



NCRS Risk System Discussion

Investment Advisory Committee

June 23, 2011

NCRS Risk System Objectives

- Superior data management capabilities
- Hosted solution
- Decompose the total plan into a set of systematic risk factors
- Aggregate portfolio sensitivities across all asset classes and roll into a single total portfolio
- Offer alternative modeling capabilities for all asset classes including private assets and hedge funds
- Conduct liability analysis so that asset-liability sensitivities can be measured
- Capable of capturing and calibrating to changing market environments
- Ability to capture portfolio risk at multiple hierarchies

NCRS Risk System Evaluation Process

- Created a comprehensive risk system questionnaire and provided it to multiple risk system providers
- Met with several institutional investors regarding risk management best practices
 - DUMAC, LLC
 - Wake Forest Endowment
 - CalSTRS
 - CalPERS
 - Canada Pension Plan Investment Board
 - Ontario Municipal Employee Retirement System
 - Ontario Teachers Pension Plan
 - Alaska Permanent Fund Corporation – by phone

NCRS Risk System Evaluation Process

- After a review of the questionnaires and feedback from the investment team, we invited four risk system providers to present and demonstrate their system
- Conducted several follow up meetings
- Made several reference calls
- Had SAS conduct a proof of concept with our fixed income holdings

Based on this analysis, a recommendation was made to the Treasurer to adopt SAS as NCRS's risk system provider. Approval was received from the Treasurer and contract negotiations are underway.

SAS

- Superior data management
 - **SAS is recognized as a globally leader in data management**
 - Many “off the shelf” risk management systems have an inferior data management process
- Hosted Solution
 - **SAS will allow us to connect through their hosted solution**
 - Several “off the shelf” risk systems offer a hosted solution but there are a few that require a client hosted server
- Decompose and measure the Plan based on a set of systematic factors
 - **SAS will assist us in researching and implementing a set of systematic factors to decompose the return variability of the total plan**
 - Many “off the shelf” risk systems do not provide that sort of flexibility or offer a set of customized factors based on the unique characteristics of a client portfolio
- Ability to model every asset class
 - **SAS will assist us in modeling each investment, including private equity, hedge funds and real estate, at the individual asset level**
 - In many cases, the “off the shelf” risk systems proxy the private investments at the asset class level

SAS

- Flexible solution and able to calibrate to a changing market
 - **SAS provides the flexibility to model risk based on a number of factors and has the ability to capture the dynamics of the market**
 - Many “off the shelf” risk systems have a pre-specified set of risk factors and do not provide the ability to capture the dynamics of the market
- Customized solution
 - **The SAS risk system will be customized to the unique characteristics of the NCRS investment portfolio**
 - **SAS will provide customized reporting at multiple portfolio hierarchies**
 - The “off the shelf” risk systems do not provide for that level of flexibility
- Unique functionality
 - **SAS will assist us in modeling our liability sensitivities**
 - **SAS will provide us with some economic forecasting tools including their newly created consumer sentiment analysis**
 - This is not offered by the “off the shelf” risk system providers

NCRS – SAS Relationship

- SAS Risk Management Consultants
 - NCRS will engage SAS through a dedicated team of SAS risk management consultants
 - SAS will provide NCRS with in-house training and invitations to SAS onsite training
- Implementation
 - SAS Risk Consulting group will work very closely with NCRS to upload portfolio data, research and determine factors, and create a customized solution
 - Given the level of customization, the implementation may require more time than a typical “out of the box” solution