Attachment V—Sample Calculation for Delta-Plus Method for Options

a. Assume a bank has a European short call option on a commodity with an exercise price of 490 and a market value of the underlying 12 months from the expiration of the option at 500; a risk-free interest rate at 8% per annum, and the volatility at 20 percent. The current delta for this position is according to the Black-Scholes formula -0.721 (that is, the price of the option changes by -0.721 if the price of the underlying moves by 1). The gamma is -0.0034 (that is, the delta changes by -0.721 to -0.7244 if the price of the underlying moves by 1). The current value of the option is 65.48.

b. The first step under the delta-plus method is to multiply the market value of the commodity by the absolute value of the delta. $500 \ge 0.721 = 360.5$. The delta-weighted position is then incorporated into the measure described in section IV.D. of this Appendix E. If the bank uses the maturity approach and no other positions exist, the delta-weighted position is multiplied by 0.15 to calculate the capital requirement for delta. $360.5 \ge 0.15 = 54.075$.

c. The capital requirement for gamma is calculated according to the Taylor expansion by multiplying the absolute value of the assumed gamma of -0.0034 by 1.125% and by the square of the market value of the underlying. $-0.0034 \ge 0.0125 \ge 500^2 = 10.625$.

d. The capital requirement for vega is calculated next. The assumed current (implied) volatility is 20%. Since only an increase in volatility carries a risk of loss for a short call option, the volatility has to be increased by a relative shift of 25%. This means that the vega capital requirement has to be calculated on the basis of a change in volatility of 5 percentage points from 20% to 25% in this example. According to the Black-Scholes formula used here, the vega equals 168. Thus, a 1% or 0.01 increase in volatility increases the value of the option by 1.68. Accordingly, a change in volatility of 5 percentage points increases the value of 5 x 1.68 = 8.4. This is the capital requirement for vega risk. The total capital requirement would be \$73.10 (54.075 + 10.625 + 8.4).

PART 225—BANK HOLDING COMPANIES AND CHANGE IN BANK CONTROL (REGULATION Y)

1. The authority citation for part 225 continues to read as follows:

Authority: 12 U.S.C. 1817(j)(13), 1818, 1828(o), 1831i, 1831p-1, 1843(c)(8), 1844(b), 1972(1), 3106, 3108, 3310, 3331–3351, 3907, and 3909.

2. In part 225, appendix A to part 225 is amended by revising the first and second paragraphs of section I. to read as follows:

Appendix A to Part 225—Capital Adequacy Guidelines for Bank Holding Companies: Risk-Based Measure

I. Overview

The Board of Governors of the Federal Reserve System has adopted a risk-based capital measure to assist in the assessment of the capital adequacy of bank holding companies (banking organizations).¹ The principal objectives of this measure are to (i) make regulatory capital requirements more sensitive to differences in risk profiles among banking organizations; (ii) factor off-balancesheet exposures into the assessment of capital adequacy; (iii) minimize disincentives to holding liquid, low-risk assets; and (iv) achieve greater consistency in the evaluation of the capital adequacy of major banking organizations throughout the world.

The risk-based capital guidelines include both a definition of capital and a framework for calculating weighted risk assets by assigning assets and off-balance-sheet items to broad risk categories.² An institution's risk-based capital ratio is calculated by dividing its qualifying capital (the numerator of the ratio) by its weighted risk assets (the denominator).³ The definition of qualifying capital is outlined below in section II. of this appendix A, and the procedures for calculating weighted risk assets are discussed in section III. of this appendix A. Attachment I to this appendix A illustrates a sample calculation of weighted risk assets and the risk-based capital ratio.

* * * * *

3. In Part 225 a new appendix E is added to read as follows:

¹ Some banking organizations are also subject to capital requirements for market risk as set forth in appendix E of this part. Banking organizations that are subject to the market risk measure are required to follow the guidelines set forth in appendix E of this part for determining qualifying and eligible capital, calculating market risk-equivalent assets and adding them into weighted-risk assets, and calculating risk-based capital ratios adjusted for market risk. Supervisory ratios that relate capital to total assets for bank holding companies are outlined in appendices B and D of this part.

² The risk-based capital measure is based upon a framework developed jointly by supervisory authorities from the countries represented on the Basle Committee on Banking Regulations and Supervisory Practices (Basle Supervisors' Committee) and endorsed by the Group of Ten Central Bank Governors. The framework is described in a paper prepared by the Basle Supervisors' Committee entitled ''International Convergence of Capital Measurement,'' July 1988.

³Banking organizations generally are expected to utilize period-end amounts in calculating their riskbased capital ratios. When necessary and appropriate, ratios based on average balances may also be calculated on a case-by-case basis. Moreover, to the extent banking organizations have data on average balances that can be used to calculate risk-based ratios, the Federal Reserve will take such data into account.

Appendix E to Part 225—Capital Adequacy Guidelines for Bank Holding Companies: Market Risk Measure

I. Introduction

A. Overview

1. The Board of Governors of the Federal Reserve System has adopted a framework for determining capital requirements for the market risk exposure of bank holding companies (banking organizations).¹ For this purpose, market risk is defined as the risk of losses in a banking organization's on- and offbalance-sheet positions arising from movements in market prices. The market risks subject to these capital requirements are those associated with debt and equity instruments held in the banking organization's trading account, as well as foreign exchange risk and commodities risk throughout the organization, including options and other derivative contracts in each risk category.

2. Effective December 31, 1997, the market risk measure will be applied to all bank holding companies that, on a consolidated basis:

a. Have total assets in excess of \$5 billion; and have a total volume of trading activities (measured as the sum of the banking organization's trading assets and liabilities ² on a daily average basis for the quarter) that is 3.0 percent or more of the total assets of the banking organization, or have interest rate, foreign exchange, equity, and commodity off-balance-sheet derivative contracts relating to trading activities whose total notional amounts exceed \$5 billion; or

b. Have total assets of \$5 billion or less; *and* have trading activities exceeding 10.0 percent of the total assets of the banking organization.

3. Such banking organizations are still subject to the risk-based capital measure set forth in appendix A of this part, subject to the exclusion of certain assets specified in this appendix E. However, these banking organizations must calculate their market risk-equivalent assets and determine riskbased capital ratios adjusted for market risk in accordance with this appendix E.³

4. The market risk measure provides two ways for a banking organization to determine its exposure to market risk. A banking organization may use its internal risk measurement model, subject to the conditions and criteria set forth in section III. of this appendix E (referred to as the internal models approach), or when appropriate, a

² As reflected in the Consolidated Financial Statements for Bank Holding Companies (FR Y–9C Report).

¹The market risk measure is based on a framework developed jointly by supervisory authorities from the countries represented on the Basle Committee on Banking Supervision (Basle Supervisors Committee) and endorsed by the Group of Ten Central Bank Governors. The framework is described in a paper prepared by the Basle Supervisors Committee entitled "[Proposal to issue a] Supplement to the Basle Capital Accord to Cover Market Risks." [April] 1995.

³ The Federal Reserve may apply all or portions of this appendix E to other banking organizations when deemed necessary for safety and soundness purposes.