NEPC, LLC

To: Delaware Cash Management Policy Board – Investment Subcommittee

From: John Krimmel and Jennifer Appel

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Subject: Scenario Analysis for Portfolio Balances – COVID 19 Pandemic

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Background
NEPC was asked to provide a long-term scenario analysis for the fixed income portfolio balances for the Delaware Cash Management Policy Board Investment Subcommittee Meeting. Our analysis was focused on generating outcomes related to the COVID-19 Pandemic. The analysis considered three forecasting methods based on historical cash flows and expected return on portfolio assets. The analysis results in a terminal value at the end of an 18-month forecasting period (9/30/2021).

Scenario #1 – Global Financial Crisis Cash Flows
The first set of scenarios we modeled utilized cash flows realized during the Global Financial Crisis, which ran during the following timeframe: September 30, 2007 – March 31, 2009. Due to the seasonality of cash flows in the Delaware portfolio, we used the appropriate month's cash flows in our analysis (i.e., April 2008 data was used for April 2020). The "best case" scenario utilized the actual cash flows, both positive and negative to develop the "best case" outcome. The "worst case" scenario, utilized a $0 cash flow in months that normally have positive cash flows (where revenues > expenses). The results from these analyses are presented in the Summary Results table on the following page.

Scenario #2 – Trailing 10 Years Worst Month
The second set of scenarios we modeled utilized the same expected cash flows that are used in the monthly investment report cash flow monitoring slide. In this analysis we incorporated the monthly cash flow from the previous 10 fiscal years with the worst outcome (revenues < expenses). The "best case" scenario utilized the expected cash flows during the appropriate months, both positive and negative, to develop the terminal value. The "worst case" scenario, utilized a $0 cash flow in months that normally have generated positive cash flows (revenues > expenses) and the worst monthly outcome in a trailing 10 fiscal year period for months with negative cash flows. The results from these analyses are presented in the Summary Results table on the following page.

Scenario #3 – Trailing 10-Years Worst Month – Smoothed
In developing the second set of scenarios, we discovered that timing differences can play a significant role in the terminal value outcome. If a "normal" receipt or payment is delayed by a week and gets pushed into a different month, the timing of the receipt or disbursement can significantly alter the terminal value. The Smoothed scenario adjusted for these timing differences by smoothing the worst month. Again, the "best case" scenario utilized the expected cash flows during the appropriate months, both positive and negative, to develop the terminal value. The "worst case" scenario, utilized a $0 cash flow in months that normally have generated positive cash flows (revenues > expenses). The results from these analyses are presented in the Summary Results table on the following page.

Scenario Analysis - Summary of Results	
Beginning Market Value (3/31/2020)	$ 2,729,746,924
Financial Crisis Cash Flows Unadjusted	2,401,523,067
Financial Crisis Cash Flows Adjusted	1,848,102,962
Trailing 10-Years - Worst Month Unadjusted	795,534,245
Trailing 10-Years - Worst Month Adjusted	741,059,925
Trailing 10 Years - Worst Month Smoothed Unadjusted	2,693,514,736
Trailing 10 Years - Worst Month Smoothed Adjusted	1,291,666,791

Terminal Values were based on 18 month forecasting period.

Results of the Analysis

The terminal values developed in the scenario analysis varied widely. Using actual cash flows from the Financial Crisis let to outcomes that end with a terminal value between $2.4 billion (best case) and $1.85 billion for the fixed income portfolio. The Trailing 10-Year Worst Month resulted in the worst results with outcomes for both the best case and worst case ending with portfolios of less than $1 billion. The final analysis, Trailing 10-Year Worst Month Smoothed, generates a worst-case terminal portfolio value that is between the previous two analysis.

We do not draw any definite conclusions from these analyses, rather they are designed to discuss ranges of potential outcomes given the recent COVID-19 Pandemic. We look forward to discussing this with the Investment Subcommittee on April 15th.