Actuarial Valuation of The Long-Term Disability Insurance Plan

As of December 31, 2016

For the State of Wisconsin Department of Employee Trust Funds

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April 21, 2017

Table of Contents

Certification Letter 3

Section I: Introduction and Executive Summary 6

Section II: Actuarial Valuation 8

Section III: Discussion of LTDI Funding Levels 12

Appendices:

A. Plan Description

B. Data for Valuation

C. Actuarial Methods and Assumptions

D. Reliance Items

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April 21, 2017

Ms. Deb Roemer
Director of the Benefit Services Bureau
Division of Retirement Services
Wisconsin Department of Employee Trust Funds
Madison, WI 53707

RE: Actuarial Valuation of Long-Term Disability Insurance Plan as of 12/31/2016

Dear Deb:

Thank you for asking Milliman to perform an actuarial valuation of the Long-Term Disability Insurance (LTDI) Plan as of December 31, 2016. The results from our analyses are provided in this report, along with documentation of the valuation methods and assumptions.

The State of Wisconsin Department of Employee Trust Funds (ETF) has determined that the LTDI Plan is not subject to the provisions of GASB 43 or 45, which govern the financial reporting of Other Post-Employment Benefits (OPEBs), and which require the use of pension accounting methods, including the calculation of a liability for active lives. We have therefore performed this valuation according to the requirements of GASB 10 ("Accounting and Reporting for Risk Financing and Related Insurance Issues"), which does not require the calculation of a liability for active lives. This approach is consistent with prior valuation work performed on the plan. Ultimately it is the responsibility of ETF and its auditors to determine the applicable accounting standards for the plan.

This report is prepared solely for the internal business use of ETF. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions:

a) ETF may provide a copy of Milliman's work, in its entirety, to ETF's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit ETF.

b) ETF may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by ETF, including historical claims data from Aetna and ETF. While Milliman has not audited this data, we have reviewed it for reasonableness and it is, in our opinion, sufficient and reliable for the purposes of our calculations. If any of this information as summarized in this report is inaccurate or incomplete, the results shown could be materially affected and this report may need to be revised.

The discount rate used for this valuation was prescribed by ETF and is specified in this report. The annual benefit increase rate for the LTDI plan was also specified by ETF. We have performed no independent assessment of the reasonableness of these assumptions. ETF is solely responsible for establishing these assumptions and communicating any changes to Milliman for the purpose of this valuation.

This analysis is only an estimate of the Plan's financial condition as of a single date. It can neither predict the Plan's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of Plan benefits, only the timing of employer contributions. While this report is based on the assumptions documented here, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. ETF has the final decision regarding the appropriateness of the assumptions and actuarial cost methods.

The financial projections in Section III of this report assume that the Long Term Disability Insurance plan will be closed effective 1/1/2018, although the administrative rule changes needed to complete this closure will require final approval by the Governor and review by the State of Wisconsin legislature. Failure to approve this motion could result in financial experience that is significantly different than the financial projections from our analysis.

The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices.

I, Daniel D. Skwire, FSA, MAAA, am a consulting actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Paul L. Correia, FSA, MAAA, am a consulting actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely,

Daniel D. Skwire, FSA, MAAA
Principal and Consulting Actuary
Milliman, Inc.

Paul L. Correia, FSA, MAAA
Principal and Consulting Actuary
Milliman, Inc.

Section I: Introduction and Executive Summary

This report contains results and documentation of the 12/31/2016 valuation for the LTDI plan. The actuarial liabilities for the LTDI plan as of 12/31/2016 are summarized below:

Table 1.1 Actuarial Liabilities for the LTDI Plan as of 12/31/2016			
Liability Component	Basic Benefits	Retirement Contributions	Total Liability
Open Claims	$258,167,166	$44,078,236	$302,245,402
IBNR Claims	$21,466,969	$3,665,168	$25,132,138
Loss Adjustment Expense	$15,701,882	$0	$15,701,882
Total	$295,336,018	$47,743,404	$343,079,422

The values above include estimated liabilities for monthly LTDI benefit payments (Basic Benefits) and for supplemental contributions to the retirement accounts of disabled participants (Retirement Contributions). The retirement contributions are a supplemental benefit provided by the LTDI plan, equal to 7% of final average salary and contributed by WRS into the participant's retirement account.

We have analyzed the funding status of the LTDI plan as of 12/31/2016, involving only the basic benefit and not the supplemental retirement contribution benefit (since the LTDI fund does not include contributions or disbursements related to the supplemental benefit). In performing this analysis, we took into consideration the closure of the LTDI plan effective 1/1/2018. As shown in the following table, the LTDI plan was in a deficit as of 12/31/2016:

Table 1.2 LTDI Fund Balances: Basic Benefit Only			
Balance Sheet Component	Valuation Date		
	12/31/2014	12/31/2015	12/31/2016
Beginning Balance	$215,938,543	$231,066,095	$239,163,895
Closing Adjustments	($6,148,059)	($6,972,445)	($7,526,429)
Adjusted Beginning Balance	$209,790,484	$224,093,650	$231,637,466
Plus: Premium Contributions	$42,301,135	$43,296,424	$71,271,030
Plus: Investment Earnings	$18,377,826	$14,368,484	$15,185,788
Less: Insurance Claims	$37,052,195	$40,110,299	$42,012,609
Less: Administrative Expenses	$2,351,154	$2,480,455	$2,952,882
Ending Balance	$231,066,095	$239,167,803	$273,128,794
Actuarial Liability	$253,576,498	$277,673,599	$295,336,018
Surplus / (Deficit)	($22,510,403)	($38,505,795)	($22,207,224)

According to our financial projections, which are consistent with LTDI valuation assumptions, the plan would remain in a deficit position when it closes to new claims in

2018 if contributions are not made beyond 2017. We have developed another scenario under which the deficit is expected to be eliminated by 12/31/2018 assuming the current contribution rate of 0.42% is reduced to 0.06% for calendar year 2018, with no further contributions required in 2019 and beyond. These two scenarios are discussed in detail in Section III of this report.

Further discussions of the estimated liabilities and funding analyses are included in the body of this report, including a description of our valuation methods and assumptions, comparisons to prior year values, and an assessment of the adequacy of the liabilities.

Section II: Actuarial Valuation

The actuarial liabilities for the LTDI Plan discussed in this report contain three components:

- Open Claims: The expected present value of future benefits payable to members disabled prior to the valuation date whose claims had been reported to ETF on or before that date

- Incurred but not Reported (IBNR) Claims: The expected present value of future benefits payable to members disabled prior to the valuation date, but whose claims had not yet been reported to ETF as of that date

- Loss Adjustment Expenses: The expected present value of future expenses related to the ongoing management and payment of disability claims

The valuation also includes a calculation of the liability for retirement contributions. These contributions are a supplemental benefit provided by the LTDI plan. The supplemental benefit is 7% of final average salary, contributed by WRS into the participant's retirement account.

The following tables compare the 12/31/2016 and 12/31/2015 liabilities for the LTDI plan:

Table 2.1a
Actuarial Liabilities for the LTDI Plan as of 12/31/2016

Liability Component	Basic Benefit	Retirement Contribution	Total Liability Amount
Open Claims	$258,167,166	$44,078,236	$302,245,402
IBNR Claims	$21,466,969	$3,665,168	$25,132,138
Loss Adjustment Expense	$15,701,882	$0	$15,701,882
Total	$295,336,018	$47,743,404	$343,079,422

Table 2.1b
Actuarial Liabilities for the LTDI Plan as of 12/31/2015

Liability Component	Basic Benefit	Retirement Contribution	Total Liability Amount
Open Claims	$243,146,155	$41,834,922	$284,981,077
IBNR Claims	$22,250,817	$3,828,402	$26,079,219
Loss Adjustment Expense	$12,276,626	$0	$12,276,626
Total	$277,673,598	$45,663,324	$323,336,922

Appendix C of this letter contains a detailed description of the valuation assumptions used to compute the 12/31/2016 liabilities for the LTDI plan. A discussion of the liability components is provided below.

Open Claims

The liability for open claims increased by approximately 6% since last year. The increase was driven by several factors including a 4% increase in the number of open claims, from 2,282 as of 12/31/2015 to 2,378 as of 12/31/2016, and a 2% increase in the average monthly benefit amount, from $1,380 as of 12/31/2015 to $1,409 as of 12/31/2016.

The LTDI plan will be closed to new claims effective 1/1/2018, at which time participants who are not currently receiving benefits will be covered under Section 40.63, the disability benefit within the WRS retirement plan. Therefore, the LTDI liability is expected to decrease over time because new LTDI claims will no longer be approved beginning 1/1/2018. There will be no impact on claimants currently receiving LTDI benefits

The assumptions used to calculate LTDI liabilities as of 12/31/2016 were very similar to last year's assumptions. The claim termination rate assumptions and interest rate assumptions are unchanged. This year, we took a different approach for determining the overpayment credit, based on the aggregate LTDI overpayment balance reported as of 12/31/2016. In particular, we estimated that 75% of the overpayment balance would eventually be recovered, and we applied this amount as an offset to the total liability. This estimate was based on an analysis of historical overpayment balances reported by ETF from 12/31/2012 through 12/31/2016. The impact of our new method for determining the overpayment credit is a slight increase in the 12/31/2016 liability of approximately $2.6 million (i.e., approximately 1%), as shown below.

Table 2.2
Impact of New Method for Determining Future Overpayment Recoveries

Overpayment Credit	12/31/2016 Liability
Prior Method	$340,471,640
New Method	$343,079,422
Difference	$2,607,782

To assess the adequacy of the liability for open claims, we performed a retrospective runoff test to determine whether the liabilities at prior valuation dates for the basic benefits, calculated using the current valuation assumptions, would have been sufficient to cover the emerging costs of LTDI claims. The study used LTDI claims experience from 12/31/2013 through 12/31/2016. The results, shown below, represent three mutually distinct 12-month studies that were combined.

Table 2.3 Runout Study for LTDI Plan: Basic Benefits Study Period: 12/31/2013 – 12/31/2016	
Claim Duration	Average Annual Margin
1 – 12 months	0.9%
13 – 24 months	2.8%
25 – 36 months	2.5%
37 – 48 months	1.3%
49 – 60 months	1.3%
61 + months	0.2%
Total	1.3%

In the preceding table, a positive margin indicates the liability was adequate to cover the runout of open disability claims during the study period, while a negative margin indicates a deficiency. The cost of the claim runout is computed as the present value of paid claims during the study period, plus the present value of the liability for these claims at the end of the study period. For this type of plan, we typically target a positive overall margin of 1% to 5%, with reasonably consistent patterns by claim duration. The preceding table indicates that the LTDI plan meets that objective. We will continue to monitor the valuation assumptions closely.

IBNR Claims

The liability for IBNR claims reflects the expected portion of the total cost of claims incurred in a given year that is attributable to those claims that had not been reported as of the end of the year. For example, if, on average, claims are reported 6 months after the date of disability, then the IBNR liability would likely be approximately 50% of the expected total cost of new claims for the year. We therefore computed the IBNR liability by estimating the total cost of incurred claims for 2016 (based on recent trends) and by using historical claim data to determine the proportion of claims that were typically unreported at each year end.

The liability for IBNR claims decreased by approximately 3.5% from 12/31/2015 to 12/31/2016. This was because the estimated annual incurred claims, which is calculated using historical claims experience, decreased from $40.5 million last year to $39.0 million this year. We continue to assume that the proportion of unreported annual LTDI claims is 55% in our IBNR liability calculations, which was derived from an analysis of historical LTDI reporting lags.

Our IBNR calculation for the LTDI plan is summarized below:

Table 2.4 Development of IBNR Liability for the LTDI Plan: Basic Benefits	
Estimated Incurred Claims	$39,030,853
Estimated Proportion of Unreported Claims	55.0%
IBNR Liability as of 12/31/2016	$21,466,969

The IBNR liability for supplemental retirement contribution benefits was developed using the same ratio of IBNR to open claim liabilities as for basic benefits.

Loss Adjustment Expense

The liability for loss adjustment expenses was computed by comparing the annual fees payable to Aetna, which are $3,450,015 in 2017, to the expected annual incurred claims (including only basic benefits from the LTDI plan) for all three plans administered by Aetna (i.e. LTDI, State ICI, and Local ICI). The annual fees are approximately equal to 5.7% of estimated annual incurred claims. The loss adjustment expense liability was then calculated as 7.0% of the IBNR liability and 5.5% of the open claim liability. The factor is lower for open claims than for IBNR claims because the expenses related to initial claim investigation have already been incurred and do not need to be included in the liability.

Our loss adjustment expense calculation for the LTDI plan is summarized below:

Table 2.5 Development of Loss Adjustment Expense Liability for the LTDI Plan as of 12/31/2016			
Component	Liability	Expense Factor	Loss Adjustment Expenses
Open Claims	$258,167,166	5.5%	$14,199,194
IBNR	$21,466,969	7.0%	$1,502,688
Total	$279,634,136	5.6%	$15,701,882

No separate loss adjustment expense liability is held for supplemental retirement contribution benefits because no additional expenses are incurred beyond what is needed to adjudicate the basic benefits.

Section III: Discussion of LTDI Funding Levels

We performed a funding analysis on the LTDI plan, involving only the basic benefit and not the supplemental retirement contribution benefit (since the LTDI fund does not include contributions or disbursements related to the supplemental benefit). The following table shows the fund balances as of the three most recent fiscal year-ends.

Table 3.1
LTDI Fund Balances: Basic Benefits Only

Balance Sheet Component	Valuation Date		
	12/31/2014	12/31/2015	12/31/2016
Beginning Balance	$215,938,543	$231,066,095	$239,163,895
Closing Adjustments	($6,148,059)	($6,972,445)	($7,526,429)
Adjusted Beginning Balance	$209,790,484	$224,093,650	$231,637,466
Plus: Premium Contributions	$42,301,135	$43,296,424	$71,271,030
Plus: Investment Earnings	$18,377,826	$14,368,484	$15,185,788
Less: Insurance Claims	$37,052,195	$40,110,299	$42,012,609
Less: Administrative Expenses	$2,351,154	$2,480,455	$2,952,882
Ending Balance	$231,066,095	$239,167,803	$273,128,794
Actuarial Liability	$253,576,498	$277,673,599	$295,336,018
Surplus / (Deficit)	($22,510,403)	($38,505,795)	($22,207,224)

To evaluate the contributions necessary to eliminate the deficit, we prepared a financial projection for the LTDI plan. The projection reflects actual results for 2016 and projected values in 2017 and beyond. The key elements of this projection included the following:

- Beginning Balance: The projected beginning balance for each year is equal to the prior year's ending balance.

- Covered Payroll: The current covered payroll was provided to us by ETF. Future covered payroll is assumed to increase 3.20% per year, which is consistent with the assumptions used by ETF for retirement fund projections.

- Premium Contributions: Premiums are modeled as a percentage of covered payroll. The rate for 2016 is 0.52% and the rate for 2017 is 0.42%.

- Investment Income: Investment income is projected using the valuation assumption of 7.2%.

- Insurance Claims: Annual paid insurance claims are the sum of projected payments on existing claims as of 12/31/2016, and of payments on expected future claims incurred after 12/31/2016. Future incurred claims are based on historical experience of 0.28% of covered payroll in 2016, adjusted for expected aging in subsequent years.

- Administrative Expenses: Administrative expenses are modeled as a constant percentage of paid insurance claims, based on actual values in 2016.

- Ending Balance: The ending balance equals the starting balance, plus premiums, plus investment earnings, less claims, and less expenses.

- Actuarial Liability: The actuarial liability is modeled in a similar fashion to the insurance claims. It represents the sum of the liability on claims that existed as of 12/31/2016, and of the liability for claims incurred after 12/31/2016.

- Surplus or Deficit: The projected surplus or deficit equals the ending balance less the actuarial liability.

In 2016, the Employee Trust Funds Board approved closing the LTDI program to new open claims effective 1/1/2018 and beyond. Based on our analysis, the plan would remain in a deficit position if future contributions are terminated once the plan is closed to new claims. We have developed an alternate projection in which the deficit can be eliminated by the end of 2018, based on a one-time contribution rate of 0.06% in 2018 and no further contributions in 2019 and beyond. This scenario results in surplus by the end of 2018, and would provide a modest level of margin to the LTDI fund in future years. We believe this would be a reasonable approach to eliminate the deficit for the LTDI plan, resulting in a reasonable level of margin to mitigate against future uncertainties, such as future investment returns being lower than the 7.2% yield that WRS assumes it will earn on the assets backing LTDI liabilities.

The two financial projections shown on the following pages are summarized below:

- Baseline: Contributions in 2018 and beyond are terminated once the LTDI plan is closed to new claims effective January 2018

- Scenario 1: the current contribution rate of 0.42% is reduced to 0.06% effective January 2018, and no additional contributions would be required in 2019 and beyond

Please note that the projections depend on a variety of actuarial assumptions about future experience, including but not limited to investment earnings, payroll growth, and disability claim experience. It is nearly certain that actual experience will vary from these assumptions, meaning that the plan's actual surplus or deficit will be higher or lower than the illustrated values.

LTDI Fund Balance Analysis as of December 31, 2016

Baseline: Contribution rate of 0.42% in 2017. No further contributions in 2018 and beyond.

Calendar Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
BOY Fund Balance	$231,637,466	$273,128,794	$306,744,249	$280,930,409	$255,599,759	$231,787,367	$209,183,248
Premium Contributions	$71,271,030	$59,407,145	$0	$0	$0	$0	$0
Investment Income	$15,185,788	$19,665,273	$22,085,586	$20,226,989	$18,403,183	$16,688,690	$15,061,194
Total Revenues	$86,456,818	$79,072,418	$22,085,586	$20,226,989	$18,403,183	$16,688,690	$15,061,194
Insurance Claims	$42,012,609	$42,471,807	$44,753,873	$42,565,871	$39,443,280	$36,712,453	$34,031,837
Carrier Administrative Expenses	$2,145,554	$2,169,004	$2,285,548	$2,173,808	$2,014,340	$1,874,878	$1,737,981
Administrative Expenses	$807,328	$816,152	$860,005	$817,960	$757,955	$705,478	$653,967
Total Operating Expenses	$44,965,490	$45,456,963	$47,899,426	$45,557,639	$42,215,574	$39,292,810	$36,423,785
Net Change in Fund Balance	$41,491,328	$33,615,455	($25,813,840)	($25,330,650)	($23,812,392)	($22,604,119)	($21,362,591)
EOY Fund Balance	$273,128,794	$306,744,249	$280,930,409	$255,599,759	$231,787,367	$209,183,248	$187,820,657
Incurred Claim Liability	$295,336,018	$313,259,751	$286,334,264	$260,390,365	$235,941,894	$212,771,039	$190,913,250
Surplus / (Deficit)	**($22,207,224)**	**($6,515,502)**	**($5,403,855)**	**($4,790,606)**	**($4,154,527)**	**($3,587,792)**	**($3,092,593)**

LTDI Fund Balance Analysis as of December 31, 2016

Scenario 1: Contribution rate of 0.42% in 2017 reduced to 0.06% in 2018. No further contributions in 2019 and beyond.

Calendar Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
BOY Fund Balance	$231,637,466	$273,128,794	$306,744,249	$289,688,719	$264,988,668	$241,852,278	$219,972,832
Premium Contributions	$71,271,030	$59,407,145	$8,758,310	$0	$0	$0	$0
Investment Income	$15,185,788	$19,665,273	$22,085,586	$20,857,588	$19,079,184	$17,413,364	$15,838,044
Total Revenues	$86,456,818	$79,072,418	$30,843,896	$20,857,588	$19,079,184	$17,413,364	$15,838,044
Insurance Claims	$42,012,609	$42,471,807	$44,753,873	$42,565,871	$39,443,280	$36,712,453	$34,031,837
Carrier Administrative Expenses	$2,145,554	$2,169,004	$2,285,548	$2,173,808	$2,014,340	$1,874,878	$1,737,981
Administrative Expenses	$807,328	$816,152	$860,005	$817,960	$757,955	$705,478	$653,967
Total Operating Expenses	$44,965,490	$45,456,963	$47,899,426	$45,557,639	$42,215,574	$39,292,810	$36,423,785
Net Change in Fund Balance	$41,491,328	$33,615,455	($17,055,529)	($24,700,051)	($23,136,390)	($21,879,446)	($20,585,741)
EOY Fund Balance	$273,128,794	$306,744,249	$289,688,719	$264,988,668	$241,852,278	$219,972,832	$199,387,091
Incurred Claim Liability	$295,336,018	$313,259,751	$286,334,264	$260,390,365	$235,941,894	$212,771,039	$190,913,250
Surplus / (Deficit)	**($22,207,224)**	**($6,515,502)**	**$3,354,456**	**$4,598,303**	**$5,910,383**	**$7,201,792**	**$8,473,841**

Appendix A: Plan Description

The LTDI Plan provides long-term disability benefits as summarized below. This is a high-level plan summary intended to provide a context for understanding the valuation analysis. It is not a comprehensive plan description:

- Maximum Benefit Period: The following table shows the maximum duration of benefits:

Age on Benefit Effective Date	Maximum Benefit Period
Before Age 61	End of the month in which you reach age 65
Age 61 or 62	End of the month in which you reach age 66
Age 63 or 64	End of the month in which you reach age 67
Age 65 or 66	End of the month in which you reach age 68
Age 67	End of the month in which you reach age 69
Age 68	End of the month in which you reach age 70
Age 69 and Older	12 months after LTDI benefit effective date

- Benefit Amount: The amount of the benefit is 40% or 50% of the participant's average salary based on his or her three highest years of earnings. The benefit is 50% of the participant's average salary if he or she is not eligible for Social Security benefits. Otherwise, the benefit is 40% of the average salary.

- Supplemental Retirement Contribution Benefit: An additional 7% of final average salary is contributed to the participant's WRS retirement account.

- Benefit Increases: The basic benefit amount is adjusted every year by the same Core Fund dividend percentage as monthly retirement annuities.

- Benefit Offsets: The LTDI plan benefit is offset by WRS retirement benefits. It is not offset for Social Security benefits or other sources.

- Definition of Disability: A participant is disabled if he or she is unable to engage in any substantial gainful activity by reason of a medically determinable impairment, whether physical or mental, which can reasonably be expected to result in death or to be permanent or of long-continued and indefinite duration.

Appendix B: Data for Valuation

The following tables show the distribution of open claims as of 12/31/2016 by year of disability and gender, and by age at disability and gender.

Number of Open LTDI Claims as of 12/31/2016 By Year of Disability and Gender			
Disability Year	Male	Female	Total
2001 and earlier	21	58	79
2002	10	22	32
2003	14	29	43
2004	19	33	52
2005	19	64	83
2006	24	79	103
2007	38	77	115
2008	41	81	122
2009	43	94	137
2010	52	112	164
2011	60	147	207
2012	93	177	270
2013	98	186	284
2014	101	179	280
2015	99	146	245
2016	69	93	162
Total	801	1,577	2,378

Number of Open LTDI Claims as of 12/31/2016 By Age at Disability and Gender			
Age at Disability	Male	Female	Total
< 20	0	0	0
20-24	2	1	3
25-29	9	16	25
30-34	23	63	86
35-39	48	140	188
40-44	100	227	327
45-49	143	280	423
50-54	214	407	621
55-59	188	333	521
60-64	71	105	176
65+	3	5	8
Total	801	1,577	2,378

The following tables show the distribution of total net monthly benefit amounts as of 12/31/2016 by year of disability and gender, and by age at disability and gender.

Total Net Monthly Benefit Amounts as of 12/31/2016 By Year of Disability and Gender			
Disability Year	Male	Female	Total
2001 and earlier	$21,976	$62,708	$84,684
2002	$11,359	$22,867	$34,226
2003	$16,826	$30,732	$47,557
2004	$20,116	$32,993	$53,109
2005	$25,017	$68,225	$93,242
2006	$30,728	$95,088	$125,815
2007	$56,624	$95,411	$152,035
2008	$58,908	$100,051	$158,959
2009	$71,122	$126,163	$197,285
2010	$77,480	$161,447	$238,926
2011	$98,650	$206,789	$305,439
2012	$150,177	$257,938	$408,115
2013	$158,051	$275,636	$433,687
2014	$155,810	$259,340	$415,150
2015	$157,413	$211,733	$369,147
2016	$103,793	$128,977	$232,770
Total	$1,214,048	$2,136,098	$3,350,145

Total Net Monthly Benefit Amounts as of 12/31/2016 By Age at Disability and Gender			
Age at Disability	Male	Female	Total
< 20	$0	$0	$0
20-24	$1,839	$872	$2,710
25-29	$11,821	$19,946	$31,768
30-34	$28,313	$79,906	$108,219
35-39	$68,500	$182,301	$250,801
40-44	$162,332	$312,328	$474,661
45-49	$226,697	$381,043	$607,739
50-54	$330,917	$575,171	$906,089
55-59	$294,826	$465,530	$760,356
60-64	$86,178	$116,430	$202,608
65+	$2,624	$2,571	$5,195
Total	$1,214,048	$2,136,098	$3,350,145

Appendix C: Actuarial Methods and Assumptions

- Valuation Date: 12/31/2016

- Discount Rate: 7.20%, specified by ETF

- Annual Benefit Increases: 2.10%, specified by ETF.

- Claim Termination Rates: Claim termination rate assumptions were derived from the 1987 Commissioner's Group Disability Table (CGDT). The CGDT rates were multiplied by a factor of 0.25 for the first 24 months of disability, and by a factor of 0.50 for all subsequent months.

- Incurred But Not Reported Claims: 55% of the estimated incurred claims for the current year, as determined from analyses of historical LTDI claims experience.

- Loss Adjustment Expenses: 5.5% of the liability for open claims plus 7.0% of the liability for IBNR claims.

- Overpayment Credit: 75% of the overpayment balance reported by ETF as of 12/31/2016

Appendix D: Reliance Items

In performing the valuation, we relied, without audit, on certain data and information provided by ETF and Aetna. To the extent any of the data or other items was incomplete or inaccurate, the results of our work may be materially affected.

The principal items on which we relied included the following:

- Lists of active disability claims and related information provided by Aetna
- Asset balances, premium contributions, plan expenses, covered payroll, and other financial information provided by ETF
- Plan descriptions provided by ETF
- Discussions with ETF and Aetna personnel