

SUBMISSION COVER SHEET

IMPORTANT: Check box if Confidential Treatment is requested

Registered Entity Identifier Code (optional): 19-213R

Organization: Chicago Mercantile Exchange Inc. ("CME")

Filing as a: DCM SEF DCO SDR

Please note - only ONE choice allowed.

Filing Date (mm/dd/yy): July 5, 2019 Filing Description: Adoption of a New Framework for Initial Margin Calculations

SPECIFY FILING TYPE

Please note only ONE choice allowed per Submission.

Organization Rules and Rule Amendments

- Certification § 40.6(a)
- Approval § 40.5(a)
- Notification § 40.6(d)-
- Advance Notice of SIDCO Rule Change § 40.10(a)
- SIDCO Emergency Rule Change § 40.10(h)

Rule Numbers: See filing.

New Product

Please note only ONE product per Submission.

- Certification § 40.2(a)
- Certification Security Futures § 41.23(a)
- Certification Swap Class § 40.2(d)
- Approval § 40.3(a)
- Approval Security Futures § 41.23(b)
- Novel Derivative Product Notification § 40.12(a)
- Swap Submission § 39.5

Official Product Name:

Product Terms and Conditions (product related Rules and Rule Amendments)

- Certification § 40.6(a)
- Certification Made Available to Trade Determination § 40.6(a)
- Certification Security Futures § 41.24(a)
- Delisting (No Open Interest) § 40.6(a)
- Approval § 40.5(a)
- Approval Made Available to Trade Determination § 40.5(a)
- Approval Security Futures § 41.24(c)
- Approval Amendments to enumerated agricultural products § 40.4(a), § 40.5(a)
- "Non-Material Agricultural Rule Change" § 40.4(b)(5)
- Notification § 40.6(d)

Official Name(s) of Product(s) Affected:

Rule Numbers:



Christopher Bowen
Managing Director and Chief Regulatory Counsel
Legal Department

July 5, 2019

VIA ELECTRONIC PORTAL

Mr. Christopher J. Kirkpatrick
Office of the Secretariat
Commodity Futures Trading Commission
Three Lafayette Centre
1155 21st Street, N.W.
Washington, DC 20581

**Re: Regulation 40.10(a) Submission – Adoption of a New Framework for Initial Margin Calculations
CME Submission No.19-213R**

Dear Mr. Kirkpatrick:

The clearing house division of the Chicago Mercantile Exchange Inc. (“**CME**” or the “**Clearing House**”), in its capacity as a registered derivatives clearing organization (“**DCO**”) and a systemically important DCO (“**SIDCO**”),¹ hereby provides advance notice to the Commodity Futures Trading Commission (“**CFTC**” or “**Commission**”) that it intends to adopt a new framework to calculate initial margin (performance bond) requirements² for CME-cleared products (the “**New Framework**”).³ The New Framework will closely track the risk posed by such products to the Clearing House by prudently adapting to prevailing market conditions, and through margin requirements that are tailored for specific products and portfolios based on a variety of risk factors.⁴

¹ On July 18, 2012, Chicago Mercantile Exchange Inc. was designated as a systemically important financial market utility under Title VIII of the Dodd-Frank Act.

² The initial margin requirements discussed in this notice refer to the actual risk performance bond amounts calculated by the Clearing House. Such amounts, commonly known as the maintenance portion of an initial performance bond requirement, coincide with the minimum amount of performance bond equity that must be maintained in any account with open positions.

³ This advance notice is accompanied by supporting documentation and analysis for which confidential treatment has been requested. Additionally, as with margin methodologies for certain cleared swaps, the Clearing House maintains a “Whitepaper” that describes key aspects of the New Framework in mathematical terms. The Whitepaper is periodically revised and is available to Commission staff for review upon request.

⁴ Risk factors are a set of factors that impact price returns for a given product. For example, the risk factors for a prompt month WTI futures contract under the New Framework are derived from WTI futures contracts with expiries beyond the front month (*i.e.*, dozens of other futures contracts beyond the front month that comprise the relevant forward pricing curve). By way of another example, seasonal volatility (captured in curves reflecting price changes associated with specific points in time during the calendar year) in CME’s Henry Hub Natural Gas futures contract is a risk factor that differs from the seasonality risk factor in its PJM Western Hub Real-Time Off-Peak Calendar-Month 5 MW futures contract.

More specifically, the New Framework will use a filtered historical value-at-risk (“**HVaR**”)⁵ methodology, among other things, to:

- produce prudent initial margin requirements by analyzing the actual losses that would have been incurred by a given portfolio based on historical scenarios, and by taking into account the market conditions that existed during the time of that historical scenario sampling;
- provide a single, unified margining framework capable of supporting all CME futures and options (as well as swaps and cash products if desired);⁶
- yield precise and efficiently-determined margin calculations for the increasing number and diversity of products traded in today’s markets;
- self-adapt to changes in market volatility and risk conditions with reduced manual intervention to determine initial margin, including with respect to anti-procyclicality measures;
- prudently account for risk offsets by capturing the effects of highly interrelated risk factors embedded in the historical data that provides the foundation for the New Framework’s risk estimates;
- utilize hypothetical scenarios, in addition to historical scenarios, as may be prudent to account for potential market conditions;
- provide an enhanced approach to capturing liquidity and concentration risks beyond the risk posed by changes in the market value of positions;
- allow for a straightforward extension of risk horizons from one day to multiple days for risk analysis and margin computation purposes; and
- facilitate greater transparency to the marketplace through risk reports that attribute portfolio level risks to granular components or risk factors.

CME intends to adopt the New Framework for CME Base Guaranty Fund Products with the exception of cleared foreign exchange swaps.⁷ Initially, CME will apply the New Framework to approximately 150

⁵ As described further in Section 2a, below, a filtered HVaR methodology is one that “scale[s] the historical data based on some estimate of current conditions, so that if current conditions are less volatile then they ‘damp down’ the risk estimate, while if conditions are more volatile, they ‘turn them up’. Models like this have demonstrated improved risk estimates compared to unfiltered first generation VaR, and hence [they] have become widely used by financial institutions.” Gurrola-Perez, Pedro and David Murphy, Working Paper No. 525, Filtered historical simulation Value-at-Risk models and their competitors at 4 (March 2015), *available at*: <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2015/filtered-historical-simulation-value-at-risk-models-and-their-competitors.pdf?la=en&hash=34BF0E24DB60656E044E3DB5524E08DF5D0112D3>.

⁶ The New Framework is product-agnostic in that its components and modules do not have to be redesigned for risk margining purposes when new product groupings are incorporated. While the New Framework could therefore be used to calculate initial margin for all CME-cleared products, including interest rate and foreign exchange swaps, CME does not presently intend to migrate these swaps to the New Framework.

⁷As defined in CME Rule 802.A, Base Guaranty Fund Products are CME-cleared products other than interest rate swaps, including any positions commingled with interest rate swaps pursuant to CME Rule 8G831. Cleared over-the-counter interest rate swaps (“**OTC IRS**”) are HVaR-margined in a manner that is consistent with the New Framework but are supported by a separate guaranty fund. Over-the-counter foreign exchange (“**OTC FX**”) products are Base Guaranty Fund Products, but will continue to be margined under a Commission-approved methodology that has been specifically customized for such products and their particular characteristics. As with IRS, OTC FX products are HVaR-margined in a manner that is consistent with the New Framework. The Clearing House does not presently intend to migrate OTC FX products to the New Framework.

major energy futures and options products. Thereafter, CME will migrate additional New York Mercantile Exchange, Inc. (“**NYMEX**”) energy products and other Base Guaranty Fund Products to the New Framework. Such future non-energy product group extensions, as well as changes in the application of the New Framework that incorporate new systematically utilized risk calculation features within the New Framework’s components,⁸ will be submitted to the Commission in accordance with required procedures.⁹ During the implementation phase, products that have not yet been migrated to the New Framework will continue to be margined under the Clearing House’s current initial margin framework.¹⁰

This advance notice seeks to implement the New Framework as an enhanced means for calculating initial margins (including intra-day initial margins and any potential ad-hoc initial margin calls). Adopting the New Framework, however, will not require the Clearing House to amend: (1) its methodology for calculating settlement variation or options premiums; (2) the types of assets accepted by the Clearing House for margin purposes; (3) the manner by which the Clearing House collects or holds initial or variation margin; (4) the methodology for assessing the adequacy of Clearing House financial resources; or (5) the Clearing House’s default management rules or procedures.

Pursuant to Commission Regulation 40.10, CME hereby submits this advance notice describing the nature of the changes to its existing framework for calculating initial margins.

1. **Background**

a. **CME’s Current Margin Models**

CME historically has used the Standard Portfolio Analysis of Risk framework (“**SPAN**”) to determine margin requirements for all of its listed products. CME developed and implemented SPAN in 1988. SPAN was the first margining framework to calculate margins on the basis of the overall risk of a portfolio within the clearing house and exchange domain.

The SPAN framework uses a representative number of market simulations of underlying price, volatility and implied volatility shocks, along with time to expiration reductions, to arrive at appropriate margin levels. More specifically, SPAN applies 16 hypothetical scenarios representing different maximum price and volatility changes to compartmentalized groupings of related products held in a given portfolio during a given time frame, while discounting basis risk across related products. The largest loss from these 16 scenarios represents each grouping’s maximum potential loss, and, when aggregated, the maximum potential loss that the portfolio could sustain over the applicable time frame. The shock magnitudes for both price and volatility parameters, as well as changes in the time to expiry parameter, can be calibrated through SPAN to cover a myriad of potential market moves.

⁸ Risk calculation features and the New Framework’s components are discussed in Sections 2c(iii) and 2b(i), respectively, below.

⁹ Such risk calculation features may include incorporating previously unutilized techniques such as moment adjustments which may be beneficial to margining products other than energy futures and options.

¹⁰ Phased product migration to the New Framework and the recognition of offsets during implementation are discussed further in Section 4 below.

The SPAN framework then applies an intra-commodity spread charge to account for the initial discounting of basis risks from calendar spread positions in each product grouping, and applies inter-commodity spread credits to recognize the risk reducing aspects of highly correlated products. Ultimately, the Clearing House uses the results calculated under SPAN in an additive manner to set a final, total margin requirement.

SPAN continues to be a highly effective risk management tool for the Clearing House. Among other things, it “provides transparency and replicability, as well as increased flexibility in determining margin requirements.”¹¹ However, SPAN was developed when there were far fewer futures and options products and less diversity in those products, and when portfolio risk calculations required less cross-product risk analysis. The derivatives markets have evolved significantly since SPAN was initially implemented.

Partly in anticipation of the considerable growth in the number of products cleared at CME and in the diversity of often interrelated risk factors that impact their value, CME has already commenced a transition to a filtered HVaR methodology for certain of its products. For example, CME, with the Commission’s approval, uses a filtered HVaR methodology for margining OTC IRS and OTC FX products, as well as qualifying futures products that may be commingled in OTC IRS or OTC FX cleared swaps accounts.¹²

The New Framework would enable CME to extend a filtered HVaR methodology to all cleared products. As elaborated further in Section 2b(i), below, the modularity of the New Framework is well-suited for efficiently calculating maximum potential losses for the considerable number of diverse products and portfolios that CME clears today.

b. History of HVaR and HVaR-Based Methodologies

Value-at-Risk (“**VaR**”) reflects “the maximum potential loss that would be incurred at a given probability ‘p’ for a financial instrument or portfolio during a given frame of time.”¹³ The modern principles underlying VaR began to emerge as far back as the 1920s.¹⁴ In 1980, the Securities and Exchange Commission updated certain mandatory haircuts applied to a firm’s capital, which were “intended to

¹¹ See Committee on Payments and Market Infrastructures-Board of International Organization of Securities Commissions, *Implementation monitoring of PFMI: Level 3 assessment – Report on the financial risk management and recovery practices of 10 derivatives CCPs* at 67 (Aug. 2016).

¹² On October 12, 2012, CME received Commission approval to commingle significantly and reliably correlated futures and OTC IRS positions held in cleared swaps customer accounts. On February 6, 2017, CME received approval to commingle significantly and reliably correlated futures in cleared swaps customer accounts holding Base Guaranty Fund Products. Applying HVaR-margining to futures and swaps positions commingled in clearing member house accounts is permissible and requires no specific Commission authorization to implement.

¹³ Roy, Indrajit, *Estimating Value at Risk (VaR) using Filtered Historical Simulation in the Indian capital market*, RESERVE BANK OF INDIA OCCASIONAL PAPERS, Vol. 32, No. 2 (2011).

¹⁴ See Holton, Glyn, *History of Value-at-Risk: 1922-1998*, Working Paper (July 25, 2002), available at: <http://stat.wharton.upenn.edu/~steele/Courses/434/434Context/RiskManagement/VaRHistory.pdf>.

reflect a .95-quantile of the amount of money a firm might lose over a one-month liquidation period.”¹⁵ This was effectively a VaR metric, although that term was not commonly used in financial markets until the 1990s. Over time, VaR has become widely used by the Commission to measure the risk of a given portfolio.¹⁶

One of the most common methods for calculating VaR is based on historical simulation (*i.e.*, HVaR).¹⁷ HVaR calculates the maximum potential loss that could be incurred by a specific portfolio by analyzing the actual losses that would have been incurred by that portfolio over a given historical period of time. The HVaR approach was developed early in VaR’s history. In 1996, it was described as a way of calculating VaR whereby “[t]he distribution of profits and losses is constructed by taking the *current* portfolio, and subjecting it to the *actual* changes in the market forces experienced during each of the last *N* periods.”¹⁸ Today, HVaR is well-understood and often the methodology of choice for the risk management departments of financial services firms. Values derived from its usage are widely considered to be proxies for the aggregated risk of diverse portfolios held firm-wide.

2. The New Framework

a. Introduction

There are several variants of VaR and HVaR-based methodologies. An “unfiltered HVaR” methodology is typically based on historical returns without any normalization or scaling mechanisms for contextualizing historical data to reflect current market conditions. Unfiltered HVaR methodologies do not account for the difference between volatility or correlations that existed during the applicable historical period vis-a-vis currently prevailing market conditions.

In contrast, a filtered HVaR methodology (such as the New Framework) estimates future price returns not only by analyzing historical returns, but also by taking into account the context of the volatility and correlations that existed at the time those observations were made.¹⁹ A filtered HVaR methodology

¹⁵ See Holton, Glyn. VALUE-AT-RISK at § 1.9 (2d ed. 2014), available at: <https://www.value-at-risk.net/history-of-value-at-risk/>.

¹⁶ The Commission noted the utility of VaR-based methodologies in the adopting release of its rules relating to Core Principles for DCOs. See Derivatives Clearing Organization General Provisions and Core Principles, 76 Fed. Reg. 69334, 69419 (“The value-at-risk confidence interval protects DCOs, their clearing members, market participants, and the public by fixing the probability that a default will occur and the position cannot be liquidated in time.”). Several Commission regulatory requirements also utilize VaR as a measure of risk. For example, a clearing house applying to register as a DCO must explain how it will use various risk tools, including VaR. See Form DCO, Exhibit D.

¹⁷ See Sharma, Meera, *The Historical Simulation Method for Value-at-Risk: A Research Based Evaluation of the Industry Favorite* at 3 (April 19, 2012); available: <https://ssrn.com/abstract=2042594>; see also Roy, *supra* note 10 at 83.

¹⁸ Linsmeier, Thomas J. and Neil D. Pearson, *Risk Measurement: An Introduction to Value at Risk* at 7 (1996), available at: <https://experts.illinois.edu/en/publications/value-at-risk> (emphasis in original).

¹⁹ Specifically, with respect to volatility, “the historical returns in the data window are ... devolatilised by dividing them by the relevant volatility estimate,” and then “the VaR for day t [is calculated] by scaling the [devolatilised returns] up by a current estimate of the volatility of each risk factor.” See Gurrola-Perez, Pedro and David Murphy, Working Paper No. 525, Filtered historical simulation Value-at-Risk models and their competitors at 4 (March

closely tracks the risk of a given portfolio because it normalizes historical data based on the conditions existing at that time, and then scales historical price returns to the market conditions that exist today.

The New Framework adopts a filtered HVaR margin methodology to calculate initial margin requirements. It calculates the maximum potential loss that could be incurred by a specific portfolio by: (1) analyzing the actual losses that would have been incurred by that portfolio over a given historical period of time, and (2) normalizing the resulting historical data to take into account the conditions existing during that period (e.g., a recession, or high volatility), and scaling the historical price return data in comparison to the market conditions that exist today. The New Framework thus prudently calculates initial margin requirements during both times of uncommon market stress, as well as times of normal market conditions. In a highly volatile period, the New Framework appropriately scales up the returns that were obtained during historical periods of lower volatility, and it does the opposite in low volatility periods. In this way, the New Framework conservatively yields prudent initial margin calculations in differing market environments.

In addition to the benefits of a filtered HVaR methodology, the New Framework can also accommodate all CME-cleared products (and any portfolio based on those products) because it does not limit the characteristics that can be considered to those that are specific to a particular product or product grouping. Rather, the Clearing House will identify, in accordance with CME's relevant procedures, certain risk factors and attributes of risk factors (e.g., seasonality) that are relevant for each unique product. When a given product is added to a portfolio, specific modules²⁰ and calibrated parameters will be applied to that portfolio to account for the effect of the product's risk factors relative to historical prices. In this way, risk factors and parameters for products within a portfolio can be applied or not applied to sets and subsets of any product grouping. This allows the New Framework to calculate initial margin requirements differently for products with different risk attributes (such as agricultural versus equity futures or natural gas versus crude oil futures), while at the same time creating a straight-forward process for incorporating additional products within the New Framework.

Finally, the New Framework will allow the Clearing House to easily adjust the risk horizon for closing out portfolios, from one day to multiple days, for purposes of risk management of such product groups or meeting regulatory requirements.

b. Detailed Overview of the New Framework's Methodology

The New Framework utilizes several advanced techniques to produce prudent initial margin calculations. Specifically, among other things, the New Framework: (1) adopts a modular approach that provides the flexibility necessary to calculate margin requirements for the highly diversified portfolios cleared at CME; (2) employs enhanced calculation methods to better align risk measures with current trading practices and the growing diversity of cleared markets; (3) methodically accounts for cross-product risks by analyzing the historical performance of an entire portfolio (and how various risk factors

2015), available at: <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2015/filtered-historical-simulation-value-at-risk-models-and-their-competitors.pdf?la=en&hash=34BF0E24DB60656E044E3DB5524E08DF5D0112D3>.

²⁰ Modules are the analytic or mathematical building blocks of initial margin calculations under the New Framework. The New Framework's modular approach is discussed in Section 2b(i), below.

interact);²¹ and (4) attunes its market risk calculations by incorporating stress VaR (“**SVaR**”) in order to provide, among other things, anti-procyclicality adjustments and appropriate injection of risk management judgment over and above broad historical observations. These techniques are generally described below.

i. Modular Approach

The New Framework consists of three components, which measure different types of risk posed by a given portfolio. Specifically, the three components in the New Framework are as follows:

- **Market Risk Component** that measures the potential losses a portfolio could incur due to daily price movements, as adjusted by an SVaR sub-component, that measures the potential losses a portfolio could incur under historical or hypothetical stressed conditions;
- **Liquidity Risk Component** that evaluates the costs to close out positions in a portfolio during a market participant or clearing member default; and
- **Concentration Risk Component** that accounts for the potential that a portfolio with large positions relative to total open positions will take additional time to close-out (and therefore potentially incur greater losses) if necessary.

Each component contains certain modules, which are the analytic or mathematical steps necessary to calculate risk in a given component. For example, as set out below, the Market Risk Component includes modules that, among other things, apply relevant risk factors for a portfolio to historical data and separately normalize and scale the historical data based on current market conditions.

When integrated, these components (and the modules that make up the components) cohesively produce a margin calculation that reflects a combination of market risk (adjusted by SVaR), and liquidity and concentration risks. Each of the three components, including their respective key modules, is described, in turn, below.

A. *Market Risk Component*

The Market Risk Component is designed to calculate the potential losses a portfolio can incur due to daily price movements. The Market Risk Component consists of a progression of key modules that process, simplify, normalize, and scale historical data to determine a margin calculation appropriate to a given portfolio in today’s market conditions. Specifically, the modules in the Market Risk Component (which are described further below) are:

- Data Processing Module;
- Scenario Pre-Processing Module;
- Historical Scenario Building Module;
- Scenario Post-Processing Module;
- VaR Calculation Module; and
- Add-On Calculation Module.

²¹ In this regard, uncorrelated risks within a portfolio will have a diversification effect. When correlated instruments are present in opposite directions (long/short) in a portfolio, their realized risk is likely to be lower than if they were uncorrelated instruments (causing diversification effect).

In the Data Processing Module, raw historical pricing data is processed in order to produce data showing returns, which simplifies the analysis for subsequent modules. Data regarding returns shows the percentage of gains or losses over time.

The Scenario Pre-Processing Module then simplifies the processed return data generated by the Data Processing Module by identifying the representative risk factors that explain the price dynamics of a given product set. This Module is applied when it is appropriate to reduce the vast amount of data processed by the Data Processing Module, such as when there are multiple contracts associated with the same commodity or a large number of contracts that are otherwise highly correlated.

For example, CME lists a significant number of natural gas contracts, and the Data Processing Module will yield processed return data for all of them. The correlated nature of this data, however, means that a set of select risk factors can adequately capture substantially all of these contracts' price dynamics. The Scenario Pre-Processing Module therefore identifies appropriate representative data points within the processed data.

The Historical Scenario Building Module recognizes the differences in market conditions between when risk factors (e.g., volatility and correlations) were historically observed and today's market conditions to calculate current appropriate levels for such risk factors. This generally involves applying the following statistical procedures to the relevant historical data:

1. Normalizing the historically observed returns by isolating the effects of the then-present risk factors (e.g., volatility) from that data; and
2. Scaling the normalized returns to today's market dynamics.

By way of example, historical price shocks for the Eurodollar interest rate futures contract in 2008 were heavily influenced by interest rates as well as the volatility levels prevailing at that time. However, since then the market has transitioned to different interest rate and volatility levels, including a prolonged period of low rates and low volatility. The Historical Scenario Building Module would normalize and scale those relevant shocks to render the historical data more apt relative to current market conditions given today's prevailing price and volatility levels.

The Scenario Post-Processing Module then takes scenarios generated by the Historical Scenario Building Module and prepares a distribution of gains and losses for a given portfolio, thus providing a rich set of potential outcomes over the close-out period.

The VaR Calculation Module next uses the potential gain and loss distribution to calculate an initial margin amount for a given portfolio by sampling from the tail of the loss side of the distribution.

Finally, for certain risk factors, an Add-On Calculation Module may be applied to account for any uncertainty in the valuations utilized in the calculation process. Because of the vast amount of historical data in the analysis of every price return, simplification measures may be used in various stages of the calculation process (e.g., simplifying processed return data in the Scenario Pre-Processing Module, or by using a subset of anchor points rather than the entire volatility curve in calculating implied volatility for options on futures) in order to obtain a more manageable data set. This simplification can lead to some loss in specificity; the Add-On Calculation Module therefore addresses any resulting valuation uncertainty.

B. SVaR Sub-component

The Market Risk Component incorporates an SVaR sub-component. SVaR focuses on scenarios where the largest historical market moves have occurred, and the largest hypothetical market moves that could occur. The SVaR sub-component, therefore, incorporates into the estimates the market moves and portfolio returns associated with the most stressed historical (and hypothetical) periods, which naturally results in conservative initial margin requirements during non-stressed periods. As a result (and as described in further detail in Section 2b(iv) below), adjusting the Market Risk Component by the SVaR sub-component controls for procyclicality.²²

The SVaR sub-component consists of the following three key modules:

- Historical Module that identifies and analyzes historical stressed scenarios;
- Hypothetical Module that creates and analyzes hypothetical stressed scenarios; and
- Integration Module that combines the relevant data from the Historical Module and the Hypothetical Module.

The Historical Module analyzes a product's price returns during periods of stress through a scenario-variable selection functionality. It allows the Clearing House to methodically define the criteria for selecting stress dates. For example, the Clearing House can capture all historical scenarios where a \$10 or greater move was observed for Brent Crude Oil, or generically capture all scenarios in a consecutive historical period overlapping with stressed market conditions. The Historical Module identifies the most highly stressed historical dates according to the selected scenario criteria, while also giving the Clearing House the flexibility to include market data regarding returns observed on more recent historical dates that may not have been captured by the general historical scenario-variable selection criteria. Based on the data selected per the above, the Historical Module generates curves reflecting the profit and loss associated with the relevant contracts in a given portfolio in order to produce the historical SVaR.

The Hypothetical Module performs a similar function, but for hypothetical stress scenarios. Specifically, it creates hypothetical stress scenarios, and calculates a hypothetical SVaR for the contracts in any given portfolio based on those scenarios.

Finally, the Integration Module combines the historical and hypothetical SVaR scenarios. The result is a final calculation for the SVaR sub-component that is incorporated into the overall margin calculation established for the portfolio by the Market Risk Component.²³

²² Margin requirements that are positively correlated with the overall state of the market are deemed procyclical. For example, increasing margin requirements in times of stressed market conditions, or lowering margin requirements when markets are calm, is procyclical. Measures to limit procyclicality are intended to prevent risk-based models from fluctuating too drastically in response to such changes in market conditions.

²³ In mathematical terms, the inclusion of stress scenarios into the Market Risk Component can be presented as $\text{Market Risk} = w_1 \cdot \text{HVaR} + w_2 \cdot \text{SVaR}$, where w_1 and w_2 are weights of HVaR and SVaR scenarios, respectively.

C. Liquidity and Concentration Risk Components

The Liquidity and Concentration Risk Components are assessed using data from CME's Globex platform or quotes provided by market participants (for example, liquidity providers or brokers). The Liquidity and Concentration Risk Components consist of the following modules:

- Data Processing Module;
- Dimension Reduction Module;
- Market View Injection Module; and
- Portfolio Liquidity Charge Breakdown and Calculation Module ("**LCC Module**").

The Data Processing Module collects transaction cost data. This could be derived from leveraging the central limit order book or polling market participants. In this Module, market data (*i.e.*, bid and offer data from the central limit order book) is processed to identify the transaction costs one might incur upon the liquidation of an instrument or a simple portfolio.²⁴

Similar to the Scenario Pre-Processing Module in the Market Risk Component, the Dimension Reduction Module simplifies the cost structure of the data produced by the Data Processing Module.²⁵ For example, the Dimension Reduction Module could create a parametric function that determines the transaction costs of a given instrument as a function of size. Or, alternatively, the Dimension Reduction Module could categorize various instruments into a limited number of liquidity buckets that share the same transaction costs.

The Market View Injection Module incorporates the Clearing House's estimated transaction costs to, for example, reflect information gathered during default management drills or observed during actual default events.

The LCC Module calculates a total portfolio liquidity charge by breaking down each portfolio into sub-portfolios that are more frequently traded, and whose liquidity charges are more easily observable. In this way, this Module identifies segments of a given portfolio that could potentially be auctioned off independently, thereby reducing any charge applied to a portfolio due to its lower aggregate liquidity. This approach is akin to computing the liquidation costs based on a replicating strategy to hedge the portfolio.

Significantly, the Liquidity and Concentration Risk Components are an integral part of the New Framework's core margin methodology (*i.e.*, as compared to components addressing such risks as "add-ons" to the margin calculations). As a result, in stressed conditions, the Liquidity and

²⁴ Transaction costs refer to the cost, as reflected in bids and offers, that is incurred in trading a product. Since bids and offers are different at any given point in time, both the buyer and seller incur transaction costs when executing a trade by selling at the bid and buying at the offer.

²⁵ Cost structure refers to different transaction costs associated with the different position-types that are observed on the central limit order book. For example, an outright position would have a different cost structure relative to a spread position. In assessing transaction costs, portfolios are broken down into a series of smaller and simpler portfolios traded through the central limit order book.

Concentration Risk Components can drive initial margin determinations because each component is equally weighted.

D. The Clearing House's Continuous and Active Management of Risk

It is important to emphasize that the New Framework's components will be implemented in a manner that is consistent with the Clearing House's obligation to continuously and actively manage risk. The Clearing House can incorporate its judgment into the margin calculation process in appropriate respects. For example, in the Market Risk Component, the Clearing House can choose various parameters (such as lambda parameters, which balance the need for an appropriate reaction to sudden events in the marketplace with the need for stability and anti-procyclicality)²⁶ in order to reflect CME's risk tolerance. Further, in the Liquidity and Concentration Risk Components, the Clearing House can adjust the relevant risk scaling parameter (which scales the calculated liquidation transaction costs for a product or portfolio) to consider information gathered during default management drills or actual default events.

The parameters that can be manually adjusted are unlikely to change daily because they relate to CME's overall risk tolerance and the market macro structure, both of which are characteristically stable. Therefore, the New Framework anticipates incorporating the Clearing House's judgment in order to account for changing risk tolerances and market structures or events as appropriate, without requiring manual intervention in the more dynamic process of applying risk factors to historical data for calculating margin requirements in the normal course of operations.

ii. Enhanced Calculation Methods

As illustrated above, several of the components and modules of the New Framework utilize enhanced calculation methods to align with current trading and risk management practices associated with the diverse markets the Clearing House supports.

The Market Risk Component, for example, takes into account the dynamics of volatility and correlation and adjusts margin calculations accordingly. To illustrate, the price of the front month contract for WTI crude oil futures varied from around \$150 per barrel in 2008 to \$30 in 2009, and currently trades at approximately \$60. Similarly, the volatility of the crude oil market can range from 20% to 80%. Under the New Framework, as described above, the price returns (*i.e.*, how much prices change day-to-day in percentage terms), as opposed to price changes (*i.e.*, how much prices change day-to-day in dollar terms), are normalized on each scenario day by the corresponding volatility level. The normalization and scaling process in the Historical Scenario Building Module uses historical volatility and correlation to calculate returns, and scales such returns using current expectations of volatility and correlation. This facilitates a meaningful and fair comparison of the returns across various scenario days, and in general, makes the historical scenarios more appropriate for risk computations.

Similarly, as also described above, the enhanced calculation methods in the SVaR sub-component allow for historical and hypothetical stress scenarios to be incorporated. Most portfolios today contain a diverse range of products and are highly sensitive to the implied correlation between portfolio instruments. Using historical data on a portfolio level (as opposed to a product level) yields margin

²⁶ In statistical terms, lambda is a smoothing constant that helps assign a weight to each historical observation such that recent returns have a higher weight and older returns have a lesser weight. The main objective of lambda is to identify a variance or covariance inside the scenario generation process that comes closest to realized variance/covariance levels.

calculations that are more in line with current trading practices, thus better reflecting correlations observed in prior stressed periods. Using hypothetical scenarios, in turn, allows the Clearing House to control the volatility and correlation assumptions, which is necessary to produce stressed yet plausible scenarios to reflect the diversity of markets.

iii. Inherent and Scaled Recognition of Correlations

The New Framework analyzes the historical performance and returns for all products in a given portfolio on each historical day in order to identify the scope of potential scenarios that could occur on any given margin collection day. By basing margin calculations on the historical performance of all products in a given portfolio, the New Framework inherently identifies and applies correlations between related products where prices are influenced by common external factors. The New Framework thus sets margin requirements based on the portfolio-level risk, since any risk reductions that exist between two correlated products are inherently recognized.²⁷

iv. Controls for Procyclicality

Margin requirements produced by the New Framework will be anti-procyclical because, among other things, the SVaR sub-component captures the largest market moves that have occurred during highly stressed time periods and those that hypothetically could occur in times of stress. Thus, even in periods of relatively low volatility (where a pure market risk-based model may produce low margin requirements), the SVaR sub-component will yield a more conservative margin calculation. Incorporating SVaR into the Market Risk Component thereby ensures that margin requirements do not fall so low that increasing such requirements in response to an unexpected market event would cause shocks to clearing members or the clearing system.²⁸

Further, the New Framework's filtered HVaR utilizes a variety of parameters, and both short-term and longer-term volatility movements or margin floors, to appropriately set and adjust margin coverage. By analyzing a wide variety of risk factors simultaneously, the New Framework ensures that margin calculations will not over-react to the most current volatility or market conditions (whether positive or negative) and will foster overall stability in margin rates.

c. **Additional Attributes of the New Framework**

The New Framework will continue to facilitate the Clearing House's ability to effectively manage risk because it: (1) produces margin requirements that dynamically assess a portfolio's risk exposures, potentially resulting in additional capital efficiencies; (2) supports growth and change in the markets cleared at CME because it reduces reliance on manual involvement required with the current margin

²⁷ The New Framework does not provide "offsets" for correlated products, but rather calculates margin for a portfolio by analyzing the risk of an entire portfolio (and how the various risk factors interact) in a holistic manner. However, as discussed further in Section 4 below, the Clearing House intends to provide offsets between products margined under the New Framework and those margined under SPAN during implementation in order to recognize certain risk-reducing correlations at the risk factor level that would not otherwise be recognized in the parallel use of the two margin frameworks.

²⁸ The incorporation of stress is intended to ensure a level of margin that is stable. In times of high volatility, margin levels under the New Framework will naturally be higher, but the SVaR sub-component will keep margin levels stable.

calculation process; and (3) facilitates additional transparency to the marketplace through granular and customizable risk reports.

i. Assessing Risk Dynamically

The New Framework utilizes fewer parametric assumptions because it fully leverages market observables, resulting in dynamic risk assessments. To predict potential future losses, the Framework looks at past losses (*i.e.*, one-dimensional data) as the principal metric. It next adjusts those results for various market conditions (*e.g.*, volatility, correlation, and seasonality), trading practices and liquidation transaction costs.

That is, the New Framework adjusts the one-dimensional data by recognizing certain risk-reducing and risk-increasing aspects of the historical data being analyzed and the portfolio being margined. For example, the New Framework automatically recognizes that volatility in certain portfolios can be hedged (*i.e.*, vega-hedged) using a few liquid spread strategies. By way of further example, the New Framework also recognizes that a delta-hedged position is cheaper to liquidate than the corresponding naked position because the variability between the price of the position and the underlier has been hedged. This market knowledge is built into the New Framework.

Thus, the New Framework does not merely estimate returns by analyzing the historical data for a given product or products. Rather, it filters that historical data based on its sophisticated command of the relationships between various products as well as the conditions that existed at the time the prices were observed and utilizes that market knowledge in applying the historical data to a given portfolio. By adjusting historical data based on advanced analytical tools in this manner, the New Framework will produce prudent dynamic risk assessments and margin requirements, potentially leading to greater capital efficiencies for clearing members and market participants.

ii. Support for Growth and Evolution in CME Cleared Markets

The New Framework supports growth and evolution of the markets cleared at CME because it fully leverages data available to CME from various sources to quickly adapt to new or changing products or market conditions. Specifically, the New Framework combines automated routines executed by the Market, Liquidity and Concentration Risk Components to efficiently calculate margins using market data (adjusted by embedded market knowledge as discussed above), while preserving the Clearing House's injection of risk judgment as appropriate.

The key inputs for the New Framework's Market, Liquidity and Concentration Risk Components are settlement prices, open interest, volume, and bid-ask data, respectively. Using those inputs and certain parameters (such as decay parameters, lookbacks, confidence levels, and stress weights), the New Framework's algorithm can calculate margin requirements for any portfolio within the Clearing House's risk appetite for margin levels. The addition of new products requires only a one-step process to feed market data into the Framework, and the corresponding parameters and margin calculation modules will then calculate margin requirements for any portfolio containing the newly-listed products.²⁹

²⁹ As described above, the New Framework relies on historical product data in calculating initial margin requirements. For new products that do not have historical data, the method of calculating margin will depend on

Similarly, the New Framework captures changes in market conditions (e.g., changes in volatility or market shocks that are embedded in market data) by continuously monitoring and comparing prior market states to current states without any required manual intervention – albeit within a dynamically risk-managed environment that actively monitors all aspects of the New Framework’s performance and readily supports the injection of expert judgement. For each component of the Framework, actual data is the first input. The New Framework is self-adapting to market conditions because settlement prices, open interest, volume and transaction costs data are continuously refreshed and incorporated into the margin calculation . As new data comes in, it is added to the set of historical data and utilized in the calculation of margin requirements.

Thus, the New Framework can further support growth and change in the markets cleared at CME by minimizing resource-intensive manual involvement in the current margin calculation process. By reducing reliance on manual processes, adjustments and adaptations to new types of products and portfolios are efficiently incorporated into the New Framework’s margin calculations, particularly in periods of market stress.

iii. Product Agnostic

The New Framework is product-agnostic. Different product groups, such as natural gas and crude oil, have different characteristics that might warrant a different combination of risk calculation features. The New Framework is built in a generic manner to optimally facilitate the integration of additional product groups such as futures on equities, agricultural commodities, power and metals. It does so by calibrating and applying or not applying risk calculation features to tailor them to the specifics of particular product groups.³⁰ Risk calculation features include, for example:

- **Seasonality:** The seasonality feature will be turned on for products that exhibit seasonal trading patterns such as some agricultural and energy futures;
- **Samuelson Effect:** The Samuelson Effect means that a contract closer to expiry might exhibit higher volatility. This is relevant to futures contracts that can be settled through physical delivery as opposed to settling financially based on an index or other price series;
- **Principal Component Analysis (“PCA”):** This dimension reduction statistical technique may be turned on for product groupings where a substantial number of contracts are offered with several different contract months, which may include products based on or directly related to the major physical and financial commodity benchmarks traded on CME Group exchanges;

whether there is a closely-related “proxy” product. For new products that have a closely-related proxy product, the historical scenarios of the proxy product may be utilized (while taking into account the correlation structure as appropriate). For new products without a closely-related proxy product, or those that are uncorrelated with any existing product(s), the new products may be margined using their own volatility and correlation parameters, as defined by the Clearing House.

³⁰ In this regard, a risk calculation feature would only not be applied at a product grouping level when inapplicable to such grouping; for example, the inapplicability of seasonality after the extensive analysis of data demonstrates that a product grouping has never experienced a reoccurring cyclical pricing or volatility trend).

- Volatility Scaling: Volatility scaling may be turned on for any products or risk factors that may exhibit a change in the volatility regime over time; and
- Correlation Scaling: Correlation scaling may be turned on for any products or risk factors that may exhibit a change in the correlation regime over time.

The risk calculation features above will be applied depending on the characteristics of the various product groups as they are integrated into the New Framework. As with all risk calculation features, the applicability of these risk calculation features will be determined and validated by analyzing a comprehensive suite of back-testing results on trading strategies and portfolios.

iv. Additional Transparency

The New Framework offers additional transparency to clearing members and traders by providing reports with a comprehensive breakdown of margin requirements, and the sources for those margin requirements.

More specifically, CME's reports will provide a breakdown showing the various components as described above (*i.e.*, the risk that can be attributed to the Market Risk Component compared to the SVaR sub-component or Liquidity or Concentration Risk Components). A further breakdown of the components will show the contribution of each risk factor and the portfolio margining benefit in the calculation of the margin requirement.

In addition, a detailed report can be produced to provide better insights into certain specific features. For example, a seasonality report showing margin attribution to a seasonal risk factor can be provided for the Market Risk Component for a portfolio with seasonal products.

Sample reports are provided below:

Summary report	
Business date	11/17/2017
Firm	XYZ
Account ID	123
Cycle	EOD

Performance bond requirements	10
Initial margin	10
Maintenance margin	10
Net option value	0

Intermediate risk report

Maintenance margin	30
Market risk	24
Market risk weight	75%
Stress VaR	32
Stress VaR weight	25%
Liquidity risk	2
Concentration risk	4

Detailed risk report

Maintenance margin	30
WTI futures	25
Natural gas futures	13
Natural gas implied volatilities	10
Portfolio margining benefits	-18

3. The New Framework Meets CFTC Requirements

a. CFTC Regulation 39.13(g)

CFTC Regulation 39.13(g)(2)(i) requires a DCO to establish initial margin requirements that are commensurate with the risks of each product and portfolio. CFTC Regulation 39.13(g)(2)(ii) expands upon this requirement, specifying that a DCO's initial margin requirements must provide enough initial margin to cover the DCO's potential future exposures to clearing members based on price movements in the estimated time it would take to liquidate such clearing members' positions. That regulation also specifically requires a DCO's initial margin model to utilize a minimum liquidation time of one day for futures and options, and one or five days for swaps (depending on the swap's underlying commodity). CFTC Regulation 39.13(g)(2)(iii) requires a DCO's margin model to meet an established confidence level of at least 99 percent, based on data from an appropriate historic time period.

- The New Framework will produce initial margin requirements that are commensurate with the risks of each product and portfolio, including distinct characteristics or risks associated with particular portfolios (such as market risk, seasonality, liquidity and concentration risks). Initial margin requirements under the New Framework will be closely tailored to the risks posed by each product and portfolio because: (1) they will be derived from risk simulations based on historical data, (2) the Framework is self-adaptive to changes in volatility, appropriately reacting to abrupt increases or decreases in such volatilities, and (3) the Framework controls for procyclicality by the inclusion of SVaR, as well as parameters that analyze a variety of risk factors and their interactions in a holistic manner.
- The New Framework can be utilized for any CME product, and produces initial margin requirements commensurate with the risks for all such products (and all portfolios consisting of those products) because it does not limit the risk factors that can be considered to those that are specific to a limited set of particular product(s). The New Framework's flexibility appropriately recognizes and considers the risk factors relevant to each individual product and

portfolio. It simulates risk differently for different asset classes but provides a single methodology through which such simulations are produced.³¹

- The New Framework uses a modular approach that allows margin calculations to be tailored to the specific risk characteristics of each product or portfolio (e.g., based on whether the products contained in a portfolio are futures or options, or seasonal futures). It leverages historical data as the primary source of data for calculating margin requirements, but also uses hypothetical scenarios in appropriate circumstances. Using actual historical scenarios is effective in predicting potential market moves during most potential liquidation periods, while using specific hypothetical scenarios ahead of, for example, an anticipated significant event enables the Framework to produce margin requirements that are commensurate with relevant risks (both observable and unobservable). This analysis is supplemented by adjustments based on the market knowledge built into the Framework and the Clearing House's judgment in accordance with the Clearing House's current practices.
- The New Framework will allow CME to readily adjust the risk horizon for closing out defaulted portfolios from one day to multiple days. CME will also calibrate the New Framework on an ex-post basis using a robust time series and employing back-testing to ensure a targeted coverage level of at least 99%, with additional focus on the stability of portfolio risk calculations.

CFTC Regulation 39.13(g)(3) requires a DCO's systems for generating initial margin requirements, including its theoretical models, to be reviewed and validated by a qualified and independent party, on a regular basis.

- Consistent with CME's current practices, qualified parties independent from CME's development and approval process have validated and will continue to periodically validate the New Framework. The validation process is overseen by CME Clearing's Model Risk Committee and the Clearing House Oversight Committee ("**CHOC**").
- Validations cover the appropriateness of the Framework for the products covered, review of back-testing results, ensuring that the desired coverage standard is achieved, and review of the Framework parameters.
- Validation results are reviewed by the Model Risk Committee and CHOC, and any proposed adjustments based on validation recommendations are evaluated for appropriateness by the Risk Management Team. The remediation of any validation findings is overseen by the CHOC. Validation results and Clearing House responses are shared with the appropriate CME Clearing Risk Committee and relevant regulatory authorities, as appropriate.

CFTC Regulation 39.13(g)(4) permits a DCO to provide for reductions in initial margin requirements for spread and portfolio positions that are significantly and reliably correlated.

- The New Framework automatically accounts for correlations across risk factors due to the changing dynamics of the correlation structure embedded in the historical scenarios, and

³¹ For the avoidance of doubt, this 40.10 submission covers use of the New Framework for all CME-cleared products under the Base Guaranty Fund. However, as described further in Section 4 below, CME intends to roll out the New Framework in phases.

further enhances the resulting calculations to capture risks of sudden changes in those structures.

- The New Framework is a filtered HVaR framework whereby the distribution of profits and losses is constructed by taking the current portfolio and subjecting it to the actual market forces experienced during each of the prior relevant periods. As such, any correlation observed and experienced for spreads and multi-product portfolios in the past will be inherently incorporated into the distribution of profits and losses of the current portfolio.
- Additionally, the New Framework will utilize a correlation scaling procedure, which assists with correlation analyses for products that have experienced a structural shift in their correlation structure. For example, WTI crude oil and Brent oil futures contracts have historically traded in a highly correlated fashion, but after the shale oil revolution, the two benchmarks exhibited diverging price trends and may stay relatively dislocated going forward. In this example, the correlation scaling procedure allows the historical data to be scaled based on the estimate of current correlation conditions. More specifically, if current correlation conditions are lower, the Framework increases the risk estimate of a spread portfolio. On the other hand, if current correlation conditions are higher, the Framework will provide for greater risk reduction in a spread portfolio.

b. CFTC Regulation 39.33(a)

CFTC Regulation 39.33(a) establishes enhanced financial resource requirements for SIDCOs. Specifically, Regulation 39.33(a)(1) requires a SIDCO that is “systemically important in multiple jurisdictions or is involved in activities with a more complex risk profile” to maintain financial resources sufficient to cover defaults by the two clearing members creating the largest combined loss to the SIDCO in extreme but plausible market conditions.

- CME Rules 828 and 8G07 implement the CFTC requirement that CME maintain financial resources for all its products sufficient to enable it to meet its financial obligations to its clearing members notwithstanding a default by the two clearing members creating the largest combined loss to CME in extreme but plausible market conditions.
- CME maintains such financial resources through its financial safeguards packages, which include performance bonds and resources of the defaulting clearing member(s), the CME contributions to each financial safeguards package, guaranty fund contributions of non-defaulting clearing members, and assessments. Performance bond requirements will continue to be established at levels that are consistent with the prevailing risks of CME-cleared contracts, but migrating to the New Framework will enable more tailored adjustments of performance bonds based on a holistic view of those risks.
- The New Framework sets and adjusts margin coverage correspondingly to the risk posed to the Clearing House using a filtered historical simulation approach that will comprehensively address all risk factors and their impact in current and anticipated market conditions. CME’s financial resources will be calculated in light of these enhanced risk simulations and will therefore appropriately and prudently cover CME’s financial obligations and costs.
- The New Framework will not result in changes to the methodology used for calculating the size of the Base Guaranty Fund, or to CME’s stress testing methodology. The Guaranty Fund size is driven primarily by changes in exposures and stress test scenarios, and at this time CME does not expect to change the stress scenarios that size the Guaranty Fund. Changes in the

absolute size or allocation of the Guaranty Fund to the firms will reflect the shortfalls beyond the New Framework's calculation of margin amounts for portfolios based on their risk profiles.

CFTC Regulation 39.33(c)(1)(i) establishes enhanced liquidity standards for SIDCOs by (among other things) requiring each SIDCO to maintain eligible liquidity resources that, "at a minimum, will enable it to meet its intraday, same-day, and multiday obligations to perform settlements . . . with a high degree of confidence under a wide range of stress scenarios that should include, but not be limited to, a default by the clearing member creating the largest aggregate liquidity obligation for the [SIDCO]...in extreme but plausible market conditions."

- CME employs liquidity stress testing to liquidity risk scenarios that forecast potential payment obligations that could be owed during the settlement process determined by the Stress Testing Committee. The Stress Testing Committee has determined that the largest payment obligation in an extreme but plausible market condition would be driven by the default of a clearing member and its affiliates.
- CME maintains qualifying liquidity resources to meet the largest potential payment obligations resulting from a clearing member default in aggregate and by currency on an intraday, same-day and multiday basis. The size of these payment obligations determines the minimum liquidity resource requirement. The adequacy and liquidity resources available are submitted for review and approval to the Credit Committee on at least a quarterly basis.

c. Commodity Exchange Act Core Principles

CME has reviewed the DCO core principles ("**Core Principles**") set forth in the Commodity Exchange Act ("**CEA**"), and identified the following Core Principles as potentially being impacted by adoption of the New Framework.

- Core Principle B – Financial Resources: As described above, and in accordance with CFTC Regulation 39.33, CME maintains financial resources for all its products sufficient to enable it to meet its financial obligations to its clearing members notwithstanding a default by the two clearing members creating the largest combined loss to CME in extreme but plausible market conditions.³² CME maintains such financial resources through its financial safeguards packages, which include performance bonds, the CME contributions, and guaranty funds and assessments. Performance bond requirements will continue to be established at levels that are consistent with observed levels applied to all CME-cleared contracts, but migrating to the New Framework will enable more tailored adjustments of performance bonds based on market dynamics. If, after applying the relevant financial safeguards package, the funds available to CME are insufficient to cover a loss associated with a clearing member default, CME can resort to recovery tools as described above that are designed to ensure that CME can continue to operate clearing and settlement services and avoid an insolvency process or winding down.

The New Framework efficiently aligns margin coverage with the risk posed to the Clearing House by the growing number of products and diversity of risk profiles in portfolios today, and seamlessly adapts to current as well as anticipated market conditions. CME's financial resources will be calculated in light of these enhanced risk simulations and will therefore appropriately and accurately cover CME's financial obligations and costs.

³² See CME Rules 828, 8G07.

- Core Principle C – Participant and Product Eligibility: CME has established: (1) appropriate admission and continuing eligibility standards (including appropriate minimum financial requirements) for its members and participants; and (2) appropriate standards for determining eligibility of agreements, contracts, or transactions submitted to CME.
- Core Principle D – Risk Management: As described above, and consistent with the requirements of CFTC Regulation 39.13(g)(2)(i), the New Framework establishes margin requirements that are commensurate with the risks of each product and portfolio, including unique characteristics or risks associated with particular portfolios (such as seasonality and liquidity). The New Framework utilizes a minimum liquidation time (which varies by product) consistent with CFTC Regulation 39.13(g)(2)(ii), and meets an established confidence level of at least 99% based on data from appropriate historic time periods as specified under CFTC Regulation 39.13(g)(2)(iii).

For the avoidance of doubt, migrating to the New Framework will not affect CME's risk management program other than to change the methodology by which initial margin requirements are calculated. Among other things, CME will continue to:

- Apply the same default management rules (for example, under CME Rule 802);
- Utilize the same methodology for calculating Base Guaranty Fund sizing;
- Calculate settlement variation and options premiums in the same manner;
- Comply with the CFTC's requirements for permissible types of financial resources (including liquidity requirements) in CFTC Regulation 39.11(b);
- Treat all funds held by the Clearing House in the manner required by CFTC Regulation 39.15;
- Review and back-test its margin methodologies as required by CFTC Regulations 39.13(g)(6)-(7);
- Collect margin in the manner required by CFTC Regulation 39.13(g)(8);
- Impose time deadlines for initial margin payments in the manner required by CFTC Regulation 39.13(g)(9), and
- Accept only the types of assets, and apply valuations and haircuts as appropriate, as set forth in CFTC Regulations 39.13(g)(10)-(12).
- Core Principle E – Settlement Procedures: Under the New Framework, CME will continue to have the ability to: (1) complete settlements on a timely basis under varying circumstances; (2) maintain an adequate record of the flow of funds associated with each cleared transaction; and (3) comply with the terms and conditions of any permitted netting or offset arrangements with other clearing organizations. The Clearing House manages the daily requirements to evaluate appropriate daily marks to market for all CME-cleared products, and will continue to do so during and after migration to the New Framework.

- Core Principle F – Treatment of Funds: CME has standards and procedures designed to protect and ensure the safety of member and participant funds, which will continue to be applied after migration to the New Framework used to margin such members' or participants' portfolios.
- Core Principle G – Default Rules and Procedures: CME has rules and procedures designed to allow for efficient, fair and safe management of events when members or participants become insolvent or otherwise default on their obligations to the Clearing House, which will continue to apply in the same manner and degree under the New Framework.
- Core Principle I – System Safeguards: CME has: (1) established and will maintain a program of oversight and risk analysis to ensure that its automated systems function properly and have adequate capacity and security; and (2) established and will maintain emergency procedures and a plan for disaster recovery, and will periodically test backup facilities sufficient to ensure daily processing, clearing, and settlement of transactions. These standard oversight, risk analysis and emergency systems apply to all CME exchanges and products, regardless of whether they are margined under the New Framework or SPAN.

4. Implementation and Transition to the New Framework

CME intends to adopt a phased approach to transition to and implement the New Framework.

a. Parallel Production Phase

Before bringing the New Framework to market, CME plans to be in a parallel production phase for a minimum of 6 months to collaboratively prepare for the application of the New Framework. During this period, CME will undertake the following activities:

- Ensure that the New Framework is operational for calculating initial margin, and test fallback mechanisms;
- Calculate the margin requirements using both SPAN and the New Framework for each house and customer portfolio, but actual margining will be determined and executed according to the calculations performed under SPAN, since the New Framework will not take effect with respect to any portfolio prior to the conclusion of the parallel production phase;
- Compare the live operation of the SPAN margin framework to the in-test operation of the New Framework, including active evaluation of the impact (including operational impact) of New Framework margin calculations on the marketplace;
- Monitor for any material margin difference for each portfolio to ensure that margin differences can be reconciled and are appropriate in terms of the risk posed to the Clearing House;
- Share with market participants the margin requirements calculated under SPAN and the New Framework, and provide information to them on the requirements under the New Framework as necessary; and
- Work collaboratively with clearing members and service providers to ensure their ability to replicate margin calculations using deployable libraries and other margin replication tools provided by the Clearing House.

b. Migration Phase

Initially, the New Framework will be applied to the major energy products.³³ The work systems and workflows CME establishes to migrate major energy products will be readily transferred to other products because: (1) energy products have relatively diverse risk profiles compared to other products (as well as a large number of products); and (2) energy products are traded in a variety of methods offered by CME exchanges. Moreover, the choice of major energy products for initial migration covers a product group with appreciable levels of intra-grouping correlation, making energy commodity futures and options apt for the initial migration.

A phased approach will provide CME and the marketplace a non-disruptive transition period in which to implement the New Framework. During the initial migration phase for explanatory purposes below, any portfolio containing positions both in major energy products and in other products will be split into three types of sub-portfolios: (1) Portfolio Set A, containing all positions in the major energy products which are targeted to migrate to the New Framework; (2) Portfolio Set B, containing positions in Portfolio Set A and other positions that have offsets to the major energy products (and equivalent contracts); and (3) Portfolio Set C, containing the positions of products that are targeted to remain in existing SPAN.

A preliminary margin requirement (*i.e.*, without any offsets) will be calculated by applying the New Framework to Portfolio Set A, SPAN to Portfolio Set C, and adding them together. Thereafter, an offset amount will be calculated which will account for any risk correlations between the major energy products in Portfolio Set A and Portfolio Set C; for this purpose Portfolio Set B will be used and the offset computation will utilize the New Framework. The final margin requirement will then be the sum of margins for Portfolio Sets A and C, minus the offset amount that is computed using Portfolio Set B (provided that the offset amount will only reflect residual risk to obviate double counting after accounting for SPAN offsets within Portfolio Set C). As the New Framework is phased in for new product groups or asset classes, the offset methodology will scale in a commensurate manner, with a larger set of positions being margined under the New Framework similar to the energy products in Portfolio Set A.³⁴

The offsets described above will only be applied to certain products. For example, selective offsets across energy and FX, metals and agricultural products, may be permitted if there is a significant and reliable correlation between the relevant products. Additionally, risk offsets will continue to be back-tested to establish the margin offset level. Specifically, the margin reduction from a calculated offset for a given portfolio will be compared to the back-test data to ensure the 99% coverage standard is met for all product combinations.³⁵ Therefore, consistent with CFTC regulations and CME's risk tolerance, CME will continue to maintain at least 99% margin coverage of the potential future risk across all products, spreads and portfolios, and cover extreme tail-risk through stress shortfall calculations in the mutualized Base Guaranty Fund.

³³ Subsequent extensions of the New Framework will be submitted to the Commission in accordance with required procedures.

³⁴ CME maintains rigorous standards for product risk offsets. This includes not only economic judgment, but also independent evaluation of margin models and daily monitoring of the risk of individual portfolios.

³⁵ The liquidation time horizon for the margin offset utilizes whichever product has the longest liquidation period.

CME certifies that the proposed changes comply with the CEA and Commission regulations thereunder. There were no substantive opposing views to this initiative.

CME certifies that this submission has been concurrently posted on the CME Group website at <http://www.cmegroup.com/market-regulation/rule-filings.html>.

If you require any additional information regarding this submission, please contact the undersigned at 212.299.2200 or Bruce Fekrat at 212.299.2208, or you may contact CME by email at CFTCSUBMISSIONINQUIRY@cmegroup.com.

Please reference CME Submission No. 19-213 in any related correspondence.

Sincerely,

/s/ Christopher Bowen
Managing Director and Chief Regulatory Counsel

cc: Board of Governors of the Federal Reserve System