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November 21, 2012

Mr. Steve Nelsen, Executive Director
Law Enforcement Officers' and Fire Fighters' Plan 2 Retirement Board
PO Box 40918
Olympia, Washington 98504-0918

RE: LEOFF 2 ADMINISTRATIVE FACTORS UPDATE

Dear Steve:

We have completed our update of several administrative factors for use in the Washington Administrative Code (WAC). During the project to update these administrative factors, we amended them as a result of the changes to the economic assumptions adopted by the Law Enforcement Officers' and Fire Fighters' Plan 2 (LEOFF 2) Retirement Board (Board) during the 2011 Interim. The amended administrative factors also include an update to the projected mortality improvements to reflect more current data.

As a result of this project, please find attached the following updated actuarial tables for the Boards approval.

- Early retirement factors for WAC 415-02-320 (**Appendix B**).
- Monthly benefit per $1.00 of accumulation for WAC 415-02-340 (**Appendix C**).
- Joint and survivor option factors for WAC 415-02-380 (**Appendix D**).

Administrative factors should be reviewed and, if necessary, updated any time the underlying demographic or economic assumptions for the plan change. The tables will be updated again after our *2007-2012 Demographic Experience Study*. They could also change with new member options or benefit changes in the future.

The attached appendices contain supporting information for each factor we updated. **Appendix A** supplies general information about data, assumptions, and methods used to develop the factors. **Appendices B** through **D** provide more detailed information about each of the individual factors. All of the appendices should be used together with this cover letter to form a complete actuarial communication.

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We developed the administrative factors based on our understanding of how the Department of Retirement Systems (DRS) applies them and according to policy decisions made by the Board. The policy decisions were documented in our previous letter dated August 26, 2009, and have been updated to reflect more current data. We intend this communication to be used by the Board and DRS only. If a party other than the Board or DRS reads this communication, they should address questions to the Board or DRS and seek professional guidance with the content and interpretation of this communication.

In my opinion, all of the data, assumptions, and methods we used in developing the administrative factors are reasonable and appropriate for this project. The use of another set of assumptions and methods, however, could also be reasonable and could produce materially different results.

The economic assumptions we used for updating the factors were adopted by the Board in the 2011 Interim. We were responsible for the selection of the demographic assumptions. In my opinion, all methods, assumptions, and calculations are reasonable and in conformity with generally accepted actuarial principles and standards of practice as of the date of this letter.

We have not included the service credit restoration factors for WAC 415-02-370 in this communication. These factors will follow in a separate communication.

The undersigned, with actuarial credentials, meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. While this letter and supporting attachments are intended to be complete, we are available to offer extra advice and explanations as needed.

Please let me know if you have any questions concerning these administrative factors or the assumptions and methods used to develop them.

Sincerely,

Lisa A. Won, ASA, FCA, MAAA
Actuary

cc: Kelly Fox,
LEOFF Plan 2 Retirement Board
Marcie Frost,
Department of Retirement Systems
Shawn Merchant,
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Matt Smith,
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Attachments
Appendix A – General Data, Assumptions, and Methods
Appendix B – Early Retirement Factors
Appendix C – Monthly Benefit Per $1.00 of Accumulation
Appendix D – Joint and Survivor Option Factors

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APPENDIX A – GENERAL DATA, ASSUMPTIONS, AND METHODS

Purpose

Unless otherwise noted, the information contained in this appendix applies to all factors developed in this project.

Data

We relied on the *2011 Actuarial Valuation Report* (AVR) data whenever necessary to develop the administrative factors. Please see the *Actuarial Certification Letter* in the 2011 AVR for further considerations on the data we used.

Assumptions

We relied on the following key assumptions in the 2011 AVR to develop the administrative factors.

- **Economic Assumptions**.

System	Interest	Annual COLA
LEOFF 2	7.50%	3%

- **Mortality Assumptions**: We used the mortality improvement method developed in our *2001-2006 Experience Study Report* (ESR) to project the RP-2000 table to the year 2014 ("RP-2014") for the underlying mortality assumption for the plan.

  We included additional mortality improvement projections for the plan developed specifically for retirement-age members as shown in the table below.

Plan	Average Retirement Age	Projection Year
LEOFF 2	55	2032

Note the projection year in the table above does not match those in the 2011 AVR. The projection year in the 2011 AVR is based on the average age of the membership in the plan. However, the majority of the members impacted by the administrative factors in this letter will use an administrative factor that is applied at their retirement.

See the **Methods** section below for a description of the development of projected mortality assumptions.

- **Mortality Blending**: We used the retirement and disability rates as disclosed in the 2011 AVR and RP-2014 mortality rates to blend mortality assumptions (see the **Methods** section below for a description of the process).
- **Percent Male/Female**: We assumed percent male/female for primary members as shown in the table below. These percentages match the ESR.

System	Percent Male	Percent Female
LEOFF	90%	10%

Methods

Development Of Underlying Mortality Assumptions

Consistent with the Board's 2009 policy decisions, we blended healthy and disabled mortality assumptions using the following method.

- We multiplied the RP-2014 healthy mortality rates by the probability that benefit commencement is from a healthy cause. Healthy causes include service retirement and the death of a member from active service.
- We multiplied the RP-2014 disabled mortality rates by the probability a member will take a disability benefit. In other words, we multiplied the RP-2014 disabled mortality rates by the probability of a benefit commencing due to a non-healthy cause.
- We added the weighted rates above to come up with male and female RP-2014 blended mortality assumptions by age for the plan.

We incorporated mortality improvements for each year after 2014 as follows.

- We used data from the 2011 AVR to find the historical average retirement age of the service and disability retirees for the plan.
- We determined that we should project mortality improvements based on the plan's expected retirement age rather than the plan's average member age, to improve actuarial equivalence in this area.
- We projected the blended mortality rates from RP-2014 to the projected mortality improvement year. We incorporated expected mortality improvements using 50 percent of Scale AA, as developed in the ESR and applied in the 2011 AVR.

Development Of Administrative Factors

Please see **Appendices B** through **D** for administrative factor development details.

APPENDIX B – EARLY RETIREMENT FACTORS

Purpose

DRS uses Early Retirement Factors (ERFs) to reduce an annuitant's lifetime benefit for early commencement. We have provided actuarially equivalent ERFs for LEOFF 2

We intend these ERFs to be used for benefits that receive actuarially equivalent reductions for early commencement. The ERFs developed in this section do not apply to members eligible for "alternate" ERFs, such as 3 percent Early Retirement Reduction Factors, who have reached specific age and service combinations as mandated in statute.

Data

We used the 2011 AVR data as described in **Appendix A**.

Assumptions

We relied on the following key assumptions.

- We used the economic assumptions shown in **Appendix A**.
- We used the mortality assumptions, blending, and mortality improvement projection years described in **Appendix A**.
- We assumed the percent male/female as shown in **Appendix A**.
- We assumed Normal Retirement Ages (NRA) of 53 for LEOFF 2.

Methods

Development Of Exact ERFs

We first found (exact) ERFs for the plan. To find the exact ERFs, we divided annuity factors deferred to NRA by the immediate annuity factors for each age level. The ratio of these two factors at each age level is the Exact ERF that solves the actuarial equivalence relation.

PV (accrued benefits deferred to NRA) = ERF x PV (benefits started immediately)

Where "PV" denotes Present Value and includes the annuity factors produced for this project. "Benefits" means the sum of all expected lifetime benefits.

The next table displays detailed information about the annuity factors we used to develop the exact ERFs.

Annuity Factor Details		
	Immediate Annuity	Deferred Annuity
Annuity Type	Single-Life	Single-Life
Payment Commencement	Immediate	Deferred to 53
Payment Frequency	Monthly	Monthly
Payment Timing	End of Period	End of Period
Certain Period (Years)	None	None
COLA Percent	3%	3%
COLA Increase Frequency	Annual	Annual

We rounded the exact ERFs to three decimal places (one-tenth of a percent).

Using the factors from each whole age, we used linear interpolation to find the monthly factors. That is, we moved from one whole age factor to the next in 12 straight-line increments.

Other Information

We formatted the ERF table in a way consistent with the current format in WAC 415-02-320. Please see the following attached table for the LEOFF 2 ERFs.

Early Retirement Factor Table

LEOFF 2.

Years Early	Month 0	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11
0	1.0000	0.9928	0.9856	0.9784	0.9712	0.9640	0.9568	0.9496	0.9424	0.9352	0.9280	0.9208
1	0.9140	0.9075	0.9010	0.8945	0.8880	0.8815	0.8750	0.8685	0.8620	0.8555	0.8490	0.8425
2	0.8360	0.8301	0.8242	0.8183	0.8124	0.8065	0.8006	0.7947	0.7888	0.7829	0.7770	0.7711
3	0.7650	0.7597	0.7544	0.7491	0.7438	0.7385	0.7332	0.7279	0.7226	0.7173	0.7120	0.7067
4	0.7010	0.6961	0.6912	0.6863	0.6814	0.6765	0.6716	0.6667	0.6618	0.6569	0.6520	0.6471
5	0.6420	0.6376	0.6332	0.6288	0.6244	0.6200	0.6156	0.6112	0.6068	0.6024	0.5980	0.5936
6	0.5890	0.5850	0.5810	0.5770	0.5730	0.5690	0.5650	0.5610	0.5570	0.5530	0.5490	0.5450
7	0.5410	0.5373	0.5336	0.5299	0.5262	0.5225	0.5188	0.5151	0.5114	0.5077	0.5040	0.5003
8	0.4970	0.4936	0.4902	0.4868	0.4834	0.4800	0.4766	0.4732	0.4698	0.4664	0.4630	0.4596
9	0.4560	0.4530	0.4500	0.4470	0.4440	0.4410	0.4380	0.4350	0.4320	0.4290	0.4260	0.4230
10	0.4200	0.4172	0.4144	0.4116	0.4088	0.4060	0.4032	0.4004	0.3976	0.3948	0.3920	0.3892
11	0.3860	0.3834	0.3808	0.3782	0.3756	0.3730	0.3704	0.3678	0.3652	0.3626	0.3600	0.3574
12	0.3550	0.3527	0.3504	0.3481	0.3458	0.3435	0.3412	0.3389	0.3366	0.3343	0.3320	0.3297
13	0.3270	0.3248	0.3226	0.3204	0.3182	0.3160	0.3138	0.3116	0.3094	0.3072	0.3050	0.3028
14	0.3010	0.2991	0.2972	0.2953	0.2934	0.2915	0.2896	0.2877	0.2858	0.2839	0.2820	0.2801
15	0.2780	0.2762	0.2744	0.2726	0.2708	0.2690	0.2672	0.2654	0.2636	0.2618	0.2600	0.2582
16	0.2560	0.2543	0.2526	0.2509	0.2492	0.2475	0.2458	0.2441	0.2424	0.2407	0.2390	0.2373
17	0.2360	0.2345	0.2330	0.2315	0.2300	0.2285	0.2270	0.2255	0.2240	0.2225	0.2210	0.2195
18	0.2180	0.2166	0.2152	0.2138	0.2124	0.2110	0.2096	0.2082	0.2068	0.2054	0.2040	0.2026
19	0.2010	0.1998	0.1986	0.1974	0.1962	0.1950	0.1938	0.1926	0.1914	0.1902	0.1890	0.1878
20	0.1860	0.1848	0.1836	0.1824	0.1812	0.1800	0.1788	0.1776	0.1764	0.1752	0.1740	0.1728
21	0.1710	0.1699	0.1688	0.1677	0.1666	0.1655	0.1644	0.1633	0.1622	0.1611	0.1600	0.1589
22	0.1580	0.1570	0.1560	0.1550	0.1540	0.1530	0.1520	0.1510	0.1500	0.1490	0.1480	0.1470
23	0.1460	0.1451	0.1442	0.1433	0.1424	0.1415	0.1406	0.1397	0.1388	0.1379	0.1370	0.1361
24	0.1350	0.1342	0.1334	0.1326	0.1318	0.1310	0.1302	0.1294	0.1286	0.1278	0.1270	0.1262
25	0.1250	0.1243	0.1236	0.1229	0.1222	0.1215	0.1208	0.1201	0.1194	0.1187	0.1180	0.1173
26	0.1160	0.1153	0.1146	0.1139	0.1132	0.1125	0.1118	0.1111	0.1104	0.1097	0.1090	0.1083
27	0.1070	0.1064	0.1058	0.1052	0.1046	0.1040	0.1034	0.1028	0.1022	0.1016	0.1010	0.1004
28	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
29	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
30+	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000

APPENDIX C - MONTHLY BENEFIT PER $1.00 OF ACCUMULATION FACTORS

Description

DRS uses monthly benefit per $1.00 of accumulation tables in several ways. When the factors are multiplied by a lump sum dollar value, a monthly lifetime benefit amount may be obtained. Conversely, the department may divide a monthly benefit amount by a factor in these tables to determine a single lump sum payment.

Data

We used the 2011 AVR data as described in **Appendix A**.

Assumptions

We relied on the following key assumptions:

- We used the economic assumptions shown in **Appendix A**.
- We used the mortality assumptions, blending, and mortality improvement projection years described in **Appendix A**.
- We assumed the percent male/female shown in **Appendix A**.

Methods

Development Of Monthly Benefit Per $1.00 Of Accumulation Tables

The factor at each age equals one divided by an immediate single-life annuity factor divided by 12.

The next table displays additional information we used to develop these factors.

Annuity Factor Details	
Annuity Type	Single-Life
Payment Commencement	Immediate
Payment Frequency	Monthly
Payment Timing	End of Period
Certain Period (Years)	None
COLA Percent	3%
COLA Increase Frequency	Annual

Other Information

We formatted the monthly benefit per $1.00 of accumulation tables in a way consistent with the current format in WAC 415-02-340. Please see the following attached tables for the resulting monthly benefit per $1.00 of accumulation factors.

Monthly Benefit per $1.00 of Accumulation Table

Age	LEOFF 2	Age	LEOFF 2
20	0.0039924	61	0.0060743
21	0.0040086	62	0.0062228
22	0.0040255	63	0.0063815
23	0.0040431	64	0.0065507
24	0.0040613	65	0.0067312
25	0.0040803	66	0.0069247
26	0.0041000	67	0.0071312
27	0.0041203	68	0.0073521
28	0.0041414	69	0.0075914
29	0.0041633	70	0.0078497
30	0.0041861	71	0.0081339
31	0.0042099	72	0.0084419
32	0.0042347	73	0.0087779
33	0.0042605	74	0.0091455
34	0.0042875	75	0.0095478
35	0.0043157	76	0.0099860
36	0.0043451	77	0.0104668
37	0.0043758	78	0.0109911
38	0.0044078	79	0.0115638
39	0.0044414	80	0.0121902
40	0.0044769	81	0.0128751
41	0.0045143	82	0.0136237
42	0.0045537	83	0.0144341
43	0.0045952	84	0.0153240
44	0.0046390	85	0.0162863
45	0.0046852	86	0.0173412
46	0.0047341	87	0.0185030
47	0.0047854	88	0.0197508
48	0.0048392	89	0.0210731
49	0.0048956	90	0.0224936
50	0.0049548	91	0.0239573
51	0.0050263	92	0.0254862
52	0.0051025	93	0.0270280
53	0.0051834	94	0.0286202
54	0.0052708	95	0.0302882
55	0.0053643	96	0.0319061
56	0.0054645	97	0.0335599
57	0.0055712	98	0.0352742
58	0.0056844	99	0.0368840
59	0.0058056		
60	0.0059354		

APPENDIX D – JOINT AND SURVIVOR OPTION FACTORS

Description

Members of LEOFF 2 may elect a reduced monthly benefit amount to provide an ongoing survivor benefit for their designated survivor beneficiary. The department currently offers three Joint and Survivor (J&S) choices for these members:

- Survivor receives 100 percent of the member's benefit (Option 2).
- Survivor receives 50 percent of the member's benefit (Option 3).
- Survivor receives 66 2/3 percent of the member's benefit (Option 4).

The J&S option factors presented in this communication can be multiplied by a member's earned monthly benefit amount to find the member's reduced monthly benefit if they select one of these options.

Data

We used the 2011 AVR data as described in **Appendix A**. We also used data from the 2001-2006 ESR about service and disability retirees to develop the percent male assumptions and expected retirement ages (see tables in the **Assumptions** section below). Note that the assumptions in the tables below may change after the completion of the 2007-2012 ESR in 2014.

Assumptions

We relied on the following key assumptions:

- We used the economic assumptions shown in **Appendix A**.
- We used the mortality assumptions, blending, and mortality improvement projection years described in **Appendix A**.
- We assumed percent male assumptions specifically for the J&S factors of 98.86 percent, based on information in the ESR. This assumption is consistent with the assumption used to develop the J&S administrative factors currently in place.
- We developed average assumed LEOFF 2 retirement ages based on information about the same service and disability retirees cited in the data section of this appendix. This assumption is consistent with the assumption used to develop the J&S administrative factors currently in place.

Retirement Age		
Plan	Males	Females
LEOFF	56	53

Methods

Development Of J&S Option Factor Table

J&S option factors reduce members' benefits so that the selection of the option makes the benefits under that option actuarially equivalent to the members' single life benefits.

PV (single-life benefits) = Factor x PV (J&S benefits)

Where "PV" denotes Present Value and includes the annuity factors produced for this project. "Benefits" means the sum of all expected lifetime benefits.

The next table displays additional information we used to develop these factors.

Annuity Factor Details		
	Single-Life Annuity	Joint & 100% Survivor Annuity
Annuity Type	Single Life	Joint Life
Payment Commencement	Immediate	Immediate
Payment Frequency	Monthly	Monthly
Payment Timing	End of Period	End of Period
Certain Period (Years)	None	None
COLA Percent	3%	3%
COLA Increase Frequency	Annual	Annual

We developed the J&S option factors to include the probability that a survivor will pre-decease the member, and the member's benefit will "pop up" to its pre-reduction level.

Other Information

We formatted the J&S option factor table in a way consistent with their current format in WAC 415-02-380. Please see the attached table for the resulting J&S option factors.

J&S Option Factor Table

Age Difference	Option 2 100%	Option 3 50%	Option 4 66 2/3%	Age Difference	Option 2 100%	Option 3 50%	Option 4 66 2/3%
(20)	0.960	0.979	0.973	11	0.815	0.898	0.868
(19)	0.957	0.978	0.971	12	0.810	0.895	0.864
(18)	0.954	0.976	0.969	13	0.804	0.892	0.860
(17)	0.951	0.975	0.967	14	0.799	0.888	0.857
(16)	0.948	0.973	0.965	15	0.794	0.885	0.853
(15)	0.944	0.971	0.962	16	0.790	0.882	0.849
(14)	0.941	0.970	0.960	17	0.785	0.879	0.845
(13)	0.937	0.968	0.957	18	0.780	0.877	0.842
(12)	0.933	0.966	0.955	19	0.776	0.874	0.838
(11)	0.929	0.963	0.952	20	0.772	0.871	0.835
(10)	0.925	0.961	0.949	21	0.767	0.868	0.832
(9)	0.921	0.959	0.946	22	0.763	0.866	0.829
(8)	0.916	0.956	0.943	23	0.759	0.863	0.826
(7)	0.912	0.954	0.939	24	0.756	0.861	0.823
(6)	0.907	0.951	0.936	25	0.752	0.858	0.820
(5)	0.902	0.949	0.933	26	0.748	0.856	0.817
(4)	0.897	0.946	0.929	27	0.745	0.854	0.814
(3)	0.892	0.943	0.925	28	0.742	0.852	0.812
(2)	0.887	0.940	0.922	29	0.739	0.850	0.809
(1)	0.881	0.937	0.918	30	0.736	0.848	0.807
0	0.876	0.934	0.914	31	0.733	0.846	0.804
1	0.870	0.931	0.910	32	0.730	0.844	0.802
2	0.865	0.928	0.906	33	0.727	0.842	0.800
3	0.859	0.924	0.902	34	0.725	0.840	0.798
4	0.854	0.921	0.897	35	0.722	0.839	0.796
5	0.848	0.918	0.893	36	0.720	0.837	0.794
6	0.842	0.914	0.889	37	0.717	0.836	0.792
7	0.837	0.911	0.885	38	0.715	0.834	0.790
8	0.831	0.908	0.881	39	0.713	0.833	0.789
9	0.826	0.904	0.877	40	0.711	0.831	0.787
10	0.820	0.901	0.872				

Age difference equals member age minus beneficiary age.