November 1, 2016

VIA E-MAIL

Mr. Brent J. Fields
Secretary
Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549-1090

Re: **Proposed Rule Change to Adopt the CHX Liquidity Taking Access Delay, Rel. 34-78860 (SR-CHX-2016-16)**

Dear Mr. Fields:

CTC Trading Group, L.L.C. on behalf of its wholly-owned subsidiary, CTC, L.L.C.[1] (collectively, "CTC"), appreciates the opportunity to comment in response to the recent Chicago Stock Exchange, Inc. ("CHX") filing (the "Proposal") proposing to adopt a Liquidity Taking Access Delay ("LTAD"),[2] which would introduce a brief delay of 350 microseconds[3] before liquidity-taking orders[4] would be processed by the CHX order book, and which is similar to the more broadly-applicable 350 microsecond delay introduced by IEX and recently approved by the SEC.[5] CTC believes that the Proposal offers an opportunity to enhance U.S. equities and options market structure to the benefit of investors, and recommends its approval.

Market Makers Take Unique Risks to Provide Displayed Liquidity

Liquidity providers such as CTC contribute directly to transparency and price discovery by publicly disseminating the prices at which they would buy and sell a wide range of securities on multiple

[1] CTC was established in January 1998. CTC's business focus is trading in the capacity of an options market maker across asset classes and geographies, and it is currently a registered broker-dealer and a member of the Chicago Board Options Exchange, the C2 Options Exchange, NYSE Arca Options, NYSE Amex Options (NYSE MKT), the International Securities Exchange, and Nasdaq Phlx.

[2] *See* Rel. 34-78860 (SR-CHX-2016-16).

[3] 350 microseconds is on the order of magnitude of one-thousandth of the blink of a human eye. *See* http://bionumbers.hms.harvard.edu//bionumber.aspx?id=100706&ver=1 .

[4] The Proposal defines "Delayable messages" as "New incoming orders received during the Open Trading State that would take liquidity from the CHX book," along with relevant cancel and cancel/replace messages.

[5] *See* Rel. 34-77406 (File No. 10-222).

exchanges. The role of market makers in facilitating risk transfer is particularly important in less-liquid instruments (including many ETFs and, especially, options) where the likelihood of natural buyers and sellers posting simultaneous offsetting orders would otherwise be very low.

Unlike liquidity takers, liquidity providers stand at continuous risk to the market, and—especially to the extent they post a very large number of bids and offers simultaneously—risk significant losses due to instantaneous adverse selection. Professional trading firms with price feeds that are faster than the liquidity provider's by just a few microseconds[6] can be a significant source of such adverse selection. Consequently, market participants who provide liquidity must invest progressively greater sums in direct exchange feeds, ticker plant infrastructure, and related systems in order to avoid being "picked off."[7] These technology expenditures by all parties serve only to protect professional market participants from one another, and do not fill any expressed need for additional speed on the part of investors. Registered market makers are particularly impacted by the associated costs due to exchange-mandated quoting obligations which may require providing continuous liquidity in a large number of instruments simultaneously.

Continued Investment in Speed Has Diminishing Returns

These costs could be justified if they provided meaningful benefit to investors. On the contrary, however, in order to earn a return commensurate with their level of risk, market makers must account for all the costs of running their business when determining the amount of quoted size and the tightest possible bid-ask spread they are able to disseminate to the marketplace. Increased risk of instantaneous adverse selection, and the increased infrastructure costs necessary to mitigate that risk, is therefore a direct cause of market makers quoting wider spreads and/or smaller size in order to generate sufficient risk-adjusted returns—thereby increasing costs for investors. As a result, the endless furtherance of this technology "arms race" acts counter to investor protection and the public interest.[8]

The LTAD Will Enhance Liquidity Provision and Price Discovery

The Liquidity Taking Access Delay proposed by CHX would reduce adverse selection risk for CHX liquidity providers in a very thoughtful and deliberate way. By only delaying liquidity-taking orders, the CHX proposal reduces the disadvantage incurred by those liquidity providers *who are slower by the smallest*

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[6] This includes firms engaging in strategies commonly referred to as "High-Frequency Trading."

[7] "Pickoffs" are trades immediately regretted by one party (for example, because a cancellation request had already been transmitted). Trade executions best serve to advance a fair, orderly, and efficient market when, on average, they represent mutually-beneficial transfer of risk.

[8] Eric Budish (University of Chicago Booth School of Business), Peter Cramton (University of Maryland), and John Shim (University of Chicago Booth School of Business) have modeled this situation, which they identify as "a never-ending arms race for speed," and characterize the result as "a classic prisoner's dilemma: snipers invest in speed to try to win the race to snipe stale quotes; liquidity providers invest in speed to try to get out of the way of the snipers; and all trading firms would be better off if they could collectively commit not to invest in speed, but it is in each firm's private interest to invest." They conclude, "Our results say that sniping is negative for liquidity and that the speed race is socially wasteful." *See* Eric Budish, Peter Cramton, and John Shim (2015). "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response." *Quarterly Journal of Economics*, 130.4. Retrieved from http://faculty.chicagobooth.edu/ eric.budish/research/HFT-FrequentBatchAuctions.pdf.

margin than the corresponding liquidity takers. By helping to establish a market structure where massive technology expenditures are no longer as critical in preventing trading losses, the Proposal will help foster a fairer marketplace with superior liquidity provision and tighter bid-ask spreads, while still providing benefits to those who choose to invest in higher-performance trading systems (since, under the Proposal, when a trade does occur, the first liquidity taker—even if he or she beats out other would-be takers by only a single microsecond or less—will uniquely be able to execute against the entire posted size, if desired). As noted by Prof. Jim Angel of Georgetown University, "Giving the market makers a few microseconds to update their quotes is a reasonable accommodation that will help to promote the posting of public liquidity in the limit order book. This will incentivize market makers to post more liquidity, leading to deeper quotes and tighter bid-ask spreads."[9]

One comment letter states that "[t]he more quickly ETFs and futures reflect the fair value of the index, the more efficient the market is,"[10] suggesting that there is limitless benefit to simply re-pricing the market more and more quickly. CTC agrees with the general objective of re-pricing assets as quickly as is both (1) reasonable within the constraints of technology generally available to liquidity providers, and (2) beneficial to investors. That said, the SEC does not allow market participants to compete on the basis of ever-smaller price increments (one cannot step in front of other participants by outbidding them by a billionth of a cent) or quote sizes (one cannot step in front of other participants by outbidding them for a billionth of a share); on the contrary, common-sense minimum price and size increments are essential to aggregating liquidity and incentivizing the posting of meaningful quotes at risk to the market. Unrestrained competition on the basis of endlessly smaller time increments on the order of a billionth of a second is similarly not beneficial.[11] The Proposal seeks to strike an appropriate balance such that markets can still update prices very quickly while providing reasonable protections to liquidity providers that will result in deeper, tighter quotes.

<u>The IEX Decision Sets Clear Precedent for Approval of the Proposal</u>

CTC understands that Nasdaq PSX proposed a mechanism similar to the LTAD some years ago (but with a much longer delay of five milliseconds), and later withdrew the proposal,[12] presumably because it raised questions at the SEC. The recent approval of the IEX exchange application—and the accompanying interpretation explicitly stating that intentional order processing delays of up to 1,000 microseconds may be considered "*de minimis*" in appropriate circumstances—now provides an explicit new path for approval of the LTAD approach. We urge the Commission not to forego this unique opportunity to allow for a significant and timely enhancement to U.S. equity and options market structure.

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[9] *See* letter from Prof. James J. Angel of Georgetown University, dated October 16, 2016.

[10] *See* letter from Adam Nunes of Hudson River Trading LLC, dated October 6, 2016.

[11] The Commission has rightly pointed to the benefits of "*bona fide* arbitrage" in past releases (*see*, *e.g.*, Regulation SHO, Rel. 34-61595, File No. S7-08-09, p. 126, which speaks to the goal of "reduc[ing] pricing disparities between related securities"). Note, however, that liquidity providers who prevent executions by adjusting their quotes during the 350-microsecond delay in no way reduce the efficacy of the arbitrage mechanism, since even absent the execution, the liquidity provider's updated price will still be the "correct" new price (assuming that the order-sending participant was well informed).

[12] *See* Rels. 34-67680 and 34-67780 (SR-Phlx-2012-106).

Several commenters have objected to the Proposal by rehashing arguments that were submitted, and rejected by the Commission, regarding the recently-approved IEX structure. A recurring theme among these commenters is that the Proposal would somehow harm investors because they could miss executions due to the *de minimis* delay. One commenter suggests that "the LTAD would have the effect of impairing price discovery by allowing stale quotes to persist."[13] Another commenter writes that "[u]nder Reg NMS, traders would in some circumstances be required to route to quotes on CHX, only to have the quotes canceled at the last moment… ."[14] But similar objections were also raised regarding the recently-approved IEX structure, which introduces an identical delay before orders accessing the displayed quote are processed, and which the Commission has already found to be acceptable. (Further, it's likely that such microsecond-level "stale" prices are broadly disseminated today, simply due to normal latency spikes in matching engines and data transmission systems, with no adverse impact to investors, who generally make decisions at vastly longer time scales.)

It should be noted that, if the Proposal were disapproved, CHX could achieve a similar result by (1) providing one order gateway that handles only Post Only orders, including any cancels for such orders; (2) providing a separate order gateway that handles all other orders (i.e., all orders able to take liquidity from the CHX book); and (3) using a coiled wire to add a 350-microsecond delay at the access point for the second gateway only. This (admittedly simplified) hypothetical arrangement is architecturally consistent with aspects of the IEX model already approved by the Commission (and with the architecture of several options exchanges, some of which only permit registered market makers to utilize their fastest binary connection protocol—thereby effectively slowing down orders from everyone else), and would exhibit behavior very similar to that of the system envisioned by the Proposal. Instead of taking such an approach, CHX is providing appropriate transparency by engaging in the rulemaking process with explicit Commission oversight. As a result, it's difficult to see why the Proposal should not be approved.

Ancillary Questions Regarding CHX Revenues and Market Share are Not Germane to the Proposal

Several commenters raise concerns about SIP fee allocation, or question details about CHX's market share in SPY or its profit motive in promulgating the Proposal. CTC submits that if problems with SIP revenue allocation practices exist (or may arise in the future), those practices should be addressed separately from the review of the Proposal, and that the impact of the Proposal on CHX's market share or profitability is not germane to whether it should be adopted.

Innovation Is Not "Undue Competitive Burden"

One commenter states that the Proposal "unfairly discriminates against … liquidity providers on other exchanges" and would "place an undue competitive burden on other exchanges to implement similar asymmetric access delays in order to attract liquidity providers."[15] To our knowledge, however, the Commission has never adopted the view that the introduction by an exchange of a competitive new

[13] *See* letter from Adam Nunes.

[14] *See* letter from Joanna Mallers of FIA Principal Traders Group, dated October 13, 2016.

[15] *See* letter from Adam C. Cooper of Citadel Securities, dated October 13, 2016.

feature that attracts market participants *ipso facto* introduces an "undue competitive burden"—rather, this is the definition of healthy competition whereby each exchange has an incentive to adopt and improve upon the best features introduced by its peers. The Securities Exchange Act of 1934 (the "Act") does not prohibit exchanges from implementing innovative new features that competitors may find it in their interests to replicate.

<u>The Proposal Would Reduce the Level of Discrimination in the Marketplace</u>

Another commenter suggests that because the speed bump will be implemented in software rather than hardware, there will be some degree of indeterminacy in the precise amount of latency introduced, and that "[b]ecause of this indeterminacy alone the SEC should reject the rule filing."[16] By this logic, the SEC should disallow the use of software to build exchange matching engines altogether, since doing so may also introduce some small degree of indeterminacy. This commenter also objects that the Proposal "discriminates in favor of market participants who subscribe to the CME's data feeds and have the capital and sophistication to speedily gather and process intermarket signals." On the contrary, a 350 microsecond speed bump could benefit *any* market participant (even one using an arbitrarily slow source of market data) who posts an order to the extent they would otherwise be traded against by another participant with identical information but a slightly faster data feed. In any event, we note that the Act does not prohibit discrimination, only *unfair* discrimination; the speed bump makes CHX's market structure manifestly more fair.

Another commenter[17] alleges that "[the Proposal] is designed to … create a distinct advantage for firms engaged in liquidity provision on CHX relative to firms that access displayed prices" and suggests that this constitutes unfair discrimination. This comment fails to recognize that liquidity providers adopt a risk that liquidity takers do not: the risk of being picked off by participants who have any speed advantage whatsoever in exchange connectivity or market data processing (if a firm engages in a purely liquidity-taking strategy using only Immediate-Or-Cancel orders, it cannot possibly be "picked off" due to having sent a cancellation one microsecond too late). Again, reducing the degree of this existing risk does not introduce unfair discrimination—on the contrary, it will help to make liquidity more available to end investors. As noted by Prof. Eric Budish of the University of Chicago, "It is … especially important to protect displayed limit orders from latency arbitrage, which the LTAD does."[18]

<u>Under the Proposal, Orders Are Not Presented Prior to the LTAD</u>

At least two commenters suggest that the Proposal would violate Rule 602(b) (the "Quote Rule"). In particular, one states that the Proposal "would allow for members to cancel or re-price quotes after an order sought to be executed is presented, which is inconsistent with the Quote Rule."[19] However, this interpretation is at odds with the clear language of the Quote Rule. Rule 602(b)(2) states that the broker or dealer's obligation is to execute orders "presented *to it* [i.e., not to the exchange] by another

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[16] *See* letter from R.T. Leuchtkafer dated September 29, 2016.

[17] *See* letter from Adam Nunes.

[18] *See* letter from Prof. Eric Budish of the University of Chicago Booth School of Business, dated October 13, 2016.

[19] *See* letter from Elizabeth King of NYSE, dated October 14, 2016.

broker or dealer," and 602(b)(3)(ii)(A) explicitly provides for an exception if "*before the order sought to be executed is presented*, such responsible broker or dealer has communicated to its exchange or association … a revised bid or offer" (emphasis added). Because CHX is not proposing to provide any notification of any kind to a liquidity provider indicating that an inbound order has been delayed by the LTAD and may imminently execute, it is clear that no "presentation" to the liquidity provider has occurred, and therefore any revised bid or offer from the liquidity provider that is received before the end of the delay would not represent a violation of the Quote Rule.

The Proposal Could Be More Narrowly Tailored by Imposing Market Maker Obligations

We recommend the Proposal's approval in its current form, which would add valuable protections for all market participants who post liquidity on CHX. However, should the Commission find that the Proposal is too broadly applicable, it could be more narrowly tailored by stipulating that the LTAD only apply to orders which would take liquidity from *market makers meeting heightened quoting obligations.* In disapproving a proposed rule change by NYSE Amex in 2012, the Commission wrote that "while exchanges may legitimately confer special benefits on market participants willing to accept substantial responsibilities to contribute to market quality, such benefits must not be disproportionate to the services provided."[20] Strengthened quoting obligations would provide a clear metric for services provided in contributing to market quality. Accordingly, in the event that the Commission finds the Proposal unacceptable in its current form, we would respectfully suggest that it include language in any disapproval order stating that requiring liquidity providers to comply with appropriately robust quoting obligations in order to benefit from the LTAD would render it acceptable.

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For all of the reasons cited above, we encourage the Commission to approve the Proposal. We note that the issues referenced here have a much broader impact than just one exchange's rule set. We believe that speedy approval of the Proposal will reduce unfair discrimination on the basis of how much firms are willing to pay for extremely high-performance technology infrastructure, protect investors and the public interest by enhancing price discovery and transparent liquidity provision through improved disseminated quotes, and continue to remove impediments to the operation of fair and orderly markets that arise from the trading technology arms race—all directly in line with the explicit goals of the Exchange Act.

[20] *See* Rel. 67437 (SR-NYSEAmex-2011-86).

Should you have any questions with respect to this letter, we would welcome the opportunity to discuss it further. We appreciate the opportunity to respond.

Sincerely,

Steve Crutchfield
Head of Market Structure

cc: The Honorable Mary Jo White, Chair
The Honorable Michael S. Piwowar, Commissioner
The Honorable Kara M. Stein, Commissioner
Mr. Stephen Luparello, Director, Division of Trading and Markets
Mr. Gary Goldsholle, Deputy Director, Division of Trading and Markets
Mr. David S. Shillman, Associate Director, Division of Trading and Markets