HUDSON RIVER TRADING LLC

March 13, 2017

Brent J. Fields
Secretary
U.S. Securities and Exchange Commission
100 F Street, NE
Washington, D.C. 20549

Re: CHX Liquidity Enhancing Access Delay
(Release No. 34-80041; SR-CHX-2017-04)

Dear Mr. Fields:

Hudson River Trading LLC ("Hudson River Trading") appreciates the opportunity to comment on CHX's proposal for the so-called Liquidity Enhancing Access Delay ("LEAD"). Hudson River Trading is a global, multi-asset class quantitative trading firm that develops automated trading strategies that provide liquidity and facilitate price discovery on exchanges and alternative trading systems. Our affiliate, HRT Financial LLC is a member of all U.S. equities exchanges and is a registered market maker in over 3,000 stocks and exchange-traded funds.

Hudson River Trading believes it is critical that the Securities and Exchange Commission ("Commission") ensures fair, orderly and efficient markets. The LEAD proposal is similar to CHX's proposed Liquidity Taking Access Delay ("LTAD") in most respects. However, CHX now proposes to limit the ability to bypass such a delay to only LEAD Market Makers. As such, CHX has altered its proposal to make it more discriminatory than it previously was under the LTAD proposal, but has sought to justify the discrimination through enhanced market maker obligations. Hudson River Trading's comments on LTAD are attached to this letter as they address many of the issues associated with LEAD. In this letter, we will comment on the change to allow only LEAD Market Makers to bypass the delay.

Hudson River Trading has commented on market maker obligations on multiple occasions.[1] Any proposed market maker obligations and accompanying benefits should be approved only when it leads to an improvement in market quality that more than offsets the harmful effects that such policies have on competition. While LEAD may benefit CHX and LEAD Market Makers, it will have a detrimental effect on the overall market for U.S. equities. Benefits received by market makers have the effect of creating an un-level playing field as non-market makers (including agents for retail and institutional investors) are excluded from those benefits. This disparity harms competition among market participants and leads to greater intermediation as the benefits are available only to certain intermediaries. LEAD may make it easier for LEAD Market Makers

[1] *See* Letter to Elizabeth M. Murphy, Secretary, SEC, from Suhas Daftuar, Managing Director, Hudson River Trading LLC (April 30, 2010) and Letter to David Stanwick, Secretary, CFTC and Elizabeth Murphy, Secretary, SEC from Richard Gorelick, CEO, RGM Advisors, LLC, Adam Nunes, President, HRT Financial LLC and Cameron Smith, General Counsel, Quantlab Financial, LLC (May 5, 2011).

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to quote better prices in larger size, but it will make it more difficult for non-LEAD Market Makers to do so. LEAD will also harm market participants seeking to access liquidity provided by LEAD Market Makers as the LEAD Market Makers may alter their prices while incoming orders are being delayed.

There is no evidence to suggest that LEAD will lead to an improvement in overall market efficiency or that LEAD will enhance fairness and competition. To the contrary, LEAD will degrade competition by benefiting a certain class of participants, LEAD Market Makers, relative to all other market participants. Further, the proposed LEAD market model is similar the model operated by TSX Alpha[2] in Canada. Academic research suggests that an asymmetric speed bump similar to LEAD has the effect of degrading overall market quality.[3] It has also shown that contrary to CHX's assertions related to "latency arbitrage," the impact of the asymmetrical speed bump has harmed institutional order routers, increased effective spreads and is estimated to have cost over C$105 million in its first year. TSX Alpha has not demonstrated tighter spreads as a result of the asymmetrical delay, but its quoted depth has increased. However, the accessibility of those quotes has been significantly degraded. This research suggests that while the asymmetrical speed bump may benefit the market employing it and its liquidity providers, it has an overall detrimental effect on liquidity for the market as a whole.

In addition, artificial advantages such as those that would be enjoyed by LEAD Market Makers will create an un-level playing field both among exchanges and among market participants. LEAD Market Makers will have the ability to trade on up-to-date information while all other participants will be subject to an artificial delay. Given the significant advantage that LEAD Market Makers will enjoy, market makers that are able to qualify will be incentivized to register as LEAD Market Makers as it would be difficult to quote as aggressively as LEAD Market Makers without the same ability to update prices while incoming orders are being delayed. Similarly, competing exchanges will be incentivized to create markets with similar asymmetrical speed bumps in order to eliminate the advantage the CHX could enjoy.[4] However, the potential expansion in volume of LEAD and similar speed bumps is likely to degrade market quality as the displayed liquidity will go from firm quotes to conditional quotes that may change while incoming orders are being artificially delayed.

Conclusion

The CHX LEAD is designed to create a distinct advantage for LEAD Market Makers relative to firms that access displayed prices on CHX as well as non-LEAD Market Makers that provide liquidity on CHX. Any proposal that seeks to give an advantage to a small number of firms in exchange for obligations deserves the highest degree of scrutiny and should only be approved if it demonstrates a corresponding benefit to market quality that more than offsets the harmful effects such policies have on competition. This asymmetrical delay will result in a burden on

[2] Unlike CHX's LEAD, TSX Alpha has a random delay in its speed bump. Alpha is also not considered a protected quote under Canada's Order Protection Rule allowing market participants to bypass its quotes and trade at inferior prices.

[3] *See* Chen, Haoming, Foley, Sean, Goldstein, Michael, and Ruf, Thomas, "The Value of a Millisecond: Harnessing Information in Fast, Fragmented Markets" https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2860359

[4] Since the approval of IEX, CHX has filed the Liquidity Taking Access Delay and the instant proposal and NYSE announced it will seek to implement a speed bump similar to IEX's on NYSE American.

competition and unfairly discriminates in favor of CHX and LEAD Market Makers. LEAD will harm market quality by degrading competition and by enabling inaccessible or conditional quotes that, while present when CHX receives an order, may be canceled during the intentional delay. This appears inconsistent with SEC Rule 602(b) and is, at best, intended to circumvent the rule. Finally, the LEAD is intended to impair the ability of a market participant to access protected quotations, which should render the CHX quotes unprotected under Regulation NMS.

Please do not hesitate to contact me if you have any questions or would like to discuss this letter.

Sincerely,

/s/ Adam Nunes

Adam Nunes
Head of Business Development

October 6, 2016

Brent J. Fields
Secretary
U.S. Securities and Exchange Commission
100 F Street, NE
Washington, D.C. 20549

Re: CHX Liquidity Taking Access Delay
(Release No. 34-78860; SR-CHX-2016-16)

Dear Mr. Fields:

Hudson River Trading LLC ("Hudson River Trading") appreciates the opportunity to comment on the proposed CHX Liquidity Taking Access Delay ("LTAD"). Hudson River Trading is a global, multi-asset class quantitative trading firm that develops automated trading strategies that provide liquidity and facilitate price discovery on exchanges and alternative trading systems.

Hudson River Trading believes it is critical that the Securities and Exchange Commission ("Commission") ensures fair, orderly and efficient markets. Approval of the LTAD would mark a step backwards in terms of fair competition, permissible discrimination among members and market efficiency. While the Commission approved IEX's exchange application that included an intentional delay to access IEX's quotations[1] and approved an interpretation that generally suggested that speed bumps of less than 1 millisecond are *de minimis*,[2] the interpretation did not suggest that any intentional delay is permitted so long as it is less than 1 millisecond. The LTAD does not meet the requirements set forth in the Exchange Act and the LTAD does not meet the requirements set forth in the Commission's Interpretation Regarding Automated Quotations Under Regulation NMS.

The LTAD is designed to intentionally delay orders that could immediately execute against displayed prices on CHX and any cancelations of such orders by 350 microseconds while allowing orders designed to post quotes on CHX to be processed without an intentional delay. CHX justifies the proposal by stating "[T]he Exchange submits that the proposed rules for LTAD are designed to operate in a manner that is consistent with the Act in that they are designed to protect investors and the public interest, are not designed to permit unfair discrimination, and would not impose any unnecessary or inappropriate burden on competition." Contrary to this rote recitation, the proposed rules are not designed to protect investors and the public interest; aim to permit unfair discrimination; and would impose an unnecessary and inappropriate burden on competition. The LTAD is designed to 1) create a distinct advantage for firms engaged in liquidity provision on CHX relative to firms that access displayed prices on CHX; 2) harm

[1] *See* Release No. 34-77406; File No. 10-222
[2] *See* Release No. 34-78102; File No. S7-03-16

market quality by enabling inaccessible and conditional liquidity; and 3) harm the ability to access protected quotations under Regulation NMS.

LTAD is designed to permit unfair discrimination

CHX states that LTAD is in response to a decline in volume and liquidity in SPY. CHX claims that this decline is due to "latency arbitrage," which it defines as "the practice of exploiting disparities in the price of a security or related securities that are being traded in different markets by taking advantage of the time it takes to access and respond to market information."[3] CHX further claims that much of its liquidity "is provided as part of an arbitrage strategy between CHX and the futures markets, whereby liquidity providers utilize, among other things, proprietary algorithms to price and size resting orders on CHX to track index market data from a derivatives market…" CHX fails to make a distinction between what it regards as latency arbitrage and arbitrage between CHX and the futures markets. In fact, what it describes as latency arbitrage could be another firm or firms engaging in a similar arbitrage strategy between CHX and the futures markets that are simply faster and/or more skilled than CHX's liquidity provider(s).[4]

Conveniently, when CHX's preferred market participants engage in the activity of updating prices of SPY due to changes in the price of S&P 500 futures using sophisticated pricing algorithms, it is generally beneficial, whereas when another market participant does the same thing, it "diminishes displayed liquidity and impairs price discovery."[5] To the contrary, as the Commission has stated with respect to Domestic Arbitrage, "We continue to believe that bona fide arbitrage activities are beneficial to the markets because they tend to reduce pricing disparities between related securities and, thereby, promote market efficiency."[6] In fact, the more quickly ETFs and futures reflect the fair value of the index, the more efficient the market is. As such, the LTAD would have the effect of impairing price discovery by allowing stale quotes to persist.

CHX simply describes two or more firms engaged in similar strategies where one firm appears to be inferior to the other(s). It is important to note that the inferiority may be due to speed, but it could also be due to other factors such as an inferior ability to price SPY relative to the S&P futures. CHX has, without understanding why one firm appears inferior to the other(s), decided that the other firms must be engaging in "latency arbitrage." The idea that two firms doing the same thing exhibit varying levels of skill or speed is not surprising – it is a general property of the natural world. Because CHX's preferred member is not the firm that appears to be better at this trade, it seeks to modify its rules in order to tilt the playing field in its preferred member's direction.

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[3] *See* Release No. 34-78860; File No. SR-CHX-2016-16

[4] CHX's analysis of "Too-late-to-cancel" messages demonstrates that more than two-third of such cancels were received more than 350 microseconds after receiving the order that was executed. Given the proximity of the CHX data center to the CME data center, CHX fails to support its claim that time differences of more than 350 microseconds are the result of "latency arbitrage."

[5] *See Supra* note 3

[6] *See* Regulation SHO, Release No. 34-61595; File No. S7-08-09. p 126.

CHX appears to misunderstand the concept of fair competition among market participants and the dynamics of liquidity provision. HRT passively trades several billion dollars every day in US equities and substantially more when including other geographies and asset classes. HRT routinely trades after it has attempted to cancel or update an outstanding order. As a liquidity provider, HRT understands that other firms may be faster than it is, may have better information than it does, and may simply be better at pricing securities than it is, and it must factor that into the displayed prices at which it is willing to buy and sell. This is not a new concept as there have been speed, information and skill advantages since markets have existed.

CHX is proposing to implement a feature that allows it to pick winners and losers. It has no reasonable justification for why it is attempting to discriminate among its market participants, and CHX's commercial interests should not allow it to unfairly discriminate among its members or to put an undue burden on competition among competing exchanges or among its members.

LTAD is not designed to protect investors and the public interest

CHX notes that the LTAD will enhance *displayed liquidity* (emphasis added). Hudson River Trading agrees that the LTAD is likely to enhance displayed liquidity. However, the enhanced displayed liquidity will be made possible by making such displayed liquidity conditional and less accessible. Liquidity providers will have the ability to quote larger sizes and potentially tighter spreads because they will have the option to back away from those quotes during the 350 microsecond delay. CHX does not state why they believe that the LTAD would comply with SEC Rule 602(b), the "Firm Quote Rule." Use of the LTAD could constitute a violation of Rule 602(b) and, at best, it is designed to circumvent the rule. Rule 602(b) requires a broker or dealer to honor its quotes when an order is presented to trade with those prices. The LTAD is designed to delay the incoming order from being presented to provide the broker or dealer additional time to update its prices. Providing the ability to back away from quoted prices and sizes, even in the absence of knowledge of an order to execute against the quote, will harm investors, increase the cost of finding liquidity, and harm price discovery.

Displayed liquidity is only valuable if it is accessible and reflects bona fide trading interest. Granting liquidity providers an asymmetric advantage that allows them to update prices and respond to price changes before others may lead to better displayed quotes, but those quotes will not translate into better executions or market quality for investors. While CHX claims this change – imposing a delay which provides its liquidity providers with a distinct advantage while disadvantaging firms attempting to access this liquidity – will improve its financial standing, it would do so by imposing those costs on the rest of the market. [7]

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[7] A recent study found that the introduction of TSX Alpha, which employs a similar intentional delay on orders that in Canada, has increased adverse selection on other markets while reducing adverse selection on its market. *See* Chen, Haoming, Foley, Sean, Goldstein, Michael, and Ruf, Thomas, "The Value of a Millisecond: Harnessing Information in Fast, Fragmented Markets" https://openconf.s3.amazonaws.com/NFA2016/papers/704.pdf?AWSAccessKeyId=1S4TZ7FHYC2HTER44JG2&Signature=DF4tbtBNwpfwVNK%2F4pHeAHhi%2BSI%3D&Expires=1475518017

LTAD is Inconsistent with Protected Quote status

To the extent that the Commission finds that the LTAD is permissible for CHX to operate as an exchange, it is still inconsistent with Protected Quote status under Regulation NMS. While the approval of IEX, including its intentional delay, blurred what was previously a bright line prohibition against intentional delays, the CHX LTAD proposal is nevertheless significantly different than the IEX delay. As HRT noted in a comment letter on the IEX application, the IEX speed bump has no impact other than to delay the execution of displayed quotes as it relates to incoming orders seeking to execute against them.[8] In this regard, the CHX proposal and IEX differ substantially. IEX applies the same delay to displayed orders and cancellations of protected quotes and incoming marketable orders including Intermarket Sweep Orders ("ISOs"). CHX, on the other hand, treats displayed orders and cancellations of protected quotes and incoming marketable orders disparately. For example, if IEX receives an incoming marketable order followed by a cancelation of a displayed quote 100 microseconds later, it will process them in that order and a trade would occur. If CHX received the same order followed by the same cancelation, it would process the cancelation prior to processing the ISO and no trade would occur. In doing so, CHX makes its protected quotes less accessible.

In the Commission Interpretation on Automated Quotations Under Regulation NMS, the Commission stated that "the term 'immediate' precludes any coding of automated systems or other type of intentional device that would delay the action taken with respect to a quotation unless such delay is *de minimis* in that it would not impair a market participant's ability to fairly and efficiently access a quote, consistent with the goals of Rule 611."[9] The LTAD is specifically designed to impair a market participant's ability to fairly and efficiently access a quote. The revised interpretation clearly disqualifies quotes on CHX subject to the LTAD from Protected Quote status under Regulation NMS.

LTAD would result in an unfair allocation of the SIP market data revenue

While quotes that can be adjusted due to the LTAD will be less accessible and allow liquidity providers to display tighter quotes and larger quoted sizes, as Protected Quotations, they will result in CHX receiving a greater portion of the Securities Information Processor ("SIP") market data revenue. CHX notes that prior to these "unusual messaging patterns," its Time-weighted Average CHX At The NBBO in SPY relative to the total NMS Size At The NBBO in SPY was 44.36% ("Quote Market Share") and its share of volume in SPY was 5.73%. CHX does not note the unusual disparity between its Quote Market Share and its actual market share.[10] It is important to note that CHX encourages market participants to increase its Quote Market Share by sharing a portion of the SIP Market Data Revenue with the participants that contribute to its Quote Market Share.[11]

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[8] *See* Letter to Brent J. Fields, Secretary, SEC, from Adam Nunes, Head of Business Development, Hudson River Trading LLC (December 4, 2015).
[9] *See Supra* note 2.
[10] Indeed, CHX and NSX, which also shares quote revenue (http://www.nsx.com/client/pricing), exhibit extremely high cancel-to-trade ratios, particularly in exchange traded products. *See* https://www.sec.gov/marketstructure/datavis/ma_exchange_canceltotrade.html#.V_KGJpMrLdc.
[11] *See* http://www.chx.com/chxshare/market-data-revenue-sharing.html

CHX appeared to benefit from its geographical distance from the other equities exchanges. This geographical distance may have allowed CHX participants to quote at the NBBO in large size and adjust quotes before orders originating in the NY/NJ area reached CHX. This is consistent with CHX's high Quote Market Share relative to its share of volume prior to a market participant beginning to trade with CHX's displayed liquidity and the fact that when a participant began trading with it, the Quote Market Share dropped dramatically. With the LTAD, CHX market participants could again increase Quote Market Share while the LTAD would allow them to adjust their quotes before they became liable to trade. Such a scheme does not protect or in any way benefit investors; it benefits CHX and its liquidity providers at the cost of other exchanges and market participants.

Conclusion

The CHX LTAD is designed to create a distinct advantage for firms engaged in liquidity provision on CHX relative to firms that access displayed prices on CHX. This asymmetric delay will result in a burden on competition and unfairly discriminates in favor of CHX liquidity providers. The LTAD will harm market quality by enabling inaccessible or conditional quotes that, while present when CHX receives an order, may be canceled during the intentional delay. This appears inconsistent with SEC Rule 602(b) and is, at best, intended to circumvent the rule. Finally, the LTAD is intended to impair the ability of a market participant to access protected quotations, which should render the CHX quotes unprotected under Regulation NMS.

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Sincerely,

/s/ Adam Nunes

Adam Nunes
Head of Business Development