upgrade affecting the Central Repository and/or the CAT Reporters.⁹⁸ The Operating Committee will, as needed, but at least annually, review policies and procedures to ensure the timeliness, accuracy, and completeness of data reported to the Central Repository.

In order to validate data receipt, the Plan Processor will be required to send an acknowledgement to each CAT Reporter notifying them of receipt of data submitted to the Central Repository to enable CAT Reporters to create an audit trail of their own submissions and allow for tracking of data breakdowns when data is not received. The data received by the Plan Processor must be validated at both the file and individual record level if appropriate. The required data validations may be amended based on input from the Operating Committee and the Advisory Committee. Records that do not pass basic validations, such as syntax rejections, will be rejected and sent back to the CAT Reporter as soon as possible, so it can repair and resubmit the data.

(b) Error Communication, Correction and Processing

The Plan Processor will define and design a process to efficiently and effectively communicate to CAT Reporters identified errors. All identified errors will be reported back to the CAT Reporter or Data Submitter who submitted the data and the CAT Reporters on whose behalf the data was submitted, if necessary. The Central Repository must be able to receive error corrections and process them at any time, including timeframes after the standard repair window. The industry supports a continuous validation process for the Central Repository, continuous feedback to CAT Reporters on error identification and the ability to provide error correction at any time even if beyond the error correction timeframe.⁹⁹ The industry believes that this will better align with the reporting of complex transactions and allocations and is more efficient for CAT Reporters.¹⁰⁰ CAT Reporters will be able to submit error corrections through a Web-interface or via bulk uploads or file submissions. The Plan Processor must support bulk replacement of records, subject to approval by the Operating Committee, and reprocess such replaced records. A GUI must be available for CAT Reporters to make updates to individual records or attributes. Additionally, the Plan Processor will provide a mechanism to provide auto-correction of identified errors and be able to support group repairs (i.e., the wrong issue symbol affecting multiple reports).

⁹⁸ 17 CFR 252.613(e)(4)(iii).

⁹⁹ FIF Consolidated Audit Trail Working Group Processor Proposed Optimal Solution Recommendations, September 15, 2014, at 6 (hereinafter "FIF Optimal Solution Recommendations").

¹⁰⁰ FIF Consolidated Audit Trail (CAT) Working Group Response to Proposed RFP Concepts Document, January 18, 2013, at 36 (hereinafter "FIF RFP Concepts Recommendations").

SEC Rule 613(e)(6) also requires the Participants to specify a maximum Error Rate for data reported to the Central Repository pursuant to SEC Rule 613(c)(3) and (4).¹⁰¹ The Participants understand that the Central Repository will require new reporting elements and methods for CAT Reporters and there will be a learning curve when CAT Reporters begin to submit data to the Central Repository.¹⁰² However, the utility of the CAT is dependent on it providing a timely, accurate and complete audit trail for the Participants and other regulators.¹⁰³ Therefore, the Participants are proposing an initial maximum Error Rate of 5%, subject to quality assurance testing performed prior to launch, and it is anticipated that it will be reset when Industry Members, excluding Small Industry Members, begin to report to the Central Repository and again when Small Industry Members begin to report to the Central Repository. In determining the maximum Error Rate, the Participants considered the current and historical OATS error rates, the magnitude of new reporting requirements on the CAT Reporters and the fact that many CAT Reporters may have never been obligated to report data to an audit trail before. The Participants believe that this rate strikes the balance of making allowances for adapting to a new reporting regime, while ensuring that the data provided to regulators will be capable of being used to conduct surveillance and market reconstruction. Annually, the Plan Processor will analyze reporting statistics and error rates and make recommendations to the Participants for proposed changes to the maximum Error Rates. Changes to the maximum Error Rate will be recommended by the Chief Compliance Office and approved by the Operating Committee. The maximum Error Rate will be reviewed and reset at least on an annual basis.

In order to help reduce the maximum Error Rate, the Plan Processor will measure the error rate on each business day and must take the following steps in connection with error reporting: (1) the Plan Processor will provide CAT Reporters with their error reports as they become available and daily statistics will be provided after all data has been uploaded and validated by the Central Repository; (2) error reports provided to CAT Reporters will include descriptive details as to why each data record was rejected by the Central Repository; and (3) on a monthly basis, the Plan Processor will produce and publish reports detailing error rates by CAT Reporters, similar to the Report Cards published for OATS today, which will enable CAT Reporters to identify how they compare to the rest of their industry peers and help them assess the risk related to their reporting of transmitted data.

All CAT Reporters exceeding this threshold will be notified each time that they have exceeded the maximum allowable Error Rate and will be informed of the specific reporting requirements that they did not fully meet (e.g., timeliness or rejections). Upon request from the Participants or other regulators, the Plan Processor will produce and provide reports containing Error Rates and other metrics as needed on each CAT

¹⁰¹ SEC Rule 613(e)(6)(i) defines “Error Rate” to mean “[t]he percentage of reportable events collected by the central repository for which the data reported does not fully and accurately reflect the order event that occurred in the market.” 17 CFR 613(e)(6)(i).

¹⁰² As indicated by FINRA in its comment to the Adopting Release, OATS compliance rates have steadily improved as reporters have become more familiar with the system. When OATS was first adopted compliance rates were 76%, but current compliance rates are 99%. See, Letter from Marcia E. Asquith, Senior Vice President and Corporate Secretary, FINRA, to Elizabeth M. Murphy, Secretary, Commission, dated August 9, 2010.

¹⁰³ Adopting Release at 45790-91

Reporter's compliance rates so that the Participants as Participants or the Securities and Exchange Commission may take appropriate action for failing to comply with the reporting obligations under the CAT NMS Plan and SEC Rule 613.

(c) Clock Synchronization

SEC Rule 613(c)(1) requires the Central Repository to provide "an accurate, time-sequenced record of orders." As an initial matter, because of the drift between clocks, an accurately-sequenced record of orders cannot be based solely on the timestamps provided by CAT Reporters. As discussed above, the CAT NMS Plan requires that CAT Reporters synchronize their clocks to within 50 milliseconds of the NIST. Because of this permitted drift, any two separate clocks can vary by 100 milliseconds: one clock can drift forward 50 milliseconds while another can drift back 50 milliseconds. Thus, it is possible to have, for example, one firm report the route of an order at 10:40:00.005 while the firm receiving the routed order reports a receipt time of 10:39:59.983 (i.e., the timestamps alone indicate that the routed order was received before it was sent). For this reason, the Participants plan to require that the Plan Processor develop a way to accurately track the order events without relying entirely on timestamps.¹⁰⁴

There were several different approaches suggested by the Bidders to accomplish the accurate sequencing of Orders. Some Bidders suggested using timestamp-based sequencing; however, most Bidders recognized that, while all CAT Reporters should have their timestamp clocks synchronized, in practice this synchronization cannot be wholly relied upon due to variations in computer systems. These Bidders rely on linkage logic to derive the event sequencing chain, such as parent/child orders. To help resolve timestamp issues, one Bidder proposed adding unique sequence ID numbers as well to the event information to help with time clock issues and a few others would analyze the variations on clock time and notify those CAT Reporters that need to resynchronize their clocks.

The Participants believe that using a linking logic not dependent on timestamps would enable proper sequencing of an Order. This decision is supported by the industry since timestamps across disparate systems cannot be guaranteed and are likely to be error-prone.¹⁰⁵ The Participants believe that this type of sequencing can be successfully used for both simple and complex Orders that will be reported to the Central Repository. The industry supports using event sequencing that is already built into the exchange protocols, which imposes sequencing and determines the true market environment.¹⁰⁶

As required by Section 6.6(a) of the CAT NMS Plan, each Participant will, and will adopt a rule requiring its Industry Members to, synchronize its business clocks that are used for the purposes of recording the date and time of any Reportable Event that must be reported under SEC Rule 613 to within 50 milliseconds of the time maintained by the NIST, consistent with industry standards. Furthermore, in order to ensure the accuracy of

¹⁰⁴ Of course, timestamps regarding events occurring within a single system that uses the same clock can be accurately sequenced based on the timestamp.

¹⁰⁵ FIF Letter regarding Participant Request for Comment on Selected Draft CAT NMS Plan Topics, dated June 12, 2013 at 10-11 (hereinafter "FIF Comments on Selected Topics").

¹⁰⁶ FIF Comments on Selected Topics at 11.

timestamps for Reportable Events, the Participants anticipate that Participants and Industry Members will adopt policies and procedures to verify such required synchronization each trading day (1) before the market opens and (2) periodically throughout the trading day.

As required by Section 6.6(b) of the CAT NMS Plan, each Participant will, and will adopt a rule requiring its Industry Members that are CAT Reporters to, specify the time of occurrence of any event required by SEC Rule 613 and the CAT NMS Plan to be reported to the Central Repository as a time that is within 50 milliseconds of the time such event actually occurred as measured by the time maintained by the NIST.¹⁰⁷

Although millisecond increments are generally the industry standard for trading systems, there is a wide range of time stamp granularity across the industry commonly ranging from seconds to milliseconds to micro-seconds for latency sensitive applications.¹⁰⁸ The disparity is largely attributed to the age of the system being utilized for reporting, as older systems cannot cost effectively support, finer time stamp granularity.¹⁰⁹ To comply with a millisecond timestamp requirement, firms will face significant costs in both time and resources to implement a consistent time stamp across multiple systems.¹¹⁰ This may include a need to upgrade databases, internal messaging applications/protocols, data warehouses, and reporting applications to enable the reporting of such timestamps to the Central Repository.¹¹¹ Because of this, FIF recommended to the Participants a two year grace period for timestamp compliance.¹¹² FIF and SIFMA also supported an exception for millisecond reporting for order events that are manually processed, which is discussed below.¹¹³

To the extent that any CAT Reporter uses timestamps in increments finer than the minimum required by the CAT NMS Plan, each Participant will, and will adopt a rule requiring its Industry Members that are CAT Reporters to, use such finer increments when providing data to the Central Repository.

With respect to the requirement under SEC Rule 613(c) and (d)(3) that timestamps “reflect current industry standards and be at least to the millisecond,”¹¹⁴ the Participants believe that timestamp granularity to the millisecond reflects current industry standards. However, after careful consideration, including numerous discussions with the DAG, the Participants have determined that timestamp granularity at the level of a millisecond is not practical for order events that involve non-electronic communication of information

¹⁰⁷ The Participants note that, although Section 6.8(a) of the CAT NMS Plan initially requires computer clocks to be synchronized to within 50 milliseconds, Section 6.8(c) of the CAT NMS Plan requires the Chief Compliance Officer to review this threshold each year. See SEC Rule 613(d)(2). Broker-dealers will not report to the CAT for approximately two years after the CAT NMS Plan is approved; thus, this initial synchronization requirement may change before broker-dealers are submitting data to the CAT as a result of the Participants’ annual review.

¹⁰⁸ SIFMA Letter Regarding Participant Request for Comments on Selected Draft CAT NMS Plan Topics dated June 11, 2013 at 11 (hereinafter “SIFMA Comments on Selected Topics”); FIF Comments on Selected Topics at 10.

¹⁰⁹ FIF Comments on Selected Topics at 10.

¹¹⁰ FIF Comments on Selected Topics at 10; SIFMA Comments on Selected Topics at 11.

¹¹¹ FIF Comments on Selected Topics at 10.

¹¹² FIF Comments on Selected Topics at 10.

¹¹³ FIF Comments on Selected Topics at 10; SIFMA Comments on Selected Topics at 11.

(hereinafter, “Manual Order Events”). In particular, it is the Participants’ understanding that recording manual orders to the millisecond would be both very costly, requiring specialized software configurations and expensive hardware, and inherently imprecise due to the manner in which human interaction is required. The industry feedback that the Participants received through the DAG suggests that the established business practice with respect to Manual Order Events is to manually capture timestamps with granularity at the level of a second because finer increments cannot be accurately captured when dealing with manual processes which, by their nature, take longer to perform than a time increment of under one second. The Participants agree that, due to the nature of transactions originated over the phone, it is not practical to attempt granularity finer than one second, as any such finer increment would be inherently unreliable. Further, the Participants do not believe that recording Manual Order Events to the second will hinder the ability of regulators to determine the sequence in which reportable events occur.

As a result of these discussions, the Participants plan to request exemptive relief from the Commission to allow the CAT NMS Plan to require Manual Order Events to be reported to the second but also require CAT Reporters to report the timestamp of when a Manual Order Event was captured electronically in the relevant order handling and execution system of the party to the event (hereinafter, “Electronic Capture”). Granularity of the Electronic Capture time stamp will be consistent with the SEC Rule 613(d)(3) requirement that timestamps be at least to the millisecond.

Thus, the Participants have determined that adding the Electronic Capture time stamp would be beneficial for successful reconstruction of the order handling process and would add important information about how the Manual Order Events are processed once they are entered into an electronic system. Additionally, Manual Order Events, when reported, must be clearly identified as such.

To adopt such an approach, however, would require certain exemptions from the requirements of SEC Rule 613. Therefore, the Participants propose to request an exemption from certain sections of SEC Rule 613 so that this approach could be included in the CAT NMS Plan. However, given the current absence of such relief, the Participants determined to include in the CAT NMS Plan a provision that satisfies the requirements of SEC Rule 613, by requiring millisecond timestamps for Manual Order Events.

In accordance with SEC Rule 613(d), Section 6.6(c) of the CAT NMS Plan states that “[t]he Participants shall annually evaluate whether industry standards have evolved such that (i) the synchronization standard in Section 6.6(a) should be shortened, or (ii) the required time stamp in Section 6.6(b) should be in finer increments.”

The Participants anticipate that compliance with this provision will require Participants and Industry Members to perform the following or comparable procedures. The Participants and their Industry Members will document their clock synchronization procedures and maintain a log recording the time of performance of each clock synchronization performed by it and the result of such synchronization, specifically identifying any synchronization revealing that the discrepancy between its business clock

and the time maintained by the NIST exceeded 50 milliseconds. At all times such log will include results for a period of not less than five years ending on the then current date.

(d) Data Maintenance and Management

Data Maintenance and Management of the Central Repository “refers to the process for storing data at the [C]entral [R]epository, indexing the data for linkages, searches, and retrieval, dividing the data into logical partitions when necessary to optimize access and retrieval, and the creation and storage of data backups.^{115,}”

The Plan Processor must create a formal records retention policy to be approved by the Operating Committee. All of the data (including both corrected and uncorrected or rejected data) in the Central Repository must be kept online for a rolling six year period, which would create a six year historical audit trail. This data must be directly available and searchable by regulators electronically without any manual intervention. Additionally, the Plan Processor is required to create and maintain for a minimum of six years a symbol history and mapping table, as well as to provide a tool that will display a complete issue symbol history that will be accessible to CAT Reporters, Participants and the SEC.

Assembled lifecycles of order events must be stored so that each unique event (e.g., origination, route, execution, modification) can be quickly and easily associated with the originating customer(s) for both targeted queries and comprehensive data scans. For example, an execution on an exchange must be linked to the originating customer(s) regardless of how the order may have been aggregated, disaggregated, or routed through multiple broker-dealers before being sent to the exchange for execution.

Most Bidders recommended dividing data in the Central Repository into nodes based on symbol, date or a combination thereof in order to speed query response times. The Participants are not specifying how the data is divided, but will require that it be partitioned in a logical manner in order to optimize access and retrieval.

All of the Bidders addressed data loss through data replication and redundancy. Some of the Bidders proposed a hot-hot design for replication for primary and secondary data, so both sites are fully operational at all times and there would be no recovery time necessary in the case of fall-over to the secondary site. However, this is a more costly solution, and many Bidders therefore proposed data loss prevention by operating in a hot-warm design for replication to a secondary site. The Participants are requiring that the Plan Processor implement a disaster recover capability that will ensure no loss of data and will support the data availability requirements for the Central Repository and a secondary processing site will need to be capable of recovery and restoration of services at the secondary site within 48 hours of a disaster event.

(e) Data Access by Regulators

¹¹⁵ Adoption Release at 45790.

As detailed above in Section A.2 of this Appendix C (Time and Method by which CAT Data will be Available to Regulators), the Participants and other regulators will have access to raw unprocessed data that has been ingested by the Central Repository prior to Noon Eastern Time on T +1.¹¹⁶ Between Noon Eastern Time on T +1 and T+5, the Participants and other regulators should have access to all iterations of processed data.¹¹⁷ At T+5, the Participants and other regulators should have access to corrected data.¹¹⁸ The Plan Processor must adopt policies and procedures to reasonably inform Participants and the SEC of material data corrections made after T+5. The Participants and other regulators will be able to build and generate targeted queries against data in the Central Repository. More information about the report, query and extraction capabilities can be found in Section A.2 of this Appendix C (Time and Method by which CAT Data will be Available to Regulators).

(f) Data Recovery and Business Continuity

As noted above, in addition to describing data security and confidentiality, all of the Bidders were required to set forth an approach to data loss recovery and business continuity in the event of data loss. All of the Bidders addressed data loss through data replication and redundancy. Some of the Bidders proposed a hot-hot design for replication for primary and secondary data, so both sites are fully operational at all times and there would be no recovery time necessary in the case of fall-over to the secondary site. However, this is a more costly solution, and many Bidders therefore proposed data loss prevention by operating in a hot-warm design for replication to a secondary site.

The Plan Processor must comply with industry best practices for disaster recovery and business continuity planning, including specifically the standards and requirements set forth in the following documents, in each case as such standards and requirements may be replaced by successor publications or modified, amended, or supplemented:

- ISO 27001 (Information Security Management);
- National Institute of Standards and Technology Special Publications 800-34 (Contingency Planning for Federal Information Systems); and
- National Institute of Standards and Technology Special Publications 800-53 (Security and Privacy Controls for Federal Information Systems and Organizations).

With respect to business continuity, the Participants have developed the following requirements that the Plan Processor must meet. In general, the Plan Processor will implement efficient and cost-effective backup and disaster recovery capability that will ensure no loss of data and will support the data availability requirements and anticipated volumes of the Central Repository. The disaster recovery site must have the same level of availability / capacity / throughput and data as the primary site. In addition, the Plan

¹¹⁶ See Appendix C.A.2 (Time and Method by which CAT Data will be Available to Regulators).

¹¹⁷ *Id.*

¹¹⁸ *Id.*

Processor will be required to design a Business Continuity Plan that is inclusive of the technical and business activities of the Central Repository, including:

- bi-annual testing;
- a secondary processing site must be capable of recovery and restoration of services at the secondary site within 48 hours of a disaster event;
- the processing sites for disaster recovery and business continuity must adhere to the “Interagency Paper on Sound Practices to Strengthen the Resilience of the U. S. Financial System”,¹¹⁹ and
- the Plan Processor must conduct an annual Business Continuity Audit using an independent auditor approved by the Operating Committee and the report provided to the Operating Committee.

4. The Security and Confidentiality of the Information Reported to the Central Repository (SEC Rule 613(a)(1)(iv))

As required by SEC Rule 613(a)(1)(iv), this section describes the security and confidentiality of the information reported to the Central Repository. As the Commission noted in the Adopting Release, keeping the data secure and confidential is critical to the efficacy of the Central Repository and the confidence of market participants. There are two separate categories for purposes of treating data security and confidentiality: (1) PII; and (2) other data related to Orders and trades reported to the CAT.¹²⁰

Because of the importance of data security, the Participants included in the RFP numerous questions to Bidders requesting detailed information on their data security approaches. In the RFP, the Participants requested general information regarding the following:

- how the Bidder’s solution protects data during transmission, processing, and at rest (i.e., when stored in the Central Repository);¹²¹
- the specific security governance/compliance methodologies utilized in the proposed solution;¹²²

¹¹⁹ SEC Release No. 34-47638; File No. S7-32-02; <http://www.sec.gov/news/studies/34-47638.htm>

¹²⁰ Some trade data (e.g., trade data feeds disseminated by the SIPs) is public and therefore of little concern from a security standpoint. However, because this data may be linked to confidential Order data or other non-public information, the Participants are requiring the Plan Processor to store this public data in the same manner as the non-public Order and trade information submitted to the Central Repository by Data Submitters.

¹²¹ RFP, Question 65.

¹²² RFP, Question 66.

- how access to the data is controlled and how the system(s) confirms the identity of persons (e.g., username/password), monitors who is permitted to access the data and logs every instance of user access;¹²³
- what system controls for users are in place to grant different levels of access depending on their role or function;¹²⁴
- the strategy, tools and techniques, and operational and management practices that will be used to maintain security of the system;¹²⁵
- the proposed system controls and operational practices;¹²⁶
- the organization's security auditing practices, including internal audit, external audit, third-party independent penetration testing, and all other forms of audit and testing;¹²⁷
- how security practices may differ across system development lifecycles and environments that support them (e.g., development, testing, and production);¹²⁸
- experiences in developing policies and procedures for a robust security environment, including the protection of PII;¹²⁹
- the use of monitoring and incident handling tools to log and manage the incident handling lifecycle;¹³⁰
- the approach(es) to secure user access, including security features that will prevent unauthorized users from accessing the system;¹³¹
- the processes/procedures followed if security is breached;¹³²
- the infrastructure security architecture, including network, firewalls, authentication, encryption, and protocols; and¹³³
- the physical security controls for corporate, data center and leased data center locations.¹³⁴

123 RFP, Question 67.
 124 RFP, Question 68.
 125 RFP, Question 69.
 126 RFP, Question 70.
 127 RFP, Question 71.
 128 RFP, Question 72.
 129 RFP, Question 75.
 130 RFP, Question 76.
 131 RFP, Question 77.
 132 RFP, Question 78.
 133 RFP, Question 79.
 134 RFP, Question 80.

All Bidders acknowledged the importance of data security; however, the proposals varied in the details about security policies, data access management, proactive monitoring and intrusion prevention, and how data security will be implemented. Some Bidders intend to leverage their experience in financial services and adopt their policies and technologies to control data, and many Bidders supported such measures as role-based access controls, two factor authentication, detailed system logs, and segmentation of sensitive data that is isolated in both logical and physical layers. Other Bidders indicated that they would use role-based security policies, data and file encryption, and redundant and layered controls to prevent unauthorized access. Additionally, Bidders noted that the physical locations at which data is stored need security measures to ensure data is not compromised. Some Bidders indicated that physical controls would include background checks for employees working with the system; physical building security measures (e.g., locks, alarms, key control programs, CCTV monitoring for all critical areas, and computer controlled access systems with ID badges).

The RFP also requested additional information specific to the treatment and control over PII. The RFP required Bidders to specifically address:

- how PII will be stored,¹³⁵ and
- how PII access will be controlled and tracked.¹³⁶

All of the Bidders proposed segregating PII from the other data in the Central Repository. Additionally, all of the Bidders recommended limiting access to PII to only those regulators who need to have access to such information, and requiring additional validations to access PII. Although all Bidders proposed to keep a log of access to the Central Repository by user, the Bidders suggested different methods of authentication and utilized varying security policies, including the use of VPNs or HTTPS.

The RFP also requested information from Bidders on data loss prevention (“DLP”) and business continuity to ensure the continued security and availability of the data in the Central Repository. Specifically, the RFP asked Bidders to describe:

- their DLP program; and¹³⁷
- the process of data classification and how it relates to the DLP architecture and strategy.¹³⁸

(a) General Security Requirements

SEC Rule 613 requires that the Plan Processor ensure the security and confidentiality of all information reported to and maintained by the Central Repository in

¹³⁵ RFP, Question 5.

¹³⁶ RFP, Question 6.

¹³⁷ RFP, Question 73. The Bidders were asked to include information pertaining to strategy, tools and techniques, and operational and management practices that will be used.

¹³⁸ RFP, Question 74.

accordance with the policies, procedures, and standards in the CAT NMS Plan.¹³⁹ Based on the numerous options and proposals identified by the Bidders, the Participants have outlined multiple security requirements the Plan Processor will be required to meet to ensure the security and confidentiality of data reported to the Central Repository. The Plan Processor will be responsible for ensuring the security and confidentiality of data during transmission and processing as well as data at rest. In addition, CAT Data cannot be co-mingled with other non-CAT data (e.g., co-mingled with other non-CAT data in a cloud storage facility).

The Plan Processor must provide a solution addressing physical security controls for corporate, data center and any leased facilities where any of the above data is transmitted or stored. In addition to physical security, the Plan Processor must provide for data security for electronic access by outside parties, including Participant and SEC staff and, as permitted, CAT Reporters or Data Submitters. Specifically:

- the Plan Processor must anticipate protection of data during transmission, processing and at rest;
- access to the data must be controlled and system(s) must have a mechanism to confirm the identity of persons (e.g., username/password) who are permitted to access the data;
- every instance of user access must be logged for auditing purposes;
- the system controls must allow for users to be granted different levels of access and capabilities depending on their role or function; and
- as discussed in more detail below, the Plan Processor must propose an additional level of security for populating, storing, and retrieving sensitive data, such as PII.

Pursuant to SEC Rule 613(i)(C), the Plan Processor has to develop and maintain a comprehensive security program for the Central Repository with dedicated staff: (1) that is subject to regular reviews by the Chief Compliance Officer; (2) that has a mechanism to confirm the identity of all persons permitted to access the data; and (3) that maintains a record of all such instances where such persons access the data.

To effectuate these requirements, Section 6.5 of the CAT NMS Plan sets forth certain provisions designed to (1) limit access to data stored in the Central Repository to only authorized personnel and only for permitted purposes; (2) ensure data confidentiality and security during all communications between CAT Reporters and the Plan Processor, data extractions, manipulation and transformation, loading to and from the Central Repository, and data maintenance by the Central Repository; (3) require the establishment of secure controls for data retrieval and query reports by Participant regulatory staff and the

¹³⁹ Rule 613(e)(4). This section of Appendix C provides an outline of the policies and procedures to be implemented. When adopting this requirement, the Commission recognized “the utility of allowing the [Participants] flexibility to subsequently delineate them in greater detail with the ability to make modifications as needed.” Adopting Release, at 45782. The Participants intend to provide greater detail in the PFR.

Commission staff; and (4) otherwise provide appropriate database security for the Central Repository. Section 6.2(a) of the CAT NMS Plan provides that the Chief Compliance Officer will retain independent third parties with appropriate data security expertise to review and audit on an annual basis the policies, procedures, standards, and real time tools that monitor and address data security issues for the Plan Processor and the Central Repository.¹⁴⁰

Section 6.12 of the CAT NMS Plan requires that the Plan Processor implement and maintain technology policies and procedures that will safeguard CAT Data reported to the Central Repository and comply with all applicable regulations, including relevant provisions of Regulation Systems Compliance and Integrity under the Exchange Act (if adopted). Additionally, the Plan Processor must meet industry best practices for database security, including specifically the standards and requirements set forth in the following Special Publications of the National Institute of Standards and Technology, in each case as such standards and requirements may be replaced by successor publications or modified, amended, or supplemented:

- 800-23 (Guidelines to Federal Organizations on Security Assurance and Acquisition/Use of Tested/Evaluated Products);
- 800-115 (Technical Guide to Information Security Testing and Assessment);
- 800-133 (Recommendation for Cryptographic Key Generation); and
- 800-137 (Information Security Continuous Monitoring for Federal Information Systems and Organizations).

The Plan Processor must have appropriate solutions and controls in place to ensure data confidentiality and security during all communication between CAT Reporters and the CAT System, data extraction, manipulation and transformation, loading to and from the Central Repository and data maintenance by the system. The solution must also address secure controls for data retrieval and query reports by Participant regulatory staff and the SEC. The solution must provide appropriate tools, logging, auditing and access controls for different components of the system, such as access to the Central Repository, access for CAT Reporters, access to rejected data, processing status and CAT Reporter calculated error rates.

In addition, pursuant to SEC Rule 613(e)(4)(i)(C)(2), the Plan Processor will develop and maintain a mechanism to confirm the identity of all persons permitted to access the data. The Plan Processor is responsible for defining, assigning and monitoring CAT Reporter entitlements. Similarly, pursuant to SEC Rule 613(e)(4)(i)(C)(3), the Plan Processor will record all instances where a person accesses the data. The Plan Processor will make a record of each use of a public key infrastructure (“PKI”) to track all instances where a person accesses the data.

¹⁴⁰ See SEC Rule 613(e)(5).

Pursuant to SEC Rule 613(e)(4)(i)(B), Section 6.5(e)(ii) of the CAT NMS Plan requires each Participant to adopt and enforce rules that require information barriers between its regulatory staff and non-regulatory staff with regard to access to and use of data in the Central Repository, and permit only persons designated by such Participants to have access to and use of the data in the Central Repository.

(b) PII

As noted above, because of the sensitivity of PII, the Participants have determined PII should be subject to more stringent standards and requirements than other order and trading data. In response to the RFP questions, many Bidders mentioned that a range of techniques were required to ensure safety of PII. These techniques included development of PII policies and managerial processes for use by Plan Processor as well as SRO and SEC staff, physical data center considerations and strong automated levels, such as application, mid-tier, database, and operating systems levels, and use of role-based access and other parameters such as time-limited, case-restricted, and compartmentalized privilege. Most Bidders advocated for separate storage of PII in a dedicated repository to reduce the ability for hacking events to occur.

In accordance with SEC Rule 613(e)(4)(i)(A), all Participants and their employees, as well as all employees of the Plan Processor, will be required to use appropriate safeguards to ensure the confidentiality of data reported to the Central Repository and not to use such data for any purpose other than surveillance and regulatory purposes. A Participant, however, may use the data that it reports to the Central Repository for regulatory, surveillance, commercial, or other purposes as otherwise permitted by applicable law, rule, or regulation.

As an initial matter, the Participants anticipate that access to PII will be limited to a “need-to-know” basis and only after potentially violative trading has been identified. Therefore, it is expected that access to PII associated with customers and accounts will have a much lower number of registered users, and access to this data will be limited to SRO and SEC regulatory staff who need to know the specific identity of an individual. For this reason, PII such as customer SSN and tax identifier numbers will not be made available in the general query tools, reports, or bulk data extraction.¹⁴¹ Instead, the Participants will require that the Plan Processor provide for a separate limited access query capability that allows this information to be retrieved only when required by specific regulatory staff of a Participant or the SEC, including additional security requirements for this sensitive data. Specifically, the Plan Processor must take steps to protect PII:

- PII must be stored separately from Order and transaction data;

¹⁴¹ As described in Section A.1.b of this Appendix C, general queries can be carried out using the Customer ID without the need to know specific, personally-identifiable information (i.e., who the individual person associated with the Customer ID is). The Customer ID will be associated with the relevant accounts of that person; thus, the use of Customer ID for querying will not reduce surveillance in any way.

- PII cannot be accessible via the Internet;
- default access to PII is not permitted;
- two-factor authentication for access to PII must be required;
- a full audit trail must be maintained for any PII access (i.e., tracking who accessed what specific data);
- access to PII must be limited to a defined set of individuals identified by each Regulator that require access to PII;¹⁴²
- each attribute in the PII database must be configurable to determine which roles have access to that data;
- PII data must be masked and encrypted and must not be made available in the query tools, reports, or bulk data extraction, but instead only made available via a separate limited access tool only accessible when required by Participant regulatory staff and the SEC;¹⁴³
- the Plan Processor must produce daily reports that list all individuals that have access to PII;
- vertical and horizontal partitioning of data sets is required for PII data;
- each PII attribute must be protected; and
- the Plan Processor must have the ability to segregate PII elements within the PII database.

As required by SEC Rule 613(e)(4)(i)(C)(1), the Plan Processor will develop and maintain a comprehensive information security program for the Central Repository, with dedicated staff, which program will be subject to regular review by the Chief Compliance Officer. As a key aspect of the information security program, the Plan Processor will provide encryption for data at rest and data in transit in accordance with the Technical Specifications. Furthermore, Customer Account Information, which includes PII, will be provided the additional protections set forth above. Access to Customer Account Information will only be provided pursuant to a controlled and auditable process described in the Technical Specifications. An Industry Member will not be permitted to access Customer Account Information except as needed to correct potential errors in data reported by such Industry Member. It is anticipated that the Technical Specifications will set forth

¹⁴² It is anticipated that the CRO at each Participant will be required to periodically review the individuals with access to PII and attest that each person's access is appropriate and necessary.

¹⁴³ It is anticipated that responses to initial requests for data from the Central Repository will not include PII. Instead, such information will be masked and not revealed unless subsequently requested by Commission or Participant regulatory staff.

additional policies and procedures concerning the security of data reported to the Central Repository; however, any such policies and procedures must, at a minimum, meet the requirements set forth in the CAT NMS Plan and the Plan Processor Functional Requirements.

5. The Flexibility and Scalability of the CAT (SEC Rule 613(a)(1)(v)):

a. Overview

As required by SEC Rule 613(a)(1)(v), this section discusses the flexibility and scalability of the systems used by the Central Repository to collect, consolidate and store CAT Data, including the capacity of the Central Repository to efficiently incorporate, in a cost-effective manner, improvements in technology, additional capacity, additional Order data, information about additional securities or transactions, changes in regulatory requirements, and other developments.

The Plan Processor will ensure that the Central Repository's technical infrastructure is scalable, adaptable to new requirements and operable within a rigorous processing and control environment. As a result, the technical infrastructure will require an environment with significant throughput capabilities, advanced data management services and robust processing architecture. The technical infrastructure should be designed so that in the event of a capacity upgrade or hardware replacement, the Central Repository can continue to receive data from CAT Reporters with no unexpected issues.

The Plan Processor will perform assessments of the Central Repository's technical infrastructure to ensure the technology employed therein continues to meet the functional requirements established by the Participants. The Plan Processor will provide such assessments to, and review such assessments with, the Operating Committee within one month of completion. The Operating Committee will set forth the frequency with which the Plan Processor is required to perform such assessments. The Operating Committee must approve all changes / upgrades proposed by the Plan Processor before they can be acted upon. The Operating Committee may solicit feedback from the Advisory Committee for additional comments and/ or suggestions on changes to the capacity study as the Operating Committee determines necessary.

The Central Repository will employ optimal technology for supporting (1) scalability to increase capacity to handle a significant increase in the volume of data reported, (2) adaptability to support future technology developments and new requirements and (3) maintenance and upgrades to ensure that technology is kept current, supported and operational. The technology should also be current with all applicable industry standards as outlined by the Operating Committee.

Participants will identify baseline metrics and forecasted growth to facilitate Central Repository capacity planning. The Plan Processor will maintain records of usage statistics to identify trends and processing peaks. The Central Repository's capacity levels will be documented by the Operating Committee and used to monitor resources, including CPU power, memory, storage and network capacity.

The Plan Processor will ensure the Central Repository's compliance with all applicable service level agreements concerning flexibility and scalability of the Central Repository, including those specified in the CAT NMS Plan and by the Operating Committee.

b. Approaches proposed by Bidders

Information received from Shortlisted Bidders indicated that all six Shortlisted Bidders considered incoming transaction volumes to be one of their most significant drivers of cost across hardware, software, and full-time employees (“FTEs”), with the expected rate of increase in transaction volumes and retention requirements also being prominent drivers of cost. The approaches described above will facilitate effective management of these factors to provide for a cost-effective and flexible Central Repository.

As noted in the FFP, the Bidders were required to provide comments on how the Central Repository would be scalable for growth in the following aspects: number of issues accepted by the CAT, types of messages accepted by the CAT, addition of fields stored on individual data records or increases in any data type due to market growth. The respondents were also requested to describe how the system can be scaled up for peak periods and scaled down as needed.

Bidders using a network infrastructure of data collections hubs noted the use of Ethernet links throughout a single hub as a method of handling additional throughput and capacity. Other Bidders note access points will be load balanced, allowing for additional capacity. Some Bidders note the need for continued monitoring to timely facilitate additional capacity functionality. Other Bidders highlighted the ability to scale processing horizontally by adding nodes to the database structure which will allow for additional capacity. In this instance, adding nodes to an existing clustered environment allows for the preservation of processing speed in the existing processing environment. In a cloud solution, Bidders note the systems will scale automatically. That is, the processing load or capacity is determined at the instance the tool is ‘run’ by the processor.¹⁴⁴ Some Bidders broadly note that the selection of platform components or features of their proposed solution infrastructure was the key in developing a scalable system. It is further noted that the selection of these elements allows for technological upgrades to incorporate newer technologies without a system replacement. Bidders identify the use of additional server and storage capacity as a key proponent of providing a scalable system.

6. The Feasibility, Benefits, and Costs for Broker-Dealers Reporting Allocations in Primary Market Transactions to the Consolidated Audit Trail (SEC Rule 613(a)(1)(vi))

SEC Rule 613(a)(1)(vi) requires the Participants to assess the feasibility, benefits and costs of broker-dealers reporting to the consolidated audit trail in a timely manner:

¹⁴⁴ <https://cloud.google.com/developers/articles/auto-scaling-on-the-google-cloud-platform/>

- The identity of all market participants (including broker-dealers and customers) that are allocated NMS Securities, directly or indirectly, in a primary market transaction;
- The number of such securities each such market participant is allocated; and
- The identity of the broker-dealer making each such allocation.¹⁴⁵

The objective of this CAT NMS Plan is to provide a comprehensive audit trail that “allows regulators to efficiently and accurately track all activity in NMS securities throughout the U.S. markets.” The Participants believe that an expansion of the CAT to gather complete information on primary market transactions would be beneficial to achieving that objective. However, based on the analysis directed to be completed as part of this plan, the Participants have concluded that it is appropriate to limit CAT submissions related to allocations in primary market transactions to sub-account allocations, as described below.

Specifically, based on comments received by the Participants on this and other topics related to the consolidated audit trail,¹⁴⁶ the Participants believe that information related to sub-account allocations – the allocation of shares in a primary market offering to the accounts that ultimately will own them – currently is maintained by broker-dealers in a manner that would allow for reporting to the Central Repository without unreasonable costs and could assist the Commission and the Participants in their regulatory obligations, including a variety of rulemaking and policy decisions. By contrast, the reporting of so-called “top account” information in primary market transactions to the Central Repository would involve significantly more costs which, when balanced against the marginal benefit, is not justified at this time. These issues are discussed further below.

As a preliminary matter, the analysis required pursuant to this section is limited to primary market transactions in NMS Securities that involve allocations. As the Commission has noted, “a primary market transaction is any transaction other than a secondary market transaction and refers to any transaction where a person purchases securities in an offering.”¹⁴⁷ The Participants understand that primary market transactions generally involve two phases that implicate the allocation of shares. The “book building” phase involves the process “by which underwriters gather and assess investor demand for an offering of securities and seek information important to their determination as to the size and pricing of an issue.”¹⁴⁸ This process may involve road shows to market an offering to potential investors, typically institutional investors, including the discussion of the prospective issuer, and its management and prospects. The book building phase also involves efforts by the underwriter to ascertain indications of interest in purchasing quantities of the underwritten securities at varying prices from potential investors.¹⁴⁹ Using this and other information, the underwriter will then decide how to allocate IPO

¹⁴⁵ SEC Rule 613(a)(1)(vi), 17 C.F.R. § 242.613(a)(1)(vi).

¹⁴⁶ Questions for Public Comment re CAT Plan (April 22, 2013), available at <http://catnmsplan.com/web/groups/catnms/@catnms/documents/appsupportdocs/p246652.pdf> (“April Request for Comment”).

¹⁴⁷ Securities Exchange Act Release No. 67457, 77 Fed. Reg. 45722, 45792 n. 792 (August 1, 2012) (“Adopting Release”).

¹⁴⁸ See generally, Securities Act Release No. 8565, 70 Fed. Reg. 19672 (April 13, 2005) (Commission guidance regarding prohibited conduct in connection with IPO allocations) (“IPO Allocation Release”).

¹⁴⁹ Id.

shares to purchasers. The Participants understand that these are so-called “top account” allocations – allocations to institutional clients or retail broker-dealers, and that such allocations are conditional and may fluctuate until the offering syndicate terminates. Sub-account allocations occur subsequently, and are made by top account institutions and broker-dealers prior to settlement. Sub-account allocations represent the allocation of IPO shares to the actual account receiving the shares and are based on an allocation process that is similar to secondary market transactions.¹⁵⁰

(a) Feasibility

In the April 2013 Request for Comment, the Participants requested information on how firms handle primary market transactions. In response to the request, FIF, SIFMA and Thomson Reuters submitted comments explaining current industry practice with respect to primary market transactions.¹⁵¹ Both SIFMA and FIF noted that broker-dealers generally maintain top account allocation information in book building systems that are separate from their systems for secondary market transactions and that differ across the industry, including the use of applications provided by third parties, in house systems and spread sheets for small firms.¹⁵² The Participants also understand that the investment banking divisions of broker-dealers typically use different compliance systems than those used for secondary market transactions.¹⁵³ Thus, the Participants believe that capturing indications of interest and other information about top account allocations in an accurate and consistent manner across the industry would be challenging.

By contrast, the Participants believe that it would be more feasible to gather information relating to sub-account allocations in primary market transactions. The Participants understand that sub-account allocations are received in a manner and level of detail similar to allocations in secondary market transactions,¹⁵⁴ and that the same middle and back office systems that are used for the processing of sub-account allocations for secondary market transactions generally are also used for the sub-account allocations for primary market transactions.¹⁵⁵ Similarly, sub-account allocations for primary market transactions generally are maintained in an electronic format that could be converted into a reportable format acceptable for the CAT System. Therefore, these systems could more easily report information about sub-account allocations to the Central Repository than systems containing information regarding top-account allocations.

(b) Benefits

¹⁵⁰ See Letter from Manisha Kimmel, Executive Director, Financial Information Forum, to Participant Representatives of the CAT (June 12, 2013) (“FIF Letter”).

¹⁵¹ See FIF Letter; Letter from T.R. Lazo, Managing Director, SIFMA, and Thomas Price, Managing Director, SIFMA (June 11, 2013) (“SIFMA Letter”), and Thomson Reuters (May 21, 2013) (“Thomson Reuters Letter”), available at <http://catnmsplan.com/industryFeedback/>; see also Thomson Reuters Letter (systems used for primary market allocations differ from those used for secondary market transactions).

¹⁵² FIF Letter at 4; SIFMA Letter at 3

¹⁵³ FIF Letter at 4. The Participants also understand that top account allocation systems do not generally have execution reporting capacity, since reporting of primary market transactions is not currently required under OATS and other transaction reporting systems. SIFMA Letter at 2.

¹⁵⁴ FIF Letter at 4.

¹⁵⁵ For example, commenters noted that that “firms generally use the same clearance and settlement systems for clearing and settling final allocations in primary market transactions as they do for clearing and settling secondary market trades.” SIFMA Letter at 4.

As the Commission notes, data about the final allocations of NMS Securities in primary market transactions could improve compliance monitoring and market analyses by the Commission and the Participants, which, in turn, could help inform rulemaking and other policy decisions.¹⁵⁶ For example, such data could enhance the Commission's understanding of the role of the allocations in the capital formation process, when and how investors receiving allocations sell their securities and how allocations differ among broker-dealers.¹⁵⁷ Such data also could assist the Commission and Participants in conducting their respective examinations and investigations related to primary market transactions.¹⁵⁸

The Participants believe that most of these potential benefits could be achieved through the gathering of information relating to sub-account allocations rather than top account information. For example, sub-account allocation information would aid the Commission and the Participants in gaining a better understanding of how shares allocated in primary market transactions are sold in the secondary market, or how allocations differ across broker-dealers. By contrast, because top account information of conditional and interim allocations for NMS Securities fluctuates throughout the syndicate process and may vary significantly among firms, the marginal benefits of such information over final sub-account allocations are much less clear.

(c) Costs

The cost of reporting primary market transaction information will depend on the scope of allocation information subject to the rule, as well as the related technology upgrades that would be necessary to report such information to the Central Repository. Based on the response of commenters, the Participants believe that reporting top account information about conditional allocations to the Central Repository would require significant technology enhancements. As noted above, current market practices capture top account allocations using systems and data sources that are different and separate from those used in secondary market transactions. Commenters also noted that there may be significant variability among underwriters in terms of the systems and applications used to gather such data.

While the scope and cost of technological system acquisitions or upgrades that would be required to capture and transmit to the Central Repository information about primary market sub-account allocations likely would be more limited than those associated with top account allocations, they would be significant.¹⁵⁹ Although the clearance and settlement systems, in particular, used for sub-account allocations are similar to secondary market transaction systems, the cost of reporting allocation information for primary market transactions also will depend on the additional technology parameters for the CAT NMS Plan. Specifically, the CAT NMS Plan would need to reflect the unique aspects of reporting of sub-account allocations. For example, primary market transactions currently

¹⁵⁶ Adopting Release at 45792-93.

¹⁵⁷ Id.

¹⁵⁸ Id.

¹⁵⁹ Feedback provided in the "FIF CAT WG Feedback for July 23, 2014 DAG Meeting" document indicates that without specific documented requirements, cost implications are not determinable

are not required to be reported under OATS rules or any transaction reporting rules.¹⁶⁰ Thus, sub-account allocation reports would differ from other reportable Order events because there would be no other order-lifecycle events associated with the sub-account allocation report. Therefore, the CAT NMS Plan would need to define an additional scenario specifically for these allocations, and each CAT Reporter would need to include this additional scenario in its reporting processes. The incremental cost of including these additional stand-alone parameters regarding allocation in the CAT NMS Plan would not be insignificant. However, based on discussions with Industry Members, the Participants believe that such costs likely would be outweighed by the benefits of gathering and reporting sub-account allocations in primary market transactions to the Central Repository.

B. ANALYSIS OF THE NMS PLAN: These considerations will help to inform the SEC about the cost for development, implementation and maintenance of the CAT and to help determine if such plan is in the public interest.

7. Detailed Estimated Costs for Creating, Implementing, and Maintaining the Consolidated Audit Trail (SEC Rule 613(a)(1)(vii)):

As required by SEC Rule 613(a)(1)(vii), this section provides detailed estimated costs for creating, implementing, and maintaining the consolidated audit trail, specifying (1) an estimate of the costs to Participants for establishing and maintaining the Central Repository; (2) an estimate of the costs to members of the Participants, initially and on an ongoing basis, for reporting the data required by the CAT NMS Plan; (3) an estimate of the costs to the Participants, initially and on an ongoing basis, for reporting the data required by the CAT NMS Plan; and (4) the Participants' proposal to fund the creation, implementation, and maintenance of the consolidated audit trail, including the proposed allocation of such estimated costs among the Participants, and between the Participants and members of the Participants. The Participants are sensitive to the economic impacts of SEC Rule 613. Throughout the development of the CAT NMS Plan, the Participants have continued to focus on minimizing the costs imposed by the adoption of SEC Rule 613. The figures presented herein are best estimates based on research completed and currently available data and are inherently subject to uncertainties.

Given the size and scope of this initiative, estimating the costs of the creation, implementation and maintenance of the consolidated audit trail is a complex task. In light of this complexity, the Participants have used a multi-pronged approach in analyzing the potential costs of the consolidated audit trail. Among other things, the Participants have evaluated the many cost-related comments received in response to the SEC's rule proposal and during the CAT NMS Plan development process. In addition, the Participants have considered cost analyses and considerations provided by Bidders as well as the views provided by the DAG which includes written feedback from SIFMA and FIF.

Bidders were asked to provide total one-year cost estimates and annual recurring cost estimates. While each bidder identified specific material costs for resource and technology requirements a few key items identified included (1) transactional volumes of

¹⁶⁰ SIFMA Letter at 2.

data ingested into the central repository, (2) the number of technical environments that would be required to build the CAT, (3) data archival requirements and (4) user support/help desk resource requirements.

The DAG has largely provided written feedback on costs through the industry association members. In March 2013, SIFMA provided feedback on industry costs in its Consolidated Audit Trail White Paper.¹⁶¹ The association group stated the industry is likely to face costs related to upgrade in the regulatory reporting infrastructure. SIFMA highlighted additional costs borne will be distributed across the front office, middle office, customer master data, middle office, compliance and risk and data management. Additionally, in February 2012, the FIF conducted a study to assess the costs associated with the implementation of OATS.¹⁶² In a summary of the study, FIF highlights that ‘future estimates of cost should consider the FIF cost model, most importantly the effort expended on business analysis and testing as part of the implementation effort.’ One key view presented by the DAG was that retiring legacy systems will likely reduce costs to the industry, given their redundancies with the CAT.

Finally, the Participants developed three cost studies to obtain data about the potential costs related to consolidated audit trail from broker-dealers, the Participants and service providers. These, as well as the economic baseline against which the potential costs and benefits of the consolidated audit trail must be compared, are discussed below.

Cost Studies

In order to estimate the direct costs associated with the CAT NMS Plan, the Participants undertook a series of surveys. The first survey was directed at understanding the potential costs of the consolidated audit trail for broker-dealers. In consultation with the DAG,¹⁶³ the Participants developed an independent survey requesting estimates from broker-dealers on costs related to technology, compliance and outsourcing. For each of these categories, the Participants requested estimates for current costs under the existing regulatory reporting framework as well as future costs for reporting to the consolidated audit trail. Questions related to current costs are intended to capture the baseline costs to broker-dealers for regulatory reporting, including costs related to compliance with OATS, the Electronic Blue Sheets and Large Trader reporting, and other reporting requirements, such as NYSE Rule 410B, PHLX Rule 1022, FESC/NYSE Rule 123(e)/(f), and CBOE Rule 8.9.

Questions related to future costs are intended to collect information related both to the retirement of existing systems and compliance with requirements of the consolidated audit trail. Survey respondents were asked to evaluate the future costs under two separate scenarios. One scenario asked firms to estimate costs where they were able to rely on their

¹⁶¹ <http://catnmsplan.com/web/groups/catnms/@catnms/documents/appsupportdocs/p242319.pdf>

¹⁶² <http://www.sec.gov/comments/s7-11-10/s71110-112.pdf>

¹⁶³ The Participants shared iterations of the draft study with the DAG and discussed the DAG’s feedback at length on calls meetings held on May 9 2014 and June 4 2014. Among other things, the DAG provided recommendations on the survey structure and content, including the set of assumptions underlying the survey.

existing reporting systems, while the other contemplated a new uniform reporting system for all broker-dealers.

The survey was distributed to 4,406 broker-dealers¹⁶⁴ on June 23, 2014. The survey link was sent to the compliance contact at each recipient broker-dealer identified by the designated examining authority or designated options examining authority to receive regulatory update and information requests. Responses to the broker-dealer cost survey were due August 20, 2014. Due to the volume and complexity of the information required,¹⁶⁵ the industry requested an extension of the survey window. The Participants extended the due date for the survey until September 3, 2014, two weeks past the original due date. The Participants received 422 responses, of which 167 were used in the analysis.¹⁶⁶ The DAG provided direct cost estimates in the survey to firms.

The second survey undertaken by the Participants was intended to collect information about the potential costs of the consolidated audit trail to the Participants. This survey was similar in structure to the broker-dealer survey described above. Due to the complexity of the data collection effort, the due date for the survey was extended until September 24, 2014. The study evaluated costs for current regulatory reporting by Participants as reporters and regulators. Responses were received from eight of the 10 Participant complexes to which the study was distributed.

The third survey requested information about the potential costs of the consolidated audit trail from various service providers and vendors. On June 22, 2014, the Participants held a meeting with members of the DAG committee to request feedback on the survey to service providers and vendors. In follow up, members of the DAG provided feedback on both the content of the survey, the suggested distribution list and suggested collection period for the survey. On August 11, 2014 individual survey links were distributed to thirteen service bureaus and technology vendors.

The Participants received five completed responses to the Cost to Vendors Study. One of the responses indicated that the firm did not currently have any reporting expenses on behalf of its clients and did not expect to face any costs under the CAT.

Of the remaining responses, three firms supported more than 100 clients, and one supported between 50 – 99 clients. Two of the firms supported up to 25 million accounts, and two supported up to 50 million accounts. Two of the firms serviced clients with institutional and retail businesses, while the remaining two supported clients with institutional businesses only.

The results of these surveys are discussed below, providing additional context to the Participants' discussions of baseline costs and costs that could be imposed by the Plan.

¹⁶⁴ A unique study link was distributed to 4406 broker-dealers. For approximately 381 of the broker-dealers, the distribution email either bounced or the broker-dealer responded that the study did not apply to them, leaving approximately 4025 broker-dealers who received the study.

¹⁶⁵ For example, large broker-dealers store data in different systems and in various business segments, and thus accurate responses to the survey questions required complex data assimilation.

¹⁶⁶ A total of 422 broker-dealers responded. Of those responses, 180 were substantially incomplete, and 75 were determined to be erroneous, leaving a population of 167 responses which were used for analysis.

The Participants recognize that to provide estimates of costs to report to the consolidated audit trail, particularly cost estimates as complex as those required to facilitate this initiative, survey respondents were required to make assumptions about what might be contained in a final CAT NMS Plan. The Participants further recognize that this uncertainty or differences in expectations about the Plan may make comparing survey responses more difficult. Accordingly, the estimated costs set forth herein represent the Participants' best estimate of costs based on the information collected, reviewed and analyzed by the Participants as of the date of this Plan, and actual costs incurred may not be consistent with the estimated costs.

Economic Baseline

In publishing SEC Rule 613, the SEC stated that it “believes that the regulatory infrastructure on which the Participants and the Commission currently must rely generally is outdated and inadequate to effectively oversee a complex, dispersed, and highly automated national market system.”¹⁶⁷ The purpose of this plan is to develop, build and maintain a system that provides an infrastructure appropriate to monitor, surveil and oversee the national market system in its current state and provide sufficient flexibility that the infrastructure can adequately adjust for future financial market innovations.

Such a system may necessarily impact the SEC, Participants, potential future Participant entrants, broker-dealers and other market participants, issuers and investors. Each party may derive costs, benefits and other economic impacts, depending upon plan implementation, the relevant economic activities of each entity and the allocation of costs and responsibilities across those entities.

Current Audit Trail Reporting

Currently, separate audit trails exist within each exchange in addition to the audit trail requirements for FINRA members to report to OATS. For equities, all broker-dealers that are members of FINRA must report their orders in NMS stock and OTC equity securities, including executions or cancellations, to OATS. Thus, for FINRA members, it is possible to match OATS reports to related exchange audit trail entries, provided that the related exchange has a regulatory services agreement with FINRA such that FINRA has access to the exchange data. Broker-dealers that are not FINRA members do not have a regular equity audit trail reporting requirement, although NYSE and Nasdaq member proprietary firms that are not FINRA members have an obligation to record OATS data and report if requested. Additionally, each exchange creates its own audit trail for each order received and processed by the exchange.

For options, the options exchanges utilize the Consolidated Options Audit Trail System (“COATS”) to obtain and review option transactions. The COATS audit trail includes trades, the NBBO at the time of the trade and clearing information for customers at the clearing firm level. It also identifies clearing firm proprietary trading and individual marker maker transactions if they are reported correctly at the time of the trade. However, COATS has some shortcomings. For example, it does not include Options Clearing

¹⁶⁷ Adopting Release at 45723.

Corporation adjustment data; these adjustments include changes to either the account type or size of the position. Another significant shortcoming of COATS is that order information is only available upon request from the options exchanges. Currently reports need to be built on order information received from the various options exchanges. Additionally, more fulsome quote information is only available upon request to the option exchanges. As previously noted, only the NBBO at the time of the trade is included in the COATS data; however, this is optional data the exchanges may or may not provide. The Participants utilize their independent quote information to build their reports.

In sum, each equities and options exchange is built on its own unique platform, utilizes unique entry protocols and requirements and thus create uniquely formatted audit trails.

The existence of multiple non-integrated audit trails has direct consequences on the accuracy and efficiency of regulatory oversight. The SEC has stated that:

...there are shortcomings in the completeness, accuracy, accessibility, and timeliness of these existing audit trail systems. Some of these shortcomings are a result of the disparate nature of the systems, which make it impractical, for example, to follow orders through their entire lifecycle as they may be routed, aggregated, rerouted, and disaggregated across multiple markets. The lack of key information in the audit trails that would be useful for regulatory oversight, such as the identity of the customers who originate orders, or even the fact that two sets of orders may have been originated by the same customer, is another shortcoming.¹⁶⁸

There are several efforts to combine information from multiple audit trails into a more complete and consolidated view. For example, as part of its cross-markets surveillance, FINRA integrates data collected through OATS with exchange audit trail data where FINRA has an agreement in place to permit this activity. FINRA expends considerable resources to link and standardize, where possible, these disparate data sources. The resulting audit trail provides a more complete record that may include multiple routes over an order lifecycle. However, this audit trail is limited to equity securities and does not include options.

In addition, the Intermarket Surveillance Group (“ISG”) consolidated audit trail combines transaction data from all exchanges and OTC trades and is used by all Participants for surveillance purposes. However, the ISG audit trail is limited because it only contains clearing member and executing broker’s CRD number. It does not contain order detail information such as order entry time or routing history of the order. In addition, it does not contain information about the beneficial owner to a trade.

COATS and the ISG equity audit trail are utilized to generate various option cross market/cross product exception reports, such as min-manipulation, front-running, and

¹⁶⁸ Adopting Release at 45722.

anticipatory hedges. Since the current data is unable to drill down to participant or order information, these reports are less effective and produce a large number of false positives.

Impact of Audit Trail Reporting on Regulators and Market Participants

SROs

There are 19 SROs of varying sizes that have established audit trail reporting requirements for NMS securities. Of these, one is an association. The other 18 Participants are associated with exchanges. 14 of these exchanges permit quotation and transactions in NMS equity securities and 12 permit transactions and quotations in NMS options.

SROs expend resources today to maintain and update their audit trail reporting systems. Costs for current surveillance programs as indicated by SROs responding to the Cost to Participants study vary significantly, reflecting the various sizes of SROs: annual costs for hardware and software associated with current surveillance programs are reported to be between \$200,000 and \$17,000,000.

Broker-Dealers

There are approximately 4,025 broker-dealers that are members of FINRA. Of these, approximately 1,800 quote or execute transactions in NMS securities. The Participants estimate that there are as many as an additional 200 broker-dealers that quote or execute transactions in either NMS equities or options that are members of an exchange but not FINRA members. Thus, the Participants estimate the total number of broker-dealers with current audit trail reporting obligations to be approximately 2000.

Broker-dealers benefit from the current regime of audit trail reporting to the extent that reporting today permits the SEC and Participants to monitor for rule compliance. Effective regulatory and compliance oversight ensures increased market integrity and supports investor confidence in participating in financial markets. Their participation increases broker-dealer activities, and hence revenues. Conversely, if investors believe that regulators are unable to adequately and effectively monitor activities in a complex market (through current audit trail reporting), broker-dealers bear some of the cost in the form of lower market activity.

Broker-dealers that are FINRA members must have systems and processes in place to provide FINRA with the reportable necessary data in the required format. These systems also require resources to ensure data quality and consistency, timeliness of reporting, and record keeping obligations. Additionally, firm trading and order routing systems send orders and quotations to each exchange in the format required by each exchange. In turn, each exchange must store and convert the data for the purposes of creating internal exchange audit trails. Broker-dealers also commit staff to respond to Participant and SEC requests for additional data and related information where current surveillance identifies concerning quotes or trades.

Broker-dealers may take varied approaches to fulfilling their regulatory reporting obligations. For instance, larger broker-dealers may develop internal systems for the purpose of compiling order and trading data into a reportable format. In many instances, these firms must centralize varied and disparate systems. Smaller brokers typically use third parties to help them comply with their reporting obligation. These third parties may include service bureaus that provide the firms with order management systems. Smaller firms may also contract with their clearing firms to package and submit order data files on their behalf.

Some broker-dealers that are FINRA members may be exempt from OATS reporting, or are excluded under FINRA rules from OATS requirements. Exempt firms go through a formal exemption request process through which they certify that they meet the exemption criteria which includes: 1) total revenue of less than two million dollars; 2) a clean disciplinary history; 3) no clearing or carrying activities; 4) the firm cannot be a market maker in NMS stocks or OTC equity securities; and, 5) the firm does not execute principally. FINRA also excludes some members from the definition of a reporting member. The criteria to receive this exclusion includes: 1) the member must engage in a non-discretionary order routing process where the firm immediately routes all of its orders to a single receiving reporting member; 2) the member cannot direct or maintain control over subsequent routing or execution by the receiving reporting member; 3) the receiving reporting member must record and report all information under applicable FINRA rules ; and 4) the member must have a written agreement with the receiving reporting member specifying the respective functions and responsibilities of each party.

Additionally, the OATS Rules do not require that proprietary orders generated in the normal course of market-making be reported. As such, there are current gaps in the audit trail.

Upon request, all broker-dealers must submit Electronic Blue Sheet (“EBS”) reportable data by the specified due date. EBS data provides detailed information about the underlying account that transacted in a particular security during a particular time period. Broker-dealers must have systems and processes in place to provide FINRA with EBS reportable data in the required format. These systems require resources to ensure data quality, timeliness of reporting, and record keeping obligations. Broker-dealers must commit staff to respond to Participant and SEC requests for EBS data. Broker-dealers may take varied approaches to fulfilling their regulatory reporting obligations. For instance, some broker-dealers may self-clear and develop internal systems for the purpose of compiling EBS reportable data into the required format. Other broker-dealers may contract with a clearing firm to submit EBS data files on their behalf.

Of the 167 respondents to the broker-dealer survey used in the analysis of costs associated with the CAT, 49 are large and 118 are small.¹⁶⁹ 116 respondents stated that

¹⁶⁹ Firms were requested to self-select as “small” if they would qualify under Securities Exchange Act Rule 0-10(c) as a broker or dealer that:
(1) had total capital (net worth plus subordinated liabilities) of less than \$500,000 on the date in the prior fiscal year as of which its audited

they do not currently report to OATS. However, six of those respondents report a positive number for the current regulatory reporting costs. Of the 116 that do not report to OATS, 11 use the FIX protocol for order entry or order routing to exchanges. Of the 11 FIX users, only two reported a positive current cost.

Of the 51 respondents that report to OATS, 21 are large and 30 are small. However, of the 51 respondents, 17 report \$0 for costs associated with current regulatory reporting requirements. Including another six firms (three small and three large) in the sample that are not OATS-reporters, but provided positive estimates for the current cost, the average (median) current regulatory reporting costs for small firms are \$449,182 (\$3,000). For large respondents, the reported regulatory reporting costs are \$634,679 (\$14,000). The difference between the averages across large and small firms is not significant due to small sample size and high variance caused by a few very large observations, especially in the small firm subsample. Therefore, the comparison of the median costs associated with the current regulatory reporting environment may provide more accurate information about the typical costs incurred by small and large firms.

Large firms report that they employ an average (median) of 11.60 (4.75) FTEs for OATS reporting, while the reported figure is 4.97 (2.0) for small firms. When we consider the FTEs for EBS and large trader reporting and other reporting, large firms report employing an average (median) of 19.40 (7.0) FTEs, and small firms report employing an average (median) of 8.16 (4.0) FTEs.¹⁷⁰

Some firms report that they choose to outsource the regulatory reporting services. Of the 167 respondents, 38 reported that they currently incur outsourcing costs for regulatory reporting services. Of these 38 firms, nine reported a \$0 cost associated with current regulatory reporting requirements and thus incurred outsourcing costs only. The average (median) outsourcing cost reported by 13 large firms is \$586,100 (\$10,000) and by 25 small firms is \$592,720 (\$4,000). The large difference between the average and median numbers is again due to a few very large cost responses in the data.

Based upon the Survey to Vendors, the Participants understand that for equity order reporting, two respondents indicated that they report up to 1 million equity orders per day on behalf of their clients, and two respondents indicated that they report up to 2 million equity orders per day. For options order reporting, three respondents indicated that they report up to 1 million options orders per day on behalf of their clients, and one respondent indicated that it reports up to 2 million options orders per day. All four respondents indicated that they report between three and 100 million OATS Reportable Order Events per day. Three of the four responding firms submitted Electronic Blue Sheet reports for

financial statements were prepared pursuant to 240.17a5(d) or, if not required to file such statements, a broker or dealer that had total capital (net worth plus subordinated liabilities) of less than \$500,000 on the last business day of the preceding fiscal year (or in the time that it has been in business, if shorter); and (2) is not affiliated with any person (other than a natural person) that is not a small business or small organization as defined in this section.

¹⁷⁰ One anonymous large firm reported an aggregate of 190 FTEs for OATS, EBS and large trader, and other reporting. Such outliers create an upward bias in the estimated averages and might potentially cause an overestimation of the staffing costs. Therefore, reported averages must be interpreted with caution, and median numbers might better represent the typical costs across large and small firms.

their clients, with two submitting up to 200 responses per month and one submitting up to 400 responses per month.

Reported costs for current regulatory reporting for vendors varied widely across both dollar costs and FTE requirements. Dollar costs for hardware and software ranged from \$50,000 to \$15,000,000, and FTE requirements ranged from 11 to 92. While the firm with the largest number of clients reported the highest costs, costs did not always correlate uniformly with the number of clients for other firms.

In addition, broker-dealers may bear a significant portion of the costs of the Participants' systems through fees and other assessments imposed by the Participants. The extent to which these costs are not passed on to broker-dealers is related to alternative sources of revenue available to the Participants, the materiality of those costs, and the ease with which broker-dealers can substitute away from any given exchange or Participant.

Investors

Approximately 52% of Americans hold individual stocks, stock mutual funds or stocks through their retirement plan,¹⁷¹ and the retail options industry continues to grow.¹⁷²

Investors benefit from the protections provided through the use of audit trail data, as previously described. They may also bear the costs associated with maintaining and enhancing the current audit trail systems. In some cases, broker-dealers may pass on regulatory charges that support Participant supervision, such as the Commission's Section 31 fees.¹⁷³ In other cases, broker-dealers may cover some of their regulatory charges through commissions and other charges. The extent to which these costs are passed on to investors depends on the materiality of the costs and the ease with which investors can substitute away from any given broker-dealer.

Issuers

Issuers also benefit from an effective regulatory regime supported by a reliable and complete audit trail. Specifically, issuers may benefit from an economic externality that arises from enhanced investor confidence associated with better and more efficient oversight. The increase in investor confidence may draw more investors into the market, relative to other investment opportunities that do not provide the same protections. Increasing the pool of investors willing to invest in a primary offering may manifest itself in a lower cost of capital. Increased investor participation in secondary trading may also increase demand in the primary market, as the increased interest would be associated with greater efficiency in pricing and lower adverse selection costs.

Need for Regulatory Action

¹⁷¹ Gallup Poll in 2013. See <http://money.cnn.com/2013/05/09/investing/american-stock-ownership/>.

¹⁷² See <http://tabbforum.com/opinions/the-retail-options-renaissance>.

¹⁷³ Pursuant to Section 31 of the Exchange Act, Participants are required to pay transaction fees and assessments to the SEC that are designed to recover the costs related to the government's supervision and regulation of the securities markets and securities professionals. Participants in turn may collect their Section 31 fees and assessments from their broker-dealer members.

SEC Rule 613 provides a basis for the need for regulatory action given the current economic baseline. As the Commission stated in the Adopting Release:

The Commission therefore believes that the regulatory data infrastructure on which the SROs and the Commission currently must rely generally is outdated and inadequate to effectively oversee a complex, dispersed, and highly automated national market system. In performing their oversight responsibilities, regulators today must attempt to cobble together disparate data from a variety of existing information systems lacking in completeness, accuracy, accessibility, and/or timeliness – a model that neither supports the efficient aggregation of data from multiple trading venues nor yields the type of complete and accurate market activity data needed for robust market oversight.¹⁷⁴

Estimated Costs

Through the request for proposals, the review of those proposals, and interaction with industry, the Participants have identified the sources of costs associated with the CAT NMS Plan. There are direct costs associated with developing, building and maintaining the infrastructure required to meet the requirements of the CAT NMS Plan. There are also direct costs associated with adapting broker-dealer reporting systems to meet the requirements of the CAT NMS Plan. Additionally, Participants and broker-dealers may incur direct costs associated with the retirement of redundant reporting systems, although there may also be significant savings to broker-dealers associated with retiring those systems over time. We discuss estimates of these direct costs below.

The Participants also considered the potential for indirect costs associated with the CAT NMS Plan. These indirect costs would manifest themselves in at least two possible forms. First, as discussed above, some market participants may shift the costs associated with supporting the consolidated audit trail to their customers. Participants may charge their members to cover the CAT NMS Plan costs either explicitly or subsume those costs in other fees or assessments. Broker-dealers may charge their clients for their costs, whether incurred directly or indirectly, either through explicit fees associated with consolidated audit trail costs or through their existing fee structure. The second set of indirect costs may be associated with any negative impacts to efficiency, competition or capital formation that the Plan might cause. We discuss these potential impacts separately below.

(a) Estimated Cost to Participants for Creating and Maintaining Consolidated Audit Trail

As part of the RFP process, the bidders were asked to provide a schedule of the anticipated total cost of ownership of building, operating and maintaining the CAT that will be passed through to the CAT. As noted above in Section I of this Appendix C, any

¹⁷⁴ Adopting Release at 45723.

one of the six Shortlisted Bidders could be selected as the Plan Processor and each Shortlisted Bidder has proposed different approaches to various issues. The Shortlisted Bidder selected as the Plan Processor must meet the specific requirements set forth in the PPRF and will be required to revise its Bid if it does not reflect those requirements. Accordingly, the Participants anticipate that the cost estimates to build and maintain the CAT may differ from what is set forth below.

The RFP requested that Bidders provide an estimate of the total one-time cost to build the CAT, including technology, operational, administration and any other material costs. The six Shortlisted Bidders provided estimates ranging from a low of \$30,000,000 to a high of \$91,623,000, with an average one-time cost of \$53,002,915.27.

The RFP also requested that Bidders provide an estimate of annual recurring costs for the five year period following the selection of the Plan Processor, and an estimate of the annual peak year costs, i.e., for the year that it will cost the most to run the CAT. The six Shortlisted Bidders provided estimates ranging from a low of \$135,001,250 to a high of \$465,050,000 over the course of the first five years of operation, with an average five-year cost of \$255,640,125.02 and an average annual cost of \$51,128,025.00. Estimates of peak year recurring costs range from a low of \$27,001,250 to a high of \$109,753,000, with an average of \$59,389,916.

The Participants note, however, that there may be a relation between the initial construction costs and maintenance costs based on technological choices, among other factors. To better compare estimates, the Participants provide a range based on the reported combined build and annual recurring costs for the five year period following plan selection, discounted by a factor of 2%.¹⁷⁵ Estimates of total costs range from \$157,263,407 to \$527,887,443.

Participants sought insight into the economic drivers of the cost estimates from the Shortlisted Bidders. Specifically, Participants asked the Shortlisted Bidders to identify the factors, such as amount of message traffic, complexity of order life cycles, number and complexity of Participant and SEC data requests or administration and support costs that were material to their bid. Respondents identified the following as primary drivers of their bid cost: (1) transactional volumes of data ingested into the central repository, (2) the number of technical environments that would be required to build; (3) the CAT rate of increase in transaction volumes, (4) data archival requirements and (5) user support/help desk resource requirements.

(b) Estimated Cost to Members of Participants for Reporting Data required by the CAT NMS Plan

The population of respondents to the Cost to CAT Reporters study consisted of 118 small broker-dealers and 49 large broker-dealers.¹⁷⁶ Expected costs reported in the Survey to Firms for the two scenarios presented were quantitatively similar, therefore the

¹⁷⁵ The discount factor represents an estimate of the average yield on AAA-rated corporate debt for the month period August 28, 2014 to September 27, 2014.
As defined in SEC Rule 613

estimated costs presented here refer to responses for the scenario where reporters would be using their current systems. For costs related to the implementation and maintenance of technology and processes to comply with CAT requirements, in the sample of 57 firms (51 OATS reporters and 6 non-OATS reporting firms that disclosed a positive number for the current reporting costs), 24 large broker-dealers reported average (median) costs of roughly \$981,167 (\$89,000) and 33 small broker-dealers reported an average (median) implementation and maintenance cost of roughly \$24,422 (\$2,000) annually. For large firms, the average (median) change in costs would be \$346,488 (\$13,000), and the average (median) change for small firms would be \$435,500 (\$0). The large difference between average and median response is due to a few very large responses given especially by firms reporting no current regulatory reporting costs.

Under CAT, large firms reported that they would employ an average (median) of 35.58 (12.5) FTEs to meet their obligations. This estimate implies an average (median) increase of 16.19 (3.5) FTEs for large firms. Small firms reported that they would employ an average (median) of 6.75 (4.0) FTEs, implying an average (median) decrease of 1.40 (0.0) FTEs. The averages are again sensitive to a few large reported values and should be interpreted with caution.

Of the 167 respondent firms, 32 reported that they would incur costs associated with the retirement of current systems. Twelve large firms reported a mean (median) retirement cost of \$146,102 (\$94,000), whereas the same figure for small firms is \$7,700 (\$3,000). Average FTEs required for system retirement were less than one across all categories, though variances were large, with one firm reporting an estimated headcount of 50 for retirement of OATS reporting.

Of the 38 firms that incur outsourcing costs, 15 reported that they would incur no cost associated with the retirement of outsourcing systems when CAT is implemented. For the remaining 23 firms, the mean (median) cost for the 5 large firms is \$102,500 (\$60,000), and the same figure reported is \$22,095 (\$6,000) for the 21 small firms.

Based upon the responses to the Survey to Vendors, the expected dollar costs for implementation and maintenance of the CAT are largely the same for both approaches, and ranged widely between \$0 and \$20,000,000 for implementation and \$50,000 and \$6,000,000 for ongoing maintenance. One firm did indicate that Approach 1 would have substantially higher maintenance costs (\$400,000 for Approach 1 versus \$50,000 for Approach 2). For headcount associated with implementation and maintenance of the CAT, all respondents indicated that Approach 1 would require more FTE resources to implement (ranging from 14 to 170 FTEs for Approach 1 and from 4 to 45 for Approach 2), while Approach 2 would require more FTE resources to maintain (ranging from 4.5 to 35 for Approach 1 and from 2 to 56 for Approach 2). As with current regulatory reporting costs, the firm with the largest number of clients reported the highest costs, but number of clients did not always correlate uniformly with higher expected costs for the other firms.

Three of the four respondents to the vendor survey indicated that they would incur costs to retire current regulatory reporting systems, with costs ranging from \$500,000 to

\$5,000,000, with the firm with the highest expected retirement costs also having the highest current reporting costs. FTE requirements ranged from 1.5 to 23 FTEs.

Under CAT Approach 1, two respondents expected ongoing maintenance to cost less than current regulatory reporting requirements, with the remaining two expecting higher costs. Under CAT Approach 2, two respondents expected ongoing maintenance to cost less than current regulatory reporting requirements, one expected costs to be the same, and the final firm expected costs to be greater. All firms expected headcount associated with ongoing maintenance of the CAT to be less than under current reporting requirements.

(c) Estimated Cost to Participants for Reporting Data required by the CAT NMS Plan

Hardware and software costs expected for implementation of the CAT varied widely, from \$13,200 to \$5,000,000. Costs for ongoing maintenance of the CAT also varied widely, from \$9,600/year to \$5,000,000/year.

Current surveillance hardware and software costs ranged from \$200,000 per year to \$17,000,000 per year, and Participants provided estimates of future surveillance hardware and software costs of \$125,000 per year to \$17,000,000 per year.

Retirement costs were not provided with sufficient consistency to facilitate conclusions, though one Participant did indicate that they expected to save \$4,000,000 in development costs, \$4,000,000 in legal costs, and \$1,000,000 in consulting costs through the adoption of the CAT.

Responses from Participants were considered to be tentative and highly subject to change based on selection of a bidder and finalization of a cost model.

(d) Method of Funding the Creation, Implementation, and Maintenance of the Consolidated Audit Trail

Article XI of the CAT NMS Plan sets forth the provisions for establishing the funding of the Company and recovering the costs of operating the CAT. The Participants are committed to funding the CAT in accordance with the following principles:

- to create transparent, predictable revenue streams for the Company that are aligned with the anticipated costs to build, operate and administer the consolidated audit trail and the other costs of the Company;
- to establish an allocation of the Company's related costs among Participants and Industry Members that is consistent with the Exchange Act, taking into account the timeline for implementation of the consolidated audit trail, distinctions in the securities trading operations of Participants and Industry Members and their relative impact upon Company resources and operations;
- to provide for ease of billing and other administrative functions;

- to avoid any disincentives such as placing an inappropriate burden on competition and a reduction in market quality; and
- to build financial stability to support the Company as a going concern.

To fund the initial development and implementation of the CAT, the Plan provides for the imposition and collection of all fees on Participants and Industry Members in a manner reasonably related to the timing when the Company expects to incur such initial development and implementation costs. The Participants are mindful of the need to balance the potential impact on CAT Reporters resulting from having fees imposed prior to commencement of their CAT reporting obligations against the need to recover costs incurred to build the CAT.¹⁷⁷

With respect to recovering costs to operate the CAT, the Plan provides that the Operating Committee may establish fixed fees to be payable by Participants and Industry Members, and may establish categories of such fees, depending on the securities trading operations of the Participant or Industry Member, the type of business in which the Participant or Industry Member engages and any other factors the Operating Committee reasonably determines appropriate. In addition, the Plan provides that the Operating Committee may establish Industry Member and Participant activity fees based on the aggregate dollar amount of trading volume, share or contract trading volume, message traffic, or any other factors that the Operating Committee reasonably determines appropriate, and may establish differing levels of such fees depending on the types of securities traded and any other factors the Operating Committee reasonably determines appropriate.

Finally, the Plan provides that the Operating Committee may establish any other fees ancillary to the operation of the CAT System that it deems appropriate, including, e.g., fees for late or inaccurate reporting; fees for correcting submitted information; and fees based on access and use of the CAT System for regulatory and oversight purposes.

Section 11.3(d) of the Plan expressly provides that notwithstanding anything to the contrary in any of Sections 11.3(a), 11.3(b) or 11.3(c), the Operating Committee may establish, as it reasonably determines appropriate, any fixed fee, any variable fee, any combination of a fixed fee and a variable fee, or any other fee.

Participants considered a number of alternate specifications for establishing the basis for cost allocation among CAT Reporters. These specifications ranged from a strict pro-rata distribution, regardless of entity size to a distribution based purely on CAT Reporter activity. Participants considered a variety of measures of activity including, notional value of trading (as currently applied for purposes of Section 31 fees today), trades, quotations and all message traffic sent as part of the audit trail. Further, Participants considered the comparability of audit trail activity across different securities.

¹⁷⁷ Pursuant to SEC Rule 613(a)(3), Participants are required to report to the CAT within one year of the effectiveness of the CAT NMS Plan, while Industry Members are required to report two years after the effectiveness of the Plan, or three years for Industry Members that qualify as small broker-dealers.

The Participants recognize that there are a number of different approaches to funding the CAT and have considered a number of different funding models. Each model has its potential advantages and disadvantages. For example, a fixed fee structure would provide CAT Reporters greater certainty regarding their fee obligations. A variable fee structure may make it easier for Industry Members to pass fees to their customers, however, it may be more complex and difficult to administer. A tiered approach, particularly for fixed fees, based on such factors as size of firm, message traffic or trading dollar volume, would help ensure that fees are equitably allocated among similarly situated CAT Reporters and would further the goal of the Participants to lessen the impact on smaller firms. For example, a review of OATS data for a recent month shows the wide range in activity among broker-dealers, with a number of broker-dealers submitting fewer than 1000 orders for the month and other broker-dealers submitting millions and even billions of orders. Irrespective of the approach, fees should be aligned to the costs of building, implementing and operating the CAT, and if fees collected are in excess of costs for any given year, then fees would be reduced the following year.

The Participants believe that it is important to establish a simple fee structure that is easy to understand and administer. The Participants are committed to establishing and billing fees so that Industry Members will have certainty and the ability to budget for them. In that regard, the Plan expressly provides that the Operating Committee shall not make any changes to any fees on more than a semi-annual basis unless, pursuant to a Supermajority Vote, the Operating Committee concludes that such change is necessary for the adequate funding of the Company.

The Participants discussed potential approaches to funding, including the above principles and an illustrative funding model, with the DAG on September 17, 2014.

8. An Analysis of the Impact on Competition, Efficiency and Capital Formation (SEC Rule 613(a)(1)(viii))

As required by SEC Rule 613(a)(1)(viii), this section provides an analysis of the impact on competition, efficiency and capital formation of creating, implementing, and maintaining the CAT NMS Plan. In recognition of the complexity of this analysis, the Participants have evaluated a variety of sources of information to assist in the analysis of the impact of the CAT NMS Plan on the competition, efficiency and capital formation. Specifically, the Participants have evaluated the many comments related to competition, efficiency and capital formation received in response to the SEC's rule proposal and during the CAT NMS Plan development process. In addition, the Participants considered the input of the DAG. Finally, the Participants utilized information derived from three cost studies described in the prior section on costs. Based on a review and analysis of these materials, the Participants believe that the CAT NMS Plan, as submitted, is justified given its estimated impacts on competition, efficiency and capital formation.

(a) Impact on Competition

Through an analysis of the data and information described above, the Participants have evaluated the impact of the CAT NMS Plan on competition, including the

competitive impact on the market generally and the competitive impact on each type of Person playing a role in the market (e.g., Participants, broker-dealers, vendors, investors). Potential negative impacts on competition could arise if the Plan were to burden a group or class of participants in a way that would harm the public's ability to access their services, either through increasing costs or decreased provision of those services. These impacts may be direct, as in the provision of brokerage services to individual investors, or indirect, as in the aggregate costs of managing, trading and maintaining a securities holding. These impacts should be measured relative to the economic baseline, described above.

Participants have identified a series of potential impacts on competition that may arise as a result of the terms and conditions of the Plan. These potential impacts may be related to: 1) the technology ultimately used by the consolidated audit trail and differences across CAT Reporters in their efforts necessary to meet the Plan's requirements; 2) the method of cost allocation across CAT Reporters; and 3) changes in regulatory reporting requirements, and their attendant costs, particularly to smaller entities, who may previously have benefited from regulatory exemptions.

In general, the Participants believe that the CAT NMS Plan will avoid any disincentives such as placing an inappropriate burden on competition in the US securities markets. The discussion below focuses on competition in the Participant and broker-dealer communities, where the Participants believe there is the greatest potential for impact on competition.

(i) Participants

The equity and options exchanges already incur significant costs to maintain and surveil an audit trail of activity concerning their trading venue. Each exchange bears these costs whether it expends its resources to monitor relevant activity itself, or whether it contracts with others to perform these services on its behalf. The CAT NMS Plan, through the funding principles it sets forth in Section 11.2, seeks to distribute the regulatory costs associated with the development and maintenance of a meaningful and comprehensive audit trail in a fair and even manner. By calibrating the Plan's funding according to these principles, the Participants sought to avoid placing undue burden on exchanges relative to their core characteristics, including market share and volume of message traffic. Thus, the Participants do not believe that any particular exchange in either the equities or options markets would be placed at a competitive disadvantage in a way that would materially impact the respective execution venue marketplaces for either type of security.

In addition, because the Plan seeks to distribute costs in a fair and equitable manner, the Participants do not believe that it would discourage potential new entrants in a distorted or non-competitive fashion. For instance, an equity ATS – which would already be incurring costs under the Plan as a reporting broker-dealer – should not be discouraged from becoming a national securities exchanges because of the costs it would incur as an Participant based on its business model or pricing structure. Accordingly, the Participants do not believe that adoption of the Plan would favor existing exchanges or types of exchanges vis-à-vis potential new competitors in a way that would degrade available execution venue services or pricing. For similar reasons, the Participants also do not

believe that the costs of the Plan would distort the marketplace for existing or potential national securities associations.

(ii) Broker-Dealers

Broker-dealer competition may be impacted if the direct and indirect costs associated with meeting the Plan's requirements materially impact the provision of their services to the public. Further, competition may be harmed if a particular class or group of broker-dealers bears the costs disproportionately, and as a result, investors have more limited choices or increased costs for certain types of broker-dealer services.

For larger broker-dealers, the Participants rely on the information obtained from their survey of broker-dealers and dialogue with industry to preliminarily conclude that the Plan will not likely have an adverse impact on competition. Under the plan, broker-dealers would be assessed charges, as determined by the Operating Committee, for the build and maintenance of the CAT. They would also incur costs to build and maintain systems and processes necessary to submit and retain their own information to the CAT. The Participants' efforts to align costs with market activity leads to an outcome where costs are being born significantly more by larger entities.

As discussed above, the Participants performed a study of the Plan's potential costs to broker-dealers. According to this study, for large firms, the average (median) increase in costs associated with audit trail compliance (i.e., the cost that CAT would impose on firms beyond the current economic baseline) would be \$346,488 (\$13,000), and the average (median) change for small firms would be \$435,500 (\$0). These averages could suggest that the increased costs imposed by CAT would represent a significantly larger percentage of small firms' regulatory budget than large firms' budgets. However, as noted above, the Participants believe the averages are inflated due to a few responses. Based on the median of responses, the Participants believe that the Plan would not materially disadvantage small broker-dealers vis-à-vis large broker-dealers.

For smaller broker-dealers, the Participants considered their contribution to market activity as an important determinant of the amount of the cost of the CAT they should bear. Further, the Participants understand that the Plan will require imposing a range of costs on the smallest market participants who currently benefit from exclusion or exemption from OATS reporting. While this allocation of costs may be significant for some smaller firms, and may even impact their business models materially, SEC Rule 613 requires these entities to report. Therefore Participants believe that there is no avenue to further minimize the costs to these firms within the context of the funding principles established as part of the Plan.

The Participants were particularly sensitive during the development of the CAT NMS Plan to the potential burdens the Plan could place on smaller broker-dealers. These firms may incur minimal costs under existing audit trail requirements because they are OATS-exempt or excluded broker-dealers or limited purpose broker-dealers. The Participants note that the Plan contemplates steps to diffuse the potential cost differential between large and small firms. For instance, small broker-dealers generally will have an additional year before they are required to start reporting data under the Plan to the Central

Repository. This will permit these firms greater time to implement the changes to their own systems necessary to comply with the Plan. Furthermore, the Participants have sought exemptive relief concerning synchronization of manual business clocks, which are more likely to be in place at small broker dealers.

The Participants are cognizant that the method by which costs are allocated to broker-dealers may have implications for their business models that might ultimately impact competition. For instance, if the method of cost allocation created disincentives to quoting activity, certain firm's business models might be affected more greatly than others. But, it is an open question as to whether and how changing these incentives impacts competition. Participants intend to monitor changes to over-all market activity and market quality and will consider appropriate changes to the cost allocation model where merited.

The Participants note that if the exemption requests that have been submitted to the SEC are not granted, the requirements of SEC Rule 613 may impose significantly greater costs that could cause smaller broker-dealers to exit the marketplace, discourage new entrants to the small broker-dealer marketplace, or impact the broker-dealer landscape in other ways that may dampen competitive pressures.

(b) Impact on Efficiency

Through an analysis of the data and information described above, the Participants have evaluated the impact of the CAT NMS Plan on efficiency, including the impact on the time, resources and effort needed to perform various regulatory and other functions. In general, the Participants believe that that the CAT NMS Plan should have a net positive effect on efficiency.

Overall, the Participants believe that the Plan could improve market efficiency by reducing monitoring costs and increasing efficiency in the enforcement of Participant and Commission rules. Additionally, the Participants believe that the consolidated audit trail will enable the Participants and the Commission to detect more – and more sophisticated – wrong-doing more quickly, which may deter some market participants from taking such actions. FINRA's equity cross market surveillance patterns have already demonstrated the value of integrating data from multiple markets. FINRA has found that approximately 44 percent of the manipulation-based alerts it generated involved conduct on two or more equity markets and 43 percent of the alerts involved conduct by two or more market participants.¹⁷⁸ A reduction in prohibited activity, and more and quicker identification of such activity by regulators, would lead to a reduction in losses to investors and increased efficiency.

The CAT could also create more focused efficiencies for broker-dealers and Participants by reducing the redundant and overlapping systems and requirements identified above. For all CAT Reporters, the standardization of various technology systems will provide, over time, improved process efficiencies, including efficiencies gained through the replacement of outdated processes and technology with cost saving and

¹⁷⁸ <http://www.finra.org/Newsroom/Speeches/Ketchum/P600785>

related staffing reductions. Standardization of systems will improve efficiency both for, Participants as well as broker-dealers, in the form of resource consolidation, sun-setting of systems, consolidated legacy systems/processes and consolidated data processing. In addition, more sophisticated monitoring may reduce the number of ad hoc information requests, thereby reducing the overall burden and increasing the operational efficiency of CAT Reporters.

CAT Reporters may also experience various long term efficiencies from the increase in surveillance capabilities, such as greater efficiencies related to administrative functions provided by enhanced regulatory access, superior system speed and reduced system downtime. Moreover, the SEC and the Participants expect to have more fulsome access to unprocessed regulatory data and timely and accurate information on market activity, thus providing the opportunity for improved market surveillance and monitoring.

Note, however, that uniform use of data reported to the Central Repository and Participant access to such data will require the development of data mapping and data dictionaries which will impose burdens in the short term. In addition, in the short term, CAT Reporters may incur additional time and costs to comply with new encryption mechanisms in connection with PII connectivity (although the quality of the process will improve).

The Participants are cognizant that the method by which costs are allocated to broker-dealers may have implications for their business models that might ultimately impact efficiency. For instance, if the method of cost allocation created disincentives to the provision of liquidity, there may be an impact on the quality of the markets and an increase in the costs to investors to transact. As a result, the Participants set forth the funding principles that will guide the selection of the cost allocation model. The Participants have also sought out evidence available to best understand how cost allocation models may impact market participation, and more importantly, ultimately market outcomes.¹⁷⁹

The Participants intend to monitor changes to over-all market activity and market quality and will consider appropriate changes to the cost allocation model where merited.

(c) Impact on Capital Formation

Through an analysis of the data and information described above, the Participants also have assessed the impact of the CAT NMS Plan on capital formation, including the impact on both investments and the formation of additional capital. In general, the Participants believe that that the CAT NMS Plan will have no deleterious effect on capital formation.

In general the Participants believe that the enhanced surveillance of the markets may instill greater investor confidence in the markets, which, in turn, may prompt greater

¹⁷⁹ See, for example, IIROC's analysis of its market regulation fee model, available at [http://www.iiroc.ca/Documents/2011/5f95e549-10d1-473e-93cf-3250e026a476_en.pdf\[iiroc.ca\]](http://www.iiroc.ca/Documents/2011/5f95e549-10d1-473e-93cf-3250e026a476_en.pdf[iiroc.ca]), [http://www.iiroc.ca/Documents/2012/bf393b26-7bdf-49ff-a1fc-3904d1de3983_en.pdf\[iiroc.ca\]](http://www.iiroc.ca/Documents/2012/bf393b26-7bdf-49ff-a1fc-3904d1de3983_en.pdf[iiroc.ca])

participation in the markets. It is possible that greater investor participation in the markets could bolster capital formation by supporting the environment in which companies raise capital.

Moreover, the Participants believe that the Plan would not discourage capital formation. As discussed in greater detail above, the Participants have analyzed the degree to which the Plan should cover primary market transactions. Based on this analysis, the Participants believe that the Plan has been appropriately tailored so it does not create an undue burden on the primary issuances that companies may use to raise capital.

In addition, the Participants do not believe that the costs of the Plan would come to bear on investors in a way that would materially limit their access to or participation in the capital markets.

Finally, the Participants believe that, given the Plan's provisions to secure the data collected and stored by the Central Repository, the Plan should not discourage participation by market participants who are worried about data security and data breaches. As described more fully in the Plan and Section A.4 of this Appendix C, the Plan Processor will be responsible for ensuring the security and confidentiality of data during transmission and processing, as well as at rest, and for ensuring that the data is used only for permitted purposes. The Plan Processor will be required to provide physical security for facilities where data is transmitted or stored, and must provide for the security of electronic access to data by outside parties, including Participants and SEC staff, CAT Reporters, or Data Submitters. The Plan Processor must include in these measures heightened security for populating, storing, and retrieving particularly sensitive data such as PII. Moreover, the Plan Processor must develop and maintain this security program with a dedicated staff including, among others, an information security officer dedicated to monitoring and addressing data security issues for the Plan Processor and Central Repository, subject to regular review by the Chief Compliance Officer. The Plan Processor also will be required to provide regular reports to the Operating Committee on a number of items, including any data security issues for the Plan Processor and Central Repository.

C. IMPLEMENTATION AND MILESTONES OF THE CAT

9. A Plan to Eliminate Existing Rules and Systems (SEC Rule 613(a)(1)(ix)):

As required by SEC Rule 613(a)(1)(ix), this section sets forth a plan to eliminate rules and systems (or components thereof) that will be rendered duplicative by the consolidated audit trail, including identification of such rules and systems (or components thereof); to the extent that any existing rules or systems related to monitoring quotes, orders and executions provide information that is not rendered duplicative by the consolidated audit trail, an analysis of, among other things, whether the collection of such information remains appropriate; if still appropriate whether such information should continue to be separately collected or should instead be incorporated into the CAT; or if no longer appropriate, how the collection of such information could be efficiently terminated.

<u>Milestone</u>	<u>Projected Completion Date</u>
Identification of Duplicative Rules and Systems	
<p>Each Participant will initiate an analysis of its rules and systems to determine which require information that is duplicative of the information available to the Participants through the Central Repository. Examples of Participants' rules to be reviewed include:</p> <ul style="list-style-type: none"> • The Participants' rules that implement the exchange-wide Consolidated Options Audit Trail System (e.g., CBOE Rule 6.24, etc.) • FINRA rules that implement the Order Audit Trail System (OATS) including the relevant rules of the Nasdaq Stock Market, Nasdaq OMX BX, and Nasdaq OMX PHLX • Option exchange rules that require the reporting of transactions in the equity underlier for options products listed on the options exchange (e.g., PHLX Rule 1022, portions of CBOE Rule 8.9, etc.) 	<p>Each Participant should complete its analysis within twelve (12) months after Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository or, if such Participant determines sufficient data is not available to complete such analysis by such date, a subsequent date determined by such Participant based on the availability of such data.</p>
Identification of Partially Duplicative Rules and Systems	
<p>Each Participant will initiate an analysis of its rules and systems to determine which require information that is partially duplicative of the information available to the Participants through the Central Repository. The analysis should</p>	<p>Each Participant should complete its analysis within eighteen (18) months after Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository or, if such Participant determines sufficient data is not</p>

<p>include a determination as to (1) whether the duplicative information available in the Central Repository should continue to be collected by the Participant; (2) whether the duplicative information made available in the Central Repository can be used by the Participant without degrading the effectiveness of the Participant’s rules or systems; and (3) whether the non-duplicative information should continue to be collected by the Participant or, alternatively, should be added to information collected by the Central Repository.</p> <p>Examples of Participants’ rules to be reviewed include:</p> <ul style="list-style-type: none"> • Options exchange rules that require the reporting of large options positions (e.g., CBOE Rule 4.13, etc.) • NYSE Rule 410B which requires the reporting of transactions effected in NYSE listed securities by NYSE members which are not reported to the consolidated reporting systems • Portions of CBOE Rule 8.9 concerning position reporting details 	<p>available to complete such analysis by such date, a subsequent date determined by such Participant based on the availability of such data.</p>
<p>Identification of Non-Duplicative Rules or System related to Monitoring Quotes, Orders and Executions</p>	
<p>Each Participant will initiate an analysis of its rules and systems to determine which of the Participant’s rules and systems related to monitoring quotes, orders, and executions provide information that is not rendered</p>	<p>Each Participant should complete its analysis within eighteen (18) months after Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository or, if such Participant determines sufficient data is not</p>

<p>duplicative by consolidated audit trail. Each Participant must analyze (1) whether collection of such information should continue to be separately collected or should instead be incorporated into the consolidated audit trail; (2) if still appropriate, whether such information should continue to be separately collected or should instead be incorporated into the consolidated audit trail.; and (3) if no longer appropriate, how the collection of such information could be efficiently terminated, the steps the Participants propose to take to seek Commission approval for the elimination of such rules and systems (or components thereof), and a timetable for such elimination, including a description of the phasing-in of the consolidated audit trail and phasing-out of such existing rules and systems (or components thereof)</p>	<p>available to complete such analysis by such date, a subsequent date determined by such Participant based on the availability of such data.</p>
<p>Identification of Participant Rule and System Changes Due to Elimination or Modification of SEC Rules</p>	
<p>To the extent the SEC eliminates SEC rules that require information that is duplicative of information available through the Central Repository, each Participant will analyze its rules and systems to determine whether any modifications are necessary (e.g., delete references to outdated SEC rules, etc.) to support data requests made pursuant to such SEC rules. Examples of rules the SEC might eliminate or modify as a result of the implementation of CAT include:</p> <ul style="list-style-type: none"> • Rule 17a-25 under the Exchange Act which requires brokers and dealers to submit electronically to the SEC information on customer and firms securities 	<p>Each Participant should complete its analysis within three (3) months after the SEC approves the deletion or modification of an SEC rule related to the information available through the Central Repository.</p> <p>The Participants will coordinate with the SEC regarding modification of the Plan to include information sufficient to eliminate or modify those Exchange Act rules or systems that the SEC deems appropriate.</p> <p>With respect to Rule 17a-25, such coordination will include, among other things, consideration of EBS data elements and asset classes that would need to be included in the Plan, as well as the timing of when all Industry Members will be subject to the</p>

<p>trading</p> <ul style="list-style-type: none"> • Rule 17h-1 under the Exchange Act concerning the identification of large traders and the required reporting obligations of large traders 	<p>Plan.¹⁸⁰</p> <p>Based on preliminary industry analyses, broker-dealer large trader reporting requirements under Rule 17h-1 could be eliminated via the CAT. The same appears true with respect to broker-dealer recordkeeping. Large trader reporting responsibilities on Form 13H and self-identification would not appear to be covered by the CAT.¹⁸¹</p>
<p>Participant Rule Changes to Modify or Eliminate Participant Rules</p>	
<p>Each Participant will prepare appropriate rule change filings to implement the rule modifications or deletions that can be made based on the Participant’s analysis of duplicative or partially duplicative rules. The rule change filing should describe the process for phasing out the requirements under the relevant rule.</p>	<p>Each Participant will file to the SEC the relevant rule change filing to eliminate or modify its rules within six (6) months of the Participant’s determination that such modification or deletion is appropriate.</p>
<p>Elimination (including any Phase-Out) of Relevant Existing Rules and Systems</p>	
<p>After each Participant completes the above analysis of its rules and systems, each Participant will analyze the most appropriate and expeditious timeline and manner for eliminating such rules and systems.</p>	<p>Upon the SEC’s approval of relevant rule changes, each Participant will implement such timeline.</p>

Order Audit Trail System (“OATS”)

The OATS Rules impose obligations on FINRA members to record in electronic form and report to FINRA on a daily basis certain information with respect to orders

¹⁸⁰ See SEC Rule 613 – Consolidated Audit Trail (CAT) Preliminary EBS-CAT Gap Analysis, at <http://catnmsplan.com/web/groups/catnms/@catnms/documents/appsupportdocs/p450537.pdf>

¹⁸¹ See FIF CAT WG: Preliminary Large Trader Rule (Rule 13h-1) – CAT (Rule 613) Gap Analysis (prepared February 11, 2014).

originated, received, transmitted, modified, canceled, or executed by members relating to OTC equity securities¹⁸² and NMS stocks.¹⁸³ OATS captures this order information and integrates it with quote and transaction information to create a time-sequenced record of orders, quotes, and transactions. This information is then used by FINRA staff to conduct surveillance and investigations of member firms for potential violations of FINRA rules and federal securities laws. In general, the OATS Rules apply to any FINRA member that is a “Reporting Member,” which is defined in Rule 7410 as “a member that receives or originates an order and has an obligation to record and report information under Rules 7440 and 7450.”

Although FINRA is committed to retiring OATS in as efficient and timely a manner as practicable, its ability to retire OATS is dependent on a number of events. Most importantly, before OATS can be retired, the Central Repository must contain CAT Data sufficient to ensure that FINRA can effectively conduct surveillance and investigations of its members for potential violations of FINRA rules and Federal laws and regulations, which includes ensuring that the CAT Data is complete and accurate. Consequently, one of the first steps taken by the Participants to address the elimination of OATS was an analysis of gaps between the informational requirements of SEC Rule 613 and current OATS recording and reporting rules. Most obviously, SEC Rule 613(c)(5) and (6) require reporting of data only for each NMS security that is (a) registered or listed for trading on a national securities exchange; (b) or admitted to unlisted trading privileges on such exchange; or (c) for which reports are required to be submitted to the national securities association. SEC Rule 613(i) requires the Participants to provide to the Commission within six months after the Effective Date a document outlining how the Participants could incorporate into the consolidated audit trail information with respect to equity securities that are not NMS securities (“OTC equity securities”) and debt securities (and primary market transactions in such securities). Even though SEC Rule 613 does not require reporting of OTC equity securities, the Participants have agreed to expand the reporting requirements to include OTC equity securities to facilitate the elimination of OATS.¹⁸⁴

Next, the Participants performed a detailed analysis of the current OATS requirements and the specific reporting obligations under SEC Rule 613 and concluded that there are 42 data elements found in both OATS and SEC Rule 613; however, there are 33 data elements currently captured in OATS that are not specified in SEC Rule 613.¹⁸⁵ The Participants believe it is appropriate to incorporate all data elements into the Central Repository that are necessary to retire OATS and the OATS Rules. The Participants believe that these additional data elements will increase the likelihood that the Central Repository will include sufficient order information to ensure FINRA can continue to

¹⁸² See FINRA Rule 7410(l).

¹⁸³ Other self-regulatory organizations have rules requiring their members to report information pursuant to the OATS Rules. See, e.g., NYSE Rule 7400 Series; NASDAQ Rule 7400 Series.

¹⁸⁴ This expansion of the CAT reporting requirements to OTC equity securities was generally supported by members of the broker-dealer industry.

¹⁸⁵ SEC Rule 613(c)(7) lists the minimum order information that must be reported to the CAT and specifies the information that must be included in the CAT NMS Plan. The Commission noted in the Adopting Release that “the SROs are not prohibited from proposing additional data elements not specified in SEC Rule 613 if the SROs believe such data elements would further, or more efficiently, facilitate the requirements of [SEC Rule 613].” Adopting Release, at 45750.

perform its surveillance with CAT Data rather than OATS data and can thus more quickly eliminate OATS and the OATS Rules.

The purpose of OATS is to collect data to be used by FINRA staff to conduct surveillance and investigations of member firms for potential violations of FINRA rules and federal securities laws and regulations. SEC Rule 613 requires the Participants to include in the CAT NMS Plan a requirement that all Industry Members report information to the Central Repository within three years after the Effective Date. Consistent with this provision, under the terms of Sections 6.4 and 6.7 of the CAT NMS Plan, some Reporting Members will not be reporting information to the Central Repository until three years after the Effective Date. Because FINRA must continue to perform its surveillance obligations without interruption, OATS cannot be entirely eliminated until all FINRA members who currently report to OATS are reporting CAT Data to the Central Repository. However, FINRA will monitor its ability to integrate CAT Data with OATS data to determine whether it can continue to perform its surveillance obligations. If it is practicable to integrate the data in a way that ensures no interruption in FINRA's surveillance capabilities, FINRA will consider exempting firms from the OATS Rules provided they report data to the Central Repository pursuant to the CAT NMS Plan and any implementing rules.

FINRA's ability to eliminate OATS reporting obligations is dependent upon the ability of the Plan Processor and FINRA to work together to integrate CAT Data with the data collected by OATS. FINRA is committed to working diligently with the Plan Processor to ensure this process occurs in a timely manner; however, it is anticipated that Reporting Members will have to report to both OATS and the Central Repository for some period of time until FINRA can verify that the data it is receiving is sufficient for surveillance purposes. Once this is verified, FINRA's goal is to minimize the dual-reporting requirement.

Finally, the Participants note that, pursuant to Section 19 of the Exchange Act, the amendment or elimination of the OATS Rules can only be done with Commission approval. Approval of any such filings is dependent upon a number of factors, including public notice and comment and required findings by the Commission before it can approve any amendments; therefore, FINRA cannot speculate how long this process may ultimately take.

10. Objective Milestones to Assess Progress (SEC Rule 613(a)(1)(x)):

As required by SEC Rule 613(a)(1)(x), this section sets forth a series of detailed objective milestones, with projected completion dates, toward implementation of the consolidated audit trail.

- (a) Publication and implementation of the methods for obtaining a CAT-Reporter-ID and providing information to the Customer-ID database**

Milestone	Projected Completion Date
Selection of Plan Processor	
Participants jointly select the winning Shortlisted Bid and the Plan Processor pursuant to the process set forth in Article V of the CAT NMS Plan	2 months after Effective Date.
Participants	
Plan Processor assigns and provides a CAT-Reporter-ID to each Participant	3 months before Participants are required to begin reporting data to the Central Repository
Industry Members (other than Small Industry Members¹⁸⁶)	
Plan Processor publishes the procedure for all Industry Members to obtain a CAT-Reporter-ID	9 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Industry Members (other than Small Industry Members) begin process of submitting required information to Plan Processor to receive a CAT-Reporter-ID	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Plan Processor assigns and provides a CAT-Reporter-ID to each Industry Member (other than Small Industry Members) that has submitted the requisite information to the Plan Processor to receive a CAT-Reporter-ID	3 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Plan Processor publishes the procedures, connectivity requirements and Technical Specifications for Industry Members to report Customer Account Information to the Central Repository	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Industry Members (other than Small Industry Members) begin connectivity and acceptance testing with the Central	3 months before Industry Members (other than Small Industry Members) are required to begin reporting data to

¹⁸⁶ Small broker-dealers are defined in Rule 0-10(c) under the Securities Exchange Act.

Repository	the Central Repository
Industry Members (other than Small Industry Members) begin reporting customer / institutional / firm account information to the Central Repository for processing	1 month before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Small Industry Members	
Small Industry Members begin process of submitting required information to Plan Processor to receive a CAT-Reporter-ID	6 months before Small Industry Members are required to begin reporting data to the Central Repository
Plan Processor assigns and provides a CAT-Reporter-ID to each Small Industry Member that has submitted the requisite information to the Plan Processor to receive a CAT-Reporter-ID	3 months before Small Industry Members are required to begin reporting data to the Central Repository
Small Industry Members begin connectivity and acceptance testing with the Central Repository	3 months before Small Industry Members are required to begin reporting data to the Central Repository
Small Industry Members begin reporting customer / institutional / firm account information to the Central Repository for processing	1 month before Small Industry Members are required to begin reporting data to the Central Repository

(b) Submission of Order and MM Quote Data to Central Repository

Milestone	Projected Completion Date
Participants	
Plan Processor begins developing Technical Specification(s) for Participant submission of Order and MM Quote data	10 months before Participants are required to begin reporting data to the Central Repository
Iterative drafts of Technical Specification(s) are published	As needed before publishing of the final document

Plan Processor publishes Technical Specification(s) for Participant submission of Order and MM Quote data	6 months before Participants are required to begin reporting data to the Central Repository
Plan Processor begins connectivity testing and accepting Order and MM Quote data from Participants for testing purposes	3 months before Participants are required to begin reporting data to the Central Repository
Plan Processor plans specific testing dates for Participant testing of Order and MM Quote submission	Beginning 3 months before Participants are required to begin reporting data to the Central Repository
Industry Members (other than Small Industry Members)	
Plan Processor begins developing Technical Specification(s) for Industry Members submission of Order data	15 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Iterative drafts of Technical Specification(s) are published	As needed before publishing of the final document
Plan Processor publishes Technical Specification(s) for Industry Member submission of Order data	1 year before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Participant exchanges that support options MM quoting publish specifications for adding Quote Sent time to Quoting APIs	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Plan Processor begins connectivity testing and accepting Order data from Industry Members (other than Small Industry Members) for testing purposes	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Plan Processor plans specific testing dates for Industry Members (other than Small Industry Members) testing of Order submission	Beginning 3 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Participant exchanges that support	1 month before Industry Members

options MM quoting begin accepting Quote Sent time on Quotes	(other than Small Industry Members) are required to begin reporting data to the Central Repository
Small Industry Members	
Plan Processor begins connectivity testing and accepting Order data from Small Industry Members for testing purposes	6 months before Small Industry Members are required to begin reporting data to the Central Repository
Plan Processor plans specific testing dates for Small Industry Members testing of Order submissions	Beginning 3 months before Small Industry Members are required to begin reporting data to the Central Repository

(c) Linkage of Lifecycle of Order Events

Milestone	Projected Completion Date
Participants	
Using Order and MM Quote data submitted during planned testing, Plan Processor creates linkages of the lifecycle of Order events based on the received data	3 months before Participants are required to begin reporting data to the Central Repository
Industry Members (other than Small Industry Members)	
Using Order and MM Quote data submitted during planned testing, Plan Processor creates linkages of the lifecycle of Order events based on the received data	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Small Industry Members	
Using Order and MM Quote data submitted during planned testing, Plan Processor creates linkages of the lifecycle of Order events based on the received data	6 months before Small Industry Members are required to begin reporting data to the Central Repository

(d) Access to the Central Repository for Regulators

Milestone	Projected Completion Date
Plan Processor publishes a draft document detailing methods of access to the Central Repository for regulators	6 months before Participants are required to begin reporting data to the Central Repository
Plan Processor publishes a finalized document detailing methods of access to the Central Repository for regulators, including any relevant APIs, GUI descriptions, etc. that will be supplied for access	1 month before Participants are required to begin reporting data to the Central Repository
Plan Processor provides (1) test information, either from Participant testing or from other test data, for regulators to test use of the Central Repository and (2) regulators connectivity to the Central Repository test environment and production environments	1 month before Participants are required to begin reporting data to the Central Repository
Plan Processor provides regulators access to test data for Industry Members (other than Small Industry Members)	6 months before Industry Members (other than Small Industry Members) are required to begin reporting data to the Central Repository
Plan Processor provides regulators access to test data for Small Industry Members	6 months before Small Industry Members are required to begin reporting data to the Central Repository

(e) **Integration of Other Data (“Other Data” includes SIP quote and trade data, OCC data, trade and quote information from Participants and reference data)**

Milestone	Projected Completion Date
Operating Committee finalizes Other Data requirements	10 months before Participants are required to begin reporting data to the Central Repository
Plan Processor determines methods and requirements for each additional data source and publish applicable Technical	3 months before Participants are required to begin reporting data to the Central Repository

Specifications, if required	
Plan Processor begins testing with Other Data sources	1 month before Participants are required to begin reporting data to the Central Repository
Plan Processor begins accepting Other Data sources	Concurrently when Participants report to the Central Repository

D. PROCESS FOLLOWED TO DEVELOP THE NMS PLAN: These considerations require the CAT NMS Plan to discuss (i) the views of the Participants’ members and other appropriate parties regarding the creation, implementation, and maintenance of the Consolidated Audit Trail (CAT) and (ii) the alternative approaches to creating, implementing, and maintaining the CAT considered and rejected by the Participants.

11. Process by Which Participants Solicited Views of Members and Other Appropriate Parties Regarding Creation, Implementation, and Maintenance of CAT; Summary of Views; and How Sponsors Took Views Into Account in Preparing NMS Plan (SEC Rule 613(a)(1)(xi))

(a) Process Used to Solicit Views:

When the Participants first began creating a CAT pursuant to SEC Rule 613, the Participants have developed the following guiding principles (the “Guiding Principles”):

- The CAT must meet the specific requirements of SEC Rule 613 and achieve the primary goal of creating a single, comprehensive audit trail to enhance regulators’ ability to surveil the U.S. markets in an effective and efficient way.
- The reporting requirements and technology infrastructure developed must be adaptable to changing market structures and reflective of trading practices, as well as scalable to increasing market volumes.
- The costs of developing, implementing, and operating the CAT should be minimized to the extent possible. To this end, existing reporting structures and technology interfaces will be utilized where practicable.
- Industry input is a critical component in the creation of the CAT. The Participants will consider industry feedback before decisions are made with respect to reporting requirements and cost allocation models.

The Participants explicitly recognized in the Guiding Principles that meaningful input by the industry was integral to the successful creation and implementation of the CAT, and as outlined below, the Participants have taken numerous steps throughout this process to ensure the industry and the public have a voice in the process.

(i) General Industry Solicitation

SEC Rule 613 was published in the Federal Register on August 1, 2012, and the following month, the Participants launched the Consolidated Audit Trail NMS Plan website, which includes a dedicated email address for firms or the public to submit views on any aspect of the CAT.¹⁸⁷ This website has been used as a means to communicate information to the industry and the public at large since that time. Also beginning in September 2012, the Participants hosted several events intended to solicit industry input regarding the CAT NMS Plan. A summary of the events is provided below:

- [*CAT Industry Call \(September 19, 2012\)*](#). The Participants provided an overview of SEC Rule 613, the steps the Participants were taking to develop a CAT NMS Plan as required by SEC Rule 613, and how the Participants planned to solicit industry comments and feedback on key implementation issues.
- [*CAT Industry Events \(October 2012\)*](#). The Participants provided an overview of SEC Rule 613 and the steps the Participants were taking to develop an NMS Plan as required by SEC Rule 613. The events included an open Q & A and feedback session so that industry participants could ask questions of the Participants and share feedback on key implementation issues. Two identical sessions were held on October 15, 2012 from 2:00 p.m. to 4:00 p.m. and on October 16, 2012 from 10:00 a.m. to 12:00 p.m. A total of 89 industry participants attended the October 15 event in person, and a total of 162 industry participants attended it by phone. A total of 130 industry participants attended the October 16 event in person, and a total of 48 industry participants attended it by phone.
- [*CAT Industry Call and WebEx \(November 29, 2012\)*](#). The Participants provided an update on CAT NMS Plan development efforts including the process and timeline for issuing the RFP to solicit bids to build and operate the CAT.
- [*CAT Industry Events \(February 27, 2014 and April 9, 2014\)*](#). During these two events, the Participants provided an overview of the latest progress on the RFP process and the overall development of the NMS Plan. A total of 120 industry participants attended the February event in person, and a total of 123 industry participants attended it by phone. A total of 46 industry participants attended the April event in person, and a total of 76 industry participants attended it by phone.
- [*CAT Cost Study Webinar \(June 25, 2014 and July 9, 2014\)*](#). The Participants hosted two Webinars to review and answer questions related to the Reporter Cost Study. There were approximately 100 to 120 industry participants on each call.

The Participants also received industry feedback in response to general solicitations by the Participants for industry viewpoints as follows:

- [*RFP Concept Document \(December 5, 2012\)*](#). The Participants published via the Consolidated Audit Trail website¹⁸⁸ this document to solicit feedback on the feasibility

¹⁸⁷ <http://catnmsplan.com>

¹⁸⁸ <http://catnmsplan.com/web/groups/catnms/@catnms/documents/appsupportdocs/p197699.pdf>

and cost of implementing the CAT reporting requirements being considered by the Participants.

- *Representative Order Scenarios Solicitation for Feedback* (February 1, 2013). The Participants solicited feedback via the Consolidated Audit Trail website¹⁸⁹ on potential CAT reporting requirements to facilitate the reporting of representative orders. Approximately 30 responses were received.
- *CAT Industry Solicitation for Feedback Concerning Selected Topics Related to NMS Plan* (April 22, 2013). The Participants solicited feedback via the Consolidated Audit Trail website¹⁹⁰ on four components of the NMS Plan: (1) primary market transaction, (2) Advisory Committee, (3) Time Stamp Requirement and (4) Clock Synchronization. Approximately 80 industry members provided responses. Both FIF and SIFMA, as well as an industry member, submitted detailed responses to the request for comments.
- *CAT Industry Solicitation for Feedback Concerning Selected Topics Related to NMS Plan* (June 2013): The Participants solicited feedback via the Consolidated Audit Trail website¹⁹¹ concerning customer identifiers, customer information, CAT Reporter IDs, CAT Order IDs, CAT intra-firm order linkages, CAT inter-firm order linkages, broker-dealer CAT order-to-exchange order linkages, data transmission, and error correction.

Feedback on these topics was received primarily through discussion during meetings of the DAG.

(ii) The Development Advisory Group (“DAG”)

In furtherance of Guiding Principle (iv) above, the Participants solicited members for the DAG in February 2013 to further facilitate input from the industry regarding various topics that are critical to the success of the CAT NMS Plan. Initially, the DAG consisted of 10 firms that represented large, medium, and small broker-dealers, the Options Clearing Corporation (OCC), a service bureau and three industry associations: the Security Traders Association (STA), the Securities Industry and Financial Markets Association (SIFMA), and the Financial Information Forum (FIF).

In March 2014, the Participants invited additional firms to join the DAG in an effort to ensure that it reflected a diversity of perspectives. At this time, the Participants increased the membership of the DAG to include 12 additional firms. As of May 2014, the DAG consisted of the Participants and representatives from 27 firms and industry associations.

The DAG has had 36 meetings since April 2013. Topics discussed with the DAG have included:

¹⁸⁹ <http://catnmsplan.com>
¹⁹⁰ <http://catnmsplan.com>
¹⁹¹ <http://catnmsplan.com>

- *Options Market Maker Quotes:* The DAG discussed the impact of options market maker quotes on the industry. A cost analysis was conducted by the industry trade associations to analyze the impact of market maker quote reporting, as well as adding a “quote sent” timestamp to messages sent to exchanges by all options market makers. The Participants intend to submit a letter for exemptive relief to the Commission related to option market maker quotes given that exchanges will be reporting this data to the CAT.
- *Customer ID:* The DAG discussed the requirements for capturing Customer-ID. The Participants proposed a customer information approach in which broker-dealers assign a unique firm-designated identifier to each customer and the CAT plan processor creates and stores the Customer-ID. This concept was supported by the DAG and the Participants intend to submit a letter for exemptive relief to the Commission related to the CAT Customer ID to reduce the reporting on CAT Reporters.
- *Timestamp, Clock Synchronization and Clock Drift:* The DAG discussed timestamps in regards to potential exemptive relief on the timestamp requirements for allocations and manual order events. In addition, industry clock synchronization processes was discussed as well as the feasibility of specific clock drift requirements (e.g., 50ms). The Participants intend to submit a letter for exemptive relief to the Commission related to manual timestamps.
- *Order Handling Scenarios:* The DAG discussed potential CAT reporting requirements for certain order handling scenarios and additional corresponding sub-scenarios (e.g., riskless principal order and sub-scenarios involving post-execution print-for-print matching, pre-execution one-to-one matching, pre-execution many-to-one matching, complex options and auctions) An industry and Participant working group was established to discuss order handling scenarios in more detail.
- *Error Handling and Correction Process:* The DAG discussed error handling and correction process. Industry members of the DAG provided recommendations for making the CAT error correction processes more efficient. The Participants have reviewed and analyzed these recommended solutions for error correction processes and incorporated them in the requirements for the Plan Processor.
- *Elimination of Systems:* The DAG discussed the gaps between CATS and both OATS and EBS. An OATS-EBS-CAT gap analysis was developed and published on the CAT NMS Plan website to identify commonalities and redundancies between the systems and the functionality of the CAT. Additionally, gaps between Large Trader ID and the CAT were also developed. Additional examples of systems and rules being analyzed include, but are not limited to: CBOE Rule 8.9, PHLX Rule 1022, COATS, Equity Cleared Reports, LOPR, and FINRA Rule 4560.
- *Cost and Funding of the CAT:* The DAG helped to develop the cost study that was distributed to industry participants. Additionally, the Participants have discussed with the DAG the funding principles for the CAT and potential funding models.

In addition, a subgroup of the DAG has met 6 times to discuss equity and option order handling scenarios, order types, how and whether the orders are currently reported and how linkages could be created for the orders within the CAT.

(b) Summary of Views Expressed by Members and Other Parties and How Sponsors Took Those Views Into Account in Preparing NMS Plan

The various perspectives of members and other industry participants informed the Participants' consideration of operational and technical issues during the development of the CAT NMS Plan. In addition to the regular DAG meetings and special industry calls and events noted above, the Participants conducted multiple group working sessions to discuss the industry's unique perspectives on CAT-related operational and technical issues. These sessions included discussions of options and equity order scenarios and the RFP specifications and requirements.

Industry feedback was provided to Participants through gap analyses, cost studies, comment letters and active discussion in DAG meetings and industry outreach events. Specific topics on which the industry provided input include:

Overall Timeline: Industry members expressed a concern that the original timeline for implementation of the CAT is significantly shorter than the timeline for other large scale requirements such as Large Trader Reporting. The industry requested that, in developing the overall timeline for development and implementation of the CAT NMS Plan, the Participants account for additional industry comment/input on specifications in the official timeline and discuss risk mitigation strategies for implementation of the Central Repository.

Request for proposal: The Participants provided relevant excerpts of the RFP to DAG members for review and input. These sections were discussed by the Participants, and appropriate feedback was incorporated prior to publishing the RFP.

Options Market Maker Quotes: Industry members expressed the view that requiring market makers to provide quote information to the CAT will be duplicative of information already being submitted to the CAT by the exchanges. Participants worked closely with DAG members to develop an alternative approach that will meet the goals of Rule 613, and which will be detailed in a request for exemptive relief that the Participants intend to submit to the Commission related to manual timestamps.

Customer ID: Extensive DAG discussions reviewed the Customer-ID requirements in Rule 613. The industry expressed significant concern that the complexities of adding a unique CAT customer identifier to order reporting would introduce significant costs and effort related to the system modifications and business process changes broker-dealers would face in order to implement this requirement of Rule 613. Working with industry members, the Participants proposed a customer information approach in which broker-dealers would assign a unique firm-designated identifier to each customer which

the CAT plan processor would retain. Additional feedback was provided by the DAG for the use of the Legal Entity Identifier (LEI) as a valid unique customer identifier as an alternative to Tax Identification Numbers to identify non-natural person accounts. This customer information approach will be included in a request for exemptive relief that the Participants intend to submit.

Error Correction: DAG members discussed the criticality of CAT data quality to market surveillance and reconstruction, as well as the need for a robust process for the timely identification and correction of errors. Industry members provided feedback on error correction objectives and processes, including the importance of that data errors not cause linkage breaks. This feedback was incorporated into the RFP and relevant portions of the Plan Processor Functional Requirements.

Industry members also suggested that CAT Reporters be provided access to their submitted data. Participants discussed the data security and cost considerations of this request and determined that it was not a cost-effective requirement for the CAT.

Governance of the CAT: Industry members provided detailed recommendation for the integration of industry representatives into the governance of the CAT, including an expansion of the proposed Advisory Committee to include industry associations such as FIF and SIFMA. Industry members also recommended a three-year term with one-third turnover per year is recommended to provide improved continuity given the complexity of CAT processing.

The SROs have discussed CAT governance considerations with the DAG at several meetings. The SROs incorporated industry feedback into the CAT NMS Plan to the extent possible in light of the regulatory responsibilities placed solely upon the SROs under the provisions of Rule 613. The proposed structure and composition of the Advisory Committee in Article 4.12 was discussed with the DAG in advance of the submission of this Plan.

Transparency in the Bidding and Selection Process: DAG members requested input into the bidding and selection process for the Plan Processor, citing the extensive impact of CAT requirements on the industry as well as proposed cost for compliance. Specifically, industry members requested that non-proprietary aspects of the responses to the RFP should be available to the public to inform the discussion regarding the costs and benefits of various CAT features and the technological feasibility of different solutions. Participants, working with counsel, determined that such information could be appropriately shared with DAG members pursuant to the provisions of a non-disclosure agreement (“NDA”) that was consistent with the terms of the NDA executed between the SROs and the bidders. After extensive discussion, DAG members declined to sign such an NDA. The SROs continued to share non-bid specific information and to solicit the views and perspective of DAG members as it developed a Plan approach and related solutions.

Time Stamp Granularity and Clock Synchronization Requirement: Industry members recommended a millisecond time stamp for electronic order and execution events and a time stamp in seconds for manual order handling. In addition, industry members

recommended that time stamps not be required for allocation reports. Industry members suggested a grace period of two years after the CAT requirements are finalized to allow broker-dealers sufficient time to meet the millisecond time stamp granularity. In addition, industry members recommended maintaining the current OATS rule of a one second clock drift tolerance for electronic order and execution events, citing a significant burden to industry participants to comply with a change to the current one-second clock drift. Participants conducted active discussions with industry members on this topic, and intend to request exemptive relief for manual orders.

Equitable Cost and Funding: Industry members expressed the view that any funding mechanism developed by the Participants should provide for equitable funding among all market participants, including the Participants. The Participants recognized the importance of this viewpoint and have incorporated it within the guiding principles that will continue to be discussed within the DAG as cost and funding approaches are taken into consideration during the ongoing development the CAT solution.

Order ID/Linkages: The DAG formed an order scenarios working group to discuss approaches to satisfy the order linkage requirements of Rule 613. On the topic of allocations, industry members provided feedback that the order and execution processes are handled via front office systems, while allocation processes are conducted in the back office. Industry members expressed the view that creating linkages between these systems, which currently operate independently, would require extensive reengineering of middle and back office processes not just within a broker dealer but across broker-dealers, imposing significant additional costs on the industry as a whole. Given the widespread use of average price processing accounts, clearing firms, prime brokers and self-clearing firm cannot always determine which specific order results in a given allocation or allocations. Industry members worked closely with Participants on a proposed alternative approach which the Participants intend to submit in a request for exemptive relief.

Elimination of Systems and Rules: The elimination of duplicative and redundant systems and rules is a critical aspect of the CAT development process. Industry DAG members including SIFMA and FIF provided broad based and comprehensive insight on the list of existing regulatory systems and Participant rules that they deem to be duplicative, including, among others, FINRA's Order Audit Trail System ("OATS"), the Electronic Blue Sheets ("EBS") reporting system, and Large Trader reporting. In addition, FIF provided a gap analysis of CAT requirements against certain Large Trader reporting obligations.

The Participants conducted a gap analyses of CAT requirements against their own rules and systems supporting those rules and will publish a timeline for elimination, taking into consideration the feedback provided by Industry associations.

The Participants discussed feedback from the industry in a variety of forums: (i) during DAG meetings, (ii) in relevant subcommittee meetings, depending on the topic and (iii) at two multi-day offsite meetings where representatives of each Participant gathered in a series of in-person workshops to discuss the requirements of the Plan Processor, both

technical and operational. This was in addition to numerous video-conference meetings when Participants discussed and developed the RFP document incorporating, where appropriate, feedback from the industry.

12. Discuss Reasonable Alternative Approaches to Creating, Implementing and Maintaining the CAT which the Participants considered (SEC Rule 613(a)(1)(xii)):

The Participants, working as a consortium, selected the approach reflected in the Plan through a detailed analysis of alternatives, relying on both internal and external knowledge and expertise to collect and evaluate information related to the CAT.

The Participants leveraged their own extensive experience with regulatory, technical and securities issues in formulating, drafting and filing the Plan. Specifically, the nineteen Participants formed various subcommittees to focus on specific critical issues during the development of the CAT NMS Plan. The subcommittees included:

- a Governance Committee, which developed recommendations for decision-making protocols and voting criteria for critical pre-formal CAT NMS Plan topics, in addition to developing formal governance and operating structures for the CAT NMS Plan;
- a Technical Committee, which developed the technical scope requirements of the CAT and CAT RFP documents;
- an Industry Outreach Committee, which provided recommendations on effective methods for soliciting industry input, in addition to facilitating industry involvement in CAT-related public events
- a Cost and Funding Committee, which drafted a framework for determining the costs of the CAT, and provided recommendations on revenue/funding of the CAT for both initial development costs and ongoing costs; and
- an Other Products Committee, which planned the outreach to non-securities regulators and the expansion of the CAT to other products.

Representatives from all subcommittees met to discuss the overall progress of the CAT initiative in the Operating Committee.

To support the Participant's internal expertise, the Participants also engaged outside experts to assist in formulating the Plan. Specifically, the Participants engaged the consulting firm Deloitte & Touche LLP as a project manager, and engaged the law firm Wilmer Cutler Pickering Hale and Dorr LLP to serve as legal counsel in drafting the Plan, both of which have extensive experience with issues raised by the CAT.

Furthermore, as discussed in more detail above in Section D.11, the Participants have been engaged in meaningful dialogue with industry participants with respect to the

development of the CAT through the Development Advisory Group and through other industry outreach events.

Using this internal and external expertise, the Participants developed a process to identify, evaluate and resolve issues so as to finalize the CAT NMS Plan. As discussed above in the Introduction to Appendix C, the Participants have, among other things, developed a plan for selecting the Plan Processor, created and published an RFP, evaluated bids, and chose a shortlist of bids. Correspondingly, the Participants have drafted the Plan set forth herein to reflect the recommendations that have resulted from the above analysis and engagement.

(a) RFP

The SROs considered various means to explore and discover a reasonable approach to create, implement and maintain the CAT, including issuance of an RFI (Request for Information) and RFP (Request for Proposal). After due consideration, with a view to meeting demanding timeframes, the SROs decided to use their expertise to craft an RFP to outline the main requirements. This approach was designed to solicit imaginative and competitive proposals from the private sector. Ten competitive proposals were submitted on March 21, 2014. These were carefully reviewed by the SROs and reduced to six proposals. The proposals offer a variety of solutions as discussed below.

(b) Organizational Structure

Of the bids submitted, three organizational structures emerged: consortiums or partnerships, single firms, and dedicated corporate entities (e.g., in which CAT operations would be spun off into a separate LLC). Consortiums and partnerships can provide for financial stability, and can provide access to broader pool of expertise than might a single firm or entity. However, communication and coordination within a consortium or partnership may present challenges, and there may be competing interests between firms within the consortium or partnership. A single firm would streamline communication, and would provide a single point of accountability. It could also provide efficiencies through a more concentrated group of resources with experience working together. However, a single firm may have a lower level of resource availability. A dedicated corporate entity would provide for legal independence, but could also have a larger amount of administrative overhead.

The Participants have not mandated an organizational structure for the Plan Processor. The Participants may consider the advantages and disadvantages of each structure as part of their calculation for selecting the Plan Processor.

(c) Primary Storage

Two methods of primary data storage were considered: traditionally-hosted storage architecture, and infrastructure-as-a-service. Traditionally-hosted storage architecture would provide economies of scale and predictable storage costs. It would also make the Plan Processor less reliant on a vendor, and would provide full control over the storage architecture. However, its large fixed costs would be dependent on accurate forecasts of

usage patterns, and it may be less flexible in response to changes in use. It would also require significant administrative expense (e.g., system administrators). Infrastructure-as-service would provide flexibility and ease of scaling, with lower fixed costs and lower administrative costs. The Plan Processor would also pay only for actual usage, and so would not be reliant on forecasting. However, infrastructure-as-service would provide lower economies of scale, and possibly higher costs. It would also make the Plan Processor reliant on the service provider, and could create security concerns, due to data residing on third-party systems.

The Plan Processor has not mandated a method for primary data storage. As long as the primary data storage environment can meet the security, reliability and accessibility requirements for the CAT, including storing PII data separately, the Plan Processors do not believe it is necessary to prescribe the format.

(d) Customer/Account Data

All bidders proposed a solution that is consistent with the Customer Information Approach in which broker-dealers would report a unique firm-designated identifier for each customer and the Plan Processor creates and stores the Customer-ID . The use of existing unique identifiers (such as internal firm customer identifiers) could minimize potentially large overhead in the CAT System required to create and transmit back to the CAT Reporters system generated unique identifiers. However, allowing multiple identifiers will still require mapping of identifiers, to connect all trading associated with a single beneficial entity. But it will also ease the burden on CAT Reporters because each CAT Reporter will report information using existing identifiers which it currently uses in its internal systems. As such, the CAT system will not be sending a CAT Customer ID back to the CAT Reporters. This reduces the burden on the CAT Reporters because they would not need to build an additional process to receive back a Customer ID and append that identifier to each order origination, receipt or cancellation. This may help alleviate storage and processing costs and potentially reduce the security risk of transmission of the Customer ID back to the CAT Reporter.

The Participants support the use of the Customer Information Approach and subject to approval of an exemption request by the Commission, the Central Repository will utilize this approach to link customer and account information. The Participants believe that this approach will be the more efficient for both the Plan Processor and CAT Reporters.

(e) Personally Identifying Information (PII)

All bidders proposed encrypting all PII data, both at rest and in motion. This approach allows for secure storage of PII, even if servers should be compromised or data should be leaked. However, it can be highly complex to implement effectively (e.g., the poor choice of password salting or an insecure storage of private keys can compromise security, even without knowledge of the system administrator).

All bidders also proposed imposing role-based access controls. These controls would allow for varying levels of access depending on user needs, and could allow

compartmentalizing access based on “need to know.” However, multiple layers of access can add further complexity to the implementation and use of a system.

Some bidders also proposed implementing multi-factor authentication. This greatly enhances security, and can prevent a leak of passwords or keys from completely compromising security. However, it increases system overhead, and increases the difficulty of accessing data.

The Participants are requiring a multi-factor authentication for access to PII. The Participants believe that any increased costs to the Plan Processor and any delays that this could cause to accessing PII are balanced by the need to protect PII.

(f) Data Ingestion Format

Several approaches were considered for the ingestion format for CAT data: uniform format, leveraging existing messaging protocols or a hybrid approach whereby data can be submitted in a uniform format or leveraging existing message protocols. There are benefits to the industry under either format. A large portion of the industry currently reports to OATS in a uniform format. These firms have invested time and resources to develop a process for reporting to OATS. The uniform formats recommended by the Bidders intended to leverage OATS format and enhance it to meet the requirements of SEC Rule 613 and therefore, may reduce the burden on certain CAT Reporters and simplify the process for certain CAT Reporters to implement the CAT. However, firms use message protocols, like FIX, as a standard point of reference with industry participants that is typically used across the order lifecycle and within a firm’s order management processes. Leveraging FIX could result in quicker implementation times and simplify data aggregation at the Participants and CAT level.

The Participants are not mandating the data ingestion format for the CAT. The Participants believe that the nature of the data ingestion is key to the architecture of the CAT. A cost study of members of the Participants did not reveal a strong cost preference for using an existing file format for reporting vs. creation of a new format.¹⁹² However, FIF did indicate a preference for using the FIX protocol.¹⁹³

(g) Process to Develop the CAT

Two processes for development of the CAT were considered: the agile or iterative development model, and the waterfall model. The agile or iterative model is flexible to changes, and facilitates early delivery of usable software that can be used for testing and feedback, helping to facilitate software that meets users’ needs. However, at the beginning of an agile or iterative development process, it can be difficult to accurately estimate the effort and time required for completion. The waterfall model would provide an up-front estimate of time and effort, and would facilitate longer-term planning and coordination among multiple vendors or project streams. But, the waterfall model could be less flexible

¹⁹² See Appendix C Section B.7. for additional details on cost studies.

¹⁹³ See FIF Response to Proposed RFP Concept Document, dated January 18, 2013.

to changes, and particularly to changes that occur between design and delivery (and thereby potentially producing software that meets specifications but not user needs).

The Participants are not mandating a development process. The Participants believe that either agile or iterative developments could be utilized to manage the development of CAT or even a combination of both methods.

(h) Industry Testing

Bidders also proposed a range of approaches to industry testing, including dedicated environments, re-use of existing environments, scheduled testing events, and ongoing testing.

Dedicated industry test environments could provide the possibility of continuous testing by participants, rather than allow for testing only on scheduled dates. It would also not impact other ongoing operations (such as disaster recovery sites). However, developing and maintaining test environments would entail additional complexity and expense (such expenses may be highest in hosted architecture systems where dedicated hardware would be needed, but potentially rarely used).

The re-use of existing environments, such as disaster recovery environment, would provide simplicity and lower administrative costs. However, it could impact other ongoing operations, such as disaster recovery.

Scheduled testing events (which might be held, for example, on weekends only, or on specific dates throughout the year), could provide for more realistic testing by involving multiple market participants. It also would not require the test environment to be available at all times. However, scheduled events would not allow users to test on CAT systems until a dedicated time window is open.

Ongoing testing would allow users to test CAT systems as often as needed. However, this requires the test environment to be available at all time. It also may lead to lower levels of test participation at any given time, which may lead to less realistic testing.

The Participants are requiring that the CAT provide a test environment that is equivalent to the production environment and available 24 x 6. The Participants believe that an ongoing testing model will be more helpful to the industry, because it will provide an environment in which to test any internal system changes or updates that may occur in the course of their business that may affect reporting to the CAT. Additionally, this environment will provide a resource through which the CAT Reporters can continually test any CAT System mandated or rule associated changes to identify and reduce data errors prior to the changes being implemented in the production environment.

(i) Quality Assurance (QA Staffing)

Quality assurance staffing proposals range between nine and sixty-six. Some firms proposed allocating QA resources after the third month. A larger number of QA resources

would facilitate structured, in-depth testing and validation of CAT systems. However, a larger set of QA resources would have higher fixed costs and administrative overhead.

The Participants are not mandating the size for QA Staffing. The Participants believe that the QA staffing numbers varied in the Bids because they are largely dependent on both the staffing philosophy of the Bidder as well as the structure for proposed Central Repository.

(j) User Support

Bidders proposed user support staffing ranges from 5 to 36 FTEs. They also proposed dedicated support teams and support teams shared with other groups.

A larger number of FTE user support staff could provide a higher level and quality of support. However, a higher number of staff would impose additional overhead and administrative costs. Additionally, as the support organization grows, it may become less closely integrated with the development team, which could decrease support effectiveness.

A dedicated CAT support team would facilitate deep knowledge of the CAT system and industry practices. However, it would create additional overhead and costs. Additionally, management of support teams may not be the managing firm's primary business, which could lead to inefficiencies. A support staff shared with non-CAT teams could provide for increased efficiency, if the team has greater experience in support more broadly. However, support resources may not have the depth of knowledge that dedicated support teams could be expected to develop.

The Participants are not requiring specific FTEs for user support staffing. The Participants believe that the number of FTEs varied in the bids so much because they are largely dependent on both the staffing philosophy of the Bidder as well as the structure for proposed central repository.

(k) Help Desk

Some Bidders proposed a US-based help desk, while others proposed basing it offshore. A U.S.-based help desk could facilitate a higher level of service, and could provide a greater level of security (given the sensitive nature of the CAT). However, a U.S.-based help desk would have greater labor costs. An offshore help desk would potentially have lower labor costs, but could provide (actual or perceived) lower level of service, and could raise security concerns (particularly where the help desk resources are employed by a third-party).

(l) CAT User Management

Bidders proposed several approaches to user management: help desk creation of user accounts, user (e.g., broker-dealer) creation of accounts, and multi-role. Help desk creation of accounts would allow for greater oversight and validation of user creation. However, it would increase administrative costs, particularly in the early stages of CAT (as

an FTE must setup each user). User creation of accounts would require lower staffing levels but would provide less oversight and validation of user creation.

A multi-role approach would allow for a blended approach in which the Plan Processor could, for example, set up an administrator or superuser at each broker-dealer, and then allow the broker-dealer to set up additional accounts as needed. This approach could allow users with different levels of access to be provisioned differently, with those requiring greater oversight being provisioned manually. However, it would add complexity to the user creation system, and would provide less oversight and validation than would a fully manual system.

For CAT Reporters entering information into the CAT, the Participants are requiring that each user be validated by the Plan Processor to set-up access to the system. However, for staff at regulators that will be accessing the information for regulatory purposes only, the Plan Processor can establish a superuser or set-up administrator who has the ability to provide access to other users within its organization. However, such superusers cannot set-up access for PII information. Staff at regulators who need access to PII information, must go through an authentication process directly with the Plan Processor. The Participants believe that this approach balances the demand on the staff at the Plan Processor with the need to ensure proper oversight and validation for users of the CAT.

(m) Required Data Attributes for Order Submission

Both results order event type and CAT feedback order event were considered as a reportable order event. Results order event type would not provide additional value over a “daisy chain” linkage method. CAT feedback order event can be generated by the CAT Processor, thereby removing the reporting burden from reporting firms.

(n) Data Retention Requirements

The Bidders proposed a six year retention time, rather than five years as defined in SEC Rule 613. The six year timeframe is a current requirement for broker-dealers under Exchange Act Rule 17a-4(a).

The Participants support the use of the longer timeframe as it complies with Exchange Act Rule 17a-4(a). The Participants are requiring all six years to be kept online in an easily accessible format to enable regulators to have access to full six years of audit trail materials for purposes of its regulation. The Participants understand that requiring this extra year of data storage may increase the cost to run the CAT; however, this cost will only be minimal and is outweighed by the needs of regulators for access to the information.

(o) Data Feed Connectivity

Bidders proposed either real-time SIP connectivity or end-of-day batch SIP connectivity. Real-time SIP connectivity would provide for more rapid access to SIP data, but may require additional processing support to deal with out-of-sequence or missing records. End-of-day batch SIP connectivity provides the possibility of simpler

implementation, but data from SIPs would not be available in the CAT until after overnight processing. Because CAT Reporters are only required to report order information on a next-day basis, the Plan Processor is not required to have real-time SIP connectivity.

(p) Disaster Recovery

Participants discussed both commonly accepted structures for disaster recovery, hot-hot and hot-warm. While hot-hot allows for immediate cutover, the Participants agreed that real-time synchronization was not required, but rather that data must be kept synchronized to satisfy disaster recovery timing requirements (e.g. 48 hour cutover). In addition, costs for hot-hot between the primary and secondary sites were considered too high to require the Plan Processor to support this model.