CME Group

Timothy R. Elliott
Director and Associate General Counsel
Legal Department

March 30, 2012

VIA E-MAIL

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

RE: Section 5c(c)(1), Rule 40.6(a) –Revisions to Certification of the Change in Performance Bond Methodology from SPAN to HVaR for Cleared OTC FX Spot, Forward and Swap Transactions.
CME Submission 12-102R

Dear Mr. Stawick:

Chicago Mercantile Exchange Inc. hereby notifies the Commission that the Chicago Mercantile Exchange Inc. ("CME") is changing its methodology for calculation of the "cash mark-to-mark" performance bonds for Cleared Over-the-Counter ("OTC") Foreign Exchange ("FX") Spot, Forward and Swap Transactions from Standard Portfolio Analysis ("SPAN®") to Historical Value at Risk ("HVaR"). This submission includes the description supporting the implementation of this enhancement of the performance bond administration procedures, which are summarized as follows.

Please note that we are revising Submission No. 12-102. A black lined copy of this submission is attached as Appendix D.

CME is migrating from SPAN® to HVaR for cleared OTC FX performance bonds. This action is consistent with an analogous migration in performance bond methodology for CME Group's cleared OTC Interest Rate Swaps ("IRS") completed in Third Quarter 2011. CME currently has a total of thirty-eight ("38") OTC FX products listed for clearing (12 non-deliverable forward FX pairs & 26 CME WM/Reuters OTC Cash-Settlement Forwards FX pairs). "CME Rule 930.A. Performance Bond System" is amended to note cleared OTC FX transactions will use the HVaR Performance Bond System for margining. See Appendix A for the rule amendments with additions underlined. Appendix B is a clean copy of the amended CME Rule 930.A.

CME Special Executive Report S-6232, dated Friday, May 4, 2012 and attached as Appendix C, clarifies a phased-in implementation schedule to HVaR performance bond methodology across all 38 FX pairs for the Cleared OTC FX initiative. These 38 products include twelve ("12") cleared OTC non-deliverable forward or "NDFs," namely,

U.S. Dollar/Brazilian Real ("USD/BRL"), U.S. Dollar/Chinese Renminbi ("USD/RMB" aka, "CNY"), U.S. Dollar/Malaysian Ringgit ("USD/MYR"), U.S. Dollar/Indonesian Rupiah ("USD/IDR"), U.S. Dollar/Indian Rupee ("USD/INR"), U.S. Dollar/Korean Won ("USD/KRW"), U.S. Dollar/ Philippine Peso ("USD/PHP"), U.S. Dollar/Taiwan Dollar ("USD/TWD"), U.S. Dollar/Chilean Peso ("USD/CLP"), U.S. Dollar/Colombian Peso ("USD/COP"), U.S. Dollar/Peruvian New Sol ("USD/PEN") and U.S. Dollar/Russian Ruble ("USD/RUB") non-deliverable forwards ("NDFs"); and twenty-six ("26") CME WM/Reuters OTC FX Cash-Settlement Forwards, namely

Australian Dollar/U.S. Dollar ("AUD/USD"), U.S. Dollar/Swiss Franc ("USD/CHF"), U.S. Dollar/Canadian Dollar ("USD/CAD"), New Zealand Dollar/U.S. Dollar ("NZD/USD"), U.S. Dollar/Norwegian Krone ("USD/NOK"), U.S. Dollar/Swedish Krona ("USD/SEK"), U.S. Dollar/Denmark Krone ("USD/DKK"), Euro /U.S. Dollar ("EUR/USD"), U.S. Dollar/Japanese Yen ("USD/JPY"), Great British Pound/U.S. Dollar ("GBP/USD"), U.S. Dollar/Mexican Peso ("USD/MXN"), U.S. Dollar/Singapore Dollar ("USD/SGD"), U.S. Dollar/Polish Zloty ("USD/PLN"), U.S. Dollar/South African Rand ("USD/ZAR"), Australian Dollar/Japanese Yen ("AUD/JPY"), Euro/Australian Dollar ("EUR/AUD"), Canadian Dollar/Japanese Yen("CAD/JPY"), Euro/Great British Pound ("EUR/GBP"), Euro/Japanese Yen ("EUR/JPY"), Euro/Swiss Franc ("EUR/CHF"), U.S. Dollar/Czech Koruna ("USD/CZK"), U.S. Dollar/Hungarian Forint ("USD/HUF"), U.S. Dollar/Turkish Lira ("USD/TRY"), U.S. Dollar/Israeli Shekel ("USD/ILS"), U.S. Dollar/Thailand Baht ("USD/THB") and U.S. Dollar/Hong Kong Dollar ("USD/HKD").

CME is publishing CME Group Special Executive Report ("SER"), S-6184, dated Tuesday, April 3, 2012, as notification to market participants about implementation of the new performance bond methodology scheduled for Monday, April 16, 2012.

CME Group has determined that the HVaR methodology more appropriately accounts for historical risk in the OTC FX market. Extended back testing ability is a primary characteristic of HVaR methodology with Exponentially Weighted Moving Average ("EWMA") volatility forecasting. This methodology has been well-researched over the years and is widely used in the industry.[1]

Consistent with best practices recommendations,[2] CME's preferred margin model covers losses over any 5-day period in a large universe of portfolios during 99% of days; it quickly reacts to changes in FX and volatility regimes; it is simple and transparent for market participants. HVaR methodology is the model of choice for the risk departments of most, if not all financial services firms and is widely considered to be a proxy for market risk. It is also well-understood and easily replicable. In the HVaR framework, past events are used for coming up with possible scenarios in the future. This approach implicitly assumes that historical data series provide rich sample sets of the possible probability distribution of the relevant financial variable. CME has arranged for receipt of FX historical data by FX pair by maturity curve from Super Derivatives. In depth analysis and stress testing of sample FX portfolios will be done upon receipt of data.

CME Clearing has found in analyzing OTC interest rate swap data that simple application of the past scenarios to current environment has to be enhanced in order to correctly capture the proper volatility regime. To achieve that, the HVaR model scales historical returns by the ratio of the forecasted volatility to the realized volatility from the time-period the shock was sampled. This allows the model to retain a

[1] See for example, "Incorporating volatility updating into the historical simulation method for value at risk" by John Hull and Alan White.
[2] "Principles for financial market infrastructures," CPSS-IOSCO, March 2011 (http://www.bis.org/publ/cpss94.pdf).

rich history of data/scenarios, but remain nimble enough to react to the current volatility regime. A simple way to understand this volatility scaling is to notice that if forecasted volatility increases, then the distribution of returns will have more dispersion than what's observed in the sampled historical period. Essentially, this assumes stationarity of the volatility-scaled returns' distribution, which is very well supported through our statistical analysis. In a highly volatile environment the model appropriately scales up the returns that were obtained during periods of lower volatility. The opposite is, of course, also true.

In the HVaR approach, each observed tenor of the forward curve has its own volatility forecast and therefore its own scaling factor. We will check that this methodology preserves, to a reasonable degree, the average observed covariance matrix between the tenors of the forward curve, so as the historical correlations between different parts of the forward curve are maintained.

The margin methodology, at a high level, follows these four steps:

1. Generate matrix of historical returns

2. Compute volatility scaling factors and apply them individually to each tenor in each scenario

3. Generate scenarios by applying the scaled return matrix to today's forward curve and compute the profit (loss) of the portfolio in each scenario.

4. Rank the scenarios by maximum loss to maximum gain and take the required percentile as a margin. In our model, we chose to take the 4th largest loss over the 5-year period, which corresponds to approximately 99.7% confidence interval.

Note that in addition to historical scenarios used to generate margins required for 99% coverage, CME will consider truly extreme events for the purpose of sizing up the Guaranty Fund. This Fund is designed to withstand large systemic shocks at the Clearing Member level (which combines portfolios from its many customers), and thus has the benefit of netting out the risks amongst its clients. These stress tests will contain both historical and theoretical scenarios to represent potential tail-risks not accounted for in the margin model much more adequately.

1. Create Historical Return Matrices

Obtain the historical rates

The FX margin model will use the following data sources:

- Following sources of data will be used to build the historical curve dataset from January 1, 2002 to the current date.
    - Super Derivatives is providing the forward rates on all standard traded tenors (a.k.a. observed rates). These data are extensively cleansed by comparing to Bloomberg quotes as well as identifying any dates where the forward rates did not look correct through trend analysis and examination of the curves.
    - On a daily basis the forward rates are received from WM Reuters at 4 p.m. London close.

For a typical two-year curve, the number of traded tenors is generally between 16 to 18, excluding IMM FX delivery dates, and 20 tenors including IMM FX delivery dates out the first year, but depending on the

specific currency and instruments.[3] Assuming we have 16 tenors, Figure 1 shows a 5-yr zero-rate matrix (approximately 1265 X 16 days worth to provide 1260 sets of 5-day returns).

Figure 1.

$$\begin{bmatrix} Rate\ (Time\ 1, Tenor\ 1) & Rate\ (Time\ 1, Tenor\ 2) & \dots & Rate\ (Time\ 1, Tenor\ 16) \\ Rate\ (Time\ 2, Tenor\ 1) & Rate\ (Time\ 2, Tenor\ 2) & \dots & Rate\ (Time\ 2, Tenor\ 16) \\ Rate\ (Time\ 3, Tenor\ 1) & Rate\ (Time\ 3, Tenor\ 2) & \dots & Rate\ (Time\ 3, Tenor\ 16) \\ \dots & \dots & \dots & \dots \\ Rate\ (Time\ 1265, Tenor\ 1) & Rate\ (Time\ 1265, Tenor\ 2) & \dots & Rate\ (Time\ 1265, Tenor\ 16) \end{bmatrix}$$

Figure 2.

In short notation, we write it as: $\begin{bmatrix} R_{1,1} & R_{1,2} & \dots & R_{1,16} \\ R_{2,1} & R_{2,2} & \dots & R_{2,16} \\ R_{3,1} & R_{3,2} & \dots & R_{3,16} \\ \dots & \dots & \dots & \dots \\ R_{1265,1} & R_{1265,2} & \dots & R_{1265,16} \end{bmatrix}$

Calculate 5-day Log Return Matrices for the prior 5 years

The returns for each tenor for each historical date are computed as the logarithm of ratio of the continuously compounded zero rates on that date and the fifth business day thereafter.

$$r_{t,j} = log\left(\frac{R_{t,j}}{R_{t-l,j}}\right)$$

Where,

- r is the log return
- $\mathbf{R_{t,j}}$ is the historical Forward Rate at time t of tenor = **j**
- $\mathbf{R_{t-l,i}}$ is the leading Forward Rate at time t, of tenor = **j**, where **l** denotes 5-day lag
- **t** is each of the rolling approximately 1260 business days
- l is the 5-day lag
- **j** is each observed tenor of the forward curve

Generate a return matrix of 5-day log returns, going back 5 years, for each of the observed tenors as shown in Table 1.

[3] Estimates based on Bloomberg FX forward curve out two years for USD/CNY and USD/BRL, and Reuters FX forward curve out two years for USD/CNY.

Table 1.

	Return (Tenor 1)	Return (Tenor 2)	Return (Tenor ...)	Return (Tenor 16)
t = 1	$\log\left(\frac{R_{6,1}}{R_{1,1}}\right)$	$\log\left(\frac{R_{6,2}}{R_{1,2}}\right)$	$\log\left(\frac{R_{6,\dots}}{R_{1,\dots}}\right)$	$\log\left(\frac{R_{6,16}}{R_{1,16}}\right)$
t =2	$\log\left(\frac{R_{7,1}}{R_{2,1}}\right)$	$\log\left(\frac{R_{7,2}}{R_{2,2}}\right)$	$\log\left(\frac{R_{7,\dots}}{R_{2,\dots}}\right)$	$\log\left(\frac{R_{7,16}}{R_{2,16}}\right)$
t =3	$\log\left(\frac{R_{8,1}}{R_{3,1}}\right)$	$\log\left(\frac{R_{8,2}}{R_{3,2}}\right)$	$\log\left(\frac{R_{8,\dots}}{R_{3,\dots}}\right)$	$\log\left(\frac{R_{8,16}}{R_{3,16}}\right)$
t = ...	$\log\left(\frac{R_{t+5,1}}{R_{t,1}}\right)$	$\log\left(\frac{R_{t+5,2}}{R_{t,2}}\right)$	$\log\left(\frac{R_{t+5,\dots}}{R_{t,\dots}}\right)$	$\log\left(\frac{R_{t+5,16}}{R_{t,16}}\right)$
t = 1260	$\log\left(\frac{R_{1265,1}}{R_{1260,1}}\right)$	$\log\left(\frac{R_{1265,2}}{R_{1260,2}}\right)$	$\log\left(\frac{R_{1265,\dots}}{R_{1260,\dots}}\right)$	$\log\left(\frac{R_{1265,16}}{R_{1260,16}}\right)$

Or, using the above notation:

Figure 3.

$$\begin{bmatrix} r_{1,1} & r_{1,2} & \cdots & r_{1,16} \\ r_{2,1} & r_{2,2} & \cdots & r_{2,16} \\ r_{3,1} & r_{3,2} & \cdots & r_{3,16} \\ \cdots & \cdots & \cdots & \cdots \\ r_{1260,1} & r_{1260,2} & \cdots & r_{1260,16} \end{bmatrix}$$

2. Scale the Returns by Volatility

Calculate a time series of volatility forecasts

The objective of EWMA is that the model quickly reacts to changes in the underlying volatility regime. To calculate the EWMA Volatility (the numerator of the rescaling coefficient), plug each time series into the EWMA model (r_1 through r_{1260}).

For each tenor, use the time-series of the 5-day log returns and lambda to calculate EWMA volatility forecast (1260 x 16 matrix) for each day in the time-series.

$$\sigma_{t,j}^2 = (1-\lambda) r_{t-1,j}^2 + \lambda \sigma_{t-1,j}^2$$

- σ is the volatility forecast at time t
- r is the log return
- λ is the time decay coefficient of the historical log returns (currently calibrated to 0.97 based on the extensive testing of FX portfolios). This is applied daily to the returns which are in-turn weekly.
- j is the tenor
- Please note that the current day is denoted as T and all historical dates are denoted with t; therefore σ_t are all historical EWMA forecasts and σ_T is the current date's forecast.

From the fitted volatilities above, calculate volatilities for each tenor in the time series [4]

Figure 4.

$$\begin{bmatrix} \sigma_{1,1} & \sigma_{1,2} & \sigma_{1,m} & \sigma_{1,16} \\ \sigma_{2,1} & \sigma_{2,2} & \sigma_{2,m} & \sigma_{2,16} \\ \sigma_{3,1} & \sigma_{3,2} & \sigma_{3,m} & \sigma_{3,16} \\ \sigma_{m,1} & \sigma_{m,2} & \sigma_{m,m} & \sigma_{m,16} \\ \sigma_{1260,1} & \sigma_{1260,2} & \sigma_{1260,m} & \sigma_{1260,16} \end{bmatrix}$$

σ_{1260} is today's forecasted volatility.

Smooth the volatilities

In order to reduce noise and mitigate unwarranted fluctuations in margins, we found it useful to average the forecasted volatility over a fairly short look-back horizon. This smoothing algorithm is fairly straightforward:

$$\sigma'_{t,j} = \sigma'_{t-1,j} + \alpha\left(\sigma_{t,j} - \sigma'_{t-1,j}\right)$$
$$\sigma'_{1,j} = \sigma_{1,j}$$
$$\alpha = \frac{2}{L+1}$$

- σ' is the volatility using the time series based moving average algorithm (Alternatively, if the moving average is not applicable, $\sigma'_T = \sigma_t$ which is the last value of the EWMA volatility matrix.)
- α is the smoothing coefficient
- L is the target horizon: in our model it is 10 days and the choice of 10 days was made so that it doesn't adversely impact the desired reactiveness of the EWMA based volatility forecasting model

Introduce the volatility floor

In order to prevent the volatility and subsequently the margins from dropping too low at times, we introduced volatility floor at approximately the level of the lowest observed value of the implied volatility period in recent history. This volatility floor is applied to each currency pair:

$$\sigma_{T,j}^{EWMA} = max\left\{\sigma'_{T,j} \ , \ X\%\right\}$$

[4] In order to generate a time series of EWMA forecasts, there is a need for a "seed" value forecast for the first value in the time series. In our model we "seed" this first volatility by running the EWMA calculations on 5-years prior to the data corresponding to the seed-value. In the preceding time series we seed its first value as the square of the returns. By doing so, we minimize any potential for any model error.

Even though the current volatility forecast (from EWMA) is not sensitive to the choice of the seed value of volatility 5-years ago, the fact that we scale those returns using the EWMA volatility at that time makes the scenarios quite sensitive. To mitigate any seeding error, we perform EWMA starting 10-years back even though we use the last 5-years for scenarios. Our tests suggest that having at least 7-8 years is good enough but data exists for USD for 10 years, therefore we've chosen 10 years. For other currencies, we will do a similar analysis to minimize any errors due to seeding.

$\sigma'_{T,j}$ is the last value from the volatility matrix above (after the 10 day moving average) and T is the current date.

X% is the volatility floor individually calibrated for each currency pair.

The floor helps to mitigate large breaks in the event of a sudden correction in the market.

Calculate scaling coefficients

For each tenor/scenario, we use the forecasted volatility (smoothed and floored as described in the steps above) to compute a scaling coefficient by dividing it by the historical EWMA volatility of that tenor/ scenario. As one would expect, this coefficient would scale the scenario-return up if the forecasted EWMA is higher than that scenario's historical volatility and down if the forecasted EWMA volatility is lower than that scenario's historical volatility.

$$c_{t,j} = \sigma_{T,j}^{EWMA} / \sigma'_{t,j}$$

Where,

- c is the scaling coefficient
- $\sigma_{T,j}^{EWMA}$ is the forecasted EWMA volatility after smoothing and flooring
- $\sigma'_{t,j}$ is the historical EWMA volatility as of time t after smoothing

Thus, creating the matrix of coefficients as shown in Figure 5.

Figure 5.

$$\begin{bmatrix} C_{1,1} & C_{1,2} & C_{1,m} & C_{1,16} \\ C_{2,1} & C_{2,2} & C_{2,m} & C_{2,16} \\ C_{3,1} & C_{3,2} & C_{3,m} & C_{3,16} \\ C_{m,1} & C_{m,2} & C_{m,m} & C_{m,16} \\ C_{1260,1} & C_{1260,2} & C_{1260,m} & C_{1260,16} \end{bmatrix}$$

Calculate scaled returns

For each scenario and each tenor we calculate the scaled return by multiplying the scaling coefficients by the historical 5-day log return:

Figure 6.

$$\begin{bmatrix} r_{1,1} & r_{1,2} & r_{1,m} & r_{1,16} \\ r_{2,1} & r_{2,2} & r_{2,m} & r_{2,16} \\ r_{3,1} & r_{3,2} & r_{3,m} & r_{3,16} \\ r_{m,1} & r_{m,2} & r_{m,m} & r_{m,16} \\ r_{1260,1} & r_{1260,2} & r_{1260,m} & r_{1260,16} \end{bmatrix} * \begin{bmatrix} C_{1,1} & C_{1,2} & C_{1,m} & C_{1,16} \\ C_{2,1} & C_{2,2} & C_{2,m} & C_{2,16} \\ C_{3,1} & C_{3,2} & C_{3,m} & C_{3,16} \\ C_{m,1} & C_{m,2} & C_{m,m} & C_{m,16} \\ C_{1260,1} & C_{1260,2} & C_{1260,m} & C_{1260,16} \end{bmatrix} =$$

$$r^* = \begin{bmatrix} c_{1,1}r_{1,1} & c_{1,2}r_{1,2} & \cdots & c_{1,16}r_{1,16} \\ \vdots & \cdots & \cdots & \vdots \\ c_{t,1}r_{t,1} & c_{t,2}r_{t,2} & \cdots & c_{t,16}r_{t,16} \\ \vdots & \cdots & \cdots & \vdots \\ c_{T,1}r_{T,1} & c_{T,2}r_{T,2} & \cdots & c_{T,16}r_{T1,6} \end{bmatrix} =$$

Table 2.	Scaled Returns (Tenor 1)	Scaled Returns (Tenor 2)	Scaled Returns (Tenor …)	Scaled Returns (Tenor 16)
t = 1	$C_{1,1} * r_{1,1}$	$C_{1,2} * r_{1,2}$	$C_{1,\ldots} * r_{1,\ldots}$	$C_{1,16} * r_{1,16}$
t =2	$C_{2,1} * r_{2,1}$	$C_{2,2} * r_{2,2}$	$C_{2,\ldots} * r_{2,\ldots}$	$C_{2,16} * r_{2,16}$
t =3	$C_{3,1} * r_{3,1}$	$C_{3,2} * r_{3,2}$	$C_{3,\ldots} * r_{3,\ldots}$	$C_{3,16} * r_{3,16}$
t = …	$C_{\ldots,1} * r_{\ldots,1}$	$C_{\ldots,2} * r_{\ldots,2}$	$C_{\ldots,\ldots} * r_{\ldots,\ldots}$	$C_{\ldots,16} * r_{\ldots,16}$
t = 1260	$C_{1260,1} * r_{1260,1}$	$C_{1260,2} * r_{1260,2}$	$C_{1260,\ldots} * r_{1260,\ldots}$	$C_{1260,16} * r_{1260,16}$

Where,

- r^* is the scaled log return matrix
- r is the original log return for each tenor

3. Calculate Shocked US Zero Curves and Shocked FX Forward Curves

Using the above scaled returns matrix, we calculate the shocked US zero curves and shocked forward curves.

Apply scaled return matrix to base curves (US zero curve and FX forward curve)

Apply the scaled return matrix to the base curve as of the margin date to get the shocked US zero curve and shocked FX forward curve, where $[R_1, R_2, R_3, R_4, \ldots, R_{16}]$ represents the base curve, by tenor as shown below.

$$R^*_{t,j} = R_{T,j} \cdot exp\{r^*_{t,j}\}$$

Where:

- $R^*_{t,j}$ is the shocked curve vector of Tenor j
- $R_{T,j}$ is the base curve as of the margin day
- $r^*_{t,j}$ is the rescaled return matrix

Table 3.	Shocked Curve (Tenor 1)	Shocked Curve (Tenor 2)	Shocked Curve (Tenor …)	Shocked Curve (Tenor 16)
t = 1	$R_1 \exp(C_{1,1} * r_{1,1})$	$R_2 \exp(C_{1,2} * r_{1,2})$	$R_m \exp(C_{1,m} * r_{1,m})$	$R_{16} \exp(C_{1,16} * r_{1,16})$
t =2	$R_1 \exp(C_{2,1} * r_{2,1})$	$R_2 \exp(C_{2,2} * r_{2,2})$	$R_m \exp(C_{2,m} * r_{2,m})$	$R_{16} \exp(C_{2,16} * r_{2,16})$
t =3	$R_1 \exp(C_{3,1} * r_{3,1})$	$R_2 \exp(C_{3,2} * r_{3,2})$	$R_m \exp(C_{3,m} * r_{3,m})$	$R_{16} \exp(C_{3,16} * r_{3,16})$
t = …	$R_1 \exp(C_{m,1} * r_{m,1})$	$R_2 \exp(C_{m,2} * r_{m,2})$	$R_m \exp(C_{m,m} * r_{m,m})$	$R_{16} \exp(C_{m,16} * r_{m,16})$
t = 1260	$R_1 \exp(C_{1260,1} * r_{1260,1})$	$R_2 \exp(C_{1260,2} * r_{1260,2})$	$R_m \exp(C_{1260,m} * r_{1260,m})$	$R_{16} \exp(C_{1260,16} * r_{1260,16})$

This yields 1260 scenarios.

4. Calculate Portfolio Margin

The subsequent steps are all specific to a portfolio and will derive the margin for the portfolio on a given day.

Calculate the portfolio value

From the shocked forward curves ($SC_{1,1}$), calculate the value of the portfolio under each scenario:

Figure 7.

$$\begin{bmatrix} SC_{1,1} & SC_{1,2} & SC_{1,m} & SC_{1,16} \\ SC_{2,1} & SC_{2,2} & SC_{2,m} & SC_{2,16} \\ SC_{3,1} & SC_{3,2} & SC_{3,m} & SC_{3,16} \\ SC_{m,1} & SC_{m,2} & SC_{m,m} & SC_{m,16} \\ SC_{1260,1} & SC_{1260,2} & SC_{1260,m} & SC_{1260,16} \end{bmatrix} \Rightarrow \Rightarrow \begin{bmatrix} PV_1 \\ PV_2 \\ PV_3 \\ PV_m \\ PV_{1260} \end{bmatrix}$$

Note: $SC_{1,1}$ corresponds to $R_1 \exp(C_{1,1} * r_{1,1})$ as calculated above. The columns represent tenors and therefore each row in the above matrix represents a full-scenario.

Calculate the portfolio gain (loss) under each scenario

Calculate the Portfolio Gain (Loss) as the difference between the Portfolio Value under each scenario and the Base Portfolio Value on the margin date.

Figure 8.

$$\begin{bmatrix} PV_1 \\ PV_2 \\ PV_3 \\ PV_m \\ PV_{1260} \end{bmatrix} - Base\ Price_{margin-date} = \begin{bmatrix} P\&L_1 \\ P\&L_2 \\ \cdots \\ \cdots \\ P\ L_{1260} \end{bmatrix}$$

OR

Pnl in $:

Currency Pair: AAABBB

$$PnL\ in\ \$ = Notional^{AAA} * \left(Forward_{T,S}^{AAABBB} - Forward_{T,0}^{AAABBB}\right) * Forward_{T,S}^{BBBUSD} * DF_S^{USD}(0,T)$$

Where
T : is the days in Maturity for the currency pair
S : is the scenario rate
$DF_S^{USD}(0,T)$: is the scenario discount factor between time 0 (today) and expiry(T) from USD OIS curve

Pnl in Dealing Currency:
Currency Pair: AAABBB

$$PnL\ in\ Dealing\ Currency = Notional^{AAA} * \left(Forward_{T,S}^{AAABBB} - Forward_{T,0}^{AAABBB}\right) * Forward_{T,S}^{BBBUSD} * DF_S^{USD} * Forward_{0,S}^{USDBBB}$$

Where
T : is the days in Maturity for the currency pair
S : is the scenario rate

Select the margin value based on the targeted confidence interval

Sort the P&L distribution from maximum gain to maximum loss. Thereafter, using the targeted confidence value, 99.7, extract the margin from the loss side of the distribution.

$$M^+ = P\&L^{0.3rd} \quad , \quad M^- = P\&L^{99.7th}$$

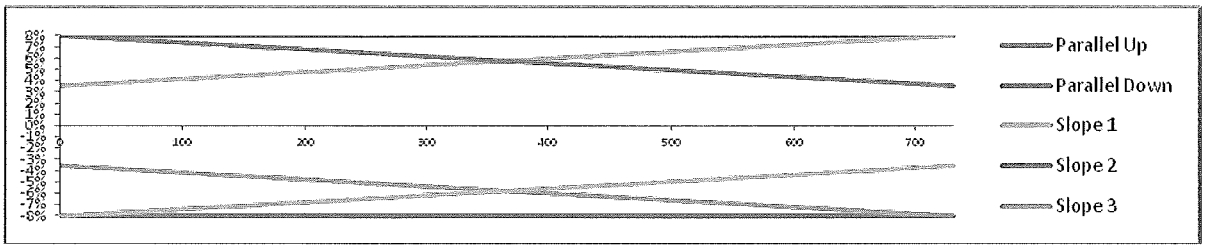
- M^+ is the margin for a given portfolio;
- M^- is the margin for the portfolio with exactly opposite trades

5. Pegged Currency Margining

- We margin each pegged currency separately, by applying artificial shocks to today's forward curve to imply large parallel and slope moves

- Artificial shocks are periodically reviewed based on the recent market events:
  - For parallel shock, we look at the spot history of pairs that had experienced an unpegging event:
    - Append that data to the history of the particular pegged currency by preserving the log return. This new history provides a good estimate of how that pair will behave once unpegged.
    - Now margin calculated with a specific percent up and down parallel shock which captures a reasonable portion of the loss.
  - For slope shock, margin data analyzing other currency pairs, where unpegged event happened :
    - Take a spread of 1D and 2Y with same notional and calculate its average margin for the past one year.
    - The ratio between average margin and notional defines the slope

- There are six artificial shocks, two parallel and four slope:



6. Stress Testing Methodology

The purpose of this Stress Testing is to estimate the size of the CME FX Guaranty Fund. Stress test scenarios will be built to cover extreme but plausible 7-day moves across all portfolios.

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Business staff responsible for the proposed change and the legal department collectively reviewed the derivatives clearing organization core principles ("Core Principles") as set forth in the Commodity Exchange Act ("CEA"). During this review, the following Core Principles were identified as being relevant to this submission:

FINANCIAL RESOURCES—Demonstrate that CME (the derivative clearing organization or DCO) has adequate financial, operational, and managerial resources to discharge the responsibilities of a derivatives clearing organization.

Compliance: There are minor financial impacts associated with the enhanced performance bond administration regime, where CME Clearing is migrating from SPAN to HVaR systems for calculation of cleared FX spot, forwards and swaps margins. However, initial performance bond requirements will continue to be established at levels that are consistent with observed levels of volatility in the particular currency pairing and generally aligned with initial margin levels applied to current CME FX futures and option contracts, where applicable. These components of the clearing system are unchanged. The migration to HVaR margin calculations for cleared OTC FX will enable more tailored and responsive adjustments of performance bonds based upon market dynamics. Variation margins may be satisfied with the posting of appropriate amounts of collateral, where CME Clearing collects and pays in cash between the counterparties each day. These payments are adjusted with implementation of HVaR, which will make the CME cleared OTC FX products more appealing to the OTC community, because of its simplicity and broad-based acceptance for risk management in the financial marketplace.

Since CME has implemented this same feature (HVaR) for cleared interest rate swaps, it can implement this enhancement in a very cost effective manner. CME's utilization of the HVaR-based "cash mark to market" system continues to provide for all open positions held by market participants to be evaluated each day and real cash payments are made by CME Clearing to appropriate parties. These payments will now result in even more alignment with typical bilateral OTC FX transactions. This system, analogous to margining for futures, is also consistent with the requirements of the CEA.

PARTICIPANT AND PRODUCT ELIGIBILITY—CME has established (i) appropriate admission and continuing eligibility standards (including appropriate minimum financial requirements) for members of and participants in the organization; and (ii) appropriate standards for determining eligibility of agreements, contracts, or transactions submitted to CME.

Compliance: Parties to transactions in these Cleared OTC Contracts continue to be limited to "eligible contract participants" as defined in Section 1a(12) of the Commodity Exchange Act and existing methods for monitoring compliance with eligibility standards are utilized by CME, so there is no change or impact there. However, CME believes the inclusion of HVaR as the performance bond calculation methodology will make the CME cleared OTC FX product more appealing to OTC FX customers, given that HVaR is the risk management standard for the OTC market.

RISK MANAGEMENT—CME has the ability to manage the risks associated with discharging the responsibilities of a derivatives clearing organization through the use of appropriate tools and procedures.

Compliance: There are other existing CME products that feature cash mark to market performance bonds derived from HVaR methodology, namely, the cleared interest rate swaps. CME Clearing will utilize existing tools, procedures and processes to discharge the responsibilities of a derivatives clearing organization with respect to this enhanced cash mark to market mechanism for the cleared OTC FX products.

SETTLEMENT PROCEDURES—CME will have the ability to (i) complete settlements on a timely basis under varying circumstances; (ii) maintain an adequate record of the flow of funds associated with each transaction that the applicant clears; and (iii) comply with the terms and conditions of any permitted netting or offset arrangements with other clearing organizations.

Compliance: CME Clearing and the Settlements Team together manage the daily requirements to evaluate appropriate daily marks to market for all CME products including the cash-settlement Cleared OTC FX Spot, Forward and Swap transactions. The cash mark to market of this suite of products is in U.S. dollars, Canadian dollars, Japanese yen, Euro and British pounds. This arrangement has long history of working smoothly. The migration to HVaR does impact the daily mark to market amounts for open position holders to a degree, given it is a different methodology. However, given that the HVaR enhancement is more conforming to the existing procedures in the OTC FX market, this added feature serves to strengthen the cleared OTC FX product as it will now be more viable for users. Also, its use is proven acceptable to the OTC marketplace in the cleared interest rate swaps products.

TREATMENT OF FUNDS—CME will have standards and procedures designed to protect and ensure the safety of member and participant funds.

Compliance: CME has standards and procedures that it applies to other existing products that feature cash mark to market with HVaR-based performance bonds that will be applied to protect and ensure safety of member and participant funds in connection with the proposed procedure change.

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 derivatives clearing organization.

Compliance: The CME's standard financial safeguards package will apply under the new, enhanced performance bond administration regime described by the proposed procedural changes.

SYSTEM SAFEGUARDS—CME demonstrates that it (i) has established and will maintain a program of oversight and risk analysis to ensure that the automated systems of the applicant function properly and have adequate capacity and security; and (ii) has 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.

Compliance: CME's standard oversight, risk analysis and emergency systems apply to all CME products, including the newly enhanced cash mark to market performance bonds with HVaR for the cleared OTC FX spot, forward and swaps.

The Exchange certifies that these rule amendments and procedures comply with the Act and the rules thereunder and that there were no substantive opposing views to this proposal. The Exchange certifies that this submission has been concurrently posted on the Exchange's website at http://www.cmegroup.com/market-regulation/rule-filings.html.

Members/shareholders will be notified of the information contained herein in CME Group Special Executive Report, S-6184, dated Tuesday, April 3, 2012.

If you require any additional information regarding this action, please do not hesitate to contact me or Steve Youngren, at 312-930-4583 or via e-mail at Steve.Youngren@cmegroup.com or me. Please reference our CME Submission No. 12-102 in any related correspondence.

Sincerely,

/s/ Tim Elliott
Director and Associate General Counsel

Attachments: Appendix A
Appendix B
Appendix C
Appendix D

Appendix A

Proposed Rule Amendments: Rule additions are underlined.

930.A. Performance Bond System

The Standard Portfolio Analysis of Risk ("SPAN®") Performance Bond System is the performance bond system adopted by the Exchange. SPAN-generated performance bond requirements shall constitute Exchange performance bond requirements. All references to performance bond within the rules of the Exchange shall relate to those computed by the SPAN system, except for cleared over-the-counter ("OTC") foreign exchange ("FX") and interest rate swap ("IRS") transactions, where the Historical Value at Risk ("HVaR") Performance Bond System is used for cleared OTC FX and IRS transaction performance bonds.

Performance bond systems other than the SPAN system may be used to meet Exchange performance bond requirements if the clearing member can demonstrate that its system will always produce a performance bond requirement equal to or greater than the SPAN performance bond requirements.

Appendix B

Proposed Rule Amendments: Clean copy of amended Rule 930.A.

930.A. Performance Bond System

The Standard Portfolio Analysis of Risk ("SPAN®") Performance Bond System is the performance bond system adopted by the Exchange. SPAN-generated performance bond requirements shall constitute Exchange performance bond requirements. All references to performance bond within the rules of the Exchange shall relate to those computed by the SPAN system, except for cleared over-the-counter ("OTC") foreign exchange ("FX") and interest rate swap ("IRS") transactions, where the Historical Value at Risk ("HVaR") Performance Bond System is used for cleared OTC FX and IRS transaction performance bonds.

Performance bond systems other than the SPAN system may be used to meet Exchange performance bond requirements if the clearing member can demonstrate that its system will always produce a performance bond requirement equal to or greater than the SPAN performance bond requirements.

Appendix C

CME Group

Special Executive Report

S-6232 **May 4, 2012**

Clarification of HVaR Performance Bond Methodology Implementation for Cleared OTC FX Spot, Forward and Swap Transactions

As you were previously notified in CME Group Special Executive Report, S-6184, dated Tuesday, April 3, 2012, CME is changing its methodology for calculation of the performance bond requirements for Cleared Over-the-Counter ("OTC") Foreign Exchange ("FX") Spot, Forward and Swap Transactions from Standard Portfolio Analysis ("SPAN®") to Historical Value at Risk ("HVaR"). CME is clarifying the implementation schedule as follows:

Release 1: As of Monday, April 16, 2012, the HVaR performance bond methodology was implemented for Cleared OTC U.S. Dollar (USD)/Brazilian Real (BRL), USD/Philippines Peso (PHP), USD/Malaysian Ringgit (MYR), USD/Indian Rupee (INR), USD/Korean Won (KRW), USD/Chinese Renminbi (CNY), USD/Indonesian Rupiah (IDR) spot, forward and swap transactions.

Release 2: As of Monday, May 7, 2012, the HVaR performance bond methodology will be implemented for Cleared OTC USD/Taiwan Dollar (TWD), USD/Chilean Peso (CLP), USD/Colombian Peso (COP), USD/Peruvian New Sol (PEN), USD/Russian Ruble (RUB), Euro (EUR)/USD spot, forward and swap transactions.

Release 3: As of Monday, May 28, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Japanese Yen (JPY), British Pound (GBP)/USD, USD/Canadian Dollar (CAD), USD/Swiss Franc (CHF), Australian Dollar (AUD)/USD, USD/Swedish Krona (SEK) spot, forward and swap transactions.

Release 4: As of Monday, June 18, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Norwegian Krone (NOK), USD/Danish Krone (DKK), New Zealand Dollar (NZD)/USD, EUR/JPY, EUR/GBP, AUD/JPY spot, forward and swap transactions.

Release 5: As of Monday, July 9, 2012, the HVaR performance bond methodology will be implemented for Cleared EUR/CHF, CAD/JPY, EUR/AUD, USD/Hong Kong Dollar (HKD), USD/Hungarian Forint (HUF), USD/Israeli Shekel (ILS) spot, forward and swap transactions.

Release 6: As of Monday, July 30, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Czech Koruna (CZK), USD/Mexican Peso (MXN), USD/Polish Zloty (PLN), USD/Singapore Dollar (SGD), USD/Thailand Baht (THB), USD/Turkish Lira (TRY), USD/South African Rand (ZAR) spot, forward and swap transactions.

These contracts will be enabled to be cleared on CME ClearPort according to the release schedule described above.

If you have any questions, please contact Craig LeVeille (email: Craig.LeVeille@cmegroup.com or ph. 312-454-5301) or Marco Ossanna (email: Marco.Ossanna@cmegroup.com or ph: (212) 299-2129) or Ian Nikolov (email: Ivaylo.Nikolov@cmegroup.com or ph. 312-466-4427) or Steve Youngren (email: Steve.Youngren@cmegroup.com or ph: 312-930-4583).

Appendix D

Timothy R. Elliott
Director and Associate General Counsel
Legal Department

March 30, 2012

VIA E-MAIL

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

RE: Section 5c(c)(1), Rule 40.6(a) –Revisions to Certification of the Change in Performance Bond Methodology from SPAN to HVaR for Cleared OTC FX Spot, Forward and Swap Transactions.
CME Submission 12-102R

Dear Mr. Stawick:

Chicago Mercantile Exchange Inc. hereby notifies the Commission that the Chicago Mercantile Exchange Inc. ("CME") is changing its methodology for calculation of the "cash mark-to-mark" performance bonds for Cleared Over-the-Counter ("OTC") Foreign Exchange ("FX") Spot, Forward and Swap Transactions from Standard Portfolio Analysis ("SPAN®") to Historical Value at Risk ("HVaR"). This submission includes the description supporting the implementation of this enhancement of the performance bond administration procedures, which are summarized as follows.

Please note that we are revising Submission No. 12-102. A black lined copy of this submission is attached as Appendix D.

CME is migrating from SPAN® to HVaR for cleared OTC FX performance bonds. This action is consistent with an analogous migration in performance bond methodology for CME Group's cleared OTC Interest Rate Swaps ("IRS") completed in Third Quarter 2011. CME currently has a total of thirty-eight ("38") OTC FX products listed for clearing (12 non-deliverable forward FX pairs & 26 CME WM/Reuters OTC Cash-Settlement Forwards FX pairs). "CME Rule 930.A. Performance Bond System" is amended to note cleared OTC FX transactions will use the HVaR Performance Bond System for margining. See Appendix A for the rule amendments with additions underlined. Appendix B is a clean copy of the amended CME Rule 930.A.

~~Effective Monday, April 16, 2012, CME will migrate all 38 OTC FX pairs currently listed for clearing from the current SPAN to HVaR methodology for determining performance bonds.~~CME Special Executive Report S-6232, dated Friday, May 4, 2012 and attached as Appendix C, clarifies a phased-in implementation schedule to HVaR performance bond methodology across all 38 FX pairs for the Cleared

OTC FX initiative. These 38 products include twelve ("12") cleared OTC non-deliverable forward or "NDFs," namely,

U.S. Dollar/Brazilian Real ("USD/BRL"), U.S. Dollar/Chinese Renminbi ("USD/RMB" aka, "CNY"), U.S. Dollar/Malaysian Ringgit ("USD/MYR"), U.S. Dollar/Indonesian Rupiah ("USD/IDR"), U.S. Dollar/Indian Rupee ("USD/INR"), U.S. Dollar/Korean Won ("USD/KRW"), U.S. Dollar/ Philippine Peso ("USD/PHP"), U.S. Dollar/Taiwan Dollar ("USD/TWD"), U.S. Dollar/Chilean Peso ("USD/CLP"), U.S. Dollar/Colombian Peso ("USD/COP"), U.S. Dollar/Peruvian New Sol ("USD/PEN") and U.S. Dollar/Russian Ruble ("USD/RUB") non-deliverable forwards ("NDFs"); and twenty-six ("26") CME WM/Reuters OTC FX Cash-Settlement Forwards, namely

Australian Dollar/U.S. Dollar ("AUD/USD"), U.S. Dollar/Swiss Franc ("USD/CHF"), U.S. Dollar/Canadian Dollar ("USD/CAD"), New Zealand Dollar/U.S. Dollar ("NZD/USD"), U.S. Dollar/Norwegian Krone ("USD/NOK"), U.S. Dollar/Swedish Krona ("USD/SEK"), U.S. Dollar/Denmark Krone ("USD/DKK"), Euro /U.S. Dollar ("EUR/USD"), U.S. Dollar/Japanese Yen ("USD/JPY"), Great British Pound/U.S. Dollar ("GBP/USD"), U.S. Dollar/Mexican Peso ("USD/MXN"), U.S. Dollar/Singapore Dollar ("USD/SGD"), U.S. Dollar/Polish Zloty ("USD/PLN"), U.S. Dollar/South African Rand ("USD/ZAR"), Australian Dollar/Japanese Yen ("AUD/JPY"), Euro/Australian Dollar ("EUR/AUD"), Canadian Dollar/Japanese Yen("CAD/JPY"), Euro/Great British Pound ("EUR/GBP"), Euro/Japanese Yen ("EUR/JPY"), Euro/Swiss Franc ("EUR/CHF"), U.S. Dollar/Czech Koruna ("USD/CZK"), U.S. Dollar/Hungarian Forint ("USD/HUF"), U.S. Dollar/Turkish Lira ("USD/TRY"), U.S. Dollar/Israeli Shekel ("USD/ILS"), U.S. Dollar/Thailand Baht ("USD/THB") and U.S. Dollar/Hong Kong Dollar ("USD/HKD").

CME is publishing CME Group Special Executive Report ("SER"), S-6184, dated Tuesday, April 3, 2012, as notification to market participants about implementation of the new performance bond methodology scheduled for Monday, April 16, 2012. ~~Please note that, prior to the migration of performance bond method from SPAN to HVaR, customers may continue to submit trades for clearing using the SPAN performance bond method.~~

CME Group has determined that the HVaR methodology more appropriately accounts for historical risk in the OTC FX market. Extended back testing ability is a primary characteristic of HVaR methodology with Exponentially Weighted Moving Average ("EWMA") volatility forecasting. This methodology has been well-researched over the years and is widely used in the industry.[5]

Consistent with best practices recommendations,[6] CME's preferred margin model covers losses over any 5-day period in a large universe of portfolios during 99% of days; it quickly reacts to changes in FX and volatility regimes; it is simple and transparent for market participants. HVaR methodology is the model of choice for the risk departments of most, if not all financial services firms and is widely considered to be a proxy for market risk. It is also well-understood and easily replicable. In the HVaR framework, past events are used for coming up with possible scenarios in the future. This approach implicitly assumes that historical data series provide rich sample sets of the possible probability distribution of the relevant financial variable. CME has arranged for receipt of FX historical data by FX pair by maturity curve from Super Derivatives. In depth analysis and stress testing of sample FX portfolios will be done upon receipt of data.

CME Clearing has found in analyzing OTC interest rate swap data that simple application of the past scenarios to current environment has to be enhanced in order to correctly capture the proper volatility

[5] See for example, "Incorporating volatility updating into the historical simulation method for value at risk" by John Hull and Alan White.
[6] "Principles for financial market infrastructures," CPSS-IOSCO, March 2011 (http://www.bis.org/publ/cpss94.pdf).

regime. To achieve that, the HVaR model scales historical returns by the ratio of the forecasted volatility to the realized volatility from the time-period the shock was sampled. This allows the model to retain a rich history of data/scenarios, but remain nimble enough to react to the current volatility regime. A simple way to understand this volatility scaling is to notice that if forecasted volatility increases, then the distribution of returns will have more dispersion than what's observed in the sampled historical period. Essentially, this assumes stationarity of the volatility-scaled returns' distribution, which is very well supported through our statistical analysis. In a highly volatile environment the model appropriately scales up the returns that were obtained during periods of lower volatility. The opposite is, of course, also true.

In the HVaR approach, each observed tenor of the forward curve has its own volatility forecast and therefore its own scaling factor. We will check that this methodology preserves, to a reasonable degree, the average observed covariance matrix between the tenors of the forward curve, so as the historical correlations between different parts of the forward curve are maintained.

The margin methodology, at a high level, follows these four steps:

5. Generate matrix of historical returns

6. Compute volatility scaling factors and apply them individually to each tenor in each scenario

7. Generate scenarios by applying the scaled return matrix to today's forward curve and compute the profit (loss) of the portfolio in each scenario.

8. Rank the scenarios by maximum loss to maximum gain and take the required percentile as a margin. In our model, we chose to take the 4th largest loss over the 5-year period, which corresponds to approximately 99.7% confidence interval.

Note that in addition to historical scenarios used to generate margins required for 99% coverage, CME will consider truly extreme events for the purpose of sizing up the Guaranty Fund. This Fund is designed to withstand large systemic shocks at the Clearing Member level (which combines portfolios from its many customers), and thus has the benefit of netting out the risks amongst its clients. These stress tests will contain both historical and theoretical scenarios to represent potential tail-risks not accounted for in the margin model much more adequately.

1. Create Historical Return Matrices

Obtain the historical rates

The FX margin model will use the following data sources:

- Following sources of data will be used to build the historical curve dataset from January 1, 2002 to the current date.
    - Super Derivatives is providing the forward rates on all standard traded tenors (a.k.a. observed rates). These data are extensively cleansed by comparing to Bloomberg quotes as well as identifying any dates where the forward rates did not look correct through trend analysis and examination of the curves.
    - On a daily basis the forward rates are received from WM Reuters at 4 p.m. London close.

For a typical two-year curve, the number of traded tenors is generally between 16 to 18, excluding IMM FX delivery dates, and 20 tenors including IMM FX delivery dates out the first year, but depending on the specific currency and instruments.[7] Assuming we have 16 tenors, Figure 1 shows a 5-yr zero-rate matrix (approximately 1265 X 16 days worth to provide 1260 sets of 5-day returns).

Figure 1.

$$\begin{bmatrix} Rate\ (Time\ 1, Tenor\ 1) & Rate\ (Time\ 1, Tenor\ 2) & \dots & Rate\ (Time\ 1, Tenor\ 16) \\ Rate\ (Time\ 2, Tenor\ 1) & Rate\ (Time\ 2, Tenor\ 2) & \dots & Rate\ (Time\ 2, Tenor\ 16) \\ Rate\ (Time\ 3, Tenor\ 1) & Rate\ (Time\ 3, Tenor\ 2) & \dots & Rate\ (Time\ 3, Tenor\ 16) \\ \dots & \dots & \dots & \dots \\ Rate\ (Time\ 1265, Tenor\ 1) & Rate\ (Time\ 1265, Tenor\ 2) & \dots & Rate\ (Time\ 1265, Tenor\ 16) \end{bmatrix}$$

Figure 2.

In short notation, we write it as: $\begin{bmatrix} R_{1,1} & R_{1,2} & \dots & R_{1,16} \\ R_{2,1} & R_{2,2} & \dots & R_{2,16} \\ R_{3,1} & R_{3,2} & \dots & R_{3,16} \\ \dots & \dots & \dots & \dots \\ R_{1265,1} & R_{1265,2} & \dots & R_{1265,16} \end{bmatrix}$

Calculate 5-day Log Return Matrices for the prior 5 years

The returns for each tenor for each historical date are computed as the logarithm of ratio of the continuously compounded zero rates on that date and the fifth business day thereafter.

$$r_{t,j} = log\left(\frac{R_{t,j}}{R_{t-l,j}}\right)$$

Where,

- r is the log return
- $\mathbf{R_{t,j}}$ is the historical Forward Rate at time t of tenor = **j**
- $\mathbf{R_{t-l,i}}$ is the leading Forward Rate at time t, of tenor = **j**, where **l** denotes 5-day lag
- **t** is each of the rolling approximately 1260 business days
- l is the 5-day lag
- **j** is each observed tenor of the forward curve

Generate a return matrix of 5-day log returns, going back 5 years, for each of the observed tenors as shown in Table 1.

[7] Estimates based on Bloomberg FX forward curve out two years for USD/CNY and USD/BRL, and Reuters FX forward curve out two years for USD/CNY.

Table 1.

	Return (Tenor 1)	Return (Tenor 2)	Return (Tenor ...)	Return (Tenor 16)
t = 1	$\log\left(\frac{R_{6,1}}{R_{1,1}}\right)$	$\log\left(\frac{R_{6,2}}{R_{1,2}}\right)$	$\log\left(\frac{R_{6,...}}{R_{1,...}}\right)$	$\log\left(\frac{R_{6,16}}{R_{1,16}}\right)$
t =2	$\log\left(\frac{R_{7,1}}{R_{2,1}}\right)$	$\log\left(\frac{R_{7,2}}{R_{2,2}}\right)$	$\log\left(\frac{R_{7,...}}{R_{2,...}}\right)$	$\log\left(\frac{R_{7,16}}{R_{2,16}}\right)$
t =3	$\log\left(\frac{R_{8,1}}{R_{3,1}}\right)$	$\log\left(\frac{R_{8,2}}{R_{3,2}}\right)$	$\log\left(\frac{R_{8,...}}{R_{3,...}}\right)$	$\log\left(\frac{R_{8,16}}{R_{3,16}}\right)$
t = ...	$\log\left(\frac{R_{t+5,1}}{R_{t,1}}\right)$	$\log\left(\frac{R_{t+5,2}}{R_{t,2}}\right)$	$\log\left(\frac{R_{t+5,...}}{R_{t,...}}\right)$	$\log\left(\frac{R_{t+5,16}}{R_{t,16}}\right)$
t = 1260	$\log\left(\frac{R_{1265,1}}{R_{1260,1}}\right)$	$\log\left(\frac{R_{1265,2}}{R_{1260,2}}\right)$	$\log\left(\frac{R_{1265,...}}{R_{1260,...}}\right)$	$\log\left(\frac{R_{1265,16}}{R_{1260,16}}\right)$

Or, using the above notation:

Figure 3.

$$\begin{bmatrix} r_{1,1} & r_{1,2} & \cdots & r_{1,16} \\ r_{2,1} & r_{2,2} & \cdots & r_{2,16} \\ r_{3,1} & r_{3,2} & \cdots & r_{3,16} \\ \cdots & \cdots & \cdots & \cdots \\ r_{1260,1} & r_{1260,2} & \cdots & r_{1260,16} \end{bmatrix}$$

2. Scale the Returns by Volatility

Calculate a time series of volatility forecasts

The objective of EWMA is that the model quickly reacts to changes in the underlying volatility regime. To calculate the EWMA Volatility (the numerator of the rescaling coefficient), plug each time series into the EWMA model (r_1 through r_{1260}).

For each tenor, use the time-series of the 5-day log returns and lambda to calculate EWMA volatility forecast (1260 x 16 matrix) for each day in the time-series.

$$\sigma_{t,j}^2 = (1-\lambda) r_{t-1,j}^2 + \lambda \sigma_{t-1,j}^2$$

- σ is the volatility forecast at time t
- r is the log return
- λ is the time decay coefficient of the historical log returns (currently calibrated to 0.97 based on the extensive testing of FX portfolios). This is applied daily to the returns which are in-turn weekly.
- j is the tenor
- Please note that the current day is denoted as T and all historical dates are denoted with t; therefore σ_t are all historical EWMA forecasts and σ_T is the current date's forecast.

From the fitted volatilities above, calculate volatilities for each tenor in the time series [8]

Figure 4.

$$\begin{bmatrix} \sigma_{1,1} & \sigma_{1,2} & \sigma_{1,m} & \sigma_{1,16} \\ \sigma_{2,1} & \sigma_{2,2} & \sigma_{2,m} & \sigma_{2,16} \\ \sigma_{3,1} & \sigma_{3,2} & \sigma_{3,m} & \sigma_{3,16} \\ \sigma_{m,1} & \sigma_{m,2} & \sigma_{m,m} & \sigma_{m,16} \\ \sigma_{1260,1} & \sigma_{1260,2} & \sigma_{1260,m} & \sigma_{1260,16} \end{bmatrix}$$

σ_{1260} is today's forecasted volatility.

Smooth the volatilities

In order to reduce noise and mitigate unwarranted fluctuations in margins, we found it useful to average the forecasted volatility over a fairly short look-back horizon. This smoothing algorithm is fairly straightforward:

$$\sigma'_{t,j} = \sigma'_{t-1,j} + \alpha\left(\sigma_{t,j} - \sigma'_{t-1,j}\right)$$
$$\sigma'_{1,j} = \sigma_{1,j}$$
$$\alpha = \frac{2}{L+1}$$

- σ' is the volatility using the time series based moving average algorithm (Alternatively, if the moving average is not applicable, $\sigma'_T = \sigma_t$ which is the last value of the EWMA volatility matrix.)
- α is the smoothing coefficient
- L is the target horizon: in our model it is 10 days and the choice of 10 days was made so that it doesn't adversely impact the desired reactiveness of the EWMA based volatility forecasting model

Introduce the volatility floor

In order to prevent the volatility and subsequently the margins from dropping too low at times, we introduced volatility floor at approximately the level of the lowest observed value of the implied volatility period in recent history. This volatility floor is applied to each currency pair:

$$\sigma_{T,j}^{EWMA} = max\left\{\sigma'_{T,j} \ , \ X\%\right\}$$

[8] In order to generate a time series of EWMA forecasts, there is a need for a "seed" value forecast for the first value in the time series. In our model we "seed" this first volatility by running the EWMA calculations on 5-years prior to the data corresponding to the seed-value. In the preceding time series we seed its first value as the square of the returns. By doing so, we minimize any potential for any model error.

Even though the current volatility forecast (from EWMA) is not sensitive to the choice of the seed value of volatility 5-years ago, the fact that we scale those returns using the EWMA volatility at that time makes the scenarios quite sensitive. To mitigate any seeding error, we perform EWMA starting 10-years back even though we use the last 5-years for scenarios. Our tests suggest that having at least 7-8 years is good enough but data exists for USD for 10 years, therefore we've chosen 10 years. For other currencies, we will do a similar analysis to minimize any errors due to seeding.

$\sigma'_{T,j}$ is the last value from the volatility matrix above (after the 10 day moving average) and T is the current date.

X% is the volatility floor individually calibrated for each currency pair.

The floor helps to mitigate large breaks in the event of a sudden correction in the market.

Calculate scaling coefficients

For each tenor/scenario, we use the forecasted volatility (smoothed and floored as described in the steps above) to compute a scaling coefficient by dividing it by the historical EWMA volatility of that tenor/ scenario. As one would expect, this coefficient would scale the scenario-return up if the forecasted EWMA is higher than that scenario's historical volatility and down if the forecasted EWMA volatility is lower than that scenario's historical volatility.

$$c_{t,j} = \sigma_{T,j}^{EWMA} / \sigma'_{t,j}$$

Where,

- c is the scaling coefficient
- $\sigma_{T,j}^{EWMA}$ is the forecasted EWMA volatility after smoothing and flooring
- $\sigma'_{t,j}$ is the historical EWMA volatility as of time t after smoothing

Thus, creating the matrix of coefficients as shown in Figure 5.

Figure 5.

$$\begin{bmatrix} C_{1,1} & C_{1,2} & C_{1,\dots} & C_{1,16} \\ C_{2,1} & C_{2,2} & C_{2,\dots} & C_{2,16} \\ C_{3,1} & C_{3,2} & C_{3,\dots} & C_{3,16} \\ C_{\dots,1} & C_{\dots,2} & C_{\dots,\dots} & C_{\dots,16} \\ C_{1260,1} & C_{1260,2} & C_{1260,\dots} & C_{1260,16} \end{bmatrix}$$

Calculate scaled returns

For each scenario and each tenor we calculate the scaled return by multiplying the scaling coefficients by the historical 5-day log return:

Figure 6.

$$\begin{bmatrix} r_{1,1} & r_{1,2} & r_{1,\dots} & r_{1,16} \\ r_{2,1} & r_{2,2} & r_{2,\dots} & r_{2,16} \\ r_{3,1} & r_{3,2} & r_{3,\dots} & r_{3,16} \\ r_{\dots,1} & r_{\dots,2} & r_{\dots,\dots} & r_{\dots,16} \\ r_{1260,1} & r_{1260,2} & r_{1260,\dots} & r_{1260,16} \end{bmatrix} * \begin{bmatrix} C_{1,1} & C_{1,2} & C_{1,\dots} & C_{1,16} \\ C_{2,1} & C_{2,2} & C_{2,\dots} & C_{2,16} \\ C_{3,1} & C_{3,2} & C_{3,\dots} & C_{3,16} \\ C_{\dots,1} & C_{\dots,2} & C_{\dots,\dots} & C_{\dots,16} \\ C_{1260,1} & C_{1260,2} & C_{1260,\dots} & C_{1260,16} \end{bmatrix} =$$

$$r^* = \begin{bmatrix} c_{1,1}r_{1,1} & c_{1,2}r_{1,2} & \cdots & c_{1,16}r_{1,16} \\ \vdots & \cdots & \cdots & \vdots \\ c_{t,1}r_{t,1} & c_{t,2}r_{t,2} & \cdots & c_{t,16}r_{t,16} \\ \vdots & \cdots & \cdots & \vdots \\ c_{T,1}r_{T,1} & c_{T,2}r_{T,2} & \cdots & c_{T,16}r_{T1,6} \end{bmatrix} =$$

Table 2.	Scaled Returns (Tenor 1)	Scaled Returns (Tenor 2)	Scaled Returns (Tenor …)	Scaled Returns (Tenor 16)
t = 1	$C_{1,1} * r_{1,1}$	$C_{1,2} * r_{1,2}$	$C_{1,\ldots} * r_{1,\ldots}$	$C_{1,16} * r_{1,16}$
t =2	$C_{2,1} * r_{2,1}$	$C_{2,2} * r_{2,2}$	$C_{2,\ldots} * r_{2,\ldots}$	$C_{2,16} * r_{2,16}$
t =3	$C_{3,1} * r_{3,1}$	$C_{3,2} * r_{3,2}$	$C_{3,\ldots} * r_{3,\ldots}$	$C_{3,16} * r_{3,16}$
t = …	$C_{\ldots,1} * r_{\ldots,1}$	$C_{\ldots,2} * r_{\ldots,2}$	$C_{\ldots,\ldots} * r_{\ldots,\ldots}$	$C_{\ldots,16} * r_{\ldots,16}$
t = 1260	$C_{1260,1} * r_{1260,1}$	$C_{1260,2} * r_{1260,2}$	$C_{1260,\ldots} * r_{1260,\ldots}$	$C_{1260,16} * r_{1260,16}$

Where,

- r^* is the scaled log return matrix
- r is the original log return for each tenor

3. Calculate Shocked US Zero Curves and Shocked FX Forward Curves

Using the above scaled returns matrix, we calculate the shocked US zero curves and shocked forward curves.

Apply scaled return matrix to base curves (US zero curve and FX forward curve)

Apply the scaled return matrix to the base curve as of the margin date to get the shocked US zero curve and shocked FX forward curve, where $[R_1, R_2, R_3, R_4, \ldots, R_{16}]$ represents the base curve, by tenor as shown below.

$$\boldsymbol{R^*_{t,j} = R_{T,j} \cdot exp\{r^*_{t,j}\}}$$

Where:

- $R^*_{t,j}$ is the shocked curve vector of Tenor j
- $R_{T,j}$ is the base curve as of the margin day
- $r^*_{t,j}$ is the rescaled return matrix

Table 3.	Shocked Curve (Tenor 1)	Shocked Curve (Tenor 2)	Shocked Curve (Tenor …)	Shocked Curve (Tenor 16)
t = 1	$R_1 \exp(C_{1,1} * r_{1,1})$	$R_2 \exp(C_{1,2} * r_{1,2})$	$R_{...} \exp(C_{1,...} * r_{1,...})$	$R_{16} \exp(C_{1,16} * r_{1,16})$
t =2	$R_1 \exp(C_{2,1} * r_{2,1})$	$R_2 \exp(C_{2,2} * r_{2,2})$	$R_{...} \exp(C_{2,...} * r_{2,...})$	$R_{16} \exp(C_{2,16} * r_{2,16})$
t =3	$R_1 \exp(C_{3,1} * r_{3,1})$	$R_2 \exp(C_{3,2} * r_{3,2})$	$R_{...} \exp(C_{3,...} * r_{3,...})$	$R_{16} \exp(C_{3,16} * r_{3,16})$
t = ...	$R_1 \exp(C_{...,1} * r_{...,1})$	$R_2 \exp(C_{...,2} * r_{...,2})$	$R_{...} \exp(C_{...,...} * r_{...,...})$	$R_{16} \exp(C_{...,16} * r_{...,16})$
t = 1260	$R_1 \exp(C_{1260,1} * r_{1260,1})$	$R_2 \exp(C_{1260,2} * r_{1260,2})$	$R_{...} \exp(C_{1260,...} * r_{1260,...})$	$R_{16} \exp(C_{1260,16} * r_{1260,16})$

This yields 1260 scenarios.

4. Calculate Portfolio Margin

The subsequent steps are all specific to a portfolio and will derive the margin for the portfolio on a given day.

Calculate the portfolio value

From the shocked forward curves ($SC_{1,1}$), calculate the value of the portfolio under each scenario:

Figure 7.

$$\begin{bmatrix} SC_{1,1} & SC_{1,2} & SC_{1,...} & SC_{1,16} \\ SC_{2,1} & SC_{2,2} & SC_{2,...} & SC_{2,16} \\ SC_{3,1} & SC_{3,2} & SC_{3,...} & SC_{3,16} \\ SC_{...,1} & SC_{...,2} & SC_{...,...} & SC_{...,16} \\ SC_{1260,1} & SC_{1260,2} & SC_{1260,...} & SC_{1260,16} \end{bmatrix} \Rightarrow\Rightarrow \begin{bmatrix} PV_1 \\ PV_2 \\ PV_3 \\ PV_{...} \\ PV_{1260} \end{bmatrix}$$

Note: $SC_{1,1}$ corresponds to $R_1 \exp(C_{1,1} * r_{1,1})$ as calculated above. The columns represent tenors and therefore each row in the above matrix represents a full-scenario.

Calculate the portfolio gain (loss) under each scenario

Calculate the Portfolio Gain (Loss) as the difference between the Portfolio Value under each scenario and the Base Portfolio Value on the margin date.

Figure 8.

$$\begin{bmatrix} PV_1 \\ PV_2 \\ PV_3 \\ PV_{...} \\ PV_{1260} \end{bmatrix} - Base\ Price_{margin-date} = \begin{bmatrix} P\&L_1 \\ P\&L_2 \\ ... \\ ... \\ P\ L_{1260} \end{bmatrix}$$

OR

Pnl in $:
Currency Pair: AAABBB

$$PnL\ in\ \$ = Notional^{AAA} * \left(Forward_{T,S}^{AAABBB} - Forward_{T,0}^{AAABBB}\right) * Forward_{T,S}^{BBBUSD} * DF_S^{USD}(0,T)$$

Where T : is the days in Maturity for the currency pair
S : is the scenario rate
$DF_S^{USD}(0,T)$: is the scenario discount factor between time 0 (today) and expiry(T) from USD OIS curve

Pnl in Dealing Currency:
Currency Pair: AAABBB

$$PnL\ in\ Dealing\ Currency = Notional^{AAA} * \left(Forward_{T,S}^{AAABBB} - Forward_{T,0}^{AAABBB}\right) * Forward_{T,S}^{BBBUSD} * DF_S^{USD} * Forward_{0,S}^{USDBBB}$$

Where T : is the days in Maturity for the currency pair
S : is the scenario rate

Select the margin value based on the targeted confidence interval

Sort the P&L distribution from maximum gain to maximum loss. Thereafter, using the targeted confidence value, 99.7, extract the margin from the loss side of the distribution.

$$M^+ = P\&L^{0.3rd} \quad , \quad M^- = P\&L^{99.7th}$$

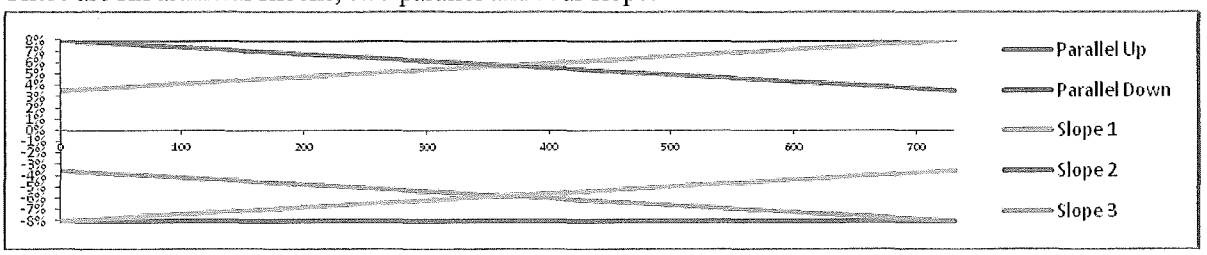
- M^+ is the margin for a given portfolio;
- M^- is the margin for the portfolio with exactly opposite trades

5. Pegged Currency Margining

- We margin each pegged currency separately, by applying artificial shocks to today's forward curve to imply large parallel and slope moves

- Artificial shocks are periodically reviewed based on the recent market events:
  - For parallel shock, we look at the spot history of pairs that had experienced an unpegging event:
    - Append that data to the history of the particular pegged currency by preserving the log return. This new history provides a good estimate of how that pair will behave once unpegged.
    - Now margin calculated with a specific percent up and down parallel shock which captures a reasonable portion of the loss.
  - For slope shock, margin data analyzing other currency pairs, where unpegged event happened :
    - Take a spread of 1D and 2Y with same notional and calculate its average margin for the past one year.
    - The ratio between average margin and notional defines the slope

- There are six artificial shocks, two parallel and four slope:



7. Stress Testing Methodology

The purpose of this Stress Testing is to estimate the size of the CME FX Guaranty Fund. Stress test scenarios will be built to cover extreme but plausible 7-day moves across all portfolios.

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Business staff responsible for the proposed change and the legal department collectively reviewed the derivatives clearing organization core principles ("Core Principles") as set forth in the Commodity Exchange Act ("CEA"). During this review, the following Core Principles were identified as being relevant to this submission:

FINANCIAL RESOURCES—Demonstrate that CME (the derivative clearing organization or DCO) has adequate financial, operational, and managerial resources to discharge the responsibilities of a derivatives clearing organization.

Compliance: There are minor financial impacts associated with the enhanced performance bond administration regime, where CME Clearing is migrating from SPAN to HVaR systems for calculation of cleared FX spot, forwards and swaps margins. However, initial performance bond requirements will continue to be established at levels that are consistent with observed levels of volatility in the particular currency pairing and generally aligned with initial margin levels applied to current CME FX futures and option contracts, where applicable. These components of the clearing system are unchanged. The migration to HVaR margin calculations for cleared OTC FX will enable more tailored and responsive adjustments of performance bonds based upon market dynamics. Variation margins may be satisfied with the posting of appropriate amounts of collateral, where CME Clearing collects and pays in cash between the counterparties each day. These payments are adjusted with implementation of HVaR, which will make the CME cleared OTC FX products more appealing to the OTC community, because of its simplicity and broad-based acceptance for risk management in the financial marketplace.

Since CME has implemented this same feature (HVaR) for cleared interest rate swaps, it can implement this enhancement in a very cost effective manner. CME's utilization of the HVaR-based "cash mark to market" system continues to provide for all open positions held by market participants to be evaluated each day and real cash payments are made by CME Clearing to appropriate parties. These payments will now result in even more alignment with typical bilateral OTC FX transactions. This system, analogous to margining for futures, is also consistent with the requirements of the CEA.

PARTICIPANT AND PRODUCT ELIGIBILITY—CME has established (i) appropriate admission and continuing eligibility standards (including appropriate minimum financial requirements) for members of and participants in the organization; and (ii) appropriate standards for determining eligibility of agreements, contracts, or transactions submitted to CME.

Compliance: Parties to transactions in these Cleared OTC Contracts continue to be limited to "eligible contract participants" as defined in Section 1a(12) of the Commodity Exchange Act and existing methods for monitoring compliance with eligibility standards are utilized by CME, so there is no change or impact there. However, CME believes the inclusion of HVaR as the performance bond calculation methodology will make the CME cleared OTC FX product more appealing to OTC FX customers, given that HVaR is the risk management standard for the OTC market.

RISK MANAGEMENT—CME has the ability to manage the risks associated with discharging the responsibilities of a derivatives clearing organization through the use of appropriate tools and procedures.

Compliance: There are other existing CME products that feature cash mark to market performance bonds derived from HVaR methodology, namely, the cleared interest rate swaps. CME Clearing will utilize existing tools, procedures and processes to discharge the responsibilities of a derivatives clearing organization with respect to this enhanced cash mark to market mechanism for the cleared OTC FX products.

SETTLEMENT PROCEDURES—CME will have the ability to (i) complete settlements on a timely basis under varying circumstances; (ii) maintain an adequate record of the flow of funds associated with each transaction that the applicant clears; and (iii) comply with the terms and conditions of any permitted netting or offset arrangements with other clearing organizations.

Compliance: CME Clearing and the Settlements Team together manage the daily requirements to evaluate appropriate daily marks to market for all CME products including the cash-settlement Cleared OTC FX Spot, Forward and Swap transactions. The cash mark to market of this suite of products is in U.S. dollars, Canadian dollars, Japanese yen, Euro and British pounds. This arrangement has long history of working smoothly. The migration to HVaR does impact the daily mark to market amounts for open position holders to a degree, given it is a different methodology. However, given that the HVaR enhancement is more conforming to the existing procedures in the OTC FX market, this added feature serves to strengthen the cleared OTC FX product as it will now be more viable for users. Also, its use is proven acceptable to the OTC marketplace in the cleared interest rate swaps products.

TREATMENT OF FUNDS—CME will have standards and procedures designed to protect and ensure the safety of member and participant funds.

Compliance: CME has standards and procedures that it applies to other existing products that feature cash mark to market with HVaR-based performance bonds that will be applied to protect and ensure safety of member and participant funds in connection with the proposed procedure change.

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 derivatives clearing organization.

Compliance: The CME's standard financial safeguards package will apply under the new, enhanced performance bond administration regime described by the proposed procedural changes.

SYSTEM SAFEGUARDS—CME demonstrates that it (i) has established and will maintain a program of oversight and risk analysis to ensure that the automated systems of the applicant function properly and have adequate capacity and security; and (ii) has 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.

Compliance: CME's standard oversight, risk analysis and emergency systems apply to all CME products, including the newly enhanced cash mark to market performance bonds with HVaR for the cleared OTC FX spot, forward and swaps.

The Exchange certifies that these rule amendments and procedures comply with the Act and the rules thereunder and that there were no substantive opposing views to this proposal. The Exchange certifies that this submission has been concurrently posted on the Exchange's website at http://www.cmegroup.com/market-regulation/rule-filings.html.

Members/shareholders will be notified of the information contained herein in CME Group Special Executive Report, S-6184, dated Tuesday, April 3, 2012.

If you require any additional information regarding this action, please do not hesitate to contact me or Steve Youngren, at 312-930-4583 or via e-mail at Steve.Youngren@cmegroup.com or me. Please reference our CME Submission No. 12-102 in any related correspondence.

Sincerely,

/s/ Tim Elliott
Director and Associate General Counsel

Attachments: Appendix A
Appendix B
Appendix C
Appendix D

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Appendix A

Proposed Rule Amendments: Rule additions are underlined.

930.A. Performance Bond System

The Standard Portfolio Analysis of Risk ("SPAN®") Performance Bond System is the performance bond system adopted by the Exchange. SPAN-generated performance bond requirements shall constitute Exchange performance bond requirements. All references to performance bond within the rules of the Exchange shall relate to those computed by the SPAN system, except for cleared over-the-counter ("OTC") foreign exchange ("FX") and interest rate swap ("IRS") transactions, where the Historical Value at Risk ("HVaR") Performance Bond System is used for cleared OTC FX and IRS transaction performance bonds.

Performance bond systems other than the SPAN system may be used to meet Exchange performance bond requirements if the clearing member can demonstrate that its system will always produce a performance bond requirement equal to or greater than the SPAN performance bond requirements.

Appendix B

Proposed Rule Amendments: Clean copy of amended Rule 930.A.

930.A. Performance Bond System

The Standard Portfolio Analysis of Risk ("SPAN®") Performance Bond System is the performance bond system adopted by the Exchange. SPAN-generated performance bond requirements shall constitute Exchange performance bond requirements. All references to performance bond within the rules of the Exchange shall relate to those computed by the SPAN system, except for cleared over-the-counter ("OTC") foreign exchange ("FX") and interest rate swap ("IRS") transactions, where the Historical Value at Risk ("HVaR") Performance Bond System is used for cleared OTC FX and IRS transaction performance bonds.

Performance bond systems other than the SPAN system may be used to meet Exchange performance bond requirements if the clearing member can demonstrate that its system will always produce a performance bond requirement equal to or greater than the SPAN performance bond requirements.

Appendix C

CME Group

Special Executive Report

S-6232 **May 4, 2012**

Clarification of HVaR Performance Bond Methodology Implementation for Cleared OTC FX Spot, Forward and Swap Transactions

As you were previously notified in CME Group Special Executive Report, S-6184, dated Tuesday, April 3, 2012, CME is changing its methodology for calculation of the performance bond requirements for Cleared Over-the-Counter ("OTC") Foreign Exchange ("FX") Spot, Forward and Swap Transactions from Standard Portfolio Analysis ("SPAN®") to Historical Value at Risk ("HVaR"). CME is clarifying the implementation schedule as follows:

Release 1: As of Monday, April 16, 2012, the HVaR performance bond methodology was implemented for Cleared OTC U.S. Dollar (USD)/Brazilian Real (BRL), USD/Philippines Peso (PHP), USD/Malaysian Ringgit (MYR), USD/Indian Rupee (INR), USD/Korean Won (KRW), USD/Chinese Renminbi (CNY), USD/Indonesian Rupiah (IDR) spot, forward and swap transactions.

Release 2: As of Monday, May 7, 2012, the HVaR performance bond methodology will be implemented for Cleared OTC USD/Taiwan Dollar (TWD), USD/Chilean Peso (CLP), USD/Colombian Peso (COP), USD/Peruvian New Sol (PEN), USD/Russian Ruble (RUB), Euro (EUR)/USD spot, forward and swap transactions.

Release 3: As of Monday, May 28, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Japanese Yen (JPY), British Pound (GBP)/USD, USD/Canadian Dollar (CAD), USD/Swiss Franc (CHF), Australian Dollar (AUD)/USD, USD/Swedish Krona (SEK) spot, forward and swap transactions.

Release 4: As of Monday, June 18, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Norwegian Krone (NOK), USD/Danish Krone (DKK), New Zealand Dollar (NZD)/USD, EUR/JPY, EUR/GBP, AUD/JPY spot, forward and swap transactions.

Release 5: As of Monday, July 9, 2012, the HVaR performance bond methodology will be implemented for Cleared EUR/CHF, CAD/JPY, EUR/AUD, USD/Hong Kong Dollar (HKD), USD/Hungarian Forint (HUF), USD/Israeli Shekel (ILS) spot, forward and swap transactions.

Release 6: As of Monday, July 30, 2012, the HVaR performance bond methodology will be implemented for Cleared USD/Czech Koruna (CZK), USD/Mexican Peso (MXN), USD/Polish Zloty (PLN), USD/Singapore Dollar (SGD), USD/Thailand Baht (THB),

USD/Turkish Lira (TRY), USD/South African Rand (ZAR) spot, forward and swap transactions.

These contracts will be enabled to be cleared on CME ClearPort according to the release schedule described above.

If you have any questions, please contact Craig LeVeille (email: Craig.LeVeille@cmegroup.com or ph. 312-454-5301) or Marco Ossanna (email: Marco.Ossanna@cmegroup.com or ph: (212) 299-2129) or Ian Nikolov (email: Ivaylo.Nikolov@cmegroup.com or ph. 312-466-4427) or Steve Youngren (email: Steve.Youngren@cmegroup.com or ph: 312-930-4583).