OFFICE OF INTERNAL AUDIT
Stan Sewell, City Auditor

MEMORANDUM

To: **City Council**

From: **Stan Sewell, City Auditor**

Digitally signed by Stan Sewell
DN: cn=Stan Sewell, o=City of Chattanooga, ou=Office of Internal Audit, email=sewell_stan@chattanooga.gov, c=US
Date: 2014.09.05 16:33:04 -04'00'

Date: **September 5, 2014**

Re: **EPB – Mauldin & Jenkins Report on Agreed-Upon Procedures**

Background

At the request of the City Council's Audit and IT Committee, the Office of Internal Audit (OIA) previously issued a memorandum dated July 22, 2014, regarding overbilling of energy charges by EPB. Specifically, the Committee asked if the finding by Mauldin & Jenkins[1] related to EPB management's assertion that "within the total streetlight bill to the City of Chattanooga, any overbilling of energy associated with the misclassification of high pressure sodium lights as mercury vapor lights was more than offset by an under-billing of facilities charges is reasonable and supported by the underlying source documents" was accurate. In our memorandum, **we concluded there was not an offsetting under-billing of facilities charges**.

Also, on July 22, 2014, EPB provided the Mayor and Council of the City of Chattanooga a Report on Agreed-Upon Procedures dated July 21, 2014 regarding street light billings prepared by Mauldin & Jenkins. The cover letter accompanying the report indicated there was a "net under billing due EPB of $685,877". This report created confusion during the Audit and IT Committee meeting as members had no time to review it nor the OIA report issued on the same day. Further, the two reports had different scopes. The Audit and IT Committee determined to meet at a later time so OIA could review the Mauldin & Jenkins report, consider the differing time periods and report to the Committee. It also appeared the intent was to allow EPB and/or Mauldin & Jenkins to present to the Committee, if they desired.

Subsequently, Mayor Andy Berke, appointed a working group to resolve any discrepancies between EPB's Agreed-Upon Procedures report and the City Auditor's memorandum, and to determine if a process was in place to ensure billings are accurate and transparent going forward. Since that time the working group has met with the appropriate parties (EPB, Mauldin & Jenkins and the City Auditor).

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[1] Report on Agreed-Upon Procedures dated May 5, 2014

The City Auditor presented information to the working group related to some specific concerns about the accuracy of data in the Mauldin & Jenkins July 21, 2014 report. After meeting with the working group, Mauldin & Jenkins provided them with a **preliminary** revision to the schedule attached to their July 21, 2014 report. This preliminary schedule showed a net amount due to the City of Chattanooga from EPB of $17,049. During a meeting with our office, Mauldin & Jenkins stated the original report needed to be revised because EPB had provided them with erroneous information. As of the date of this memorandum, it does not appear Mauldin & Jenkins has issued a revised report.

Energy Overbillings ($1,255,000 for 89 months)

In our report dated July 22, 2014, we provided an estimated amount of energy charges overbilled by EPB related to the improper classification of light types (Mercury Vapor vs. High Pressure Sodium) to be $619,000 for the three year period 2010 – 2012. We extended our procedures (using the data obtained to develop our previous report) to include the same time period reported on in the July 21, 2014 Mauldin & Jenkins report (January 1, 2007 through May 2014). This resulted in an estimated overbilling of energy charges of $1,255,000. Mauldin & Jenkins' **preliminary** revised schedule indicates a total overbilling of energy charges due to misclassified light types of $1,539,274 for this 89 month period. We requested the detail calculations supporting their amounts from Mauldin & Jenkins. However, those details were not provided to us.

In developing their **preliminary** revised schedule, it is our understanding, Mauldin & Jenkins became aware of data/documentation related to the "CAD" system allowing them to factor in more manual correcting adjustments by EPB that OIA had not allowed for. OIA had considered all changes to light types in the billings prior to January 2013 to be related to the normal flow of light replacements (due to lack of documentation related to manual adjustments). Considering this, the revised $1,539,000 may be a reasonable estimate for the overbillings during this 89 month period of time. However, we would not feel comfortable with this estimate without reviewing the detail supporting Mauldin & Jenkins' calculations. We further note the energy overbilling occurred over a period greater than the 89 months used for the calculation.

Non-Metered Street Lights (potential under-billing of $442,000)

The July 21, 2014 Mauldin & Jenkins report included an offsetting under-billing related to a 5% additional charge they asserted should have been added to all energy billings during the 89 month period included in their report. There is documentation to support this assertion as of October 2008. See the highlighted section (page 2) of Exhibit I, Outdoor Lighting Rate - Schedule LS (effective October 2008). Prior to October 2008, the Outdoor Lighting Rate - Schedule LS does not appear to require the 5% added charge for non-metered street lights, only metered lights with a failure (See Exhibit II).

When the 5% additional charge is added to the corrected billings for the last 68 months of the 89 month period, it results in an estimated amount of $442,000 that should have been added to the bills. However, we have been unable to obtain a clear statement from TVA about the applicability of this additional charge. We recommend consultation with the City Attorney for clarification about whether this additional charge should be applied and if it would be appropriate to back-bill for previous periods. Also, there is information supporting the argument that the 5% additional charge should not be applied (see the supplemental discussion attached as Exhibit III).

Average Burn Hours and Ballast Wattage

The July 21, 2014 Mauldin & Jenkins report included an offsetting under-billing related to application of different monthly kWh rates for the various light types. Some comparative examples can be seen in item number 3 of Exhibit III (column heading Delay Document). Mauldin & Jenkins' assertion that these increased rates should be applied is based on two documents that appear to be related (see document titled "Why the New kWh Values?" and copy of an Excel spreadsheet "by Sam DeLay", attached as Exhibit IV). We have inquired of EPB management, EPB staff, EPB Internal Audit and Mauldin & Jenkins regarding any additional documentation to support this assertion. In particular, we expected there to be some formal transmittal letter (or email) with a directive that distributors must change their rates to match these documents. No further documentation was provided to indicate a formal transmittal of these two documents was made from TVA to EPB. To the best of our understanding, the documents were found in a folder by an EPB employee in the Systems Modeling and Records Department approximately 3 years ago. This employee stated there was no transmittal letter or any other information to provide context as to how it was obtained.

Without any additional directive from TVA mandating EPB change their rates, this asserted offsetting under-billing does not appear to be valid. In particular, we have noted:

1. The document (Exhibit IV) appears to be a flyer, handout or presentation outline of some sort. There is no authoritative directive. There is no indication of who this "flyer" was sent to. If sent, there is no indication who sent it. There is no signature by a representative of TVA on this document. There is nothing we have seen that indicates this document is authoritative.

2. This "flyer" has a bullet point stating, clearly, "A letter to the TVA Customer Service Manager is made to request these changes from the power distributor." EPB sent no letter to TVA to request these changes.

3. In an email from TVA to EPB on July 30, 2014 (see Exhibit V), specifically sent to communicate TVA's position as to whether EPB should have been billing based on the 4,377 burn hours, Jay Erickson states "… If consistent with EPBs operating characteristics, EPB should have requested a lighting change to 4,377 burn hours, accordingly." This seems to clearly state the TVA position that EPB needs to or should have taken steps or efforts to determine if the particular situation for EPB warrants a change to the 4,377 and if determined to be so, EPB should request a change from TVA prior to initiating any billing based on a higher number of burn hours than the current 4,200.

With regard to this document (Exhibit IV), it appears someone (apparently Sam Delay) at TVA developed a presentation (or simply developed some reasonable analysis for distributor's use) that used numbers from an older study on burn hours to develop a chart that would represent billings for a typical street light using currently manufactured ballasts in the region (or some area that was not particularly Chattanooga). It was not specific to the geography or structure of the Chattanooga area or system. However, it was documentation that a distributor could use that would, probably by default, pass TVA scrutiny to obtain approval of a request for a rate change due to increased burn hours. EPB made no request and did not use this study to support their billings.

The latest communication from TVA (Exhibit V) supports the assertion EPB was billing based on the number of burn hours and Watts approved by TVA. Further, EPB management has stated that TVA is extremely aggressive about ensuring the distributors properly bill. TVA is aware the EPB billings are not based on 4,377 burn hours. However, TVA has taken no action nor issued any statements to EPB demanding EPB "correct" their billings to reflect 4,377 burn hours.

Facilities Charges and Maintenance Billings

In our memorandum dated July 22, 2014, we reported there was no material over or under billing of facilities charges related to street light fixtures. The analysis we performed to make that determination resulted in a slight indication of overbilling. However, because the analysis was based, in part, on estimates, we concluded the amounts were reasonable. We have reviewed facilities charges for the expanded scope of 89 months. Although we noted some issues that appear to be related to timing, we still believe the amounts billed (in the aggregate) for facilities charges are reasonable and, any actual over or under billing would be immaterial. For the purposes of considering materiality, we note EPB bills the City an average of $1,000,000 per year in facilities charges.

Mauldin & Jenkins’ **preliminary** revised schedule indicates there was a net under-billing of facilities charges by EPB of $95,108 over the 89 month period analyzed. Based on discussions with Mauldin & Jenkins, it is our understanding the $95,108 is actually a total for error adjustments over the 89 month period, not a certain amount of under-billing during that time (i.e. if the plant asset account that facilities charges are based on was erroneously overstated several years in the past, application of these adjustments may not be sufficient to result in an under-billing). Considering the average ($1,000,000) annual facilities charges relative to the average ($13,000) annual error asserted by Mauldin & Jenkins, we believe the amount is immaterial and warrants no further review by our office.

OIA did not perform any procedures related to maintenance billings. However, we note EPB’s billings for street lights exceed $2,000,000 per year. Therefore, the $10,646 total under-billings (over 89 months) for maintenance identified by Mauldin & Jenkins is immaterial and warrants no further review by our office.

Conclusion

For the 89 month period considered, a reasonable estimate for the amount of overbilled energy charges due to misclassification of light types is $1,255,000. There does not appear to be a reasonable argument for back billing based on a higher number of average burn hours or higher estimated ballast watts. If the 5% additional charge for non-metered streetlights is valid and back billing is appropriate, the net amount overbilled by EPB is estimated to be $813,000 ($1,255,000 less $442,000).

EPB is a component of the municipal corporation that is the City of Chattanooga. However, an intra-government agreement between general government and EPB is needed with regard to street light services. Had such an agreement been in place, it is very likely recent confusion and concerns would have been avoided.

The issues discussed in this memorandum are not the result of an audit performed in accordance with generally accepted government auditing standards. Had we performed such an audit, additional issues might have been reported. The purpose of this memorandum is to provide information that may be useful to those charged with governance of the City of Chattanooga.

cc: Mayor Andy Berke
Travis McDonough, Chief of Staff
Wade Hinton, City Attorney
Daisy Madison, Chief Financial Officer
Vicky Gregg, EPB Audit Committee Chair
Harold DePriest, EPB CEO
Audit Committee

Exhibit I

ELECTRIC POWER BOARD OF CHATTANOOGA

OUTDOOR LIGHTING RATE--SCHEDULE LS

(October 2008)

Availability

Available for service to street and park lighting systems, traffic signal systems, athletic field lighting installations, and outdoor lighting for individual customers.

Service under this schedule is for a term of not less than 1 year.

Payment

Bills under this rate schedule will be rendered monthly. Any amount of bill unpaid after due date specified on bill may be subject to additional charges under Distributor's standard policy.

Adjustment

The energy charge in Part A and Part B of this rate schedule shall be increased or decreased in accordance with the current Adjustment Addendum published by TVA. In addition, the energy charge in Part A and Part B of this rate schedule shall be increased or decreased to correspond to increases or decreases determined by TVA under Adjustment 4 of the wholesale power rate schedule applicable under contractual arrangements between TVA and Distributor.

PART A--CHARGES FOR STREET AND PARK LIGHTING SYSTEMS, TRAFFIC SIGNAL SYSTEMS, AND ATHLETIC FIELD LIGHTING INSTALLATIONS

I. Energy Charge: 5.823¢ per kWh per month

II. Facility Charge

The annual facility charge shall be 12.3 percent of the installed cost to Distributor's electric system of the facilities devoted to street and park lighting service specified in this Part A. Such installed cost shall be recomputed on July 1 of each year, or more often if substantial changes in the facilities are made. Each month, one-twelfth of the then total annual facility charge shall be billed to the customer. If any part of the facilities has not been provided at the electric system's expense or if the installed cost of any portion thereof is reflected on the books of another municipality or agency or department, the annual facility charge shall be adjusted to reflect properly the remaining cost to be borne by the electric system.

Traffic signal systems and athletic field lighting installations shall be provided, owned, and maintained by and at the expense of the customer, except as Distributor may agree otherwise in accordance with the provisions of the paragraph next following in this section II. The facilities necessary to provide service to such systems and installations shall be provided by and at the expense of Distributor's electric system, and the annual facility charge provided for first above in this section II shall apply to the installed cost of such facilities.

When so authorized by policy duly adopted by Distributor's governing board, traffic signal systems and athletic field lighting installations may be provided, owned, and maintained by Distributor's electric system for the customer's benefit. In such cases Distributor may require reimbursement from the customer for a portion of the initial installed cost of any such system or installation and shall require payment by the customer of a facility charge sufficient to cover all of Distributor's costs (except reimbursed costs), including appropriate overheads, of providing, owning, and maintaining such system or installation; provided that, for athletic field lighting installations, such facility charge shall in no case be less than 12 percent per year of such costs. Said facility charge shall be in addition to the annual facility charge on the facilities necessary to provide service to such system or installation as provided for in the preceding paragraph. Replacement of lamps and related glassware for traffic signal systems and athletic field lighting installations provided under this paragraph shall be paid for under the provisions of paragraph A in Section IV.

III. Customer Charge - Traffic Signal Systems and Athletic Field Lighting Installations.

Distributor shall apply a uniform monthly customer charge of $2.94 for service to each traffic signal system or athletic field lighting installation.

IV. Replacement of Lamps and Related Glassware - Street and Park Lighting

Customer shall be billed and shall pay for replacements as provided in paragraph A or B below, which shall be applied to all service for street and park lighting.

A. Distributor shall bill the customer monthly for such replacements during each month at Distributor's cost of materials, including appropriate storeroom expense.

B. Distributor shall bill the customer monthly for one-twelfth of the amount by which Distributor's cost of materials, including appropriate storeroom expense, exceeds the product of 3 mills multiplied by the number of kilowatthours used for street and park lighting during the fiscal year immediately preceding the fiscal year in which such month occurs.

Metering

For any billing month or part of such month in which the energy is not metered or for which a meter reading is found to be in error or a meter is found to have failed, the energy for billing purposes for that billing month or part of such month shall be computed from the rated capacity of the lamps (including ballast) plus 5 percent of such capacity to reflect secondary circuit losses, multiplied by the number of hours of use.

Revenue and Cost Review

Distributor's costs of providing service under Part A of this rate schedule are subject to review at any time and from time to time to determine if Distributor's revenues from the charges being applied are sufficient to cover its costs. (Such costs, including applicable overheads, include, but are not limited to, those incurred in the operation and maintenance of the systems provided and those resulting from depreciation and payments for taxes, tax equivalents and interest.) If any such review discloses that revenues are either less or more than sufficient to cover said costs, Distributor shall revise the above facility charges so that revenues will be sufficient to cover said costs. Any such revision of the annual facility charge provided for first above in section II of Part A of this rate schedule shall be by agreement between Distributor and TVA.

Exhibit II

ELECTRIC POWER BOARD OF CHATTANOOGA

OUTDOOR LIGHTING RATE--SCHEDULE LS
(July 1, 1998)

Availability

Available for service to street and park lighting systems, traffic signal systems, athletic field lighting installations, and outdoor lighting for individual customers.

Service under this schedule is for a term of not less than 1 year.

Payment

Bills under this rate schedule will be rendered monthly. Any amount of bill unpaid after due date specified on bill may be subject to additional charges under Distributor's standard policy.

Adjustment

The energy charge in Part A and Part B of this rate schedule shall be increased or decreased in accordance with the current Adjustment Addendum published by TVA. (In addition, the energy charge in Part A and Part B of this rate schedule shall be increased or decreased to correspond to increases or decreases determined by TVA in the value of the hydro generation benefit allocated to residential customers.)

PART A--CHARGES FOR STREET AND PARK LIGHTING SYSTEMS, TRAFFIC SIGNAL SYSTEMS, AND ATHLETIC FIELD LIGHTING INSTALLATIONS

I. Energy Charge: 4.509¢ per kWh per month

II. Facility Charge

The annual facility charge shall be 12.3 percent of the installed cost to Distributor's electric system of the facilities devoted to street and park lighting service specified in this Part A. Such installed cost shall be recomputed on July 1 of each year, or more often if substantial changes in the facilities are made. Each month, one-twelfth of the then total annual facility charge shall be billed to the customer. If any part of the facilities has not been provided at the electric system's expense or if the installed cost of any portion thereof is reflected on the books of another municipality or agency or department, the annual facility charge shall be adjusted to reflect properly the remaining cost to be borne by the electric system.

Traffic signal systems and athletic field lighting installations shall be provided, owned, and maintained by and at the expense of the customer, except as Distributor may agree otherwise in accordance with the provisions of the paragraph next following in this section II. The facilities necessary to provide service to such systems and installations shall be provided by and at the expense of Distributor's electric system, and the annual facility charge provided for first above in this section II shall apply to the installed cost of such facilities.

Exhibit II

When so authorized by policy duly adopted by Distributor's governing board, traffic signal systems and athletic field lighting installations may be provided, owned, and maintained by Distributor's electric system for the customer's benefit. In such cases Distributor may require reimbursement from the customer for a portion of the initial installed cost of any such system or installation and shall require payment by the customer of a facility charge sufficient to cover all of Distributor's costs (except reimbursed costs), including appropriate overheads, of providing, owning, and maintaining such system or installation; provided that, for athletic field lighting installations, such facility charge shall in no case be less than 12 percent per year of such costs. Said facility charge shall be in addition to the annual facility charge on the facilities necessary to provide service to such system or installation as provided for in the preceding paragraph. Replacement of lamps and related glassware for traffic signal systems and athletic field lighting installations provided under this paragraph shall be paid for under the provisions of paragraph A in Section IV.

III. Customer Charge - Traffic Signal Systems and Athletic Field Lighting Installations.

Distributor shall apply a uniform monthly customer charge of $2.83 for service to each traffic signal system or athletic field lighting installation.

IV. Replacement of Lamps and Related Glassware - Street and Park Lighting

Customer shall be billed and shall pay for replacements of specified facilities under either paragraph A or B below, as designated by Distributor.

A. Distributor shall bill the customer monthly for such replacements during each month at Distributor's cost of materials, including appropriate storeroom expense, when facilities are not owned by Distributor.

B. Distributor shall bill the customer monthly for one-twelfth of the amount by which Distributor's cost of materials, including appropriate storeroom expense, exceeds the product of 3 mills multiplied by the number of kilowatthours used for street and park lighting during the fiscal year immediately preceding the fiscal year in which such month occurs.

Metering

For any billing month or part of such month for which a meter reading is found to be in error or a meter is found to have failed, the energy for billing purposes for that billing month or part of such month shall be computed from the rated capacity of the lamps (including ballast) plus 5 percent of such capacity to reflect secondary circuit losses, multiplied by the number of hours of use.

Revenue and Cost Review

Distributor's costs of providing service under Part A of this rate schedule are subject to review at any time and from time to time to determine if Distributor's revenues from the charges being applied are sufficient to cover its costs. (Such costs, including applicable overheads, include, but are not limited to, those incurred in the operation and maintenance of the systems provided and those resulting from depreciation and payments for taxes, tax equivalents and interest.) If any such review discloses that revenues are either less or more than sufficient to cover said costs, Distributor shall revise the above facility charges so that revenues will be sufficient to cover said costs. Any such revision of the annual facility charge provided for first above in section II of Part A of this rate schedule shall be by agreement between Distributor and TVA.

Supplement to Office of Internal Audit's Memorandum Regarding
EPB – Mauldin & Jenkins Report on Agreed Upon Procedures
Non-metered Street Lights 5% Additional Charge
Exhibit III (Additional Information obtained by OIA)

1. On July 26, 2010 TVA's Office of the Inspector General issued their audit report related to the City of Chattanooga Electric Power Board. The stated objective of this audit was "to determine compliance with key provisions of the power contract between TVA and Chattanooga…." This report did not include any finding of errors related to a failure to add 5% to the street light energy billings.

2. On November 16, 2011 TVA's Office of the Inspector General issued an audit report related to Volunteer Energy Cooperative (VEC). The stated "objective of the audit was to determine compliance with provisions of the power contract between the Tennessee Valley Authority (TVA) and Volunteer…." We noted street light billings were specifically included in the scope of testing. There was no finding related to a failure to charge an additional 5% on non-metered street lights. We communicated with VEC and they confirmed **they do not add 5%** to energy charges for their non-metered street lights. They also provided us with a copy of their Outdoor Lighting Rate – Schedule LS. We confirmed the language in this document matches the language in EBP's Schedule LS with regard to *Metering*. VEC also stated any changes to their rate structure are approved by TVA. Also, every year their TVA field accountant reviews the list and makes sure it matches the approved list TVA has.

3. We communicated with Caney Fork Electric Cooperative regarding their municipal street light billings. They stated TVA must approve any changes to their billing structure. They have a set monthly rate per light, based on the type of light. This rate is based on the lamp and ballast wattage and average burn hours. They multiply the rate by the number of each type of light then by the energy rate and the fuel adjustment rate. **They do not add 5%**. This is the same process used by EPB. Their rates (based on wattage and burn hours) are as follows:

		Caney	**EPB**	**Delay Document**
a.	MH 100	47	N/A	43
b.	MH 400	165	154	164
c.	MH 1000	398	N/A	394
d.	HPS 100	42	42	45
e.	HPS 200	82	85	87
f.	MV 175	70	71	77
g.	MV 400	155	155	174

Caney Fork Electric Cooperative's street light billings were reviewed with scrutiny by TVA approximately 1.5 to 2 years ago. As a result, they had to change the way they were billing facilities charges. However, TVA found no problem with them not adding 5% to non-metered street lights.

Supplement to Office of Internal Audit's Memorandum Regarding
EPB – Mauldin & Jenkins Report on Agreed Upon Procedures
Non-metered Street Lights 5% Additional Charge
Exhibit III (Additional Information obtained by OIA)

4. We communicated with Fort Loudoun Electric Cooperative regarding their municipal street light billings. All of their street lights are on one of two timed switches. Therefore, they have a definitive number of burn hours the energy billings are based on (not an estimated average). Otherwise, they bill similar to EPB (flat rate for each light type based on lamp and ballast watts). **They do not add 5%**. Their TVA field auditor/accountant does an annual rates and contract check that includes a review of all classes and rates in detail, including street lights.

5. We communicated with Plateau Electric Cooperative regarding their municipal street light billings. The staff member in charge of these billings was on leave. However, the Chief Financial Director stated they do not meter street lights; they bill based on the kWh for each light type; and, he is "pretty sure" **they do not add 5%**.

6. We communicated with Fayetteville Public Utilities regarding their municipal street light billings. The staff member in charge of billing stated she inherited a spreadsheet when she started in her position in 1997. She updates the spreadsheet for changes in the number of light types. She was not familiar with the spreadsheet formulas. However, the calculations are based on average burn hours of 360 per month (4,320 per year). **She adds 5%** to the total amount produced by the spreadsheet. She has been doing this (adding 5%) since she started the job in 1997 (prior to the October 2008 language change in the TVA Schedule LS). She was **not aware of why the 5% was being added**.

Why the New kWh Values?

TVA Lighting Services reviewed literature to see the current ballast input watts.

- Higher input wattage was found for HPS and Mercury Vapor fixture ballasts
- Lower input wattage was found for Metal Halide ballasts

Hours use was raised based on load research data.

- My records show In March 11, 1976 CH Patterson used a Duck River burn estimate of 4200 hours per year. The burn time was re-evaluated in FY 1985 load data studies. In 1985 different hours were used by the Rate Design Staff and Energy Use and Distributor Relations. The Rate Design Staff proposed a standard list in a study on 12/12/85 which I am using in the calculations of average energy use for outdoor light fixtures (attached). The result is 4377 hr per year which I use in the kWh calculations. The result provides for 50% load factor operation.

Developing additional kWh usage for LS lights

- Alternately, if you do not want to use the attached chart, when you make your calculations for facility charges to turn in with your rate change request letter, you may attach a manufacturer's "cut" sheet which gives input watts to the ballast for the fixture you are calculating. Those cut sheet ballast input watts divided by 1000 to get kW may be multiplied by 4377 hr per year and divided by 12 to get the monthly average kWh for your alternative light. Normally this is documented on the facility calculation attachment to the rate request.
- If you wish to have a new light added to the list and I will add one.

Additional factors which affect the kWh usage on LS lights

- There are also line losses. First, distribution losses up to the point of service are already included in the kWh energy rate. In Street Lighting Only, there is an additional 5% allowance for distribution secondary line losses associated with long secondary distribution circuits. There is no equivalent loss allowance for Part B outdoor lighting in the LS power supply contract with TVA.

Applying for changes to LS kWh usage

- A letter to the TVA Customer Service Manager is made to request these changes from the power distributor. This letter should include the kWh requested by fixture, and a requested date for implementing the changes, usually allowing for a 30 day approval window.
- Attachments to the request letter should put the lamp type and watts, lumens, facility charge, and kWh on the worksheets attached to the LS Rate change request. The total fixture watts with the ballast are normally documented on the attachments.

TVA from Sam DeLay KWH PER FIXTURE Dec 2007.xls

PHOTOCELL CONTROLED LIGHTING SYSTEMS OF POWER DISTRIBUTORS

	Mean Lumens	Lamp watts	cwa ballast GE Catalog Ballast watts	Color Rendering Index (CRI)	Fixture watts	4377HRS/YR Fixture kWH
MERCURY VAPOR LAMPS						
MER-175	**6,830**	175	36	20	211	77
MER-250	**8,250**	250	38	20	288	105
MER-400	**13,400**	400	77	20	477	174
MER-1000	**28,500**	1000	95	20	1095	399
HIGH PRESSURE SODIUM LAMPS						
HPS-100	**8,550**	100	23	21	123	45
HPS-150	**14,400**	150	36	21	186	68
HPS-200	**19,800**	200	38	21	238	87
HPS-250	**27,000**	250	53	21	303	111
HPS-400	**45,000**	400	69	21	469	171
HPS-1000	**126,000**	1000	105	21	1105	403
METAL HALIDE LAMPS						
MH-100	**6,200**	100	19	70	119	43
MH-175	**11,200**	175	31	62	206	75
MH 250	**16,625**	250	44	65	294	107
MH-400	**31,000**	400	50	65	450	164
MH-1000	**85,500**	1000	80	65	1080	394
MH-1000S	***71,500***	*1000*	*80*	*65*	*1080*	*394*
MH-1500S	***160,000***	*1500*	*148*	*65*	*1648*	*601*

S=Sports fixture, however, it is unlikely that sports fixtures will be photocell controled. The more likely case is switch controled which requires a meter for billing the actual kWh used. Using a meter would also require the customer pay a customer charge.

HOURS USE OUTDOOR LIGHTING

	P.M.	A.M.	HOURS/DA	HOURS/MO	# DAYS
July	2000	600	10	310	31
August	2000	700	11	341	31
September	1900	700	12	360	30
October	1900	700	12	372	31
November	1700	700	14	420	30
December	1700	700	14	434	31
January	1700	700	14	434	31
February	1800	700	13	364	28
March	1800	600	12	372	31
April	1800	600	12	360	30
May	2000	600	10	310	31
June	2000	600	10	300	30
				4377	365

Central military time

Street lighting will be considered to be onpeak when the p.m. peak
occurs on or after the hour shown and the a.m. peak occures on or before the hour shown.

Exhibit V

Sewell Stan

From: Erickson, Jay William II <jwerickson@tva.gov>
Sent: Wednesday, July 30, 2014 3:02 PM
To: Asher, Rebecca
Cc: DiBiase, David; Pratt, Daniel Patrick; Wardlaw, Van M
Subject: RE: hr schedule

Rebecca,

Since the 1985 lighting study, the standard customer burn hour basis has been 4,377 hours. If consistent with EPBs operating characteristics, EPB should have requested a lighting change to 4,377 burn hours, accordingly.

Thank you,

Jay Erickson
Rate Design & Administration
Tennessee Valley Authority
865-632-3449 office
865-805-0953 cell

From: Asher, Rebecca [mailto:asherrd@epb.net]
Sent: Tuesday, July 29, 2014 9:48 AM
To: Erickson, Jay William II
Cc: DiBiase, David; Pratt, Daniel Patrick; Wardlaw, Van M
Subject: RE: hr schedule

Jay,
Thank you for your assistance in clarifying the 5%. Also, to make sure I have the correct understanding, 4,377 was the required burn hours?

From: Erickson, Jay William II [mailto:jwerickson@tva.gov]
Sent: Wednesday, July 23, 2014 1:58 PM
To: Asher, Rebecca
Cc: Mitchell, Nancy K; DiBiase, David
Subject: RE: hr schedule

Hello Rebecca,

I spoke to the author of the attached, TVA employee Sam DeLay. Sam clarified that primary line losses are recovered in the kWh energy rate found in the LS Schedule. The 5% "additional allowance" is in place to cover secondary line losses for street lighting. This allows for the recovery of additional line losses associated with long secondary distribution circuits.

EPB's LS Schedule states the following:

For any billing month or part of such month in which the energy is not metered or for which a meter reading is found to be in error or a meter is found to have failed, the energy for billing purposes for that billing month or part of such month shall be computed from the rated capacity of the lamps (including ballast) plus 5 percent of such capacity to reflect secondary circuit losses, multiplied by the number of hours of use.

Exhibit V

Regarding the question of number of burn hours, it appears that EPB was using the accepted number of burn hours from a March 11, 1976 study. In 1985 and 2007 TVA completed lighting studies which recommended the number of burn hours be increased to 4,377 unless TVA received a request for and approved based on supporting documentation requesting a different number of hours. I have not found any supporting documentation regarding EPB's change in number of burn hours since that time.

Jay Erickson
Rate Design & Administration
Tennessee Valley Authority
865-632-3449 office
865-805-0953 cell

From: Asher, Rebecca [mailto:asherrd@epb.net]
Sent: Tuesday, July 22, 2014 9:45 AM
To: Erickson, Jay William II
Cc: Treece, Monica Lynn
Subject: FW: hr schedule

Jay,
Attached is a document, with sections highlighted related to the burn hours and the 5% if this helps any. In addition to the LS Schedule, this gave us an interpretation that there are losses with street lighting only not captured within the energy rate.