**Q. Re: Replace Mercury Vapour Street Lights, Schedule B, page 33 of 81 and the Energy Efficient Streetlights Report (4.2)**

**In the Economic Analysis (section 4, p. 2 of Report) Option I is the status quo alternative where the remaining 7,000 MV streetlights are replaced through normal attrition at the rate of 538 per year. (A) Does the assumed level of attrition replacements hold true for the purposes of the economic analysis given that the report notes at p. 1 that these remaining MV streetlight fixtures were purchased prior to 1982 and at an age in excess of 26 years, these fixtures have an in service life greater than what would normally be expected? (B) Related to this question, is it realistic to assume for the purposes of the Economic Analysis that given the advanced age of the remaining MV streetlight fixtures that it will take approximately 13 years to remove all MV streetlights from the system?**

A. In the Economic Analysis (section 4, p. 2 of Report), Option 1 is the *status quo* alternative where the remaining 7,000 MV streetlights are replaced through normal attrition at an assessed rate of 538 per year. Option 1 was developed to represent the Company's current course of action, where Mercury Vapour (MV) streetlights are being replaced as they fail by high pressure sodium (HPS) streetlights.

The average number of actual in service failures over the period 2002 through 2007 was used as the basis of an assumption of the number of failures anticipated on an annual basis going forward. This predicts the existing 7,000 MV lights would be replaced over 13 years. The Company believes that this is realistic, however, it recognizes that it is an *assumption*.

A sensitivity analysis reflecting an accelerated assumption of future failures has been developed by the Company. The annual failure rate of 538 per year from the original report was increased to 1,000 per year for the sensitivity analysis. This results in the 7,000 MV lights being replaced over 7 years instead of 13 years. The results of the analysis is reflected in Tables 1 and 2 which are found at Pages 2 and 3 respectively of this Response.

Table 1 shows Option 1A (1,000 replacements per year – 7 years remaining) has a cumulative present worth cost of $2,019,000 over the period from 2009 to 2030. Table 2 shows Option 2A (accelerated replacement – 3 years remaining) has a cumulative present worth cost of $1,707,000 over the same period. Selecting Option 2A over Option 1A provides a net present worth ***benefit*** of approximately $312,000, as compared to the net present benefit of Option 2 over Option 1 of $626,000 (in the analysis found in *4.2 Energy Efficient Streetlights*).

The economic analysis indicates that the benefit of accelerated replacement is reduced as the assumption for the normal attrition rate approaches the accelerated replacement rate but the benefit of accelerated replacement remains material.

Replacing the 7,000 MV streetlights with HPS streetlights will reduce system demand by 0.5 MW and energy consumption by 2,184 MWh.

**Table 1 - Present Worth Analysis**

**Option 1A**
**Replace 7,000 MV Streetlights in 7 Years**
**(2009 to 2015)**

Weighted Average Incremental Cost of Capital **7.27%**
Present Worth Year **2008**
Depreciation Rate **20years @ 8% CCA**

| Year | Capital Cost | Capital Revenue Requirement | Operating Costs | Operating Benefits | Net Benefit | Present Worth Benefit | Cumulative Present Worth Benefit |
|---|---|---|---|---|---|---|---|
| 2009 | 250,000 | 27,244 | 111,429 | 40,092 | -98,581 | -91,900 | -91,900 |
| 2010 | 254,000 | 58,791 | 94,343 | 80,184 | -72,950 | -63,397 | -155,297 |
| 2011 | 257,810 | 90,270 | 76,606 | 120,276 | -46,600 | -37,753 | -193,050 |
| 2012 | 261,677 | 121,564 | 58,317 | 160,368 | -19,512 | -14,737 | -207,787 |
| 2013 | 266,126 | 152,801 | 39,539 | 200,460 | 8,121 | 5,717 | -202,069 |
| 2014 | 270,650 | 183,946 | 20,105 | 240,552 | 36,500 | 23,957 | -178,113 |
| 2015 | 275,251 | 214,959 | 0 | 280,644 | 65,685 | 40,190 | -137,923 |
| 2016 | | 215,296 | 145,564 | 0 | -360,860 | -205,832 | -343,754 |
| 2017 | | 210,578 | 148,184 | 0 | -358,762 | -190,766 | -534,521 |
| 2018 | | 205,631 | 150,851 | 0 | -356,482 | -176,708 | -711,228 |
| 2019 | | 200,545 | 153,566 | 0 | -354,112 | -163,636 | -874,865 |
| 2020 | | 195,211 | 156,331 | 0 | -351,542 | -151,439 | -1,026,304 |
| 2021 | | 189,650 | 159,145 | 0 | -348,795 | -140,072 | -1,166,376 |
| 2022 | | 183,879 | 162,009 | 0 | -345,888 | -129,491 | -1,295,867 |
| 2023 | | 177,915 | 164,925 | 0 | -342,841 | -119,652 | -1,415,519 |
| 2024 | | 171,774 | 167,894 | 0 | -339,668 | -110,510 | -1,526,029 |
| 2025 | | 165,470 | 170,916 | 0 | -336,386 | -102,025 | -1,628,054 |
| 2026 | | 159,016 | 173,993 | 0 | -333,008 | -94,156 | -1,722,210 |
| 2027 | | 152,423 | 177,124 | 0 | -329,548 | -86,862 | -1,809,072 |
| 2028 | | 143,636 | 180,313 | 0 | -323,949 | -79,600 | -1,888,672 |
| 2029 | | 120,770 | 183,558 | 0 | -304,328 | -69,710 | -1,958,382 |
| 2030 | | 98,527 | 186,862 | 0 | -285,389 | -60,942 | -2,019,324 |

**Table 2 - Present Worth Analysis**

**Option 2A**
**Replace 7,000 MV Streetlights in 3 Years**
**(2009, 2010 and 2011)**

Weighted Average Incremental Cost of Capital **7.27%**
Present Worth Year **2008**
Depreciation Rate **20years @ 8% CCA**

| Year | Capital Cost | Capital Revenue Requirement | Operating Costs | Operating Benefits | Net Benefit | Present Worth Benefit | Cumulative Present Worth Benefit |
|---|---|---|---|---|---|---|---|
| 2009 | 581,000 | 63,316 | 86,667 | 93,548 | -56,434 | -52,610 | -52,610 |
| 2010 | 590,296 | 136,631 | 44,027 | 187,096 | 6,438 | 5,595 | -47,015 |
| 2011 | 599,150 | 209,786 | 0 | 280,644 | 70,858 | 57,405 | 10,390 |
| 2012 | | 216,241 | 0 | 280,644 | 64,403 | 48,640 | 59,030 |
| 2013 | | 212,030 | 0 | 280,644 | 68,614 | 48,309 | 107,339 |
| 2014 | | 207,628 | 0 | 280,644 | 73,016 | 47,924 | 155,262 |
| 2015 | | 203,208 | 0 | 280,644 | 77,436 | 47,380 | 202,642 |
| 2016 | | 198,510 | 339,649 | 0 | -538,159 | -306,962 | -104,319 |
| 2017 | | 193,557 | 345,762 | 0 | -539,319 | -286,775 | -391,094 |
| 2018 | | 188,369 | 351,986 | 0 | -540,355 | -267,853 | -658,947 |
| 2019 | | 182,965 | 0 | 0 | -182,965 | -84,549 | -743,496 |
| 2020 | | 177,361 | 0 | 0 | -177,361 | -76,405 | -819,901 |
| 2021 | | 171,575 | 0 | 0 | -171,575 | -68,903 | -888,803 |
| 2022 | | 165,621 | 0 | 0 | -165,621 | -62,004 | -950,807 |
| 2023 | | 159,511 | 384,826 | 0 | -544,337 | -189,974 | -1,140,781 |
| 2024 | | 153,259 | 391,753 | 0 | -545,012 | -177,318 | -1,318,099 |
| 2025 | | 146,876 | 398,804 | 0 | -545,680 | -165,504 | -1,483,603 |
| 2026 | | 140,372 | 0 | 0 | -140,372 | -39,689 | -1,523,292 |
| 2027 | | 133,758 | 0 | 0 | -133,758 | -35,256 | -1,558,548 |
| 2028 | | 122,236 | 0 | 0 | -122,236 | -30,035 | -1,588,583 |
| 2029 | | 78,171 | 0 | 0 | -78,171 | -17,906 | -1,606,489 |
| 2030 | | 35,719 | 436,012 | 0 | -471,731 | -100,733 | -1,707,223 |