



# MEMORANDUM

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**To:** Ronald H. Frake, National Bank Examiner

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**Subject:** North America Credit Trading and North America Global Structured Credit Derivatives Examination

## Scope and Objectives

The OCC performed a four-week review of the North America Credit Trading and North America Structured Credit Derivatives businesses in New York commencing October 24, 2005. Our objective was to review and assess the level of risk and the quality of management over price and transaction risks for single name credit default swaps, correlation trading and credit derivative structuring, and total return swap businesses. We also followed up on recommendations made during our 4Q04 Global Portfolio Optimization examination. During the examination, we conducted numerous meetings with staff from the Front Office, Market Risk Management, Product Control, Technology, Model Validation (MVU), Audit, Sales, In-Business Risk Management, In-Business Controls, and Legal. Back-office operations were not covered in the scope of this examination.

## Conclusions

- Price risk across the trading desks is presently moderate, and transaction risk is high. Ratings specific to each desk are presented in the Summary of Findings section.
- Oversight of the credit trading activities is less than satisfactory. These businesses grew substantially despite deficiencies in infrastructure and controls. Further, metrics were insufficient to monitor and control growth.

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- We list seven specific matters requiring attention. Issues involve oversight of infrastructure in relation to growth, new product controls, model restrictions, reserving processes, risk reports, unverified trades, and recovery rate assumptions.

### **Matters Requiring Attention**

1. Management needs to develop a formal process to ensure that business growth is within infrastructure capabilities. Despite at least two warnings by independent control functions in the latter half of 2004 concerning the adequacy of the correlation infrastructure, management continued to grow this business. When the weaknesses in the infrastructure reached an untenable stage - following the problematic implementation of the Portfolio Trading (PT) system in New York, a major market disruption event, several instances of significant operational losses, and immediately prior to our examination - the business curtailed risk and commenced broad remediation efforts. Upon completion of these initiatives, management needs to develop a comprehensive plan that details forecasted growth in a fully controlled fashion. This action plan should include limits tied to the capacity and resiliency of the processing and risk management infrastructure of the business. MIS should be developed to monitor key dependencies such that the business does not grow beyond its infrastructure. The absence of this process is a contributor to the less than satisfactory rating for transaction risk management across the businesses.
2. Management needs to review the effectiveness of the New Product Approval policy. The correlation product was not approved by CMAC as a new product, despite relevant policy attributes. Management should review the history of the correlation product to determine whether changes to the CIB New Products policy or associated business processes are warranted. In particular, management should be able to provide assurance that the potential for similar new product fails is addressed. Three matters management should specifically address are:
  - a. Implementation of an adequate process to ensure that all new products meeting the bank's policy definitions are submitted to CMAC for review. As far as could be determined, the correlation product was never reviewed by CMAC, even though it triggered a number of policy criteria.
  - b. A clear articulation of business strategy at the CMAC stage. This allows all control and support functions to better plan their developmental activity to support the initiative. We believe that a Product Program would likely be useful for this purpose. This would be particularly useful when a product moves from a one-off mode to becoming "replicable."
  - c. A detailed assessment of the resiliency and capacity of the product infrastructure (e.g., people, processes, systems). Event triggers should be set by appropriate control functions that provide for escalation and assessment of situations where infrastructure adequacy may become constrained. MIS should be developed with metrics and diagnostics that allow monitoring of key dependencies such that the business does not grow beyond its infrastructure.

3. Management should ensure that all model restrictions and limitations are adhered to, with specific responsibilities assigned for follow-up. The correlation business is beset by a number of complex modeling issues, notably those related to rescaling and recalibration of the correlation skew. The model used by the correlation business is referred to as the Proxy Integration Model and is documented in Model Validation Report 771. Due to known limitations in the approximation of risk measures for certain tranches, the model validator indicated that the methodology should be checked against a full Monte Carlo calculation monthly. We found no evidence of this testing.
4. The reserving analysis for the correlation product needs improvement to ensure that levels are adequate, sufficiently sophisticated and dynamic, and fully documented as to its rationale. Presently, model risks are captured in liquidity reserves, correlation reserves and EITF reserves, but they are bluntly defined and do not address or account for all sources of uncertainty associated with model risk and parameter uncertainty. Reserving processes should be better defined and more quantitative and dynamic.
5. The risk tools available to Market Risk Management need improvement. The correlation desk does not have an effective P&L attribution capability, although one is in UAT in London. Further, Market Risk Management is unable to monitor recovery rate and correlation risk measures and accordingly, no limits have been set for these risks. Their absence prevents the market risk management function from fully discharging its responsibilities.
6. Unverified trades should be reduced. A large proportion of unverified trades in New York result from being unable to convert forward fees for distressed names observed in the market into spread curves used by internal systems. Management should assign quantitative resources to assist Product Control in developing a solution.
7. Better control over recovery rate assumptions is needed. Currently, recovery rate assumptions for a given name can be different across credit derivative products (e.g., GM recovery rate can be different for single name CDS versus bespoke trades), potentially effecting P&L and risk measures. Further, traders have access to – and can change – these assumptions. We note that the price verification process for liquid products partially mitigates the risk of valuation error.

## Summary of Findings

As each business has a distinct risk profile and varying infrastructure issues, the following table provides detail of price and transaction risk ratings by business.

	Correlation Trading	Credit Trading	Structured Finance / TRS
<b>Price Risk</b>			
Quantity	High	Moderate	Low
Quality of Risk Management	Less Than Satisfactory	Satisfactory	Satisfactory
<b>Transaction Risk</b>			
Quantity	High	Moderate	High
Quality of Risk Management	Less Than Satisfactory	Less Than Satisfactory	Less Than Satisfactory

In general, the credit derivatives business has been challenged by significant turnover in staffing in the front office, market risk management, research, model validation and technology. Further, pervasive infrastructure issues including technology, staffing and process weaknesses - as well as rapidly evolving market dynamics and risk models - have complicated remediation efforts. Finally, the correlation product was never brought to the full CMAC process during its evolution over the last three years, despite triggering many criteria in the CIB New Products Policy. These events evidence a clear breakdown in controls, as there were notable weaknesses in the oversight provided by the business, and secondarily by independent control functions. In addition, the process for assessing and monitoring the capability of technology, transaction processing and risk reporting has been inadequate. Several recommendations are made to strengthen the new product approval process and procedures for determining the resiliency and capacity of infrastructure.

Prior to commencement of this examination, the new management team initiated significant infrastructure remediation efforts. Additionally, management has sharply reduced the risk profile of the correlation business, while the credit trading business has made significant improvements in its operating environment by substantially converting from GK to Calypso. Nonetheless, the current level and breadth of weaknesses across the business' infrastructure warrant several less than satisfactory ratings.

While summary conclusions are noted above, the nature of the examination was such that we covered three front office trading units, as well as the associated middle office, product control, and technology functions that cross each of these desks/businesses. As such, we are providing specific commentary regarding the observations and conclusions for these segments below.

### 1. Correlation and Structured Credit Risk

Although the desk has recently flattened out its risk profile, the quantity of risk is rated as high due to the complexity and illiquidity of the product as well as the continued evolution of the market and pricing models, notably calibration of the correlation skew. Most of the trades on the desk are *CDS hedges and index tranches*, with a relatively small volume of bespoke transactions. The more complex synthetic transactions (CDO-squared and ABS CDOs) are either done out of

London or are backed-to-back into London for risk management purposes. The bank began using the London Branch for booking various CDO products in early 2005.

Risk management is less than satisfactory due to the New Product fail, uncontrolled growth and persistent / pervasive infrastructure weakness. The current risk and P&L system still lacks reliability, timeliness and completeness. There are limitations on when credit spread curves can be fed from Calypso into PT, mostly because an enormous calculation effort is required to generate the needed curves and sensitivities by risk factor, tenor and capital structure. Because PT batch times can run between 14 and 20 hours, risk and P&L often get reported on a two-day lag (Trade Date + 2).

CDO squared and certain CDO tranches (high and low spread portfolios and super senior position) continue to pose risk measurement challenges. While credit spread sensitivities are fed into GMR, recovery and correlation sensitivities are not. These feeds are planned to be in production early next year. Finally, there is no meaningful profit attribution analysis for the desk.

The business is implementing a remedial plan to calculate and report risk measures in an accurate and reliable fashion. Once implemented, the core systems (Calypso and PT) will provide granular risk measures for correlation, credit spread, and jump-to-default exposures. The desk currently uses an Excel spreadsheet and Access database system to generate desired risk reports on a daily basis. The system is fed by both Calypso and PT and has "what if" scenario capability, although on high volume days it may be somewhat slow due to the manual nature of trade entry.

Finally, both independent market risk managers for the business resigned in the first half of the year. The replacement risk manager is capable, but will require additional staff and time to become fully effective in his role. Additionally, given weaknesses in the current risk and P&L reporting infrastructure, his tool set is not robust. MRM plans to increase staffing.

## 2. Credit Trading

Although the desk is currently well within limits, price risk is rated moderate due to the ability to take on meaningful risk positions. The widening of credit spreads in the early portion of the year severely impacted the desk's P&L, as has a general compression of margins. The limit structure itself is straightforward and effective. CR01 limits are in place for the investment grade credits, while jump-to-default limits are used for below investment grade credits. There are also single name limits by rating category to address concentration risk, DVO1 limits and a rolling 2-month loss trigger.

Price risk management is rated satisfactory. Desk heads have significant industry experience, although recent turnover has weakened staff experience at secondary levels of desk management. The desk has generated a report with the assistance of research that aggregates bond and default swap positions. It is a web-based spreadsheet that combines information from Calypso and CDTS to show positions, limit compliance and differences between trader marks and Mark-It prices, all at a fairly granular level. Stress testing is done quarterly by Market Risk Management. A profit attribution report has been developed but awaits finalization.

Transaction risk is rated moderate due to the successful conversion from GK to Calypso. The conversion has significantly improved daily risk monitoring capability and trade processing. Yet important system enhancements are still in process, the most important of which is sales-trader match functionality that will significantly reduce trade capture errors. The ability to track trade modifications is also being added to assist in causal analysis of trade capture errors. Transaction risk management is rated less than satisfactory due to the manual nature of trade capture currently as well as the lack of MIS to track front-to-back system capacity and performance issues.

### 3. Structured Finance and TRS

This business primarily provides customers with total return swaps on loans. Price risk is low as the economics of the loan are transferred to the customer. Transaction risk for the TRS business is high and the quality of risk management is less than satisfactory due to control weaknesses including the extent of manual processes and the over-reliance on the front office for reconciliation. Further, trade capture, price verification, booking and critical systems interfaces are managed mainly on spreadsheets which inhibits significant growth. This business is also being considered for introduction in London where it will encounter similar obstacles.

There is currently no long-term solution for enhancing systems to manage the TRS product. Technology management, in collaboration with the business, developed an interim solution using an existing platform and database software to eliminate some of the manually driven system components. The plan is to feed data from the third party managed portfolio book into the existing LoanQT platform and use a customized database for middle office functionality. This improvement will largely help front office efficiencies, but will provide little added value for reconciliation and routine middle office functions, which will continue to rely on manual processes. A long-term system solution has been presented to management as part of the remediation plan, but there is no agreement yet between the business unit and Technology on plan implementation. Of concern is that most of the deficiencies identified in the September 2005 remediation plan were not noted in the October 2004 CMAC documentation approving a business request to double transaction volume from \$5B to \$10B.

#### Product Control and Middle Office Comments

New York Product Control and Middle Office benefit from competent, experienced management, stable staffing and assistance from London Product Control. Reconciliation and repair processes exist around key control points in trade capture and trade processing. However, the intensive manual intervention and dual keying of trade data into multiple systems are significant concerns in terms of data integrity and segregation of duties, and are an inefficient use of resources. Manual processes include dual input of correlation trades into PT and Oasys, Excel-based reconciliations using v-lookup functions with no aging of reconciliations, and error investigation done by email. Reconciliation of the general ledger cannot be done daily, so significant reliance is placed on the monthly process. The daily price attribution process is rudimentary; identifying daily P&L based new trades versus MTM of existing deals.

Significantly, there is little MIS generated to evaluate and control system resiliency and capacity issues. There are no P&L sign-off metrics, no trade capture error statistics and no batch running statistics compiled for management review.

Product Control has plans to use SOLAR as its reconciliation engine and database. All Excel based reconciliations will migrate to SOLAR. This will enable automation and aging of the PT / OASYS and CALYPSO / OASYS reconciliations. Capabilities to produce MIS on aged items will increase. In addition, TRS reconciliations between in-house spreadsheets and trustee reports will eventually be incorporated in SOLAR, which will significantly improve existing processes.

#### Technology Comments

Technology has suffered from high turnover and significant understaffing, both on Calypso and PT. Staff turnover in 2004 was 65%, significantly impacting remediation efforts. Notably, as of January of 2005, there were only 2 staffers supporting PT. These issues demonstrate the inadequacy of planning for system development and implementation as well as potentially inadequate allocation of resources toward staff retention. Significant additional human resources are planned for 2006, including 10 more staff assigned to Calypso and almost 20 for PT. In addition, use of consultants is increasing. E-Businessware has been retained to document PT and re-engineer PT code. Finally, two committees have been set up to prioritize and coordinate the significant remediation efforts planned for the correlation book: the Credit Correlation Steering Committee, which meets monthly, and the Credit Correlation Technology Working Group, which meets weekly. Prioritization should continue to focus on significant remedial functionality rather than expanded new business capability.

