MANITOBA HYDRO

POWER SALES AND OPERATIONS DIVISION

TRADING AND RISK MANAGEMENT ORGANIZATIONAL STRUCTURE

MAY 25, 2005

==FINAL REPORT==

Prepared by D. Leigh Parkinson & Tim J. Simard

Principal Consultants, RiskAdvisory

610, 1414 – 8th Street SW

Calgary, Alberta, Canada T2R 1J6

Tel: (403) 263-7475

Fax: (403) 263-2945

www.riskadvisory.com

Table of Contents

I. Executive Summary

RiskAdvisory has been retained by Manitoba Hydro ("MH" or "the Company") to provide recommendations with respect to the development of the organizational structure around the front, middle and back office functions of the Power Sales and Operations group ("PSO") within Manitoba Hydro, considering the existing organizational structure of the Gas Supply group ("Centra"). The front office is responsible for asset management and optimization, and the execution of the trading and hedging activities of the organization. The middle office is responsible for the monitoring and reporting of risk within the organization. The Back Office Operations group is responsible for the invoicing and payment process, aspects of contract administration and confirmation processing, accounting functions and reporting functions.

This report assumes the following:

- Manitoba Hydro will establish an affiliated power marketing subsidiary;
- The subsidiary will have all the commercial responsibilities currently housed within PSO, including the optimization and risk management of the short-term and long-term commodity market and hydro exposures in the Manitoba Hydro portfolio. The subsidiary will continue to be referenced as PSO in this report.

FRONT OFFICE SYNERGIES

RiskAdvisory does not believe there is sufficient benefit to Manitoba Hydro to consider the establishment of a single front office function for both PSO and Centra. In fact the risks associated with such a transformation result in RiskAdvisory making a recommendation that Manitoba Hydro not pursue a combination of its front office activities.

The approach to market activity and the underlying culture are quite different between Centra and PSO. There are good reasons for these distinctions – reduction of customer rate volatility versus revenue generation, the relative efficiency of the markets in which the two groups operate, and transactional volume and frequency. There is limited overlap in the markets that need to be accessed by the two groups. The types of transactions that are required to manage or optimize the risk position will also differ between Centra and PSO. These distinctions lessen the likelihood of favourable synergies between the two groups.

On the regulatory side, a move to a common trading floor and a close association with the much more active and aggressive power trading operation of PSO is likely to send the message to the regulator that there has been a shift and that the Centra gas supply group should now have enhanced capabilities to time its hedging activity and outperform the market. This will create more regulatory uncertainty and can serve to increase the risk of regulatory disallowances associated with Centra's hedging activity. Also, the shared trading floor increases the likelihood that Centra or PSO will be challenged in regulatory proceedings as to whether advantages were gained for their group at the expense of the other utility's ratepayers.

RiskAdvisory supports ongoing co-operation between the two front office groups in those isolated instances when it is required, but does not believe that the limited synergistic advantages outweigh the negative cultural and regulatory aspects of combining the two operations.

Quantitative Middle Office Synergies

RiskAdvisory believes that the most pressing organizational structure issue for Manitoba Hydro is the creation of a middle office functionality for PSO's activities. While there may be a motivation to combine the middle office activities of PSO and Centra into a single operation, the benefits of such a move are reduced by a number of factors:

- Centra market exposure is a ratepayer exposure, therefore there is no common Manitoba Hydro financial market exposure across the Centra and PSO operations;
- The limited commonality of counterparties for the two operations reduces the need for any consolidated counterparty credit risk quantification;
- Centra risk quantification is straightforward, while the PSO risk quantification is extremely complex;
- PSO risk quantification forms a much more urgent and necessary component of the risk management decision-making process than on the Centra side;
- A centralized middle office function may invite cost allocation debates in the regulatory environment.

RiskAdvisory recommends that the quantitative risk measurement activities be undertaken separately by each business unit. Centra would maintain the status quo with the limited quantitative work shared between the back office and the front office. The PSO middle office would be staffed and charged with developing and implementing the market risk and credit risk measurement models specifically for PSO. The PSO middle office staff would be available in those infrequent instances when Centra may require some consultative services around any risk quantification issues.

CREDIT SYNERGIES

Manitoba Hydro currently operates under at least two separate wholesale credit risk management policies: one for Centra that is administered by Treasury and one for PSO that is administered within PSO. The distinctions between the two policies can be quite material with respect to the determination of creditworthiness, the magnitude of credit exposure that can be extended to counterparties and the methodology for estimating open credit exposure. The establishment of a credit function within PSO has grown out of commercial necessity. PSO has interacted with Treasury on credit issues in the past, but in order to ensure the timely processing of credit applications, responsibilities for the administration of the PSO credit policy were established within the PSO business unit.

Best industry practice would call for the centralization of the credit function, both from a synergistic and a control perspective. RiskAdvisory would normally recommend such an initiative for Manitoba Hydro. An alternative approach to the centralized credit organizational structure would be to continue to have the PSO credit function reside within the PSO organization, although shift the location of this activity so that it resides within the PSO middle office.

Despite the normal recommendation for a centralized credit function, there are a number of considerations with respect to Manitoba Hydro's environment that create concerns around the value of this approach:

- Standard of Conduct issues which likely require Manitoba Hydro to maintain two separate credit functions;
- The limited degree of counterparty overlap between Centra and PSO;
- The necessity for PSO to have periodic time-sensitive responses on credit issues;
- The ability to use a credit resource within PSO to perform other middle office-related functions.

As a result of these factors, RiskAdvisory recommends the inclusion of the credit risk management activity for PSO within the PSO middle office, with Treasury continuing to have credit risk management responsibility for Centra and Manitoba Hydro transmission activities, along with any retail credit risk management oversight.

This recommendation is made with two requisite conditions. First, it is imperative that a common credit policy be developed and approved by Manitoba Hydro's Executive Committee that is applicable to all business units. Treasury and the PSO middle office credit function must operate within these corporate-wide policies. The second condition is that any loss of control over credit that may exist by housing the credit risk management operation within the PSO organization must be countered by having at least a dotted line reporting structure for the PSO middle office Risk Manager to a Manitoba Hydro executive outside of PSO.

Back Office Operations Synergies

RiskAdvisory does not believe that sufficient synergies exist with the back office functions of Centra and PSO to merit the combination of these groups. While certain responsibilities are similar in nature (payment, invoicing, forecasting), there are other areas where specialized expertise and experience is required to perform the functions.

Centra Organizational Structure

RiskAdvisory is recommending that no changes be undertaken with respect to Centra's organizational structure.

PSO Organizational Structure

A. Senior Management Oversight

There is a broad disparity between the senior management oversight of Centra's gas procurement and risk management practices and the commercial and risk management practices of PSO. Most importantly, there is a risk limit structure that has been established for Centra. On the power side, there is no risk limit structure in place for the underlying utility exposure. RiskAdvisory recommends that Manitoba Hydro move as quickly as possible to define a risk limit structure in which PSO must operate to ensure that its activities match the risk appetite of Manitoba Hydro. This risk limit structure should be approved at the Board level.

While there is a well-populated Gas Supply Risk Management Committee ("GSRMC") that oversees the gas risk management activity and advises on gas hedging policy, there is no similar committee on the power side. RiskAdvisory recommends that in addition to the tactical PSO Risk Management Committee ("PSORMC"), Manitoba Hydro establish an executive Power Risk Management Committee ("PRMC") with the following membership: Manitoba Hydro CEO, Manitoba Hydro CFO, Vice President Power Supply, the Division Manager PSO and the Middle Office risk manager.

The role of the PRMC is to provide executive oversight of the management of system risk and the marketing and procurement activities of PSO. Specific responsibilities would include the following:

- development, authorization and communication of energy risk management policies and procedures. The Risk Management Policy Manual should be approved by the Company's Board of Directors, with interim changes requiring the approval of the PRMC;
- decisions around the action that must be taken if risk limits are violated.

It is expected that the PRMC would not be involved directly in the decision-making process around specific risk management and trading transactions undertaken by PSO. The recommended approach for this committee is to approve the broad policies and risk limits under which PSO must operate, with ongoing oversight to ensure that PSO continues to operate within the guidelines of stated policy. As long as PSO is operating within pre-approved limits, the PRMC would not be directing the procurement and marketing activities of PSO. In the case of a market risk limit violation, the PRMC would have the responsibility to dictate to PSO whether actions must be taken to reduce risk below approved limits. Even at this stage, this does not require the PRMC to identify specific transactions that must be executed by PSO.

In order to avoid confusion, it is recommended that the PSORMC undergo a name change to the Power Sales & Operations Tactical Hedge Committee.

B. Independent Middle Office

It is best practice for energy utilities to have an independent middle office function to quantify the organization's exposure to market and credit risk, report on these exposures and to ensure compliance with the organization's risk management policies. In Canada, Manitoba Hydro is the exception with respect to major electric utilities and the existence of an independent middle office function.

The strongest recommendation that RiskAdvisory will make in this report is that it is imperative for Manitoba Hydro to establish this middle office functionality to monitor and report on the financial risks inherent in its power business. There are several key reasons to support this initiative:

- the middle office will allow Manitoba Hydro senior management to understand the magnitude of risk around its electricity margins and the effect of procurement and marketing transactions on this risk profile.
- The lack of an independent middle office violates one of the primary best practices that has emerged in the energy sector and financial markets over the past decade. An independent middle office becomes a vital control function in an energy trading, marketing and procurement operation. If the responsibility for forecasting expected profits and the risk profile around the income stream is left in the hands of front office personnel, there is a significant control breakdown that has been responsible for many of the well-publicized risk management disasters that have occurred in the past.
- The establishment of a separate energy marketing and fuel procurement subsidiary will serve as a lightning rod for negative media and stakeholder reaction if there are losses incurred. This will be exacerbated if it is learned that there was no independent middle office group within the organization.
- The planned move into third-party marketing transactions with a pure profitability goal (as opposed to optimizing the system portfolio) escalates the requirement for an independent risk monitoring function.
- The expertise of the middle office can be used to develop more analysis around the long-term risks embedded in new corporate initiatives.
- **The middle office can save money and it can assist in revenue generation**.

The most pressing need at this time is the development of a PSO middle office that has the quantitative capability to assess the market risk in the PSO portfolio. From a compliance perspective, the PSO middle office would monitor PSO compliance with market and credit risk limits.

It is envisioned that the PSO middle office would also have responsibility for the initial drafting of proposed risk management policies and procedures. These could be drafted with support from the existing Manitoba Hydro risk management group and input from the PSO front office. These policies and procedures would eventually be approved by the Manitoba Hydro Executive Committee and the Board after review by the PRMC.

As recommended earlier, the PSO middle office would also include the credit risk management function. All credit decisions would be governed by the corporate-wide Manitoba Hydro Credit Risk Management Policy.

To allow the PSO middle office to focus on its quantitative analysis and reporting requirements, it is recommended that responsibilities for the monitoring of control adequacies and compliance with policies (aside from market and credit risk limits), along with any qualitative analysis of operational risks not viewed as business unit responsibilities, be the domain of the existing Manitoba Hydro Risk Management Services group. This would include the responsibility for ensuring that PSO middle office practices also comply with approved policies and procedures.

RiskAdvisory estimates that the PSO middle office would require one senior manager, one credit manager and at least three intermediate staff members. The senior level candidate ideally would have energy market transactional experience, electric utility experience, familiarity with hydro systems, risk management experience and systems experience. The candidate must also have very strong interpersonal skills to be able to communicate successfully with front office personnel and act as the risk liaison with the senior management of Manitoba Hydro, the Audit Committee of the Board and external stakeholders. RiskAdvisory estimates that such an individual would command a compensation package in the range of $140,000 to $175,000 per annum, which still lies below the total remuneration of individuals holding the risk manager position at several other Canadian utilities. The remuneration costs for this individual can be easily recouped if risks are identified and quantified in a timely fashion and the front office is able to capitalize on opportunities because of the risk monitoring skills in the organization.

RiskAdvisory would recommend against attempting to develop this skill set internally. It is important that the middle office effort starts forcefully and that the individual can command respect with front office personnel and Manitoba Hydro’s senior management. A weak middle office ends up being a burden for companies, and sends the wrong message with respect to the corporate risk culture. However, it is possible that the intermediate level candidates can be developed internally.

Best practice calls for a middle office group that is independent from the front office trading activity. One interpretation of this practice would be to establish a single reporting line for the PSO Middle Office outside the PSO subsidiary, most likely to the CFO. Another interpretation would be that the Middle Office would not report to any of the front office managers within PSO, but could report to the head of the PSO.

RiskAdvisory recommends that the head of the middle office group be given dual reporting lines to the Manitoba Hydro CFO and the head of PSO. Human resources issues would be the responsibility of the head of PSO, in consultation with the CFO. The dual reporting line allows effective communication between the PSO staff members who currently have the most intimate knowledge of the system and existing quantitative methodologies which will be used as a base for the middle office quantitative model. This approach also recognizes that the Division Manager of PSO is more versed in the details of power market risks than any other member of the management team. At the same time, the reporting line to the CFO ensures an adequate control environment and elevates the importance of this position within the Manitoba Hydro organization.

It has been common in other energy trading and marketing operations for the individual to whom the head of the middle office reports to play an active role in the functionality of the middle office. There will frequently be differences of opinion between the front office and the middle office around control processes and risk quantification issues. Often these issues are resolved through the involvement of the head risk manager's superior, who is in a better organizational position to negotiate with senior personnel from the front office. One of the most significant reasons for the recommendation of at least a dotted reporting line outside of the PSO power marketing subsidiary is to ensure that the appropriate balance of power exists with respect to the interpretation and application of the corporate Risk Management Policy.

As a result, the senior Manitoba Hydro executive to whom the head of the middle office reports will frequently be required to have an awareness of front office positions and pending transactions. This could once again create Standard of Conduct ("SOC") issues if the head of the middle office reports to Manitoba Hydro's CFO. As with the recommendations around PRMC membership, RiskAdvisory believes that the most suitable dotted line report is to the CFO and that all measures should be undertaken to determine if this role can be performed without violating the SOC.

However, if SOC restrictions constrain the CFO from taking a sufficiently active role in the management of the middle office, then RiskAdvisory would recommend that the head of the PSO middle office report to Manitoba Hydro's Controller.

C. Back Office Operations

RiskAdvisory is ambivalent between a reporting structure that has the back office operations group reporting outside of PSO to the Manitoba Hydro Controller, or with a structure that maintains the PSO Back Office within the PSO Organization with a report to the Division Manager, PSO. The ambivalence is based on a recognition of the offsetting balance between the economic efficiencies associated with a maintenance of the status quo structure, and the strengthened control environment associated with a change in reporting lines through the corporate Controller. If the status quo is maintained, RiskAdvisory would make two recommendations. First, Manitoba Hydro's internal audit group must opine that it does not have any concerns around control gaps within such a back office reporting structure. Second, a dotted line report from the PSO back office to the corporate Controller should be established.

II. Scope of Report

RiskAdvisory has been retained by Manitoba Hydro ("MH" or "the Company") to provide recommendations with respect to the development of the organizational structure around the front, middle and back office functions of the Power Sales and Operations group ("PSO") within Manitoba Hydro, considering the existing organizational structure of the Gas Supply group ("Centra"). The recommendations take into account the potential for operational efficiencies, opportunities for enhanced information flow, appropriate segregation of duties, management oversight and any regulatory considerations. The report includes:

- A comparative analysis of the two organizations that highlights the key differences in how each group is expected to perform its operations in the front, middle, and back offices;
- The benefits and concerns associated with the sharing of front, middle and back office functions and how efficiency gains may be achieved within existing legislation and regulation;
- Recommendations to each group on the structure of their operations and on their policies and procedures.

RiskAdvisory has based its recommendations on its extensive experience with utilities and marketing companies in the energy sector. RiskAdvisory has also developed an understanding of the commercial functionality and objectives of PSO and Centra through several historical mandates with both organizations over the past ten years. RiskAdvisory also spent three days onsite in February 2005 conducting interviews and participating in roundtable discussions with staff members from PSO, Centra, Risk Management Services, Treasury and Finance.

III. Key Definitions

FRONT OFFICE

The front office is responsible for asset management and optimization, and the execution of the trading and hedging activities of the organization. The front office activities include the establishment and maintenance of relationships with counterparties and customers in the marketplace, and the execution of physical and financial transactions to achieve the organization's commercial objectives within a desired risk tolerance.

MIDDLE OFFICE

The middle office is responsible for the monitoring and reporting of risk within the organization. Activities of the middle office include:

- The identification of risk exposures within the organization;
- The development, application and updating of the quantitative methodologies and systems used to measure risk and profitability;
- The preparation and distribution of management reports detailing current risk status and the mark-to-market of outstanding positions;
- Assistance in the design and modification of risk management policies and procedures;
- Education and communication of risk concepts to senior management and external stakeholders;
- Analysis of the risk inherent in proposed new products and transactions.

In some organizations, the risk analysis of the middle office is restricted to market and the quantification of credit exposures. Many organizations also include the credit group within the middle office, with responsibilities for the establishment of credit lines and any collateral requirements with counterparties, the ongoing monitoring of counterparty creditworthiness and adherence to the corporate credit policy. In other organizations, the scope of the middle office is expanded to include oversight of a range of operational risks. Operational risk can include fraud, IT risk, business disruption, personnel risk, legal risk, accounting risk and reputational risk. The middle office is often charged with responsibility around governance issues as they pertain to the risk management environment, recommending modifications to corporate Policy and the appropriate organizational responsibilities to ensure the appropriate segregation of duties.

Back Office Operations

The Back Office Operations group is responsible for the invoicing and payment process, aspects of contract administration and confirmation processing, accounting functions and reporting functions.

IV. Background – Centra Gas

The commercial practices and objectives of Centra are focused on the reliable provision of gas supply to its customers on a cost-effective basis, with consideration for both lowest cost and the ratepayers' appetite for commodity price stability. The existence of the Purchased Gas Variance Account ("PGVA") allows for the pass-through of gas costs to ratepayers. As a result, Centra's financial performance is not directly affected by movements in natural gas prices. Risk management is undertaken on behalf of the ratepayer as opposed to the shareholder. Centra's financial performance can be adversely impacted by regulatory disallowances if the gas procurement and risk management activities are judged imprudent.

The Centra risk management program has been subject to extensive regulatory and intervenor scrutiny over the past ten years. The programme has undergone significant evolution during this period. Currently Centra has a largely mechanistic and very structured hedge implementation strategy. Zero-premium collars are placed on a rolling basis out through four quarters. At this juncture, the hedge implementation process is not adjusted based on management price views, with Centra having made the case in several previous Gas Cost Review hearings that it does not have and should not be expected to have any informational insights or competitive advantages that would allow it to outforecast the market over the long run.

A good deal of management time has been spent developing the risk management framework for Centra. A Gas Supply Risk Management Committee ("GSRMC") representing a significant component of Manitoba Hydro's management team continues to provide oversight responsibilities for the gas hedging programme. Recommendations are made by the GSRMC and are taken forward by the Chair of the GSRMC to the President of Centra Gas for approval.

The current implementation strategy is driven by an estimate of the risk tolerance of the Centra ratepayer. Customer research has been conducted that has helped Centra approximate the magnitude of price risk that customers are willing to accept over the course of a year. The hedge strategy is then applied in an effort to control the upside price risk within this tolerance level, while still providing ratepayers with a degree of downside price participation. The estimation of eligible hedge volumes is subject to only minor changes, requiring limited manipulation and monitoring of hedge positions once they have been established.

The AECO gas forward and options markets in which Centra transacts for its risk management programme are considered to be liquid and very efficient, with transparent prices and a broad network of counterparties. Centra is not a significant enough participant in these markets to affect the underlying forward market prices during those periods when it is executing its requisite hedge positions.

In addition to its financial hedging activities, Centra also engages in a range of physical market transactions around transportation, storage, capacity management and the sale of excess contracted supply. These activities are undertaken to optimize the physical supply portfolio.

Centra does not have a broad network of transactional counterparties. There are approximately five financial counterparties and five physical counterparties with whom Centra conducts business, in addition to arrangements with the Agent, Broker, Marketer (“ABM”) community.

Based on the straightforward approach to portfolio management and the lack of inclusion of a price view component in the implementation strategy, Centra has limited middle office requirements. These include:

- Current mark-to-market on outstanding hedge positions;
- Potential variability in gas year prices;
- Potential opportunity cost on hedge positions;
- Potential credit exposure on existing hedge positions;
- Collateral requirements for ABM participants.

While best practice would normally have quantitative risk monitoring calculations performed by independent middle office personnel, in Centra’s case the lack of complexity around these calculations and the stringent mechanistic approach does not require this additional segregation of responsibilities. As a result, the responsibility for the daily hedge position and credit report resides within the back office, while the distributional work around potential gas price variability, the potential opportunity cost on outstanding transactions and the quantitative determination of collateral requirements for ABM participants are performed by the front office, based on models that were prepared with the assistance of an external consultant.

The middle office oversight of Centra's risk management activities currently focuses on more qualitative issues around control procedures and the co-ordination of the various groups involved in the implementation of the risk management activity (front office, back office, credit and legal). The middle office reports through the Division Manager, Corporate Services who in turn reports to the Chief Financial Officer of Manitoba Hydro.

The back office accounting activities and settlement activities report through to the Controller of Manitoba Hydro.

Credit oversight of Centra's market activities is the responsibility of Manitoba Hydro Treasury. The establishment of credit lines and the monitoring of the creditworthiness of existing counterparties is segregated from the front office activities through the involvement of Treasury.

To-date, there has been limited co-ordination between PSO and Centra with respect to gas procurement activities. Centra has provided advice to PSO on gas management issues during the 2002-2004 drought period and is in a position to provide operational assistance to PSO if it is required in the future. The two groups have worked together through the Gas Supply for Electric Generation Committee, with a co-ordinated review of a major gas storage project, and a combined effort with respect to the implementation of the new OATI power and gas management system.

V. Background - Power Sales and Operations

While PSO is driven to ensure that its Manitoba customers receive reliable, low-cost power, there is a profitability objective associated with its power supply and marketing activities. Unlike Centra, there is no fuel or power cost adjustment mechanism to flow through changes in fuel costs and export power sales revenues to ratepayers in a direct fashion. As a result, changes to these items have a direct impact on Manitoba Hydro's income statement and balance sheet. Manitoba Hydro does retain the ability to request a General Rate Application which can result in an eventual flow-through of these costs to ratepayers. The 2004 GRA provides an example of this outcome - approved rate increases were designed to improve the Manitoba Hydro balance sheet after the deleterious impact of the 2003 drought.

The nature of the development of Manitoba Hydro's business has been one where generation assets have been brought on stream well in advance of native load requirements. In normal hydrological inflow years, this has left the utility with substantial excess energy, which in turn is sold into export markets, primarily in the US and Ontario. This represents a major difference from the Centra business model where short-term contracted resource procurement volumes more closely match the forecasted load requirements, resulting in less need for off-system sales. Manitoba Hydro's significant revenue opportunities have led to the adoption of a corporate goal to maximize export power net revenues, with an internal goal of 40% of net revenues emanating from these export sales in the long-term. Revenues from this activity have reached as high as $588 million in 2002, falling as low as $351 million in fiscal 2004 as a consequence of the drought. While Manitoba Hydro is not directly impacted financially by gas cost movements associated with the Centra business, modest changes in export sales volumes and prices tied to PSO's activities can have a very material impact on the Company's financial performance.

In addition to the prudent focus on the generation of export sales revenues, PSO also has responsibility to manage the fuel and purchased power expense for Manitoba Hydro. These two activities must be co-ordinated to optimize Manitoba Hydro's income while ensuring reliable supply for its native load customers and its long-term export customers. Once again, the variability in hydro availability can have a substantial impact on fuel and purchased power costs, as exemplified by the $496 million increase in these costs from fiscal 2002 to fiscal 2004 (at the same time that export power sales fell by $247 million).

The optimization of the export sales revenues/fuel and purchased power costs is a very complex process and subject to significant uncertainty. Hydro conditions are impossible to predict, and the commodity markets in which PSO transacts are subject to extreme volatility. Domestic load fluctuations can also have a material impact on net revenue. Transmission constraints and FERC rules around the procurement and marketing of power add to the complexity. PSO must also take into consideration the risk/reward trade-offs in its contracting practices: while entering into long-term fixed price export contracts serves to maximize revenue and minimize risk during normal water years, the obligation to serve these contracts during drought years increases costs and risk.

Another consideration for PSO's activities is that the power markets in which it operates are not yet efficient. Unlike the gas markets in which Centra operates, PSO's export power markets are illiquid, there is very limited price transparency and Manitoba Hydro is a significant enough participant that at times its procurement and marketing activities can have a material impact on price. Excessive reliance on spot power market purchases or sales can negatively impact financial performance. Opportunities also exist on a broader regional basis to procure or sell power at more advantageous prices than those that might be available through transactions with neighbouring utilities.

PSO risk management activities have not been subject to the same degree of regulatory oversight and intervenor scrutiny as the Centra risk management activities. The absence of an annual review and the fact that there is no automatic flow-through mechanism to ratepayers naturally limits the extent of regulatory oversight. However, in the 2004 GRA, the MPUB did request that an external report be conducted around the risk management strategies employed by PSO through the drought.

There has been limited involvement in the past from Manitoba Hydro's senior management with respect to the design and implementation of risk management strategies to control the financial exposures associated with export revenues and fuel and purchased power costs. There is a Manitoba Hydro Management Control Plan for Power Related Transactions that was approved in January 2005. This policy outlines the objectives around system energy product transactions and sets the signing authorities for transactions with defined terms and volumes. There is no requirement for approval outside PSO for any power sales transaction with a duration less than five years unless such a transaction requires new generation. This grants PSO substantial discretion to optimize the risk/reward portfolio as it sees fit within the five-year window. The Drought Management Plan that was established during the second quarter of 2003 was developed and implemented by PSO. While it did receive approval from Manitoba Hydro's Executive Committee in 2003, the Drought Management Plan gave PSO significant flexibility with respect to the tools and markets that could be used, and the timing of hedge transactions. At this juncture there are no explicit dollar risk limits or volumetric limits associated with the open exposures in the PSO portfolio associated with system transactions other than those implicit limits that reflect physical system limitations. The Management Control Plan does set volumetric and term limits around proposed PSO merchant transactions.

With the materiality of the export sales portfolio, PSO enters into thousands of transactions every month with a total of more than 45 counterparties.

Long-term quantitative analysis of forecast costs, revenues and risk are conducted by the Resource Planning and Market Analysis Department, which is separate from PSO. The Operations Planning Department within PSO creates cost and revenue forecasts and conducts a limited risk analysis within a two-year timeframe. There are no formal quantification processes established to report on a regular basis the potential variability in the margin between power sales and fuel and purchased power costs incorporating load uncertainty, hydro uncertainty and market price uncertainty.

Any quantitative analysis done on hedge positions in isolation (i.e. mark-to-market, potential opportunity cost) have been performed within PSO.

From a credit risk perspective, there is a credit policy for PSO that has been reviewed by Manitoba Hydro's internal audit group. Creditworthiness decisions, the allocation of credit lines and credit risk quantification are undertaken by PSO staff, within the guidelines of this policy. The credit analysis function reports to the Manager, Export Power Marketing within PSO. Credit risk quantification is limited to an accounts receivable calculation.

NEW DEVELOPMENTS

There are two key developments that are a consideration in the discussion around the appropriate organizational structure for Manitoba Hydro's market and risk management activities.

The MISO Day 2 Market involving the centralized, economic dispatch of power was launched on April 1, 2005. The initial assessment of RiskAdvisory is that the market design itself will not create incremental market risk for PSO's activities. However, new instruments will be available to manage risk positions, and there will be a need to understand, monitor and report these risks. The complexity of the sales process also increases from an administration perspective. In addition, the existence of a MISO Market Monitor requires that appropriate procedures and oversight be established around Manitoba Hydro's offering behaviour to ensure compliance with MISO market rules.

Based upon its experience in the market during the drought of 2003, PSO has concluded that the establishment of a power marketing subsidiary is necessary in the short-term. The primary driver is the need for a FERC Power Marketers Authorization ("PMA") in order to be able to transact more efficiently in the US power markets. While this on its own does not necessitate the subsidiary, enhanced regulatory liability management creates the incentive for the power marketing affiliate. The entity holding the PMA becomes FERC-jurisdictional, and there is a preference to have the marketing affiliate under the jurisdiction of FERC rather than Manitoba Hydro. This report assumes the following:

- Manitoba Hydro will establish an affiliated power marketing subsidiary;
- The subsidiary will have all the commercial responsibilities currently housed within PSO, including the optimization and risk management of the short-term and long-term commodity market and hydro exposures in the Manitoba Hydro portfolio. The subsidiary will continue to be referenced as PSO in this report.

VI. Front Office Synergies

Both Centra and PSO are engaged in front office energy procurement and marketing activities. Although Centra is not active in the power markets and PSO is not always active in the gas markets, there will be instances when both entities are engaging in physical and/or financial natural gas transactions. The expertise of the Centra front office could be called upon to assist PSO with advice around appropriate strategies and the execution of requisite transactions. One might also argue that at times, regional power market prices will be influenced by natural gas market conditions. The combination of the two separate front office functions into a single business unit would provide for enhanced communication flow between Centra's gas procurement specialists and the PSO traders.

Despite these potential areas of synergy, RiskAdvisory does not believe there is sufficient benefit to Manitoba Hydro to consider the establishment of a single front office function. In fact the risks associated with such a transformation result in RiskAdvisory making a recommendation that Manitoba Hydro not pursue a combination of its front office activities. Issues to consider include:

- Underlying approach to the front office functions;
- Degree of commodity market overlap;
- Type of market activity;
- Regulatory issues.

Underlying Approach to the Front Office Functions

Centra's gas management strategy is built on a defensive approach to monitor costs and ensure that risk is managed within a perceived ratepayer risk appetite. The markets in which it operates are liquid and transparent, and there is no need to take aggressive trading positions to achieve the stated objectives of Centra's gas procurement activities. On the other hand, PSO is motivated to increase revenues and enhance Manitoba Hydro's financial metrics. At the same time, PSO must operate in less efficient markets where by necessity it is forced to absorb risk in order to optimize its marketing and procurement activities. Centra's hedge positions are largely static, while PSO must be in a position to adjust its sales and procurement portfolio frequently as a result of variability in its resource portfolio.

RiskAdvisory concludes that the circumstances are such that the approach to market activity and the underlying culture is quite different between the two front office groups, and that there are good reasons for these distinctions. These distinctions lessen the likelihood of favourable synergies between the two groups.

DEGREE OF MARKET OVERLAP

RiskAdvisory does not believe that there is a significant enough market overlap to justify the unification of the two front office groups. Under non-drought circumstances, Manitoba Hydro's gas-fired generation units are only expected to operate at a 3% capacity factor given their less-efficient heat rate relative to other regional market-clearing gas units. Gas consumption only escalates during drought conditions and there could be in excess of 10 years between successive drought years.

With the absence of a strong correlation between MAPP regional power prices and gas prices, PSO power traders will not be able to garner incremental market knowledge from a closer association with gas market participants.

TYPE OF MARKET ACTIVITY

Under drought conditions when PSO does become an active participant in the gas markets, the types of transactions that need to be pursued by PSO differ from the transactions included in the Centra portfolio. Centra operates with the knowledge that every year it will require significant storage capacity to be able to manage the extreme seasonal swings in load and to optimize pipeline capacity payments. PSO does not have the same certainty around storage requirements, with the appearance of drought conditions suddenly creating a need for short-term gas storage. Also, as highlighted by the actions undertaken by PSO during the 2003 drought, this storage may not be required simply for Manitoba Hydro's gas-fired facilities. Part of the drought hedging strategy may involve the management of exposures to US regional gas prices, requiring storage in areas that are not normally accessed as part of the Centra gas procurement strategy.

From an execution perspective on financial instruments, Centra has solid experience with the execution of a specific type of transaction – collars on AECO natural gas prices with a maturity of 10-12 months. The capability certainly exists within the Centra group to execute swaps and other option strategies for different terms. However, this is currently not being done. The nature of PSO's exposures will call for different types of strategies from those employed by Centra, often at alternative delivery points to the AECO market where all of Centra's financial hedging occurs.

Some of the decisions made by PSO in the management of the natural gas exposure may involve an element of market directional view. For example, at times when it is deemed that acquired storage is no longer necessary, decisions must be made around the timing of the sale of gas out of storage. First, management must decide whether it is appropriate to inject an element of price view in this type of decision. Second, even if it is deemed appropriate for PSO to include price views in the decision-making process, there is no reason to believe that Centra staff possess the expertise to provide helpful price views – in fact the stance taken by Centra is that this skill set does not and should not be expected to exist within a gas distribution utility.

The need for different types of market expertise between Centra and PSO means that there is unlikely to be much in the way of cost savings if Manitoba Hydro combined the two front office groups. Centra would still require current staffing levels to manage its normal-course physical portfolio and capacity management activities. The staffing requirement for the execution and monitoring of the hedge program is not very material given the streamlined, mechanical approach. Much of the staff commitment associated with the hedge aspect of Centra's activities is involved on the regulatory front with preparations for and participation in the annual Cost of Gas hearings. There is also a non-trading aspect with respect to collecting and interpreting information from customers with respect to desired hedging activities. With the sporadic nature of the PSO's gas market needs and the different types of transactions that need to be analyzed and executed, PSO would still need access to a skill set that differs from the Centra skill set. If there was a common trading floor, Manitoba Hydro would still have to consider bringing on an additional staff member who had expertise managing the types of needs that PSO will experience during the infrequent drought periods, or continue with a consulting retainer relationship with a group possessing the requisite market expertise, along the lines of the current Tenaska arrangement.

REGULATORY ISSUES

As mentioned earlier, Centra's regulatory approach has been to explain in great detail to the regulator and intervenors that there should be no expectation of a beat-the-market capability within the gas procurement function. Centra does not refer to its gas procurement staff as traders. Such an approach has ensured a consistent risk management strategy over the past several years which has served ratepayers well, has helped smooth the regulatory process, and has resulted in the MPUB deeming that the hedge implementation procedures were prudent. A move to a common trading floor and a close association with the much more active and aggressive power trading operation of the PSO is likely to send the message to the regulator that there has been a shift and that the Centra gas supply group should now have enhanced capabilities to time its hedging activity and outperform the market. This will create more regulatory uncertainty and can serve to increase the risk of regulatory disallowances associated with Centra's hedging activity.

The second regulatory issue centers around the allocation of transactions between Centra and PSO. While there is some commonality between Centra ratepayers and Manitoba Hydro ratepayers, there is not a perfect overlap. Intervenors in rate cases for either utility will challenge whether Centra or PSO received some cost/revenue advantage at the expense of the other utility. For example, there might be a requirement for both utilities to resell Dawn gas on the same day. Two transactions are consummated at different prices. Which utility receives the benefit of the higher-priced transaction? Even if all transactions are executed following strict internal protocols that ensure fair treatment between the two utilities, the perception is likely to exist among external stakeholders that some kind of activity is occurring which is harmful to their interests. The move to a common trading floor could result in an elevated level of scrutiny and mistrust with respect to whether each utility's ratepayers are best-served by the procurement and trading activities of the unified front office.

CONCLUSION

For the reasons outlined above, RiskAdvisory recommends that Manitoba Hydro maintain two separate front office groups for Centra and PSO. RiskAdvisory supports ongoing co-operation between these two groups in those isolated instances when it is required, but does not believe that the limited synergistic advantages outweigh the negative cultural and regulatory aspects of such a move.

VII. Quantitative Middle Office Synergies

ISSUES

As will be outlined later in this report, RiskAdvisory believes that the most pressing requirement for Manitoba Hydro is the creation of a middle office functionality for the PSO's activities. In contrast to Centra, the magnitude and the complexity of the risk on the power side of Manitoba Hydro's operations require a dedicated middle office team to ensure that the organization is aware of the dominant financial risk in the organization.

Under normal circumstances, one would expect that all the middle office market and credit risk quantification capabilities within an organization would be centered in one group. In many instances, the skill sets that are needed to estimate exposure to power market positions are similar to those that would be required to estimate natural gas price exposure. Also, a centralized middle office allows one to analyze market and credit risk on a portfolio basis across the organization, taking into account any offsets or correlation impacts across business units.

Despite the best practice approach of having a consolidated middle office function, RiskAdvisory believes that there are a number of factors that mitigate against a common middle office group for Manitoba Hydro at this time. This belief is based on the following factors:

- The Centra market risk profile that needs to be quantified from a middle office perspective is actually a ratepayer risk profile – with the PGVA flow-through mechanism, market price changes do not have a direct impact on Manitoba Hydro's financial performance. As a result, there is nothing to be gained from a portfolio analysis of market risk across Centra and PSO functions. Gas price exposures at Centra cannot serve to offset market risks at PSO because of the flow-through mechanism on the gas side.
- The low degree of commonality between Centra and PSO counterparties lessens the importance of a centralized portfolio credit exposure capability. Centra's counterparties are financial institutions in the AECO forward market, physical gas market counterparties and members of the ABM community. PSO deals with a wide variety of customers primarily in the regional physical power markets. In those isolated instances when there are credit exposures outstanding to the same

counterparty with both business units, RiskAdvisory does support the determination of counterparty credit exposure taking into account all positions. However, the likely infrequent occurrence of this common exposure means that special procedures can be implemented to ensure the portfolio approach is taken without having a centralized middle office function;

- The risk metrics required for Centra are very straightforward. Limited staff time is needed to be able to generate the requisite reports, and there is little requirement for enhanced quantitative modeling capabilities;
- The PSO risk profile is extremely complex. A good deal of effort and skill will be required to develop and refine the quantitative model to estimate the PSO risk position. At this juncture, pieces of this model exist, but any risk modeling is in an embryonic state. The nature of the PSO marketplace, the types of transactions executed by PSO and issues around resource availability ensure that for the foreseeable future the PSO middle office will be focusing on model improvements after the core quantitative processes are established. Assigning the PSO middle office group responsibility for the measurement and monitoring of Centra risks will distract this group from the high priority need to implement PSO risk modeling capabilities;
- The middle office quantitative results will be an important component in the risk management decision-making process for PSO. On the Centra side, the quantitative analysis provides for monitoring of positions and risk, but does not guide the implementation process. As a result, there is a greater sense of urgency around the activities of the PSO middle office. This creates a different dynamic whereby there is no need for middle office reporting lines to Centra, while there will be a benefit from a middle office reporting line within PSO;
- A centralized risk management function will create cost allocation issues between PSO and Centra business units, which may cause more debate through the regulatory process.

CONCLUSION

RiskAdvisory recommends that the quantitative risk measurement activities be undertaken separately by each business unit. Centra would maintain the status quo with the limited quantitative work shared between the back office and the front office. The PSO middle office would be staffed and charged with developing and implementing the market risk and credit risk measurement models specifically for PSO. The PSO middle office staff would be available in those infrequent instances when Centra may require some consultative services around any risk quantification issues.

VIII. Credit Synergies

Manitoba Hydro currently operates under at least two separate credit risk management policies: one for Centra that is administered by Treasury and one for PSO that is administered within PSO. The distinctions between the two policies can be quite material with respect to the determination of creditworthiness, the magnitude of credit exposure that can be extended to counterparties and the methodology for estimating open credit exposure. This creates confusion between the business groups as to why there are different standards in place for each of the business units. There is also a duplication of capabilities with respect to initial credit assessments and ongoing credit monitoring. Although the instances when there are common counterparties between the two groups are rare, this type of bifurcated structure does not allow for the determination of a maximum corporate credit exposure to a specific counterparty with an allocation of credit limits between the two business units.

The establishment of a credit function within PSO has grown out of commercial necessity. PSO has interacted with Treasury on credit issues in the past, but in order to ensure the timely processing of credit applications, responsibilities for the administration of the PSO credit policy were established within the PSO business unit.

Best industry practice would call for the centralization of the credit function, both from a synergistic and a control perspective. RiskAdvisory would normally recommend such an initiative for Manitoba Hydro. Such a centralized function would have the responsibility to assess counterparty creditworthiness and establish appropriate credit exposure limits for each counterparty, monitor creditworthiness over time, determine the appropriate credit support required from counterparties, and determine the credit support that Manitoba Hydro is willing to provide to counterparties. This would allow the interpretation of the corporate Credit Policy in a common fashion across Manitoba Hydro. If the Company followed this approach, the centralized credit function would be located within Treasury.

Under this structure, the business units could still maintain all responsibility for customer contact and negotiation of credit provisions, within the guidelines established by the centralized credit group. It would also be recommended that at least one staff member from the Treasury credit function be located directly in the

PSO front office to ensure that PSO receives prompt attention to credit issues that may arise during the course of its activities.

An alternative approach to the centralized credit organizational structure would be to continue to have the PSO credit function reside within the PSO organization, although shift the location of this activity so that it resides within the PSO middle office.

Despite the normal recommendation for a centralized credit function, there are a number of considerations with respect to Manitoba Hydro's environment that create concerns around the value of this approach. First, there is a Standard of Conduct ("SOC") issue with respect to this centralized credit function having responsibility for both PSO counterparty credit assessments and Transmission counterparty credit assessments. RiskAdvisory does not profess to be an expert on SOC matters, but through conversations with Manitoba Hydro staff it would appear that it would be a violation of FERC Order 889 if the same credit group was making creditworthiness decisions and allocating credit lines for both PSO and Transmission. If this is the case, then by necessity Manitoba Hydro will be required to have two credit functions.

The second issue is one of the limited degree of synergy that will result if the credit functions for both PSO and Centra are combined in one operation. As mentioned earlier, there is negligible overlap in counterparties between the two groups.

The third issue surrounds the intensity of credit support required by the different groups. Centra has a low transactional frequency and there will often be lengthy lead times available to establish credit lines with proposed new parties. PSO on the other hand has a broader counterparty network and will frequently find itself in situations where the credit approval process is very time-sensitive.

The fourth issue deals with the potential that the credit assessment activities for PSO may not require a full-time resource. During down-time from a PSO credit assessment perspective, there is a question as to whether this resource could be better applied performing alternative Treasury tasks or PSO middle office tasks.

As a result of these factors, RiskAdvisory recommends the inclusion of the credit risk management activity for PSO within the PSO middle office, with Treasury continuing to have credit risk management responsibility for Centra and Manitoba Hydro transmission activities, along with any retail credit risk management oversight. This will help to ensure that PSO receives the concentrated level of credit service required to facilitate its commercial activities and will likely allow the deployment of additional resources to assist in other tasks assigned to the PSO middle office.

This recommendation is made with two requisite conditions. First, it is imperative that a common credit policy be developed and approved by Manitoba Hydro's Executive Committee that is applicable to all business units. Treasury and the PSO middle office credit function must operate within these corporate-wide policies. The second condition is that any loss of control over credit that may exist by housing the credit risk management operation within the PSO organization must be countered by having at least a dotted line reporting structure for the PSO middle office Risk Manager to a Manitoba Hydro executive outside of PSO.

IX. Back Office Operations Synergies

RiskAdvisory does not believe that sufficient synergies exist with the back office functions of Centra and PSO to merit the combination of these groups. While certain responsibilities are similar in nature (payment, invoicing, forecasting), there are other areas where specialized expertise and experience is required to perform the functions. The concerns with a common back office are as follows:

- There is a high degree of specialization associated with these functions. On the Centra side, the back office operations group has to allocate costs to the appropriate deferral and storage accounts, perform all the calculations to ensure recovery of gas supply costs through the rate structure, analyze and reconcile the PGVA and gas deferrals and prepare reports for submission to regulatory bodies. The PSO back office group must handle settlements through a broad range of counterparties and power pools, facilitate payments for resources, report on plant generation statistics, process external reports to regulatory agencies and regional power districts, and provide contract administration support on a range of issues unique to the power business;

- The complexity of some of these issues requires ongoing interaction with front office personnel, requiring that the back office be in close locational proximity to the front office group. Separating a common back office into two separate locations reduces any of the natural synergies that might occur from a common location.

X. Centra Organizational Structure

RiskAdvisory is recommending that no changes be undertaken with respect to Centra's organizational structure. The front office gas procurement activities on both the physical and financial side would still be conducted independently from PSO activities, the quantitative middle office activities would be shared by the Centra front and back office, and the back office function would continue to report to the Controller. Treasury would still be responsible for credit administration. As discussed earlier, RiskAdvisory does not believe there are sufficient synergistic benefits to recommend any merging of the front, middle or back office functions with PSO.

XI. PSO Organizational Structure

While RiskAdvisory is not recommending any changes to the PSO organizational structure from the perspective of synergistic opportunities with Centra, there are a number of recommendations that RiskAdvisory would make to improve senior management oversight and decision-making capabilities and enhance the control environment within PSO. These recommendations are in the areas of senior management oversight, the development of an independent middle office and issues around back office reporting lines.

A. Senior Management Oversight

There is a broad disparity between the senior management oversight of Centra's gas procurement and risk management practices and the commercial and risk management practices of PSO. Most importantly, there is a risk limit that has been established for Centra – the ratepayer tolerance to a $0.50 increase in gas costs creates the limit that drives the risk management implementation strategy.

On the power side, there is no risk limit structure in place for the underlying utility exposure. Senior management has not defined a maximum corporate tolerance to a deterioration in forecast revenue. Absent this kind of dollar-based risk tolerance, there are no volumetric limits that have been established. Although the Board and Executive Committee have the responsibility for approving transactions beyond five years, PSO is given rein to manage risks and revenues as it sees fit within the five-year timeframe. RiskAdvisory recommends that Manitoba Hydro move as quickly as possible to define a risk limit structure in which PSO must operate to ensure that its activities match the risk appetite of Manitoba Hydro. This risk limit structure should be approved at the Board level.

While there is a well-populated GSRMC that oversees the gas risk management activity and advises on gas hedging policy, there is no similar committee on the power side. The Control Plan for Power Related Transactions does reference a Power Sales and Operations Risk Management Committee ("PSORMC") but at this juncture the proposed members of this committee are all PSO staff members. The PSORMC is largely a tactical group approving specific system risk management hedging strategies.

RiskAdvisory recommends that in addition to the PSORMC, Manitoba Hydro establish an executive Power Risk Management Committee ("PRMC") with the following membership: Manitoba Hydro CEO, Manitoba Hydro CFO, Vice President Power Supply, the Division Manager PSO and the Middle Office risk manager.

The role of the PRMC is to provide executive oversight of the management of system risk and the marketing and procurement activities of PSO. Specific responsibilities would include the following:

- development, authorization and communication of energy risk management policies and procedures. The Risk Management Policy Manual should be approved by the Company's Board of Directors, with interim changes requiring the approval of the PRMC;
- authorization of specific commodities and derivative instruments to be traded;
- resolution of any disputes concerning the appropriate application of the Policy Manual that may arise between the Risk Manager and the PSO;
- authorization of appropriate systems for recording, monitoring and reporting the commodity exposure inherent in the Company's operations and the risk management activity undertaken to alter the underlying risk profile;
- recommendation to the Board of the appropriate market risk tolerances;
- decisions around the action that must be taken if risk limits are violated.

It is expected that the PRMC would not be involved directly in the decision-making process around specific risk management and trading transactions undertaken by PSO. The recommended approach for this committee is to approve the broad policies and risk limits under which PSO must operate, with ongoing oversight to ensure that PSO continues to operate within the guidelines of stated policy. As long as PSO is operating within pre-approved limits, the PRMC would not be directing the procurement and marketing activities of PSO. In the case of a market risk limit violation, PSO would have the opportunity to propose alternative courses of action to the PRMC. In the end, the PRMC would have the responsibility to dictate to PSO whether actions must be taken to reduce risk below approved limits. Even at this stage, this does not require the PRMC to identify specific transactions that must be executed by PSO.

In order to avoid confusion, it is recommended that the PSORMC undergo a name change. In general, Risk Management Committees tend to be more policy and oversight-oriented and are less involved with tactical decision-making. One suggestion would be to change the name of the PSORMC to the Power Sales & Operations Tactical Hedge Committee.

B. Independent Middle Office

Rationale for Middle Office

It is best practice for energy utilities to have an independent middle office function to quantify the organization's exposure to market and credit risk, report on these exposures and to ensure compliance with the organization's risk management policies. In Canada, Manitoba Hydro is the exception with respect to major electric utilities and the existence of an independent middle office function. Middle office staff are in place at NB Power, Emera/Nova Scotia Power, Hydro-Quebec, Ontario Power Generation, SaskPower, Enmax, EPCOR, Direct Energy Regulated Services and BC Hydro/Powerex.

The strongest recommendation that RiskAdvisory will make in this report is that it is imperative for Manitoba Hydro to establish this middle office functionality to monitor and report on the financial risks inherent in its power business. There are several key reasons to support this initiative:

- At this juncture, the senior management and Board of Manitoba Hydro have no ability to analyze the distribution around its projected electricity margins over the near-term (current and subsequent fiscal year). Existing quantitative methodologies can update the expected margins, and PSO can perform stress tests to determine the impact of negative events on the potential margin. However, there is no integrated quantification risk analysis that allows for the variability of water inflows, power prices, fuel prices and domestic load obligations. Without this capability, management's ability to define a risk tolerance and establish appropriate riverbanks for PSO utility risk management transactions is seriously impaired. In addition, there is limited ability to determine the impact that proposed transactions will have on the corporate risk profile.

- The lack of an independent middle office violates one of the primary best practices that has emerged in the energy sector and financial markets over the past decade. The Group of 30 (“G30”) report issued over ten years ago, which is viewed as the original seminal report on financial risk management, recommended that organizations have a market risk management function with clear independence and authority from the front office transactional group to ensure that organizational risk is quantified and that transactions and positions adhere to policy. Another reference point with respect to best industry practice are the Committee of Chief Risk Officers (“CCRO”) White Papers. The CCRO is a coalition of more than 30 energy companies that is striving to address key issues in the energy markets and the management of risk. Ontario Power Generation and BC Hydro/Powerex are both members of the CCRO. The following represents a direct excerpt from the Committee of Chief Risk Officers (“CCRO”) “Introduction and Executive Summaries of CCRO Recommendations”:

> “The front office functions directly execute the company’s risk taking and risk mitigation strategies with respect to individual transactions. The front office functions include deal execution, the initial capturing/logging of a transaction’s specific terms and conditions, and performing other transaction support roles such as scheduling and nominations. Because of the real-time market opportunities available to the front office, the transactions executed have the potential for exposing the company to significant risk (market, credit, liquidity, and/or operational risk). <u>Therefore, an infrastructure of control separate from that of the front office is necessary to monitor this market participation</u> (emphasis added).
>
> The middle office is the portion of the infrastructure where much of the control and policing of the front office’s activities occur (and hence it should be independent from the front office). The middle office functions include assuring integrity of the data through deal validation and risk monitoring in compliance with policies authorized by the risk

> oversight committee. The functions of the middle office may be performed within the corporate risk management function."[1]

An independent middle office becomes a vital control function in an energy trading, marketing and procurement operation. If the responsibility for forecasting expected profits and the risk profile around the income stream is left in the hands of front office personnel, there is a significant control breakdown that has been responsible for many of the well-publicized risk management disasters that have occurred in the past. Front office personnel can be motivated at times to enhance expected profits to cover up poor results, and can also be motivated to underestimate the magnitude of risk in open positions in order to take incremental risk positions without violating corporate risk limits.

- The establishment of a separate energy marketing and fuel procurement subsidiary will serve as a lightning rod for negative media and stakeholder reaction if there are losses incurred. This will be exacerbated if it is learned that there was no independent middle office group with measurement and reporting responsibilities given that the establishment of this independent middle office function has become standard practice for other energy marketing companies.
- The planned move into third-party marketing transactions with a pure profitability goal (as opposed to optimizing the system portfolio) escalates the requirement for an independent risk monitoring function. The incentive to take on speculative positions and potentially run afoul of corporate risk policies increases when there is an entrepreneurial profit objective in the marketing activities. It should be noted that the entrepreneurial profit objective is not a prerequisite for an independent risk monitoring function – material economic losses can and have occurred in organizations where there were no profit objectives around the hedging activity,
- The expertise of the middle office can be used to develop more analysis around the long-term risks embedded in new corporate initiatives.
- **The middle office can save money and it can assist in revenue generation**. The middle office will allow senior management to identify

[1] Volume 1 of 6, Introduction and Executive Summaries of CCRO Recommendations, Committee of Chief Risk Officers, November 19, 2002, p.9.

unwanted risk in a more timely fashion, allowing for the more efficient establishment of defensive positions. It will allow for the testing of alternative hedging strategies to allow for the selection of the strategy that best fits Manitoba Hydro's risk/reward profile. The robust quantification of risk may allow Manitoba Hydro to engage in incremental profitable transactions that it otherwise might have rejected on the basis that they were too risky. It may also lead to the rejection of transactions where risks are identified that exceed Manitoba Hydro's risk tolerance. Senior management confidence in a strong middle office capability will allow the front office to move into new markets and new products more quickly because there will be comfort that the organization has the ability to monitor the resulting risks over time.

PSO Middle Office Functionality

The most pressing need at this time is the development of a PSO middle office that has the quantitative capability to assess the market risk in the PSO portfolio. There are five levels to this risk identification and quantification process:

- Risk around MISO participation and hedge instruments;
- Risk inherent in third-party marketing transactions;
- Risk inherent in the near-term (current and subsequent fiscal year) utility system portfolio, taking into account water variability, power and natural gas price variability and load variability;
- Quantification of credit exposure including potential exposure:
- Risk inherent in the long-term utility system portfolio.

RiskAdvisory would recommend that the middle office initially focus on these first four risk identification and quantification levels in the near-term. From a compliance perspective, the PSO middle office would monitor PSO compliance with market and credit risk limits.

It is envisioned that the PSO middle office would also have responsibility for the initial drafting of proposed risk management policies and procedures. These could be drafted with support from the existing Manitoba Hydro risk management group and input from the PSO front office. These policies and procedures would eventually be approved by the Manitoba Hydro Executive Committee and the Board after review by the PRMC.

As recommended earlier, the PSO middle office would also include the credit risk management function. The individual in this position would be responsible for credit assessments, the establishment of credit risk limits and any requisite collateral provisions. All of these decisions must be made within the bounds of the corporate-wide Manitoba Hydro Credit Risk Management Policy.

To allow the PSO middle office to focus on its quantitative analysis and reporting requirements, it is recommended that responsibilities for the monitoring of control adequacies and compliance with policies (aside from market and credit risk limits), along with any qualitative analysis of operational risks not viewed as business unit responsibilities, be the domain of the existing Manitoba Hydro Risk Management Services group. Compliance with market and credit risk limits is excluded from the responsibilities of the Risk Management Services group because this is the primary rationale behind the establishment of the PSO middle office. However, Risk Management Services would have the responsibility for ensuring that middle office practices also comply with approved policies and procedures.

PSO Middle Office Staffing

RiskAdvisory estimates that the PSO middle office would require one senior manager, one credit manager and at least three intermediate staff members. The senior level candidate ideally would have energy market transactional experience, electric utility experience, familiarity with hydro systems, risk management experience and systems experience. The candidate must also have very strong interpersonal skills to be able to communicate successfully with front office personnel and act as the risk liaison with the senior management of Manitoba Hydro, the Audit Committee of the Board and external stakeholders.

This skill set is not inexpensive. There is a competitive market for individuals with this combination of traits. RiskAdvisory estimates that such an individual would command a compensation package in the range of $140,000 to $175,000 per annum, which still lies below the total remuneration of individuals holding the risk manager position at several other Canadian utilities. The remuneration costs for this individual can be easily recouped if risks are identified and quantified in a timely fashion and the front office is able to capitalize on opportunities because of the risk monitoring skills in the organization.

RiskAdvisory would recommend against attempting to develop this skill set internally. It is important that the middle office effort starts forcefully and that the individual can command respect with front office personnel and Manitoba Hydro's senior management. A weak middle office ends up being a burden for companies, and sends the wrong message with respect to the corporate risk culture.

It is possible that the intermediate level candidates can be developed internally. Those individuals with an understanding of the HERMES system and who have statistical backgrounds and IT systems experience can be trained in market risk analysis and become valuable members of the middle office team.

PSO Middle Office Reporting

Best practice calls for a middle office group that is independent from the front office trading activity. One interpretation of this practice would be to establish a single reporting line for the PSO Middle Office outside the PSO subsidiary, most likely to the CFO. Another interpretation would be that the Middle Office would not report to any of the front office managers within PSO, but could report to the PSO President.

In practice, RiskAdvisory has seen both models used. The more common approach is for the head of the middle office to report through the utility's CFO. However, an organization like Powerex does have an independent middle office group that reports to the CEO of the subsidiary. One can make the argument that if the subsidiary was a stand-alone organization, then the middle office would have to report to someone within the subsidiary. Segregation is still maintained because the CEO is not involved in the day-to-day trading decisions of the marketing company.

There are three important considerations with respect to the PSO middle office reporting lines – Board oversight capability, the transactional role of the PSO President and the organizational status of the middle office function.

- If there was a Board of Directors put in place for the subsidiary that was experienced in energy trading matters and had a thorough understanding of energy risk metrics and the management and control of trading operations, there would be increased comfort with a PSO middle office that reported solely to the PSO President. RiskAdvisory feels that this is unlikely in the near-term. The oversight of the marketing operation will likely be a new responsibility for many of these PSO subsidiary board members, who will have to gain experience on the job.

- Historically the head of the PSO operation has taken an active role in marketing and risk management decisions. While there is delegation of responsibility to PSO managers on many aspects of the transactional activity, the head of PSO is much more involved in the strategic implementation of marketing and procurement transactions than is common for other energy marketing company CEOs. This degree of involvement increases the concern about a single reporting line for the middle office to the CEO.
- The middle office functionality will be a new initiative for the power side of Manitoba Hydro. In order for this initiative to be successful, it must be given the organizational influence to generate respect and co-operation from other business units. This can be achieved through a reporting structure that has the middle office reporting to a member of the executive. This type of reporting line sends the appropriate message throughout the organization about the importance that senior management and the Board assign to a prudent risk management culture. Also, the ability to attract a strong candidate to the position will be a function of the seniority that is granted the individual within the Manitoba Hydro organization.

At the same time, RiskAdvisory is concerned about a sole reporting line for the middle office to the CFO. The creation of the middle office risk model is going to require substantial input from the front office PSO members, and those individuals who have been responsible for the design and implementation of HERMES. While the middle office has the final approval on the structure and mechanics of the risk model, it will rely on assistance from knowledgeable PSO staff through the model construction period. In addition, at this point the Division Manager of PSO is more versed in the details of power market risks and the unique conditions facing Manitoba Hydro than any other member of the management team. The middle office would benefit from direction provided by the head of PSO. As mentioned earlier, the selection of market transactions and hedge strategies to manage Manitoba Hydro's system exposures will be affected by the risk measurement and reporting practices of the middle office. There is merit in having PSO oversight of these activities.

RiskAdvisory recommends that the head of the middle office group be given dual reporting lines to the Manitoba CFO and the head of PSO. Human resources issues would be the responsibility of the head of PSO, in consultation with the CFO. The middle office group must be located in close proximity to the front office trading activity for a number of reasons. First, this enhances the ability to build a spirit of co-operation between the front and middle office. Second, it allows for quick response from the middle office to deal with urgent risk issues that arise on the trading floor. Finally, it provides the middle office with more effective oversight of actual trading activities and enhances the group's ability to understand the nuances of the various transactions and trading strategies employed by front office personnel.

It has been common in other energy trading and marketing operations for the individual to whom the head of the middle office reports to play an active role in the functionality of the middle office. There will frequently be differences of opinion between the front office and the middle office around control processes and risk quantification issues. Often these issues are resolved through the involvement of the head risk manager's superior, who is in a better organizational position to negotiate with senior personnel from the front office. One of the most significant reasons for the recommendation of at least a dotted reporting line outside of the PSO power marketing subsidiary is to ensure that the appropriate balance of power exists with respect to the interpretation and application of the corporate Risk Management Policy.

As a result, the senior Manitoba Hydro executive to whom the head of the middle office reports will frequently be required to have an awareness of front office positions and pending transactions. This could once again create SOC issues if the head of the middle office reports to Manitoba Hydro's CFO. As with the recommendations around PRMC membership, RiskAdvisory believes that the most suitable dotted line report is to the CFO and that all measures should be undertaken to determine if this role can be performed without violating the SOC. However, if SOC restrictions constrain the CFO from taking a sufficiently active role in the management of the middle office, then RiskAdvisory would recommend that the head of the PSO middle office report to Manitoba Hydro's Controller.

C. Back Office Operations

As mentioned earlier, the PSO back office currently reports to the PSO Division Manager. Industry best practice would call for a segregation of duties between the back office functions and the front office functions. This calls into question the appropriateness of the current back office reporting structure. However, in a similar vein to the argument made earlier with respect to middle office reporting lines, if an energy marketing and trading company operates as a stand-alone entity, the back office reporting line must be internalized at some point within the trading company.

There is a concern that a move to establish a more segregated reporting structure will lead to a degeneration in the teamwork approach and the common culture that have been established historically within PSO, resulting in a decline in efficiency. RiskAdvisory understands and accepts the practical side of this concern. However, the potential economic benefit of maintaining the status quo must be balanced against any perceived control weakness associated with the existing reporting structure.

RiskAdvisory understands that several internal audits have been performed on the PSO back office group in recent years and that these audits have not revealed any concerns with control gaps. This does serve to reduce RiskAdvisory’s concern about the lack of segregation.

From an industry perspective, there is no consensus around the nature of the reporting relationship for the energy trading back office. In RiskAdvisory’s experience it is a fairly even split between those companies that have the back office reporting to a corporate controller function, and those companies that have elected to establish the reporting line through to either the CFO or the President of the energy trading group.

One of RiskAdvisory’s areas of expertise is the establishment of the appropriate control structure for middle office risk monitoring and reporting functions. The firm’s expertise is less robust on issues surrounding back office control features. It is RiskAdvisory’s belief that this area of control is better suited to review by internal audit staff. Unlike the viewpoints taken with the middle office control structure in this report, RiskAdvisory is more ambivalent around the issue of back office reporting lines. RiskAdvisory can accept a maintenance of the status quo with the back office reporting through PSO if two conditions are met. First, Manitoba Hydro’s internal audit group must opine that it does not have any concerns around control gaps within such a back office reporting structure. Second, a dotted line report from the PSO back office to the corporate Controller should be established. . Under any reporting structure, RiskAdvisory does support the continued presence of the back office group in close proximity to the front office trading activity to ensure strong lines of communication and to provide prompt and effective service to the trading group.