Death Benefit Plans of North Carolina

Adoption of Proposed Assumptions as Set in December 31, 2014 Experience Reviews

Board of Trustees Meeting
Larry Langer and Mike Ribble

April 21, 2016

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Proposed Assumptions

On January 21, 2016, Buck Consultants presented the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014" for the following system:

- Death Benefit Plans of North Carolina

Experience review resulted in proposed changes to the following:

- Demographic Assumptions
- Economic Assumptions
- Funding Methods

Key Takeaways – Death Benefit Plans

Assumption	Recommendation	Impact on Costs
1. Mortality	Decrease Rates and Update Mortality Improvement Projection Scale	Significant Decrease
2. Service retirement	Decrease Rates	Immaterial
3. Disability retirement	Decrease Rates	Immaterial
4. Termination from active employment	Decrease Rates	Immaterial
5. Leave conversions at retirement	Varies by Group	Immaterial
6. Investment return	Decrease Rate	Significant Increase
7. Merit pay increases	Decrease Rates	Immaterial
8. Inflation	No Change	N/A
9. Productivity growth	No Change	N/A
10. Amortization method	No Change	N/A
11. Actuarial cost method	No Change	N/A
12. Asset valuation method	5-year Smoothing	Immaterial

Notes:

1. The mortality assumption was the source of the largest decrease in costs.
6. The current investment return assumption of 5.75% is no longer reasonable under current market conditions. Propose change to 3.75%.

The net impact was an increase in surplus for the TSERS and LGERS Death Benefit Plans, a decrease in surplus for the Separate Insurance Benefits Plan for Law Enforcement Officers, and an increase in the unfunded status for the Retirees' Contributory Death Benefit Plan.

Contributory Death Benefit Policy Options (CDB)

Currently 110,000 participating retirees
Avg age 68
$235M in in fund at 12/31/2014
Need $59M to cover future liabilities

	Policy Option	Financial Analysis	Law Change Required?	Operations Impact 1= low impact/green 2=med impact/yellow 3=high impact/red	Member Services Impact 1= low impact/green 2=med impact/yellow 3=high impact/red	IT Impact 1= low impact/green 2=med impact/yellow 3=high impact/red
1	**Charge Higher Premium to New Participants with No Other Changes**	If the premium amounts charged to Future Retirees are actuarially equivalent to the $10K policy amount, this is not expected to decrease the current deficit; however, it is expected to prevent the deficit from growing, assuming all other assumptions (i.e. investment return and mortality experience) are met.		1	1	1
2	**Charge Higher Premium to Existing Participants with No Other Changes**	Based on the assumptions and methods presented in Buck Consultants' letter dated April 13, 2016,this proposal, if implemented, could decrease the deficit of $59.1 million to a deficit of $9.1 million, subject to policy lapses and anti-selection.	Statutory change required	1	3	1
3	**Open Enrollment (target would be to add 10,000 new participants). Optionally, the system could with a one-time entrance fee and apply actuarily equivelent premiums from proposal number 1 above, or in crease the benefit insurance policy with appropriately higher premium with one-time entrance fee.**	If the premium amounts charged to Open Enrollment Retirees are actuarially equivalent to the applicable policy amount, the open enrollment is not expected to decrease the current deficit. The one-time entrance fee may slightly offset the current deficit; however, implementation and administrative costs should be considered. To the extent the premium amounts charged are larger than the actuarially equivalent premiums, the deficit could be reduced.	Statutory change required	2	3	3 Requires significant changes to the CDB ORBiT module and development of accounting support for the entrance fee.
4	**Only Pay the Amount of the Benefit that was in Place when the Member Enrolled in the Benefit (eg., do not pay 10k to those that signed up for 5K)**	Based on the assumptions and methods presented in our letter dated April 13, 2016, this proposal, if implemented for Current Participants, would eliminate the deficit of $59.1 million and produce a surplus of $41.1 million, subject to policy lapses and anti-selection. However, it should be noted that if premium amounts for Future Retirees are not increased to be actuarially equivalent to the policy amount, additional deficit may be created for Future Retirees	Statutory change required	2	2	2
5	**Close the CDB, allow No New Participants and Continue to pay Liability for Current Participants.**	Based on the results of the experience study presented in the January 2016 board meeting, the plan has a deficit of $59.1 million at December 31, 2014. This deficit may grow or shrink based on actual plan experience (i.e. future asset returns and mortality experience) and future legislative changes.	Statutory change required	1	1	1
6	**Close the CDB and Outsource to a Vendor** Members must continue to receive statutorily amount with no increase of premiums. a) New Participants would enroll with vendor. b) Existing Participants vendor take over liability and assets	Financial impact of this proposal is dependent on vendor's assumptions used to value the liabilities of the plan.	Statutory change required	1	2	1
7	**Include CDB with a New Retirement Benefit Option (merge CDB into pension funds) for New Participants.**	If the reduction in the retirement benefit paid from the North Carolina Retirement Systems (TSERS, LGERS, CJRS and LRS) is adjusted on a basis actuarially equivalent to the actuarial valuation assumptions, future retirees electing this option would not have an impact on those Systems. Additionally, this proposal is not expected to decrease the current deficit of the CDB; however, it is expected to prevent the deficit from growing, assuming all other assumptions (i.e. investment return and mortality experience) are met.	Statutory change required	3	3	3 Requires significant changes to the Retirement Processing and CDB ORBIT modules.
8	**Merge CDB into Pension funds for Existing Participants (merge CDB into pension funds) .**	It should be noted that the discount rate used for valuation of the North Carolina Retirement Systems (TSERS, LGERS, CJRS and LRS) is 7.25%. Merging the assets and liabilities if the CDB into these Retirement Systems would result in valuation of the liabilities based on a 7.25% discount rate, assuming no significant shift in the allocation of assets. The deficit position of the CDB benefits, if then valued separately would be eliminated. Based on the assumptions and methods presented in our letter dated April 13, 2016, the surplus of the Contributory Death Benefit at a 7.25% discount rate would be $72.2 million. The liability and assets of the plan would need to be disaggregated into the four retirement systems and may create a significant burden of tracking such assets separately, even if commingled with the other Retirement Systems for investment purposes.	Statutory change required	2	3	3
9	**Remove Return of Contributions provision: Do Not Reimburse Premiums if Deceased Before Paying 24 Months of Premiums for New Participants**	Unless the premium amounts are increased to be actuarially equivalent, the current deficit is expected to grow under this proposal. However, all else being equal, this proposal will slightly mitigate future growth of the deficit.	Statutory change required	1	1	1
10	**Remove Return of Contributions provision: Do Not Reimburse Premiums if Deceased Before Paying 24 Months of Premiums for Existing Participants**	Unless the premium amounts are increased to be actuarially equivalent, the current deficit is expected to grow under this proposal. However, all else being equal, this proposal will slightly mitigate future growth of the deficit.	Statutory change required	2	2	1 Make changes to the CDB module

Contributory Death Benefit Policy Options (CDB)

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11	**Keep the Current Premiums and Lower Benefit amount for New Participants.**	This proposal does not impact the deficit at December 31, 2014. However at a policy amount of $7,000, we expect the deficit to decrease by $0.3 million for every 1,000 Future Retirees participating. At a policy amount of $6,000, we expect the deficit to decrease by $0.7 million for every 1,000 Future Retirees participating. At a policy amount of $5,000, we expect the deficit to decrease by $1.1 million for every 1,000 Future Retirees participating. See our letter dated April 13, 2016, for the methods and assumptions for this proposal. Please note that these estimates assume that Future Retirees participating in the plan will have similar demographic characteristics as the Existing Participants.	Statutory change required	2	2	3 Requires significant tracking within ORBIT
12	**One Time Buyout Option (e.g., if partipant paid premiums ≥ 7,500 then pay $5,000 now instead of $10,000 at death)**	Based on the data for December 31, 2014 valuation, approximately 740 Current Participants had a premium balance greater than $7,500 at December 31, 2014. If all of these participants were to elect to forfeit their death benefit in exchange for an immediate payout of $5,000, we estimate that there are total potential savings of $1.6 million for this proposal. It is appropriate to note that due to anti-selection it is unlikely all participants would elect this and thus the full potential savings would not be realized. Please see our letter dated April 13, 2016, for more analysis and our assumptions and methods.	Statutory change required	2	3	3 Requires significant tracking within ORBIT
13	**Decrease interest rate paid on the return of contributions to members from the current 6.5%**	This proposal does not impact the deficit at December 31, 2014. Unless the premium amounts are increased to be actuarially equivalent, the current deficit is expected to grow under this proposal. However, all else being equal, this proposal will slightly mitigate future growth of the deficit.		2	1	1

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April 13, 2016

Mr. Sam Watts
Policy Development Analyst
State of North Carolina
Department of State Treasurer
Retirement Systems Division
325 North Salisbury Street
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Re: Proposals for the Contributory Death Benefit Plan

Dear Mr. Watts:

We have received the summary proposed changes being considered to the Contributory Death Benefit Plan sent March 29 and revised April 12. As requested, we have estimated the financial impact of these proposed changes for the following proposals and provided some commentary for inclusion in the summary of options. Before commenting on the various options and the associated financial impact, the following overall comments should be noted:

- Some of the options under consideration involve possible benefit decreases, premium increases and other changes which may be constrained by legal impediments. Buck cannot, and does not, provide legal opinions but we suggest that any changes be reviewed by legal counsel to verify which may be so constrained.

- Some of the options involve elections by participants. Under these circumstances it is possible that anti-selection may occur. For example, persons knowing that they suffer a terminal illness would almost certainly opt to pay an increased premium in order to preserve a life insurance benefit should death be anticipated in the near future. The results shown herein do not reflect any analysis of possible anti-selection choices. It may become an issue with respect to some of the alternatives. We have not modeled future changes in participations (increases or decreases) based on the proposals under consideration.

- An attachment shows our comments that are anticipated to be included in the summary worksheet showing the various alternatives in the column headed *Financial Analysis*.

- As noted below, the liabilities and projections have been based upon proposed assumptions prepared in an experience study subsequent to the completion of the 2014 actuarial valuation of this plan. Of particular note the proposed valuation discount rate is 3.75% to reflect future expectations based on the portfolio structure and future anticipated asset returns. The major effect of the use of the proposed assumptions was to increase the funding deficit shown in the 2014 valuation report from about $30.7 million to about $59.1 million as of December 31, 2014. That change is primarily due to the change in the valuation rate.

- In order to develop comparative information, all liabilities and costs have been determined as if the changes were made at January 1, 2015 so they may be compared with the information available as of the December 31, 2014 actuarial valuation.

Following is a discussion of results associated with certain options under consideration.

Proposal #2

Proposal #2 appears to increase premiums for Current Participants. We have calculated the premiums that are actuarially equivalent to a $10,000 policy amount based on the age of the retiree at retirement given that only a refund of contributions with interest is paid if death occurs within 24 months of retirement. These premiums can be found in Appendix A. For purposes of a comparable measurement of the funded status impact, we have assumed that such premium change would be effective January 1, 2015.

Based on the methods and plan provisions used in the December 31, 2014 actuarial valuation of the Contributory Death Benefit Plan and the assumptions presented in the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014" for the Death Benefit Plans, we estimate that the $59.1 million deficit of the Contributory Death Benefit Plan at December 31, 2014 based on such proposed assumption changes would be reduced by the proposed change in premiums, resulting in a deficit of $9.1 million.

Proposal #4

Proposal #4 appears to decrease the policy amount payable to Current Participants at death from $10,000 to the amount in effect when the participant entered retirement. For the purposes of this proposal, we assumed that any participant who entered the Contributory Death Benefit Plan before January 1, 1999 would receive $5,000; any participant who entered the Contributory Death Benefit Plan on or after January 1, 1999 but before July 1, 2004 would receive $6,000; any participant who entered the Contributory Death Benefit Plan on or after July 1, 2004 but before July 1, 2007 would receive $9,000; and any participant who entered the Contributory Death Benefit Plan on or after July 1, 2007 would receive $10,000.

Based on the methods and plan provisions used in the December 31, 2014 actuarial valuation of the Contributory Death Benefit Plan and the assumptions presented in the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014" for the Death Benefit Plans, we estimate that the $59.1 million deficit of the Contributory Death Benefit Plan at December 31, 2014 based on such proposed assumption changes would be eliminated by the proposed change in policy amount and result in a surplus of $41.1 million.

It should also be noted that for Future Retirees, if premiums or policy amounts are not adjusted to be actuarially equivalent then future deficits may be incurred for those participants.

Proposal #8

Proposal #8 appears to merge the Contributory Death Benefit plan for Current Participants into the Teachers' and State Employees' Retirement System (TSERS), the Local Governmental Employees' Retirement System (LGERS), the Consolidated Judicial Retirement System (CJRS) and the Legislative Retirement System (LRS). The retiree's monthly retirement benefit would continue to be reduced by the current premium amount. Payment of the $10,000 policy amount would be made by the applicable retirement System.

In effect, Proposal #8 transfers the liability and assets of the Contributory Death Benefit plan for Current Participants to TSERS, LGERS, CJRS and LRS. The liability and assets of the plan would need to be disaggregated into the four retirement Systems. A methodology for disaggregating the current assets of the plan would likely require legal approval. In this context it should be noted that the discount rate used for the valuation of the retirement systems is 7.25%. This increase in the discount rate with no associated change in benefits and premiums would have the effect of reducing the deficit position associated with these liabilities and creating a surplus position.

Based on the same measurement method of the funded status of the Contributory Death Benefit Plan but using the discount rate associated with TSERS, LGERS, CJRS and LRS of 7.25% (rather than the discount rate of the Death Benefit Plans of 3.75%), we estimate that there would be a surplus of $72.2 million at December 31, 2014.

Proposal #11

Proposal #11 appears to decrease the policy amount for Future Retirees.

Proposal #11 does not impact the deficit at December 31, 2014. However based on the methods and plan provisions used in the December 31, 2014 actuarial valuation of the Contributory Death Benefit Plan and the assumptions presented in the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014" for the Death Benefit Plans, we have estimated the expected increase/(decrease) in the deficit for every 1,000 Future Retirees.

Policy Amount	Increase/(Decrease) per 1,000 New Entrants
$10,000	$0.9 million
$9,000	$0.5 million
$8,000	$0.1 million
$7,000	$(0.3) million
$6,000	$(0.7) million
$5,000	$(1.1) million

Please note that the estimates above assume that Future Retirees will have similar demographic characteristics as the current plan participants.

Proposal #12

Proposal #12 appears to allow Current Participants the option of forfeiting their death benefit policy in return for a one-time buyout amount if the participant's total premiums contributed are greater than a certain amount.

Based on the methods and plan provisions used in the December 31, 2014 actuarial valuation of the Contributory Death Benefit Plan and the assumptions presented in the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014" for the Death Benefit Plans, we have estimated the liability impact on the following scenarios.

Premium Balance Required	Buyout Amount	Number of Eligible Participants	Average Age of Eligible Participants	Total Available Savings
$8,500	$5,000	352	96.5	$0.8 million
$7,500	$5,000	743	94.5	$1.6 million
$7,500	$3,500	743	94.5	$2.7 million
$6,000	$3,000	2,111	91.4	$8.0 million
$5,000	$2,500	4,539	88.8	$17.7 million

The liability loss/savings shown above is equal to the actuarial present value of liabilities minus the actuarial present value of future premiums and the buyout amount. The total available savings assumes that all retirees who are eligible to elect the buyout amount choose to forfeit their policy; thus, this estimate is the maximum savings based on plan assumptions. It would be appropriate to conclude that the total potential savings would not be realized as a result of anti-selection on the part of some participants

Please note that data for the current premium balances for retirees is not readily available; therefore the premium balance for current retirees has been estimated without interest based on the data provided for the December 31, 2014 valuation. Additionally, there are a small number of retirees in certain scenarios who would have small cost (instead of savings) under the buyout. Therefore, if the right combination of retirees were to choose to forfeit their policy, a small loss could occur.

As noted earlier, for the purposes of these estimates, we have assumed that all proposals are effective January 1, 2015.

The estimates above are based upon assumptions regarding future events, which may or may not materialize. They are also based upon present plan provisions that are outlined in the December 31, 2014 actuarial valuation reports and proposed plan provisions outlined in this actuarial note. They are also based upon the assumptions presented in the "Investigation of Demographic and Economic Experience Five-Year Period from January 1, 2010 – December 31, 2014". If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the authors of this actuarial note prior to relying on this information.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Buck performed no analysis of the potential range of such future differences.

The undersigned are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

If you have any questions concerning this information, please let us know.

Respectfully submitted,

Michael A. Ribble

Michael A. Ribble, FSA, EA, MAAA	Larry Langer, ASA, EA, MAAA
Principal, Consulting Actuary	Principal, Consulting Actuary

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Appendix A

Premiums that are Actuarially Equivalent to a $10,000 Policy Amount*

Age	Current Premium	Actuarially Equivalent Premiums	Increase	Age	Current Premium	Actuarially Equivalent Premiums	Increase
50	8	12.54	57%	76	46	51.12	11%
51	8	13.12	64%	77	49	54.73	12%
52	9	13.73	53%	78	52	58.70	13%
53	10	14.37	44%	79	56	62.64	12%
54	11	15.05	37%	80	59	66.14	12%
55	12	15.77	31%	81	63	69.78	11%
56	12	16.53	38%	82	67	74.42	11%
57	13	17.34	33%	83	71	79.39	12%
58	14	18.20	30%	84	75	84.70	13%
59	15	19.11	27%	85	80	90.36	13%
60	16	20.09	26%	86	84	96.39	15%
61	17	21.13	24%	87	89	102.76	15%
62	18	22.24	24%	88	94	109.48	16%
63	20	23.44	17%	89	99	116.48	18%
64	21	24.71	18%	90	105	123.76	18%
65	22	26.09	19%	91	110	131.30	19%
66	24	27.56	15%	92	115	139.08	21%
67	26	29.16	12%	93	120	147.11	23%
68	27	30.87	14%	94	125	155.39	24%
69	29	32.73	13%	95	130	163.81	26%
70	31	34.74	12%	96	140	172.38	23%
71	33	36.91	12%	97	150	181.02	21%
72	35	39.28	12%	98	160	189.66	19%
73	38	41.85	10%	99	170	198.30	17%
74	40	44.66	12%	100	200	206.89	15%
75	43	47.73	11%				

* The actuarially equivalent premiums shown above are based on proposed assumptions prepared in an experience study subsequent to the December 31, 2014 valuation. In addition, these premiums reflect that only a refund of contributions with interest is paid if death occurs within 24 months of retirement.