SECURITIES AND EXCHANGE COMMISSION

[Release No. 34–84843; File No. 4–631]

Joint Industry Plan; Notice of Filing of the Eighteenth Amendment to the National Market System Plan To Address Extraordinary Market Volatility by Cboe BYX Exchange, Inc., Cboe BZX Exchange, Inc., Cboe EDGA Exchange, Inc., Cboe EDGX Exchange, Inc., Chicago Stock Exchange, Inc., Financial Industry Regulatory Authority, Inc., Investors Exchange LLC, NASDAQ BX, Inc., NASDAQ PHLX LLC, The Nasdaq Stock Market LLC, NYSE National, Inc., New York Stock Exchange LLC, NYSE American LLC, and NYSE Arca, Inc.

December 18, 2018.

I. Introduction

On November 5, 2018, NYSE Group, Inc., on behalf of the following parties to the National Market System Plan to Address Extraordinary Market Volatility (''the Plan''): [1] Cboe BZX Exchange, Inc., Cboe BYX Exchange, Inc., Cboe EDGA Exchange, Inc., Cboe EDGX Exchange, Inc., Chicago Stock Exchange, Inc., the Financial Industry Regulatory Authority, Inc. (''FINRA''), Investors Exchange LLC, NASDAQ BX, Inc., NASDAQ PHLX LLC, The NASDAQ Stock Market LLC (''Nasdaq''), New York Stock Exchange LLC (''NYSE''), NYSE Arca, Inc., NYSE National Inc., and NYSE American LLC (collectively, the ''Participants'') filed with the Securities and Exchange Commission (''Commission'') pursuant to Section 11A(a)(3) of the Securities Exchange Act of 1934 (''Exchange Act'') [2] and Rule 608 thereunder,[3] a proposal to amend the Plan (''Eighteenth Amendment'').[4] The proposal reflects changes unanimously approved by the Participants. The Eighteenth Amendment proposes to: (i) Amend Section VIII of the Plan to transition the Plan from operating on a pilot to a permanent basis; (ii) adopt a mechanism for periodic review and assessment of the Plan; (iii) eliminate the doubling of the Percentage Parameters [5] between 9:30 a.m. and 9:45 a.m.; [6] and (iv) eliminate the doubling of the Percentage Parameters between 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close, for Tier 2 NMS Stocks with a Reference Price above $3.00., as discussed below. A copy of the Plan, as proposed to be amended is attached as Exhibit A hereto. The Commission is publishing this notice to solicit comments from interested persons on the Eighteenth Amendment.[7]

II. Description of the Plan

Set forth in this Section II is the statement of the purpose and summary of the Eighteenth Amendment, along with the information required by Rule 608(a)(4) and (5) under the Exchange Act,[8] substantially prepared and submitted by the Participants to the Commission.[9]

A. Statement of Purpose and Summary of the Plan Amendment

The Participants filed the Plan with the Commission on April 5, 2011 to create a market-wide limit up-limit down mechanism intended to address extraordinary market volatility in NMS Stocks, as defined in Rule 600(b)(47) of Regulation NMS under the Exchange Act.[10] The Plan sets forth procedures that provide for market-wide limit up-limit down requirements to prevent trades in individual NMS Stocks from occurring outside of the specified Price Bands. These limit up-limit down requirements are coupled with Trading Pauses, as defined in Section I(Y) of the Plan, to accommodate more fundamental price moves. In particular, the Participants adopted this Plan to address extraordinary volatility in the securities markets, *i.e.,* significant fluctuations in individual securities' prices over a short period of time, such as those experienced during the ''Flash Crash'' on the afternoon of May 6, 2010.

As set forth in more detail in the Plan, all Trading Centers in NMS Stocks, including both those operated by Participants and those operated by members of Participants, shall establish, maintain, and enforce written policies and procedures that are reasonably designed to comply with the limit up-limit down requirements specified in the Plan. More specifically, the single plan processor (''Processors'') responsible for consolidation of information for an NMS Stock pursuant to Rule 603(b) of Regulation NMS under the Exchange Act is responsible for calculating and disseminating a lower Price Band and upper Price Band, as provided for in Section V of the Plan. Section VI of the Plan sets forth the limit up-limit down requirements of the Plan, and in particular, that all Trading Centers in NMS Stocks, including both those operated by Participants and those operated by members of Participants, shall establish, maintain, and enforce written policies and procedures that are reasonably designed to prevent trades at prices that are below the lower Price Band or above the upper Price Band for an NMS Stock, consistent with the Plan.

[1] On May 31, 2012, the Commission approved the Plan, as modified by Amendment No. 1. *See* Securities Exchange Act Release No. 67091, 77 FR 33498 (June 6, 2012) (File No. 4–631) (''Approval Order''). On February 20, 2013, the Commission noticed for immediate effectiveness the Second Amendment to the Plan. *See* Securities Exchange Act Release No. 68953, 78 FR 13113 (February 26, 2013). On April 3, 2013, the Commission approved the Third Amendment to the Plan. *See* Securities Exchange Act Release No. 69287, 78 FR 21483 (April 10, 2013). On August 27, 2013, the Commission noticed for immediate effectiveness the Fourth Amendment to the Plan. *See* Securities Exchange Act Release No. 70273, 78 FR 54321 (September 3, 2013). On September 26, 2013, the Commission approved the Fifth Amendment to the Plan. *See* Securities Exchange Act Release No. 70530, 78 FR 60937 (October 2, 2013). On January 7, 2014, the Commission noticed for immediate effectiveness the Sixth Amendment to the Plan. *See* Securities Exchange Act Release No. 71247, 79 FR 2204 (January 13, 2014). On April 3, 2014, the Commission approved the Seventh Amendment to the Plan. *See* Securities Exchange Act Release No. 71851, 79 FR 19687 (April 9, 2014). On February 19, 2015, the Commission approved the Eight Amendment to the Plan. *See* Securities Exchange Act Release No. 74323, 80 FR 10169 (February 25, 2015). On October 22, 2015, the Commission approved the Ninth Amendment to the Plan. *See* Securities Exchange Act Release No. 76244, 80 FR 66099 (October 28, 2015). On April 21, 2016, the Commission approved the Tenth Amendment to the Plan. *See* Securities Exchange Act Release No. 77679, 81 FR 24908 (April 27, 2016). On August 26, 2016, the Commission noticed for immediate effectiveness the Eleventh Amendment to the Plan. *See* Securities Exchange Act Release No. 78703, 81 FR 60397 (September 1, 2016). On January 19, 2017, the Commission approved the Twelfth Amendment to the Plan. *See* Securities Exchange Act Release No. 79845, 82 FR 8551 (January 26, 2017). On April 13, 2017, the Commission approved the Thirteenth Amendment to the Plan. *See* Securities Exchange Act Release No. 80455, 82 FR 18519 (April 19, 2017). On April 28, 2017, the Commission noticed for immediate effectiveness the Fourteenth Amendment to the Plan. *See* Securities Exchange Act Release No. 80549, 82 FR 20928 (May 4, 2017). On September 26, 2017, the Commission noticed for immediate effectiveness the Fifteenth Amendment to Plan. *See* Securities Exchange Act Release No. 81720, 82 FR 45922 (October 2, 2017). On March 15, 2018, the Commission noticed for immediate effectiveness the Sixteenth Amendment to the Plan. *See* Securities Exchange Act Release No. 82887, 83 FR 12414 (March 21, 2018) (File No. 4–631). On April 12, 2018, the Commission approved the Seventeenth Amendment to the Plan. *See* Securities Exchange Act Release No. 83044, 83 FR 17205 (April 18, 2018).

[2] 15 U.S.C. 78k–1(a)(3).

[3] 17 CFR 242.608.

[4] *See* Letter from Elizabeth King, General Counsel and Corporate Secretary, NYSE, to Brent Fields, Secretary, Commission, dated November 2, 2018 (''Transmittal Letter'').

[5] Unless otherwise specified, the terms used herein have the same meaning as set forth in the Plan.

[6] All times are Eastern Standard or ET.

[7] 17 CFR 242.608.

[8] *See* 17 CFR 242.608(a)(4) and (a)(5).

[9] *See* Transmittal Letter, *supra* note 4. The statement of the purpose and summary of the amendment and the information required by Rule 608(a)(4) and (5) is reproduced verbatim from the Transmittal Letter unless otherwise noted; cross-references have been revised to conform with the footnote sequencing of this notice.

[10] 17 CFR 242.600(b)(47).

As set forth in Section V of the Plan, the Price Bands consist of a Lower Price Band and an Upper Price Band for each NMS Stock. The Price Bands are calculated by the Processor responsible for consolidation of information for an NMS Stock pursuant to Rule 603(b) of Regulation NMS under the Act.[11] Those Price Bands are based on a Reference Price for each NMS Stock that equals the arithmetic mean price of Eligible Reported Transactions for the NMS Stock over the immediately preceding five-minute period. The Price Bands for an NMS Stock are calculated by applying the Percentage Parameter for such NMS Stock to the Reference Price, with the Lower Price Band being a Percentage Parameter below the Reference Price, and the Upper Price Band being a Percentage Parameter above the Reference Price. Between 9:30 a.m. and 9:45 a.m. and 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close, the Price Bands are calculated by applying double the Percentage Parameters.

The Processors also calculate a Pro-Forma Reference Price for each NMS Stock on a continuous basis during Regular Trading Hours. If a Pro-Forma Reference Price does not move by one percent or more from the Reference Price in effect, no new Price Bands are disseminated, and the current Reference Price remains the effective Reference Price. If the Pro-Forma Reference Price moves by one percent or more from the Reference Price in effect, the Pro-Forma Reference Price becomes the Reference Price, and the Processors disseminates new Price Bands based on the new Reference Price. Each new Reference Price remains in effect for at least 30 seconds. When the other side of the market reaches the applicable Price Band, the market for an individual security enters a Limit State, and the Processors are required to disseminate such National Best Offer or National Best Bid with an appropriate flag identifying it as a Limit State Quotation. All trading immediately enters a Limit State if the National Best Offer equals the lower Price Band and does not cross the National Best Bid, or the National Best Bid equals the upper Price Band and does not cross the National Best Offer. Trading for an NMS Stock exits a Limit State if, within 15 seconds of entering the Limit State, all Limit State Quotations were executed or canceled in their entirety.

[11] 17 CFR 242.603(b). The Plan refers to this entity as the Processor.

With respect to Trading Pauses, Section VII(A)(1) of the Plan provides that if trading for an NMS Stock does not exit a Limit State within 15 seconds of entry during Regular Trading Hours, the Primary Listing Exchange declares a Trading Pause for such NMS Stock and shall notify the Processor. Section VII(B)(1) of the Plan further provides that five minutes after declaring a Trading Pause for an NMS Stock, and if the Primary Listing Exchange has not declared a Regulatory Halt, the Primary Listing Exchange shall attempt to reopen trading using its established procedures and the Trading Pause shall end when the Primary Listing Exchange reports a Reopening Price. Section VII(B)(3) of the Plan provides that Trading Centers may not resume trading in an NMS Stock following a Trading Pause without Price Bands in such NMS Stock.

The Plan was initially approved for a one-year pilot period, which began on April 8, 2013.[12] Accordingly, the pilot period was scheduled to end on April 8, 2014. As initially contemplated, the Plan would have been fully implemented across all NMS Stocks within six months of initial Plan operations, which meant there would have been full implementation of the Plan for six months before the end of the pilot period. However, pursuant to the fourth amendment to the Plan,[13] the Participants modified the implementation schedule of Phase II of the Plan to extend the time period as to when the Plan would fully apply to all NMS Stocks. Accordingly, the Plan was not implemented across all NMS Stocks until December 8, 2013. Pursuant to the sixth amendment to the Plan,[14] which further modified the implementation schedule of Phase II of the Plan, the date for full implementation of the Plan was moved to February 24, 2014. Pursuant to the seventh, ninth, tenth, and thirteenth amendments to the Plan,[15] the pilot period was extended from April 8, 2014 to February 20, 2015, from February 20, 2015 to April 22, 2016, from April 22, 2016 to April 17, 2017, from April 17, 2017 to April 16, 2018, and from April 16, 2018 to April 15, 2019.

The Participants now propose to: (i) Amend Section VIII of the Plan to transition the Plan from operating on a pilot to a permanent basis; (ii) adopt a mechanism for periodic review and assessment of the Plan; (iii) eliminate the doubling of the Percentage Parameters between 9:30 a.m. and 9:45 a.m.; and (iv) eliminate the doubling of the Percentage Parameters between 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close, for Tier 2 NMS Stocks with a Reference Price above $3.00.

[12] *See* Section VIII of the Plan.

[13] *See supra* note 1.

[14] *See id.*

[15] *See id.*

The Plan Should Operate on a Permanent Basis

As mentioned above, the Plan was designed to prevent potentially harmful price volatility in NMS Stocks, including the kind of volatility experienced during the market disruption that occurred on May 6, 2010, often referred to as the ''Flash Crash''. Among other things, the prices of a large number of individual securities suddenly declined by significant amounts in a very short time period, before suddenly reversing to prices consistent with their pre-decline levels. This severe price volatility led to a large number of trades being executed at temporarily depressed prices, including many that were more than 60% away from pre-decline prices and were broken by the exchanges and FINRA. Occasionally a sudden and unanticipated price movement, unrelated to a security's fundamental and/or fair value, can be so drastic that market orders and stop loss orders face an increased risk of being executed at prices far away from their fundamental and/or fair values. Such extreme volatility causing significant fluctuations in an individual security's price over short periods of time can undermine the integrity of the securities market. Key features of the Plan—Price Bands, Trading Pauses, and Limit States—are intended to reduce the frequency of these large, transitory price movements.

The Plan was implemented in phases beginning on April 8, 2013.[16] Prior to the operation of the Plan, each Participant adopted uniform rules on a pilot basis in response to the market events of May 6, 2010 that paused

[16] The implementation of Phase I of the Plan began on April 8, 2013 and ended on May 31, 2013. Phase I applied to securities included in the S&P 500 and Russell 1000 and some high volume ETPs from 9:45 a.m. to 3:30 p.m. During Phase I, the Plan did not operate during the market open and close. The implementation of the first part of Phase II began on August 5, 2013 and ended on September 3, 2013. The first part of Phase II applied to all NMS securities beginning at 9:30 a.m. and ending at 3:45 p.m. Price Bands were calculated by applying double the Percentage Parameters during 9:30 to 9:45 a.m. and during 3:35 to 3:45 p.m. The implementation of the second part of Phase II began on February 24, 2014. The second part of Phase II added Price Bands for the last 15 minutes of trading from 3:45 to 4:00 p.m. and applied to all exchange-listed securities except for Nasdaq. On May 12, 2104, the second part of Phase 2 was implemented for Nasdaq-listed securities.

trading in individual securities during times of price volatility (''Single-Stock Circuit Breaker'' or ''SSCB'').[17] The SSCB rules were an earlier attempt to address extraordinary market volatility under which a Participant paused an individual security for five minutes across all exchanges if the security experienced a 10% change in price over the preceding five minutes.[18] The SSCB pilot mechanism was later replaced by the Plan, which is a more finely calibrated mechanism to address extraordinary price volatility.[19] Specifically and unlike SSCB wherein a security was halted only after three trades at an extreme price, the Plan's mechanism suspends trading before such execution occurs.

The Plan was approved on a pilot basis to allow the Participants and the public to gain valuable practical experience with the Plan's operations during the pilot period. This experience has proven instructive to the Participants and the public in assessing whether further modifications to the Plan were necessary and whether the Plan should operate on a permanent basis. During the pilot period, the Participants provided the Commission and the public [20] with a significant amount of data bearing on the Plan's performance to aid in an assessment of its operations. Based on the Plan's performance, the Participants now propose to implement the Plan on a permanent basis. The Participants believe that the Plan has been beneficial to the national market system by serving to dampen price volatility and prevent unwarranted Trading Pauses that are unrelated to volatility, as intended. Therefore, the Participants believe that the Plan should be approved to operate on a permanent basis.

The data collected during the pilot period and numerous studies conducted by the Participants and the Commission's Department of Economic and Risk Analysis (''DERA'') have shown that the Plan has been beneficial to the markets by serving to dampen price volatility. For instance, DERA issued a number of papers studying the operation of the Plan. In one paper, DERA described their study of the Plan's effect on extraordinary transitory volatility and found evidence that the Plan's mechanism reduced extraordinary transitory volatility relative to the prior SSCB mechanism depending on which methodology was employed.[21] In particular, DERA found evidence that the magnitude of the largest price reversals that occurred each day for both Tier 1 and Tier 2 NMS Stocks were smaller during the Plan time period than during the SSCB Pilot time period or the time period before the SSCB Pilot went into effect. DERA also found evidence that the frequency of moderate price reversal decreased during the eight week phase-in implementation during which Tier 1 NMS Stocks were subject to the Plan and Tier 2 NMS Stocks were subject to the SSCB mechanism.

Moreover, pursuant to the Plan's requirements,[22] the Participants provided the Commission with an assessment relating to the impact of the Plan and calibration of the Percentage Parameters on May 28, 2015.[23] In performing the Joint Assessment, the Participants, in conjunction with a third party consultant, studied data from each exchange and FINRA for the time period from the implementation of the Plan on April 2012 through December 2014. The Participants studied the impact of approaching Price Bands on limit order books, the Plan's impact on erroneous executions, appropriateness of Percentage Parameters, length of Limit States, concerns by options market participants regarding limit states, the process for entering Limit States and the impact of Straddle States, exiting Limit States, as well as the length of Trading Pauses and the reopening process.

Based on the data analyzed, the Supplemental Joint Assessment found that the Plan has been largely effective at reducing the negative impacts of sudden, unanticipated price movements in NMS Stocks, thereby protecting investors and promoting a fair and orderly market. In particular, the data in the Supplemental Joint Assessment had shown that the Price Bands dampened price volatility by keeping prices within the Price Bands. For instance, the data in the Supplemental Joint Assessment showed that even in the cases where a Limit State is reached, a majority (63.3%) of those Limit States naturally resolved themselves within one second without triggering a Trading Pause.[24] Only 4.08% of Limit States resulted in a Trading Pause.[25] The data in the Supplemental Joint Assessment further showed that the Percentage Parameters used to determine the width of the Price Bands were reasonably designed to ensure that they were not too wide as to permit trades to occur at prices that do not properly reflect supply and demand, and not too narrow as to cause excessive disruptions, inhibiting the price discovery process.[26] In reaching this conclusion, the Supplemental Joint Assessment examined, among other things, the frequency distribution of intraday stock returns to gain insight on reasonable price moves that could take place within a day as well as frequency of Reference Price changes. Based on this study, the Supplemental Joint Assessment stated that the ''relative rarity of large price updates of comparable magnitude to the wider Price Bands indicate that the Price Bands could be narrowed substantially without causing undue restrictions on trading.'' [27] The Supplemental Joint Assessment also examined minute by minute changes in stock prices to examine short-term price reversals for the month of October 2014, the most volatile month in the sample period. It further found the five minute time period within which Reference Prices are calculated provided a representative measure of price trends on which to base such calculation.[28]

The data in the Supplemental Joint Assessment also showed that the length of Limit States is clearly adequate for the markets in individual stocks to revert to normal market condition. The

[17] *See* Securities Exchange Act Release No. 62252 (June 10, 2010), 75 FR 34186 (June 16, 2010) (SR–BATS–2010–014; SR–EDGA–2010–01; SR–EDGX2010–01; SR–BX–2010–037; SR–ISE–2010–48; SR–NYSE–2010–39; SR–NYSEAmex–2010–46; SR–NYSEArca–2010–41; SR–NASDAQ–2010–061; SR–CHX–2010–10; SR–NSX–2010–05; SR–CBOE–2010–047) (Order Granting Accelerated Approval to Proposed Rule Changes Relating to Trading Pauses Due to Extraordinary Market Volatility).

[18] The 10% threshold is for securities in the S&P 500. A 30% price movement is required for all other listed securities priced above $1.00 and a 50% price movement is for all listed securities priced below $1.00. Calculation of whether a securities price meets the required threshold is based on the price of executed trades.

[19] For example, the number of multiple cancellation events decreased after the implementation of the Plan. *See* page 34, Table 15 of the Limit Up—Limit Down; National Market System Plan Assessment to Address Extraordinary Market Volatility (the ''Supplemental Joint Assessment'' or ''Assessment''), *available athttps://www.sec.gov/comments/4-631/4631-39.pdf* (indicating a decrease from an average of 35.63 to 13.45 multiple cancelation events per month from the time during the SSCB Pilot Mechanism was in effect to after the Plan was fully implemented). For purposes of the Joint Assessment, a multiple cancellation event is an event in which there were six or more cancelled trade reports for a single stock during the day.

[20] *See* Supplemental Joint Assessment, *id.*

[21] *See* '' 'Limit Up-Limit Down'' Pilot Plan and Extraordinary Transitory Volatility'', by Paul Hughes, John Ritter, and Hao Zhang, DERA, dated December 2017, *available at https://www.sec.gov/comments/4-631/4631-2830173-161647.pdf.*

[22] *See* Appendix B, Section III of the Plan.

[23] *See* the Supplemental Joint Assessment, *supra* note 19.

[24] *Id.* at page 19.

[25] *Id.*

[26] *Id.* at page 35.

[27] *Id.* at page 39.

[28] *See* the Supplemental Joint Assessment, *supra* note 19, at page 39.

Supplemental Joint Assessment observed that over 99% of the Limit States in stocks with a market capitalization of over $1 billion resolved themselves without a Trading Pause, and the vast majority of them were resolved in one second.[29] The same general pattern was also true for small capitalization NMS Stocks.

In its conclusion, the Supplemental Joint Assessment found that cancellation events decreased significantly under the Plan and that the Plan's parameters are successful in preventing trades from occurring outside of the Price Bands, avoiding the types of mispriced trades that resulted in the Flash Crash.[30] However, the Supplemental Joint Assessment expressed concern regarding potential disruption in the price discovery process around the opening of trading due to the possible calculation of an inaccurate Reference Price, which may trigger Limit States or Trading Pauses for reasons unrelated to the market for the security. Therefore, the Supplemental Joint Assessment recommended that the previous day's closing price be used as the Reference Price where there are no trades in the opening auction. Based on these findings, the Supplemental Joint Assessment recommended that the Plan be made permanent with the one modification to the Reference Price calculation,[31] which the Participants later adopted in Amendment No. 10 discussed below.

Notwithstanding the Plan's positive impact on the markets, the Participants continued to monitor the scope and operation of the Plan during the pilot period. As a result, the Participants identified two areas of the Plan that needed improvement; namely, the calculation of Reference Prices during the opening of trading and the performance of the reopening process following a Trading Pause. As a result, the Participants filed Amendments Nos. 10 and 12 to the Plan proposing modifications that the Participants deemed necessary and appropriate to improve the Plan's performance in these two areas.

Amendment No. 10. First, in Amendment No. 10, the Participants amended the Plan to modify the definition of Opening Price, which is used to determine the first Reference Price of the day.[32] Prior to Amendment No. 10, the Opening Price was defined as the first trade or the midpoint of the Primary Listing Exchange's best bid and offer where the Primary Listing Exchange opened with a quotation, if such Opening Price occurred within the first five minutes of the start of Regular Trading Hours. Amendment No. 10 changed the definition of Opening Price where the Primary Listing Exchange opens with a quotation from the midpoint of that quotation to the previous day's official closing price. In proposing Amendment No. 10, the Participants noted that the midpoint of the bid and offer often resulted in an unrealistic Reference Price[33] where a security opens on quotes that are extremely wide or improperly skewed. The Participants noted that this could, in turn, trigger Limit States and Trading Pauses at inaccurate price levels.[34]

The revised definition of Opening Price in Amendment No. 10 altered the determination of a security's first Reference Price when that security does not trade in an opening auction in an effort to reduce the incidence of unnecessary price moves and reduce the number of unwarranted[35] Trading Pauses and Limit States during the commencement of Regular Trading Hours.

Amendment No. 10 improved the operation of the Plan. Since its implementation on July 18, 2016, Amendment No. 10 reduced the number of unwarranted Trading Pauses and Limit States during the commencement of Regular Trading Hours as intended. Chart A sets forth the number of Trading Pauses in all NMS Stocks across all Primary Listing Exchanges from January 4, 2016 through August 30, 2018. The data in Chart A illustrates the decrease in Trading Pauses for all NMS Stocks in the time since Amendment No. 10 was implemented in July 2016. Trading Pauses dropped from an average of 64.4 per day to an average of 9.2 per after Amendment No. 10 was implemented.

[29] *Id.*

[30] *Id.* at page 54.

[31] *Id.*

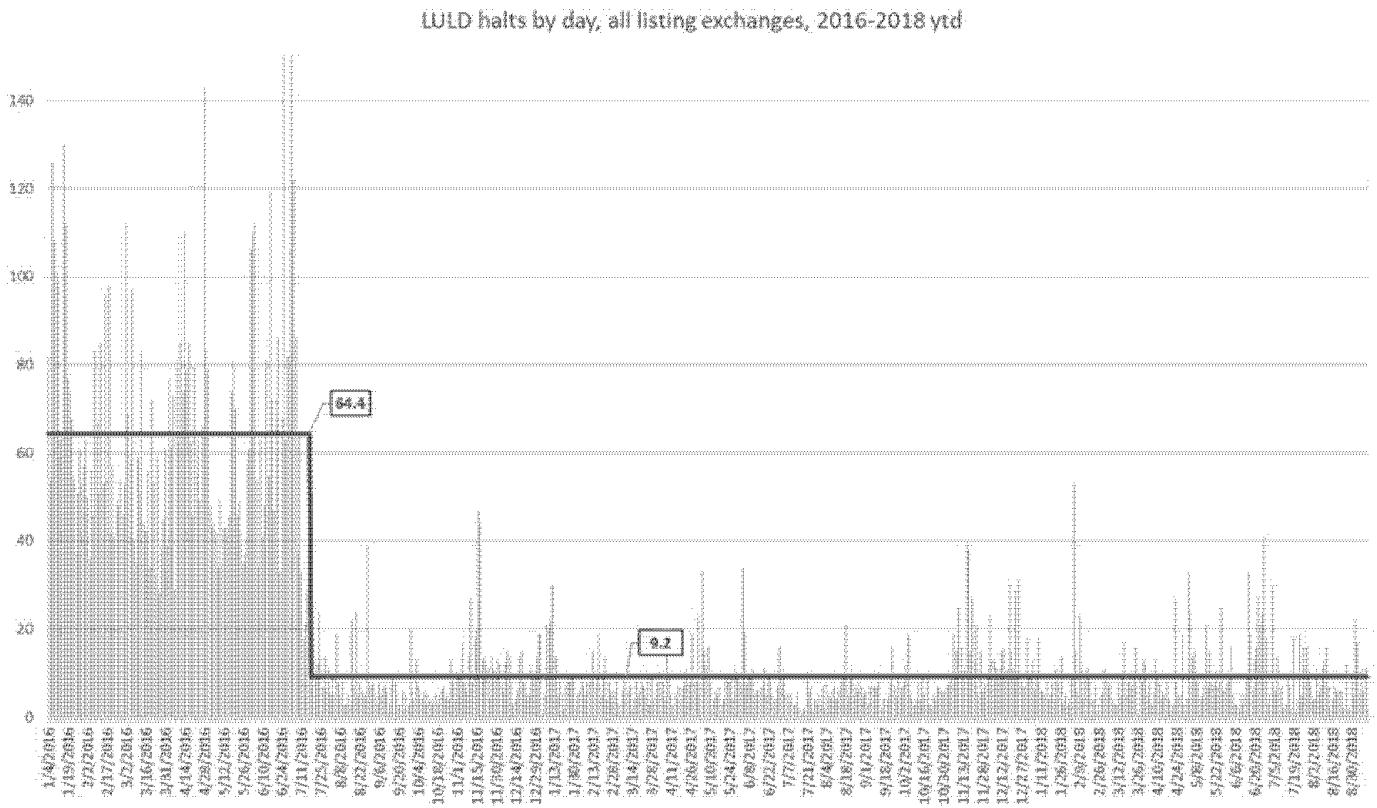
[32] Section V(B)(1) of the Plan provides that the first Reference Price for a Trading Day shall be the Opening Price on the Primary Listing Exchange in an NMS Stock if such Opening Price occurs less than five minutes after the start of Regular Trading Hours.

[33] *See* Securities Exchange Act Release No. 77205 (February 22, 2016), 81 FR 10315 (February 29, 2016) (''Amendment No. 10 Notice'').

[34] *Id.*

[35] An ''unwarranted Trading Pause'' is one that occurs because of factors unrelated to trading volatility. For example, if the Price Bands based on poor Reference Prices result in a Trading Pause, such Trading Pause would be considered unwarranted. Unwarranted Trading Pauses in illiquid stocks are typically characterized by wide or skewed spreads between buy and sell orders and no trading activity leading into the Trading Pause. Another example of an unwarranted Trading Pause is discussed below under the section entitled Proposal to Amend Calculation of Percentage Parameters beginning on page 21.

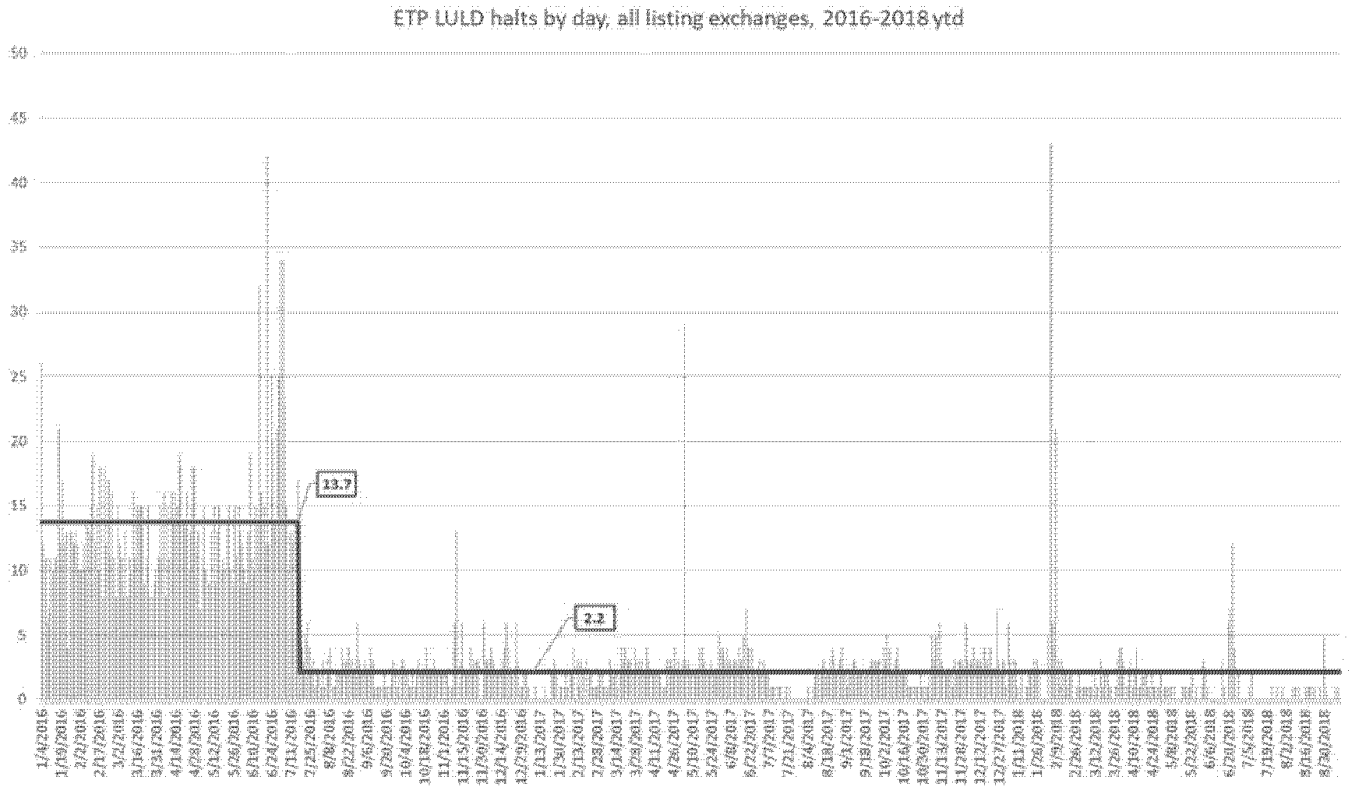
Chart A



* Source. Participant data.

Further, as evidenced by the data in Chart B, Trading Pauses in ETPs declined from 13.7 per day to 2.2 per day since Amendment No. 10 was implemented.

Chart B



* Source. Participant data.

In addition, DERA issued a white paper studying the impact of Amendment No. 10 and found that Trading Pauses for both Tier 1 and Tier 2 NMS Stocks were less frequent following the implementation of the amendment.[36] DERA found that the ''decrease in the frequency of Trading Pauses was largest for Tier 2 securities, relative to Tier 1, and also larger in the first 30 minutes after the opening of the trading day.'' [37] In particular, from May 12, 2014 (the day Phase 2 of the Plan was implemented) to December 31, 2016, DERA found that the number of Trading Pauses decreased by nearly 80%.[38] Since the implementation of Amendment No. 10, DERA found a further decrease in Trading Pauses, with the largest decrease occurring prior to 10:00 a.m. As evidenced by the above data and DERA's study, Amendment No. 10 improved the performance of the Plan during the commencement of trading by refining the selection method of an NMS Stock's Reference Price, resulting in a decrease in the number of Trading Pauses at the open.

Amendments Nos. 12 and 13. On August 24, 2015, the U.S. markets experienced extraordinary equities market volatility in which 257 securities triggered more than one halt, and those multi-halt securities accounted for 1,064 of the 1,278 total halts.[39] Following this event, the Participants focused on a method to improve the accuracy of the reopening price so as to avoid triggering repeated Trading Pauses and adopted a set of common elements across all Primary Listing Exchanges for automated reopenings. The overarching objective was to ensure consistent and standardized behavior across markets, while carefully balancing Halt Auction price quality and the speed with which continuous trading can be resumed.

The process of reopening a security after a Trading Pause prior to Amendment No. 12, provided that the Primary Listing Exchange would attempt to open the paused symbol five minutes after the commencement of the pause and, if unsuccessful, again 10 minutes later. If the Primary Listing Market was unable to reopen 10 minutes after the commencement of the pause, other markets were permitted to resume trading that symbol. Amendment No. 12 improved and standardized the automated reopening process following a Trading Pause. The Primary Listing Exchanges also adopted rules revising their automated reopening processes following a Trading Pause consistent with Amendment No. 12.[40]

Under the original reopening process after a Trading Pause, the Primary Listing Exchange would attempt to open the paused symbol at five minutes and then again at 10 minutes after the initial

[36] *See* ''The Effects of Amendment No. 10 of the 'Limit Up-Limit Down'' Pilot Plan'', by Paul Hughes, DERA, dated December 2017, *available at https://www.sec.gov/comments/4-631/4631-2830189-161648.pdf.*

[37] *Id.* at 2.

[38] *Id.* at page 4.

[39] *See Research Note: Equity Market Volatility on August 24, 2015,* by Commission Staff of the Office of Analytics and Research, Division of Trading and Markets, dated December 2015, *available at https://www.sec.gov/marketstructure/research/equity_market_volatility.pdf.*

[40] *See* Securities Exchange Act Release Nos. 79846 (January 19, 2017), 82 FR 8548 (January 26, 2017) (SR–NYSEArca–2016–130) (Approval Order); 79884 (January 26, 2017), 82 FR 8968 (February 1, 2017) (SR–BatsBZX–2016–61) (Approval Order); 79876 (January 25, 2017), 82 FR 8888 (January 31, 2017) (SR–Nasdaq–2016–131) (Approval Order). The Primary Listing Exchanges implemented these changes to their automated reopenings on November 20, 2017.

pause. If the Primary Listing Market was unable to reopen at 10 minutes under its own auction rules (*e.g.,* a market order imbalance was remaining or the auction clearing price is outside of the auction collar bands), other markets were permitted to resume trading that symbol. Amendment No. 12 changed this reopening process by generally requiring a Primary Listing Exchange to conduct a reopening auction prior to trade resumption by other Trading Centers. Specifically, Amendment No. 12 provided that, if the Primary Listing Exchange is unable to reopen after 10 minutes following a Trading Pause, non-primary markets would no longer be allowed to resume trading. Instead, Amendment No. 12 required that the Trading Pause continue until the Primary Listing Exchange reopens and non-primary exchanges have received Price Bands from the Processor.

In tandem with Amendment No. 12, the Primary Listing Exchanges amended their rules to harmonize certain aspects of their automated re-opening procedures following a Trading Pause. The amended rules require that the Primary Listing Exchange publish auction price collars, which use a Reference Price based on the upper or lower Price Band that triggered the Trading Pause.[41] The initial Trading Pause remains in effect for a full five minute period. If the Primary Listing Exchange is unable to reopen, a second full five minute Trading Pause begins and the auction price collar will be widened by another 5% (based on the last Reference Price. Price collars will be widened with each extension. Subsequent Trading Pause time periods also have a five minute duration, however re-openings after the initial 10 minutes can occur whenever the re-opening criteria have been met, without waiting for a full five minutes. In the event a Trading Pause is in effect and trading has not resumed by 3:50 p.m., trading in the NMS Stock will be deferred until 4:00 p.m. and combined with the closing auction process at each exchange.

To preclude potential scenarios when trading may resume without Price Bands, Amendment No. 12 also prohibits a Trading Center from resuming trading in an NMS Stock following a Trading Pause in the absence of Price Bands. In addition, to address potential scenarios in which there is no Reopening Price from the Primary Listing Exchange to use to calculate Price Bands, Amendment No. 12 also addressed when trading may resume if the Primary Listing Exchange is unable to reopen due to a systems or technology issue. Lastly, Amendment No. 12 also addressed how an NMS Stock's Reference Price would be determined in such a scenario as well as where the Primary Listing Exchange reopens trading on a zero bid or zero offer, or both. The Participants subsequently submitted Amendment No. 13 to build upon Amendment No. 12 by providing that the Processor will publish the following information provided by a Primary Listing Exchange in connection with the reopening of trading following a Trading Pause: Auction reference price; upper auction collar; lower auction collar; and number of extensions to the reopening auction. This information provides greater transparency regarding the price range in which an NMS Stock can reopen and the elapsed time duration of the reopening process.

The Commission-empaneled Equity Structure Advisory Committee (''EMSAC'') tasked its Market Quality Subcommittee to examine the events of August 24, 2015 and to recommend changes as needed. Like the Participants, the Market Quality Subcommittee (''Subcommittee'') studied mechanisms and functions that ''could fix the auction process so that it would more successfully re-price securities to its new fair range.''[42] The Subcommittee recommended that, instead of halting trading when a stock hits a Price Band as provided in the Plan, trading should continue within the current Price Bands for four minutes and then new Price Bands should be reset using the limit Price Band as the Reference Price for those Price Bands. Several members of the Subcommittee were also members of the Plan's Advisory Committee and the Subcommittee recommendations were discussed over a number of Operating Committee meetings on fixing the auction process. The Participants raised concerns that continued trading at the Price Bands would expose retail investors to disadvantageous pricing and determined to address the reopening auction process as described in Amendment No. 12.[43]

The changes adopted by the Primary Listing Exchanges to extend the Trading Pause and widen the Reopening Auction Collar on the side of the Impermissible Price set forth a measured approach to provide additional time to attract offsetting interest, to help to address an imbalance that may not be resolved within the prior Halt Auction Collars, and to reduce the potential for triggering another Trading Pause.

Conclusion. As supported by the above data and the Plan's overall performance, the Plan has proved to be a valuable tool in dampening and preventing extreme price volatility. Therefore, the Participants believe that the above data justifies the Plan being approved to operate on a permanent, rather than pilot, basis. Operation of the Plan on a permanent basis would provide market participants with greater assurance regarding the ongoing operation of the Plan and application of controls reasonably designed to stifle extraordinary price volatility.

The Plan has been in effect for over five years since it commenced operation on April 18, 2013. The improvements made to the Plan in Amendments Nos. 10, 12, and 13 have been in place in since July 18, 2016 (for Amendment No. 10) and November 20, 2017 (for Amendments Nos. 12 and 13). In Amendment No. 17 to the Plan, the Participants extended the pilot period until April 15, 2019 to provide additional time for the public, the Participants, and the Commission to assess the operation of Amendment No. 12. The extension of the pilot period was also intended to provide additional time for the Participants, the Commission, and the public to consider other potential modifications to the Plan, including changes to how NMS Stocks are tiered under the Plan, and the applicable Percentage Parameters associated with such tiers, as well as the EMSAC recommendations.

Since the implementation of Amendment Nos. 10, 12, and 13, the U.S. equity markets have not experienced a disruption similar to what had occurred on August 24, 2015, with stable price continuity occurring at the open and following reopenings after a Trading Pause. Nonetheless, the amended Plan has worked well during normal market conditions as well as the volatile market activity that occurred in February 2018. The Plan met the expectations of the Pilot by preventing unwarranted Trading Pauses that are unrelated to volatility while also

[41] For example, if there is selling pressure, the auction reference price will be the lower Price Band. The lower Auction Collars would be 5% below that auction reference price (or $0.15 for stocks with a reference price below $3.00). To address mean price reversion, the upper Auction Collar will be the upper Price Band.

[42] *See* U.S. Securities and Exchange Commission Equity Market Structure Advisory Committee, *Recommendations for Rulemaking on Issues of Market Quality,* dated November 29, 2016, *available at https://www.sec.gov/spotlight/emsac/emsac-recommendations-rulemaking-market-quality.pdf.*

[43] The Participants will address the EMSAC recommendations in their first annual report regarding the Plan's operation, proposed herein and discussed below.

reducing the negative impacts of sudden, unanticipated price movements in NMS Stocks, as evidenced by the above data. Amendment No. 10 has served to greatly reduce the potential for a Reference Price to invoke an unwarranted Trading Pause. The Participants also believe that Amendment No. 12 will continue to perform as expected and will do so during times of potential future market volatility. In addition, the Participants propose to adopt a mechanism for the periodic review and assessment of the Plan's performance discussed below. That assessment would encompass an ongoing review of the Plan's operation generally, including the effectiveness of Amendments Nos. 12 and 13.

The Participants believe that the five year pilot period has provided a robust sample size for ''the public, the Participants, and the Commission to assess the operation of the Plan and whether the Plan should be modified prior to approval on a permanent basis.'' [44] In particular, this time has also allowed the public, the Participants, and the Commission time to assess the operation of the Plan as amended by Amendment Nos. 10 and 12. The Participants believe that the amended Plan has positively impacted the markets by meeting its intended goal, to dampen and prevent extreme price volatility, and should therefore be approved to operate on a permanent basis.

Proposed Mechanism for Periodic Review and Assessment

As part of its proposal to operate the Plan on a permanent basis, the Participants propose a periodic reporting mechanism by which they, along with the Commission and other market participants may continue to monitor the Plan's ongoing operation. The proposed structure would allow for the continued evaluation of the Plan's performance while accounting for an evolving market structure. The proposed mechanism would also ensure that the Plan continues to be monitored in a data-driven manner by requiring data, analyses and reporting on a periodic basis. The proposed mechanism would provide transparency into the effectiveness of the Plan and allow the public and the Commission to examine its ongoing performance.

Appendix B of the Plan currently requires that the Participants collect and transmit to the Commission certain information on a monthly basis, to be provided 30 calendar days following month end. Unless otherwise specified in Appendix B, the Primary Listing Exchanges are responsible for collecting and transmitting the data to the SEC. In sum, Sections I and II of Appendix B of the Plan require the Participants to produce the following data to the Commission as set forth in the Plan:

- Summary statistics concerning the frequency with which NMS Stocks enter a Limit State and when a Trading Pause has been declared for an NMS Stock;
- Raw Data concerning a record of every Straddle State, Price Band, Limit State, Trading Pause or halt;
- Data set of orders entered into reopening auctions during halts or Trading Pauses;
- Data set of order events received during Limit States; and,
- Summary data on order flow of arrivals and cancellations for each 15-second period for discrete time periods and sample stocks to be determined by the SEC in subsequent data requests.

The Plan also includes a provision under Appendix B, Section III that required the Participants to produce a one-time report to the Commission relating to the impact of the Plan and calibration of the Percentage Parameters, as discussed above. The Participants produced that report to the Commission on May 25, 2015.[45] As part of its proposal to operate the Plan on a permanent basis, the Participants propose to replace the current reporting provision under Appendix B, Section III with a reporting mechanism by which the performance of the Plan would be reviewed and assessed on an ongoing basis.

As described earlier, Appendix B, Section III of the Plan required the Participants to provide the Commission at least two months prior to the end of the initial pilot period with an assessment relating to the impact of the Plan and calibration of the Percentage Parameters.[46] The Participants submitted their Supplemental Joint Assessment on May 28, 2015.[47]

As part of its proposal to implement the Plan on a permanent basis, the Participants propose to replace these data reporting requirements with a mechanism by which the Participants would periodically review and assess the performance of the Plan.

Data Provision. The Participants believe that regular, ongoing provision of data to the Commission is no longer necessary as public information provided in standard data products provides much of the information currently required by Appendix B.I and B.II.A through B.II.D. With respect to the data that is not publicly available, the Participants propose that the Plan would require the Participants to provide certain data listed below to the Commission upon request.

As proposed, the Commission may request from the Primary Listing Exchanges the following data elements:

A. Data set of all orders entered during halts or Trading Pauses
  1. Normal or Auction Only orders, Arrivals, Changes, Cancels, # shares, limit/market, side, Limit State side
  2. Pipe delimited with field name as first record
B. Data set of order events received during Limit States
C. Summary data on order flow of arrivals and cancellations for each 15-second period for discrete time periods and sample stocks to be determined by the SEC in subsequent data requests. Must indicate side(s) of Limit State
  1. Market/marketable sell orders arrivals and executions
  a. Count
  b. Shares
  c. Shares executed
  2. Market/marketable buy orders arrivals and executions
  a. Count
  b. Shares
  c. Shares executed
  3. Count arriving, volume arriving and shares executing in limit sell orders above NBBO mid-point
  4. Count arriving, volume arriving and shares executing in limit sell orders at or below NBBO mid-point (non-marketable)
  5. Count arriving, volume arriving and shares executing in limit buy orders at or above NBBO mid-point (non-marketable)
  6. Count arriving, volume arriving and shares executing in limit buy orders below NBBO mid-point
  7. Count and volume arriving of limit sell orders priced at or above NBBO mid-point plus $0.05
  8. Count and volume arriving of limit buy orders priced at or below NBBO mid-point minus $0.05
  9. Count and volume of (3–8) for cancels
  10. Include: Ticker, date, time at start, time of Limit State, all data item fields in 1, last sale prior to 15-second period (null if no trades today), range during 15-second period, last trade during 15-second period.

These data elements are substantially similar to that currently required to be

[44] *See supra* note 1, 77 FR 33498 at 33508.

[45] *See* Supplemental Joint Assessment, *supra* note 19.

[46] *See* Appendix B, Section III of the Plan.

[47] *See* Supplemental Joint Assessment, *supra* note 19.

produced monthly under Appendix B.II.E through G. The only difference is that amended Appendix B.I.A would require data for all orders entered during a halt or Trading Pause as well as identifying whether an order was an auction-eligible order. The requested data would be collected and transmitted to the Commission in an agreed-upon format, and would be provided 30 calendar days following the date of the request, or such other date as agreed upon by the Commission and Primary Listing Exchange(s). As is the case today, the proposed data collected and provided to the Commission under the Plan would be transmitted to the Commission with a request for confidential treatment under the Freedom of Information Act. 5 U.S.C. 552, and the Commission's rules and regulations thereunder.[48] The proposed data collection requirements under Appendix B.I would expire at the time the above data becomes available via the National Market System Plan Governing the Consolidated Audit Trail or becomes publicly available.

Reporting. The Participants propose to provide the Commission, and make publicly available, three categories of reports concerning the Plan's ongoing operation on either a periodic or *ad hoc* basis, as described below. Specifically, the Participants propose to submit to the Commission an annual report assessing the Plan's performance, quarterly reports providing basic statistics, as well as an *ad hoc* report on the effectiveness of LULD following a significant market event if requested by the Commission. The Participants would perform the proposed ongoing assessment and reporting concerning the Plan's performance based on an empirical analysis of relevant data. Each report proposed herein and provided to the Commission would be made publicly available and published on the Plan's website.

Annual Report. As amended, Appendix B, Section III of the Plan would require that by no later than March 31, 2020 and annually thereafter, the Operating Committee would provide the Commission and make publicly available a report containing key information concerning the Plan's performance during the preceding calendar year (''Annual Report''). The proposed Annual Report would be produced in consultation with the Advisory Committee and include the following items: (i) An update on the Plan's operations; (ii) an analysis of any amendments to the Plan implemented during the period covered by the report; and (iii) an analysis of potential material emerging issues that may directly impact the operation of the Plan.

- *Update on the Plan's Operations.* This section of the Annual Report would analyze the Plan's operation during the covered period, including a discussion of any areas of the Plan's operation that require additional analysis. In particular, this section of the Annual Report would examine the calibration of the parameters set forth in the Plan (*e.g.,* Price Bands, duration of Limit States, impact of Straddle States, duration of Trading Pauses, and the performance of reopening procedures following a Trading Pause). This section of the Annual Report also would consider stock characteristics and variations in market conditions over time, and will include tests that differentiate results for different characteristics, both in isolation and in combination.
- *Analysis of Amendments Implemented.* This section of the Annual Report would provide an analysis of any amendments implemented during the covered period. The analysis would include a discussion of the amendment's operation and its impact on the overall operation of the Plan. For example, this section of the Annual Report would include an analysis of the amendments proposed herein to Section V.A. I of the Plan concerning the calculation of the Percentage Parameters should those changes be approved by the Commission and implemented by the Participants during the period covered by that Annual Report.
- *Analysis of Emerging Issues.* This section of the Annual Report should vary from year-to-year and would include a discussion and analysis of the Plan's operation during a significant market event that may have occurred during the covered period. This section shall also include any additional analyses performed during the covered period on issues that were raised in previous Annual Reports. In this section of the first Annual Report to be produced by March 31, 2020, the Participants intend to discuss the November 29, 2016 recommendations made by EMSAC's Market Quality Subcommittee.[49]

The Participants would perform the proposed ongoing assessment and reporting concerning the Plan's performance based on an empirical analysis of relevant data. Any analysis conducted by the Participants and included in the Annual Report would be based on aggregated data from all relevant exchanges and FINRA, depending on the issue that is being analyzed. The Annual Report would be published on the Plan's website.[50]

Quarterly Data. 30 days following the end of each calendar quarter, the Participants would provide the Commission and make publicly available a report including basic statistics regarding the Plan's operation (''Monitoring Report'') during the preceding calendar quarter as well as aggregated data from the previous 12 quarters beginning with the calendar quarter covered by the first Monitoring Report. The data included in the Monitoring Report would be collected and transmitted to the Commission in an agreed-upon format that would allow for the download and analysis by the Commission and the public. The purpose of the Monitoring Report is to identify trends in the performance and impact of the Plan on market activity. The Monitoring Report would include data, for example, of the number and rate of recurrence of Limit States, Straddle States and Trading Pauses for each month during the calendar quarter. The Monitoring Report would also examine the number of Clearly Erroneous Executions that occur during the operation of the Plan and the performance of reopening procedures following a Trading Pause. Appendix B.II.B would require the quarterly data production to include the following data for each month during the preceding calendar quarter:

A. Events Data.

[48] The Participants understand the data requested pursuant to proposed Appendix B.I may be used by the Commission for analysis and assessment of the Plan and that any portion of the data utilized as part of a public report produced by the Commission would be included on an anonymous and aggregated basis.

[49] *See* U.S. Securities and Exchange Commission Equity Market Structure Advisory Committee, *Recommendations for Rulemaking on Issues of Market Quality,* dated November 29, 2016, *available at https://www.sec.gov/spotlight/emsac/emsac-recommendations-rulemaking-market-quality.pdf.*

[50] As is the case today with proposed amendments to National Market System Plan submitted pursuant to Rule 608 of Regulation NMS, 17 CFR 242.608, and published by the Commission for public comment, the Participants would consult with Commission staff when evaluating comments submitted by the public on the Annual Report and whether a response is necessary. The Participants note that a similar process is also currently in place when evaluating public comments submitted on proposed rule changes submitted by self-regulatory organizations under Section 19(b) of the Exchange Act. Neither Rule 608 nor Section 19(b) of the Exchange Act, 15 U.S.C. 78s(b), require that the Participants respond to each comment submitted on a proposed amendment to a National Market System Plan or rule change proposed to an individual exchange rule. Nonetheless, as with current practice, potential public comments on the reports proposed herein that raise material issues relevant to the Plan's operation would likely warrant a response from the Participants.

1. Number of Limit States, Trading Pauses, and Straddle States per day, including distribution statics such as the mean, median, minimum and maximum percentiles
2. Number of NMS Stocks that experience more than one Limit State, Trading Pause, or Straddle State in a single day including the length of each Limit State, Trading Pause, and Straddle State per day

B. The number of Clearly Erroneous Events per day for all NMS Stocks that occurred during the time when Price Bands are disseminated by the Processor

C. Reopening Data
1. Number of times an automated reopening process is extended for and the length of the Trading Pause
2. Whether the reopening process ended in a trade
3. The price calculated by an automated reopening process for an NMS Stock exiting a Trading Pause
4. For the five minutes following the conclusion of a Trading Pause, the highest price of all last sale eligible trades, the lowest price of all last sale eligible trades, and the average price of all last sale eligible trades

Appendix B.II.B would also require that the data production partition stocks by the following categories, which are identical to that currently required for the monthly data productions under the existing text to Appendix B.I.A.1.

A. Tier 1 non-ETP issues >$3.00
B. Tier 1 non-ETP issues >=$0.75 and =$3.00
C. Tier 1 non-ETP issues <$0.75
D. Tier 1 non-leveraged ETPs in each of above categories
E. Tier 1 leveraged ETPs in each of above categories
F. Tier 2 non-ETPs in each of above categories
G. Tier 2 non-leveraged ETPs in each of above categories
H. Tier 2 leveraged ETPs in each of above categories

Appendix B.II.B would also require that the above data be partitioned by time of day into the following categories, which are identical to that currently required for the monthly data productions under the existing text to Appendix B.I.A.2.

A. Opening (prior to 9:45 a.m. ET)
B. Regular (between 9:45 a.m. ET and 3:35 p.m. ET)
C. Closing (after 3:35 p.m. ET)
D. Within five minutes of a Trading Pause re-open or IPO open

Reports on Market Events. As proposed, the Plan would include a provision that would describe when the Operating Committee would be required to produce a report at the Commission's request. Specifically, upon Commission request, the Operating Committee would provide the Commission and make publicly available a report analyzing the Plan's operation during a significant market event that (1) materially impacted the trading of more than one security across multiple Trading Centers; (2) and is directly related to or implicating the performance of the Plan. For example, this report will evaluate the performance of Market-Wide Circuit Breakers during the covered period and their relationship to and interaction with the operation of the Plan during times when the Market Wide Circuit Breakers have been triggered. The Participants note that a discussion of the Plan's operation during a significant market event is also proposed to be included in the proposed Annual Report. Depending on the timing of the *ad hoc* report requested by the Commission, the Participants anticipate that the report requested by the Commission may be satisfied by inclusion of an analysis of the Plan's operation during a significant market event in the proposed Annual Report.

Proposal To Amend Calculation of Percentage Parameters

The Price Bands for an NMS Stock are calculated by applying the Percentage Parameter for such NMS Stock to the Reference Price, with the Lower Price Band being a Percentage Parameter below the Reference Price, and the Upper Price Band being a Percentage Parameter above the Reference Price. The Price Bands are calculated during Regular Trading Hours. The Price Bands are calculated by applying double the Percentage Parameters between 9:30 a.m. and 9:45 a.m., and 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close.[51] Doubling of Percentage Parameters results in Price Bands for Tier 1 and Tier 2 NMS Stocks priced above $3.00 of 10% and 20%, respectively.

As part of their ongoing obligation to study and make recommendations for improvement and in consultation with the Advisory Committee, the Participants propose to amend the Plan to change the calculation of Price Bands between 9:30 a.m. and 9:45 a.m. by eliminating the requirement to double the applicable Percentage Parameters under Section V.A.1. The Participants also propose to amend Section V.A.1 of the Plan to double the Percentage Parameters between 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close, for only Tier 1 NMS Stocks and Tier 2 NMS Stocks with a Reference Price equal to or below $3.00. This change would result in no longer doubling the Percentage Parameters of Tier 2 NMS Stocks with a Reference Price above $3.00 near the close.[52]

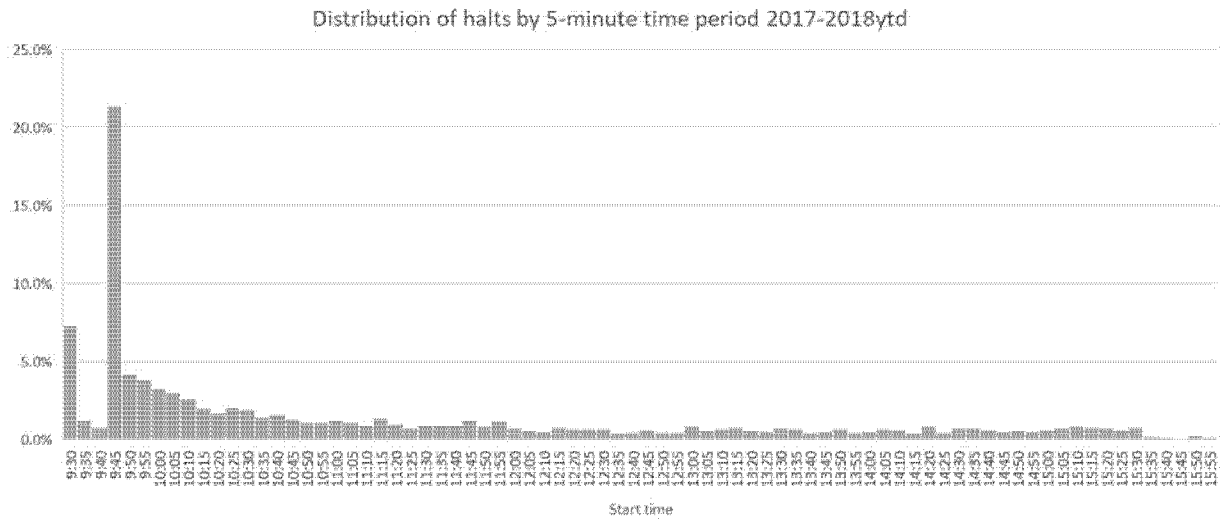
Chart C illustrates the disproportionate number of Limit States and Trading Pauses that occur at or shortly after 9:45 a.m., the only time Price Bands contract intraday. Wider Price Bands could cause displayed quotations that are within the Price Bands prior to 9:45 a.m. to then be outside of the Price Bands once they contract. This, in turn, results in an increased number of Limit States and Trading Pauses starting at 9:45 a.m. when quotations may not be updated quickly enough. (The chart also shows that the number of Limit States and Trading Pauses then decreases as trading adjusts to the tighter Price Bands.)

As illustrated in Chart C, over 21% of all Trading Pauses occur in the five minutes following the contraction of the Price Bands between 9:45 a.m. and 9:50 a.m. Chart D shows that the increase in Trading Pauses at 9:45 a.m. is not due to an increase in volatility at or around 9:45 a.m., but is primarily driven by the sudden contraction of Price Bands as currently required by the Plan.

[51] If the Processor has not yet disseminated Price Bands, but a Reference Price is available, a Trading Center may calculate and apply Price Bands based on the same Reference Price that the Processor would use for calculating such Price Bands until such trading center receives Price Bands from the Processor.

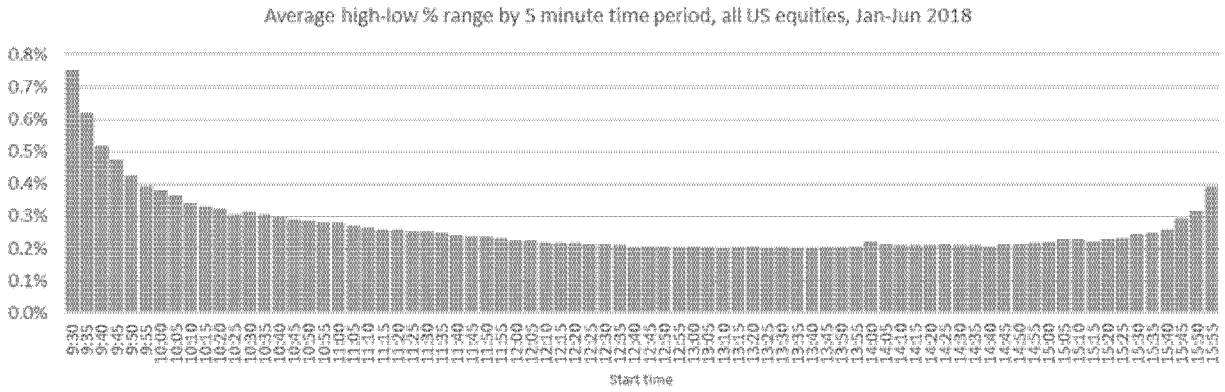
[52] The Participants would include in an Annual Report an analysis of the amendments proposed herein to Section V.A.I of the Plan concerning the calculation of the Percentage Parameters if implemented by the Participants during the period covered by that Annual Report.

Chart C



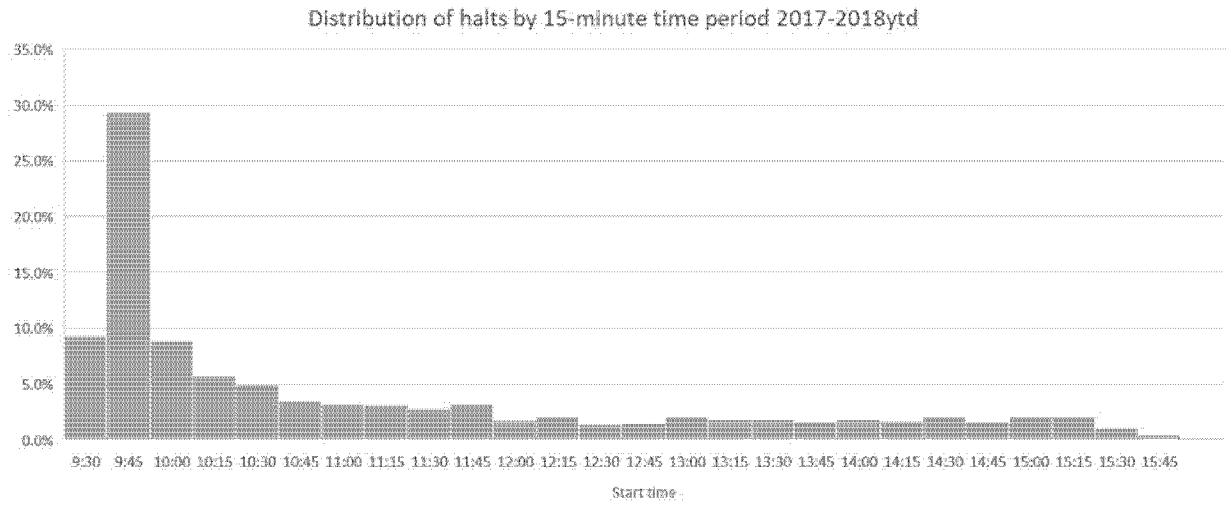
* Source. Participant data.

Chart D



* Source. Participant data.

Chart E



* Source. Participant data.

Chart E and F below review the same data as Chart C over 15-minute periods, rather than 5-minutes, and show that the first 15 minutes of the trading day from 9:30 a.m. to 9:45 a.m. account for less than 10% of all Trading Pauses. Meanwhile, the subsequent 15 minutes following the contraction of Price Bands at 9:45 a.m. account for nearly 30% of all Trading Pauses despite no evidence of abnormal volatility.

To further illustrate distortions caused by double wide Price Bands from 9:30–9:45 a.m., the Participants studied the distribution of clearly erroneous executions during the trading day. Chart F shows that 44% of all clearly erroneous executions occur between 9:30 a.m. and 9:45 a.m. since the implementation of Amendment No. 10 on July 18, 2016. With regard to ETPs, 64% of all clearly erroneous executions occur between 9:30 a.m. and 9:45 a.m. during that same period. The Participants and Advisors [53] believe that narrower Price Bands during this 15 minute period would have prevented some of these clearly erroneous executions by pausing trading at the Price Bands.

The Participants analyzed the potential impact of eliminating double wide Price Bands on the number of Limit States and Trading Pauses. As expected, using trading data from January 2, 2018 to June 30, 2018, our model predicts a hypothetical increase in the number of Limit States and Trading Pauses. Under existing procedures for calculating Price Bands, the Participants observed that an average of 1.3 NMS Stocks per day experienced one or more Limit States between 9:30 a.m. and 9:45 a.m. Those Limit States resulted in an average of 0.85 NMS Stocks experiencing a Trading Pause each day. Based on historical data, the Participants estimated that eliminating the doubling of Percentage Parameters between 9:30 a.m. and 9:45 a.m. would increase the number of NMS Stocks that experience a Limit State from 1.3 to 5.5 per day, leading to an estimated average of 3.60 NMS Stocks experiencing a Trading Pause, an increase of 2.75 per day.

Chart F

All

CE events since reference price fix

Time of day	Count	Percent
9:30-9:45	16	44%
9:45-10:00	2	6%
10:00-15:40	16	44%
15:40-16:00	2	6%
Total	36	

ETPs

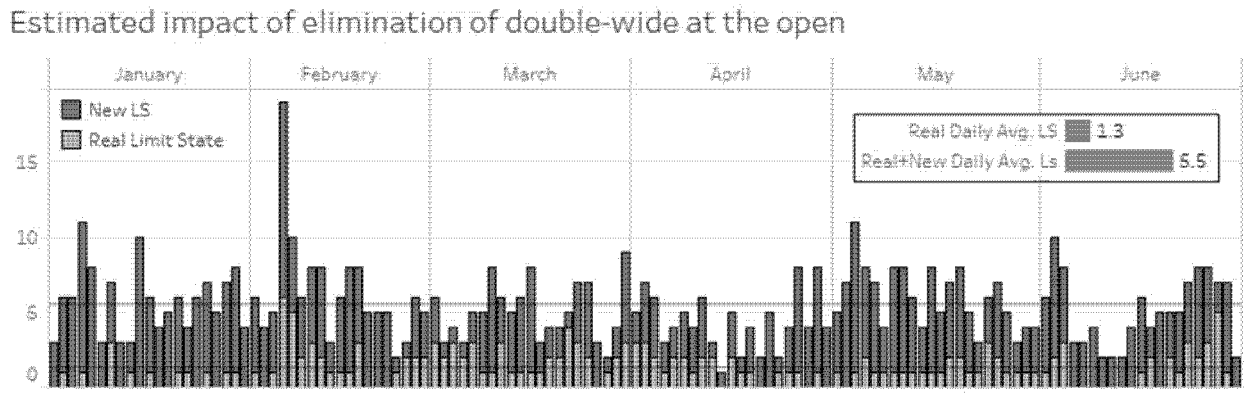
ETP CE events since reference price fix

Time of day	Count	Percent
9:30-9:45	7	64%
9:45-10:00	0	0%
10:00-15:40	3	27%
15:40-16:00	1	9%
Total	11	

* Source. Participant data.

[53] The Commission understands that this reference to ''Advisors'' is related to Section II(D) of the plan, which discusses the Advisory Committee.

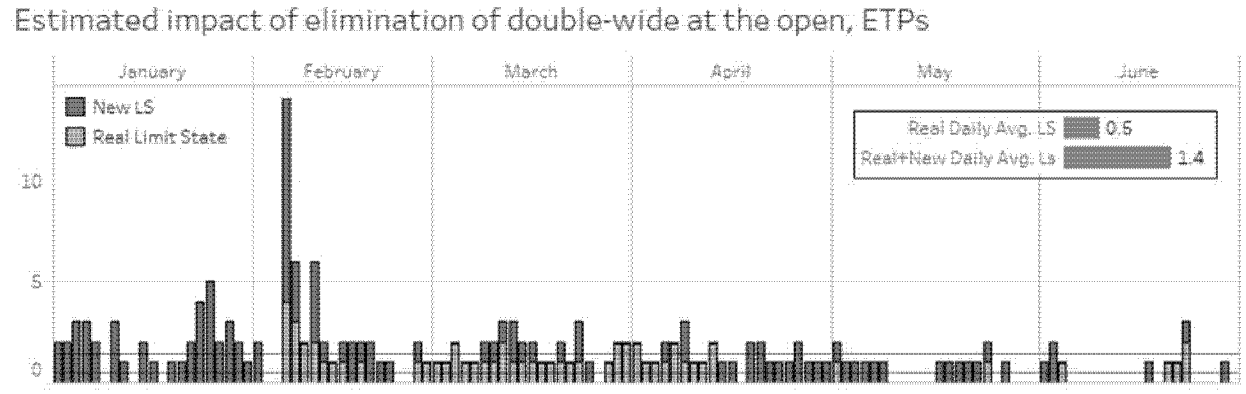
Chart G



* Source. Participant data.

With regard to ETPs, the Participants observed that an average of 0.5 ETPs per day experienced one or more Limit States between 9:30 a.m. and 9:45 a.m. from January 2, 2018 to June 30, 2018. Those Limit States resulted in an average of 0.34 symbols experiencing a Trading Pause each day. Based on historical data, the Participants anticipate that no longer doubling the Percentage Parameters between 9:30 a.m. and 9:45 a.m. would increase the number of ETP symbols with limit states from 0.5 per day to 1.4 per day, with an average of 0.94 symbols experiencing a Trading Pause, and increase of 0.6 per day.

Chart H



* Source. Participant data

Despite this theoretical increase in Limit States and Trading Pauses, the Participants and Advisors believe that eliminating double wide Price Bands would not result in an actual increase. Instead, the Participants and Advisors, in particular, believe that market participants will quickly adapt their systems to quote and trade within the new, tighter Price Bands. Furthermore, market participants will no longer need to adjust their quotes in response to a sudden narrowing of Price Bands at 9:45. It is anticipated that market makers would quote within the proposed tighter Price Bands and their quotes would remain within the Price Bands as they adjust due to market conditions, rather than at a set time where they drastically contract. The expectation is that market makers would continue to provide liquidity within the Price Bands, even if the Price Bands are tighter than the current levels. As a result of the proposal, the Participants and Advisors anticipate that overall the average number of Limit States and Trading Pauses will decrease.

Currently, Percentage Parameters are also doubled at the close of trading—*i.e.,* the period between 3:35 p.m. and 4:00 p.m., or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close. The Participants propose to amend Section V.A.1 of the Plan to double the Percentage Parameters at the close for only Tier 1 NMS Stocks and Tier 2 NMS Stocks with a Reference Price equal to or below $3.00. Tier 2 NMS Stocks priced above $3.00, which are already subject to a wide Percentage Parameter of 10% during the rest of the trading day, would not be doubled. This proposed change is intended to dampen extreme price movements that may occur inside of the

expanded Price Bands near the close of trading.

The Participants originally designed the Plan to include doubled Percentage Parameters around the opening and close of trading to ensure that the new Limit Up-Limit Down mechanism would perform as intended in periods of higher volatility. Although there was no available data on which to base this decision, at the time the Participants believed that this exception to the regular Percentage Parameters was an appropriate cautionary measure while the Participants and the industry gained experience with this new mechanism. Specifically, as stated in the Participants' response to comments on the proposed Plan, the Participants stated that, ''[t]he Participants believe that the proposed doubling of the Percentage Parameters is appropriate in light of the volatility profiles around the opening and closing periods, and that no adjustment to the timing or levels of the Price Bands should be made to the Plan *until experience is gained* from both Phases I and II'' (*emphasis added*). In approving this aspect of the Plan, the Commission relied on the expertise of the Participants but further provided that the pilot period would provide additional time to gain experience with the operation of the Plan that would inform any permanent approval.

Based on the Participants' collective experience in operating the Plan over the past five years, as well as advice from market participants including the Advisory Committee, the Participants believe that the original concerns about volatility around the close were unfounded with respect to Tier 2 NMS Stocks where the applicable Percentage Parameters are already 10% during the remainder of the trading day. Specifically, the Participants found that only a *de minimis* number of trades actually occur outside of the regular 10% Percentage Parameter, and that therefore the doubling of the Percentage Parameters for Tier 2 NMS Stocks at the close is unwarranted.

Furthermore, the Participants believe that the currently doubled Percentage Parameters for Tier 2 NMS Stocks—which would accommodate price swings of as much as 40% when trading from the upper Price Band to the lower Price Band—are inconsistent with the stated goal of the Plan, which is to address extraordinary volatility in NMS Stocks, and thereby protect investors and promote fair and orderly markets. While data collected by the Participants shows that such extreme price moves are rare today, the Participants believe that waiting for a major event to occur before closing this gap would weaken investor confidence in the markets, and is inconsistent with principles of investor protection.

As shown by Chart I, extreme price changes remain rare and are readily accommodated within the normal, non-doubled, Percentage Parameter for Tier 2 NMS Stocks. To illustrate, the Participants reviewed how far every NMS Stock's price moved (high to low) during every 30-second period from January 2018 to March 2018, a period that included relatively higher volatility in February 2018. As described by the below data, over that period, 99.9% of 30-second high-low price changes were less than 3%. Less than .02% of 30-second periods (22,347 out of 117 million measured) included a price change greater than 5%. Only 126 30-second periods included price change of more than 20%.

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Chart I

Distribution of 30-second price changes, all US stocks, Jan-Mar 2018

Stock price range	0-3%	3-5%	5-10%	10-20%	20-30%	30-40%	40-50%	>50%	Total
1. Less than $1	1,402,543	25,320	4,859	379	21	4	1	1	1,433,128
2. $1-$3	4,905,040	31,467	7,224	783	47	9	2	1	4,944,573
3. $3-$5	4,349,881	11,615	3,301	278	6	-	-	-	4,365,081
4. $5-$10	9,987,661	7,685	1,868	152	7	1	-	-	9,997,374
5. $10-$20	20,211,549	6,556	1,733	140	11	-	-	-	20,219,989
6. $20-$50	38,482,239	4,535	1,104	119	11	-	-	-	38,488,008
7. $50-$100	23,733,919	711	168	24	2	-	-	-	23,734,824
8. >$100	13,838,764	247	68	21	2	-	-	-	13,839,102
Total	116,911,596	88,136	20,325	1,896	107	14	3	2	117,022,079

* Source. Participant data.

Distribution of 30-second price changes, all US stocks, Jan-Mar 2018

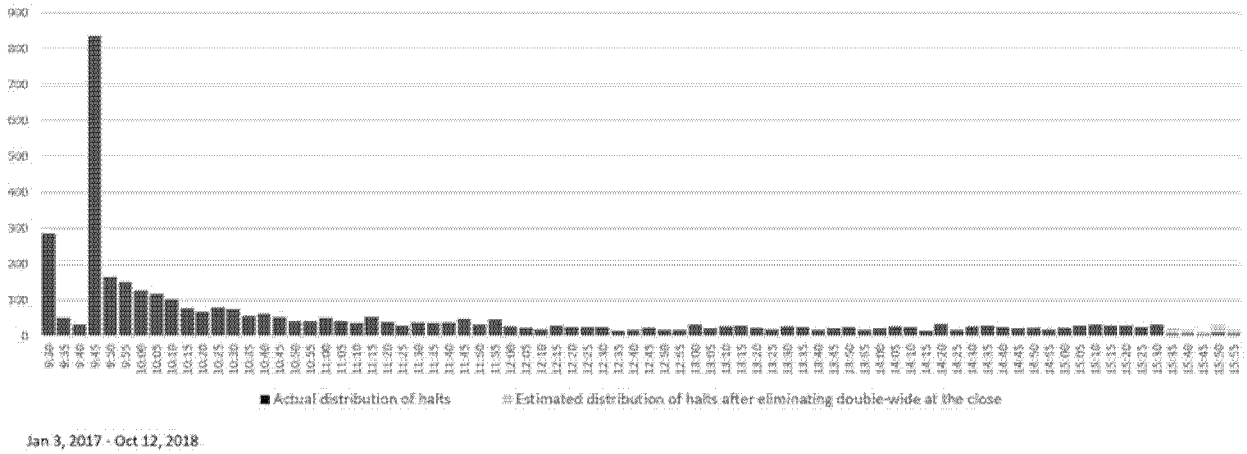
Stock price range	0-3%	3-5%	5-10%	10-20%	20-30%	30-40%	40-50%	>50%	Total
1. Less than $1	97.8659%	1.7668%	0.3390%	0.0264%	0.0015%	0.0003%	0.0001%	0.0001%	100%
2. $1-$3	99.2005%	0.6364%	0.1461%	0.0158%	0.0010%	0.0002%	0.0000%	0.0000%	100%
3. $3-$5	99.6518%	0.2661%	0.0756%	0.0064%	0.0001%	0.0000%	0.0000%	0.0000%	100%
4. $5-$10	99.9028%	0.0769%	0.0187%	0.0015%	0.0001%	0.0000%	0.0000%	0.0000%	100%
5. $10-$20	99.9583%	0.0324%	0.0086%	0.0007%	0.0001%	0.0000%	0.0000%	0.0000%	100%
6. $20-$50	99.9850%	0.0118%	0.0029%	0.0003%	0.0000%	0.0000%	0.0000%	0.0000%	100%
7. $50-$100	99.9962%	0.0030%	0.0007%	0.0001%	0.0000%	0.0000%	0.0000%	0.0000%	100%
8. >$100	99.9976%	0.0018%	0.0005%	0.0002%	0.0000%	0.0000%	0.0000%	0.0000%	100%
Total	99.9056%	0.0753%	0.0174%	0.0016%	0.0001%	0.0000%	0.0000%	0.0000%	100%

* Source. Participant data.

As illustrated in Charts J and K below, Trading Pauses are significantly underrepresented during the last 25 minutes of the trading day where the Percentage Parameters are doubled. Based on data compiled by the Participants, during 2017 and 2018 through October 12, an average of 0.06 Trading Pauses occurred each day at the close (about one pause every 17 trading days). By comparison, the average for any 25 minute period across the entire trading day is 0.57 Trading Pauses per day (about one pause every 2 trading days). Even with the proposed change to only double Percentage Parameters for Tier 2 NMS Stocks with a Reference Price below $3.00, the Participants expect that the total number of Trading Pauses experienced during this period would be *de minimis.* The Participants estimate that eliminating double wide at the close will results in about 0.2 new Trading Pauses per day (out of a total of 9 per day during 2017 and 2018 through October 12, 2018) would result from the proposed change, without accounting for a reduction attributable to behavioral changes. Trading Pauses would therefore continue to be underrepresented at the close notwithstanding any minimal increase.

Chart J

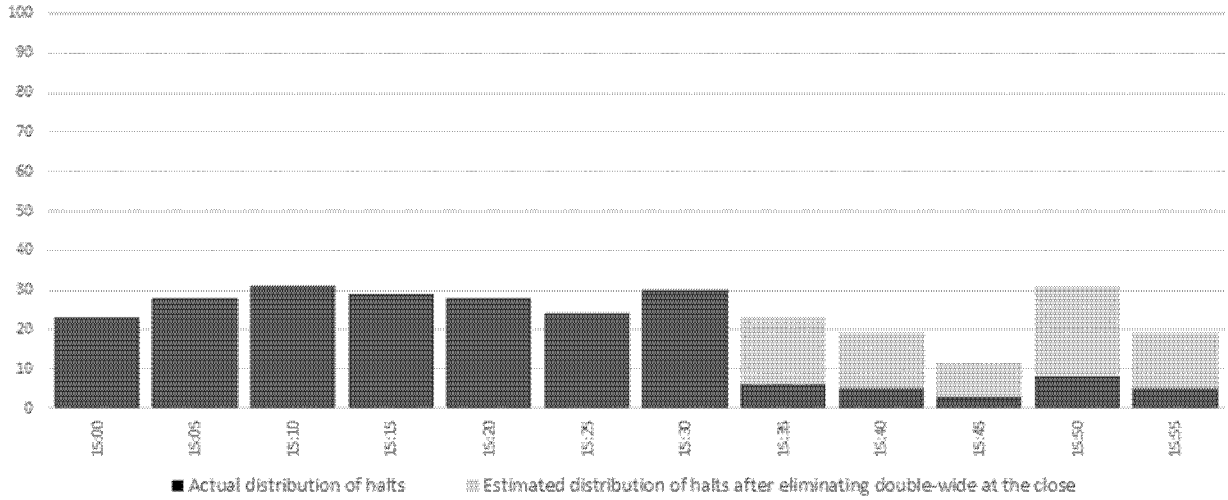
Distribution of Trading Pauses by 5-minute time period 2017 through Oct 2018



* Source. Participant data.

Chart K

Distribution of Trading Pauses by 5-minute time period 2017 through Oct 2018, 3-4p.m.



* Source. Participant data.

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Furthermore as discussed above, the Participants believe that the real number of new Trading Pauses under the proposed modified percentage parameters would be significantly lower than suggested by historical data because that data does not take into account changes in behavior by market participants. Specifically, the Participants believe, based on experience operating the Plan and the advice of the Advisory Committee, that market participants would adjust their quoting behavior in response to these changes, resulting in a much lower number of Trading Pauses than suggested by the historical data.

Eliminating the doubling of the Percentage Parameters at the close for Tier 2 NMS Stocks priced above $3.00 would therefore come with almost no cost in terms of additional Trading Pauses and would remove the possibility of extreme price movements within the Price Bands. While volatility near the close has been rare, continuing to double Percentage Parameters leaves investors at risk of extreme price changes of up to 40% from the Upper Price Band to the Lower Price Band. At the same time, there is no evidence that eliminating the doubling of Percentage

Parameters at the close for Tier 2 NMS Stocks priced above $3.00 would be disruptive to the market. The Participants therefore believe that it is consistent with the protection of investors and the public interest to no longer double the Percentage Parameters at the close for these securities. In addition, the Participants believe that this change is consistent with the goals of the Plan itself as Price Bands that are 40% wide from the Upper Band to the Lower Band at the close leave open the potential for the extraordinary price movements that resulted in the Plan being adopted in the first place. In fact, Participants believe that these double wide Price Bands leave open the potential for future mini-Flash Crashes that can and should be prevented.

In addition, there have been discussions around eliminating clearly erroneous rules when the Limit Up-Limit Down mechanism is in effect. Broadly, the Limit Up-Limit Down mechanism prevents trades from happening at prices where one party to the trade would be considered ''aggrieved,'' and thus could be viewed as an appropriate mechanism to supplant clearly erroneous rules. The Participants believe, however, that without the backstop of clearly erroneous rules, it is vital that the Price Bands are appropriately tailored to prevent trades that are so far from current market prices that they would be viewed as having been executed in error. Continuing to permit trading to occur within Price Bands that are as much as 20% above or below the Reference Price without the protections provided by the clearly erroneous rules does not satisfy this requirement, and would be detrimental to investors and the public interest.

B. Governing or Constituent Documents

The governing documents of the Processor, as defined in Section I(P) of the Plan, will not be affected by the Plan, but once the Plan is implemented, the Processor's obligations will change, as set forth in detail in the Plan.

C. Implementation of Plan

The Plan was initially implemented as a one-year pilot program in two phases, consistent with Section VIII of the Plan: Phase I of Plan implementation began on April 8, 2013 and was completed on May 3, 2013. Implementation of Phase II of the Plan began on August 5, 2013 and was completed on February 24, 2014.

The Participants propose to implement the proposal to operate the Plan on a permanent basis upon Commission approval of this amendment.

The Participants propose to implement the proposed changes to Section V.A.1 of the Plan no later than 12 months after approval of this amendment. The implementation of these changes is contingent upon the Processors' ability to implement this amendment on the proposed timeline. The Participants will provide six month advance public notice to market participants of the implementation date of the proposed changes to Section V.A.1 of the Plan.

Quarterly Monitoring Reports required under Appendix B.II.B would be submitted no later than 30 days after the end of the covered calendar quarter. The Participants propose that the first quarterly Monitoring Report would cover the second full calendar quarter following the approval of this amendment. For example, if this amendment is approved during Q1 2019 then the first quarterly Monitoring Report would cover Q3 2019 and would be submitted no later than October 30, 2019. The Participants would continue to submit monthly data required by current Appendix B.I and B.II for months that would not be included in a quarterly Monitoring Report. The Participants would cease producing monthly data required by current Appendix B.I and B.II at the beginning of the calendar quarter covered by the first quarterly Monitoring Report.

The Participants propose to submit the first Annual Report required under Appendix B.II.A no later than March 31, 2020.

D. Development and Implementation Phases

The Plan was initially implemented as a one-year pilot program in two Phases, consistent with Section VIII of the Plan: Phase I of Plan implementation began on April 8, 2013 and was completed on May 3, 2013. Implementation of Phase II of the Plan began on August 5, 2013 and was completed on February 24, 2014. The tenth amendment to the Plan was implemented on July 18, 2016 and the twelfth and thirteenth amendments to the Plan were implemented on November 20, 2017.[54] Pursuant to this proposed amendment, the Participants propose to make the Plan permanent upon approval of this amendment.

E. Analysis of Impact on Competition

The proposed amendments to the Plan would apply to all market participants equally and would not impose a competitive burden on one category of market participant in favor of another category of market participant. The proposed amendment would apply to trading on all Trading Centers and all NMS Stocks would be subject to the amended Plan's requirements. Therefore, the proposed Plan does not impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Exchange Act. The Participants do not believe that the proposed Plan introduces terms that are unreasonably discriminatory for the purposes of Section 11A(c)(1)(D) of the Exchange Act because it would apply to all market participants equally.

F. Written Understanding or Agreements Relating to Interpretation of, or Participation in, Plan

The Participants have no written understandings or agreements relating to interpretation of the Plan. Section II(C) of the Plan sets forth how any entity registered as a national securities exchange or national securities association may become a Participant.

G. Approval of Amendment of the Plan

On October 31, 2018, the Operating Committee, duly constituted and chaired by Mr. Robert Books of Cboe Global Markets, Inc., voted unanimously to amend the Plan as set forth herein in accordance with Section III(C) of the Plan. The Plan Advisory Committee was notified in connection with the Eighteenth Amendment and was in favor. Each of the Plan's Participants has executed a written amended Plan.

H. Terms and Conditions of Access

Section II(C) of the Plan provides that any entity registered as a national securities exchange or national securities association under the Exchange Act may become a Participant by: (1) Becoming a participant in the applicable Market Data Plans, as defined in Section I(F) of the Plan; (2) executing a copy of the Plan, as then in effect; (3) providing each then-current Participant with a copy of such executed Plan; and (4) effecting an amendment to the Plan as specified in Section III(B) of the Plan.

I. Method of Determination and Imposition, and Amount of, Fees and Charges

This section is not applicable as the proposed amendment to the Plan does not involve fees or charges.

[54] *See* text accompanying 82 FR 45922, note 1, *supra.*

J. Method and Frequency of Processor Evaluation

This section is not applicable as the operation of the Plan is conducted by the Primary Listing Exchange.

K. Dispute Resolution

Section III(C) of the Plan provides that each Participant shall designate an individual to represent the Participant as a member of an Operating Committee. No later than the initial date of the Plan, the Operating Committee shall designate one member of the Operating Committee to act as the Chair of the Operating Committee. Any recommendation for an amendment to the Plan from the Operating Committee that receives an affirmative vote of at least two-thirds of the Participants, but is less than unanimous, shall be submitted to the Commission as a request for an amendment to the Plan initiated by the Commission under Rule 608.

III. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the amendment is consistent with the Exchange Act and the rules thereunder.

Proposal To Narrow Bands Between 9:30 and 9:45

1. Is the proposal to amend the Plan by eliminating the requirement to double the applicable Percentage Parameters between 9:30 a.m. and 9:45 a.m. under Section V.A.1 appropriate?

2. Alternatively, would it be preferable and appropriate to maintain the current provision that doubles the Percentage Parameters between 9:30 a.m. and 9:45 a.m.? Please support any response with data, if possible.

3. The requirement to double the Percentage Parameters between 9:30 a.m. and 9:45 a.m. for purposes of calculating the Price Bands was established in light of the higher volatility at the beginning of the trading day. Chart D in the Transmittal Letter accompanying the Eighteenth Amendment shows that the most volatile period of the trading day is between 9:30 a.m. and 9:45 a.m. Would the proposed narrower Price Bands increase the occurrence of Limit States and Trading Pauses that occur between 9:30 a.m. and 9:45 a.m.? Are there any concerns that narrowing the Price Bands between 9:30 a.m. and 9:45 a.m. as proposed in the Eighteenth Amendment would impede an orderly trading environment during this more volatile period of the trading day? Please support any response with data, if possible.

4. The Transmittal Letter provides historical analysis in Charts G and H estimating the impact of eliminating double-wide Price Bands between 9:30 a.m. and 9:45 a.m. This analysis estimates an increase in both limit states and trading pauses were the double-wide bands eliminated during the time period analyzed. The Participants state, however, that this estimated impact is theoretical in nature and that market participant behavior would adjust to narrower Price Bands at the open, ultimately resulting in fewer limit states and trading pauses than reflected in Charts G and H. Do commenters agree with the Participants that market participant behavior would change such that eliminating double-wide bands at the open would not result in an increase in limit states and trading pauses similar to what the Participants project based on Charts G and H? If the double-wide bands did in fact result in a higher incidence of trading pauses and limit states as estimated based on Charts G and H, would market participants be concerned about impacts of the Plan on trading and market quality between 9:30 a.m. and 9:45 a.m. and beyond? [55] Please support any response with data, if possible.

5. Charts G and H demonstrate a spike in actual and projected limit states and trading pauses during February 2018. This spike appears to have occurred during the volatile trading day of February 5, 2018. Are commenters concerned about the impact of narrowing double-wide bands between 9:30 a.m. and 9:45 a.m. on volatile trading days? Please support any response with data, if possible.

6. Is there a disproportionate number of Limit States and Trading Pauses that occur at or shortly after 9:45 a.m.? [56] Are these Limit States and Trading Pauses caused by the contraction of the Price Bands rather than an increase in volatility of the type the Plan is designed to prevent? Would the proposed narrower Price Bands reduce the occurrence of Limit States and Trading Pauses that presently occur at or shortly after the Price Bands contract at 9:45 a.m.?

7. Would the proposed narrower Price Bands reduce the number of clearly erroneous executions that occur between 9:30 a.m. and 9:45 a.m.?

Proposal to Narrow Bands Between 3:35 and 4:00

8. Is the proposal to amend the Plan to eliminate the doubling of Percentage Parameters of Tier 2 NMS Stocks with a Reference Price above $3.00 between 3:35 p.m. and 4:00 p.m. appropriate?

9. Alternatively, would it be preferable and appropriate to maintain the current provision that doubles the Percentage Parameters of Tier 2 NMS Stocks with a Reference Price above $3.00 between 3:45 p.m. and 4:00 p.m.? Please support any response with data, if possible.

10. The requirement to double the Percentage Parameters of Tier 2 NMS Stocks with a Reference Price above $3.00 between 3:35 p.m. and 4:00 p.m. for purposes of calculating the Price Bands was established in light of the higher volatility at the end of the trading day. Chart D shows that the volatility gradually increases as the trading day progresses towards the close of trading. Would the proposed narrower Price Bands between 3:35 p.m. and 4:00 p.m. increase the occurrence of Limit States and Trading Pauses that occur during that time period? Are there any concerns that narrowing the Price Bands between 3:35 p.m. and 4:00 p.m. as proposed would impede an orderly trading environment during this more volatile period of the trading day? Would an increase in Limit States and Trading Pauses between 3:35 p.m. and 4:00 p.m. impact negatively the primary listing exchange closing auction processes? Please support any response with data, if possible.

11. Do commenters agree with the Participants that market participant behavior would change such that eliminating double-wide bands at the close would not result in an increase in limit states and trading pauses similar to what the Participants project based on Chart K? If the double-wide bands did in fact result in a higher incidence of trading pauses and limit states as estimated based on Chart K, would market participants be concerned about impacts of the Plan on trading between 3:35 p.m. and 4:00 p.m. or the primary listing exchange closing auction processes? Please support any response with data, if possible.

12. Are commenters concerned about the impact of narrowing double-wide

[55] One academic study examined trading pauses during the SSCB Pilot and LULD Pilot and found that, on average, trading pauses increase volatility and widen bid-ask spreads. Hautsch, Nikolaus and Akos Horvath, 2018. ''How Effective Are Trading Pauses?'', *Journal of Financial Economics,* forthcoming, available at *https://www.sciencedirect.com/science/article/pii/S0304405X18302356.*

[56] Another DERA study looked at the frequency of Trading Pauses around the introduction of Limit up Limit Down and found that a disproportionate number of trading pauses occurred during the five minutes after the opening bands contracted, *i.e.* 9:45–9:50 a.m. *See* Moise, C. and P. Flaherty, 2017. ''Limit Up-Limit Down Pilot Plan and Associated Events'', SEC White Paper, available at *https://www.sec.gov/dera/staff-papers/whitepapers/10mar17moiseflahertyluld.*

bands between 3:35 p.m. and 4:00 p.m. on volatile trading days? Please support any response with data, if possible.

13. Would the proposed narrower Price Bands increase the occurrence of Limit States and Trading Pauses near the close? Is the current doubling of Percentage Parameters for such stocks near the close unwarranted? Are potential price swings of as much as 40% for such stocks inconsistent with the Plan's goal of addressing extraordinary market volatility in NMS Stocks?

Proposal To Provide Data to the Commission That Would Not Be Made Public

14. The Participants propose to provide certain data to the Commission upon request that would not be made publicly available. Should any data that is provided to the Commission also be made publicly available? Please describe any concerns with respect to making public, or not making public, the data that will be provided to the Commission.

Participant Statement Regarding Competition

15. The Participants state that Plan does not impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Exchange Act. Do commenters believe that the Plan imposes any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Exchange Act?

16. Further, would the proposal have a positive, negative, or neutral impact on competition? Please explain. How would any impact on competition from the proposal benefit or harm the national market system or the various market participants? Please describe and explain how, if at all, aspects of the national market system or different market participants would be affected. Please support any response with data, if possible.

17. More generally, to the extent possible please provide specific data, analyses, or studies for support regarding any impacts of the proposal on competition.

Comments may be submitted by any of the following methods:

Electronic Comments

- Use the Commission's internet comment form (*http://www.sec.gov/rules/sro.shtml*); or
- Send an email to *rule-comments@sec.gov.* Please include File Number 4–631 on the subject line.

Paper Comments

- Send paper comments in triplicate to Brent J. Fields, Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549–1090.

All submissions should refer to File Number 4–631.This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (*http://www.sec.gov/rules/sro.shtml*). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed plan amendment that are filed with the Commission, and all written communications relating to the amendment between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10:00 a.m. and 3:00 p.m. Copies of such filing also will be available for inspection and copying at the Participants' offices. All comments received will be posted without change. Persons submitting comments are cautioned that we do not redact or edit personal identifying information from comment submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number 4–631 and should be submitted on or before January 16, 2019.

By the Commission.

Eduardo A. Aleman,

Deputy Secretary.

Exhibit A

Proposed new language is underlined; proposed deletions are in [brackets]

PLAN TO ADDRESS EXTRAORDINARY MARKET VOLATILITY

SUBMITTED TO

THE SECURITIES AND EXCHANGE COMMISSION

PURSUANT TO RULE 608 OF REGULATION NMS

UNDER THE

SECURITIES EXCHANGE ACT OF 1934

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Preamble

The Participants submit to the SEC this Plan establishing procedures to address extraordinary volatility in NMS Stocks. The procedures provide for market-wide limit up-limit down requirements that prevent trades in individual NMS Stocks from occurring outside of the specified Price Bands. These limit up-limit down requirements are coupled with Trading Pauses to accommodate more fundamental price moves. The Plan procedures are designed, among other things, to protect investors and promote fair and orderly markets. The Participants developed this Plan pursuant to Rule 608(a)(3) of Regulation NMS under the Exchange Act, which authorizes the Participants to act jointly in preparing, filing, and implementing national market system plans.

I. Definitions

(A) ''Eligible Reported Transactions'' shall have the meaning prescribed by the Operating Committee and shall generally mean transactions that are eligible to update the last sale price of an NMS Stock.

(B) ''Exchange Act'' means the Securities Exchange Act of 1934, as amended.

(C) ''Limit State'' shall have the meaning provided in Section VI of the Plan.

(D) ''Limit State Quotation'' shall have the meaning provided in Section VI of the Plan.

(E) ''Lower Price Band'' shall have the meaning provided in Section V of the Plan.

(F) ''Market Data Plans'' shall mean the effective national market system plans through which the Participants act jointly to disseminate consolidated information in compliance with Rule 603(b) of Regulation NMS under the Exchange Act.

(G) ''National Best Bid'' and ''National Best Offer'' shall have the meaning provided in Rule 600(b)(42) of Regulation NMS under the Exchange Act.

(H) ''NMS Stock'' shall have the meaning provided in Rule 600(b)(47) of Regulation NMS under the Exchange Act.

(I) ''Opening Price'' shall mean the price of a transaction that opens trading on the Primary Listing Exchange. If the Primary Listing Exchange opens with quotations, the ''Opening Price'' shall mean the closing price of the NMS Stock on the Primary Listing Exchange on the previous trading day, or if no such closing price exists, the last sale on the Primary Listing Exchange.

(J) ''Operating Committee'' shall have the meaning provided in Section III(C) of the Plan.

(K) ''Participant'' means a party to the Plan.

(L) ''Plan'' means the plan set forth in this instrument, as amended from time to time in accordance with its provisions.

(M) ''Percentage Parameter'' shall mean the percentages for each tier of NMS Stocks set forth in Appendix A of the Plan.

(N) ''Price Bands'' shall have the meaning provided in Section V of the Plan.

(O) ''Primary Listing Exchange'' shall mean the Participant on which an NMS Stock is listed. If an NMS Stock is listed on more than one Participant, the Participant on which the NMS Stock has been listed the longest shall be the Primary Listing Exchange.

(P) ''Processor'' shall mean the single plan processor responsible for the consolidation of information for an NMS Stock pursuant to Rule 603(b) of Regulation NMS under the Exchange Act.

(Q) ''Pro-Forma Reference Price'' shall have the meaning provided in Section V(A)(2) of the Plan.

(R) ''Reference Price'' shall have the meaning provided in Section V of the Plan.

(S) ''Regular Trading Hours'' shall have the meaning provided in Rule 600(b)(64) of Regulation NMS under the Exchange Act. For purposes of the Plan, Regular Trading Hours can end earlier than 4:00 p.m. ET in the case of an early scheduled close.

(T) ''Regulatory Halt'' shall have the meaning specified in the Market Data Plans.

(U) ''Reopening Price'' shall mean the price of a transaction that reopens trading on the Primary Listing Exchange following a Trading Pause or a Regulatory Halt, or, if the Primary Listing Exchange reopens with quotations, the midpoint of those quotations.

(V) ''SEC'' shall mean the United States Securities and Exchange Commission.

(W) ''Straddle State'' shall have the meaning provided in Section VII(A)(2) of the Plan.

(X) ''Trading center'' shall have the meaning provided in Rule 600(b)(78) of Regulation NMS under the Exchange Act.

(Y) ''Trading Pause'' shall have the meaning provided in Section VII of the Plan.

(Z) ''Upper Price Band'' shall have the meaning provided in Section V of the Plan.

II. Parties

(A) List of Parties

The parties to the Plan are as follows:

(1) Cboe BZX Exchange, Inc., 400 South LaSalle Street, Chicago, Illinois 60605
(2) Cboe BYX Exchange, Inc., 400 South LaSalle Street, Chicago, Illinois 60605
(3) Cboe EDGA Exchange, Inc., 400 South LaSalle Street, Chicago, Illinois 60605
(4) Cboe EDGX Exchange, Inc., 400 South LaSalle Street, Chicago, Illinois 60605
(5) Chicago Stock Exchange, Inc., 440 South LaSalle Street, Chicago, Illinois 60605
(6) Financial Industry Regulatory Authority, Inc., 1735 K Street NW, Washington, DC 20006
(7) Investors Exchange LLC, 4 World Trade Center, 44th Floor, New York, New York 10007
(8) NASDAQ BX, Inc., One Liberty Plaza, New York, New York 10006
(9) NASDAQ PHLX LLC, 1900 Market Street, Philadelphia, Pennsylvania 19103
(10) The Nasdaq Stock Market LLC, 1 Liberty Plaza, 165 Broadway, New York, NY 10006
(11) NYSE National, Inc., 11 Wall Street, New York, NY 10005
(12) New York Stock Exchange LLC, 11 Wall Street, New York, New York 10005
(13) NYSE American LLC, 11 Wall Street, New York, New York 10005
(14) NYSE Arca, Inc., 11 Wall Street, New York, New York 10005

(B) Compliance Undertaking

By subscribing to and submitting the Plan for approval by the SEC, each Participant agrees to comply with and to enforce compliance, as required by Rule 608(c) of Regulation NMS under the Exchange Act, by its members with the provisions of the Plan. To this end, each Participant shall adopt a rule requiring compliance by its members with the provisions of the Plan, and each Participant shall take such actions as are necessary and appropriate as a participant of the Market Data Plans to cause and enable the Processor for each NMS Stock to fulfill the functions set forth in this Plan.

(C) New Participants

The Participants agree that any entity registered as a national securities exchange or national securities association under the Exchange Act may become a Participant by: (1) Becoming a participant in the applicable Market Data Plans; (2) executing a copy of the

Plan, as then in effect; (3) providing each then-current Participant with a copy of such executed Plan; and (4) effecting an amendment to the Plan as specified in Section III (B) of the Plan.

(D) Advisory Committee

(1) *Formation.* Notwithstanding other provisions of this Plan, an Advisory Committee to the Plan shall be formed and shall function in accordance with the provisions set forth in this section.

(2) *Composition.* Members of the Advisory Committee shall be selected for two-year terms as follows:

(A) *Advisory Committee Selections.* By affirmative vote of a majority of the Participants, the Participants shall select at least one representatives from each of the following categories to be members of the Advisory Committee: (1) A broker-dealer with a substantial retail investor customer base; (2) a broker-dealer with a substantial institutional investor customer base; (3) an alternative trading system; (4) a broker-dealer that primarily engages in trading for its own account; and (5) an investor.

(3) *Function.* Members of the Advisory Committee shall have the right to submit their views to the Operating Committee on Plan matters, prior to a decision by the Operating Committee on such matters. Such matters shall include, but not be limited to, proposed material amendments to the Plan.

(4) *Meetings and Information.* Members of the Advisory Committee shall have the right to attend meetings of the Operating Committee and to receive any information concerning Plan matters; provided, however, that the Operating Committee may meet in executive session if, by affirmative vote of a majority of the Participants, the Operating Committee determines that an item of Plan business requires confidential treatment.

III. Amendments to Plan

(A) General Amendments

Except with respect to the addition of new Participants to the Plan, any proposed change in, addition to, or deletion from the Plan shall be effected by means of a written amendment to the Plan that: (1) Sets forth the change, addition, or deletion; (2) is executed on behalf of each Participant; and, (3) is approved by the SEC pursuant to Rule 608 of Regulation NMS under the Exchange Act, or otherwise becomes effective under Rule 608 of Regulation NMS under the Exchange Act.

(B) New Participants

With respect to new Participants, an amendment to the Plan may be effected by the new national securities exchange or national securities association executing a copy of the Plan, as then in effect (with the only changes being the addition of the new Participant's name in Section II(A) of the Plan) and submitting such executed Plan to the SEC for approval. The amendment shall be effective when it is approved by the SEC in accordance with Rule 608 of Regulation NMS under the Exchange Act or otherwise becomes effective pursuant to Rule 608 of Regulation NMS under the Exchange Act.

(C) Operating Committee

(1) Each Participant shall select from its staff one individual to represent the Participant as a member of an Operating Committee, together with a substitute for such individual. The substitute may participate in deliberations of the Operating Committee and shall be considered a voting member thereof only in the absence of the primary representative. Each Participant shall have one vote on all matters considered by the Operating Committee. No later than the initial date of Plan operations, the Operating Committee shall designate one member of the Operating Committee to act as the Chair of the Operating Committee.

(2) The Operating Committee shall monitor the procedures established pursuant to this Plan and advise the Participants with respect to any deficiencies, problems, or recommendations as the Operating Committee may deem appropriate. The Operating Committee shall establish specifications and procedures for the implementation and operation of the Plan that are consistent with the provisions of this Plan and the Appendixes thereto. With respect to matters in this paragraph, Operating Committee decisions shall be approved by a simple majority vote.

(3) Any recommendation for an amendment to the Plan from the Operating Committee that receives an affirmative vote of at least two-thirds of the Participants, but is less than unanimous, shall be submitted to the SEC as a request for an amendment to the Plan initiated by the Commission under Rule 608 of Regulation NMS.

IV. Trading Center Policies and Procedures

All trading centers in NMS Stocks, including both those operated by Participants and those operated by members of Participants, shall establish, maintain, and enforce written policies and procedures that are reasonably designed to comply with the limit up—limit down requirements specified in Sections VI of the Plan, and to comply with the Trading Pauses specified in Section VII of the Plan.

V. Price Bands

(A) Calculation and Dissemination of Price Bands

(1) The Processor for each NMS stock shall calculate and disseminate to the public a Lower Price Band and an Upper Price Band during Regular Trading Hours for such NMS Stock. The Price Bands shall be based on a Reference Price for each NMS Stock that equals the arithmetic mean price of Eligible Reported Transactions for the NMS stock over the immediately preceding five-minute period (except for periods following openings and reopenings, which are addressed below). If no Eligible Reported Transactions for the NMS Stock have occurred over the immediately preceding five-minute period, the previous Reference Price shall remain in effect. The Price Bands for an NMS Stock shall be calculated by applying the Percentage Parameter for such NMS Stock to the Reference Price, with the Lower Price Band being a Percentage Parameter below the Reference Price, and the Upper Price Band being a Percentage Parameter above the Reference Price. The Price Bands shall be calculated during Regular Trading Hours. Between [9:30 a.m. and 9:45 a.m. ET, and]3:35 p.m. and 4:00 p.m. ET, or in the case of an early scheduled close, during the last 25 minutes of trading before the early scheduled close, the Price Bands shall be calculated by applying double the Percentage Parameters set forth in Appendix A <u>for (i) all Tier 1 NMS Stocks and (ii) Tier 2 NMS Stocks priced equal to or below $3.00</u>. If the Processor has not yet disseminated Price Bands, but a Reference Price is available, a trading center may calculate and apply Price Bands based on the same Reference Price that the Processor would use for calculating such Price Bands until such trading center receives Price Bands from the Processor. If, under Section VII(B)(2), the Primary Listing Exchange notifies the Processor that it is unable to reopen an NMS Stock due to a systems or technology issue and it has not declared a Regulatory Halt, the Processor will calculate and disseminate Price Bands by applying triple the Percentage Parameters set forth in Appendix A for the first 30 seconds such Price Bands are disseminated.

(2) The Processor shall calculate a Pro-Forma Reference Price on a continuous basis during Regular Trading Hours, as specified in Section V(A)(1) of the Plan. If a Pro-Forma Reference Price has not moved by 1% or more from the Reference Price currently in effect, no new Price Bands shall be disseminated, and the current Reference Price shall remain the effective Reference Price. When the Pro-Forma Reference Price has moved by 1% or more from the Reference Price currently in effect, the Pro-Forma Reference Price shall become the Reference Price, and the Processor shall disseminate new Price Bands based on the new Reference Price; provided, however, that each new Reference Price shall remain in effect for at least 30 seconds.

(B) Openings

(1) Except when a Regulatory Halt is in effect at the start of Regular Trading Hours, the first Reference Price for a trading day shall be the Opening Price on the Primary Listing Exchange in an NMS Stock if such Opening Price occurs less than five minutes after the start of Regular Trading Hours. During the period less than five minutes after the Opening Price, a Pro-Forma Reference Price shall be updated on a continuous basis to be the arithmetic mean price of Eligible Reported Transactions for the NMS Stock during the period following the Opening Price (including the Opening Price), and if it differs from the current Reference Price by 1% or more shall become the new Reference Price, except that a new Reference Price shall remain in effect for at least 30 seconds. Subsequent Reference Prices shall be calculated as specified in Section V(A) of the Plan.

(2) If the Opening Price on the Primary Listing Exchange in an NMS Stock does not occur within five minutes after the start of Regular Trading Hours, the first Reference Price for a trading day shall be the arithmetic mean price of Eligible Reported Transactions for the NMS Stock over the preceding five minute time period, and subsequent Reference Prices shall be calculated as specified in Section V(A) of the Plan.

(C) Reopenings

(1) Following a Trading Pause in an NMS Stock, and if the Primary Listing Exchange has not declared a Regulatory Halt, if the Primary Listing Exchange reopens trading with a transaction or quotation that does not include a zero bid or zero offer, the next Reference Price shall be the Reopening Price on the Primary Listing Exchange. Subsequent Reference Prices shall be determined in the manner prescribed for normal openings, as specified in Section V(B)(1) of the Plan. If the Primary Listing Exchange notifies the Processor that it is unable to reopen an NMS Stock due to a systems or technology issue, or if the Primary Listing Exchange reopens trading with a quotation that has a zero bid or zero offer, or both, the next Reference Price shall be the last effective Price Band that was in a Limit State before the Trading Pause. Subsequent Reference Prices shall be calculated as specified in Section V(A) of the Plan.

(2) Following a Regulatory Halt, the next Reference Price shall be the Opening or Reopening Price on the Primary Listing Exchange if such Opening or Reopening Price occurs within five minutes after the end of the Regulatory Halt, and subsequent Reference Prices shall be determined in the manner prescribed for normal openings, as specified in Section V(B)(1) of the Plan. If such Opening or Reopening Price has not occurred within five minutes after the end of the Regulatory Halt, the Reference Price shall be equal to the arithmetic mean price of Eligible Reported Transactions for the NMS Stock over the preceding five minute time period, and subsequent Reference Prices shall be calculated as specified in Section V(A) of the Plan.

VI. Limit Up-Limit Down Requirements

(A) Limitations on Trades and Quotations Outside of Price Bands

(1) All trading centers in NMS Stocks, including both those operated by Participants and those operated by members of Participants, shall establish, maintain, and enforce written policies and procedures that are reasonably designed to prevent trades at prices that are below the Lower Price Band or above the Upper Price Band for an NMS Stock. Single-priced opening, reopening, and closing transactions on the Primary Listing Exchange, however, shall be excluded from this limitation. In addition, any transaction that both (i) does not update the last sale price (except if solely because the transaction was reported late or because the transaction was an odd-lot sized transaction), and (ii) is excepted or exempt from Rule 611 under Regulation NMS shall be excluded from this limitation.

(2) When a National Best Bid is below the Lower Price Band or a National Best Offer is above the Upper Price Band for an NMS Stock, the Processor shall disseminate such National Best Bid or National Best Offer with an appropriate flag identifying it as non-executable.

When a National Best Offer is equal to the Lower Price Band or a National Best Bid is equal to the Upper Price Band for an NMS Stock, the Processor shall distribute such National Best Bid or National Best Offer with an appropriate flag identifying it as a ''Limit State Quotation''.

(3) All trading centers in NMS Stocks, including both those operated by Participants and those operated by members of Participants, shall establish, maintain, and enforce written policies and procedures that are reasonably designed to prevent the display of offers below the Lower Price Band and bids above the Upper Price Band for an NMS Stock. The Processor shall disseminate an offer below the Lower Price Band or bid above the Upper Price Band that may be submitted despite such reasonable policies and procedures, but with an appropriate flag identifying it as non-executable; provided, however, that any such bid or offer shall not be included in National Best Bid or National Best Offer calculations.

(B) Entering and Exiting a Limit State

(1) All trading for an NMS Stock shall immediately enter a Limit State if the National Best Offer equals the Lower Price Band and does not cross the National Best Bid, or the National Best Bid equals the Upper Price Band and does not cross the National Best Offer.

(2) When trading for an NMS Stock enters a Limit State, the Processor shall disseminate this information by identifying the relevant quotation (*i.e.,* a National Best Offer that equals the Lower Price Band or a National Best Bid that equals the Upper Price Band) as a Limit State Quotation. At this point, the Processor shall cease calculating and disseminating updated Reference Prices and Price Bands for the NMS Stock until either trading exits the Limit State or trading resumes with an opening or re-opening as provided in Section V.

(3) Trading for an NMS Stock shall exit a Limit State if, within 15 seconds of entering the Limit State, the entire size of all Limit State Quotations are executed or cancelled.

(4) If trading for an NMS Stock exits a Limit State within 15 seconds of entry, the Processor shall immediately calculate and disseminate updated Price Bands based on a Reference Price that equals the arithmetic mean price of Eligible Reported Transactions for the NMS Stock over the immediately preceding five-minute period (including the period of the Limit State).

(5) If trading for an NMS Stock does not exit a Limit State within 15 seconds of entry, the Limit State will terminate when the Primary Listing Exchange declares a Trading Pause pursuant to Section VII of the Plan or at the end of Regular Trading Hours.

VII. Trading Pauses

(A) Declaration of Trading Pauses

(1) If trading for an NMS Stock does not exit a Limit State within 15 seconds of entry during Regular Trading Hours, then the Primary Listing Exchange shall declare a Trading Pause for such NMS Stock and shall notify the Processor.

(2) The Primary Listing Exchange may also declare a Trading Pause for an NMS Stock when an NMS Stock is in a Straddle State, which is when National Best Bid (Offer) is below (above) the Lower (Upper) Price Band and the NMS Stock is not in a Limit State, and trading in that NMS Stock deviates from normal trading characteristics such that declaring a Trading Pause would support the Plan's goal to address extraordinary market volatility. The Primary Listing Exchange shall develop policies and procedures for determining when it would declare a Trading Pause in such circumstances. If a Trading Pause is declared for an NMS Stock under this provision, the Primary Listing Exchange shall notify the Processor.

(3) The Processor shall disseminate Trading Pause information to the public. No trades in an NMS Stock shall occur during a Trading Pause, but all bids and offers may be displayed.

(B) Reopening of Trading During Regular Trading Hours

(1) Five minutes after declaring a Trading Pause for an NMS Stock, and if the Primary Listing Exchange has not declared a Regulatory Halt, the Primary Listing Exchange shall attempt to reopen trading using its established reopening procedures. The Processor will publish the following information that the Primary Listing Exchange provides to the Processor in connection with such reopening: Auction reference price; auction collars; and number of extensions to the reopening auction. The Trading Pause shall end when the Primary Listing Exchange reports a Reopening Price.

(2) The Primary Listing Exchange shall notify the Processor if it is unable to reopen trading in an NMS Stock due to a systems or technology issue and if it has not declared a Regulatory Halt. The Processor shall disseminate this information to the public.

(3) Trading centers may not resume trading in an NMS Stock following a Trading Pause without Price Bands in such NMS Stock.

(4) The Processor shall update the Price Bands as set forth in Section V(C)(1)–(2) of the Plan after receiving notification from the Primary Listing Exchange of a Reopening Price following a Trading Pause (or a resume message in the case of a reopening quote that has a zero bid or zero offer, or both) or that it is unable to reopen trading following a Trading Pause due to a systems or technology issue, provided that if the Primary Listing Exchange is unable to reopen due to a systems or technology issue, the update to the Price Bands will be no earlier than ten minutes after the beginning of the Trading Pause.

(C) Trading Pauses Within Ten Minutes of the End of Regular Trading Hours

(1) If an NMS Stock is in a Trading Pause during the last ten minutes of trading before the end of Regular Trading Hours, the Primary Listing Exchange shall not reopen trading and shall attempt to execute a closing transaction using its established closing procedures. All trading centers may begin trading the NMS Stock when the Primary Listing Exchange executes a closing transaction.

(2) If the Primary Listing Exchange does not execute a closing transaction within five minutes after the end of Regular Trading Hours, all trading centers may begin trading the NMS Stock.

VIII. Implementation

IX. Withdrawal From Plan

If a Participant obtains SEC approval to withdraw from the Plan, such Participant may withdraw from the Plan at any time on not less than 30 days' prior written notice to each of the other Participants. At such time, the withdrawing Participant shall have no further rights or obligations under the Plan.

X. Counterparts and Signatures

The Plan may be executed in any number of counterparts, no one of which need contain all signatures of all Participants, and as many of such counterparts as shall together contain all such signatures shall constitute one and the same instrument.

The initial date of Plan operations shall be April 8, 2013.

[The Plan shall be implemented on a pilot basis set to end on April 15, 2019.]

IN WITNESS THEREOF, this Plan has been executed as of the __ day of [July]November 2018 by each of the parties hereto.

Cboe BZX EXCHANGE, INC.

BY:_____

Cboe BYX EXCHANGE, INC.

BY:_____

Cboe EDGA EXCHANGE, INC.

BY:_____

Cboe EDGX EXCHANGE, INC.

BY:_____

CHICAGO STOCK EXCHANGE, INC.

BY:_____

FINANCIAL INDUSTRY REGULATORY AUTHORITY, INC.

BY:_____

INVESTORS EXCHANGE LLC

BY:_____

NASDAQ BX, Inc.

BY:_____

NASDAQ PHLX LLC

BY:_____

THE NASDAQ STOCK MARKET LLC

BY:_____

NYSE NATIONAL, INC.

BY:_____

NEW YORK STOCK EXCHANGE LLC

BY:_____

NYSE American LLC

BY:_____

NYSE ARCA, INC.

BY:_____

Appendix A—Percentage Parameters

I. Tier 1 NMS Stocks

(2) The Percentage Parameters for Tier 1 NMS Stocks with a Reference Price more than $3.00 shall be 5%.

(3) The Percentage Parameters for Tier 1 NMS Stocks with a Reference Price equal to $0.75 and up to and including $3.00 shall be 20%.

(4) The Percentage Parameters for Tier 1 NMS Stocks with a Reference Price less than $0.75 shall be the lesser of (a) $0.15 or (b) 75%.

(5) The Reference Price used for determining which Percentage Parameter shall be applicable during a trading day shall be based on the closing price of the NMS Stock on the Primary Listing Exchange on the previous trading day, or if no closing price exists, the last sale on the Primary Listing Exchange reported by the Processor.

(1) Tier 1 NMS Stocks shall include all NMS Stocks included in the S&P 500 Index[,] and the Russell 1000 Index, and the exchange-traded products ("ETP") identified as Schedule 1 to this Appendix. Schedule 1 to the Appendix will be reviewed and updated semi-annually based on the fiscal year by the Primary Listing Exchange to add ETPs that meet the criteria, or delete ETPs that are no longer eligible. To determine eligibility for an ETP to be included as a Tier 1 NMS Stock, all ETPs across multiple asset classes and issuers, including domestic equity, international equity, fixed income, currency, and commodities and futures will be identified. Leveraged ETPs will be excluded and the list will be sorted by notional consolidated average daily volume ("CADV"). The period used to measure CADV will be from the first day of the previous fiscal half year up until one week before the beginning of the next fiscal half year. Daily volumes will be multiplied by closing prices and then averaged over the period. ETPs, including inverse ETPs, that trade over $2,000,000 CADV will be eligible to be included as a Tier 1 NMS Stock. The semi-annual updates to Schedule 1 do not require an amendment to the Plan. The Primary Listing Exchanges will maintain the updated Schedule 1 on their respective websites.

II. Tier 2 NMS Stocks

(1) Tier 2 NMS Stocks shall include all NMS Stocks other than those in Tier 1, provided, however, that all rights and warrants are excluded from the Plan.

(2) The Percentage Parameters for Tier 2 NMS Stocks with a Reference Price more than $3.00 shall be **10**%.

(3) The Percentage Parameters for Tier 2 NMS Stocks with a Reference Price equal to $0.75 and up to and including $3.00 shall be 20%.

(4) The Percentage Parameters for Tier 2 NMS Stocks with a Reference Price less than $0.75 shall be the lesser of (a) $0.15 or (b) 75%.

(5) Notwithstanding the foregoing, the Percentage Parameters for a Tier 2 NMS Stock that is a leveraged ETP shall be the applicable Percentage Parameter set forth in clauses (2), (3), or (4) above, multiplied by the leverage ratio of such product.

(6) The Reference Price used for determining which Percentage Parameter shall be applicable during a trading day shall be based on the closing price of the NMS Stock on the Primary Listing Exchange on the previous trading day, or if no closing price exists, the last sale on the Primary Listing Exchange reported by the Processor.

Appendix A—Schedule 1
(as of July 2, 2018)

Ticker	ETP name	Exchange
SPY	SPDR S&P 500 ETF Trust	NYSE Arca.
QQQ	Invesco QQQ Trust	NASDAQ.
IWM	iShares Russell 2000 ETF	NYSE Arca.
EEM	iShares MSCI Emerging Markets ETF	NYSE Arca.
EFA	iShares MSCI EAFE ETF	NYSE Arca.
XLF	Financial Select Sector SPDR Fund	NYSE Arca.
VXX	iPath S&P 500 VIX Short-Term Futures ETN Class A	NYSE Arca.
DIA	SPDR Dow Jones Industrial Average ETF Trust	NYSE Arca.
HYG	iShares iBoxx $ High Yield Corporate Bond ETF	NYSE Arca.
IVV	iShares Core S&P 500 ETF	NYSE Arca.
XLE	Energy Select Sector SPDR Fund	NYSE Arca.
FXI	iShares China Large-Cap ETF	NYSE Arca.
TLT	iShares 20+ Year Treasury Bond ETF	NASDAQ.
XLI	Industrial Select Sector SPDR Fund	NYSE Arca.
XLK	Technology Select Sector SPDR Fund	NYSE Arca.
GLD	SPDR Gold Trust	NYSE Arca.
EWZ	iShares MSCI Brazil ETF	NYSE Arca.
XLU	Utilities Select Sector SPDR Fund	NYSE Arca.
GDX	VanEck Vectors Gold Miners ETF	NYSE Arca.
XLP	Consumer Staples Select Sector SPDR Fund	NYSE Arca.
XLV	Health Care Select Sector SPDR Fund	NYSE Arca.
VOO	Vanguard S&P 500 ETF	NYSE Arca.
LQD	iShares iBoxx $ Investment Grade Corporate Bond ETF	NYSE Arca.
XOP	SPDR S&P Oil & Gas Exploration & Production ETF	NYSE Arca.

Ticker	ETP name	Exchange
IEMG	iShares Core MSCI Emerging Markets ETF	NYSE Arca.
IYR	iShares U.S. Real Estate ETF	NYSE Arca.
VWO	Vanguard FTSE Emerging Markets ETF	NYSE Arca.
XLY	Consumer Discretionary Select Sector SPDR Fund	NYSE Arca.
SMH	VanEck Vectors Semiconductor ETF	NYSE Arca.
EWJ	iShares MSCI Japan ETF	NYSE Arca.
IEFA	iShares Core MSCI EAFE ETF	Cboe BZX.
JNK	SPDR Bloomberg Barclays High Yield Bond ETF	NYSE Arca.
VNQ	Vanguard Real Estate ETF	NYSE Arca.
XBI	SPDR S&P BIOTECH ETF	NYSE Arca.
VEA	Vanguard FTSE Developed Markets ETF	NYSE Arca.
AGG	iShares Core U.S. Aggregate Bond ETF	NYSE Arca.
MDY	SPDR S&P Midcap 400 ETF Trust	NYSE Arca.
XLB	Materials Select Sector SPDR Fund	NYSE Arca.
GDXJ	VanEck Vectors Junior Gold Miners ETF	NYSE Arca.
KRE	SPDR S&P Regional Banking ETF	NYSE Arca.
VTI	Vanguard Total Stock Market ETF	NYSE Arca.
SVXY	ProShares Short VIX Short-Term Futures ETF	NYSE Arca.
EMB	iShares JP Morgan USD Emerging Markets Bond ETF	NASDAQ.
EZU	iShares MSCI Eurozone ETF	Cboe BZX.
IEF	iShares 7–10 Year Treasury Bond ETF	NASDAQ.
IBB	iShares NASDAQ. Biotechnology ETF	NASDAQ.
VGK	Vanguard FTSE Europe ETF	NYSE Arca.
IJR	iShares Core S&P Small Cap ETF	NYSE Arca.
IWF	iShares Russell 1000 Growth ETF	NYSE Arca.
USO	United States Oil Fund LP	NYSE Arca.
IWD	iShares Russell 1000 Value ETF	NYSE Arca.
IJH	iShares Core S&P Mid-Cap ETF	NYSE Arca.
XRT	SPDR S&P Retail ETF	NYSE Arca.
EWY	iShares MSCI South Korea ETF	NYSE Arca.
MCHI	iShares MSCI China ETF	NASDAQ.
OIH	VanEck Vectors Oil Services ETF	NYSE Arca.
RSX	VanEck Vectors Russia ETF	NYSE Arca.
EWT	iShares MSCI Taiwan ETF	NYSE Arca.
EWW	iShares MSCI Mexico ETF	NYSE Arca.
BND	Vanguard Total Bond Market ETF	NYSE Arca.
IWB	iShares Russell 1000 ETF	NYSE Arca.
VTV	Vanguard Value ETF	NYSE Arca.
ACWI	iShares MSCI ACWI ETF	NASDAQ.
AMLP	Alerian MLP ETF	NYSE Arca.
DXJ	WisdomTree Japan Hedged Equity Fund	NYSE Arca.
IAU	iShares Gold Trust	NYSE Arca.
TIP	iShares TIPS Bond ETF	NYSE Arca.
FEZ	SPDR EURO STOXX 50 ETF	NYSE Arca.
SHV	iShares Short Treasury Bond ETF	NASDAQ.
SHY	iShares 1–3 Year Treasury Bond ETF	NASDAQ.
EWG	iShares MSCI Germany ETF	NYSE Arca.
BSV	Vanguard Short-Term Bond ETF	NYSE Arca.
VEU	Vanguard FTSE All-World ex-US Index Fund	NYSE Arca.
VUG	Vanguard Growth ETF	NYSE Arca.
IVE	iShares S&P 500 Value ETF	NYSE Arca.
INDA	iShares MSCI India ETF	Cboe BZX.
SH	ProShares Short S&P 500	NYSE Arca.
EWH	iShares MSCI Hong Kong ETF	NYSE Arca.
SLV	iShares Silver Trust	NYSE Arca.
IVW	iShares S&P 500 Growth ETF	NYSE Arca.
VCSH	Vanguard Short-Term Corporate Bond ETF	NASDAQ.
ITB	iShares U.S. Home Construction ETF	Cboe BZX.
IWN	iShares Russell 2000 Value ETF	NYSE Arca.
SOXX	iShares PHLX Semiconductor ETF	NASDAQ.
KBE	SPDR S&P Bank ETF	NYSE Arca.
VGT	Vanguard Information Technology ETF	NYSE Arca.
IWO	iShares Russell 2000 Growth ETF	NYSE Arca.
MTUM	iShares Edge MSCI USA Momentum Factor ETF	Cboe BZX.
XHB	SPDR S&P Homebuilders ETF	NYSE Arca.
XME	SPDR S&P Metals & Mining ETF	NYSE Arca.
XLRE	Real Estate Select Sector SPDR Fund	NYSE Arca.
VCIT	Vanguard Intermediate-Term Corporate Bond ETF	NASDAQ.
VT	Vanguard Total World Stock ETF	NYSE Arca.
USMV	iShares Edge MSCI Min Vol USA ETF	Cboe BZX.
BKLN	Invesco Senior Loan ETF	NYSE Arca.
EWC	iShares MSCI Canada ETF	NYSE Arca.
PFF	iShares U.S. Preferred Stock ETF	NASDAQ.
FLOT	iShares Floating Rate Bond ETF	Cboe BZX.

Ticker	ETP name	Exchange
BIL	SPDR Bloomberg Barclays 1–3 Month T-Bill ETF	NYSE Arca.
OEF	iShares S&P 100 ETF	NYSE Arca.
UNG	United States Natural Gas Fund LP	NYSE Arca.
VB	Vanguard Small-Cap ETF	NYSE Arca.
MINT	PIMCO Enhanced Short Maturity Active ETF	NYSE Arca.
SPLV	Invesco S&P 500 Low Volatility ETF	NYSE Arca.
VIG	Vanguard Dividend Appreciation ETF	NYSE Arca.
HEDJ	WisdomTree Europe Hedged Equity Fund	NYSE Arca.
SCZ	iShares MSCI EAFE Small-Cap ETF	NASDAQ.
EWU	iShares MSCI United Kingdom ETF	NYSE Arca.
VYM	Vanguard High Dividend Yield Yield Index Fund	NYSE Arca.
SCHF	Schwab International Equity ETF	NYSE Arca.
AAXJ	iShares MSCI All Country Asia ex Japan ETF	NASDAQ.
FDN	First Trust Dow Jones Internet Index Fund	NYSE Arca.
EMLC	VanEck Vectors J.P. Morgan EM Local Currency Bond ETF	NYSE Arca.
VIXY	ProShares VIX Short-Term Futures ETF	NYSE Arca.
BNDX	Vanguard Total International Bond ETF	NASDAQ.
MUB	iShares National Muni Bond ETF	NYSE Arca.
DVY	iShares Select Dividend ETF	NASDAQ.
ITA	iShares U.S. Aerospace & Defense ETF	Cboe BZX.
AMJ	J.P. Morgan Alerian MLP Index ETN	NYSE Arca.
MBB	iShares MBS ETF	NASDAQ.
RSP	Invesco S&P 500 Equal Weight ETF	NYSE Arca.
ITOT	iShares Core S&P Total U.S. Stock Market ETF	NYSE Arca.
SJNK	SPDR Bloomberg Barclays Short Term High Yield Bond ETF	NYSE Arca.
BIV	Vanguard Intermediate-Term Bond ETF	NYSE Arca.
ILF	iShares Latin America 40 ETF	NYSE Arca.
CWB	SPDR Bloomberg Barclays Convertible Securities ETF	NYSE Arca.
VO	Vanguard Mid-Cap ETF	NYSE Arca.
IWV	iShares Russell 3000 ETF	NYSE Arca.
CSJ	iShares 1–3 Year Credit Bond ETF	NASDAQ.
SCHX	Schwab U.S. Large-Cap ETF	NYSE Arca.
IEI	iShares 3–7 Year Treasury Bond ETF	NASDAQ.
SCHB	Schwab U.S. Broad Market ETF	NYSE Arca.
PCY	Invesco Emerging Markets Sovereign Debt ETF	NYSE Arca.
DBC	Invesco DB Commodity Index Tracking Fund	NYSE Arca.
EPI	WisdomTree India Earnings Fund	NYSE Arca.
SDY	SPDR S&P Dividend ETF	NYSE Arca.
VFH	Vanguard Financials ETF	NYSE Arca.
SCHD	Schwab US Dividend Equity ETF	NYSE Arca.
PSQ	ProShares Short QQQ	NYSE Arca.
HYS	PIMCO 0–5 Year High Yield Corporate Bond Index ETF	NYSE Arca.
VXUS	Vanguard Total International Stock ETF	NASDAQ.
EWA	iShares MSCI Australia ETF	NYSE Arca.
VV	Vanguard Large-Cap ETF	NYSE Arca.
IYT	iShares Transportation Average ETF	Cboe BZX.
EUFN	iShares MSCI Europe Financials ETF	NASDAQ.
IYW	iShares U.S. Technology ETF	NYSE Arca.
EWI	iShares MSCI Italy ETF	NYSE Arca.
FXE	Invesco CurrencyShares Euro Trust	NYSE Arca.
IWS	iShares Russell Mid-Cap Value ETF	NYSE Arca.
IYF	iShares U.S. Financials ETF	NYSE Arca.
DBEF	Xtrackers MSCI EAFE Hedged Equity ETF	NYSE Arca.
EFV	iShares MSCI EAFE Value ETF	Cboe BZX.
IWR	iShares Russell Midcap ETF	NYSE Arca.
BOTZ	Global X Robotics & Artificial Intelligence ETF	NASDAQ.
IGV	iShares North American Tech-Software ETF	Cboe BZX.
VBR	Vanguard Small Cap Value ETF	NYSE Arca.
KWEB	KraneShares CSI China Internet ETF	NYSE Arca.
NEAR	iShares Short Maturity Bond ETF	Cboe BZX.
IXUS	iShares Core MSCI Total International Stock ETF	NASDAQ.
IWP	iShares Russell Mid-Cap Growth ETF	NYSE Arca.
GOVT	iShares U.S. Treasury Bond ETF	Cboe BZX.
CIU	iShares Intermediate Credit Bond ETF	NASDAQ.
EWM	iShares MSCI Malaysia ETF	NYSE Arca.
EFAV	iShares Edge MSCI Min Vol EAFE ETF	Cboe BZX.
EWP	iShares MSCI Spain ETF	NYSE Arca.
HDV	iShares Core High Dividend ETF	NYSE Arca.
SCHP	Schwab US TIPS ETF	NYSE Arca.
SHYG	iShares 0–5 Year High Yield Corporate Bond ETF	NYSE Arca.
EZA	iShares MSCI South Africa ETF	NYSE Arca.
IEV	iShares Europe ETF	NYSE Arca.
EWQ	iShares MSCI France ETF	NYSE Arca.
EWL	iShares MSCI Switzerland ETF	NYSE Arca.

Ticker	ETP name	Exchange
ASHR	Xtrackers Harvest CSI 300 China A-Shares ETF	NYSE Arca.
SCHE	Schwab Emerging Markets Equity ETF	NYSE Arca.
VTIP	Vanguard Short-Term Inflation-Protected Securities ETF	NASDAQ.
VMBS	Vanguard Mortgage-Backed Securities ETF	NASDAQ.
VOE	Vanguard Mid-Cap Value ETF	NYSE Arca.
ACWX	iShares MSCI ACWI ex U.S. ETF	NASDAQ.
QUAL	iShares Edge MSCI USA Quality Factor ETF	Cboe BZX.
HEWJ	iShares Currency Hedged MSCI Japan ETF	NYSE Arca.
VDE	Vanguard Energy ETF	NYSE Arca.
EIDO	iShares MSCI Indonesia ETF	NYSE Arca.
IJK	iShares S&P Mid-Cap 400 Growth ETF	NYSE Arca.
KBWB	Invesco KBW Bank ETF	NASDAQ.
HEZU	iShares Currency Hedged MSCI Eurozone ETF	NYSE Arca.
VHT	Vanguard Health Care ETF	NYSE Arca.
VXF	Vanguard Extended Market ETF	NYSE Arca.
VLUE	iShares Edge MSCI USA Value Factor ETF	Cboe BZX.
HEFA	iShares Currency Hedged MSCI EAFE ETF	Cboe BZX.
SPIB	SPDR Portfolio Intermediate Term Corporate Bond ETF	NYSE Arca.
UUP	Invesco DB US Dollar Index Bullish Fund	NYSE Arca.
SRLN	SPDR Blackstone/GSO Senior Loan ETF	NYSE Arca.
VNQI	Vanguard Global ex-U.S. Real Estate ETF	NASDAQ.
SCHA	Schwab U.S. Small-Cap ETF	NYSE Arca.
SPYG	SPDR Portfolio S&P 500 Growth ETF	NYSE Arca.
SCHH	Schwab U.S. REIT ETF	NYSE Arca.
SCHG	Schwab U.S. Large-Cap Growth ETF	NYSE Arca.
PGX	Invesco Preferred ETF	NYSE Arca.
FLRN	SPDR Bloomberg Barclays Investment Grade Floating Rate ETF	NYSE Arca.
VPL	Vanguard FTSE Pacific ETF	NYSE Arca.
VTEB	Vanguard Tax-Exempt Bond ETF	NYSE Arca.
FTSM	First Trust Enhanced Short Maturity ETF	NASDAQ.
FTEC	Fidelity MSCI Information Technology Index ETF	NYSE Arca.
SPSB	SPDR Portfolio Short Term Corporate Bond ETF	NYSE Arca.
EPP	iShares MSCI Pacific ex-Japan ETF	NYSE Arca.
DOG	ProShares Short Dow30	NYSE Arca.
EEMV	iShares Edge MSCI Min Vol Emerging Markets ETF	Cboe BZX.
IUSG	iShares Core S&P U.S. Growth ETF	NASDAQ.
VSS	Vanguard FTSE All-World ex-US Small-Cap ETF	NYSE Arca.
BWX	SPDR Bloomberg Barclays International Treasury Bond ETF	NYSE Arca.
TFI	SPDR Nuveen Bloomberg Barclays Municipal Bond ETF	NYSE Arca.
SHM	SPDR Nuveen Bloomberg Barclays Short Term Municipal Bond ETF	NYSE Arca.
IJS	iShares S&P Small-Cap 600 Value ETF	NYSE Arca.
ROBO	ROBO Global Robotics and Automation Index ETF	NYSE Arca.
EWS	iShares MSCI Singapore ETF	NYSE Arca.
VBK	Vanguard Small-Cap Growth ETF	NYSE Arca.
RWX	SPDR Dow Jones International Real Estate ETF	NYSE Arca.
DGRO	iShares Core Dividend Growth ETF	NYSE Arca.
IYE	iShares U.S. Energy ETF	NYSE Arca.
IJT	iShares S&P Small-Cap 600 Growth ETF	NASDAQ.
IDV	iShares International Select Dividend ETF	Cboe BZX.
HYLB	Xtrackers USD High Yield Corporate Bond ETF	NYSE Arca.
JUST	Goldman Sachs JUST U.S. Large Cap Equity ETF	NYSE Arca.
EFG	iShares MSCI EAFE Growth ETF	Cboe BZX.
MJ	ETFMG Alternative Harvest ETF	NYSE Arca.
SPHD	Invesco S&P 500 High Dividend Low Volatility ETF	NYSE Arca.
THD	iShares MSCI Thailand ETF	NYSE Arca.
IHI	iShares U.S. Medical Devices ETF	NYSE Arca.
SCHZ	Schwab US Aggregate Bond ETF	NYSE Arca.
VPU	Vanguard Utilities ETF	NYSE Arca.
SPAB	SPDR Portfolio Aggregate Bond ETF	NYSE Arca.
HYD	VanEck Vectors High-Yield Municipal Index ETF	NYSE Arca.
SPTM	SPDR Portfolio Total Stock Market ETF	NYSE Arca.
NOBL	ProShares S&P 500 Dividend Aristocrats ETF	Cboe BZX.
MGK	Vanguard Mega Cap Growth ETF	NYSE Arca.
ECH	iShares MSCI Chile ETF	Cboe BZX.
SCHO	Schwab Short-Term US Treasury ETF	NYSE Arca.
VCLT	Vanguard Long-Term Corporate Bond ETF	NASDAQ.
RWR	SPDR Dow Jones REIT ETF	NYSE Arca.
VIS	Vanguard Industrials ETF	NYSE Arca.
DBEU	Xtrackers MSCI Europe Hedged Equity ETF	NYSE Arca.
IUSV	iShares Core S&P US Value ETF	NASDAQ.
VAW	Vanguard Materials ETF	NYSE Arca.
VGSH	Vanguard Short-Term Treasury ETF	NASDAQ.
DBJP	Xtrackers MSCI Japan Hedged Equity ETF	NYSE Arca.
VDC	Vanguard Consumer Staples ETF	NYSE Arca.

Ticker	ETP name	Exchange
BLV	Vanguard Long-Term Bond ETF	NYSE Arca.
SPYV	SPDR Portfolio S&P 500 Value ETF	NYSE Arca.
SPDW	SPDR Portfolio Developed World ex-US ETF	NYSE Arca.
VOT	Vanguard Mid-Cap Growth ETF	NYSE Arca.
PDBC	Invesco Optimum Yield Diversified Commodity Strategy K–1 ETF	NASDAQ.
SCHR	Schwab Intermediate-Term US Treasury ETF	NYSE Arca.
FPE	First Trust Preferred Securities & Income ETF	NYSE Arca.
ERUS	iShares MSCI Russia ETF	NYSE Arca.
IYG	iShares US Financial Services ETF	NYSE Arca.
LIT	Global X Lithium & Battery Tech ETF	NYSE Arca.
IEUR	iShares Core MSCI Europe ETF	NYSE Arca.
SCHM	Schwab U.S. Mid-Cap ETF	NYSE Arca.
PRF	Invesco FTSE RAFI US 1000 ETF	NYSE Arca.
SPEM	SPDR Portfolio Emerging Markets ETF	NYSE Arca.
SCHV	Schwab U.S. Large-Cap Value ETF	NYSE Arca.
QTEC	First Trust NASDAQ–100 Technology Sector Index Fund	NASDAQ.
VCR	Vanguard Consumer Discretionary ETF	NYSE Arca.
TOTL	SPDR DoubleLine Total Return Tactical ETF	NYSE Arca.
FXY	Invesco CurrencyShares Japanese Yen Trust	NYSE Arca.
FVD	First Trust Value Line Dividend Index Fund	NYSE Arca.
TUR	iShares MSCI Turkey ETF	NASDAQ.
GSY	Invesco Ultra Short Duration ETF	NYSE Arca.
ARKK	ARK Innovation ETF	NYSE Arca.
RPG	Invesco S&P 500 Pure Growth ETF	NYSE Arca.
IYM	iShares U.S. Basic Materials ETF	NYSE Arca.
PHB	Invesco Fundamental High Yield Corporate Bond ETF	NYSE Arca.
ISTB	iShares Core 1–5 Year USD Bond ETF	NASDAQ.
EMLP	First Trust North American Energy Infrastructure Fund	NYSE Arca.
ACWV	iShares Edge MSCI Min Vol Global ETF	Cboe BZX.
SPLG	SPDR Portfolio Large Cap ETF	NYSE Arca.
RWO	SPDR Dow Jones Global Real Estate ETF	NYSE Arca.
SKYY	First Trust Cloud Computing ETF	NASDAQ.
ICF	iShares Cohen & Steers REIT ETF	Cboe BZX.
IYH	iShares U.S. Healthcare ETF	NYSE Arca.
IXC	iShares Global Energy ETF	NYSE Arca.
ANGL	VanEck Vectors Fallen Angel High Yield Bond ETF	NYSE Arca.
XES	SPDR S&P Oil & Gas Equipment & Services ETF	NYSE Arca.
RWM	ProShares Short Russell2000	NYSE Arca.
DBO	Invesco DB Oil Fund	NYSE Arca.
IJJ	iShares S&P Mid-Cap 400 Value ETF	NYSE Arca.
DBA	Invesco DB Agriculture Fund	NYSE Arca.
TBF	Proshares Short 20+ Year Treasury	NYSE Arca.
GSLC	Goldman Sachs ActiveBeta U.S. Large Cap Equity ETF	NYSE Arca.
FNCL	Fidelity MSCI Financials Index ETF	NYSE Arca.
IGF	iShares Global Infrastructure ETF	NASDAQ.
FNDX	Schwab Fundamental US Large Co. Index ETF	NYSE Arca.
REM	iShares Mortgage Real Estate ETF	Cboe BZX.
KIE	SPDR S&P Insurance ETF	NYSE Arca.
ONEQ	Fidelity NASDAQ Composite Index Tracking Stock	NASDAQ.
LMBS	First Trust Low Duration Opportunities ETF	NASDAQ.
GUNR	FlexShares Morningstar Global Upstream Natural Resources Index Fund	NYSE Arca.
HACK	ETFMG Prime Cyber Security ETF	NYSE Arca.
EWD	iShares MSCI Sweden ETF	NYSE Arca.
AIA	iShares Asia 50 ETF	NASDAQ.
IGOV	iShares International Treasury Bond ETF	NASDAQ.
ARKW	ARK Web x.0 ETF	NYSE Arca.
IXN	iShares Global Tech ETF	NYSE Arca.
STIP	iShares 0–5 Year TIPS Bond ETF	NYSE Arca.
VOOG	Vanguard S&P 500 Growth ETF	NYSE Arca.
XAR	SPDR S&P Aerospace & Defense ETF	NYSE Arca.
RYT	Invesco S&P 500 Equal Weight Technology ETF	NYSE Arca.
INDY	iShares India 50 ETF	NASDAQ.
SCJ	iShares MSCI Japan Small-Cap ETF	NYSE Arca.
DEM	WisdomTree Emerging Markets High Dividend Fund	NYSE Arca.
IYJ	iShares U.S. Industrials ETF	Cboe BZX.
XT	iShares Exponential Technologies ETF	NASDAQ.
FNDF	Schwab Fundamental International Large Co. Index ETF	NYSE Arca.
MLPI	ETRACS Alerian MLP Infrastructure Index ETN	NYSE Arca.
VGIT	Vanguard Intermediate-Term Treasury ETF	NASDAQ.
JPST	JPMorgan Ultra-Short Income ETF	Cboe BZX.
GVI	iShares Intermediate Government/Credit Bond ETF	Cboe BZX.
BOND	PIMCO Active Bond ETF	NYSE Arca.
SLYV	SPDR S&P 600 Small Cap Value ETF	NYSE Arca.
ZIV	VelocityShares Daily Inverse VIX Medium-Term ETN	NASDAQ.

Ticker	ETP name	Exchange
SPHB	Invesco S&P 500 High Beta ETF	NYSE Arca.
HEWG	iShares Currency Hedged MSCI Germany ETF	NASDAQ.
AMZA	InfraCap MLP ETF	NYSE Arca.
FNDA	Schwab Fundamental US Small Co. Index ETF	NYSE Arca.
XLC	Communication Services Select Sector SPDR Fund	NYSE Arca.
BBRE	JPMorgan BetaBuilders MSCI U.S. REIT ETF	Cboe BZX.
XSD	SPDR S&P Semiconductor ETF	NYSE Arca.
EUM	ProShares Short MSCI Emerging Markets	NYSE Arca.
EPOL	iShares MSCI Poland ETF	NYSE Arca.
SLYG	SPDR S&P 600 Small Cap Growth ETF	NYSE Arca.
DJP	iPath Bloomberg Commodity Index Total Return ETN	NYSE Arca.
GSG	iShares S&P GSCI Commodity Indexed Trust	NYSE Arca.
FDT	First Trust Developed Markets ex-US AlphaDEX Fund	NASDAQ.
VOX	Vanguard Communication Services ETF	NYSE Arca.
VRP	Invesco Variable Rate Preferred ETF	NYSE Arca.
FFTY	Innovator IBD 50 ETF	NYSE Arca.
IAT	iShares U.S. Regional Banks ETF	NYSE Arca.
EBND	SPDR Bloomberg Barclays Emerging Markets Local Bond ETF	NYSE Arca.
DGRW	WisdomTree US Quality Dividend Growth Fund	NASDAQ.
ITM	VanEck Vectors AMT-Free Intermediate Municipal Index ETF	NYSE Arca.
SGOL	ETFS Physical Swiss Shares	NYSE Arca.
FBT	First Trust NYSE Arca Biotechnology Index Fund	NYSE Arca.
VONG	Vanguard Russell 1000 Growth ETF	NASDAQ.
FXL	First Trust Technology AlphaDEX Fund	NYSE Arca.
FTSL	First Trust Senior Loan Fund	NASDAQ.
DON	WisdomTree U.S. MidCap Dividend Fund	NYSE Arca.
SPSM	SPDR Portfolio Small Cap ETF	NYSE Arca.
GXC	SPDR S&P China ETF	NYSE Arca.
FV	First Trust Dorsey Wright Focus 5 ETF	NASDAQ.
CEF	Sprott Physical Gold and Silver Trust Units	NYSE Arca.
SPMD	SPDR Portfolio Mid Cap ETF	NYSE Arca.
IDU	iShares U.S. Utilities ETF	NYSE Arca.
MDYG	SPDR S&P 400 Mid Cap Growth ETF	NYSE Arca.
IYZ	iShares U.S. Telecommunications ETF	Cboe BZX.
FNDE	Schwab Fundamental Emerging Markets Large Co. Index ETF	NYSE Arca.
CQQQ	Invesco China Technology ETF	NYSE Arca.
IGM	iShares North American Tech ETF	NYSE Arca.
GBIL	Goldman Sachs TreasuryAccess 0–1 Year ETF	NYSE Arca.
VGLT	Vanguard Long-Term Treasury ETF	NASDAQ.
EPHE	iShares MSCI Philippines ETF	NYSE Arca.
MLPA	Global X MLP ETF	NYSE Arca.
EWN	iShares MSCI Netherlands ETF	NYSE Arca.
FM	iShares MSCI Frontier 100 ETF	NYSE Arca.
IVOG	Vanguard S&P Mid-Cap 400 Growth ETF	NYSE Arca.
LRGF	iShares Edge MSCI Multifactor USA ETF	NYSE Arca.
DFJ	WisdomTree Japan SmallCap Dividend Fund	NYSE Arca.
KBA	KraneShares Bosera MSCI China A Share ETF	NYSE Arca.
CWI	SPDR MSCI ACWI ex-US ETF	NYSE Arca.
SPTL	SPDR Portfolio Long Term Treasury ETF	NYSE Arca.
SUB	iShares Short-Term National Muni Bond ETF	NYSE Arca.
FHLC	Fidelity MSCI Health Care Index ETF	NYSE Arca.
GNR	SPDR S&P Global Natural Resources ETF	NYSE Arca.
IUSB	iShares Core Total USD Bond Market ETF	NASDAQ.
USMC	Principal U.S. Mega-Cap Multi-Factor Index ETF	NASDAQ.
SPYD	SPDR Portfolio S&P 500 High Dividend ETF	NYSE Arca.
GREK	Global X MSCI Greece ETF	NYSE Arca.
EDV	Vanguard Extended Duration Treasury ETF	NYSE Arca.
VWOB	Vanguard Emerging Markets Government Bond ETF	NASDAQ.
CLY	iShares 10+ Year Credit Bond ETF	NYSE Arca.
JPIN	J.P. Morgan Diversified Return International Equity ETF	NYSE Arca.
SCHC	Schwab International Small-Cap Equity ETF	NYSE Arca.
SDOG	ALPS Sector Dividend Dogs ETF	NYSE Arca.
FEP	First Trust Europe AlphaDEX Fund	NASDAQ.
VNM	VanEck Vectors Vietnam ETF	NYSE Arca.
INTF	iShares Edge MSCI Multifactor Intl ETF	NYSE Arca.
VTWO	Vanguard Russell 2000 ETF	NASDAQ.
PICK	iShares MSCI Global Metals & Mining Producers ETF	Cboe BZX.
XMLV	Invesco S&P MidCap Low Volatility ETF	NYSE Arca.
VYMI	Vanguard International High Dividend Yield ETF	NASDAQ.
PXH	Invesco FTSE RAFI Emerging Markets ETF	NYSE Arca.
XSLV	Invesco S&P SmallCap Low Volatility ETF	NYSE Arca.
CRED	iShares U.S. Credit Bond ETF	NASDAQ.
FENY	Fidelity MSCI Energy Index ETF	NYSE Arca.
PZA	Invesco National AMT-Free Municipal Bond ETF	NYSE Arca.

Ticker	ETP name	Exchange
EMQQ	Emerging Markets Internet & Ecommerce ETF	NYSE Arca.
PPA	Invesco Aerospace & Defense ETF	NYSE Arca.
HYLS	First Trust Tactical High Yield ETF	NASDAQ.
VONV	Vanguard Russell 1000 Value ETF	NASDAQ.
DGS	WisdomTree Emerging Markets SmallCap Dividend Fund	NYSE Arca.
PSCH	Invesco S&P SmallCap Health Care ETF	NASDAQ.
FIDU	Fidelity MSCI Industrials Index ETF	NYSE Arca.
FEM	First Trust Emerging Markets AlphaDEX Fund	NASDAQ.
FXO	First Trust Financials AlphaDEX Fund	NYSE Arca.
SPLB	SPDR Portfolio Long Term Corporate Bond ETF	NYSE Arca.
IXG	iShares Global Financials ETF	NYSE Arca.
IPE	SPDR Bloomberg Barclays TIPS ETF	NYSE Arca.
CORP	PIMCO Investment Grade Corporate Bond Index ETF	NYSE Arca.
WIP	SPDR FTSE International Government Inflation-Protected Bond ETF	NYSE Arca.
RPV	Invesco S&P 500 Pure Value ETF	NYSE Arca.
BSJI	Invesco BulletShares 2018 High Yield Corporate Bond ETF	NYSE Arca.
IEO	iShares U.S. Oil & Gas Exploration & Production ETF	Cboe BZX.
PRFZ	Invesco FTSE RAFI US 1500 Small-Mid ETF	NASDAQ.
FXR	First Trust Industrials/Producer Durables AlphaDEX Fund	NYSE Arca.
FEX	First Trust Large Cap Core AlphaDEX Fund	NASDAQ.
DLS	WisdomTree International SmallCap Dividend Fund	NYSE Arca.
DFE	WisdomTree Europe SmallCap Dividend Fund	NYSE Arca.
FTCS	First Trust Capital Strength ETF	NASDAQ.
BSJJ	Invesco BulletShares 2019 High Yield Corporate Bond ETF	NYSE Arca.
PNQI	Invesco NASDAQ Internet ETF	NASDAQ.
TLH	iShares 10–20 Year Treasury Bond ETF	NYSE Arca.
SLQD	iShares 0–5 Year Investment Grade Corporate Bond ETF	NASDAQ.
EXI	iShares Global Industrials ETF	NYSE Arca.
PGF	Invesco Financial Preferred ETF	NYSE Arca.
GEM	Goldman Sachs ActiveBeta Emerging Markets Equity ETF	NYSE Arca.
PPH	VanEck Vectors Pharmaceutical ETF	NASDAQ.
PDP	Invesco DWA Momentum ETF	NASDAQ.
FDIS	Fidelity MSCI Consumer Discretionary Index ETF	NYSE Arca.
FXB	Invesco CurrencyShares British Pound Sterling Trust	NYSE Arca.
PHYS	Sprott Physical Gold Trust Units	NYSE Arca.
IAI	iShares U.S. Broker-Dealers & Securities Exchanges ETF	NYSE Arca.
LEMB	iShares J.P. Morgan EM Local Currency Bond ETF	NYSE Arca.
BLOK	Amplify Transformational Data Sharing ETF	NYSE Arca.
USRT	iShares Core U.S. REIT ETF	NYSE Arca.
SPTS	SPDR Portfolio Short Term Treasury ETF	NYSE Arca.
IYC	iShares U.S. Consumer Services ETF	NYSE Arca.
CMF	iShares California Muni Bond ETF	NYSE Arca.
FXH	First Trust Health Care AlphaDEX Fund	NYSE Arca.
FNDC	Schwab Fundamental International Small Co. Index ETF	NYSE Arca.
OGIG	O'Shares Global Internet Giants ETF	NYSE Arca.
IGHG	ProShares Investment Grade-Interest Rate Hedged	Cboe BZX.
MGC	Vanguard Mega Cap ETF	NYSE Arca.
DES	WisdomTree U.S. SmallCap Dividend Fund	NYSE Arca.
DWX	SPDR S&P International Dividend ETF	NYSE Arca.
PTLC	Pacer Trendpilot US Large Cap ETF	Cboe BZX.
MGV	Vanguard Mega Cap Value ETF	NYSE Arca.
BSJK	Invesco BulletShares 2020 High Yield Corporate Bond ETF	NYSE Arca.
MOAT	VanEck Vectors Morningstar Wide Moat ETF	NYSE Arca.
EELV	Invesco S&P Emerging Markets Low Volatility ETF	NYSE Arca.
SDIV	Global X Superdividend ETF	NYSE Arca.
DSI	iShares MSCI KLD 400 Social ETF	NYSE Arca.
VIGI	Vanguard International Dividend Appreciation ETF	NASDAQ.
MDYV	SPDR S&P 400 Mid Cap Value ETF	NYSE Arca.
REET	iShares Global REIT ETF	NYSE Arca.
ITE	SPDR Bloomberg Barclays Intermediate Term Treasury ETF	NYSE Arca.
IWY	iShares Russell Top 200 Growth ETF	NYSE Arca.
QDF	FlexShares Quality Dividend Index Fund	NYSE Arca.
FDL	First Trust Morningstar Dividend Leaders Index Fund	NYSE Arca.
SPHQ	Invesco S&P 500 Quality ETF	NYSE Arca.
AOR	iShares Core Growth Allocation ETF	NYSE Arca.
AOM	iShares Core Moderate Allocation ETF	NYSE Arca.
COMT	iShares Commodities Select Strategy ETF	NASDAQ.
IBND	SPDR Bloomberg Barclays International Corporate Bond ETF	NYSE Arca.
EMHY	iShares Emerging Markets High Yield Bond ETF	Cboe BZX.
WPS	iShares International Developed Property ETF	NYSE Arca.
FXZ	First Trust Materials AlphaDEX Fund	NYSE Arca.
ECON	Columbia Emerging Markets Consumer ETF	NYSE Arca.
DLN	WisdomTree U.S. LargeCap Dividend Fund	NYSE Arca.
MOO	VanEck Vectors Agribusiness ETF	NYSE Arca.

Ticker	ETP name	Exchange
IBUY	Amplify Online Retail ETF	NASDAQ.
BSCJ	Invesco BulletShares 2019 Corporate Bond ETF	NYSE Arca.
GSIE	Goldman Sachs ActiveBeta International Equity ETF	NYSE Arca.
TAN	Invesco Solar ETF	NYSE Arca.
RING	iShares MSCI Global Gold Miners ETF	NASDAQ.
VNLA	Janus Henderson Short Duration Income ETF	NYSE Arca.
FXN	First Trust Energy AlphaDEX Fund	NYSE Arca.
PPLT	ETFS Physical Platinum Shares	NYSE Arca.
EEMO	Invesco S&P Emerging Markets Momentum ETF	NYSE Arca.
VXZ	iPath S&P 500 VIX Mid-Term Futures ETN Class A	NYSE Arca.
RODM	Hartford Multifactor Developed Markets (ex-US) ETF	NYSE Arca.
VIOO	Vanguard S&P Small-Cap 600 ETF	NYSE Arca.
EEMA	iShares MSCI Emerging Markets Asia ETF	NASDAQ.
URA	Global X Uranium ETF	NYSE Arca.
BSCK	Invesco BulletShares 2020 Corporate Bond ETF	NYSE Arca.
QAI	IQ Hedge Multi-Strategy Tracker ETF	NYSE Arca.
REMX	VanEck Vectors Rare Earth/Strategic Metals ETF	NYSE Arca.
STPZ	PIMCO 1–5 Year US TIPS Index ETF	NYSE Arca.
FPX	First Trust US Equity Opportunities ETF	NYSE Arca.
FXC	Invesco CurrencyShares Canadian Dollar Trust	NYSE Arca.
IAGG	iShares Core International Aggregate Bond ETF	Cboe BZX.
PXF	Invesco FTSE RAFI Developed Markets ex-U.S. ETF	NYSE Arca.
BBH	VanEck Vectors Biotech ETF	NASDAQ.
BSCI	Invesco BulletShares 2018 Corporate Bond ETF	NYSE Arca.
VONE	Vanguard Russell 1000 ETF	NASDAQ.
PWV	Invesco Dynamic Large Cap Value ETF	NYSE Arca.
CIBR	First Trust NASDAQ. Cybersecurity ETF	NASDAQ.
TOK	iShares MSCI Kokusai ETF	NYSE Arca.
ARGT	Global X MSCI Argentina ETF	NYSE Arca.
IYK	iShares U.S. Consumer Goods ETF	NYSE Arca.
IYY	iShares Dow Jones U.S. ETF	NYSE Arca.
IHF	iShares U.S. Healthcare Providers ETF	NYSE Arca.
TDTT	FlexShares iBoxx 3 Year Target Duration TIPS Index Fund	NYSE Arca.
CFO	VictoryShares US 500 Enhanced Volatility Wtd ETF	NASDAQ.
CLRG	IQ Chaikin U.S. Large Cap ETF	NASDAQ.
RTM	Invesco S&P 500 Equal Weight Materials ETF	NYSE Arca.
SMIN	iShares MSCI India Small Cap ETF	Cboe BZX.
RWL	Oppenheimer S&P 500 Revenue ETF	NYSE Arca.
SCHK	Schwab 1000 Index ETF	NYSE Arca.
PSI	Invesco Dynamic Semiconductors ETF	NYSE Arca.
RHS	Invesco S&P 500 Equal Weight Consumer Staples ETF	NYSE Arca.
FTA	First Trust Large Cap Value AlphaDEX Fund	NASDAQ.
FCG	First Trust Natural Gas ETF	NYSE Arca.
DDWM	WisdomTree Dynamic Currency Hedged International Equity Fund	Cboe BZX.
DBB	Invesco DB Base Metals Fund	NYSE Arca.
MNA	IQ Merger Arbitrage ETF	NYSE Arca.
PKW	Invesco Buyback Achievers ETF	NASDAQ.
EWO	iShares MSCI Austria ETF	NYSE Arca.
NANR	SPDR S&P North American Natural Resources ETF	NYSE Arca.
HYMB	SPDR Nuveen S&P High Yield Municipal Bond ETF	NYSE Arca.
IWC	iShares Micro-Cap ETF	NYSE Arca.
XLG	Invesco S&P 500 Top 50 ETF	NYSE Arca.
SIL	Global X Silver Miners ETF	NYSE Arca.
FXD	First Trust Consumer Discretionary AlphaDEX Fund	NYSE Arca.
BSCL	Invesco BulletShares 2021 Corporate Bond ETF	NYSE Arca.
ICVT	iShares Convertible Bond ETF	Cboe BZX.
BAB	Invesco Taxable Municipal Bond ETF	NYSE Arca.
FLTR	VanEck Vectors Investment Grade Floating Rate ETF	NYSE Arca.
PSK	SPDR Wells Fargo Preferred Stock ETF	NYSE Arca.
IXJ	iShares Global Healthcare ETF	NYSE Arca.
EEMS	iShares MSCI Emerging Markets Small Cap ETF	NYSE Arca.
AOA	iShares Core Aggressive Allocation ETF	NYSE Arca.
GWX	SPDR S&P International Small Cap ETF	NYSE Arca.
FREL	Fidelity MSCI Real Estate Index ETF	NYSE Arca.
RFDI	First Trust Riverfront Dynamic Developed International ETF	NASDAQ.
FMAT	Fidelity MSCI Materials Index ETF	NYSE Arca.
SLX	VanEck Vectors Steel ETF	NYSE Arca.
WOOD	iShares Global Timber & Forestry ETF	NASDAQ.
IEZ	iShares U.S. Oil Equipment & Services ETF	NYSE Arca.
FEMS	First Trust Emerging Markets Small Cap AlphaDEX Fund	NASDAQ.
CHIQ	Global X China Consumer ETF	NYSE Arca.
JKD	iShares Morningstar Large-Cap ETF	NYSE Arca.
IFV	First Trust Dorsey Wright International Focus 5 ETF	NASDAQ.
BSCM	Invesco BulletShares 2022 Corporate Bond ETF	NYSE Arca.

Ticker	ETP name	Exchange
FTXO	First Trust NASDAQ. Bank ETF	NASDAQ.
SCIF	VanEck Vectors India Small-Cap Index ETF	NYSE Arca.
IPAC	iShares Core MSCI Pacific ETF	NYSE Arca.
FTC	First Trust Large Cap Growth AlphaDEX Fund	NASDAQ.
PALL	ETFS Physical Palladium Shares	NYSE Arca.
RDVY	First Trust Rising Dividend Achievers ETF	NASDAQ.
XPH	SPDR S&P Pharmaceuticals ETF	NYSE Arca.
HYEM	VanEck Vectors Emerging Markets High Yield Bond ETF	NYSE Arca.
ICSH	iShares Ultra Short-Term Bond ETF	Cboe BZX.
URTH	iShares MSCI World ETF	NYSE Arca.
BAR	GraniteShares Gold Shares	NYSE Arca.
BNO	United States Brent Oil Fund LP	NYSE Arca.
RYH	Invesco S&P 500 Equal Weight Health Care ETF	NYSE Arca.
BSJL	Invesco Bulletshares 2021 High Yield Corporate Bond ETF	NYSE Arca.
USCI	United States Commodity Index Fund	NYSE Arca.
RYF	Invesco S&P 500 Equal Weight Financials ETF	NYSE Arca.
IVOO	Vanguard S&P Mid-Cap 400 ETF	NYSE Arca.
SLY	SPDR S&P 600 Small Cap ETF	NYSE Arca.
XHE	SPDR S&P Health Care Equipment ETF	NYSE Arca.
IBDL	iShares iBonds Dec 2020 Term Corporate ETF	NYSE Arca.
AGGY	WisdomTree Barclays Yield Enhanced U.S. Aggregate Bond Fund	NYSE Arca.
FMB	First Trust Managed Municipal ETF	NASDAQ.
IFGL	iShares International Developed Real Estate ETF	NASDAQ.
IBDK	iShares iBonds Dec 2019 Term Corporate ETF	NYSE Arca.
IBDM	iShares iBonds Dec 2021 Term Corporate ETF	NYSE Arca.
IQDF	FlexShares International Quality Dividend Index Fund	NYSE Arca.
FLTB	Fidelity Limited Term Bond ETF	NYSE Arca.
KSA	iShares MSCI Saudi Arabia ETF	NYSE Arca.
BLCN	Reality Shares Nasdaq NextGen Economy ETF	NASDAQ.
IOO	iShares Global 100 ETF	NYSE Arca.
VOOV	Vanguard S&P 500 Value ETF	NYSE Arca.
EWX	SPDR S&P Emerging Markets Small Cap ETF	NYSE Arca.
OUSA	O'Shares FTSE US Quality Dividend ETF	NYSE Arca.
FNX	First Trust Mid Cap Core AlphaDEX Fund	NASDAQ.
FUTY	Fidelity MSCI Utilities Index ETF	NYSE Arca.
DHS	WisdomTree U.S. High Dividend Fund	NYSE Arca.
DVYE	iShares Emerging Markets Dividend ETF	NYSE Arca.
HYGH	iShares Interest Rate Hedged High Yield Bond ETF	NYSE Arca.
MLPX	Global X MLP & Energy Infrastructure ETF	NYSE Arca.
AGZ	iShares Agency Bond ETF	NYSE Arca.
FDD	First Trust Stoxx European Select Dividend Index Fund	NYSE Arca.
RGI	Invesco S&P 500 Equal Weight Industrials ETF	NYSE Arca.
SOCL	Global X Social Media ETF	NASDAQ.
IGE	iShares North American Natural Resources ETF	Cboe BZX.
TDTF	FlexShares iBoxx 5 Year Target Duration TIPS Index Fund	NYSE Arca.
IPAY	ETFMG Prime Mobile Payments ETF	NYSE Arca.
TDIV	First Trust NASDAQ Technology Dividend Index Fund	NASDAQ.
JKE	iShares Morningstar Large-Cap Growth ETF	NYSE Arca.
RYE	Invesco S&P 500 Equal Weight Energy ETF	NYSE Arca.
IHE	iShares U.S. Pharmaceuticals ETF	NYSE Arca.
PJP	Invesco Dynamic Pharmaceuticals ETF	NYSE Arca.
PID	Invesco International Dividend Achievers ETF	NASDAQ.
PEY	Invesco High Yield Equity Dividend Achievers ETF	NASDAQ.
ILTB	iShares Core 10+ Year USD Bond ETF	NYSE Arca.
RDIV	Oppenheimer S&P Ultra Dividend Revenue ETF	NYSE Arca.
LVHD	Legg Mason Low Volatility High Dividend ETF	NASDAQ.
EZM	WisdomTree U.S. MidCap Earnings Fund	NYSE Arca.
ARKG	ARK Genomic Revolution Multi-Sector ETF	NYSE Arca.
HFXI	IQ 50 Percent Hedged FTSE International ETF	NYSE Arca.
SNLN	Highland iBoxx Senior Loan ETF	NASDAQ.
CSML	IQ Chaikin U.S. Small Cap ETF	NASDAQ.
FXU	First Trust Utilities AlphaDEX Fund	NYSE Arca.
PSLV	Sprott Physical Silver Trust	NYSE Arca.
QQEW	First Trust Nasdaq-100 Equal Weighted Index Fund	NASDAQ.
EMGF	iShares Edge MSCI Multifactor Emerging Markets ETF	Cboe BZX.
FXF	Invesco CurrencyShares Swiss Franc Trust	NYSE Arca.
HYZD	WisdomTree Interest Rate Hedged High Yield Bond Fund	NASDAQ.
AGGP	IQ Enhanced Core Plus Bond U.S. ETF	NYSE Arca.
AIEQ	AI Powered Equity ETF	NYSE Arca.
PCEF	Invesco CEF Income Composite ETF	NYSE Arca.
KBWY	Invesco KBW Premium Yield Equity REIT ETF	NASDAQ.
IBDN	iShares iBonds Dec 2022 Term Corporate ETF	NYSE Arca.
PBP	Invesco S&P 500 BuyWrite ETF	NYSE Arca.
CFA	VictoryShares US 500 Volatility Wtd ETF	NASDAQ.

Ticker	ETP name	Exchange
BWZ	SPDR Bloomberg Barclays Short Term International Treasury Bond ETF	NYSE Arca.
VIIX	VelocityShares VIX Short-Term ETN	NASDAQ.
SJB	ProShares Short High Yield	NYSE Arca.
FSTA	Fidelity MSCI Consumer Staples Index ETF	NYSE Arca.
DWM	WisdomTree International Equity Fund	NYSE Arca.
ESGE	iShares MSCI EM ESG Optimized ETF	NASDAQ.
FXG	First Trust Consumer Staples AlphaDEX Fund	NYSE Arca.
CXSE	WisdomTree China ex-State-Owned Enterprises Fund	NASDAQ.
EQAL	Invesco Russell 1000 Equal Weight ETF	NYSE Arca.
SMDV	ProShares Russell 2000 Dividend Growers ETF	Cboe BZX.
MXI	iShares Global Materials ETF	NYSE Arca.
IHDG	WisdomTree International Hedged Quality Dividend Growth Fund	NYSE Arca.
FYX	First Trust Small Cap Core AlphaDEX Fund	NASDAQ.
JPUS	JPMorgan Diversified Return U.S. Equity ETF	NYSE Arca.
CGW	Invesco S&P Global Water Index ETF	NYSE Arca.
SIZE	iShares Edge MSCI USA Size Factor ETF	NYSE Arca.
XNTK	SPDR NYSE Technology ETF	NYSE Arca.
CDC	VictoryShares US EQ Income Enhanced Volatility Wtd ETF	NASDAQ.
SIVR	ETFS Physical Silver Shares	NYSE Arca.
IDLV	Invesco S&P International Developed Low Volatility ETF	NYSE Arca.
FBND	Fidelity Total Bond ETF	NYSE Arca.
VRIG	Invesco Variable Rate Investment Grade ETF	NASDAQ.
XMX	WisdomTree Global ex-Mexico Equity Fund	NYSE Arca.
QABA	First Trust NASDAQ ABA Community Bank Index Fund	NASDAQ.
RIGS	RiverFront Strategic Income Fund	NYSE Arca.
FDRR	Fidelity Dividend ETF for Rising Rates	NYSE Arca.
EPU	iShares MSCI Peru ETF	NYSE Arca.
QYLD	Recon Capital NASDAQ 100 Covered Call ETF	NASDAQ.
CSM	ProShares Large Cap Core Plus	Cboe BZX.
FINX	Global X FinTech ETF	NASDAQ.
GLTR	ETFS Physical Precious Metals Basket Shares	NYSE Arca.
MDIV	First Trust Multi-Asset Diversified Income Index Fund	NASDAQ.
AADR	AdvisorShares Dorsey Wright ADR ETF	NYSE Arca.
PFXF	VanEck Vectors Preferred Securities ex Financials ETF	NYSE Arca.
PGHY	Invesco Global Short Term High Yield Bond ETF	NYSE Arca.
BKF	iShares MSCI BRIC ETF	NYSE Arca.
PSCT	Invesco S&P SmallCap Information Technology ETF	NASDAQ.
JPN	Xtrackers Japan JPX-Nikkei 400 Equity ETF	NYSE Arca.
ULVM	USAA MSCI USA Value Momentum Blend Index ETF	NYSE Arca.
AMU	ETRACS Alerian MLP Index ETN	NYSE Arca.
TFLO	iShares Treasury Floating Rate Bond ETF	NYSE Arca.
FIXD	First Trust TCW Opportunistic Fixed Income ETF	NASDAQ.
EES	WisdomTree U.S. SmallCap Earnings Fund	NYSE Arca.
FVC	First Trust Dorsey Wright Dynamic Focus 5 ETF	NASDAQ.
EDIV	SPDR S&P Emerging Markets Dividend ETF	NYSE Arca.
FCVT	First Trust SSI Strategic Convertible Securities ETF	NASDAQ.
HDGE	AdvisorShares Ranger Equity Bear ETF	NYSE Arca.
IBDO	iShares iBonds Dec 2023 Term Corporate ETF	NYSE Arca.
TMFC	Motley Fool 100 Index ETF	Cboe BZX.
FEU	SPDR STOXX Europe 50 ETF	NYSE Arca.
PKB	Invesco Dynamic Building & Construction ETF	NYSE Arca.
PTMC	Pacer Trendpilot US Mid Cap ETF	Cboe BZX.
FTGC	First Trust Global Tactical Commodity Strategy Fund	NASDAQ.
ESGD	iShares MSCI EAFE ESG Optimized ETF	NASDAQ.
KXI	iShares Global Consumer Staples ETF	NYSE Arca.
PWB	Invesco Dynamic Large Cap Growth ETF	NYSE Arca.
FXA	Invesco CurrencyShares Australian Dollar Trust	NYSE Arca.
REGL	ProShares S&P MidCap 400 Dividend Aristocrats ETF	Cboe BZX.
JPGE	J.P. Morgan Diversified Return Global Equity ETF	NYSE Arca.
BSCN	Invesco Bulletshares 2023 Corporate Bond ETF	NYSE Arca.
JKG	iShares Morningstar Mid-Cap ETF	NYSE Arca.
GMF	SPDR S&P Emerging Asia Pacific ETF	NYSE Arca.
NUAG	NuShares Enhanced Yield U.S. Aggregate Bond ETF	NYSE Arca.
NIB	iPath Bloomberg Cocoa Subindex Total Return ETN	NYSE Arca.
PIE	Invesco DWA Emerging Markets Momentum ETF	NASDAQ.
PUTW	WisdomTree CBOE S&P 500 PutWrite Strategy Fund	NYSE Arca.
FYC	First Trust Small Cap Growth AlphaDEX Fund	NASDAQ.
SUSA	iShares MSCI USA ESG Select ETF	NYSE Arca.
RXI	iShares Global Consumer Discretionary ETF	NYSE Arca.
IPKW	Invesco International BuyBack Achievers ETF	NASDAQ.
TLTE	FlexShares Morningstar Emerging Markets Factor Tilt Index	NYSE Arca.
UDN	Invesco DB US Dollar Index Bearish Fund	NYSE Arca.
HDEF	Xtrackers MSCI EAFE High Dividend Yield Equity ETF	NYSE Arca.
ELD	WisdomTree Emerging Markets Local Debt Fund	NYSE Arca.

Ticker	ETP name	Exchange
XTL	SPDR S&P Telecom ETF	NYSE Arca.
ZROZ	PIMCO 25+ Year Zero Coupon US Treasury Index ETF	NYSE Arca.
ATMP	Barclays ETN+ Select MLP ETN	NYSE Arca.

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Appendix B – Data and Reporting

[Unless otherwise specified, the following data shall be collected and transmitted to the SEC in an agreed-upon format on a monthly basis, to be provided 30 calendar days following month end. Unless otherwise specified, the Primary Listing Exchanges shall be responsible for collecting and transmitting the data to the SEC. Data collected in connection with Sections II(E) – (G) below shall be transmitted to the SEC with a request for confidential treatment under the Freedom of Information Act. 5 U.S.C. § 552, and the SEC's rules and regulations thereunder.

I. **Summary Statistics**

A. Frequency with which NMS Stocks enter a Limit State. Such summary data shall be broken down as follows:

1. Partition stocks by category

a. Tier 1 non-ETP issues > $3.00

b. Tier 1 non-ETP issues >= $0.75 and <= $3.00

c. Tier 1 non-ETP issues < $0.75

d. Tier 1 non-leveraged ETPs in each of above categories

e. Tier 1 leveraged ETPs in each of above categories

f. Tier 2 non-ETPs in each of above categories

g. Tier 2 non-leveraged ETPs in each of above categories

h. Tier 2 leveraged ETPs in each of above categories

2. Partition by time of day

a. Opening (prior to 9:45 am ET)

b. Regular (between 9:45 am ET and 3:35 pm ET)

c. Closing (after 3:35 pm ET)

d. Within five minutes of a Trading Pause re-open or IPO open

3. Track reasons for entering a Limit State, such as:

a. Liquidity gap –price reverts from a Limit State Quotation and returns to trading within the Price Bands

b. Broken trades

c. Primary Listing Exchange manually declares a Trading Pause pursuant to Section (VII)(2) of the Plan

d. Other

B. Determine (1), (2) and (3) for when a Trading Pause has been declared for an NMS Stock pursuant to the Plan.

II. **Raw Data** *(all Participants, except A-E, which are for the Primary Listing Exchanges only)*

A. Record of every Straddle State.

1. Ticker, date, time entered, time exited, flag for ending with Limit State, flag for ending with manual override.

2. Pipe delimited with field names as first record.

B. Record of every Price Band

1. Ticker, date, time at beginning of Price Band, Upper Price Band, Lower Price Band

2. Pipe delimited with field names as first record

C. Record of every Limit State

1. Ticker, date, time entered, time exited, flag for halt

2. Pipe delimited with field names as first record

D. Record of every Trading Pause or halt

1. Ticker, date, time entered, time exited, type of halt (i.e., regulatory halt, non-regulatory halt, Trading Pause pursuant to the Plan, other)

2. Pipe delimited with field names as first record

E. Data set or orders entered into reopening auctions during halts or Trading Pauses

1. Arrivals, Changes, Cancels, # shares, limit/market, side, Limit State side

2. Pipe delimited with field name as first record

F. Data set of order events received during Limit States

G. Summary data on order flow of arrivals and cancellations for each 15-second period for discrete time periods and sample stocks to be determined by the SEC in subsequent data requests. Must indicate side(s) of Limit State.

1. Market/marketable sell orders arrivals and executions

   a. Count

   b. Shares

   c. Shares executed

2. Market/marketable buy orders arrivals and executions

   a. Count

   b. Shares

   c. Shares executed

3. Count arriving, volume arriving and shares executing in limit sell orders above NBBO mid-point

4. Count arriving, volume arriving and shares executing in limit sell orders at or below NBBO mid-point (non-marketable)

5. Count arriving, volume arriving and shares executing in limit buy orders at or above NBBO mid-point (non-marketable)

6. Count arriving, volume arriving and shares executing in limit buy orders below NBBO mid-point

7. Count and volume arriving of limit sell orders priced at or above NBBO mid-point plus $0.05

8. Count and volume arriving of limit buy orders priced at or below NBBO mid-point minus $0.05

9. Count and volume of (3-8) for cancels

10. Include: ticker, date, time at start, time of Limit State, all data item fields in 1, last sale prior to 15-second period (null if no trades today), range during 15-second period, last trade during 15-second period

III. **On May 28, 2015, Participants provided to the SEC a supplemental joint assessment relating to the impact of the Plan and calibration of the Percentage Parameters as follows:**

A. Assess the statistical and economic impact on liquidity of approaching Price Bands.

B. Assess the statistical and economic impact of the Price Bands on erroneous trades.

C. Assess the statistical and economic impact of the appropriateness of the Percentage Parameters used for the Price Bands.

D. Assess whether the Limit State is the appropriate length to allow for liquidity replenishment when a Limit State is reached because of a temporary liquidity gap.

E. Evaluate concerns from the options markets regarding the statistical and economic impact of Limit States on liquidity and market quality in the options markets. (Participants that operate options exchange should also prepare such assessment reports.)

F. Assess whether the process for entering a Limit State should be adjusted and whether Straddle States are problematic.

G. Assess whether the process for exiting a Limit State should be adjusted.

H. Assess whether the Trading Pauses are too long or short and whether the reopening procedures should be adjusted.]

I. Data Provision. The Commission may request from the Primary Listing Exchanges the below data that is not otherwise publicly available. The requested data shall be collected and transmitted to the Commission in an agreed-upon format, to be provided 30 calendar days following the date of the request, or such other date as agreed upon by the Commission and Primary Listing Exchange. Data collected in connection with a Commission request shall be transmitted to the Commission with a request for confidential treatment under the Freedom of Information Act. 5 U.S.C. § 552, and the Commission's rules and regulations thereunder. This section shall expire at the time the below data becomes available via the National Market System Plan Governing the Consolidated Audit Trail or becomes publicly available.

A. Data set of all orders entered during halts or Trading Pauses

1. Normal or Auction Only orders, Arrivals, Changes, Cancels, # shares, limit/market, side, Limit State side

2. Pipe delimited with field name as first record

B. Data set of order events received during Limit States

C. Summary data on order flow of arrivals and cancellations for each 15-second period for discrete time periods and sample stocks to be determined by the SEC in subsequent data requests. Must indicate side(s) of Limit State.

1. Market/marketable sell orders arrivals and executions

a. Count

b. Shares

c. Shares executed

2. Market/marketable buy orders arrivals and executions

a. Count

b. Shares

c. Shares executed

3. Count arriving, volume arriving and shares executing in limit sell orders above NBBO mid-point

4. Count arriving, volume arriving and shares executing in limit sell orders at or below NBBO mid-point (non-marketable)

5. Count arriving, volume arriving and shares executing in limit buy orders at or above NBBO mid-point (non-marketable)

6. Count arriving, volume arriving and shares executing in limit buy orders below NBBO mid-point

7. Count and volume arriving of limit sell orders priced at or above NBBO mid-point plus $0.05

8. Count and volume arriving of limit buy orders priced at or below NBBO mid-point minus $0.05

9. Count and volume of (3-8) for cancels

10. Include: ticker, date, time at start, time of Limit State, all data item fields in 1, last sale prior to 15-second period (null if no trades today), range during 15-second period, last trade during 15-second period

II. Reporting

A. Annual Report. No later than March 31, 2020 and annually thereafter, the Operating Committee, in consultation with the Advisory Committee, will provide the Commission and make

publicly available a report containing key information concerning the Plan's performance during the preceding calendar year which shall include the following items: (1) an update on the Plan's operations; (2) an analysis of any amendments to the Plan implemented during the period covered by the report; and (3) an analysis of potential material emerging issues that may directly impact the operation of the Plan.

1. Update on the Plan's Operations. This section of the Annual Report shall analyze the Plan's operation during the covered period, including a discussion of any areas of the Plan's operation that require additional analysis. In particular, this section of the Annual Report shall examine the calibration of the parameters set forth in the Plan (e.g., Price Bands, duration of Limit States, impact of Straddle States, duration of Trading Pauses, and the performance of reopening procedures following a Trading Pause). The section of the Annual Report also shall consider stock characteristics and variations in market conditions over time, and may include tests that differentiate results for different characteristics, both in isolation and in combination.

2. Analysis of Amendments Implemented. This section of the Annual Report shall provide an analysis of any amendments implemented during the covered period. The analysis shall include a discussion of any such amendment's operation and its impact on the overall operation of the Plan.

3. Analysis of Emerging Issues. This section of the Annual Report should vary from year-to-year and will include a discussion and analysis of the Plan's operation during a significant market event that may have occurred during the covered period. This section shall also include any additional analyses performed during the covered period on issues that were raised in previous Annual Reports.

B. Quarterly Data. 30 days following the end of each calendar quarter, the Operating Committee shall provide the Commission and make publicly available a report including basic statistics regarding the Plan's operation ("Monitoring Report") during the preceding calendar quarter as well as aggregated data from the previous 12 quarters beginning with the calendar quarter covered by the first Monitoring Report. The purpose of the Monitoring Report is to identify trends in the performance and impact of the Plan on market activity.

1. The quarterly production shall include the following data for each month during the preceding calendar quarter:

a. Events Data.

i. Number of Limit States, Trading Pauses, and Straddle States per day, including distribution statics such as the mean, median, minimum and maximum percentiles

ii. Number of NMS Stocks that experience more than one Limit State Trading Pause, or Straddle State in a single day including the length of each Limit State, Trading Pause, and Straddle State per day

b. The number of Clearly Erroneous Events per day for all NMS Stocks that occurred during the time when Price Bands are disseminated by the Processor

c. Reopening Data

i. Number of times an automated reopening process is extended for and the length of the Trading Pause

ii. Whether the reopening process ended in a trade

iii. The price calculated by an automated reopening process for an NMS Stock exiting a Trading Pause

iv. For the five minutes following the conclusion of a Trading Pause, the highest price of all last sale eligible trades, the lowest price of all last sale eligible trades, and the average price of all last sale eligible trades

2. Partition stocks by category

a. Tier 1 non-ETP issues > $3.00

b. Tier 1 non-ETP issues >= $0.75 and <= $3.00

c. Tier 1 non-ETP issues < $0.75

d. Tier 1 non-leveraged ETPs in each of above categories

e. Tier 1 leveraged ETPs in each of above categories

f. Tier 2 non-ETPs in each of above categories

g. Tier 2 non-leveraged ETPs in each of above categories

h. Tier 2 leveraged ETPs in each of above categories

3. Partition by time of day

a. Opening (prior to 9:45 am ET)

b. Regular (between 9:45 am ET and 3:35 pm ET)

c. Closing (after 3:35 pm ET)

d. Within five minutes of a Trading Pause re-open or IPO open

C. Reports on Market Events. At the Commission's request, the Operating Committee shall provide the Commission and make publicly available a report analyzing the Plan's operation during a significant market event that (1) materially impacted the trading of more than one security across multiple Trading Centers; and (2) is directly related to or implicating the performance of the

Plan. Such report shall be provided to the Commission no later than 30 days following the Commission's request, or at a later date as agreed upon between the Commission and the Operating Committee. The requirement to submit a report under this section may be satisfied by including the required analysis within an Annual Report.

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