

Operations Monitoring Report

Third Quarter FY15

Prepared by:

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I. Executive Summary

A review of the fiscal year 2015 (FY15) Third Quarter performance and contract obligations between Constellation New Energy (CNE) and the Metropolitan Government of Nashville and Davidson County (Metro) is presented in this report by Thermal Engineering Group, Inc (TEG). The status of the available funds for all active capital construction and repair and improvement projects are also presented. For the fiscal year 2015 to date, CNE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the Third Quarter FY15, the chilled water sales decreased approximately 10% over the previous Third Quarter (FY14). The Third Quarter FY15 saw two cooling degree days where the Third Quarter of FY14 did not have any. The peak chilled water demand for the current quarter was 10,130 tons, which is 1% higher than the previous Third Quarter.

Steam sendout for the current quarter decreased by approximately 8.7% over the previous Third Quarter, marked by a 3% decrease in the number of heating degree days. Likewise, steam sales also decreased by approximately 9.2% over the previous Third Quarter. Steam system losses, as a percentage of sendout, increased, and the total losses increased approximately 31% over the previous Third Quarter. The peak steam demand for the current quarter was 166,094 pounds per hour, which represents a decrease in the Third Quarter demand by approximately 2.3%.

The Energy Generating Facility (EGF) performance continues to surpass the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water plant electric consumption continues to perform lower than the guaranteed levels but continues to increase over previous years. The steam plant electric consumption decreased approximately 4.3% over the previous Third Quarter, and the amount of electricity per unit of sales increased by approximately 5.4%. The steam plant fuel efficiency has decreased marginally from the previous Third Quarter. The total water consumption for the steam and chilled water plants increased approximately 7.2% from the previous Third Quarter marked by a 6.7% increase in the EDS make-up for the chilled water system and a 31% increase in the steam plant usage.

Work continued on DES Capital and Repair & Improvement Projects during the Third Quarter of FY15. Repair and Improvements to the EDS continue as scheduled. Construction was completed on DES109 during the Third Quarter FY15. No projects were closed-out during the Third Quarter FY15. It is anticipated that three projects will be closed during the Fourth Quarter FY15.

The current fiscal year system operating costs to date are \$16,319,700. This value represents approximately 73.6% of the total budgeted operating cost for FY15. The customer revenues from the sales of steam and chilled water for FY15 (to date) are \$14,097,148 which is approximately 69.4% of the budgeted amount. The difference between the operating costs and stomer revenue is the Metro funding amount (MFA), which represents the shortfall in cash flow for the system. The MFA transferred to date for FY15 is \$1,387,125 (75% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices.

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II. Energy Distribution Sales and Performance

A. Chilled Water

This section of the report discusses and presents performance information regarding the operation of the EGF for the periods described. Charts and tabular data are also presented to provide a more detailed description of the actual EGF performance.

1. Sales and Sendout

A comparison for the Second Quarter chilled water sales is shown in Figure 1. This data reflects a 9.9% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

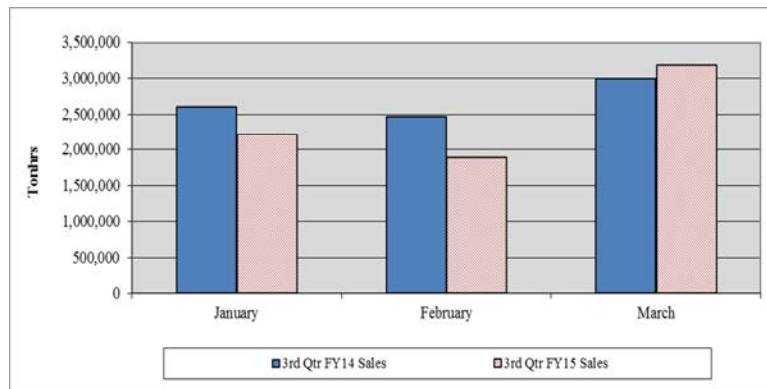


Figure 1. Third Quarter FY15 Sales Comparison

The peak chilled water demand for the current quarter was 10,130 tons, which represents an approximate 1% increase over the previous Third Quarter.

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS. The number of cooling degree days per month are also tracked for comparison.

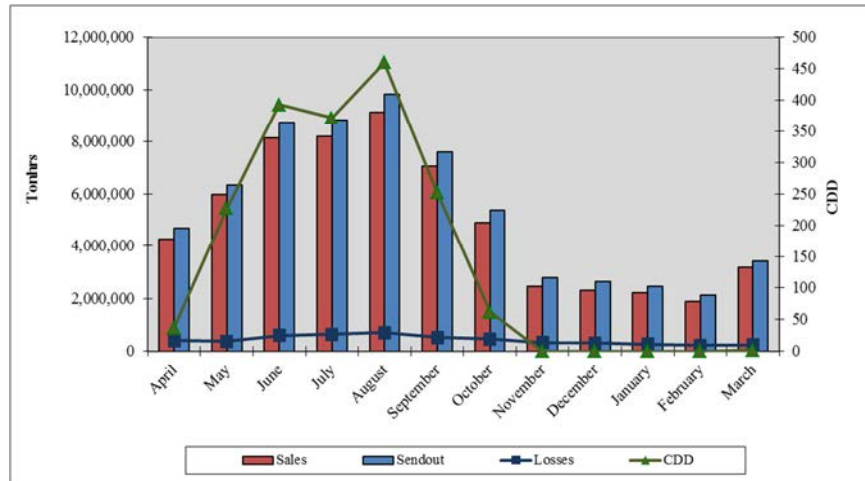


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the Third Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales.



Figure 3. Chilled Water System Loss Comparison for the Third Quarter FY15

The EDS make-up increased by approximately 6.7% over the previous Third Quarter despite numerous attempts by CNE to locate the source of the water leaks. However, the total EDS water usage represents only a small part of the total EGF water usage for the quarter.

The total energy losses have increased by approximately 6% over the previous Third Quarter. The make-up to the cooling towers decreased 1.2% during the quarter. The number of cycles of concentration in the condensing water circuit

experienced a 27.5% decrease during the current quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

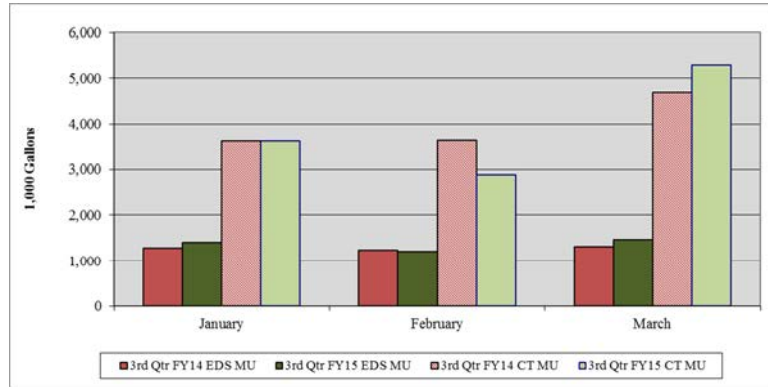


Figure 4. Chilled Water System City Water Usage Comparison

3. Performance

The performance of the chilled water aspect of the EGF is presented by the following two charts, Figures 5 and 6, for the previous twelve months. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

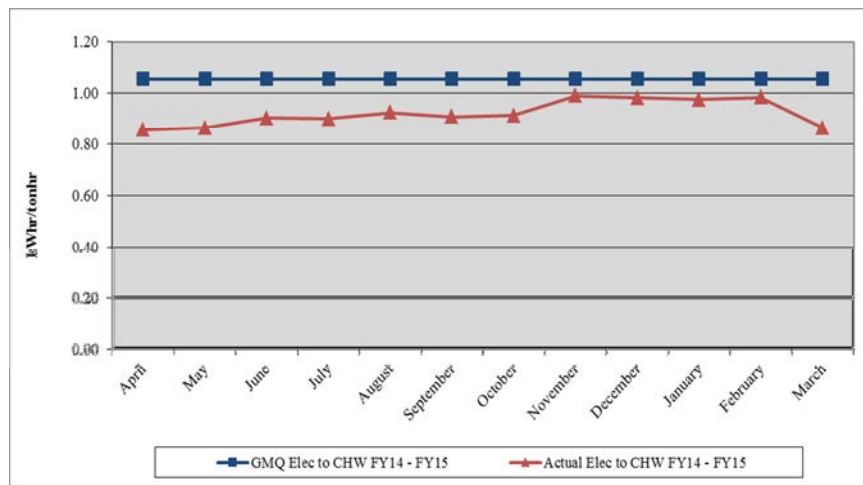


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

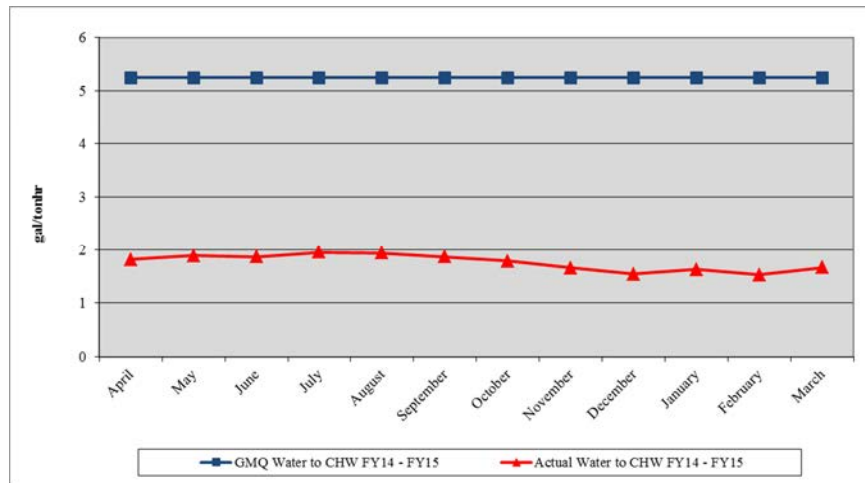


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

The chilled water allocation of the electric consumption falls under the GMQ limit of 1.055 kWhr per tonhr for the current quarter, and no excursion is reported for the current fiscal year. However, the chiller plant electric usage continues to show a steady increase over previous years with an exception in March. This increase is believed to be due, in part, to a change in operation of the chiller plant adopted by CNE during the First Quarter that was addressed during the Second Quarter. TEG will continue to monitor this issue during the Fourth Quarter. The electric usage per unit of sales increased approximately 11.9% over the Third Quarter for FY14 (Figure 5).

The actual chilled water plant water conversion factor increased approximately 11.9% over the previous Third Quarter. However, the total consumption of city water for the chiller plant for the current quarter increased only marginally.

B. Steam

1. Sales and Sendout

The steam sendout decreased by approximately 8.7% over the previous Third Quarter (FY14), and the sales also decreased by approximately 9.2%. The number of heating degree days decreased 3.2% over the previous Third Quarter despite several snow and ice storms. The steam system losses increased 31% over the previous Third Quarter. A comparison for the Third Quarter steam sales is shown in Figure 7.

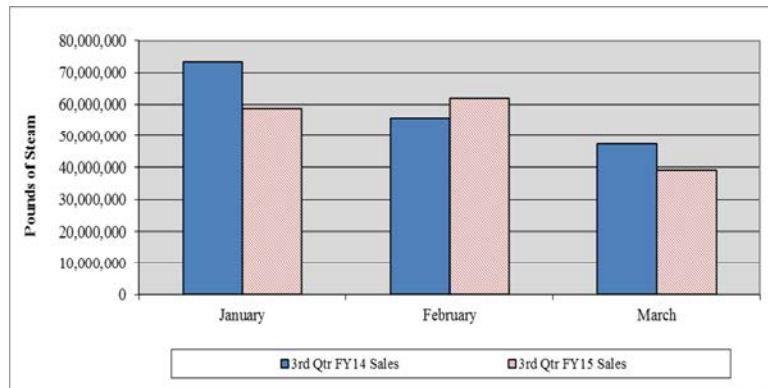


Figure 7. Steam Sales Comparison for the Third Quarter FY15

The peak steam demand for the current quarter was 166,094 pph, which reflects an approximate 2.3% decrease in the peak steam production over the previous Third Quarter.

Figure 8 shows the steam sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in pounds per month between the recorded sendout and sales values and represent the total mass loss in the EDS between the EGF and the customer meters.

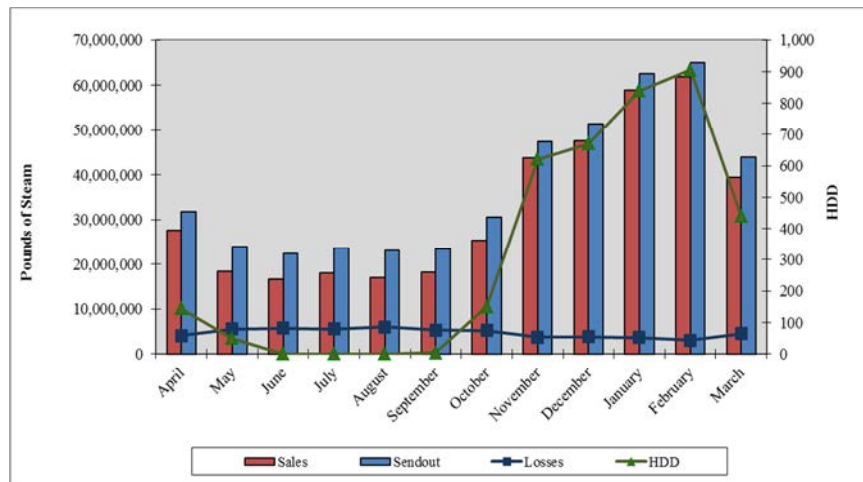


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Third Quarter is shown in Figure 9. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing cause of these losses.

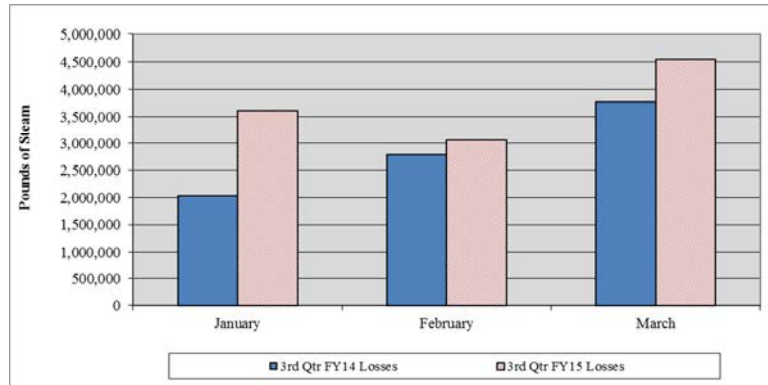


Figure 9. Third Quarter FY15 Steam System Losses

The amount of city water make-up (MU) to the steam system consists of the loss in mass between the EGF and the customers, in the condensate return from the customers to the EGF and losses at the EGF. This data is shown in the comparison of Third Quarter data in Figure 10.

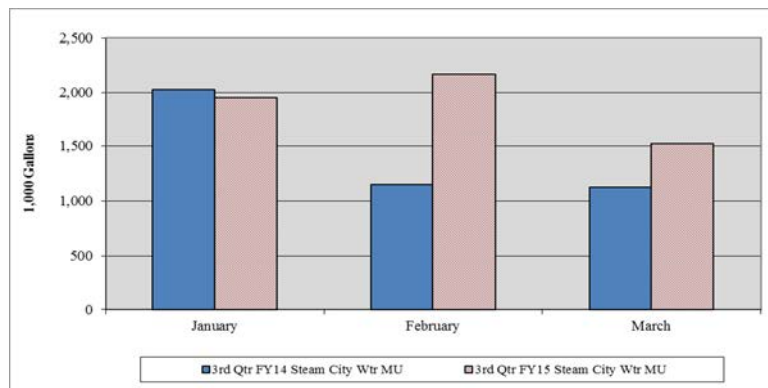


Figure 10. Third Quarter FY15 Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system aspect of the EGF is presented by the following three charts, Figures 11, 12 and 13. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved satisfactorily.

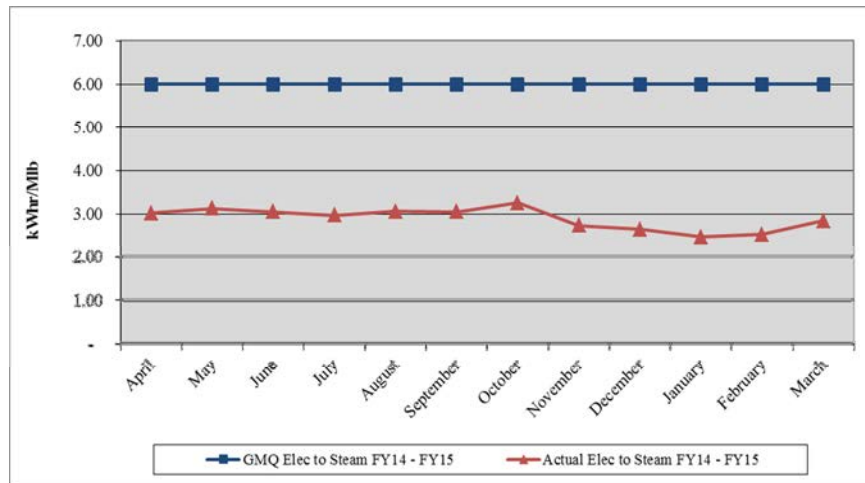


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

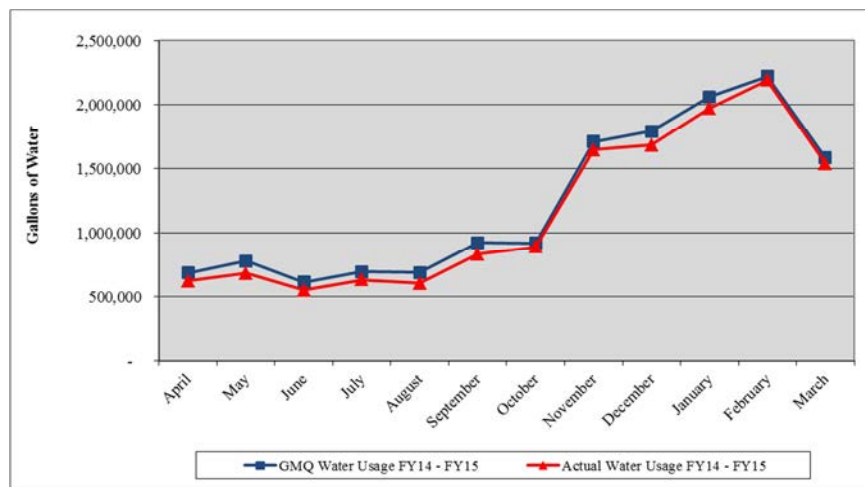


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

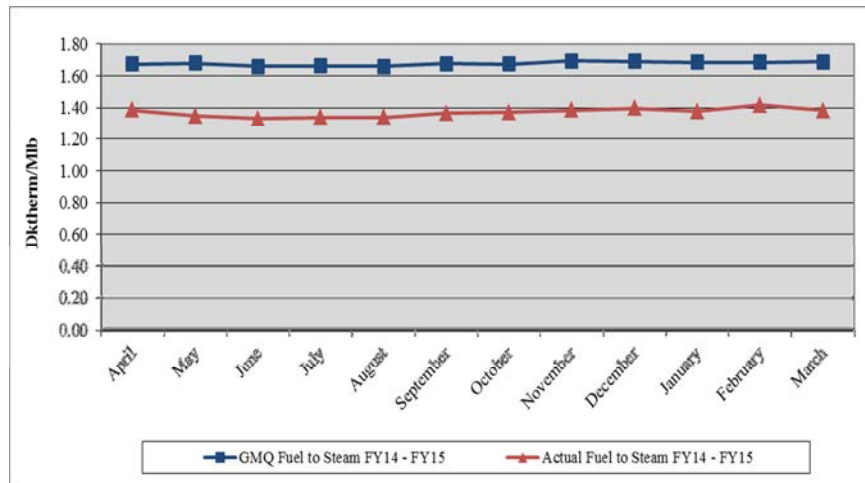


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 4.3% decrease in the steam plant electric consumption while experiencing a 5.4% increase in the electric conversion factor. The water consumption for the steam plant increased 30.9% this quarter as compared to the previous Third Quarter. The fuel consumption per unit of steam sales is relatively constant throughout the year and when compared to the historic data. The boiler plant fuel efficiency decreased 0.48% for the current quarter.

C. Contract Guarantee Performance

The production and sales performance for the EGF and EDS are summarized in Table 1 for the current quarter and the complete fiscal year. Additional parameters, such as cooling tower blow-down and peak demands are listed in this table, as well. Table 2 presents the Third Quarter comparisons of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. Third Quarter FY15 Production, Sales and Consumption Summary

Item	Unit	Third Quarter FY15	Third Quarter FY14	*Percent Difference
	days	90	90	0.00%
Total Electric Use	kWhrs	7,169,428	7,136,420	0.46%
Chilled Water	kWhrs	6,756,302	6,704,934	0.77%
Steam	kWhrs	413,126	431,486	-4.26%
Total Water Use	kgal	21,491	20,043	7.22%
Total Chilled Water	kgal	15,854	15,735	0.76%
EDS Make-up	kgal	4,089	3,831	6.73%
Cooling Towers	kgal	11,765	11,904	-1.17%
Calc CT Evaporation	kgal	10,058	10,599	-5.10%
CT Blowdown	kgal	1,707	1,305	30.80%
Calc # Cycles		5.89	8.12	-27.45%
Steam	kgal	5,637	4,308	30.85%
Total Fuel Use	mmBTU	238,906	256,503	-6.86%
Natural Gas	mmBTU	220,695	248,615	-11.23%
Propane	mmBTU	18,211	7,888	130.87%
Condensate Return	kgal	15,920	18,831	-15.46%
	lbs	129,842,763	153,585,258	-15.46%
Avg Temp	°F	170.7	168.7	1.19%
Sendout				
Chilled Water	tonhrs	8,000,500	8,764,200	-8.71%
Steam	lbs	171,390,000	184,898,000	-7.31%
Peak CHW Demand	tons	10,130	10,067	0.63%
Peak Steam Demand	lb/hr	166,094	170,031	-2.32%
CHW LF		36.56%	40.30%	-9.28%
Steam LF		47.77%	50.34%	-5.11%
Sales				
Chilled Water	tonhrs	7,278,454	8,082,547	-9.95%
Steam	lbs	160,171,677	176,315,849	-9.16%
Losses				
Chilled Water	tonhrs	722,046	681,653	5.93%
Steam	lbs	11,218,323	8,582,151	30.72%
		6.55%	4.64%	41.02%
Degree Days				
CDD		2	0	NA
HDD		2,186	2,259	-3.23%

*positive percent difference values imply an increase from FY14 to FY15

Table 2. Third Quarter FY15 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	Third Quarter FY15	Third Quarter FY14	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	2.58	2.45	5.40%
GMQ Plant Efficiency	Dth/Mlb	1.687	1.676	
Plant Efficiency	Dth/Mlb	1.394	1.387	0.48%
Actual %CR		75.76%	83.06%	-8.80%
Avg CR Temp	°F	171	169	1.19%
GMQ Water Conversion	gal	5,858,289	4,415,193	
Water Conversion	gal	5,693,370	4,351,080	30.85%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.928	0.830	11.90%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.18	1.95	11.89%

*positive percent difference values imply an increase from FY14 to FY15

D. Operating Costs

The fixed operating costs for the DES include the management fee to CNE, debt service payments on the bonds and engineering and administration costs and are charged to the customers relative to their contract demand. The variable costs are dependent on the amounts of steam and chilled water produced and sold to the customers. These latter costs include the utility and chemical treatment costs. The vast majority of the costs incurred for the operation of the DES are passed onto the customers in the form of the demand charges (fixed costs) and energy charges (variable costs). A summary of the total operating costs for the fiscal year to date are shown in Table 3.

The revenues shown reflect the charges to the customers for their respective steam and chilled water service. The difference between the total costs and revenues from the customers is the shortfall that must be paid by Metro. The shortfall exists, in part, due to the remaining capacity at the EGF that was included in the original construction and remains unsold. This capacity is available for potential future customers.

The system operating costs for FY15 to date are \$16,319,700. This value represents approximately 73.6% of the total budgeted operating cost for FY15 and includes expenses to date that have been invoiced but were not paid at the time of this report. Additional invoices that would be charged to the Third Quarter have not been issued or

paid at the time of this report. The customer revenues from the sales of steam and chilled water for FY15 are \$14,097,148 which is approximately 69.4% of the budgeted amount. The MFA transferred to date is \$1,387,125 (75% of budget). However, the actual MFA required cannot be accurately calculated due to the outstanding invoices.

Table 3. DES Expenses and Revenues to Date

Item	FY15 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,374,300	\$ 1,076,159	\$ 1,076,159	\$ 1,076,159	\$ -	\$ 3,228,476	73.81%
9th Chiller	\$ 41,000	\$ 10,084	\$ 10,084	\$ 10,084	\$ -	\$ 30,251	73.78%
C/O 6A	\$ 80,900	\$ 19,908	\$ 19,908	\$ 19,908	\$ -	\$ 59,725	73.83%
C/O 6B	\$ 70,900	\$ 17,429	\$ 17,429	\$ 17,429	\$ -	\$ 52,287	73.75%
C/O 7	\$ 26,700	\$ 6,566	\$ 6,566	\$ 6,566	\$ -	\$ 19,698	73.78%
C/O 8	\$ 13,000	\$ 2,873	\$ 2,873	\$ 2,873	\$ -	\$ 8,620	66.31%
Pass-thru Charges: Chemical Treatment	\$ 151,500	\$ 60,541	\$ 40,990	\$ 42,735	\$ -	\$ 144,267	95.23%
Insurance	\$ 31,200	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Marketing: CES Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ 12,400	\$ 3,139	\$ 3,139	\$ 3,139	\$ -	\$ 9,418	75.95%
FEA: Steam	\$ -	\$ 24,860	\$ 42,244	\$ 57,148	\$ -	\$ 124,252	n.a.
Chilled Water	\$ -	\$ 147,576	\$ 41,414	\$ 38,031	\$ -	\$ 227,021	n.a.
Misc: Metro Credit	\$ -	\$ (220,970)	\$ (123,494)	\$ (88,094)	\$ -	\$ (432,558)	n.a.
ARFA	\$ -	\$ 15,630	\$ 15,630	\$ 15,630	\$ -	\$ 46,889	n.a.
Deferral	\$ -	\$ -	\$ (17,564)	\$ (95,178)	\$ -	\$ (112,742)	n.a.
Subtotal - Man Fee =	\$ 4,801,900	\$ 1,384,765	\$ 1,258,872	\$ 1,194,523	\$ -	\$ 3,838,160	79.93%
Reimbursed Management Fee + Chem Treatment		\$ 1,384,765	\$ 1,258,872	\$ 396,429	\$ -	\$ 3,040,066	0.00%
Metro Costs							
Pass-thru Charges: Engineering	\$ 8,700	\$ 23,301	\$ 24,744	\$ (48,781)	\$ -	\$ (737)	-8.47%
EDS R&I Transfers	\$ 275,100	\$ 70,350	\$ 71,925	\$ 71,925	\$ 23,975	\$ 238,175	86.58%
Metro Marketing	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ 27,900	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Metro Incremental Cost	\$ 524,500	\$ 111,740	\$ 60,163	\$ 120,158	\$ 3,359	\$ 295,420	56.32%
Utility Costs: Water/Sewer	\$ 724,600	\$ 201,426	\$ 110,046	\$ 77,500	\$ -	\$ 388,972	53.68%
EDS Water/Sewer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
EDS Electricity	\$ -	\$ 19,544	\$ 13,448	\$ 10,593	\$ -	\$ 43,586	n.a.
Electricity	\$ 6,574,600	\$ 2,487,218	\$ 756,635	\$ 685,384	\$ -	\$ 3,929,237	59.76%
Natural Gas Consultant	\$ 99,600	\$ 4,000	\$ 5,560	\$ 3,200	\$ -	\$ 12,760	12.81%
Natural Gas Transport	\$ -	\$ 30,100	\$ 82,374	\$ 100,934	\$ -	\$ 213,408	n.a.
Natural Gas Fuel	\$ 3,657,600	\$ 410,315	\$ 795,227	\$ 873,031	\$ -	\$ 2,078,572	56.83%
Propane	\$ -	\$ -	\$ -	\$ 183,307	\$ -	\$ 183,307	n.a.
Subtotal - Metro Costs =	\$ 11,902,600	\$ 3,357,993	\$ 1,920,122	\$ 2,077,252	\$ 27,334	\$ 7,382,701	62.03%
Subtotal - Operations =	\$ 16,704,500	\$ 4,742,758	\$ 3,178,994	\$ 3,271,775	\$ 27,334	\$ 11,220,861	67.17%
Debt Service							
2012 Bonds	\$ 3,476,900	\$ 869,146	\$ 869,313	\$ 869,313	\$ -	\$ 2,607,771	75.00%
2005 Bonds -Self Funded	\$ 811,800	\$ 343,978	\$ 344,028	\$ 467,813	\$ -	\$ 1,155,818	142.38%
2007 Bonds -Self Funded	\$ 210,000	\$ -	\$ 339,300	\$ -	\$ -	\$ 339,300	161.57%
2008 Bonds -Self Funded	\$ 208,900	\$ -	\$ 339,300	\$ -	\$ -	\$ 339,300	162.42%
2010 Bonds -Self Funded	\$ 207,300	\$ -	\$ -	\$ 339,300	\$ -	\$ 339,300	163.68%
MCCC Fund -Self Funded	\$ 731,000	\$ -	\$ -	\$ 339,300	\$ -	\$ 339,300	46.42%
Interest & Misc Revenue	\$ (175,800)	\$ (6,747)	\$ (8,458)	\$ (6,747)	\$ -	\$ (21,951)	12.49%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ 600	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Subtotal - Capital =	\$ 5,470,700	\$ 1,206,377	\$ 1,883,482	\$ 2,008,979	\$ -	\$ 5,098,838	93.20%
Total =	\$ 22,175,200	\$ 5,949,135	\$ 5,062,476	\$ 5,280,754	\$ 27,334	\$ 16,319,700	73.59%
Customer Revenues							
Taxes Collected		\$ 109,142	\$ 86,298	\$ 87,826	\$ -	\$ 283,266	n.a.
Taxes Paid		\$ 109,141	\$ 85,018	\$ 89,748	\$ -	\$ 283,907	n.a.
Penalty Revenues/Credits		\$ (103,266)	\$ 702	\$ (5,088)	\$ -	\$ (103,652)	n.a.
Energy Revenues Collected		\$ 5,683,734	\$ 4,203,289	\$ 4,318,417	\$ -	\$ 14,205,441	n.a.
Revenues =	\$ 20,325,700	\$ 5,580,469	\$ 4,205,272	\$ 4,311,407	\$ -	\$ 14,097,148	69.36%
Metro Funding Amount =	\$ 1,849,500	\$ 368,666	\$ 857,204	\$ 969,347	\$ 27,334	\$ 2,222,552	120.17%

The DES serves 28 customers and 41 buildings in downtown Nashville. These customers are divided into three categories: 1) Private customers who privately own their buildings, 2) State of TN owned buildings and 3) Metro owned buildings. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties and any unpaid balances.

Table 4. Customer Revenue Summary to Date

Building	Chilled Water			Steam		
	Total Cost	Consumption (tonhrs/yr)	Unit Cost (\$/tonhr)	Total Cost	Consumption (Mlb/yr)	Unit Cost (\$/Mlb)
Private Customers	\$ 2,645,529	12,356,525	\$ 0.2141	\$ 1,298,069	86,390	\$ 15.0257
State Government	\$ 2,448,601	9,457,335	\$ 0.2589	\$ 1,666,310	102,493	\$ 16.2578
Metro Government	\$ 4,116,557	19,520,063	\$ 0.2109	\$ 2,030,375	141,089	\$ 14.3908
New Customers	\$ 2,466,687	11,374,186	\$ 0.2169	\$ 1,132,172	91,117	\$ 12.4255
Total	\$ 9,210,686	41,333,923	\$ 0.2228	\$ 4,994,754	329,972	\$ 15.1369

Total Revenue \$ 14,205,440
 True-up and Adjustments (Net) \$ (108,293)
 Net Revenue \$ 14,097,148

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY15. Communication between TEG and CNE continues to be excellent, and CNE has reported and managed all EGF operations satisfactorily and according to the ARMA with no contract violations.

A. Reliability

The principle issues surrounding the reliable operation of the EGF relates to the ability to operate without significant interruption, exclusive of planned outages, and disruption of service to the customers. The following disruptions in service occurred during the quarter.

- A natural gas curtailment occurred January 7 through 9. While starting an additional boiler on January 8, the steam pressure dropped to a low of 132 psig and was below 150 psig for approximately one hour. No customer complaints regarding this pressure excursion were recorded.
- Two boiler trips occurred during January outside of the curtailment period. On January 20, a boiler tripped due to the Maxon natural gas control valve, and on January 28, a boiler tripped due to low feedwater pressure. Both trips caused the pressure to be below 150 psig for less than one hour. No customer complaints regarding these pressure excursions were recorded.
- An additional natural gas curtailment occurred February 18 through 20. During this curtailment, there were two instances where the steam pressure dropped below 150 psig. One trip occurred on February 18 due to a short in one of the propane transfer pump motors. Since it required CNE sometime to locate and isolate the electrical short, the system pressure dropped to a low of 25 psig and was below 150 psig for approximately two hours. The second trip occurred on February 19 due to a tripped control panel breaker. Steam pressure dropped to a low of 54 psig and was below 150 psig for approximately 90 minutes. Only one customer complaint was reported during this curtailment.

- On March 5th, the boilers tripped offline due to low natural gas pressure. Upon investigation by CNE personnel, the safety relief valve for the natural gas service from Piedmont was found to have lifted. Piedmont was notified and the boilers were transferred over to propane until Piedmont could make repairs. The steam pressure dropped to a low of 86 psig and was below 150 psig for approximately 2.5 hours. No customer complaints regarding this excursion were recorded.
- On March 9th and 17th, a contractor working on the construction of a new building at 4th Ave South and Demonbreun inadvertently struck the DES chilled water lines in the area while drilling wall anchors under the city streets. The first hole was made in the chilled water service to the Symphony and the second was made into the chilled water service to the MCC. Since the system chilled water pressure could not be maintained until the locations of the leaks were determined, the chiller plant tripped off line. Service was down for 2.5 and 3.5 hours, respectively, for each occurrence.
- Excursions and disruptions in operations that have occurred throughout the year are included in the individual Monthly Operational Reports from CNE.

B. Efficiency

The operation of the EGF satisfied the guaranteed levels for all commodity usage during the quarter. There were no significant excursions above the guaranteed levels for the current quarter. A more detailed discussion of the contract guarantee performance was presented previously in this report.

C. Environment, Health and Safety

The Annual Emission Inventory Report and the Semi-Annual Monitoring Report for July-December 2014 were issued to the Metro Health Department in January. The Title V Certificate of Compliance for 2014 was sent to the USEPA and also to the Metro Health Department in January.

The Annual Tier II Report for 2014 was sent to the State Emergency Planning Commission, Nashville Fire Department and Davidson County LEPC in February. The Annual Greenhouse Gas Report was sent to the USEPA in February.

No environmental violations were reported during the quarter.

Monthly safety meetings were held on Lock-out/Tag-out Procedures, Hazard Management and Analysis and Office Safety and Accident Reporting.

CNE continues cross-training its maintenance employees to fill in as relief operators.

D. Personnel

The EGF currently has twenty-five full time employees. Of the current number of employees, seventeen were previously employed by Nashville Thermal Transfer Corporation.

E. Training

Staff training for this quarter consisted of the Health and Safety training discussed previously. CNE continues cross training maintenance personnel to perform the tasks of the operators at the EGF in case of emergency or need.

F. Water Treatment

The water treatment program consists of regular testing and monitoring of the water chemistry in the steam, chilled water and condensing water systems. Chemicals are added to control the water hardness, chlorine levels and biologicals. Remote testing of the condensate at the AA Birch, Tennessee Tower and the Andrew Jackson also occurs regularly to monitor the concentration and distribution of the steam system chemicals.

- Steam System
 - The condensate return averaged approximately 75.8% of the steam sendout during the quarter which represents a decrease of approximately 8.8% over the previous Third Quarter.
- Condensing Water System
 - The conductivity of the condensing water continues normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - During the Second Quarter, the presence of some peculiar water chemistry at several of the customers' buildings prompted an investigation by TEG, CNE and their water treatment company. The source of problem is believed to be bacteriological contamination, and a plan is being developed by CNE to address the issue. It is also believed that the presence of the bacteria is reducing the heat transfer abilities of several of the customer heat exchangers.

G. Maintenance and EGF Repairs

CNE continues to report on the numerous routine maintenance and preventive maintenance activities performed on the EGF primary and ancillary equipment. The principle items are discussed herein as they relate to the repair, maintenance or replacement of equipment or devices at the facility and are not considered extraordinary. The cost for these items is included as part of the FOCs.

- The Maxon natural gas control valves were replaced on boilers #2, #3 and #4.
- The chilled water outage occurred in early January during which several valves were replaced at the EGF.
- Other minor repairs and maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on March 24, 2015, by Kevin Jacobs, P.E. with TEG. This review involved a tour of the facility with the primary points of interest and concern noted herein.

- Many of the housekeeping items noted in the previous walk-through have been repaired or resolved.
- Some of the riser pipes in the cooling towers have been painted, but some repairs remain. CNE has dedicated itself to repaint these riser pipes as the tower basins are repaired and the fill is replaced. They estimate a complete restoration of these components over the next couple of winters. Cooling tower #13 showed a significant amount of corrosion which CNE plans on addressing in FY15.
- The #3 and #4 boiler natural gas control valves (Maxon valves) were noted in the log book as not working during the Second Quarter. These valves have been replaced by CNE and are working properly.
- A rung is bent on the ladder between the main operating floor and the water treatment mezzanine and remains unrepaired by CNE.
- Other minor items remaining include:
 - Cobwebs have reformed in various places throughout the plant and on motor control center #4 located near the boilers; these should be removed. However, progress has been made in removing some of these cobwebs.

IV. Capital Projects

The Capital Projects discussed in this section are those projects funded through the issuance of bonds by Metro. Costs for these projects will be paid from funds already appropriated. The statuses of the projects are discussed, and the project cost-to-date and bond balances are also presented.

A. Third Quarter FY15 Open Projects

The following projects remained open at the end of the Third Quarter FY15.

1. DES033 – Manhole Lid and Ring Replacement/Restoration

This project relates to the repair and replacement of manhole lids and rings whenever Metro Public Works performs Street re-paving. This project will remain open and on-going.

2. DES089 – AA Birch Tunnel Repairs

This project was awarded and the work was completed during the Second Quarter FY15 and is awaiting the completion of the close-out documentation. It is anticipated that this project will be closed out during the Fourth Quarter FY15.

3. DES090 – Manhole & Tunnel Insulation Repair (Revised from DES060)

Work associated with this project will be on-going as required.

4. DES091 – Thermal Storage and NES Time of Use Rates

A proposal has yet to be provided from a local programmer who may be able to implement the necessary program and programming changes to the CNE invoicing system to facilitate the necessary changes to allow DES to charge the customers their respective time of use rate for electricity used at the EGF.

5. DES 105 – Vertical Tunnel Shaft Repairs at Suntrust Building

This project was awarded and the work was completed during the Second Quarter FY15 and is awaiting the completion of the close-out documentation. It is anticipated that this project will be closed out during the Fourth Quarter FY15.

6. DES 106 – Chilled Water Modifications at the Metro Courthouse

Phase II of this project began during the Third Quarter with a pre-bid meeting on March 26. The bids are anticipated in early April and work is anticipated to be completed by the end of the Fourth Quarter.

7. DES 107 – Manholes A, B and M Repairs and Improvements

Manholes A, B and M are located within the bounds of the West Riverfront Project which includes the construction of an amphitheater along the river at the old waste-to-energy plant site. There is some maintenance and repair work which needs to take place within these manholes prior to the opening of the West Riverfront Park in July 2015. This project addresses these maintenance and repair items.

TEG completed construction documents and this project was bid and awarded during the Third Quarter FY15. Work will begin on this project early in the Fourth Quarter FY15 and must be completed in May 2015.

8. DES 109 – Indigo Hotel Sparge Tube Addition

Work was completed on this project during the Third Quarter FY15. It is anticipated that this project will be closed-out during the Fourth Quarter FY15.

9. DES 110 – EGF Alternative Fuel

TEG and CNE have evaluated the options for alternative fuel sources during the Second and Third Quarters. At this time, no modifications to the EGF are anticipated, but a change in the purchase and delivery of propane will be made by CNE to ensure a consistent and available supply during curtailments. A final report from CNE is anticipated in the Fourth Quarter.

B. Third Quarter FY15 Closed Projects

There were no projects closed during the Third Quarter FY15.

C. Capital Projects Budget

The following table summarizes the costs and remaining balance of the DES capital projects based on reported expenditures to date. Open projects or completed projects that require some additional management are shown. Total costs for projects that are closed are shown with a gray highlight. Only the funds currently available are shown.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY15 Spending to Date	Total Spent to Date	Remaining Balance
2010 Bond Projects -49109					
DES070	MH 6 to 23 Cond Line	\$ 20,000	\$ -	\$ 527	\$ 19,473
DES071	Hermitage Hotel Ser Modifications	\$ 20,000	\$ -	\$ 1,119	\$ 18,881
DES072	Sheraton Stm & Cond Line	\$ 11,000	\$ -	\$ 10,462	\$ 538
DES091	NES Time of Use Electric Rate	\$ 100,000	\$ -	\$ 64,616	\$ 35,384
DES089	AA Birch Tunnel Repairs	\$ 175,000	\$ 172,732	\$ 172,732	\$ 2,268
DES105	Suntrust Shaft Repairs	\$ 160,000	\$ 158,892	\$ 158,892	\$ 1,108
DES111	DES CHP	\$ 200,000	\$ 66,068	\$ 66,068	\$ 133,932
Total Closed Projects		\$ 1,814,533	\$ -	\$ 1,814,533	\$ -
Metro Project Admin		\$ -	\$ -	\$ -	\$ -
Project Man, Development, etc		\$ 125,383	\$ -	\$ -	\$ 125,383
Total 2010 Bond		\$ 2,625,916	\$ 397,692	\$ 2,288,949	\$ 336,967
Customer Connection Fund -49107					
DES104	Time of Use/ Customer Billing	\$ 30,000	\$ 5,955	\$ 5,955	\$ 24,045
DES106	Courthouse CHW Heat Exchanger	\$ 10,000	\$ 6,967	\$ 9,693	\$ 307
DES110	Alternative Fuel Source for EGF	\$ 50,000	\$ 19,242	\$ 19,242	\$ 30,758
Sub-Total Closed Projects		\$ 7,161,827	\$ 33,039	\$ 6,559,502	\$ 602,325
Metro Project Admin		\$ 60,000	\$ 16,177	\$ 55,590	\$ 4,410
Project Man, Development, etc		\$ 1,188,173	\$ -	\$ -	\$ 1,188,173
Customer Connection Fund		\$ 8,500,000	\$ 81,380	\$ 6,649,981	\$ 1,850,019

V. Energy Distribution System Repairs, Improvements, PM and Emergencies

Several EDS repairs and improvements were made during the Third Quarter. The principle items for discussion are presented in the following sections.

A. Repairs and Improvements

Several repairs were made to the EDS and at customer buildings during the quarter. The remaining value of the R&I budget at the end of the current quarter is \$362,667. Table 6 provides a summary of the FY15 expenditures and revenues to date associated with the R&I budget.

Table 6. Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Net Market Adjustment	Market Value	Balance
Value at end of FY15						\$ -	\$ 208,524.78	\$ 208,524.78
CNE May 2014 R&I Invoice	6/30/2014	DES-1755	CNE	\$ 606.59				
CNE July 2014 R&I Invoice	9/25/2014	DES-1784	CNE	\$ 1,302.60				
Sub-Total First Quarter				\$ 1,909.19	\$ 70,350.00	\$ -	\$ 68,440.81	\$ 68,440.81
DES-107: MH-A & B Rebuild	10/10/2014	DES-1791	TEG	\$ 361.10				
CNE Aug 2014 R&I Invoice	10/31/2014	DES-1795	CNE	\$ 4,604.68				
DES-107: MH-A & B Rebuild	12/1/2014	DES-1911	TEG	\$ 495.30				
DES 109: Indigo Hotel	12/1/2014	DES-1911	TEG	\$ 2,574.30				
CNE Sept 2014 R&I Invoice	12/2/2014	DES-1916	CNE	\$ 13,950.48				
CNE Oct 2014 R&I Invoice	12/19/2014	DES-1926	CNE	\$ 4,192.49				
Sub-Total Second Quarter				\$ 26,178.35	\$ 71,925.00	\$ -	\$ 45,746.65	\$ 45,746.65
Suntrust Shaft Repair (Dec 2014) DES-105	01/06/15	DES-1930	TEG	\$ 38.10				
MH A&B Mech Rebuild (Dec 2014)	01/06/15	DES-1930	TEG	\$ 838.20				
Tunnel Insulation Rework (Dec 2014)	01/06/15	DES-1930	TEG	\$ 571.50				
Indigo Hotel (Dec 2014) DES-109	01/06/15	DES-1930	TEG	\$ 163.20				
CNE Nov 2014 R&I Invoice	01/23/15	DES-1940	CNE	\$ 4,748.70				
Misc Tunnel/MH Repair	01/26/15	DES-1944	TEG	\$ 1,550.34				
MH A&B Mech Rebuild (Jan 2015)	01/26/15	DES-1944	TEG	\$ 495.30				
Indigo Hotel (Jan 2015) DES-109	01/26/15	DES-1944	TEG	\$ 609.60				
DES-108 7th Ave	01/28/15	DES-1946	CNE	\$ 8,500.00				
MH A&B Mech Rebuild (Feb 2015)	03/06/15	DES-1965	TEG	\$ 5,685.60				
Tunnel Insulation Repair (Jan/Feb 2015)	03/06/15	DES-1965	TEG	\$ 27.67				
MH A&B Mech Rebuild (Mar 2015)	03/06/15	DES-1966	TEG	\$ 8,365.75				
Indigo Hotel (Feb 2015) DES-109	03/06/15	DES-1966	TEG	\$ 375.92				
Sub-Total Third Quarter				\$ 31,969.88	\$ 71,925.00	\$ -	\$ 39,955.12	\$ 39,955.12
Sub-Total Fourth Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
FY15 Year to Date				\$ 60,057.42	\$214,200.00	\$ -	\$ 362,667.36	\$ 362,667.36

B. Preventive Maintenance

Preventive maintenance, tunnel and manhole inspections and reviews of customers' mechanical rooms were performed during the quarter. The principle items for discussion are presented.

1. EDS Tunnel and Manhole Inspections
 - a. Some traps were found not to be functioning properly; CNE is continuing to repair or replace these traps during this quarter.
 - b. Structural metal in the vaults and tunnels need to be cleaned and painted.
 - c. Some minor insulation repairs are needed in some vaults.
2. Other EDS Inspections
 - a. Minor items are included in the CNE monthly reports.

C. Emergencies

The shut-down of the chiller plant in March due to a contractor drilling holes in the DES chilled water piping was discussed in the Reliability section of this report.

D. EDS Walk-through

A walkthrough was conducted on March 30 and 31, 2015 by Jon B. Belcher, PE. The tunnel systems visited include the AA Birch Tunnel, the State Tunnel, the 4th Avenue Tunnel, the 7th Avenue Tunnel and the Broadway Tunnel. The following comments and observations are a result of these visits:

1. AA Birch Tunnel

- a. The high point vents located in Manhole D3 (east end of the tunnel) are “sweating” because they are not insulated. These vents should be insulated with Armaflex to prevent the condensation. Because of the minor scope of this task, these should be insulated when other manholes/tunnel insulation work is undertaken.

2. State Tunnel

- a. There are several lights not working throughout the tunnel. CNE should inform the State and have them replaced.
- b. Several of the support C Channels have minor to moderate corrosion. This should be brought to the attention of the State for remediation.
- c. There are several locations, where the concrete tunnel structure has some minor to moderate cracking, spalling, exposed rusty rebar and/or shifting of roof structures. These problems exist at the following locations within the tunnel: N5, N7, N20, N31, N39, N47, N54, N61, N62, W42, W43, W44, W56, W59, W62, W75, E19, E26, E47, E51, E62, E66 and E69. These conditions should be reported to the State.
- d. The sump pump at the southern end of the western tunnel (Station W2) is not working and standing water exists at this end of the tunnel. This should be reported to the State so repairs can be made.
- e. There is evidence of a leak on the high pressure condensate piping at Column W74. A leak has existed in this location since the 10/29/13 report. Repairs have been made but the leak appears to be re-occurring. The reason for these leaks should be further investigated, identified and repaired by CNE.
- f. The trap at Station W17A is not functioning properly. This trap should be repaired or replaced as soon as possible by CNE.
- g. There is mud and debris at the intersection of the west and north tunnel branches; this debris and mud should be removed from the tunnel. These conditions should be reported to the State.
- h. The concrete roof at the southern end of the east tunnel is spalling badly and possibly requires replacement. CNE should bring this issue to the State’s attention.
- i. The sump pump at the southern end of the eastern tunnel is not working and standing water exists at this end of the tunnel. This should be reported to the State so repairs can be made.

3. 7th Avenue Tunnel
 - a. There is minor corrosion on structural steel location 7-81. This is a “Low” priority on the “MH & Tunnel Structural Corrosion Prevention/Repair”.
 - b. The lights at locations 7-15 and 7-49 are not working; these should be repaired as soon as possible.
 - c. The steam expansion joint at locations 7-21 and 7-61 have slight leaks; CNE should continue to monitor these joints and have them sealed when the leak progresses enough to allow the sealing to hold.
 - d. The trap isolation valve at location 7-81 has a packing leak; this valve should be investigated and repaired as soon as possible.
 - e. The trap at location 7-81 is insulated and shouldn't be; the insulation on this trap should be removed.
 - f. To keep the groundwater seepage at locations 7-42 to 7-44 from draining onto the piping at these locations, the tunnel repair contractor was asked to hang drain sheeting at this location. The drain sheeting was installed but it now covers all of the piping at this location and prevents the review of the piping condition. CNE should investigate if the sheeting can be “cut-back” to allow viewing of the piping while also keeping the sheeting in place to protect the piping from the groundwater drainage.

4. Broadway Tunnel
 - a. The steam expansion joints at locations B-19, B-65 and B-95 are leaking. CNE should continue to monitor these joints and have them sealed when the leaks progress enough to allow the sealing to hold.
 - b. The trap at location B-95 is not functioning properly. This trap should be repaired or replaced as soon as possible.
 - c. The slip joint support structure at location B-65 is badly corroded. TEG will coordinate with CNE to investigate a repair procedure for this support.
 - d. The area at location B-62/B-63 is not very well lit; a light fixture should be installed at this location.
 - e. The trap at location B-50/B-49 does not appear to be functioning properly and is hammering badly; this trap should be investigated and repaired or replaced as required. Also, the trap piping should be lowered so that it is below the bottom of the main pipe to improve its function.
 - f. The trap strainer at location B-19 is installed downstream of the trap and it should be located upstream of the trap. There also should be a check valve installed between the trap and the condensate main piping. In addition, the trap at this location is not functioning properly, the isolation valve hand wheel is not installed and the dripleg is reported to be plugged. This trap station should have repairs made as soon as possible.
 - g. There is some minor debris in Manhole 18 that should be removed.

5. 4th Avenue Tunnel
 - a. There is a drain valve located at Station 4-14 without a cap. A cap should be installed on this drain.
 - b. The steam expansion joints at locations 4-45 and 4-62 are leaking. CNE should continue to monitor these joints and have them sealed when the leaks progress enough to allow the sealing to hold.
 - c. The traps at locations 4-17 and 4-95 do not appear to be functioning properly. In addition, the trap at Location 4-95 has a bonnet leak and the isolation valve has a packing leak. These traps should be repaired or replaced as required.
 - d. There is an electrical junction box without a cover at 15+60. A cover should be installed on this junction box as soon as possible.
 - e. The lights are not working at locations 4-69, 4-70 and 4-76.

VI. Customer Relations

This section contains descriptions of the marketing efforts made by the DES Team during the quarter. The topics of interactions, meetings and training seminars with the customers are also discussed. There are currently 28 customers, comprised of 41 different buildings, connected to the EDS. Service to each of these buildings continues to prove satisfactory, and the responsiveness to customer issues is handled by CNE in an excellent and professional manner.

A. Marketing

The DES has placed a temporary hold on active marketing at this time due to the uncertainty of the actual steam and chilled water loads on the MCC and due to the higher than normal system temperature differences that may be related to the chilled water chemistry. TEG will continue to monitor this issue and make recommendations to Metro regarding the availability of any additional capacity.

B. Customer Interaction

The CNE customer service representative (CSR) continues to respond to customer issues as they arise. Much of the communication involves minor problems with the customers' heating and cooling systems that are unrelated to DES service. Other more significant issues are summarized herein.

- Customers were notified regarding the chilled water outage on January 4, 2015.
- A chilled water leak was reported at the Wells Fargo building in January and CNE personnel assisted the building personnel in isolating and re-energizing the building.
- Meetings were organized and held between CNE and TEG and several customers regarding their chilled water delta T's. These customers included Metro and the State of TN personnel.
- A meeting was held between the Sheraton Hotel, CNE and TEG to discuss some apparent steam issues at the building. Upon investigation, it was determined that

the most likely cause of the issues were the building's shell and tube heat exchanger.

- Several discussions and meetings between CNE, TEG and the Viridian were held during the quarter regarding the cleaning of their plate and frame heat exchanger.
- Where the DX metering panels still control the customer chilled water delta T's, all customers had their contractual delta T's re-established.
- The customers were notified during the emergency chilled water outages that occurred in March due to a contractor drilling holes in the chilled water distribution system.
- Other minor issues and customer interactions are noted in the monthly CNE reports.

VII. Recommendations

Based on the review of the Third Quarter EGF and EDS operations, the following recommendations are made.

- Corroded structural steel within the vaults and tunnels should be cleaned and painted or replaced; TEG will continue to coordinate this effort with CNE.
- Insulation which is absent, or in disrepair, in the vaults should be addressed through either additional capital projects, which include work within these vaults, or through DES090.
- The steam traps which need repair or replacement should be addressed as soon as possible.
- Additional monitoring is required to determine the effectiveness of the chilled water chemistry.