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Request IR-1:

Please provide an electronic file, in Excel or compatible format, of Appendix G, contained in the 2011 Unmetered Class Cost of Service and Pricing Study Review, which states and identifies all formulas.

Response IR-1:

Please refer to Attachment 1, filed electronically. Please note that customer specific information was removed to maintain confidentiality.

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Request IR-2:

Please provide an electronic download of the streetlight portion of NSPI's asset management system as of December 31, 2010, or a more recent date, as such data is available. Please provide this data in Excel or compatible format with identified column headings and explanation of each heading where codes are used.

Response IR-2:

Please refer to Attachment 1, filed electronically, for the detailed listing of the streetlight portion of NSPI's asset management system. For the continuity details of NSPI's streetlights, please refer to HRM IR-26 and HRM IR-27.

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Request IR-3:

Please file and provide a copy of the 2006 Unmetered Class Cost of Service Review and Street Lighting Study Report, dated July 31, 2006.

Response IR-3:

Please refer to Attachment 1.

Nova Scotia Utility and Review Board

Nova Scotia Power Incorporated

2006
UNMETERED CLASS
COST OF SERVICE REVIEW
and
STREET LIGHTING STUDY REPORT

DATED: July 31, 2006

Table of Contents

1.0 INTRODUCTION

In the Nova Scotia Utility and Review Board's March 10, 2006 Decision (NSUARB-NSPI-P-882), the Board directed NSPI to conduct a cost of service study with respect to the Unmetered Class. The Decision stated:

"This study shall include a review of the appropriateness of the current [C-3] weighting factor and a review of the rate base, including assets, assigned to the Unmetered Class. The study should also indicate a breakdown of costs and rate base by municipality."[1]

"The cost of service study results shall be filed with Board by July 31, 2006."[2]

This report is provided in response to the Board's directive. In summary, NSPI proposes to change the C-3 weighting factor from 5.0 to 2.0. NSPI's unmetered rate base is correctly stated and does not include any assets other than those owned and paid for by NSPI.

1.1 Background regarding Street Light Study

Street and Crosswalk Lighting rates were initially developed based on a Street/Crosswalk Lighting Study conducted in 1977.

Since 1977, rate adjustments have been applied to the all of the Street/Crosswalk Lighting rate components based on the overall UARB-approved average rate increase/decrease associated with the Unmetered Class. Street Lighting rates comprise a power and energy charge, maintenance charge, and a capital charge. A rate containing all three of these components is referred to as a full charge rate. For situations where the customer owns the fixture but NSPI performs the maintenance, NSPI offers street lighting rates that only include the power and energy and maintenance charges. For situations where the customer both owns and maintains the fixture, NSPI also offers rates that only contain the power and energy charge.

[1] NSUARB-NSPI-P-882 Decision, March 10, 2006, Page 269, paragraph 598.
[2] NSUARB-NSPI-P-882 Decision, March 10, 2006, Page 269, paragraph 600.

NSPI's Cost of Service Study ("COSS") provides an indicator as to how the current and proposed rates and resulting revenue collected compare to the costs assigned/allocated to the various customer classes. The Unmetered Class is an above-the-line ("ATL") class, and the COSS allocates and assigns direct costs to this class using methodologies approved by the Board. When compared to the revenue collected, this results in a revenue/cost ratio which the Company, and ultimately the UARB, uses to determine rate adjustments to this class.

A Street Lighting Study, which focuses on determining capital and maintenance costs, is generally conducted independently of the Company's regular cost of service study that is used for setting rate adjustments for electric tariffs. However, certain items from this cost of service study are used as input to the development of street light rates, such as street lighting operating and maintenance expenses assigned directly to the unmetered class in Exhibit 6A. These costs are used to determine the maintenance component of the street light rate.

2.0 THE C-3 WEIGHTED CUSTOMER ALLOCATOR

There has been discussion and debate about the use of the Cost of Service Study's C-3 Weighted Customer Allocator which is used to allocate certain customer-related expenses to ATL classes. There has also been debate about the use of a weighting factor of 5.0 to determine the percentage of these expenses that is allocated to the Unmetered Class.

This C-3 allocator has historically been applied to expenses incurred in the billing services, call centre, customer service head office, and customer service field operation areas of the Company. In reviewing these costs in 2006, NSPI has determined that the Unmetered Class does not contribute more to the cost causation in the customer service head office and field areas of the Company than any other ATL class and therefore proposes to discontinue the use of the C-3 customer allocator for these costs. Customer service field expenses have been transferred into customer service head office expenses and these costs are now being allocated using the C-1 Allocator (Average Customers). The Unmetered Class would still continue to receive a share of these costs but at a reduced level.

Billing Services and Call Centre functions were reviewed individually to determine the amount of time and effort personnel in these areas spend on issues related to unmetered customers in the normal course of their business operations.

In the **Billing Services** area, the majority of the effort associated with billing unmetered customers centers around those customers that have more than 10 lights, and customers converting traffic control lights from incandescent to LED technology. The LED conversion will continue to be an ongoing activity within the Billing Services function. In the future, the possibility exists that street lights could also be converted to LED with new technology improvements in this area and as government agencies continue to promote and utilize this energy saving technology. A street light conversion to LED would be a much larger project and would involve additional resources in the Billing Services area. The 2006 review results in a weighting factor of 4.78 for the Unmetered class. This is calculated by dividing; the ratio of unmetered costs to the total Billing

Services costs, by; the ratio of the number of unmetered service accounts to the total number of customer accounts.

Unmetered Class Costs	divided by:	# unmetered accounts =	4.78
Total Billing Services Costs		total accounts	

This analysis is contained in Appendix A, Table 2.

In the **Call Centre** function, the total call volume was analyzed to determine the number of calls associated with unmetered accounts. The number of unmetered calls identified for the 2005 study period was 18,781 or 1.68% out of a total of 1,114,707 calls. In addition, the review also determined that the call time associated with an unmetered call is roughly the same as any other call received by call centre staff. This analysis results in a weighting factor of 1.04 (down from the 5.0 used currently) and was calculated in the same manner as the weighting factor for the Billing Services function. This analysis is contained in Appendix A, Table 3.

In the summary analysis in Appendix A, Table 1, NSPI used the expenses from the 2006 Compliance Filing and compared the current COSS methodology for these customer service groups that employ the C-3 Weighted Customer Allocator to the Company's proposed methodology for these groups. The 5.0 weighting factor used previously was multiplied by the ratio of; the proposed new cost assignment of $0.598 million to the 2006C cost assignment of $1.625 million; resulting in a revised weighting of 1.84. This figure has been rounded to 2.0 for COSS purposes.

3.0 UNMETERED CLASS RATE BASE

With respect to the unmetered rate base, HRM's concern during NSPI's 2006 Rate Hearing appears to have centered on its belief that developers pay for streetlights in the capital contributions they provide when new subdivisions are developed. HRM argued that NSPI improperly included developer-paid streetlights in its rate base. HRM also argued that some residential customers purchase their own "area lights", and that NSPI has included these customer-owned lights in its rate base.

These assertions are incorrect, and were left somewhat vague in the last Rate Hearing following HRM's questioning of NSPI's Finance Panel. In reviewing this issue and the transcript from the 2006 Rate Hearing, NSPI would like to clarify that:

- Developers do not contribute to the capital costs of providing streetlights. Other than upgrades to provide non-standard or decorative fixtures, capital contributions required from developers relate to infrastructure and associated costs other than streetlight fixtures and associated hardware;

- Virtually all "yard lights" or area lights installed on individual homeowners' properties are NSPI-purchased and owned without any contribution from the homeowners, and any that may be paid for by the homeowner are not included in NSPI's rate base;

- All streetlights replaced as a result of motor vehicle accidents are a replacement of NSPI's assets and properly remain as part of NSPI's rate base.

NSPI's unmetered rate base is correctly stated and does not include any assets other than those owned and paid for by NSPI. Please see column 1 ("Full Charge") of Schedule 1 of the attached Street Light Study for an inventory of the 120,718 unmetered fixtures owned by NSPI.

In the Board's order, NSPI was directed to provide a breakdown of street lighting costs and rate base by municipality. The total rate base and operating costs associated with street lights contained in the regular cost of service study represents the maximum detail available from the books and records of the Company. NSPI does not have the data with which to provide this information by municipality.

4.0 STREET / CROSSWALK LIGHTING STUDY

Street and Crosswalk lighting represent 90% of the total number of NSPI's unmetered service units and the total revenue collected from customers. As stated previously, NSPI-owned streetlights include a power and energy charge, a maintenance charge and a capital recovery charge (i.e., a full charge rate if all three components are used). Customer-owned crosswalk lights and miscellaneous unmetered services contain either a power and energy charge and maintenance charge or only a power and energy charge. The inclusion of the maintenance charge depends on whether it is NSPI or the customer that provides regular maintenance work on the light. Customer-owned lights are typically floodlights installed on a customer's property such as retail parking lots, car dealerships, parks, highway intersection lighting, exhibition facilities and residential yards, barns and garages.

In conducting this 2006 update to the original 1977 Street / Crosswalk Lighting Study, the following information was reviewed and updated:

- Schedule 1 – Street and Crosswalk Lighting Inventory Levels
- Schedule 2 – Determination of Maintenance Costs by Fixture Type
- Schedule 3 – Determination of Average Installation Labour Costs associated with Street Lighting Gross Assets
- Schedule 4 – Determination of Depreciation and Capital-related costs by Fixture Type
- Schedule 5 – Tax-Adjusted Weighted Average Cost of Capital
- Schedule 6 & 7 – Summary and Detail of Current Material Costs by Fixture Type
- Schedule 8 – Lamp Life Analysis
- Schedule 9 – Updated Street and Crosswalk Lighting Rates by Cost Component and Total Revenue based on current Inventory levels

4.1 Schedule 1 - Street and Crosswalk Lighting Inventory

The lighting units reviewed in this study were based on inventory levels as of December 2005. The total units were 134,280 which were made up of 120,718 full charge lights,

894 “power and energy” and maintenance charge lights, and 12,668 “power and energy”-only lights. The majority of the lights (83%) on NSPI’s system are High Pressure (Intensity) Sodium ranging in wattage from 70W to 1000W.

4.2 Schedule 2 - Determination of Maintenance Costs by Fixture Type

The purpose of this schedule is to assign current maintenance costs to all lights containing a maintenance charge, based on the service life of each lamp type and the associated maintenance weighting factors, as measured relative to the replacement of 100W High Pressure (Intensity) Sodium lights. These weighting factors and all maintenance charged lights are then used to determine the weighted total (column F) number of lights maintained. Current street light operating expenses were then used to determine annual and monthly maintenance costs by fixture type. The operating expenses used in this review are based on forecasted street lighting expenses from the Customer Operations area for 2006C including a share of corporate overhead and pension costs. This amount of $4.916M is identified in the 2006C COSS in Exhibit 6A. The results, using the weighted number of street lights and the forecasted operating expenses for street lights, determine the annual and monthly maintenance charge to be applied to each type of light.

4.3 Schedule 3 - Determination of Average Installation Labour Costs associated with Street Lighting Gross Assets

This schedule uses the Gross Street Lighting Assets as of December 31, 2005 of $44.602M and the current material costs of each type of fixture, along with the current number of fixtures, to arrive at a total installation labour cost. The current material cost of each fixture is multiplied by the number of fixtures to arrive at a total material capital cost. The amount is subtracted from the total street light gross plant value to arrive at a total installation cost which, divided by the number of fixtures, results in an average installation labour cost of $181.48 per fixture. Material cost information for incandescent and fluorescent lighting was not available and therefore an estimated escalation factor of 125% was applied to the Unit Costs from 1977. This schedule includes a sample material

cost breakdown of a 100W High Pressure (Intensity) Sodium light, which is re-produced below.

Sample Material Cost - 100 Watt High Intensity (Pressure) Sodium:
Inventory Prices as of September 2005

Fixture, Ballast & Photocell	$100.21
Bracket Assembly (Davit)	$46.44
Wire	$11.80
Miscellaneous Hardware	$2.34
Lamp Replacement	$8.37
TOTAL	**$169.17**

4.4 Schedule 4 - Determination of Depreciation and Capital-related costs by Fixture Type

In this schedule, the capital component of the street light rate is determined by individual fixture type. The depreciation rate used in this calculation was 4.55%, which is Year 2 of the UARB-approved depreciation phase-in schedule and represents the rate for 2006. The tax-adjusted, weighted average cost of capital (WACC) of 11.96% was used to calculate the remaining capital-related costs such as interest, preferred dividends, income taxes, grants in lieu of taxes and net income. This method of assigning capital-related costs to street lighting fixtures is consistent with the methodology used in, and approved for, the development of NSPI's Open Access Transmission Tariff (OATT). In applying the depreciation and tax-adjusted WACC rate to the total material and labour installation costs results in an annual and monthly capital cost per lighting fixture.

4.5 Schedule 5 - Tax-Adjusted Weighted Average Cost of Capital

As stated previously, using a tax-adjusted WACC is consistent with the methodology used in the development of NSPI's currently approved OATT. The calculation is broken down into four components; pretax WACC, additional income tax on Common Equity, Large Corporation Tax and Grants-in-Lieu of Property Taxes. The pretax WACC of 8.21% is based on NSPI's 2006 Compliance Filing. The additional Income Tax on

Common Equity uses the extended equity cost of 3.58% and the effective tax rate of 37% to arrive at a rate of 2.10%. The Large Corporation Tax component uses a provincial capital tax rate of 0.266% for 2006 and a federal capital tax rate of 0.125% and the average Net Plant Value of Street Lighting and associated General Property Plant and a share of Deferred Charges and Credits to arrive at a Large Corporation Tax Rate of 0.46%. The resulting Grants-in-Lieu Tax rate of 1.19% used the forecasted 2006C Grants-in-Lieu expense of $32.563M and the Average Net Plant Value of Street Lights as a percentage of Total Electric Plant of 1.18%. Summing the four components of the Tax-adjusted WACC results in a combined rate of 11.96%

4.6 Schedules 6 and 7 - Summary and Detail of Street Lighting Material Costs by Fixture Type

An analysis of current material costs was conducted using information as of September 2005. This analysis involved the review of all components used in the installation of street light fixtures such as the lamp, photocell, davit, wire, connectors and fasteners. A recent review of these material costs concluded that the prices have not changed materially since September 2005 and are still appropriate for this study. In addition, NSPI has provided a detailed listing of all material costs obtained from the material inventory control system.

4.7 Schedule 8 - Lamp Life Analysis

Average Rated Life Spans of each lamp type, as provided in the Canadian Electrical Association's Lighting Reference Guide[3], were used in this study. Annual photocell cumulative operating time is based on 4000 hours per year or 333 hours per month. Using the average lamp life and burning hours per year results in the expected service life, in years, by lamp type. The lamp life and number of replacements, relative to those of a 100W High Pressure (Intensity) Sodium lamp, were then determined. The results of this

[3] Product Knowledge – Lighting Reference Guide, Canadian Electrical Association, April 1992, Originally printed by Ontario Hydro (4th Edition) 1991.

analysis were used to determine the frequency of bulb replacements as it pertains to annual maintenance work in Schedule 2.

4.8 Schedule 9 - New Street and Crosswalk Lighting Rates by Cost Component

Once the analysis of all costs components was complete, they were summarized in Schedule 9 including the rate description, the rate code, the calculated monthly kWh usage and the new power and energy, maintenance, and capital cost components. Incandescent rates < 300W and > 300W were set at those used for 250W and 400W Mercury Vapour rates respectively. Calculation of the power and energy component is shown at the bottom of Schedule 9 and is based on annual photocell and continuous burning energy usage to arrive at average cents/kWh that is applied to the standard energy usage. In addition, this schedule compares the new resulting rates for 2006 and the percentage increase/decrease from the current approved rates for 2006. In comparing these new resulting rates and the current approved rates along with the December/2005 inventory levels results in an increase in total Street and Crosswalk Lighting Revenue for 2006 of $0.276M from $21.397M to $21.673M.

5.0 CONCLUSION

In order to ensure that the three components of unmetered rates remain aligned with costs, NSPI proposes to update this Street / Crosswalk Lighting Study each time the Company files a future general rate application. The Company will review each cost component and propose revisions, if appropriate, to the rate charged to fixture types, replacing the former method of applying the average across-the-board rate adjustment to the total unmetered rate. The Unmetered Rates contained in Schedule A of the Company's official approved tariffs will still be shown as single rates but the individual cost components that make up this rate will be priced accordingly.

NSPI proposes to change the description of High Intensity Sodium to High Pressure Sodium in the Unmetered Rates section of the Company's approved Tariffs which better reflects the current lighting terminology.

APPENDIX A

ANALYSIS OF WEIGHTING FACTOR FOR C-3 CUSTOMER ALLOCATOR

APPENDIX A - TABLE 1

UNMETERED SERVICE CLASS
ANALYSIS OF ALLOCATED CUSTOMER-RELATED EXPENSES

	2006 Compliance Filing			
	Total Direct Costs ($000)	Total - Incl. Corp. O/H & Pension Costs ($000)	Cust. Costs assigned to Unmetered Class ($000)	Cust. Costs assigned to Unmetered Class (%)
Customer Costs Assigned to Unmetered Class Using C-3 Allocator:				
Current COSS Methodology				
Billing Services	$3,272	$5,456	$424	7.8%
Call Centre	6,230	10,389	808	7.8%
Cust. Serv. H/O	3,034	5,060	393	7.8%
	$12,536	$20,905	$1,625	
Proposed COSS Methodology				
Billing Services	$3,272	$5,456	$423	7.7%
Call Centre	6,230	10,389	175	1.7%
Cust. Serv. H/O	3,034	5,060	0	0.0%
	$12,536	$20,905	$598	
			1.84	

APPENDIX A - TABLE 2

BILLING SERVICES OPERATIONS

Rate Class	Total Accts	% of Accounts	Meter Reading Processing	Billing	Inquiries	Large Accts requiring manual effort	Unmetered Accts with more than 10 lights & LED TCL Conversions	Total FTEs	% of FTEs	Operating Budget allocated by Rate Class
			2.5 FTE	7.25 FTE	2.75	1.5 FTE	1.0 FTE			2.6 M
Residential	415,831	89.90%	2.28	6.52	2.47			11.27	75.17%	1,954,342
Tou	3,296	0.71%	0.02	0.05	0.02			0.09	0.60%	15,496
General (Rate 10)	22,391	4.84%	0.12	0.35	0.13			0.61	4.05%	105,222
General Demand (Rate 11)	11,103	2.40%	0.06	0.17	0.07			0.30	2.01%	52,182
Industrial (Rate 21 & 22)	2,419	0.52%	0.01	0.04	0.01			0.07	0.44%	11,362
Unmetered	7,491	1.62%	0.00	0.12	0.04		1.00	1.16	7.75%	201,396
Sub-Total	462,531	100.00%	2.50	7.25	2.75					
LCB/LCCB	57		0.00	0.00	0.00	1.50		1.50	10.00%	260,000
Total	462,588		2.50	7.25	2.75	1.50	1.00	15.00	100.00%	2,600,000
FTE			2.50	7.25	2.75	1.50	1.00			
										2,600,000.00

Billing Services Weighting Factor Calculation = (Unmetered Billing Services Costs / Total Billing Services Costs) / (Total Unmetered Accounts / Total NSPI Accounts)
= ($201,396 / $2,600,000) / (7,491 / 462,531)

Weighting Factor = 4.78

APPENDIX A - TABLE 3						
CALL CENTRE OPERATIONS						
Group		**Calls**	**Budget 2006**	**Cost Per Call**	**Total Cost**	**%**
Outage		116,565			$782,043	10%
Residential		400,097			2,684,280	36%
Commercial		66,861			448,575	6%
Collections		453,439			3,042,155	41%
Wiring Permit		41,650			279,433	4%
Web Contacts		36,095			242,164	3%
Total Contacts 2005		**1,114,707**	**$ 7,478,650**	**$ 6.71**	**$7,478,650**	
Unmetered Service Calls		16,343		$ 6.71	109,646	1.47%
Unmetered Service Web Contacts		2,438		$ 6.71	16,357	0.22%
Total Unmetered Service Transactions		**18,781**		**$ 6.71**	**$126,003**	**1.68%**
Billing Services Weighting Factor Calculation	= (Unmetered Call Centre Costs / Total Call Centre Costs) / (Total Unmetered Accounts / Total NSPI Accounts)					
	= ($126,003 / $7,478,650) / (7,491 / 462,531)					
Weighting Factor =	**1.04**					
Assumptions/Notes						
Uses 2005 Call/transaction volumes						
Uses 2006 budget						
Cost/call based on inbound contacts plus outbound collections calls (excludes technology satisfied)						
Unmetered Services transactions are a subset of total 2005 contacts and are based on activity codes entered by CSRs.						

APPENDIX B
STREET AND CROSSWALK LIGHTING STUDY

SCHEDULE 1

STREET / CROSSWALK LIGHTING STUDY

Inventory Level as of DECEMBER 2005

		Quantity			
Rate Code	**Description**	**Full Charge**	**Energy & Maint**	**Energy Only**	**Total**
001/003	Incandescent < 300 Watts	31	0	7	38
002	Incandescent > 300 Watts	3	0	0	3
		34	0	7	41
100	Mercury Vapour 100 Watts	269	0	0	269
101/201/301	Mercury Vapour 125 Watts	11,962	9	11	11,982
102/202/302	Mercury Vapour 175 Watts	3,150	24	153	3,327
103/203/303	Mercury Vapour 250 Watts	1,149	34	54	1,237
104/204/304	Mercury Vapour 400 Watts	1,484	10	16	1,510
105/205/305	Mercury Vapour 700 Watts	12	0	1	13
106/206/306	Mercury Vapour 1000 Watts	76	17	7	100
107	Mercury Vapour 250 Watt Cont. Oper.	5	0	0	5
		18,107	94	242	18,443
110	Fluorescent 2x24" 70 Watts	913	0	0	913
111	Fluorescent 2x48" 220 Watts	153	0	0	153
112	Fluorescent 2x72" 300 Watts	68	0	0	68
113/213	Fluorescent 4x72" 600 Watts	15	0	0	15
114/214	Fluorescent 1x96" 110 Watts	5	26	0	31
115/215	Fluorescent 1x72" 150 Watts	2	3	0	5
116	Fluorescent 4x48" 440 Watts	2	0	0	2
217	Fluorescent 1x48"	0	1	0	1
218	Fluorescent 2x48"	0	0	0	0
330	Fluorescent 4x35"	0	0	2	2
350	Fluorescent 4x96"	0	0	78	78
		1,158	30	80	1,268
117	Fluorescent Crosswalk Cont. 4x72"	0	0	2	2
118	Fluorescent Crosswalk Cont. 2x24"	0	0	17	17
119	Fluorescent Crosswalk Cont. 4x48"	0	0	21	21
120	Fluorescent Crosswalk Cont. 2x96"	0	0	29	29
150	Fluorescent Crosswalk Cont. 4x96"	0	0	23	23
		0	0	92	92
310	Fluorescent Crosswalk 2x24"	0	0	1	1
311	Fluorescent Crosswalk 4x48"	0	0	5	5
312	Fluorescent Crosswalk 2x72"	0	0	2	2
313	Fluorescent Crosswalk 4x72"	0	0	0	0
314	Fluorescent Crosswalk 1x96"	0	0	25	25
315	Fluorescent Crosswalk 1x72"	0	0	0	0
		0	0	33	33
121/221/321	High Pressure Sodium 250 Watts	5,256	160	1,677	7,093
122/326	High Pressure Sodium 400 Watts	3,667	0	86	3,753
123/222/322	High Pressure Sodium 70 Watts	38,321	224	6,299	44,844
124/223/323	High Pressure Sodium 100 Watts	45,889	110	2,508	48,507
125/224/324	High Pressure Sodium 150 Watts	5,241	232	1,299	6,772
327	High Pressure Sodium 500 Watts	0	0	3	3
		98,374	726	11,872	110,972
130	Low Pressure Sodium 135 Watts	61	0	0	61
131/231/331	Low Pressure Sodium 180 Watts	870	43	37	950
132	Low Pressure Sodium 90 Watts	2	0	0	2
		933	43	37	1,013
140/342	Metallic Arc 400 Watts	1,215	0	153	1368
141/341	Metallic Arc 1000 Watts	833	0	11	844
142/343	Metallic Arc 250 Watts	64	0	66	130
143	Metallic Arc 150 Watts	0	1	0	1
344	Metallic Arc 175 Watts	0	0	72	72
345	Metallic Arc 150 Watts	0	0	3	3
		2,112	1	305	2,418
	TOTAL	**120,718**	**894**	**12,668**	**134,280**

Date : 7/28/2006

SCHEDULE 2

STREET / CROSSWALK LIGHTING STUDY
CALCULATION OF MAINTENANCE COSTS BY FIXTURE TYPE

(A) Code	(B) Lamp Type	(C) Service Life (Years)	(D) Maintenance Weighting Factors	(E) # of Full Chg & Eng.+Maint. Fixtures	(F) Weighted Total	(G) Cost Per Year	(H) Cost Per Month
A	Mercury Vapour	6.000	1.0000	6,230	6,230	$37.52	$3.13
B	Mercury Vapour - 125W	4.500	1.3333	11,971	15,961	$50.03	$4.17
C	Fluorescent	3.000	2.0000	1,188	2,376	$75.04	$6.25
D	High Pressure (Intensity) Sodium (Note1)	6.000	1.0000	99,100	99,100	$37.52	$3.13
E	Incandescent	0.625	9.6000	34	326	$360.20	$30.02
G	Metallic Arc 150 & 250W	2.500	2.4000	65	156	$90.05	$7.50
H	Metallic Arc 400W	3.750	1.6000	1,215	1,944	$60.03	$5.00
I	Metallic Arc 1000W	2.500	2.4000	833	1,999	$90.05	$7.50
J	Low Pressure Sodium	2.000	3.0000	976	2,928	$112.56	$9.38
				121,612	131,021		

Street Lighting Maint. Expenses
(from 2006CF COSS, Exhibit 6A) **$4,916,000**

Annual Cost of High Pressure Sodium
($4,916,000 / 131,028 weighted fixtures) **$37.52**

Note 1: Maintenance weighting factors relative to High Pressure Sodium fixture, index = 1.0
Factor is: HPS service life / various fixture service lives

SCHEDULE 3

STREET / CROSSWALK LIGHTING STUDY

CAPITAL COST

Gross Plant Value (including installation costs) less Retirements of
Street Lighting Equipment as of December 31, 2005 **$44,601,719**

Description	Unit Cost Mar/1977	Unit Cost Sept/2005	# of Fixtures	Total Value	
Incandescent < 300 Watts	$51.36	$64.20	31	$1,990	
Incandescent > 300 Watts	$63.62	$79.53	3	239	
Mercury Vapour 100 Watts	$76.55	$206.82	269	55,635	
Mercury Vapour 125 Watts	$77.16	$182.05	11,962	2,177,632	
Mercury Vapour 175 Watts	$85.30	$178.55	3,150	562,419	
Mercury Vapour 250 Watts	$87.24	$276.89	1,149	318,148	
Mercury Vapour 400 Watts	$107.82	$286.96	1,484	425,850	
Mercury Vapour 700 Watts	$485.12	$435.30	12	5,224	
Mercury Vapour 1000 Watts	$492.29	$559.52	76	42,524	
Mercury Vapour 250 Watt Cont. Oper.	$87.24	$276.89	5	1,384	
Fluorescent 2x24" 70 Watts	$106.44	$133.05	913	121,475	
Fluorescent 2x48" 220 Watts	$131.91	$164.89	153	25,228	
Fluorescent 2x72" 300 Watts	$178.72	$223.40	68	15,191	
Fluorescent 4x72" 600 Watts	$293.72	$367.15	15	5,507	
Fluorescent 1x96" 110 Watts	$160.00	$200.00	5	1,000	
Fluorescent 1x72" 150 Watts	$121.22	$151.53	2	303	
Fluorescent 4x48" 440 Watts	$188.91	$236.14	2	472	
High Pressure Sodium 70 Watts	***N/A***	$177.00	38,321	6,782,966	
High Pressure Sodium 100 Watts	***N/A***	$169.17	45,889	7,762,849	
High Pressure Sodium 150 Watts	***N/A***	$172.21	5,241	902,531	
High Pressure Sodium 250 Watts	$156.49	$223.05	5,256	1,172,357	
High Pressure Sodium 400 Watts	$173.73	$238.12	3,667	873,190	
Low Pressure Sodium 90 Watts	***N/A***	$575.81	2	1,152	
Low Pressure Sodium 135 Watts	$371.69	$575.81	61	35,124	
Low Pressure Sodium 180 Watts	$226.10	$685.27	870	596,181	
Metallic Arc 250 Watts	***N/A***	$419.69	64	26,860	
Metallic Arc 400 Watts	$358.84	$279.83	1,215	339,995	
Metallic Arc 1000 Watts	$560.49	$527.40	833	439,325	22,692,751
			120,718		

Total Installation Costs (Labour) $21,908,968

Installation Costs per Fixture **$181.49**

Escalation Factor (Incandescent)	125%
Escalation Factor (Fluorescent)	125%

Note: 2005 costs are based on stores material inventory cost as of September 2005 with the exception of Incandescent and fluorescent which have been assumed at 125% of 1977 costs.

Sample Material Cost - 100 Watt High Intensity (Pressure) Sodium :
Inventory Prices as of September 2005

Fixture, Ballast & Photocell	$100.21
Bracket Assembly (Davit)	46.44
Wire	11.80
Miscellaneous Hardware	2.34
Lamp Replacement	8.37
TOTAL	**$169.17**

SCHEDULE 4

STREET / CROSSWALK LIGHTING STUDY

Capital Cost Rate Component Calculation

Depreciation Rate for 2006	**4.44%**
Tax Adjusted Weighted Average Cost of Capital	**11.96%**

	Material Cost Sept/2005	Labour Cost	Total	Depreciation Expense	Cost of Capital	Total Annual Cost	Total Monthly Cost
Incandescent < 300 Watts	$64.20	$181.49	$245.69	$10.91	$29.38	$40.29	$3.36
Incandescent > 300 Watts	79.53	181.49	261.01	11.59	31.22	42.81	3.57
Mercury Vapour 100 Watts	206.82	181.49	388.31	17.24	46.44	63.68	5.31
Mercury Vapour 125 Watts	182.05	181.49	363.53	16.14	43.48	59.62	4.97
Mercury Vapour 175 Watts	178.55	181.49	360.03	15.99	43.06	59.05	4.92
Mercury Vapour 250 Watts	276.89	181.49	458.38	20.35	54.82	75.17	6.26
Mercury Vapour 400 Watts	286.96	181.49	468.45	20.80	56.03	76.83	6.40
Mercury Vapour 700 Watts	435.30	181.49	616.79	27.39	73.77	101.15	8.43
Mercury Vapour 1000 Watts	559.52	181.49	741.01	32.90	88.62	121.53	10.13
Mercury Vapour 250 Watt Cont. Oper.	276.89	181.49	458.38	20.35	54.82	75.17	6.26
Fluorescent 2x24" 70 Watts	133.05	181.49	314.54	13.97	37.62	51.58	4.30
Fluorescent 2x48" 220 Watts	164.89	181.49	346.38	15.38	41.43	56.81	4.73
Fluorescent 2x72" 300 Watts	223.40	181.49	404.89	17.98	48.42	66.40	5.53
Fluorescent 4x72" 600 Watts	367.15	181.49	548.64	24.36	65.62	89.98	7.50
Fluorescent 1x96" 110 Watts	200.00	181.49	381.49	16.94	45.63	62.56	5.21
Fluorescent 1x72" 150 Watts	151.53	181.49	333.01	14.79	39.83	54.61	4.55
Fluorescent 4x48" 440 Watts	236.14	181.49	417.63	18.54	49.95	68.49	5.71
High Pressure Sodium 70 Watts	177.00	181.49	358.49	15.92	42.88	58.79	4.90
High Pressure Sodium 100 Watts	169.17	181.49	350.65	15.57	41.94	57.51	4.79
High Pressure Sodium 150 Watts	172.21	181.49	353.69	15.70	42.30	58.01	4.83
High Pressure Sodium 250 Watts	223.05	181.49	404.54	17.96	48.38	66.34	5.53
High Pressure Sodium 400 Watts	238.12	181.49	419.61	18.63	50.19	68.82	5.73
Low Pressure Sodium 90 Watts	575.81	181.49	757.29	33.62	90.57	124.20	10.35
Low Pressure Sodium 135 Watts	575.81	181.49	757.29	33.62	90.57	124.20	10.35
Low Pressure Sodium 180 Watts	685.27	181.49	866.75	38.48	103.66	142.15	11.85
Metallic Arc 250 Watts	419.69	181.49	601.18	26.69	71.90	98.59	8.22
Metallic Arc 400 Watts	279.83	181.49	461.32	20.48	55.17	75.66	6.30
Metallic Arc 1000 Watts	$527.40	$181.49	$708.89	$31.47	$84.78	$116.26	$9.69

Date: 7/28/2006

SCHEDULE 5

STREET / CROSSWALK LIGHTING STUDY
Tax-Adjusted Weighted Average Cost of Capital

a) Weighted Average Cost of Capital - Pretax

	Proportion	Cost	Extended
ST Debt	7.77%	5.08%	0.39%
LT Debt	45.57%	8.19%	3.73%
Preferred	9.15%	5.42%	0.50%
Common	37.51%	9.55%	3.58%
	100.00%		8.21%

WACC - pretax cost 8.21%

b) Additional income tax for common equity

Extended equity cost	3.58%
Effective tax rate (excluding surta	37.0%
Income tax	2.10%

WACC - equity tax cost 2.10%

c) Large Corporations Tax

Provincial capital tax	0.266%
Federal capital tax	0.125%
Ave. NBV - Street Lighting	$25.961
Ave. NBV - Assigned GP Plt.	2.008
Ave. Deferred Chgs & W/C	4.338
NPV - Total Street Lighting	$32.306
Provincial capital tax	$0.086
Federal capital tax	$0.064
Total	$0.150
Percentage of NBV	0.46%

WACC - Large Corporations Tax 0.46%

d) Grants in Lieu of Property Tax

Total 2006C Forecasted Expense	$32.563
St. Lgts. % of Total Electric Plant	1.18%
St. Lgts. Allocated Amount	$0.386
Percentage of NBV	1.19%

WACC - Grants in Lieu of Property Tax 1.19%

Total WACC - Interest / Carrying Cost **11.96%**

SCHEDULE 6

STREET / CROSSWALK LIGHTING STUDY
AREA LIGHTING MATERIAL COST ANALYSIS
September 2005

Light Type Street Lights	Material Cost	Fixture	Lamp	Photocell	Davit	Wire	Connectors	Fasteners
Incandescent < 300 Watts	$51.36	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Incandescent > 300 Watts	$63.62	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Mercury Vapour 100 Watts	$206.82	$122.41	$15.99	$7.84	$46.44	$11.80	$0.88	$1.46
Mercury Vapour 125 Watts	$182.05	$102.95	$10.67	$7.84	$46.44	$11.80	$0.88	$1.46
Mercury Vapour 175 Watts	$178.55	$102.95	$7.17	$7.84	$46.44	$11.80	$0.88	$1.46
Mercury Vapour 250 Watts	$276.89	$189.80	$7.86	$7.84	$57.25	$11.80	$0.88	$1.46
Mercury Vapour 400 Watts	$286.96	$198.75	$8.98	$7.84	$57.25	$11.80	$0.88	$1.46
Mercury Vapour 700 Watts	$435.30	$318.97	$37.10	$7.84	$57.25	$11.80	$0.88	$1.46
Mercury Vapour 1000 Watts	$559.52	$439.19	$41.10	$7.84	$57.25	$11.80	$0.88	$1.46
Mercury Vapour 250 Watt Cont. Oper.	$276.89	$189.80	$7.86	$7.84	$57.25	$11.80	$0.88	$1.46
Fluorescent 2x24" 70 Watts	$106.44	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 2x48" 220 Watts	$131.91	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 2x72" 300 Watts	$178.72	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 4x72" 600 Watts	$293.72	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 1x96" 110 Watts	$160.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 1x72" 150 Watts	$121.22	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Fluorescent 4x48" 440 Watts	$188.91	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
High Pressure Sodium 70W	$177.00	$107.80	$8.62	$0.00	$46.44	$11.80	$0.88	$1.46
High Pressure Sodium 100W	$169.17	$100.21	$8.37	$0.00	$46.44	$11.80	$0.88	$1.46
High Pressure Sodium 150W	$172.21	$102.95	$8.67	$0.00	$46.44	$11.80	$0.88	$1.46
High Pressure Sodium 250 Watts	$223.05	$142.48	$9.18	$0.00	$57.25	$11.80	$0.88	$1.46
High Pressure Sodium 400 Watts	$238.12	$156.93	$9.80	$0.00	$57.25	$11.80	$0.88	$1.46
Low Pressure Sodium 90W	$575.81	$463.38	$44.00	$7.84	$46.44	$11.80	$0.88	$1.46
Low Pressure Sodium 135 Watts	$575.81	$463.38	$44.00	$7.84	$46.44	$11.80	$0.88	$1.46
Low Pressure Sodium 180 Watts	$685.27	$562.07	$54.77	$7.84	$46.44	$11.80	$0.88	$1.46
Metallic Additive 250W	$419.69	$329.47	$18.83	$0.00	$57.25	$11.80	$0.88	$1.46
Metallic Arc 400 Watts	$279.83	$198.64	$9.80	$0.00	$57.25	$11.80	$0.88	$1.46
Metallic Arc 1000 Watts	$527.40	$399.26	$56.75	$0.00	$57.25	$11.80	$0.88	$1.46

SCHEDULE 7

STREET / CROSSWALK LIGHTING STUDY
AREA LIGHTING MATERIAL COST ANALYSIS
September 2005

ITEM	DESCRIPTION	AVG COST	Location
0000386440	LAMP FLUORESCENT 40W 48	1.35	
0000386450	LAMP FLUORESCENT 40W 48	1.75	
0000386700	LAMP FLUORESCENT 75W 96	3.49	
0000386710	LAMP FLUORESCENT 205W	3.95	
0000387070	LAMP FLUORESCENT 35W 24	4.19	
0000387190	LAMP FLUORESCENT 60W 48	3.14	
0000387360	LAMP FLUORESCENT 85W 72	6.54	
0000388000	LAMP 100 WATT M.V.	15.99	
0000388180	LAMP 125 WATT M.V.	10.67	
0000388330	LAMP 175 WATT M.V.	7.17	
0000388500	LAMP 250 WATT M.V.	7.86	
0000388660	LAMP 400 WATT M.V.	8.98	
0000388770	LAMP 700 WATT M.V.	37.10	
0000388980	LAMP 1000 WATT MV	41.10	
0000388990	LAMP 70 WATT H.P.S.	8.62	
0000389000	LAMP 100 WATT H.P.S.	8.37	
0000389030	LAMP 135 WATT L.P.S.	44.00	
0000389040	LAMP 150 WATT HPS 100V	25.23	
0000389060	LAMP 150 WATT H.P.S.55V	8.67	
0000389090	LAMP 180 WATT L.P.S.	54.77	
0000389250	LAMP 250 WATT H.P.S.	9.18	
0000389400	LAMP 400 WATT H.P.S.	9.80	
0000389450	LAMP 1000W HPS	56.75	
0000389700	LAMP HALIDE 250W	18.83	
0000389770	LAMP HALIDE 400W	14.93	
0000389810	LAMP HALIDE 1000W	31.31	
0000389900	LAMP STREET LITE SIGNAL	2.21	
0002103270	CONDUIT FLEX BLK 1/2"	3.97	
0050091540	BOLT LAG 1/2"X 4" GALV	0.56	
0050103120	BOLT MACHINE 5/8" X 12"	0.90	
0054223510	CRIMPIT #2/0- #8 WR139	0.44	
0057151000	BRACKET 10'L	88.91	
0057152040	BRACKET 1 1/4"X4' FIXED	46.62	
0057152220	BRACKET 4'X 2' 16" TEN	27.46	
0057154060	BRACKET 1 1/4"X6' LOWER	46.44	
0057155060	BRACKET SWIVEL 1 1/4 X6	18.91	
0057155720	BRACKET TAPERED 6' X 2"	48.90	
0057155723	BRACKET TAPERED 8'	87.05	
0057155725	BRACKET TAPERED 2"X10'	106.44	
0057156020	BRACKET LOWER 2" X 6'	57.25	
0057156080	BRACKET FIXED 2" X 8'	87.48	
0057157010	BRACKET TAPERED 12'L	141.42	
0057158140	PLATE POLE ST LITE 1 1/	9.46	
0057158220	PLATE POLE ST LIGHT 2"	26.24	
0057350350	LUMINAIRE LPS 135W	463.38	

SCHEDULE 7

STREET / CROSSWALK LIGHTING STUDY
AREA LIGHTING MATERIAL COST ANALYSIS
September 2005

ITEM	DESCRIPTION	AVG COST	Location
0057350720	LUM LPS 180W 120/240/347 V	562.07	R04B
0057350750	LUMINAIRE LPS 180W 240V	493.30	XX
0057350800	LUMINAIRE LPS 180W 347V	386.70	XX
0057350830	LUMINAIRE HPS 70W POLY	73.33	XX
57350835	LUM. 70W POLY C/W LAMP	99.23	XX
0057350836	LUM 70W POLY ALUM.ALLOY	97.70	XX
0057350837	LUMINAIRE 70W HPS CWA ACRY	120.88	C01A
0057350850	LUMINAIRE HPS 70W GLASS	69.32	XX
0057350855	LUM. 70W GLASS C/W LAMP	97.68	C03A
0057350856	LUM 70W GLASS AL. ALLOY	99.37	M12D
0057350857	LUM. 70W GLASS CWI BAL.	120.32	M08A
0057350860	LUM 100W HPS POLY	75.00	XX
0057350865	LUM. 100W POLY C/W LAMP	100.21	XX
0057350866	LUMINAIRE 100W ACRYLIC HPS	122.41	C07A
0057350867	LUM 100W POLY AL. ALLOY	98.37	XX
0057350875	LUM. 100W GLASS C/WLAMP	98.76	XX
0057350877	LUM. 100W GLASS CWI BAL	135.75	XX
0057350880	LUMINAIRE HPS 150W GLAS	82.27	XX
0057350885	LUM. 150W GLASS C/WLAMP	100.95	XX
0057350886	LUMINAIRE 150W HPS CWI GLAS	145.97	M05A
0057350887	LUM. 150W HPS 240V GLAS	150.88	C09A
0057350890	LUMINAIRE HPS 150W POLY	79.24	XX
0057350895	LUM. 150W POLY C/W LAMP	102.95	XX
0057351315	LUMINAIRE 250W HPS CWI GLAS	142.48	C07A
0057351400	LUMINAIRE 250W HPS CWI 347V	160.36	C05A
0057351710	LUMINAIRE HPS 400W GLAS	109.60	XX
0057351715	LUMINAIRE 400W HPS CWI 120/2	156.93	M12A
0057351720	LUMINAIRE HPS 400W 240V	204.30	XX
0057351730	LUMINAIRE HPS 400W 347V	196.00	XX
0057351760	LUMINAIRE 400W 600V HPS CWI	164.95	M12A
0057353330	LUMINAIRE MTL-HLDE 400W	281.54	XX
0057353500	LUMINAIRE HALIDE 1000 W	300.00	XX
0057353550	LUMINAIRE HALIDE 1000 W	294.79	T01C
0057400920	AREA LIGHT MV 125 W	107.76	XX
0057401200	LUMINAIRES 70W H-P.S.	107.80	D14B
0057401205	DUSK-T-DAWN 70W HPS CWA	184.25	D08B
0057402020	AREA LIGHT MV 175 W	92.88	XX
0057402100	LUMINAIRES 100W H.P.S.	106.37	XX
0057402105	DUSK-T-DAWN 100W HPS CWA	140.50	C15A
0057402150	FLOODLIGHT 150W HPS CWI	180.62	C17A
0057402240	FLOODLIGHT M.V. 175W	53.03	
0057403330	FLOODLIGHT M V 250 W	397.90	XX
0057403500	FLOODLIGHT 250W HPS CWI	181.97	
0057404050	FLOODLIGHT M V 400 W	281.17	XX
0057404600	FLOODLIGHT 400W HPS CWI	192.21	C11A

SCHEDULE 7

STREET / CROSSWALK LIGHTING STUDY
AREA LIGHTING MATERIAL COST ANALYSIS
September 2005

ITEM	DESCRIPTION	AVG COST	Location
0057408250	FLOODLIGHT MTL HAL.250W	329.47	D05B
0057408500	FLOODLIGHT 400W MTL-HAL CW	198.64	D03A
0057409000	FLOODLIGHT 1000W MH CWI	399.26	
0057409380	FLOODLIGHT M V 1000 W	439.19	XX
0057600450	BRACKET & ADAPTORS	9.15	
0057601010	CAP SHORTING TWIST LOCK	4.80	
0057601200	CONTROL 120 V PHOTO	7.05	
0057601400	CONTROL ELECT 120V PHOTOC	7.84	
0057602000	PHOTO CONTROL 120V HD	19.51	
0057602400	CONTROL 240V ELECT PHOTOC	10.30	
0057602960	GUARD WIRE FOR ST-LITE	50.44	
0057603800	REFRACTOR GLASS	32.60	
0057603900	REFRACTORS POLYCARBON #	0.00	
0057604020	REFRACTOR POLY LU B2214	48.03	
0057604050	REFRACTOR POLY LU B2217	73.74	
0057604080	REFRACTOR POLYCARBON #9	21.07	
0057604170	REFRACTOR GLASS	66.37	
0057604200	REFRACTOR ACRYLIC VB15	40.70	
0057604210	REFRACTOR POLY LUM VB15	78.68	
0057604220	REFRACTOR AREA LIGHT	18.66	
0057604240	REFRACTOR GLASS OV15	16.00	
0057604250	REFRACTOR POLY LUM 0V15	24.00	
0057604255	REFRACTOR STREETLIGHT OV	17.85	
0057604270	REFRACTOR GLASS OV25	25.89	
0057604280	REFRACTOR POLY OV25	92.87	
0057604300	REFRACTOR GLASS OV50	17.50	
0057605800	REDUCER LAMPHOLDER,	6.25	
0057606100	REFRACTOR 125 W M V	34.36	
0057606500	REFRACTOR FOR SODIUM	71.31	
0057606550	REFRACTOR FOR SODIUM	88.62	
0057606700	REFRACTOR 250 W M V	38.69	
0057606950	REFRACTOR 400 W M V	33.01	
0057607300	RELAY 30 AMP 110 V MURC	33.89	
0057607330	RELAY 30 AMP 125 V	140.04	
0057607400	RELAY 60 AMP 115 V	211.15	
0057607440	RELAY 60 AMP 250 V	191.29	
0057608690	STARTERS HPS LUMINAIRES	31.63	
0057608700	STARTER FOR HPS 70-150W	40.95	
0057608703	STARTER FOR HPS 55V	41.17	
0057608710	STARTER FOR SODIUM	40.41	
0057608713	STARTER KIT HPS 55V 70/	31.75	
0057608720	STARTER FOR HPS 150-400	40.76	
0057608722	STARTER FOR HPS 100V	36.35	
0057608730	STARTER FOR SODIUM	48.16	
0065734220	CABLE CU ST-LITE 2C #12	0.65	

SCHEDULE 8

STREET / CROSSWALK LIGHTING STUDY
LAMP LIFE ANALYSIS
September 2005

Assumptions: Total annual photocell operating time is based on 4,000 hours per year or 333 hours per month.
All Average Rated Life Spans are as indicated in the CEA Lighting Reference Guide, April 1992.
Originally printed by Ontario Hydro (4th Edition)
(CEA = Canadian Electrical Association)

Lamp Type	Average Life (Hrs)	Burning Hours per Year	Service Life (Years)	Life Relative to 100W HPS	Replacements Relative to 100W HPS
Incandescent	2500	4000	0.6	0.10	9.60
Flourescent (48 in., T12, Recess Base)	12000	4000	3.0	0.50	2.00
Mercury Vapour	24000	4000	6.0	1.00	1.00
Mercury Vapour 125W *See Note	18000	4000	4.5	0.75	1.33
Metal Halide 175W	7500	4000	1.9	0.31	3.20
Metal Halide 250W	10000	4000	2.5	0.42	2.40
Metal Halide 400W	15000	4000	3.8	0.63	1.60
Metal Halide 1000W	10000	4000	2.5	0.42	2.40
High Pressure Sodium 70W	24000	4000	6.0	1.00	1.00
High Pressure Sodium 100W	24000	4000	6.0	1.00	1.00
Low Pressure Sodium	8000	4000	2.0	0.33	3.00

*** No Average life data was available for this lamp size in the references listed above. 75% of the quoted life for all Mercury Lamps was used.**

STREET / CROSSWALK LIGHTING STUDY

COMPARISON OF NEW PROPOSED VS CURRENT STREET LIGHTING RATES
EFFECTIVE: MARCH 10, 2006

Description	Rate Code	kW.h/Mo.	Power & Energy	Maintenance	Capital	2006 New Resulting Rates	2006 New Resulting Revenue	2006 Approved Rates	Percent Change	Units	Revenue Variance
Incandescent :											
Incandescent < 300 Watts - Note 1	001	97	$10.46	$3.13	$6.26	$19.85	$7,386	$18.66	6.4%	31	444
Incandescent > 300 Watts - Note 1	002	154	16.61	3.13	6.40	26.14	941	27.06	-3.4%	3	(33)
Incandescent < 300 Watts - Note 1	003	97	10.46	0.00	0.00	10.46	879	$13.69	-23.6%	7	(271)
							9,206			41	140
Mercury Vapour :											
Mercury Vapour 100 Watts	100	43	4.64	3.13	5.31	13.08	42,212	10.65	22.8%	269	7,834
Mercury Vapour 125 Watts	101	52	5.61	4.17	4.97	14.75	2,117,031	12.31	19.8%	11,962	350,004
Mercury Vapour 175 Watts	102	69	7.44	3.13	4.92	15.49	585,540	14.50	6.8%	3,150	37,440
Mercury Vapour 250 Watts	103	97	10.46	3.13	6.26	19.85	273,754	18.52	7.2%	1,149	18,400
Mercury Vapour 400 Watts	104	154	16.61	3.13	6.40	26.14	465,539	27.02	-3.2%	1,484	(15,633)
Mercury Vapour 700 Watts	105	260	28.05	3.13	8.43	39.61	5,704	50.63	-21.8%	12	(1,587)
Mercury Vapour 1000 Watts	106	363	39.16	3.13	10.13	52.42	47,804	65.33	-19.8%	76	(11,777)
Mercury Vapour 250 Watt Cont. Oper.	107	213	17.81	6.26	6.26	30.33	1,820	28.30	7.2%	5	122
Mercury Vapour 125 Watts	201	52	5.61	4.17	0.00	9.78	1,056	8.89	10.0%	9	96
Mercury Vapour 175 Watts	202	69	7.44	3.13	0.00	10.57	3,044	10.93	-3.3%	24	(104)
Mercury Vapour 250 Watts	203	97	10.46	3.13	0.00	13.59	5,545	14.85	-8.5%	34	(514)
Mercury Vapour 400 Watts	204	154	16.61	3.13	0.00	19.74	2,369	22.91	-13.8%	10	(380)
Mercury Vapour 700 Watts	205	260	28.05	3.13	0.00	31.18	0	37.86	-17.6%	0	0
Mercury Vapour 1000 Watts	206	363	39.16	3.13	0.00	42.29	8,627	52.40	-19.3%	17	(2,062)
Mercury Vapour 125 Watts	301	52	5.61	0.00	0.00	5.61	741	5.60	0.3%	11	2
Mercury Vapour 175 Watts	302	69	7.44	0.00	0.00	7.44	13,660	7.43	0.1%	153	17
Mercury Vapour 250 Watts	303	97	10.46	0.00	0.00	10.46	6,778	10.46	0.0%	54	(1)
Mercury Vapour 400 Watts	304	154	16.61	0.00	0.00	16.61	3,189	16.61	0.0%	16	0
Mercury Vapour 700 Watts	305	260	28.05	0.00	0.00	28.05	337	28.04	0.0%	1	0
Mercury Vapour 1000 Watts	306	363	39.16	0.00	0.00	39.16	3,289	39.16	0.0%	7	0
							3,588,040			18,443	381,857

STREET / CROSSWALK LIGHTING STUDY

COMPARISON OF NEW PROPOSED VS CURRENT STREET LIGHTING RATES
EFFECTIVE: MARCH 10, 2006

Description	Rate Code	kW.h/Mo.	Power & Energy	Maintenance	Capital	2006 New Resulting Rates	2006 New Resulting Revenue	2006 Approved Rates	Percent Change	Units	Revenue Variance
Fluorescent :											
Fluorescent 2x24" 70 Watts	110	30	3.24	6.25	4.30	13.79	151,069	10.20	35.2%	913	39,318
Fluorescent 2x48" 220 Watts	111	85	9.17	6.25	4.73	20.15	37,002	18.54	8.7%	153	2,963
Fluorescent 2x72" 300 Watts	112	116	12.51	6.25	5.53	24.29	19,823	23.99	1.3%	68	248
Fluorescent 4x72" 600 Watts	113	222	23.95	6.25	7.50	37.70	6,786	41.61	-9.4%	15	(704)
Fluorescent 1x96" 110 Watts	114	47	5.07	6.25	5.21	16.53	992	13.83	19.5%	5	162
Fluorescent 1x72" 150 Watts	115	60	6.47	6.25	4.55	17.27	415	14.74	17.2%	2	61
Fluorescent 4x48" 440 Watts	116	166	17.91	6.25	5.71	29.87	717	31.28	-4.5%	2	(34)
							216,804			1,158	42,014
Fluorescent 4x72" 600 Watts	213	222	23.95	6.25	0.00	30.20	0	33.17	-9.0%	0	0
Fluorescent 1x96" 110 Watts	214	47	5.07	6.25	0.00	11.32	3,532	8.48	33.5%	26	886
Fluorescent 1x72" 150 Watts	215	60	6.47	6.25	0.00	12.72	458	10.35	22.9%	3	85
Fluorescent 4x48" 440 Watts	216	166	17.91	6.25	0.00	24.16	*0*	25.31	-4.5%	0	0
Fluorescent 1x48" 120 Watts	217	49	5.29	6.25	0.00	11.54	138	8.78	31.4%	1	33
Fluorescent 2x48" 220 Watts	218	85	9.17	6.25	0.00	15.42	0	13.85	11.3%	0	0
Fluorescent 4x35"	*330*	47	5.07	0.00	0.00	*5.07*	*122*	5.06	0.2%	2	0
							4,250			32	1,004
Fluorescent Crosswalk - Continuous Burning - Customer Owned :											
Fluorescent 2x24" 70 Watts	118	66	5.52	0.00	0.00	5.52	1,126	6.96	-20.7%	17	(294)
Fluorescent 4x48" 440 Watts	119	364	30.43	0.00	0.00	30.43	7,669	38.31	-20.6%	21	(1,985)
Fluorescent 4x72" 600 Watts	117	486	40.63	0.00	0.00	40.63	975	51.15	-20.6%	2	(252)
Fluorescent 2x96"	120	254	21.24	0.00	0.00	21.24	7,390	26.74	-20.6%	29	(1,916)
Fluorescent 4x96"	150	613	51.25	0.00	0.00	51.25	14,145	64.52	-20.6%	23	(3,663)
							31,304			92	(8,110)
Fluorescent Crosswalk - Photocell Burning - Customer Owned :											
Fluorescent 2x24" 70 Watts	310	30	3.24	0.00	0.00	3.24	39	4.25	-23.8%	1	(12)
Fluorescent 4x48" 440 Watts	311	166	17.91	0.00	0.00	17.91	1,075	23.46	-23.7%	5	(333)
Fluorescent 4x72" 600 Watts	313	222	23.95	0.00	0.00	23.95	0	31.33	-23.6%	0	0
Fluorescent 2x72"	312	116	12.51	0.00	0.00	12.51	300	16.38	-23.6%	2	(93)
Fluorescent 1x96"	314	47	5.07	0.00	0.00	5.07	1,521	5.07	-0.1%	25	(1)
Fluorescent 1x72"	315	60	6.47	0.00	0.00	6.47	0	6.47	-0.1%	0	0
Fluorescent 4x96"	350	280	30.21	0.00	0.00	30.21	28,277	39.51	-23.5%	78	(8,705)
							31,211			111	(9,144)

STREET / CROSSWALK LIGHTING STUDY

COMPARISON OF NEW PROPOSED VS CURRENT STREET LIGHTING RATES
EFFECTIVE: MARCH 10, 2006

Description	Rate Code	kW.h/Mo.	Power & Energy	Maintenance	Capital	2006 New Resulting Rates	2006 New Resulting Revenue	2006 Approved Rates	Percent Change	Units	Revenue Variance
Low Pressure Sodium :											
Low Pressure Sodium 90 Watts	132	45	4.85	9.38	10.35	24.58	590	14.21	73.0%	2	249
Low Pressure Sodium 135 Watts	130	60	6.47	9.38	10.35	26.20	19,178	16.35	60.2%	61	7,210
Low Pressure Sodium 180 Watts	131	80	8.63	9.38	11.85	29.86	311,693	19.17	55.7%	870	111,558
Low Pressure Sodium 180 Watts E&M	231	80	8.63	9.38	0.00	18.01	9,293	13.63	32.1%	43	2,260
Low Pressure Sodium 180 Watts E/O	331	80	8.63	0.00	0.00	8.63	3,832	8.63	0.0%	37	2
							344,586			1,013	121,279
High Pressure Sodium :											
High Pressure Sodium 70 Watts	123	32	3.45	3.13	4.90	11.48	5,278,825	10.99	4.5%	38,321	225,052
High Pressure Sodium 100 Watts	124	45	4.85	3.13	4.79	12.77	7,033,286	12.82	-0.4%	45,889	(26,278)
High Pressure Sodium 150 Watts	125	65	7.01	3.13	4.83	14.97	941,734	15.66	-4.4%	5,241	(43,155)
High Pressure Sodium 250 Watts	121	100	10.79	3.13	5.53	19.45	1,226,669	20.59	-5.5%	5,256	(71,983)
High Pressure Sodium 400 Watts	122	150	16.18	3.13	5.73	25.04	1,102,066	27.62	-9.3%	3,667	(113,325)
High Pressure Sodium 70 Watts	222	32	3.45	3.13	0.00	6.58	17,687	5.45	20.7%	224	3,037
High Pressure Sodium 100 Watts	223	45	4.85	3.13	0.00	7.98	10,534	7.28	9.6%	110	924
High Pressure Sodium 150 Watts	224	65	7.01	3.13	0.00	10.14	28,230	10.10	0.4%	232	111
High Pressure Sodium 250 Watts	221	100	10.79	3.13	0.00	13.92	26,726	15.07	-7.6%	160	(2,208)
High Pressure Sodium 70 Watts	323	32	3.45	0.00	0.00	3.45	260,779	3.45	-0.1%	6,299	(294)
High Pressure Sodium 100 Watts	324	45	4.85	0.00	0.00	4.85	145,966	4.86	-0.1%	2,508	(187)
High Pressure Sodium 150 Watts	325	65	7.01	0.00	0.00	7.01	109,272	7.01	0.0%	1,299	42
High Pressure Sodium 250 Watts	321	100	10.79	0.00	0.00	10.79	217,138	10.79	0.0%	1,677	41
High Pressure Sodium 400 Watts	322	150	16.18	0.00	0.00	16.18	16,698	16.17	0.1%	86	14
High Pressure Sodium 500 Watts	327	183	19.74	0.00	0.00	19.74	711	19.76	-0.1%	3	(1)
							16,416,319			110,972	(28,210)
Metallic Additive :											
Metallic Arc 250 Watts	142	100	10.79	7.50	8.22	26.51	20,357	23.44	13.1%	64	2,355
Metallic Arc 400 Watts	140	150	16.18	5.00	6.30	27.48	400,727	33.82	-18.7%	1,215	(92,369)
Metallic Arc 1000 Watts	141	360	38.84	7.50	9.69	56.03	560,058	69.40	-19.3%	833	(133,665)
Metallic Arc 150 Watts	143	67	7.23	7.50	0.00	14.73	177	19.86	-25.8%	1	(62)
Metallic Arc 250 Watts	343	100	10.79	0	0	10.79	8,546	10.79	0.0%	66	2
Metallic Arc 400 Watts	342	150	16.18	0	0	16.18	29,706	16.17	0.1%	153	25
Metallic Arc 1000 Watts	341	360	38.84	0	0	38.84	5,127	38.83	0.0%	11	1
Metallic Arc 175 Watts	344	67	7.23	0	0	7.23	6,247	8.09	-10.7%	72	(746)

STREET / CROSSWALK LIGHTING STUDY

COMPARISON OF NEW PROPOSED VS CURRENT STREET LIGHTING RATES
EFFECTIVE: MARCH 10, 2006

Description	Rate Code	kW.h/Mo.	Power & Energy	Maintenance	Capital	2006 New Resulting Rates	2006 New Resulting Revenue	2006 Approved Rates	Percent Change	Units	Revenue Variance
Metallic Arc 150 Watts	345	57	6.15	0	0	6.15	221 1,031,165	7.21	-14.7%	3 2,418	(38) (224,497)
TOTALS							**$21,672,884**			**134,280**	**$276,333**

Note 1 - Incandescent rates were set at 250W and 400W Mercury Vapour

Calculation of Power & Energy Rate : **Based on Misc. Small Loads Tariff Rate Components & 1kW lighting load**			
Photocell Operation (4000 burning hours per year)			
Demand Charge - $8.41/kW			$8.41
Energy Charge :			
1st Block : $.0956 for 1st 200 kW.h	200	0.0956	19.12
2nd Block : $.0632 for all additional	133	0.0632	8.43
			$35.96
Rate per kW.h	333		**$0.107880**
Continuous Burning (8760 burning hours per year)			
Demand Charge - $8.41/kW			$8.41
Energy Charge :			
1st Block : $.0956 for 1st 200 kW.h	200	0.0956	19.12
2nd Block : $.0632 for all additional	530	0.0632	33.50
			$61.03
Rate per kW.h	730		**$0.083603**

NON-CONFIDENTIAL

Request IR-4:

Please provide the budget and actual expenditures for NSPI's regulatory department from 2007-present, including a separate estimate of NSPI staff time and costs, outside of the regulatory department budget, that have been used to support UARB filings.

Response IR-4:

Please refer to Attachment 1.

NSPI staff time and costs related to UARB filings are not directly tracked outside of the Regulatory Affairs department.

REGULATORY AFFAIRS

(in thousands of dollars)

	2007 Actual	*2007 Budget*	*2008 Actual*	*2008 Budget*	*2009 Actual*	*2009 Budget*	*2010 Actual*	*2010 Budget*
Total Labour	**949**	**1,191**	**1,191**	**1,172**	**1,249**	**1,083**	**1,356**	**1,267**
010 Office Supplies	8	8	30	10	6	11	3	13
011 Travel Expense	21	16	13	24	28	50	25	45
012 Materials	8	5	7	10	9	8	33	8
013 Contracts	6	1	0	-	5	-	-	-
015 Frt, Post & Delivery	3	6	4	4	2	4	2	4
021 Telephones	11	15	12	11	11	13	12	14
028 Consulting	2,068	1,784	2,073	2,238	1,436	2,125	1,945	2,065
029 Membership Dues	6	9	8	10	9	11	10	14
032 Subscrpt/Info.Software	8	3	4	3	8	2	19	2
034 Appl. Software	11	12	12	12	8	13	2	15
035 Comp.Hrdwr & Op.Sftwr	1	-	1	-	13	-	1	-
037 Ext. Legal & Audit	1,245	1,295	1,413	1,339	1,274	1,483	1,466	1,483
040 Advertising	24	55	37	40	23	40	59	40
041 Meals & Entertainment	42	32	38	27	35	47	41	48
042 Employee Benefits	-	-	248	295	92	165	244	148
052 Non Reg.Cost Recovery	-	-	-	-	-	-	(11)	-
056 Training & Development	28	42	27	40	28	52	18	62
066 Other Goods & Services	49	72	52	95	35	112	66	83
Total Non-Labour	**3,539**	**3,354**	**3,979**	**4,158**	**3,020**	**4,135**	**3,935**	**4,043**
Total	**4,488**	**4,545**	**5,170**	**5,330**	**4,269**	**5,218**	**5,291**	**5,309**

Notes:

1) Figures presented reflect whole numbers which may cause $1K in rounding differences on some line items.

2) Employee Benefits expenses were not allocated to business units prior to 2008.

NON-CONFIDENTIAL

Request IR-5:

Is the cost of converting all existing unmetered streetlights included in the current rate application? Is this for NSPI-owned streetlights only? How do these costs relate to the 2011 ACE plan already filed, and a secondary filing that NSPI suggested would be coming in 2011?

Response IR-5:

In its 2011 ACE plan, NSPI included a capital cost estimate of $100 million over five years. The timeline for conversions is expected in forthcoming regulations. This amount is for NSPI-owned streetlights. The capital amount included in the 2012 rate base in the application is $20 million NS Power expects pending government regulations will provide more detail on the initiative. This information will be used to develop and issue an RFP for replacement lights. A capital work order will then be prepared and filed with the UARB.

NON-CONFIDENTIAL

Request IR-6:

Please provide a description and calculations of what the LED Conversion Fees – both lump sum payment and monthly for five years include (PR-01 Attachment 1 Page 35 of 37). Also, please indicate the specific wattage with the rate code. It is noted that the conversion fee does not include disposal costs. What were these when the Town of Amherst converted to LED's? What other fees are not included in the conversion costs?

Response IR-6:

Please refer to Multeese IR-16 for the explanation regarding calculations of LED Conversion Fees.

The disposal costs associated with the LED conversion in the Town of Amherst were approximately $30 per light. The current estimate of disposal is $17 per light.

NSPI does not anticipate other conversion costs at this time.

NON-CONFIDENTIAL

Request IR-7:

What are LED rate codes 762 and 770 and why are they substantially higher than other LED rates?

Response IR-7:

LED rate code 762, priced at $7.29, represents the monthly conversion fee (per fixture) for a 74 watt LED fixture (LED Sat-48-74W). LED rate code 770, priced at $349.35 is the one time lump sum conversion fee for the same LED fixture.

The conversion fees for this fixture are much higher because it is assumed that it will replace only one non-LED fixture (135W LPS) with a relatively high share of capital cost ($5.50/month). Other LED fixtures are assumed to replace more than one type of non-LED technology and their conversion fees reflect the diversity in associated sacrificed asset costs. Please refer to Multeese IR-16 Attachment 1 for calculation of these rates.

NON-CONFIDENTIAL

Request IR-8:

(a) The new LED rates (for NSPI-owned lights) do not include a maintenance component, unlike current HPS rates. Why?

(b) How will customers be billed for LED streetlight maintenance? Please provide a breakdown of maintenance charges and typical example of costs for a service call in Fall River and Musquodoboit.

Response IR-8:

(a) LED streetlights are expected to have little or no maintenance and that is why a maintenance component has not been proposed at this time. The failure rate of LEDs will be a function of a variety of factors, including the technology chosen and the environmental conditions. LED streetlight technology is new in Nova Scotia and in time we will have more historical information on failure rates on which to base a maintenance charge.

(b) When a maintenance rate is developed, customers will be billed as they are today, using a monthly rate that covers only the maintenance portion of the light service.

NON-CONFIDENTIAL

Request IR-9:

(a) Please provide the total number of service calls and total cost of maintaining unmetered streetlights within HRM, and separately the remainder of the province, over each of the last five years.

(b) Please provide the total number of unmetered fixtures that were replaced in HRM and the remainder of the province in each of the last five years.

Response IR-9:

a) Please refer Attachment 1. NSPI does not have a breakdown by the geography of HRM.

b) Please refer to Attachment 2. NSPI does not have a breakdown by the geography of HRM.

Street Light Service Calls

	2005	2006	2007	2008	2009
Total Number of Service Calls	23,817	23,639	27,230	25,716	24,085
Total Costs	1,129,466	1,186,677	1,465,698	1,444,855	1,377,242

Street Light Fixture Replacements

	2005	2006	2007	2008	2009
TOTAL	**2,596**	**2,709**	**2,756**	**3,293**	**2,879**

NON-CONFIDENTIAL

Request IR-10:

Reference: Appendix G, page 4 of 37, lines 11-15.

> **…Ratemaking Methodology for Unmetered Services has essentially remained unchanged since the Street and Crosswalk Lighting rate were developed, based on 1977 Street/Crosswalk Lighting study.**

Please reconcile this statement in light of the updated street lighting study that was utilized in NSPI's 2006 GRA.

Response IR-10:

The updated street lighting study filed by NSPI with the UARB on July 31, 2006, in response to Board's directive included in its 2006 Rate Case Decision[1], was not concerned with changes in ratemaking methodology. The study was concerned with a review of the appropriateness of the weighting factors and the rate base assigned to the Unmetered Class. It was conducted within the methodological framework of the UARB-approved cost of service study.

[1] NSPI 2006 Rate Case, UARB Decision, NSUARB–NSPI–P-882, March 10, 2006, paragraph 598.

NON-CONFIDENTIAL

Request IR-11:

Please provide the total number of new streetlights added to NSPI's inventory over each of the last five years, in HRM and in the remainder of the province, as well as the corresponding cost to NSPI.

Response IR-11:

The following table reflects the total number of new streetlights added in the province. NSPI does not have a breakdown by the geography of HRM.

Year	Total Number of New Streetlights
2006	7,608
2007	6,064
2008	3,175
2009	6,224
2010	3,353

NSPI does not have the corresponding cost of these streetlights. Please refer to HRM IR-26 Attachment 1 for the NSPI owned streetlight asset continuity schedule.

NON-CONFIDENTIAL

Request IR-12:

Please provide a summary total for all 70 and 100 watt high pressure sodium streetlights owned and maintained by NSPI. Include a breakdown of the number of fixtures, average age and capital, as well as maintenance and energy costs currently billed to customers.

Response IR-12:

Please see the table below for a summary of total streetlights.

	Number of streetlights	Total Monthly Charge (excl DSM)
70 watt	40,531	$11.85 & 32 kWhs
100 watt	47,219	$13.21 & 45 kWhs
100 watt (continuous use)	15	$19.89 & 99 kWhs

NSPI does not track the average age of the streetlights by this segmentation, nor separately report the maintenance and energy costs in the current monthly charge.

NON-CONFIDENTIAL

Request IR-13:

NSPI is proposing to recover money for "the early retired non-LED fixtures, due to the mandated LED deployment". From the summary provided in HRM IR-12 above, how many of the fixtures would have been retired within the next five years regardless of mandated LED deployment?

Response IR-13:

Approximately 5% of the fixtures in the table summary provided in HRM IR-12 response are retired each year.

NON-CONFIDENTIAL

Request IR-14:

Reference: Schedule 2, Appendix G, page 21 of 37.

Is NSPI saying that it spends $6.5 M to maintain current streetlight assets?

Response IR-14:

Yes. The $6.5 million represents the cost responsibility of the unmetered class for the fixture maintenance service as determined in the Cost of Service Studies.

NON-CONFIDENTIAL

Request IR-15:

NSPI is using a different depreciation factor for unmetered assets versus other rate classes, as per the Depreciation settlement. Was HRM or any non-electric utility municipality a signatory to this depreciation settlement?

Response IR-15:

The accounting depreciation rate for streetlights is 5.33 percent as per the 2011 Depreciation Settlement Agreement[1]. Please see Multeese IR-13 for further details on the depreciation related factors associated with streetlights.

HRM did not intervene in the Depreciation proceeding. Other non-electric utility municipalities did not intervene in the Depreciation proceeding. All parties in the proceeding were invited to support the settlement agreement that was subsequently approved by the UARB.

[1] NSPI 2011 Depreciation Rates Application, UARB Order, NSUARB-NSPI-P-891, May 11, 2011.

NON-CONFIDENTIAL

Request IR-16:

The maintenance and capital component, for existing 70 and 100 watt HPS streetlights, is approximately 2/3 versus the 1/3 energy only charge of the "all inclusive" NSPI rate. NSPI has suggested that the current charges reflect "overpriced" capital versus energy charges. This suggests that the current assets have been paid for already many times over. Please explain whether they have or have not.

Response IR-16:

The pricing of utility services combines forecast utility revenue requirement, the UARB approved Cost of Service methodology and UARB approved pricing policy. NSPI's recovery of its investment in capital assets is dependent on the Board approved depreciation rates and its ability to earn its allowed rate of return.

NSPI's evidence reflects its view that there is a Cost of Service imbalance between Unmetered capital and energy charges. This imbalance is matter of Cost of Service cost allocation. It does not affect the recovery of the cost of specific assets.

NON-CONFIDENTIAL

Request IR-17:

Please confirm the operating hours for current 70 and 100 watt HPS streetlights, both monthly and yearly. Please provide the calculation based upon the kWh/month as indicated in the rate codes. Why is there a significant discrepancy with the theoretical average of 333 hours/month? This would seem to suggest the energy component of existing has been drastically overcharged: please explain the discrepancy.

Response IR-17:

Please refer to Attachment 1, filed electronically, for the calculation of the energy rate for the 70 and 100 watt HPS streetlights. The monthly and yearly operating hours used in the calculations were 333 and 4,000, respectively. There is no discrepancy with the theoretical average of 333 hours/month.

NON-CONFIDENTIAL

Request IR-18:

Reference: Appendix G, Unmetered Class Cost of Service Pricing Review, page 6 of 37, Section 2.0 - Pricing of Unmetered Services.

This section describes current ratemaking methodology and states:

> **In the last two GRA proceedings, the combined revenue responsibilities of all three types of services under this class have been set equal to the allocated costs in COSS. However, while the revenues associated with fixture maintenance services were set at costs, the revenue responsibilities for electric and fixture capital services were not. The fixture capital-related revenues were set above costs.**

However, the 2006 Cost of Service Review for Unmetered Class, dated July 31, 2006, provided a pricing model for an unmetered rate for streetlights. Section 4.4, line 13 indicates:

> **This method of assigning capital-related costs to street lighting fixtures is consistent with the methodology used in, and approved for, the development of NSPI's Open Access Transmission Tariff (OATT).**

(a) The NSUARB approved methodology applied in the 2006 Cost of Service Review establishes the capital component of the full charge rate. Is NSPI indicating that this approach is not acceptable? Please explain why this methodology results in a subsidy to electricity costs.

(b) Reference: Appendix G, Table 11. Does such a recalculation of the energy charge result in an increase in a range of between 20% and 31%?

(c) What is the proposed energy-only cost for Residential? What is the proposed energy-only cost for street lighting? Is the proposed Streetlight energy rate greater

than the proposed residential rate? If yes, by how much and why? Please reference the schedule which provides the detailed energy charge calculation.

Response IR-18:

(a) The above quote from the Appendix G comes from page 4 of 37.

NSPI indicates that this approach is not sustainable in the long-run once capital-intensive LED fixtures have been fully deployed and significantly depreciated. Please refer to Multeese IR-6 for the reasons behind the subsidy to electricity costs.

(b) The proposed changes in the unmetered ratemaking methodology result in an increase in energy charges of approximately 18 percent and a decrease in fixture capital charges of up to 50 percent. Please refer to Multeese IR-2 for the derivation of these numbers.

The changes in rates reported in Schedule 11 of Appendix G, vary from -3 percent to 49 percent and are reflective of the varying extent to which the three services: electric, fixture maintenance and fixture capital, are combined for use under service options available under the Unmetered class. Customers using all three services combined see the lowest rate increases, in general. The increase in electric service cost is 20 percent and it is the same for all unmetered customers as their fixed monthly charges for electric service are calculated using the same Miscellaneous Load Rate.

(c) The comparison of proposed electric service costs for these two rate classes is as follows.

Rate Class	Residential	Unmetered	% Variance
R/C ratio	99%	100%	
GWh	4,372.5	115.7	
Revenue (electric service only) in millions	$606.8	$14.7	
Unit Revenue (cents/kWh)	**13.9**	**12.7**	**-9%**

The proposed cost of electricity to the Unmetered class remains 9 percent below that for residential classes in spite of the proposed ratemaking changes. Adjusting this variance for the difference in revenue to cost ratios between these two classes sets this variance at 10 percent.

The details behind calculations of metered rates can be found in the "Proof of Revenue" included in the standard filing section of the Evidence OR-01. The details behind unmetered rate calculations are shown in Appendix G.

NON-CONFIDENTIAL

Request IR-19:

Please provide the date and time of the net system peak for May, 2011, and for each of the previous months.

Response IR-19:

#	Month	System Peak (Hour-ending)
1	Jun-08	23-Jun-08 13:00
2	Jul-08	25-Jul-08 12:00
3	Aug-08	7-Aug-08 12:00
4	Sep-08	23-Sep-08 21:00
5	Oct-08	23-Oct-08 9:00
6	Nov-08	24-Nov-08 18:00
7	Dec-08	19-Dec-08 18:00
8	Jan-09	17-Jan-09 18:00
9	Feb-09	9-Feb-09 19:00
10	Mar-09	5-Mar-09 21:00
11	Apr-09	6-Apr-09 10:00
12	May-09	6-May-09 12:00
13	Jun-09	3-Jun-09 16:00
14	Jul-09	22-Jul-09 12:00
15	Aug-09	17-Aug-09 11:00
16	Sep-09	29-Sep-09 18:00
17	Oct-09	28-Oct-09 21:00
18	Nov-09	6-Nov-09 19:00
19	Dec-09	18-Dec-09 18:00
20	Jan-10	11-Jan-10 18:00
21	Feb-10	2-Feb-10 19:02
22	Mar-10	5-Mar-10 20:00
23	Apr-10	19-Apr-10 11:00
24	May-10	10-May-10 22:00
25	Jun-10	1-Jun-10 18:00
26	Jul-10	20-Jul-10 18:00
27	Aug-10	18-Aug-10 13:00
28	Sep-10	1-Sep-10 21:00
29	Oct-10	25-Oct-10 9:00
30	Nov-10	30-Nov-10 18:00
31	Dec-10	10-Dec-10 18:00
32	Jan-11	24-Jan-11 18:00
33	Feb-11	1-Feb-11 18:00
34	Mar-11	3-Mar-11 20:00
35	Apr-11	1-Apr-11 18:00
36	May-11	16-May-11 18:00

NON-CONFIDENTIAL

Request IR-20:

Please supply supporting information for the fixture prices used in the LED cost calculation included in Appendix G, Schedule 4 – Capital Cost Component Calculation of the 2011 Unmetered Class Cost of Service and pricing Study Review.

(a) Does NSPI anticipate that the LED Streetlight rate will be adjusted to reflect actual material purchase costs?

(b) If so, how will NSPI adjust this rate? Will it require a rate hearing?

(c) Regarding NSPI's reference to LED Roadway Inc. fixtures in identifying 2012 Forecast: Has NSPI included other manufacturers in its development of LED costs?

(d) Please provide a graph of the material costs of LED streetlights (fixture only) for the last three years and the efficacy improvements (lumens/watt) that are also happening with cost improvements.

Response IR-20:

(a-b) NSPI has proposed that the LED Streetlight rate be set in General Rate Applications. At this time the proposed LED capital rate is based on a projection of future costs. In time, as historical information becomes available, future pricing will reflect actual costs incurred over the deployment period.

(c) Pricing is based on budgetary numbers for fixtures as provided by one vendor. Other materials such as connectors, brackets, etc. are priced based on present costs through our warehouse. Actual pricing will reflect the results of a competitive solicitation for the LED fixtures, which has not yet been issued.

(d) This is a new program. NS Power has not been using LED fixtures for the past three years in sufficient quantity to establish trends and therefore, does not have the data required to respond to this request.

NON-CONFIDENTIAL

Request IR-21:

Schedule 10A provides a conversion of existing fixtures and replacement LED fixtures.

(a) Please provide the technical evaluation used to match LED fixtures with non-LED fixtures.

(b) Did NSPI develop an LED fixture specification prior to undertaking this evaluation? If so, please provide the technical specification of the fixtures used for creating this unmetered rate. Please also provide the technical evaluation of various manufacturers in accordance with the technical specification.

(c) Did NSPI assume a performance standard (which the province has yet to provide) when identifying replacement fixtures?

(d) Please provide efficacy levels for the fixtures referenced for this rate calculation.

(e) How will this LED streetlight rate be modified to accommodate lumen/watt improvements which are anticipated over the next five years?

Response IR-21:

a) NSPI used a variety of road widths, traffic types, and pedestrian levels to represent a cross section of roads within Nova Scotia. These road configurations were taken from the report "Nova Scotia LED Roadway Lighting Pilot Installations" as prepared by DMD and Associates Ltd. for LED Roadway Lighting Ltd. in 2010 (available at http://www.ledroadwaylighting.com/).

Calculations were then completed to ensure that these 'standard' lights chosen could be used to create a design for street lighting that meets the standards applicable today, specifically, American National Standards Institute / Illuminating Engineering Society of North America (ANSI/IESNA RP-8-00) 'American National Standard for Roadway Lighting'. The equivalency table that we proposed for LED conversions was then produced.

b) No. A technical specification will be released as part of a future market competitive solicitation after which a technical evaluation of various manufacturers will be completed.

c) The amount of light provided by a street lighting installation is typically based on two criteria; the classification of the roadway and the level of pedestrian conflict. In North America, the criteria and associated lighting levels are established by Illuminating Engineering Society of North America (IESNA) publication RP-8. The NSPI performance standard is to provide customers with the ability to meet the requirements of this standard (RP-8) in their designs while utilizing the 'standard' NSPI street light offerings, chosen as indicated above.

d) Please refer to the table below.

Existing fixture	Approximate wattage of equivalent LED fixture	Efficacy of equivalent LED fixture
100W MV	44 W	80 lm/W
125W MV	55 W	70 lm/W
175W MV	87 W	64 lm/W
250W MV	88 W	80 lm/W
400W MV	173 W	63 lm/W
70W HPS	44 W	80 lm/W
100W HPS	65 W	79 lm/W
150W HPS	88 W	80 lm/W
250W HPS	110 W	70 lm/W
400W HPS	173 W	63 lm/W
135W LPS	74 W	68 lm/W
180W LPS	88 W	80 lm/W
100W MAL	55 W	70 lm/W
150W MAL	88 W	80 lm/W
250W MAL	110 W	70 lm/W
400W MAL	173 W	63 lm/W

(e) The rates will reflect actual streetlights selected for use over time. Please refer to HRM IR-20.

NON-CONFIDENTIAL

Request IR-22:

Section 5.1, Schedule 1 – Street and Crosswalk Lighting inventory: Actual and Forecast states on page 12 that:

> **The projected total average LED units in 2012 are 13,133.**

(a) Please provide the economic justification for installing these LED fixtures in 2012.

(b) What would be the impact of delaying the conversion to LED by 1 year, by 2 years, by 3 years?

Response IR-22:

(a-b) This program is a recent requirement of new provincial government policy, and as such NS Power's proposal is based upon projections and forecasts at this time. The Capital Work Order application to support this initiative will include the full and usual components including economic justification, which will reflect the future competitive market solicitation. NS Power's request in this general rate application is for the approval of rates necessary to recover the costs of the program, which remains subject to the subsequent UARB approval of a capital work order.

NON-CONFIDENTIAL

Request IR-23:

Section 5.2, Schedule 2 – Determination of Maintenance Costs by Fixture type states on Page 12:

At this time, there are no maintenance costs associated with LED streetlights.

(a) How will NSPI recover routine maintenance charges for failed fixtures?

(b) Does NSPI anticipate that a maintenance charge will be introduced at a later date?

Response IR-23:

(a-b) Please refer to HRM IR-8.

NON-CONFIDENTIAL

Request IR-24:

Schedule 10A – Calculation of Conversion Charge includes a column titled Stranded Asset.

(a) The value of the stranded asset is identified in Schedule 10 as $23.1 M (2011YE). Please provide the calculations that developed this number.

(b) Please provide a summary of the streetlight asset class depreciated value, by fixture type, in 1992 when NSPI privatized.

(c) Please provide a summary of all streetlight fixtures purchased by NSPI, by year, from 1993 to 2011, by fixture type, including unit prices for each fixture type, and purchase order reference.

(d) Please provide a summary of the number of fixture brackets purchased annually from 1993 to 2011, inclusive.

(e) Please identify the annual changes to the streetlight asset net valuation between 1993 and 2011. Include depreciation expense, additions and retirements.

Response IR-24:

(a)

	Plant Balance	Accumulated Depreciation	Net Book Value
	($)	($)	($)
2011 Beginning Balance	52,179,534	28,874,170	23,305,364
2011 Additions	2,326,168		
2011 COSS Adjustment	466		
2011 Depreciation		2,455,295	
Total	**54,506,168**	**31,329,465**	**23,176,703**

(b-d) NSPI does not track streetlight asset values at this level of detail.

(e) Please refer to HRM IR–26 and HRM IR-27.

NON-CONFIDENTIAL

Request IR-25:

Section 3.0 - New Operating Environment states:

> **The LED investment will produce long-term savings in avoided fuel and deferred infrastructure costs that will benefit all ratepayers.**

This suggests that the cost of the conversion, in particular, the stranded asset, should be borne by all ratepayers (i.e. extraordinary expense), rather than the municipalities and the province, not unlike a DSM program: please explain why not?

Response IR-25:

Nova Scotia Power has proposed that the costs associated with early retirements, or sacrificed asset life, of non-LED streetlight fixtures, as well as the associated disposal costs (or salvage value), be recovered from all full service, non-LED streetlight customers at the time of their conversion to LED. This approach was taken because it is reflective of a cost causation principle and ensures that costs associated with the sacrificed life of the existing streetlight assets are recovered from customers.

NON-CONFIDENTIAL

Request IR-26:

Does NSPI maintain a separate plant account for street lighting and related equipment? If yes, please provide the account number, account name and year-by-year history showing beginning-of-year balance, additions, retirements, adjustments and end-of-year balance from 1992 through December 31, 2010.

Response IR-26:

Yes. The account number and name are 050 – DP – Street Lights. Attachment 1 provides a continuity schedule of the plant activity for streetlights from 1994 through 2010. This level of detail is only available beginning in 1994.

050 - DP - Street Lights Continuity Schedule

	Beginning Balance ($)	Additions ($)	Retirements ($)	Adjustments ($)	Ending Balance ($)
1994	26,847,209	3,763,937	(336,553)		30,274,592
1995	30,274,592	1,692,180	(178,746)		31,788,027
1996	31,788,027	1,478,617	(600,055)		32,666,589
1997	32,666,589	1,615,135	(811,596)		33,470,128
1998	33,470,128	2,902,766	(541,904)		35,830,989
1999	35,830,989	2,017,999	(408,866)		37,440,123
2000	37,440,123	1,692,115	(292,664)		38,839,573
2001	38,839,573	1,834,664	(666,248)		40,007,989
2002	40,007,989	1,852,310	(579,610)	2,029	41,282,718
2003	41,282,718	1,392,619	(4,674)		42,670,662
2004	42,670,662	1,791,414	(1,166,220)		43,295,857
2005	43,295,857	1,738,855	(432,993)		44,601,719
2006	44,601,719	1,794,829	(213,345)		46,183,203
2007	46,183,203	1,831,942	(263,496)	100	47,751,748
2008	47,751,748	770,134	(88,047)	(9,120)	48,424,715
2009	48,424,715	888,364	-		49,313,080
2010	49,313,080	3,200,400	(333,946)		52,179,534

NON-CONFIDENTIAL

Request IR-27:

Does NSPI accrue depreciation expense specifically for streetlights and related equipment? If yes, please provide a year-by-year history showing beginning year balance of depreciation reserve, additions, retirements, adjustments and end-of-year balance from 1992 through December 31, 2010. If NSPI does not accrue depreciation reserve specifically for street lighting and related equipment, please discuss how depreciation reserve for street lighting is calculated.

Response IR-27:

Yes. Attachment 1 provides a continuity schedule of the plant activity for streetlights from 1994 through 2010. This level of detail is only available beginning in 1994.

05- DP -Street Lights Depreciation Schedule

	Beginning Reserve ($)	Depreciation Expense ($)	Retirements ($)	Removal-Salvage ($)	Adjustments ($)	Ending Balance ($)
1994	9,457,254	1,122,717	(336,553)	(851,789)		9,391,628
1995	9,391,628	1,200,530	(178,746)	(191,160)		10,222,252
1996	10,222,252	1,338,317	(600,055)	(212,875)		10,747,639
1997	10,747,639	1,372,944	(811,596)	(484,407)		10,824,580
1998	10,824,580	1,434,550	(541,904)	(174,218)	(463,952)	11,079,055
1999	11,079,055	1,533,551	(408,866)	(154,976)		12,048,765
2000	12,048,765	1,598,545	(292,664)	(131,334)		13,223,313
2001	13,223,313	1,651,834	(666,248)	(168,011)		14,040,888
2002	14,040,888	1,709,952	(579,610)	(137,950)	1,430,542	16,463,822
2003	16,463,822	1,760,948	(4,674)	(148,081)		18,072,014
2004	18,072,014	1,866,638	(1,166,220)	(204,498)		18,567,935
2005	18,567,935	1,891,828	(432,993)	(192,773)		19,833,998
2006	19,833,998	2,006,691	(213,345)	(191,735)		21,435,608
2007	21,435,608	2,081,036	(263,496)	(220,492)		23,032,656
2008	23,032,656	2,141,163	(88,047)	(272,931)	166,595	24,979,435
2009	24,979,435	2,226,194	-	(270,551)		26,935,079
2010	26,935,079	2,369,326	(333,946)	(96,290)		28,874,169

NON-CONFIDENTIAL

Request IR-28:

Are non-LED streetlights treated on a mass accounting basis for the purpose of calculating depreciation reserve? What depreciation methodology does NSPI propose to use after the conversion to LED has been completed?

Response IR-28:

Yes, non-LED streetlights are treated on a mass accounting basis for the purpose of calculating depreciation. NSPI proposes to continue the use of this methodology after the conversion to LED.

NON-CONFIDENTIAL

Request IR-29:

When a non-LED streetlight is retired from plant, please describe the associated plant and depreciation reserve entries that are made.

Response IR-29:

NSPI follows UARB approved accounting policy 6420 Retirement and Disposal of Capital Assets, section 09 which states:

> For retirements of property, plant and equipment other than land, the original cost plus any costs of removal less salvage proceeds is charged to accumulated depreciation, with no immediate gain or loss recognized.

NON-CONFIDENTIAL

Request IR-30:

Reference: Appendix G, page 9, lines 2-4.

Please describe the corresponding plant and depreciation reserve entries NSPI proposes to make to its books. Where is this shown in the filing?

Response IR-30:

For the Test Year, NSPI has retained the non-LED gross plant values at their pre-conversion levels. The Company has not made adjustments to Gross Plant or Accumulated Depreciation accounts to reflect forecast conversions.

NON-CONFIDENTIAL

Request IR-31:

Reference: Appendix G, page 9, lines 31-32.

With regard to the statement that NSPI is not proposing any revisions to the cost allocators of electric service to the unmetered class, is NSPI referring only to methodology or to values in the factors?

Response IR-31:

NSPI is referring only to values in the factors. Also, please refer to Multeese IR-10.

NON-CONFIDENTIAL

Request IR-32:

At what date does NSPI propose to stop accruing depreciation expense on non-LED fixtures? How is the stop date for accrual of depreciation expense reflected in Schedule 10 of Appendix G?

Response IR-32:

NSPI proposes to continue to accrue the depreciation expense of the non-LED fixtures using the approved depreciation rate for streetlights until they are fully depreciated. At the current depreciation rate of 5.33 percent the assets would be fully depreciated in 18.8 years (1/0.0533). Please refer to Multeese IR-13(b) for the details behind the proposed test year calculations and to HRM IR-30 for the accounting treatment of this expense in the context of proposed LED conversion fees.

NSPI proposes in Schedule 10 that the costs associated with sacrificed assets life be levelized and recovered over a five year period. This sets the end date for the recovery of these costs at 2021, which is five years after the completion of the LED conversion process in 2016, but 9 years before these assets will be fully depreciated, using the 5.33 percent depreciation rate.

NSPI recognizes accounting and pricing will need to be adjusted to ensure customers are correctly charged, prior to UARB approval of the LED streetlight rates and looks forward to working with customers to find an agreeable solution.

NON-CONFIDENTIAL

Request IR-33:

Reference: Exhibit DE-03 – DE 04, Appendix G, page 6 of 37, lines 19-21; footnote 1 on page 6; and page 14 of 37, lines 17-29.

Please explain all reasons why NSPI is tied to the use of the "marginal cost of capital substitution formula" for street lighting plant. Please discuss its advantages, disadvantages and other options that can be used in lieu of this methodology.

Response IR-33:

NSPI's proposal introduces a corrective mechanism, referred to as Revenue Correction Factors, which will align the pricing of electricity and fixture capital services with their costs. NSPI understands this to be the prevalent approach to pricing of streetlight services in the North American Electric Industry. Please refer to Multeese IR-5 and Multeese IR-11 for details on how the Revenue Correction Factors were developed and applied.

NON-CONFIDENTIAL

Request IR-34:

Reference: NSPI Exhibit DE-03 – DE-04, page 114 of 161.

Are non-LED streetlights included in the Asset Retirement Obligations line in Figure 7.2? If yes, at what values for 2009 and 2012?

Response IR-34:

Non-LED streetlights are not included in the Asset Retirement Obligations line in Figure 7.2.

NON-CONFIDENTIAL

Request IR-35:

Reference: NSPI Appendix G, page 10 of 37, lines 2-5.

With regard to LED streetlight related costs not recurring at the same level over a long period of asset life as a reason for its exclusion from the COSS, how is that different than, e.g., generating units which have the same characteristics as those stated for streetlights?

Response IR-35:

The effect of the addition of a generation unit on total generation-related costs is relatively minor compared to the near-term changes to the streetlight asset base anticipated through the LED deployment in Nova Scotia.

Please refer to HRM IR-39.

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Request IR-36:

With regard to the materials cost of the proposed LED street lighting fixtures, approximately what percent does the LED assembly represent in relation to the total?

Response IR-36:

The response to this request is confidential.

NON-CONFIDENTIAL

Request IR-37:

Have LED assemblies and their heads or housings generally been standardized or are they specific to each manufacturer?

Response IR-37:

There is no standard configuration. Each manufacturer has its own design.

NON-CONFIDENTIAL

Request IR-38:

Is any depreciation reserve associated with below-the-line LED streetlights? At what point does NSPI propose to include depreciation reserve for below-the-line LED streetlights?

Response IR-38:

NSPI has proposed a depreciation reserve of $0.683 million associated with below-the-line LED streetlights for the test year 2012. Please refer to the "Depreciation Expense" item in Schedule 5A on page 25 of the DE-03 – DE-04 Appendix G.

NON-CONFIDENTIAL

Request IR-39:

For what period of time does NSPI propose to treat LED street lighting below-the-line? Please discuss and provide supportable justification as to why LED street lighting should not be treated as above-the-line at the conclusion of the conversion process. Compare with non-LED street lighting fixtures before the start of the conversion process.

Response IR-39:

NSPI did not contemplate in its Application any time limit to the duration of the proposed ratemaking treatment of LED fixture service. The primary reason for placing this category below-the-line is the suitability of an incremental cost approach, as opposed to the average cost approach used in the cost of service studies, to pricing of LED fixtures which represent an incremental investment in a new street lighting technology. The completion of a five- year LED conversion cycle may offer a suitable target date for the UARB to conduct a review of the adopted pricing approach.

NON-CONFIDENTIAL

Request IR-40:

Has NSPI investigated the treatment accorded conversion to LED street lighting in other jurisdictions insofar as:

(a) stranded assets; and

(b) below-the-line treatment are concerned?

Please provide a summary of LED conversions in other jurisdictions as noted above.

Response IR-40:

(a-b) NSPI is not aware of any complete LED streetlight conversions, similar to the one mandated in Nova Scotia.

NON-CONFIDENTIAL

Request IR-41:

Has NSPI stopped installing any non-LED streetlights? If not, why? Considering NSPI is asking to recoup the cost of these stranded assets, would it not be prudent to implement such an interim policy immediately?

Response IR-41:

NSPI continues to install some non-LED streetlights, pending anticipated provincial regulations, and the preparation, submittal and UARB approval of a capital work order to convert all NSPI-owned lights to LED.