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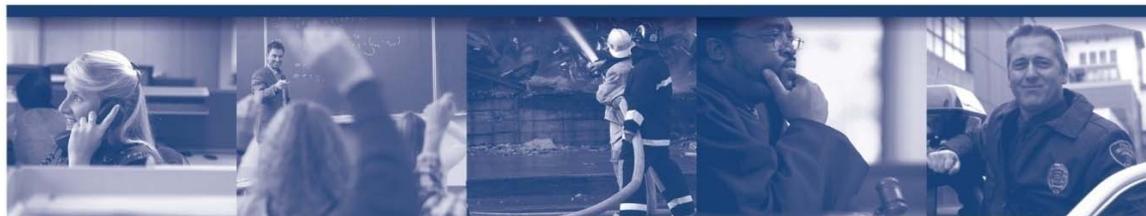
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North Dakota Teachers' Fund For Retirement Actuarial Audit

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Overview



- Actuarial audits seek to verify the actuarial work being performed
 - Actuarial calculations are complex and not likely to be exactly replicated
 - While not exactly like an accounting audit, the goal is still to provide assurance of the quality of the work product being delivered

- Key review items:
 1. Are assumptions and methods reasonable?
 2. Are the data processed accurately?
 3. Are calculations performed correctly?
 4. Do the reports communicate the appropriate and necessary information?
 5. Do the projections of the future reflect the likely direction of the Fund's health?

Overview



- Our goal is to try to evaluate and help improve the actuarial process, not just catalog trivial discrepancies.
- Overall, we believe the approach and the calculations provided by the retained actuary are reflective of generally accepted actuarial practice and present a fair picture of the funding progress and future funding needs.

Actuarial Standards of Practice



- Actuarial Standards of Practice (ASOP's) are issued by the Actuarial Standards Board to govern US practice
- ASOP's tend to be based on principles more than detailed requirements
- ASOP's frequently call for professional judgment, so two actuaries may arrive at different decisions
- ASOP's are binding guidance for credentialed actuaries
 - Failure to comply may bring action from the Actuarial Board for Counseling and Discipline

Actuarial Assumptions



- Setting actuarial assumptions is a blend of art and science
- ASOP's provide guidance
- Assumptions are generally split between:
 - Economic assumptions
 - Demographic assumptions
- We suggest a formal experience study report be produced

Economic Assumptions



- Price inflation
- Wage inflation / payroll growth
- Investment return
- Internal consistency amongst these assumptions is important (required by ASOP 27)

Economic Assumptions



- Price inflation reduced from 3.00% to 2.75%
 - Considered historical as well as anticipated inflation
 - This reduction also led to 0.25% reductions in wage inflation and investment return

- We believe Segal's recommendations are reasonable
 - Need to disclose that salary increases are based on duration from entry rather than years of service

Demographic Assumptions



- Mortality
- Retirement
- Withdrawal
- Disability
- Salary merit increases
- Miscellaneous assumptions

Demographic Assumptions



- Mortality is a key assumption
 - Segal considered the quality of the fit of the actual experience compared to the proposed table, not just the overall ratio
 - Segal weighted the experience based on benefit amounts, not just headcounts
 - Both of these represent the leading edge of actuarial practice and Segal is to be commended
 - We would have considered changing the adjustment factors to get the Actual/Expected ratio closer to 100% (professional judgment only)
- We believe Segal's recommendations are reasonable
 - Need to disclose that salary increases are based on duration from entry rather than years of service

Actuarial Methods



- Actuarial methods are used to measure a plan's funded status and contribution requirements
 - Asset valuation method
 - Actuarial cost (or liability allocation) method
 - UAAL amortization method
- ASOP's provide a great degree of latitude
- Fixed contribution rates may affect selection of methods

Actuarial Methods



- NDTFFR Methods
 - 5-year asset smoothing
 - Entry Age Normal cost method
 - Amortize a single UAAL base as a level % of pay over a closed period

- These are very common and reasonable methods

Amortization Methods



- At some point, a single closed amortization base presents volatility problems, but will not be an issue in the next ten years

- There is some movement in the public plan community toward layered amortization bases
 - Pay off the “legacy” UAAL over the remaining period
 - New gains/losses, assumption changes, etc. can be funded over a 15-20 year period

Entry Age Cost Method



- Segal calculates the entry age as the member's age at the date of initial enrollment in NDTFFR
- Our preferred approach is to calculate the entry age as the attained age less years of service
- About 25% of the actives have a difference because of elapsed time without service

Entry Age Cost Method



- For each person, we prepare calculations as though we were back at the individual “entry age”
 - We determine a hypothetical starting salary assuming the current salary increase assumption has always been met
- From this entry age vantage point, we calculate the present value of all future benefits
- From this entry age vantage point, we calculate the present value of all future pay

Entry Age Cost Method



- The ratio of the Present Value of Benefits at entry age to the Present Value of Future Salary at entry age is the normal cost rate
- Theoretically if the normal cost amount (normal cost rate times pay) was contributed and all assumptions met, benefits would be exactly funded
- The Actuarial Accrued Liability is the accumulation of these theoretical normal costs to the valuation date

Entry Age Cost Method



- Segal uses the initial enrollment date into NDTFFR to determine the entry age
- Our preferred approach is to calculate the entry age as the current age less current service
- For members with a “gap”, Segal’s method calculates a normal cost rate using a denominator with pay for years where there was no employment
 - Lowers the normal cost rate, but increases the UAAL, when compared with our approach

Data Processing



- Very little data preparation is required
 - Data is clean
 - Data contains the needed information to value plan liabilities

- We have no concerns

Valuation Calculations



- We replicated key valuation results
 - Present Value of Benefits
 - Actuarial Accrued Liability
 - Normal Cost
 - Actuarial Value of Assets
 - UAAL Amortization Payment
- We examined individual test cases for additional insight
- We used both Segal's entry age approach and our preferred approach

Valuation Calculations



- Generally matched within reasonable tolerances

Measure	Ratios	Tolerance
Present Value of Benefits	99.6%	98% - 102%
Actuarial Accrued Liability (Segal entry age method)	98.5%	95% - 105%
Normal Cost Amount (Segal entry age method)	97.7%	95% - 105%

- AVA and UAAL amortization calculations were fine

Valuation Calculations



- The deferred vested liability includes a pre-retirement death benefit for those assumed to take an immediate lump sum – very minor

- We suggest some technical adjustments for converting the normal cost amount to a normal cost rate
 - Theoretically, more precise
 - In this case, no meaningful difference in results

Actuarial Valuation Report



- Two Actuarial Standards of Practice (ASOP's) provide guidance for the contents of an actuarial report (ASOP 4 and 41).
- Over 40 specific items which are possibly relevant
 - Recent changes reflect trend toward more disclosure and transparency
- Additionally, our review provides a fresh, outside view of the report

Actuarial Valuation Report



- The report contains the information required in the ASOP's and provides a fair presentation of the Fund's status and contribution needs

- Our report includes some minor enhancements that we believe would be beneficial
 - Segal should review and determine if changes are needed

GASB Information



- We reviewed the GASB information and calculations provided for employers to use
 - Detailed review of some individual school districts
- We reviewed the development of the Single Equivalent Interest Rate (discount rate)
- We found Segal's work to be reasonable and matched their calculations

Funding Projections



- Segal provides the projected funded status under various investment return scenarios
- Their projections are based on modeling the Fund into the future as new members in Tier 2 replace Tier 1 active members (both grandfathered and non-grandfathered)

Funding Projections



- Segal provided us with their new entrant profile
 - We did not audit this profile, but it appeared reasonable
- We independently projected future liabilities and built a model of future funded status
- Results under all of the investment scenarios were comparable
 - Because of differences in software and model building, we would not expect to exactly match Segal's results
- We believe Segal's projections provide valuable information for NDTFFR

Conclusions



- Segal's work complies with the ASOP's in our opinion.
- We would prefer a different approach to the determination of entry age, but Segal's method is acceptable and the effect on results does not change the basic message of the funding progress or contribution needs of the Fund.
- There is a minor overstatement of deferred vested liabilities which has no meaningful impact.
- We offer a variety of suggestions that we believe are useful.
 - Formal experience study report is the most significant.