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SECURITIES AND EXCHANGE COMMISSION
(Release No. 34-76548; File No. SR-OCC-2015-804)

Self-Regulatory Organizations; The Options Clearing Corporation; Notice of No Objection to Advance Notice Filing to Modify The Options Clearing Corporation's Margin Methodology by Incorporating Variations in Implied Volatility

December 3, 2015

On October 5, 2015, The Options Clearing Corporation ("OCC") filed with the Securities and Exchange Commission ("Commission") the advance notice SR-OCC-2015-804 pursuant to section 806(e)(1) of the Payment, Clearing, and Settlement Supervision Act of 2010 ("Payment, Clearing and Settlement Supervision Act")¹ and Rule 19b-4(n)(1)(i) under the Securities Exchange Act of 1934 ("Exchange Act").² The advance notice was published for comment in the **Federal Register** on November 17, 2015.³ The Commission did not receive any comments on the advance notice

¹ 12 U.S.C. 5465(e)(1). The Financial Stability Oversight Council designated OCC a systemically important financial market utility on July 18, 2012. *See* Financial Stability Oversight Council 2012 Annual Report, Appendix A, <http://www.treasury.gov/initiatives/fsoc/Documents/2012%20Annual%20Report.pdf>. Therefore, OCC is required to comply with the Payment, Clearing, and Settlement Supervision Act and file advance notices with the Commission. *See* 12 U.S.C. 5465(e).

² 17 CFR 240.19b-4(n)(1)(i).

³ Securities Exchange Act Release No. 76421 (November 10, 2015), 80 FR 71900 (November 17, 2015) (SR-OCC-2015-804). OCC also filed a proposed rule change with the Commission pursuant to section 19(b)(1) of the Exchange Act and Rule 19b-4 thereunder, seeking approval of changes to its rules necessary to implement the proposal. 15 U.S.C. 78s(b)(1) and 17 CFR 240.19b-4, respectively. *See* Exchange Act Release 76128 (October 13, 2015), 80 FR 63264 (October 19, 2015) (SR-OCC-2015-016). The Commission did not receive any comments on the proposed rule change.

publication. This publication serves as a notice that the Commission does not object to the changes set forth in the advance notice.

I. Description of the Advance Notice

According to OCC, it is modifying its margin methodology by more broadly incorporating variations in implied volatility within OCC's System for Theoretical Analysis and Numerical Simulations ("STANS").⁴ As explained below, OCC believes that expanding the use of variations in implied volatility within STANS for substantially all⁵ option contracts available to be cleared by OCC that have a residual tenor⁶ of less than three years ("Shorter Tenor Options") will enhance OCC's ability to ensure that option prices and the margin coverage related to such positions more appropriately reflect possible future market value fluctuations and better protect OCC in the event it must liquidate the portfolio of a suspended clearing member.

Implied Volatility in STANS Generally

According to OCC, STANS is OCC's proprietary risk management system that calculates clearing members' margin requirements. According to OCC, the STANS

⁴ This proposal did not propose any changes concerning futures. According to OCC, OCC uses a different system to calculate initial margin requirements for segregated futures accounts: Standard Portfolio Analysis of Risk Margin Calculation System.

⁵ According to OCC, it proposes to exclude: (i) binary options, (ii) options on energy futures, and (iii) options on U.S. Treasury securities. OCC excluded them because: (i) they are new products that were introduced as OCC was completing this proposal and (ii) OCC did not believe that there was substantive risk if they were excluded at this time because they only represent a *de minimis* open interest. According to OCC, it plans to modify its margin methodology to accommodate these new products.

⁶ According to OCC, the "tenor" of an option is the amount of time remaining to its expiration.

methodology uses Monte Carlo simulations to forecast price movement and correlations in determining a clearing member's margin requirement. According to OCC, under STANS, the daily margin calculation for each clearing member account is constructed to ensure OCC maintains sufficient financial resources to liquidate a defaulting member's positions, without loss, within the liquidation horizon of two business days.

As described by OCC, the STANS margin requirement for an account is composed of two primary components: a base component and a stress test component. According to OCC, the base component is obtained from a risk measure of the expected margin shortfall for an account that results under Monte Carlo price movement simulations. For the exposures that are observed regarding the account, the base component is established as the estimated average of potential losses higher than the 99% VaR⁷ threshold. In addition, OCC augments the base component using the stress test component. According to OCC, the stress test component is obtained by considering increases in the expected margin shortfall for an account that would occur due to:

- (i) market movements that are especially large and/or in which certain risk factors would exhibit perfect or zero correlations rather than correlations otherwise estimated using historical data or
- (ii) extreme and adverse idiosyncratic movements for individual risk factors to which the account is particularly exposed.

According to OCC, including variations in implied volatility within STANS is intended to ensure that the anticipated cost of liquidating each Shorter Tenor Option position in an account recognizes the possibility that implied volatility could change

⁷ The term "value at risk" or "VaR" refers to a statistical technique that, generally speaking, is used in risk management to measure the potential risk of loss for a given set of assets over a particular time horizon.

during the two business day liquidation time horizon in STANS and lead to corresponding changes in the market prices of the options. According to OCC, generally speaking, the implied volatility of an option is a measure of the expected future volatility of the value of the option's annualized standard deviation of the price of the underlying security, index, or future at exercise, which is reflected in the current option premium in the market. Using the Black-Scholes options pricing model, the implied volatility is the standard deviation of the underlying asset price necessary to arrive at the market price of an option of a given strike, time to maturity, underlying asset price and given the current risk-free rate. In effect, the implied volatility is responsible for that portion of the premium that cannot be explained by the then-current intrinsic value⁸ of the option, discounted to reflect its time value. According to OCC, it currently incorporates variations in implied volatility as risk factors for certain options with residual tenors of at least three years ("Longer Tenor Options").

Implied Volatility for Shorter Tenor Options

OCC is proposing certain modifications to STANS to more broadly incorporate variations in implied volatility for Shorter Tenor Options. Consistent with its approach for Longer Tenor Options, OCC will model a volatility surface⁹ for Shorter Tenor Options by incorporating into the econometric models underlying STANS certain risk

⁸ According to OCC, generally speaking, the intrinsic value is the difference between the price of the underlying and the exercise price of the option.

⁹ According to OCC, the term "volatility surface" refers to a three-dimensional graphed surface that represents the implied volatility for possible tenors of the option and the implied volatility of the option over those tenors for the possible levels of "moneyness" of the option. According to OCC, the term "moneyness" refers to the relationship between the current market price of the underlying interest and the exercise price.

factors regarding a time series of proportional changes in implied volatilities for a range of tenors and absolute deltas. Shorter Tenor Option volatility points will be defined by three different tenors and three different absolute deltas, which produce nine “pivot points.” In calculating the implied volatility values for each pivot point, OCC will use the same type of series-level pricing data set to create the nine pivot points that it uses to create the pivot points used for Longer Tenor Options, so that the nine pivot points will be the result of a consolidation of the entire series-level dataset into a smaller and more manageable set of pivot points before modeling the volatility surface.

According to OCC, it considered incorporating more than nine pivot points but concluded that would not be appropriate for Shorter Tenor Options because: (i) back-testing results, from January 2008 to May 2013, revealed that using more pivot points did not produce more meaningful information (i.e. more pivot points produced a comparable number of under-margined instances) and (ii) given the large volume of Shorter Tenor Options, using more pivot points could increase computation time and, therefore, would impair OCC from making timely calculations.

Under OCC’s model for Shorter Tenor Options, the volatility surfaces will be defined using tenors of one month, three months, and one year with absolute deltas, in each case, of 0.25, 0.5, and 0.75,¹⁰ thus resulting in the nine implied volatility pivot points. OCC believes that it is appropriate to focus on pivot points representing at- and near-the-money options because prices for those options are more sensitive to variations

¹⁰ According to OCC, given that premiums of deep-in-the-money options (those with absolute deltas closer to 1.0) and deep-out-of-the-money options (those with absolute deltas closer to 0) are insensitive to changes in implied volatility, in each case notwithstanding increases or decreases in implied volatility over the two business day liquidation time horizon, those higher and lower absolute deltas have not been selected as pivot points.

in implied volatility over the liquidation time horizon of two business days. According to OCC, four factors explain 99% variance of implied volatility movements: (i) a parallel shift of the entire surface; (ii) a slope or skewness with respect to delta; (iii) a slope with respect to time to maturity; and (iv) a convexity with respect to the time to maturity. According to OCC, the nine correlated pivot points, arranged by delta and tenor, give OCC the flexibility to capture these factors.

According to OCC, it first will use its econometric models to jointly simulate changes to implied volatility at the nine pivot points and changes to underlying prices.¹¹ For each Shorter Tenor Option in the account of a clearing member, changes in its implied volatility then will be simulated according to the corresponding pivot point and the price of the option will be computed to determine the amount of profit or loss in the account under the particular STANS price simulation. Additionally, as OCC does today, it will continue to use simulated closing prices for the assets underlying options in the account of a clearing member that are scheduled to expire within the liquidation time horizon of two business days to compute the options' intrinsic value and use those values to help calculate the profit or loss in the account.¹²

Effects of the Proposed Change and Implementation

OCC believes that the proposed change will enhance OCC's ability to ensure that STANS appropriately takes into account normal market conditions that OCC may

¹¹ According to OCC, STANS relies on 10,000 price simulation scenarios that are based generally on a historical data period of 500 business days, which is updated monthly to keep model results from becoming stale.

¹² For such Shorter Tenor Options that are scheduled to expire on the open of the market rather than the close, OCC will use the relevant opening price for the underlying assets.

encounter in the event that, pursuant to OCC Rule 1102, it suspends a defaulted clearing member and liquidates its accounts.¹³ Accordingly, OCC believes that the change will promote OCC's ability to ensure that margin assets are sufficient to liquidate the accounts of a defaulted clearing member without incurring a loss.

OCC estimates that this change generally will increase margin requirements overall, but will decrease margin requirements for certain accounts with certain positions. Specifically, OCC expects this change to increase aggregate margins by about 9% (\$1.5 billion). OCC also estimates the change will most significantly affect customer accounts and least significantly affect firm accounts, with the effect on market maker accounts falling in between.

According to OCC, it expects customer accounts to experience the largest margin increases because positions considered under STANS for customer accounts typically consist of more short than long options positions, and therefore reflect a greater magnitude of directional risk than other account types. According to OCC, positions considered under STANS for customer accounts typically consist of more short than long options positions to facilitate clearing members' compliance with Commission requirements for the protection of certain customer property under Exchange Act Rule 15c3-3(b).¹⁴ Therefore, OCC segregates the long option positions in the customer

¹³ According to OCC, under authority in OCC Rules 1104 and 1106, OCC has authority to promptly liquidate margin assets and options positions of a suspended clearing member in the most orderly manner practicable, which might include, but would not be limited to, a private auction.

¹⁴ 17 CFR 240.15c3-3(b).

accounts of each clearing member and does not assign the long option positions any value when determining the margin for the customer account, resulting in higher margin.¹⁵

OCC expects margin requirements to decrease for accounts with underlying exposure and implied volatility exposure in the same direction, such as concentrated call positions, due to the negative correlation typically observed between these two factors. According to OCC, over the back-testing period, about 28% of the observations for accounts on the days studied had lower margins under the proposed methodology and the average reduction was about 2.7%. Parallel results will be made available to the membership in the weeks ahead of implementation.

To help clearing members prepare for the proposed change, OCC has provided clearing members with an information memorandum explaining the proposal, including the planned timeline for its implementation, and discussed with certain other clearinghouses the likely effects of the change on OCC's cross-margin agreements with them. OCC also published an information memorandum to notify clearing members of the submission of this filing to the Commission. Subject to all necessary regulatory approvals regarding the proposed change, OCC intends to begin making parallel margin calculations with and without the changes in the margin methodology. The commencement of the calculations will be announced by an information memorandum, and OCC will provide the calculations to clearing members each business day. OCC also

¹⁵ See OCC Rule 601(d)(1). According to OCC, pursuant to OCC Rule 611, however, a clearing member, subject to certain conditions, may instruct OCC to release segregated long option positions from segregation. Long positions may be released, for example, if they are part of a spread position. Once released from segregation, OCC receives a lien on each unsegregated long securities option carried in a customers' account and therefore OCC permits the unsegregated long to offset corresponding short option positions in the account.

will provide at least thirty days prior notice to clearing members before implementing the change. OCC believes that clearing members will have sufficient time and data to plan for the potential increases in their respective margin requirements.

II. Discussion and Commission Findings

Although the Payment, Clearing and Settlement Supervision Act does not specify a standard of review for an advance notice, its stated purpose is instructive.¹⁶ The stated purpose is to mitigate systemic risk in the financial system and promote financial stability by, among other things, promoting uniform risk management standards for systemically important financial market utilities and strengthening the liquidity of systemically important financial market utilities.¹⁷ Section 805(a)(2) of the Payment, Clearing and Settlement Supervision Act¹⁸ authorizes the Commission to prescribe risk management standards for the payment, clearing, and settlement activities of designated clearing entities and financial institutions engaged in designated activities for which it is the Supervisory Agency or the appropriate financial regulator. Section 805(b) of the Payment, Clearing and Settlement Supervision Act¹⁹ states that the objectives and principles for the risk management standards prescribed under section 805(a) shall be to:

- promote robust risk management;
- promote safety and soundness;
- reduce systemic risks; and

¹⁶ See 12 U.S.C. 5461(b).

¹⁷ *Id.*

¹⁸ 12 U.S.C. 5464(a)(2).

¹⁹ 12 U.S.C. 5464(b).

- support the stability of the broader financial system.

The Commission has adopted risk management standards under section 805(a)(2) of the Payment, Clearing and Settlement Supervision Act²⁰ and the Exchange Act (“Clearing Agency Standards”).²¹ The Clearing Agency Standards require registered clearing agencies to establish, implement, maintain, and enforce written policies and procedures that are reasonably designed to meet certain minimum requirements for their operations and risk management practices on an ongoing basis.²² Therefore, it is appropriate for the Commission to review advance notices against these Clearing Agency Standards and the objectives and principles of these risk management standards as described in section 805(b) of the Payment, Clearing and Settlement Supervision Act.²³

The Commission believes that the proposal in the advance notice is consistent with the Clearing Agency Standards, in particular, Rule 17Ad-22(b)(2) under the Exchange Act.²⁴ Rule 17Ad-22(b)(2) under the Exchange Act²⁵ requires OCC to establish, implement, maintain and enforce written policies and procedures reasonably designed to use margin requirements to limit its credit exposures to participants under normal market conditions and use risk-based models and parameters to set margin

²⁰ 12 U.S.C. 5464(a)(2).

²¹ See 17 CFR 240.17Ad-22. Securities Exchange Act Release No. 68080 (October 22, 2012), 77 FR 66220 (November 2, 2012) (S7-08-11).

²² *Id.*

²³ 12 U.S.C. 5464(b).

²⁴ 17 CFR 240.17Ad-22(b)(2).

²⁵ *Id.*

requirements, among other things. Through this proposal, OCC is modifying its margin methodology, which is designed to use margin requirements to limit its credit exposures to clearing members holding Shorter Tenor Options under normal market conditions. Specifically, OCC is modifying its risk-based model, STANS, to set margin requirements in a way that includes changes in implied volatility for Shorter Tenor Options. With this change in place, STANS is now designed to recognize a range of possible changes in implied volatility during the two business day liquidation time horizon that could lead to corresponding changes in the market prices of Shorter Tenor Options. Therefore, OCC's change is consistent with Rule 17Ad-22(b)(2) under the Exchange Act.²⁶

The Commission believes that OCC's proposal is consistent with the objectives and principles described in section 805(b) of the Payment, Clearing and Settlement Supervision Act,²⁷ including that it is consistent with promoting robust risk management and promoting safety and soundness. The Commission believes that the proposal is consistent with promoting risk management because, with this change, STANS is now designed to recognize the possibility that implied volatility could change during the two business day liquidation time horizon and lead to corresponding changes in the market prices of the options. This change to STANS is consistent with promoting robust risk management because it is designed so that OCC now will be less likely to face operational disruption in the event of a participant default.

This change also is consistent with promoting safety and soundness of OCC. As a result of this proposal, STANS is now designed to recognize a range of possible changes

²⁶ *Id.*

²⁷ 12 U.S.C. 5464(b).

in implied volatility during the two business day liquidation time horizon that could lead to corresponding changes in the market prices of Shorter Tenor Options. This change is designed to enable OCC to more accurately calculate the amount of margin a member must post, and, therefore, make it less likely, in the event of a member default, that OCC will need to access mutualized clearing fund deposits to cover losses associated with such member's default, which is consistent with promoting safety and soundness.

For these reasons, the Commission does not object to the advance notice.

III. Conclusion

IT IS THEREFORE NOTICED, pursuant to section 806(e)(1)(I) of the Payment, Clearing and Settlement Supervision Act,²⁸ that the Commission DOES NOT OBJECT to the proposed change, and AUTHORIZES OCC to implement the change in this advance notice (SR-OCC-2015-804) as of the date of this notice or the date of an order by the Commission approving a proposed rule change that reflects rule changes that are consistent with this advance notice (SR-OCC-2015-016), whichever is later.

By the Commission.

Robert W. Errett
Deputy Secretary

²⁸ 12 U.S.C. 5465(e)(1)(I).

