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1 **Request IR-1:**

2

3 **With respect to SR-01:**

4

5 (a) **Please provide an Excel version of the 2012 Cost of Service.**

6

7 (b) **Please identify changes to the COSS model since the last COSS submission to the**  
8 **Board in the 2009 GRA Compliance Filing, particularly the changes with respect to**  
9 **Unmetered.**

10

11 (c) **There are two Exhibits marked Exhibit 10. Please identify which of these should be**  
12 **Exhibit 10A.**

13

14 (d) **Please explain why the total operating expenses (Column 5) differs between the two**  
15 **exhibits referenced in c).**

16

17 **Response IR-1:**

18

19 (a) **Please refer to Confidential Attachment 1, filed electronically.**

20

21 (b) **Please see table below for changes to the COSS model since the last COSS submission to**  
22 **the Board in the 2009 GRA Compliance Filing.**

23

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#	Exhibits	Proposed Changes	Reasons for change
1	Input Data Tab	Increased precision in tracking of generation costs associated with environmental compliance and fuel conversion for the energy-only classification purposes.	In Compliance with the Board's Decision on Generic Hearing respecting COSS and Rate Design (NSPI864) in 1995, NSPI has been tracking the environmental assets separately. In previous GRA filings, the environmental projects incorporated into the COSS model were above \$1 million. To the extent possible NSPI is tracking all environmental investments for the rate base classification purposes.
2	Input Data Tab	New direct streetlight-related depreciation cost input from NSPI's financial system.	Availability of this information makes the current indirect approach in allocation of these direct costs via the use of modified allocation factors redundant.
3	Input Data Tab	LED capital costs form an external input calculated in DE-03 – DE-04, Appendix G, Table 5A	Consistent with the way below-the-line categories are treated in COSS
4	Exhibit 2	Line (20) Street Lighting	LED-related rate base is directly assigned as it has been moved below-the-line.
5	Exhibit 2	Line (37) DEF. CR –ARO Wind	Added new category in the Asset Retirement Obligations to single out wind generation in accordance with financial systems.

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#	Exhibits	Proposed Changes	Reasons for change
6	Exhibit 2	Line (41) Contract Receivable	No longer deemed confidential.
7	Exhibit 2a	Line (23) Contract Receivable	No longer deemed confidential.
8	Exhibit 2b	Line (23) Contract Receivable	No longer deemed confidential.
9	Exhibit 3	Line (23) Contract Receivable	No longer deemed confidential.
10	Exhibit 3	Page 2, Lines (15) and (16) Distribution Plant	The distribution plant function is broken into streetlight and non-streetlight related components.
11	Exhibit 4	Lines (21) and (22)	Added two new categories in operating expenses to remain consistent with financial systems.
12	Exhibit 4	Lines (37) and (38)	The distribution plant function is broken into streetlight and non-streetlight related. The total streetlight distribution cost comes directly from NSPI's financial systems rather than being assigned indirectly via the use of allocators.
13	Exhibit 4 Detail		The distribution plant function is broken into streetlight and non-streetlight related components.
14	Exhibit 5	Page 3, Lines (14) through (20)	The distribution plant function is broken into streetlight and non-streetlight related.
15	Exhibit 6	Page 2, Lines (20) through (27)	The distribution plant function is broken into streetlight and non-streetlight related.

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#	Exhibits	Proposed Changes	Reasons for change
16	Exhibit 6	Line (11) in Retail Section	New category is introduced which is called Meter Reading and Electric Inspection replacing Operating and Maintenance category which was not used.
17	Exhibit 6A	Line (20)	New category is introduced which is called Customer Service.
18	Exhibit 6d	Lines (14) and (15)	The distribution plant function is broken into streetlight and non-streetlight related.
19	Exhibit 7	Line 22	LED capital costs are directly assigned.
20	Exhibit 8a	Lines (33) and (34)	Development of average customers allocation factor (C-7) adjusted for seasonal customers. Seasonal customers will only be taken into account during the months of active service and the COSS model averages this over twelve months. This impacts allocation of some customer-service related expenses such as – Head Office, Electric Wiring Inspection – Head Office, Payment Services, COGS.

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#	Exhibits	Proposed Changes	Reasons for change
21	Exhibit 8b	Lines (19) and (20)	Development of Demand – Dist. Plant (P – 9A). These allocation factors are used to appropriately allocate between streetlight and non-streetlight related expenses. This impacts operating expenses in Exhibit 6 that are streetlight and non-streetlight related.
22	Exhibit 8b	Lines (39) through (42)	Total Rate Base – demand (DIST) allocators, originally used for the allocation of streetlight- and non-streetlight-related capital costs combined (P-16), have been split into to two separate sets of allocators (P-16 and P-16B) to allocate these costs separately.
23	Exhibit 9	Columns (10) and (11)	Exhibit is enhanced with 3 coincident peak information as used for allocation of demand-related costs.

- 1
- 2 (c) The second exhibit should have been labeled as Exhibit 10A. Please refer to Confidential
- 3 Attachment 1, filed electronically, which has these exhibits labeled appropriately.
- 4
- 5 (d) The total operating expenses in Exhibit 10A fall short of the total revenue requirement by
- 6 the amount of the requested increase. The revenue deficiency, as reflected in Retained
- 7 Earnings, is spread among all rate classes and set to match total operating expenses with

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1 total revenues priced at the current rates. This presentation of the cost information is  
2 consistent with past GRA filing practice.

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1 **Request IR-2:**

2  
3 **With respect to DE-03 – DE-04, Appendix G, page 4:**

4  
5 **(a) Please demonstrate how the “formula-based revenue allocation process” (Line 22)**  
6 **was used to develop the Street Light Rates approved by the Board in its Order**  
7 **NSUARB-NSPI-P-888, dated December 8, 2008.**

8  
9 **(b) Please provide the derivation of the costs used to support the statements in Lines 26-**  
10 **29 that revenues associated with fixed maintenance services were set at costs but the**  
11 **revenue responsibilities for electric and fixture capital services were not.**

12  
13 **Response IR-2:**

14  
15 **(a) NSPI used the following formula-based revenue allocation process in the Streetlight**  
16 **Rates approved by the Board in its Order NSUARB-NSPI-P-888<sup>1</sup>.**

17  
18 **(i) Total revenue responsibility of the unmetered class was set at its cost of \$25.2**  
19 **million, as determined in the COSS model. At this point, only directly assigned**  
20 **costs of the streetlight maintenance service of \$5.0 million, as shown in Exhibit**  
21 **6A, are explicitly known. The balance of \$20.2 million reflects combined electric**  
22 **service, inclusive of miscellaneous loads, and streetlight fixture capital costs. The**  
23 **costs of these categories are not explicitly stated in the COSS model.**

24  
25 **(ii) In a parallel and independent unmetered pricing study, the revenue responsibility**  
26 **for the three service components is determined as follows.**

27  

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<sup>1</sup> NSPI 2009 Rate Case, UARB Order, NSUARB-NSPI-P-888, December 8, 2008.

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- 1           1.     Streetlight related maintenance revenues are set at cost of \$5.0 million as  
2                     determined in the COSS model.  
3  
4           2.     Fixture capital-related revenue of \$8.1 million, are determined by  
5                     multiplying individual fixture capital-related rates by forecasted number of  
6                     fixtures in each category. The applied fixture rates are determined by  
7                     direct application of the marginal cost of capital substitution formula.  
8  
9           3.     Electric service-related revenue is set at a level commensurate with the  
10                    variance between total costs from the COSS model and the sum of the two  
11                    service components above.

12  
13 (b)    The costs of electric and fixture capital services can be calculated directly from COSS  
14        implementing these two steps.

15  
16        (i)     Streetlight capital-related costs can be separated from total capital-related costs by  
17                separating relevant allocators in Exhibit 8b between streetlight and non-streetlight  
18                rate base components. This is what NSPI proposed in its treatment of the  
19                Unmetered Class costs in the submitted COSS model in this application (Please  
20                refer to SR-01, Attachment 1).

21  
22        (ii)    Streetlight capital-related cost components and streetlight maintenance costs are  
23                subtracted from the total unmetered class costs to arrive at electric service costs.

24  
25        Using the same approach to the 2009 CF COSS model, NSPI estimated these costs by the  
26        three types of services and compared them to the associated revenues.  
27

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1        Step 1: Derivation of Streetlight Allocators

2  
3        Allocator P-9 (8b line 20): depreciation and grants in lieu of taxes  
4

<b>Ratebase Category</b>	<b>Demand Dist Plant (\$M)</b>	<b>Relative Share</b>
Streetlight	26.2	7.4%
Other Unmetered Class	<u>4.9</u>	<u>1.4%</u>
Total Unmetered Class	31.1	8.8%
Other Distribution	321.2	<u>91.2%</u>
Total Distribution	352.3	100.0%

5  
6  
7        Allocator P-16 (8b line 38): Interest, Preferred Dividends, Corporate Taxes and Return  
8

<b>Ratebase Category</b>	<b>Total Ratebase - Demand (DIST) (\$M)</b>	<b>Relative Share</b>
Streetlight	26.2	6.2%
Other Unmetered Class	<u>11.1</u>	<u>2.6%</u>
Total Unmetered Class	37.3	8.9%
Other Distribution	<u>384.0</u>	<u>91.1%</u>
Total Distribution	421.4	100.0%

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Step 2: Separation of streetlight fixture capital-related costs from demand-related unmetered class costs

Allocation of Depreciation and Grants in Lieu of Taxes

<b>Service Type</b>	<b>Allocator</b>	<b>Depreciation (\$M)</b>	<b>Grants in lieu (\$M)</b>	<b>Total (\$M)</b>
Streetlight	<b>7.4%</b>	<b>2.3</b>	<b>0.4</b>	<b>2.7</b>
Other Unmetered Class	<u>1.4%</u>	<u>0.4</u>	<u>0.1</u>	<u>0.5</u>
Total Unmetered Class	8.8%	2.7	0.5	3.2

Exh 6D, page 1, line 14    Exh 6, page 2, line 13

COSS reference

Allocation of Interest, Preferred Dividends, Corporate Taxes and Return

<b>Ratebase Category</b>	<b>Allocator</b>	<b>Interest (\$M)</b>	<b>Preferred Dividends (\$M)</b>	<b>Corporate Taxes (\$M)</b>	<b>Return (Profit/Loss) (\$M)</b>	<b>Total (\$M)</b>
Streetlight	<b>6.2%</b>	<b>1.0</b>	<b>0.1</b>	<b>0.8</b>	<b>0.8</b>	<b>2.7</b>
Other Unmetered Class	<u>2.6%</u>	<u>0.4</u>	<u>0.1</u>	<u>0.3</u>	<u>0.3</u>	<u>1.2</u>
Total Unmetered Class	8.9%	1.4	0.2	1.1	1.1	3.9

Exh 6, page 2, line 15    Exh 6, page 2, line 16    Exh 6, page 2, line 17    Exh 6, page 2, line 18

COSS reference

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1 Streetlight Capital-related Costs by Component

2

<b>Capital Cost Component</b>	<b>Amount (\$M)</b>
Depreciation	<b>2.3</b>
Grants in lieu of taxes	<b>0.4</b>
Interest	<b>1.0</b>
Preferred Dividends	<b>0.1</b>
Corporate Taxes	<b>0.8</b>
Return (Profit/Loss)	<b><u>0.8</u></b>
<b>Total</b>	<b><u>5.4</u></b>

3

4

5 Step 3: Derivation of Electric Service Costs of the Unmetered Class

6

7 Unmetered Class Costs – Fixture Maintenance Cost – Fixture Capital Cost = Electric  
 8 Service Cost

9

Total Unmetered Class Costs		\$25.2 M
Less:		
Fixture Maintenance	5.0 M	
Fixture Capital	<u>5.4 M</u>	
Subtotal	10.4 M	<u>(10.4 M)</u>
Electric Service Costs of the Unmetered Class		<b><u>\$14.8 M</u></b>

10

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1 Revenues and Costs of Unmetered Class Services Compared

2

	<b>COSS-based</b>			
	<b>Costs</b>	<b>Revenues</b>	<b>Variance</b>	
	<b>(\$M)</b>	<b>(\$M)</b>	<b>\$M</b>	<b>%</b>
Electric Service	14.8	12.1	(2.7)	-18.1%
Fixture Maintenance	5.0	5.0	0.0	0.0%
Fixture Capital	<u>5.4</u>	<u>8.1</u>	<u>2.7</u>	<u>49.5%</u>
Total	25.2	25.2	0.0	0.0%

3

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1 **Request IR-3:**

2

3 **With respect to DE-03 – DE-04, Appendix G, please explain why the 2011 Current Rates**  
4 **shown in Schedule 11 are different from the rates approved by the Board in its Order**  
5 **NSUARB-NSPI-P-888, dated December 8, 2008.**

6

7 Response IR-3:

8

9 Due to the Fuel Adjustment Mechanism processes, the Base Cost of Fuel is changed every two  
10 years or when a general rate application is filed. The 2011 current rates in Schedule 11 became  
11 effective on January 1, 2011 replacing the rates approved by the Board on December 8, 2008<sup>1</sup>.  
12 The current rates were approved by the Board in an order dated December 17, 2010<sup>2</sup>, in the  
13 matter of a hearing into Nova Scotia Power Incorporated's Base Cost of Fuel Reset and Fuel  
14 Forecast Standardized Filing for 2011 Fuel Adjustment Mechanism.

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<sup>1</sup> NSPI 2009 Rate Case, UARB Order, NSUARB-NSPI-P-888, December 8, 2008.

<sup>2</sup> NSPI 2011 Base Cost of Fuel, UARB Order, NSUARB-P-887 (2), December 17, 2010.

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1 **Request IR-4:**

2

3 **With respect to DE-03 – DE-04, Appendix G, page 5, Line 28, please reconcile the**  
4 **statement that depreciation and grants in lieu of taxes are allocated based on customer**  
5 **utilization of the entire distribution net plant, to the fact that in the COSS, these costs are**  
6 **allocated on the basis of rate base, and that over 80% of the rate base associated with street**  
7 **lighting is directly assigned.**

8

9 Response IR-4:

10

11 While some rate base components are assigned directly to rate classes for the purpose of deriving  
12 class cost allocators, class responsibility for a given category of costs is determined by  
13 multiplying a single composite allocator, reflective of both direct and indirect rate base  
14 utilization components, by the total amount of shared costs. In this instance, the unmetered class  
15 allocator is predicated on the unmetered class utilization of the entire distribution plant with  
16 direct assignment of the streetlight fixture rate base component already factored in.

17

18 NSPI made this statement to provide context that the current methodology for the allocation of  
19 depreciation costs, which are a function of gross plant value, on the basis of a “pooled asset net  
20 plant value” will not always produce reasonable results. The statement is not intended to pass an  
21 unequivocal judgment on the outcome of the current methodology. It is to signal its potential  
22 shortcomings under specific circumstances.

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1 **Request IR-5:**

2

3 **With respect to DE-03 – DE-04, Appendix G, page 6, Lines 18-22:**

4

5 **(a) Is the marginal cost of capital substitution formula used to directly set charges for**  
6 **capital service, or to develop allocators for the distribution of the capital related**  
7 **costs in the COSS?**

8

9 **(b) Are the actual costs of electric service and the actual costs of capital determined**  
10 **through the COSS or through the marginal cost of capital substitution?**

11

12 Response IR-5:

13

14 (a) Under the current methodology, the marginal cost of capital substitution formula is used  
15 to set charges for capital service.

16

17 Under the proposed approach, the marginal cost of capital substitution formula is used to  
18 develop allocators for the distribution of the capital related costs in the COSS. The  
19 allocators are referred to as Revenue Correction Factors in DE-03 – DE-04, Appendix G  
20 Schedule 4. They are applied across-the-board to preliminary charges for capital service  
21 to generate revenues which match capital-related costs from the COSS.

22

23 (b) Under the current methodology the combined costs of electric service, inclusive of  
24 miscellaneous loads, and fixture capital services are determined through the COSS. They  
25 can be arrived at by subtracting the fixture maintenance-related costs from the total cost  
26 of the unmetered class. The marginal cost of capital substitution is a formulaic approach  
27 used to determine the price component of the fixture capital rate in the Streetlight rate  
28 calculations.

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1 **Request IR-6:**

2  
3 **With respect to DE-03 – DE-04, Appendix G, page 7, Line 31 to page 8 Line 2, please**  
4 **provide NSPI's calculations showing that the current methodology would produce**  
5 **electricity prices below zero in the second half of the LED's useful life.**

6  
7 Response IR-6:

8  
9 Attachment 1, filed electronically with formulas intact, contains a long-term forecast of the unit  
10 costs and unit revenues associated with the three unmetered services: electricity, fixture  
11 maintenance and fixture capital. The forecast was produced by applying the current ratemaking  
12 methodology to the billing determinants from the 2009 Compliance Filing modified for the effect  
13 of a five year replacement of energy-intensive non-LED fixtures with the capital-intensive LED  
14 fixtures. To make the illustration of the pricing effects of the current methodology transparent,  
15 the analysis was simplified to account solely for the cost effects of the LED conversions through  
16 rising capital-related expenditures and declining consumption of electricity. All other factors,  
17 such as inflation in cost factors of electricity production, growth in the number of streetlights or  
18 miscellaneous load services, were held constant. To illustrate the pricing effect of a 25 year-long  
19 capital cycle of a five year rollout of LED assets, assumed to have a useful life of 20 years, the  
20 analysis was extended to 27 years. The last two years serve to illustrate the repetitive effect of  
21 the capital replacement cycle.

22  
23 The five year LED rollout makes for a concentrated capital expenditure relative to the assets  
24 useful life of 20 years. Once the five year investment cycle comes to an end, the aggregate net  
25 plant value of LED fixtures starts declining steadily during the next 15 years. Parallel with this  
26 decline, the capital-related expenses, other than depreciation, such as taxes, earnings and interest,  
27 also decline. Under the simplifying assumptions made in this analysis the current ratemaking  
28 methodology produces a constant price level of LED fixture capital services and therefore  
29 constant revenue flow. Over the long-run, this leads to cyclical patterns in the over-recovery of

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1 fixture capital costs. The matching principle of rate class revenues with costs forces pricing of  
2 electricity below its costs. The pattern in the under-recovery of the electric costs mirrors that of  
3 the over-recovery of the fixture capital costs. Under the capital intensive LED technology the  
4 methodology would produce negative electric revenue (line 49) and negative price (line 61) by  
5 year 2029 or 17 years since the start of the LED rollout.

6  
7 Simplifying Assumptions:

- 8
- 9 1. LED conversion takes place during the five year period commencing in 2012 at a fixed  
10 rate of 20 percent.
  - 11 2. Total cost of service is predicated on net plant value of non-LED streetlight fixtures in  
12 service (this illustration does not reflect revenue flows associated with the proposed LED  
13 conversion fees).
  - 14 3. The number of streetlights owned by NSPI and those by customers remain constant  
15 throughout the analysis.
  - 16 4. Non-LED streetlights owned by NSPI and customers are converted at the same rate.
  - 17 5. Miscellaneous Load remains constant throughout the analysis.
  - 18 6. Inflation rate is 0 percent (no change in cost factors of production; i.e. unit cost of  
19 electricity and market LED fixture prices are held constant)
  - 20 7. Unmetered rates are changed annually in reflection of changing costs as driven by LED  
21 conversion only.
  - 22 8. Depreciation rate remains constant at 5 percent.
  - 23 9. Tax Adjusted WACC at 11.59 percent remains constant (from 2009 Compliance Filing)
  - 24 10. Assumed unit electric cost remains constant at \$0.1273/kWh (simulated from 2009  
25 Compliance Filing:  $\$14.8 \text{ M} / 115.6 \text{ GWh} = \$0.12803/\text{kWh}$ , please refer to NSPI's  
26 response to Multeese IR-2 for the derivation of the \$14.8 million amount).
  - 27 11. Electric service revenues (line 49) are priced to balance with total costs.

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1 **Request IR-7:**

2

3 **With respect to DE-03 – DE-04, Appendix G, page 8, Lines 26-31, is it NSPI’s intention in**  
4 **placing capital and depreciation of LED fixtures below-the-line that these charges and**  
5 **CCA credits and would be adjusted annually?**

6

7 Response IR-7:

8

9 Placing these costs below-the-line is consistent with the incremental cost approach to the pricing  
10 of LED fixtures as opposed to the average cost approach on which the COSS methodology is  
11 based. Please refer to DE-03 – DE-04, Section 10.1.3, page 138, lines 5 - 13 and to Multeese IR-  
12 4. NSPI has proposed that these charges be set through GRA proceedings as is the case with the  
13 miscellaneous revenue charges which are also treated as a below-the-line category.

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1 **Request IR-8:**

2

3 **With respect to DE-03 – DE-04, Appendix G, page 9, Lines 3-4, please explain how**  
4 **conversion fee revenues would be applied to all full service non-LED street light customers.**

5

6 Response IR-8:

7

8 Please refer to DE-03 – DE-04, Appendix G, Page 17, lines 1 - 5 (Section 5.10).

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1 **Request IR-9:**

2

3 **With respect to DE-03 – DE-04, Appendix G, page 9, Lines 10-12, please confirm that**  
4 **NSPI's financial systems contain (or will contain) depreciation related to LED and non-**  
5 **LED fixtures separately.**

6

7 Response IR-9:

8

9 Confirmed.

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1 **Request IR-10:**

2

3 **With respect to DE-03 – DE-04, Appendix G, Schedule 3, please provide the derivation of**  
4 **the \$46,669,416.**

5

6 Response IR-10:

7

8 The amount of \$46,669,416 represents the average gross plant value (GPV) of non-LED fixtures  
9 in 2012. It has been calculated using these four steps.

10

11 1. 2011 Year End Gross Plant Value

12

2011 Beginning Balance	\$52,179,534
Additions	2,326,168
Retirements	-
2011 Ending Balance	54,505,702
COSS Adjustment	466
Adjusted 2011 Gross Plant Value	<u>\$54,506,168</u>

13

14 2. 2012 Year End Gross Plant Value

15

2012 Beginning Balance	\$54,506,168
Additions	16,510,351
Retirements	(27,728)
Adjusted 2012 Ending Balance	<u>\$70,988,791</u>

16

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1 3. 2012 Year End Gross Plant Value of non-LED fixtures in Service

2

Adjusted 2012 Ending Balance		\$70,988,791
GPV of non-LED retirements		(14,476,088)
GPV of LED	16,510,351	
CWIP Associated with LED	1,169,689	
Total LED	<u>\$17,680,040</u>	<u>(17,680,040)</u>
GPV of non-LED fixtures in service		<u>\$38,832,663</u>

3

4

5 4. Arithmetic average of 2011 and 2012 is calculated.

6

7

$$(\$54,506,168 + \$38,832,663) / 2 = \$46,669,416$$

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1 **Request IR-11:**

2  
3 **With respect to DE-03 – DE-04, Appendix G, Schedule 4, please provide the development**  
4 **of the numbers used to calculate the revenue correction factors; i.e, for the non-LED, the**  
5 **development of the \$8,603,338 and the \$4,194,480; and for the LED the development of the**  
6 **\$1,314,036 and the \$1,314,415.**

7  
8 Response IR-11:

9  
10 Revenue correction factor for Non-LED Light Fixtures

11  
12 The revenue correction factor of 0.488 applied to non-LED fixtures is calculated by dividing the  
13 non-LED capital-related cost of \$4,194,480, calculated as a total of cost items shown in lines 15  
14 through 20 of page 3 of Exhibit 5 of the COSS model (Please refer to SR-01, Attachment 1,  
15 Page 39), by the preliminary non-LED fixture revenue of \$8,603,338, as shown in the non-LED  
16 total in the column labeled “revenue” in the “2012 Forecast” section of Schedule 4 (Please refer  
17 to DE-03 – DE-04, Appendix G).

18  
19 The COSS-based capital-related cost of \$4,194,480 is determined by applying the relative shares  
20 of non-LED streetlights in the distribution net plant value to the demand-related portion of the  
21 distribution capital-related costs. For more explanation please refer to DE-03 – DE-04,  
22 Appendix G, Section 4.1, lines 8 through 15.

23  
24 The preliminary revenue of \$8,603,338 is calculated by multiplying the preliminary non-LED  
25 rates, as shown in the “Total Cost” column of the “Before Correction Factor” section, by the  
26 forecasted number of fixtures. For further details please refer to DE-03 – DE-04, Appendix G,  
27 Section 5.4.

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1 Revenue correction factor for LED Light Fixtures

2  
3 The revenue correction factor of 1.003 applied to LED fixtures was calculated by dividing the  
4 LED capital-related cost of \$1,314,415, as calculated in column labeled “LED” in DE-03 –  
5 DE04, Appendix G, Schedule 5A, by the preliminary LED fixture revenue of \$1,314,037 as  
6 shown in the LED total at the bottom of the column labeled “revenue” in the “2012 Forecast”  
7 section of Schedule 4.

8  
9 For details on how the cost of \$1,314,415 is calculated please refer to DE-03 – DE-04, Appendix  
10 G, Section 5.5.

11  
12 The preliminary revenue of \$1,314,037 is calculated by multiplying the preliminary LED unit  
13 costs, as shown in the “Total Cost” column of the “Before Correction Factor” section, by the  
14 forecasted number of fixtures. For further details please refer to DE-03 – DE-04, Appendix G,  
15 Section 5.4.

16  
17 In preparing this response NSPI realized that the revenue correction factor of 1.003 used for LED  
18 is incorrect. The factor is predicated on an incorrect LED cost amount of \$1,314,415, which in  
19 turn is reflective of an incorrect Gross and Net Plant Value amounts of \$17.68 million and \$8.84  
20 million as shown under column LED in Schedule 5A (Appendix G). The \$17.68 million  
21 represents year-end results, as opposed to year-average results. The Net Plant Value of \$8.84  
22 million is predicated on the year-end value and does not reflect depreciation in this year. The  
23 figures should have been \$8.84 million and \$8.60 million, respectively. The resulting LED  
24 capital-related cost should have been \$1,291,742, or \$22,673 lower than submitted, and the  
25 revenue correction factor 0.9830.

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1 **Request IR-12:**

2

3 **With respect to DE-03 – DE-04, Appendix G, Schedule 5:**

4

5 (a) **Please explain why grants in lieu should be included in WACC.**

6

7 (b) **Please explain why grants in lieu should be included in WACC for non-LED but not**  
8 **for LED.**

9

10 Response IR-12:

11

12 (a) Grants and lieu are included with the WACC for the purposes of allocating the expense  
13 with the capital rate base investment in accordance with the COSS embedded cost  
14 approach as reflected in current rates.

15

16 (b) Grants in lieu are excluded in the calculation of the LED streetlights based on the  
17 proposed COSS below-the-line incremental cost approach. Grants in lieu are fixed costs  
18 that change with the annual CPI escalation and therefore are not an incremental cost to  
19 the new proposed LED fixture rate base addition.

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1 **Request IR-13:**

2

3 **With respect to DE-03 – DE-04, Appendix G, Schedule 5A:**

4

5 **(a) Please provide the derivation of the Gross Plant Values and Net Plant Values for**  
6 **non-LED and LED.**

7

8 **(b) Please provide the derivation of the depreciation expenses of \$2,189.4 and \$682.9.**

9

10 Response IR-13:

11

12 (a) Derivation of Gross Plant Values and Net Plant Values for non-LED

13

14 Please refer to Multeese IR-10 for the derivation of the non-LED gross plant value of  
15 \$46.669 million.

16

17 The non-LED net plant value of \$21.981 million represents a difference between the total  
18 net plant value of streetlights of \$30.821 million and the LED net plant value of \$8.840  
19 million. The detailed calculation consists of these three steps.

20

21 1. 2011 non-LED Net Plant Value

22

2011 Gross Plant Value		\$54,506,168
2010 Accumulated Depreciation	28,874,169	
2011 Depreciation	2,455,295	
2011 Accumulated Depreciation	<u>31,329,464</u>	<u>(31,329,464)</u>
2011 Net Plant Value (before CWIP)		<u>23,176,704</u>
2011 CWIP Adjustment		480,000
2011 Non-LED Net Plant Value		<u><u>\$23,656,704</u></u>

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2. 2012 Non-LED Net Plant Value

2012 Gross Plant Value		\$70,988,791
2011 Accumulated Depreciation	31,329,464	
2012 Depreciation	2,872,281	
2012 Retirements	(27,728)	
2012 Accumulated Depreciation and Retirements	<u>34,174,017</u>	<u>(34,174,017)</u>
2012 Net Plant Value (before CWIP)		<u>36,814,774</u>
2012 CWIP Adjustment		=
2012 LED Additions		<u>(16,510,351)</u>
2012 non-LED Net Plant Value		<u><u>\$20,304,423</u></u>

3. Arithmetic average of 2011 and 2012 is calculated:

$$(\$23,656,704 + \$20,304,423) \div 2 = \$21,980,564$$

Derivation of Gross Plant Values and Net Plant Values for LED

The \$17.68 million, which represents the LED gross plant value, is the budgeted capital spend in 2012 from our financial systems for the LED streetlight conversion. The figure represents a year-end gross plant value and as such is incorrectly displayed, as DE-03 – DE-04, Appendix G, Schedule 5 intends to show a year-average figure. The displayed figure should have been \$8.84 million, half of the year-end value given its starting balance of \$0 at the beginning of the year. The LED net plant value of \$8.84 million represents half of its year-end gross plant value and as such is also incorrect. The figure should have been \$8.604 million in reflection of the depreciation effect in that year. This figure is calculated using the following formula:

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$$\$8.840 \text{ M} * (1 - 5.33\%/2) = \$8.604 \text{ M}$$

Please refer to Multeese IR-11 for the discussion of the implications of this adjustment on revenue responsibility allocation.

- (b) The depreciation of LED streetlights is derived by multiplying the year-average gross plant value of \$8.84 million by the depreciation rate of 5.33 percent.

$$\text{Depreciation amount } \$8.840 \text{ M} \times 5.33\% = \$0.4712 \text{ M}$$

This amount is then grossed up for tax purposes, by the corporate tax rate of 31 percent.

$$\text{Gross up for tax purposes } \$0.4712 \text{ M} / (1-31\%) = \$0.6829 \text{ M}$$

The depreciation of non-LED streetlights is derived by taking the total depreciation forecasted for streetlights in 2012, from our financial systems, and subtracting the amount calculated for LED streetlights (thousands).

$$\$2.8723 \text{ M} - \$0.6829 \text{ M} = \$2.1894 \text{ M}$$

In preparing a response to this question, NSPI realized that it was not appropriate to deduct the grossed up amount of \$0.6829 million from the total streetlight depreciation of \$2.8723 million. Rather, the depreciation amount of \$0.4712 million should have been subtracted as the \$2.8723 million total does not include the grossed up tax amount.

$$\$2.8723 \text{ M} - \$0.4712 \text{ M} = \$2.4011 \text{ M}$$

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1 As a result the amount of depreciation expense allocated to non-LED streetlights, was  
2 under-estimated by \$211,700. Please refer to Attachment 1 for the modified Schedule  
3 5A.

4  
5 The gross up amount of \$211,700 should have been directly assigned and deducted from  
6 the corporate taxes for the cost allocation purposes to the COSS-based rate classes (line  
7 42, SR-01 Attachment 1, Exhibit 4).

## STREET / CROSSWALK LIGHTING STUDY

**Tax-Adjusted Weighted Average Cost of Capital Amounts by Components  
For 2012 Street Light Rates**

**Capital Cost Expenses (Net Plant Value)  
For 2012 Street Light Rates**

In thousands of dollars

Depreciation Rate

5.33%

Gross-up factor for tax purposes (LED only)

31.00%

	<u>Non LED</u>	<u>LED</u>	<u>Non LED</u>	<u>LED</u>
Gross Plant Value (YA)			\$46,669	\$17,680
Net Plant Value (YA)			\$21,981	\$8,840
<b>a) Weighted Average Cost of Capital - Pretax</b>				
ST Debt	0.21%	0.21%		\$19.0
LT Debt	3.94%	3.94%		<u>\$348.6</u>
Subtotal			728	<u>\$367.5</u>
Preferred	0.22%	0.22%	\$48.5	\$19.1
Common	<u>3.60%</u>	<u>3.60%</u>	<u>\$767.7</u>	<u>\$318.2</u>
<b>WACC - pretax cost</b>	<b>7.97%</b>	<b>7.97%</b>	<b>\$1,543.8</b>	<b>\$704.9</b>
<b>b) Additional income tax for common equity</b>				
WACC - equity tax cost	1.62%	1.62%		\$143.2
<b>c) Large Corporations Tax</b>				
WACC - Large Corporations Tax	0.03%	0.03%		<u>\$2.7</u>
Subtotal			\$248.0	\$145.9
<b>d) Grants in Lieu of Property Tax</b>				
WACC - Grants in Lieu of Property Tax	1.09%		\$213.3	<u>\$0.0</u>
<b>Subtotal Financing Expense</b>	<b>10.71%</b>	<b>9.62%</b>	<b>\$2,005.1</b>	<b>\$850.8</b>
Depreciation Expense			<b>\$2,401.1</b>	<b>\$471.2</b>
Gross up for Tax Purposes			N/A	<u>\$211.7</u>
<b>Total Depreciation Expense including Gross Up for Tax Purposes</b>			<b>N/A</b>	<b>\$682.9</b>
CCA			N/A	<b>-\$219.2</b>
<b>TOTAL CAPITAL COST EXPENSE</b>			<b>\$4,406.2</b>	<b>\$1,314.4</b>

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1 **Request IR-14:**

2

3 **With respect to DE-03 – DE-04, Appendix G, please explain the purpose of Schedules 6 and**  
4 **7, including a description of how the data provided in these schedules is used to develop**  
5 **proposed rates for 2012.**

6

7 Response IR-14:

8

9 The purpose of Schedules 6 and 7 is to provide the Board with details behind how the material  
10 costs by street light type were developed. The total material costs illustrated in DE-03 – DE-04,  
11 Appendix G, Schedule 6 are used as inputs, where applicable, in Schedules 3 and 4.

12

13 To see how the material costs were calculated and then used to develop the proposed rates for  
14 2012, please refer to DE-03 – DE-04, Appendix G, pages 13, 14 and 15 (Sections 5.3, 5.4 and  
15 5.6).

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1 **Request IR-15:**

2

3 **With respect to DE-03 – DE-04, Appendix G, Schedule 10, please provide the derivation of:**

4

5 (a) **Net Plant Value YE**

6

7 (b) **Net Plant Value of displaced non-LED (YE)**

8

9 (c) **Net Plant Value of displaced non-LED (YA)**

10

11 Response IR-15:

12

13 For spreadsheet calculations, with formulas intact and numbered line references please refer to  
14 Attachment 1.

15

16 (a) The 2011 year-end net plant value of \$23.1 million represents NSPI's forecast of non-  
17 LED streetlights before the commencement of a five-year LED rollout. Individual year  
18 balances, starting in 2012, decline from the 2011 benchmark by a cumulative rate of  
19 conversion shown in line 4.

20

21 (b) The net plant value of displaced non-LED Year End (YE) found in line 7, is calculated by  
22 subtracting the previous year Net Plant Value (YE) from the current year in line 6.

23

24 (c) The net plant value of displaced non-LED Year Average (YA) in line 8 is the average of  
25 the current and previous year net plant values of displaced non-LED (YE) in line 7.

**Derivation of Net Plant Values**

Line #		2011	2012	2013	2014	2015	2016	2017	Cumulative
(1)	LED Conversions YE		23,119	24,628	24,628	24,628	24,628		
(2)	Fixture Inventory YE	121,632	98,513	73,885	49,257	24,628	0		
(3)	Annual Conversion Rate to LED		19%	20%	20%	20%	20%	100%	
(4)	Cumulative Annual Conversion Rate to LED		19%	39%	60%	80%	100%		
(5)									
(6)	Net Plant Value YE *	\$23.10	\$18.71	\$14.03	\$9.35	\$4.68	\$0.00		
(7)	Net Plant Value of displaced non-LED (YE) *		(\$4.39)	(\$4.68)	(\$4.68)	(\$4.68)	(\$4.68)		(\$23.10)
(8)	Net Plant Value of displaced non-LED (YA) *		(\$2.20)	(\$4.53)	(\$4.68)	(\$4.68)	(\$4.68)	(\$2.34)	(\$23.10)

\* In millions of dollars

(5) Intentionally left blank

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1 **Request IR-16:**

2

3 **With respect to DE-03 – DE-04, Appendix G, Schedule 10A, please provide the derivation**  
4 **of:**

5

6 **(a) The Stranded Asset values**

7

8 **(b) The Monthly LED Conversion Fee (5 Yrs)**

9

10 **(c) The Lump Sum LED Conversion Fee**

11

12 Response IR-16:

13

14 For spreadsheet calculations, with formulas intact and numbered line references please refer to  
15 Attachment 1.

16

17 (a) The calculation of annual levelized costs of \$5.78 million, which represents the sacrificed  
18 asset life value, is illustrated in DE-03 – DE-04, Appendix G, Schedule 10. The  
19 sacrificed asset values for each type of non-LED light fixture (Column F, lines 2 - 20) are  
20 calculated using the following steps:

21

22 (i) The fixture capital service monthly rate (Column B, labeled “Capital  
23 Cost/Month”, lines 2 - 20) is multiplied by the number of non-LED fixtures  
24 before conversion (Column C, lines 2 - 20) to calculate annual capital-related  
25 revenue by non-LED fixture type (Column D, lines 2 - 20).

26

27 (ii) The relative shares of annual capital-related revenues by non-LED fixture  
28 (Column E) are calculated by dividing the individual non-LED light fixture

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1 annual revenues (Column D, lines 2 - 20) by the total non-LED fixture annual  
2 revenue (Column D, line 21).

3  
4 (iii) The levelized cost over the five year period of \$5.78 million (Column F, line 21),  
5 is multiplied by the non-LED fixture relative shares (Column E) to calculate  
6 annual levelized costs in aggregate by individual fixture type.

7  
8 The total lump sum amount of \$23.1 million (Column H, line 21) is multiplied by  
9 the non-LED fixture relative shares (Column E) to calculate lump sum amounts in  
10 aggregate by individual fixture type.

11  
12 (b) The monthly LED conversion fee (five-years) is calculated as follows:

13  
14 (i) The assumed LED fixture equivalents of non-LED fixtures in Column A (lines 2 -  
15 20) are shown in Column J (lines 2 - 20). The non-LED fixture counts (Column  
16 C, lines 2 - 20) and their sacrificed asset amounts (Column F, lines 2 - 20) are  
17 aggregated by the corresponding LED fixtures and displayed in Column B, lines  
18 26 - 33, and Column C, lines 26 - 33.

19  
20 (ii) The aggregate sacrificed asset values (Column C, labeled "Stranded Asset", lines  
21 26 - 33) are divided by the aggregate number of fixtures (Column B, lines 26 - 33)  
22 and then divided by twelve to obtain the monthly LED conversion fees in  
23 Column D (lines 26 - 33). At the time of this filing, the salvage value cost was  
24 unknown. It will be included in the conversion fee at the time of the compliance  
25 filing.

26  
27 (c) The lump sum conversion fee shown in Column H (lines 26 - 33) is calculated as follows:

28  
29 (i) The lump sum LED conversion fee amounts, calculated in Column H (lines 2 -  
30 20), are aggregated by the corresponding LED fixtures in column A (lines 26 -

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1                   33) and shown in Column E (lines 26 - 33). The conversion fees in Column H  
2                   (lines 26 - 33) are calculated by dividing values in Column E (lines 26 - 33) the  
3                   aggregated fixture counts from column B (lines 26 - 33).

4  
5                   At the time of this filing, the salvage value cost was unknown. It will be included  
6                   in the conversion fee at the time of the compliance filing.

Calculation of Conversion Fee (Per Fixture)

A Formulas	B Capital Cost/Month	C # of Fix (brf conv. *)	D B x C Annual Revenue	E Relative Share of Annual Revenue	F E x F (line 21) Stranded Asset	G F ÷ C ÷ 12 Monthly LED conversion Fee (5 Years)	H E x H (line 21) Lump Sum LED conversion Fee	I H ÷ C Lump Sum LED conversion Fee	J Type of LED Light
(1) Light									
(2) 100W MV	\$3.07	272	\$10,009	0.23%	\$13,257	\$4.06	\$52,974.14	\$194.76	Sat-48-44W
(3) 125W MV	\$2.88	11222	\$387,983	8.89%	\$513,873	\$3.82	\$2,053,369.93	\$182.98	Sat-48-55W
(4) 175W MV	\$2.85	2684	\$91,948	2.11%	\$121,783	\$3.78	\$486,628.95	\$181.31	Sat-48-87W
(5) 250W MV	\$3.53	1033	\$43,754	1.00%	\$57,951	\$4.68	\$231,566.54	\$224.17	Sat-96-88W
(6) 400W MV	\$3.61	1413	\$61,129	1.40%	\$80,964	\$4.77	\$323,522.49	\$228.96	Sat-96-173W
(7)			\$0						
(8) 250W HPS	\$3.08	5550	\$205,298	4.70%	\$271,912	\$4.08	\$1,086,523.05	\$195.77	Sat-96-110W
(9) 400W HPS	\$3.19	3664	\$140,321	3.21%	\$185,852	\$4.23	\$742,639.60	\$202.69	Sat-96-173W
(10) 70W HPS	\$2.90	40531	\$1,411,232	32.33%	\$1,869,141	\$3.84	\$7,468,842.81	\$184.27	Sat-48-44W
(11) 100W HPS	\$2.93	47219	\$1,657,409	37.97%	\$2,195,196	\$3.87	\$8,771,717.20	\$185.77	Sat-72-65W
(12) 150W HPS	\$3.09	5730	\$212,466	4.87%	\$281,406	\$4.09	\$1,124,459.82	\$196.24	Sat-96-88W
(13)			\$0						
(14) 135W LPS	\$5.50	58	\$3,829	0.09%	\$5,071	\$7.29	\$20,262.28	\$349.35	Sat-48-74W
(15) 180W LPS	\$7.94	806	\$76,792	1.76%	\$101,709	\$10.52	\$406,416.63	\$504.24	Sat-96-88W
(16)			\$0						
(17) 400W MAL	\$3.64	1315	\$57,399	1.32%	\$76,023	\$4.82	\$303,779.45	\$231.01	Sat-96-173W
(18) 250W MAL	\$3.58	109	\$4,685	0.11%	\$6,205	\$4.74	\$24,794.87	\$227.48	Sat-96-110W
(19) 150W MAL	\$3.58	4	\$172	0.00%	\$228		\$909.90	\$227.48	Sat-96-88W
(20) 100W MAL	\$3.58	7	\$301	0.01%	\$398	\$4.74	\$1,592.33	\$227.48	Sat-48-55W
(21) Total		121,617	\$4,364,728	100.00%	\$5,780,970.28		\$23,100,000		
(22)									
(23)									
(24)									
(25)									
(26) LED Sat-48-44W	40,803	\$1,882,398	\$3.84	\$7,521,817	\$184.34	N/A	\$184.34		
(27) LED Sat-48-55W	11,229	\$514,272	\$3.82	\$2,054,962	\$183.00	N/A	\$183.00		
(28) LED Sat-48-74W	58	\$5,071	\$7.29	\$20,262	\$349.35	N/A	\$349.35		
(29) LED Sat-48-87W	2,684	\$121,783	\$3.78	\$486,629	\$181.31	N/A	\$181.31		
(30) LED Sat-72-65W	47,219	\$2,195,196	\$3.87	\$8,771,717	\$185.77	N/A	\$185.77		
(31) LED Sat-96-88W	7,573	\$441,294	\$4.86	\$1,763,353	\$232.85	N/A	\$232.85		
(32) LED Sat-96-110W	5,659	\$278,117	\$4.10	\$1,111,318	\$196.38	N/A	\$196.38		
(33) LED Sat-96-173W	6,392	\$342,839	\$4.47	\$1,369,942	\$214.32	N/A	\$214.32		
(34) Total	121,617	\$5,780,970		\$23,100,000					

Transition of Non LED Fixtures to appropriate LED fixtures

1) At the time of filing, the salvage value was unknown. This will be made available at the time of the Compliance Filing  
\* brf conv. = before conversion