Portfolio Benchmark Review

Investment Advisory Committee

June 23, 2011

Purpose Behind Benchmarks

➢ To represent a broad asset class and reflect a portfolio construction methodology

➢ To measure relative performance

Preferred Attributes of Good Benchmarks

➢ Representative
  ➢ Benchmark is appropriate and relevant to the portfolio's investment strategy
➢ Investable
  ➢ Should be able to invest in all of the securities included in the benchmark
➢ Transparent
  ➢ Names and weights of securities comprising the benchmark are available and understandable
➢ Measurable
  ➢ Benchmark is readily calculable on a frequent basis
➢ Independent
  ➢ Calculated by an independent third party to ensure a fair comparison

Static versus Dynamic

➤ **Static** – fixed weighting of sub-components in benchmark
  ➤ Allows for intentional over or under weighting of portfolio
  ➤ During times of transition, it is likely that unintentional bets are being made versus benchmark which could lead to underperformance

➤ **Dynamic** – weights of benchmark sub-components are adjusted to match actual weights of portfolio
  ➤ No unintentional bets are being made (removes all allocation effect)
  ➤ During times of transition, unintentional over or under weights are eliminated
  ➤ Performance is driven solely by manager selection

NCRS Benchmarks – Total Plan

- Current
  - Static weighting based on short term allocation targets
- Proposed – Transition
  - Dynamically weighted using actual monthly allocation weights as benchmark weights
- Proposed – Long Term
  - Static weighting using long term allocation targets

	Current (Static)	Transition (Dynamic)*	Long Term (Static)
Global Equity Benchmark	47.0%	47.4%	40.5%
Fixed Income Benchmark	38.0%	37.5%	38.0%
Real Estate Benchmark	6.0%	5.5%	8.0%
Alternative Benchmark	4.5%	4.6%	4.5%
Credit Benchmark	3.0%	3.0%	4.5%
Inflation Benchmark	1.5%	2.0%	4.5%

*Dynamic weighting as of 4-30-11

NCRS Benchmarks – Global Equity

➢ Current
  ➢ Static weighting between US & Non-US based on short term allocation targets

➢ Proposed
  ➢ Dynamically weighted between:
    ➢ US (Russell 3000 Index)
    ➢ Non-US (MSCI ACWI ex US IMI Index)
    ➢ Global (MSCI ACWI Index)

	Current (Static)	Proposed (Dynamic)*
US - Russell 3000	60.0%	47.2%
Non US - MSCI ACWI ex US IMI	40.0%	47.8%
Global - MSCI ACWI	0.0%	5.0%

*Dynamic weighting as of 4-30-11

NCRS Benchmarks – Fixed Income

- ## Current
  - ### Static
  - ### BOA Merrill Lynch Custom: 40% Gov't 5+ yr / 35% Investment Grade Corporate Credit (BBB – max 25%) / 25% Mortgage Master
- ## Proposed
  - ### No Change

	Current	Proposed
Government 5+ yr	40.0%	40.0%
Investment Grade Corp Credit (BBB – max 25%)	35.0%	35.0%
Mortgage Master	25.0%	25.0%

NCRS Benchmarks – Real Estate

- Current
  - Static weighting between:
    - Private Real Estate (NCREIF ODCE)
    - Public REITS (FTSE EPRA/NAREIT Global Securities Index)
- Proposed – Transition*
  - No change
- Proposed – Long Term
  - Static blend of Core, Opportunistic, Value Add, REIT, and Timber

	Current (Static)	Transition (Static)
Private Real Estate - NCREIF ODCE	90.0%	90.0%
Public REITS – FTSE EPRA/NAREIT Global Securities Index	10.0%	10.0%

* The timber allocation will be moved to the Real Estate Portfolio as of 7/1/11

NCRS Benchmarks – Alternatives

➢ Current

➢ Static weighting between Private Equity and Hedge Funds

➢ Proposed

➢ Dynamic weighting between Private Equity and Hedge Funds

	Current (Static)	Proposed (Dynamic)*
Private Equity Benchmark	85.0%	87.1%
Hedge Fund Benchmark	15.0%	12.9%

*Dynamic weighting as of 4-30-11

NCRS Benchmarks – Private Equity

➢ Current - Russell 3000 lagged 3 months + 250bps

  ➢ Public benchmark represents long term goal of private equity outperforming the public markets

  ➢ Creates large amount of tracking error since public and private market returns are not closely correlated

  ➢ Since tracking error is high, using a public benchmark would take up a relatively large amount of the risk budget within our risk management platform

➢ Proposed - Custom Cambridge Associates Benchmark

  ➢ Large Peer Universe (>4300 funds)

  ➢ Allows for creation of a customizable benchmark which is more representative of the private equity portfolio (PE ex energy/mezz)

  ➢ Other options considered:

    ➢ State Street All Private Equity Index

    ➢ Venture Economics

    ➢ Private iQ

NCRS Benchmarks – Hedge Funds

- ➤ Current - US T-Bill + 400bps
  - ➤ Current portfolio structure is not consistent with this
    - ➤ Leads to unintended tracking error
  - ➤ Hedge Funds can produce negative returns

- ➤ Proposed - HFRI Fund of Funds Conservative
  - ➤ All active funds within the Hedge Fund portfolio are Fund of Funds

NCRS Benchmarks – Credit

➢ Current - 7.5% Annualized Return

  ➢ Absolute return benchmark achieves long term goal of outperforming 7.25% actuarial rate of return

  ➢ Not representative of investment strategy which creates unintended tracking error

➢ Proposed - 50% HRFX Distressed Index / 20% HFRX Relative Value Index / 15% ML High Yield Index / 15% CS Leveraged Loan Index

  ➢ Represents long term strategic target to underlying sub-components of asset class

    ➢ Portfolio construction methodology

NCRS Benchmarks – Inflation

- Current
  - CPI + 300 bps
- Proposed – Transition*
  - Dynamically weighted between:
    - Commodities (DJUBS Commodities Total Return Index)
    - Private Energy (Cambridge Associates Energy Upstream & Royalties and Private Equity Energy Benchmark)
- Proposed – Long Term
  - Static weighting using long term allocation targets

* The timber allocation will be moved to the Real Estate Portfolio as of 7/1/11