



Operations Monitoring Report

First Quarter FY18

Prepared by:

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I. Executive Summary

A review of the fiscal year 2018 (FY18) First 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 2018 to date, CNE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the First Quarter FY18, the chilled water sales decreased 12.3% over the previous First Quarter (FY17) due to a cooler summer and a reduction in demand from the Criminal Justice Building (demolished), the Bobby Hotel (formerly Wells Fargo which is under renovation) and the Nashville Convention Center (demolished). The chilled water sendout also decreased 12.5% over the previous First Quarter. The system losses decreased approximately 16.2%. The number of cooling degree days decreased 19.8% in the First Quarter. The peak chilled water demand for the current quarter was 17,800 tons, which is 11.1% lower than the previous First Quarter.

Steam sendout for the current quarter increased by approximately 4.6% over the previous First Quarter with a 7.7% decrease in heating degree days. Likewise, steam sales also increased by approximately 2.9% over the previous First Quarter. Steam system losses, as a percentage of sendout, increased, and the total losses increased approximately 4.4% over the previous First Quarter. The peak steam demand for the current quarter was 51,718 pounds per hour, which represents an increase in the First Quarter demand by approximately 10.6%.

The EGF performance continues to satisfactorily meet the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water plant electric consumption per unit of sales continues to perform lower than the guaranteed levels for both the quarter and FY18. Total chiller plant electric usage decreased 12.3% from the previous First Quarter and the unit electric consumption was approximately the same as in FY17. The steam plant electric consumption per unit of sales also decreased over the previous First Quarter by 6.7%. The total water consumption for the steam and chilled water plants decreased 10.3% from the previous First Quarter. However, the EDS make-up for the chilled water system increased 24% for the quarter. The steam plant water usage decreased by 8.1% for the quarter.

Work continued on DES Capital and Repair & Improvement Projects during the First Quarter of FY18. Repair and Improvements to the EDS continue as scheduled. DES142 was designed and bid during the quarter with the work completed in September. Work was also completed on DES138, DES140 and DES142 during the First Quarter FY18. Work on DES143 is expected to be bid and awarded, and possibly completed during the Second Quarter FY18.

The current fiscal year system operating costs to date are \$5,819,103. This value represents approximately 27.6% of the total budgeted operating cost for FY18. The customer revenues from the sales of steam and chilled water for FY18 (to date) are \$4,824,751 which is approximately 24.8% of the budgeted amount. The difference between the operating costs and customer revenue is the Metro funding amount (MFA), which represents the shortfall in cash

flow for the system. The MFA transferred to date for FY18 is \$422,575 (25% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices as of the date of this report.

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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 First Quarter chilled water sales is shown in Figure 1. This data reflects a 12.3% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

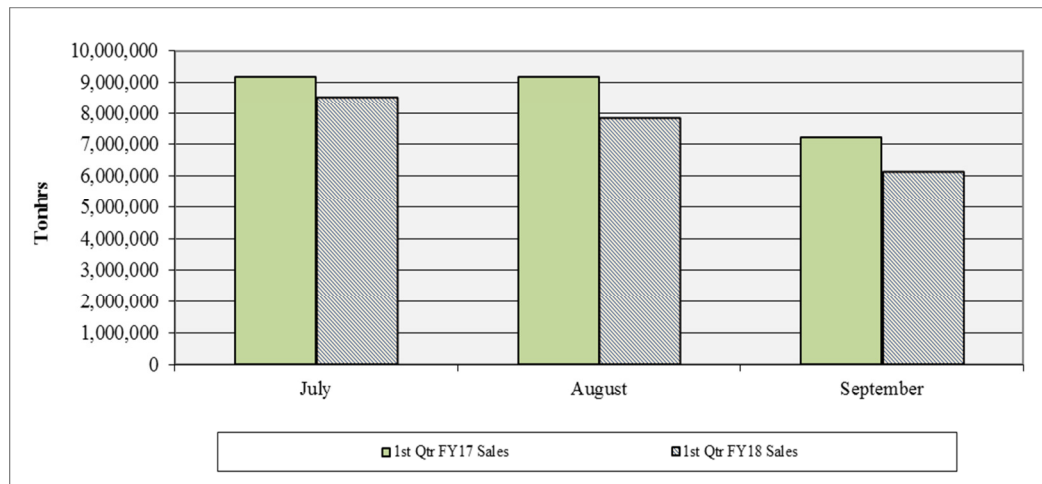


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 17,800 tons, which represents an 11.1% decrease over the previous First 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.

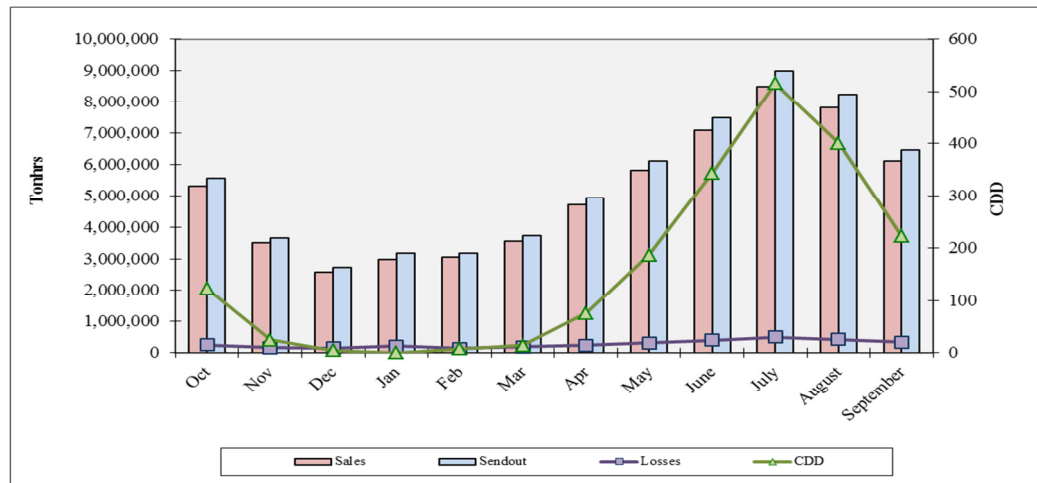


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

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

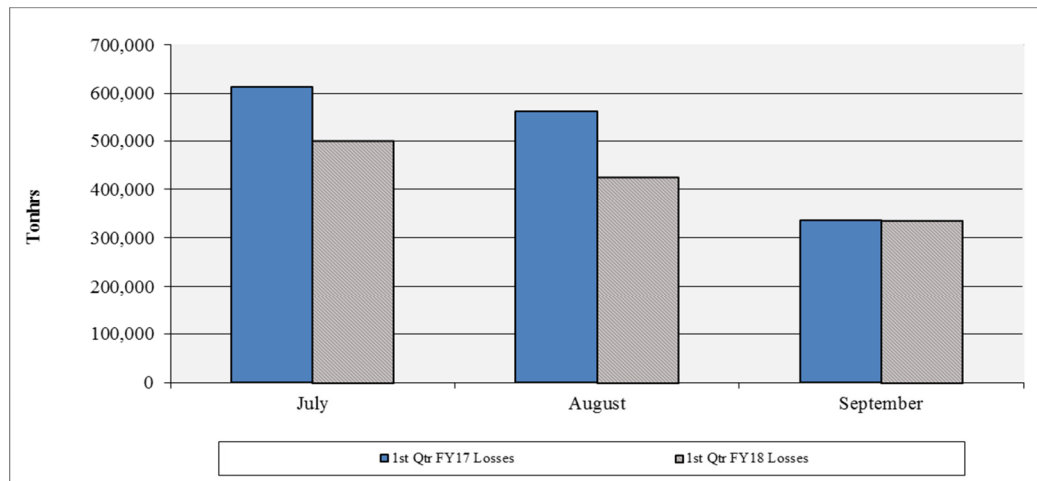


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased by approximately 24% over the previous First Quarter. CNE and TEG are continuing to investigate the sources of the chilled water leaks that cause the increase in EDS make-up. Potential locations for the leak are suspected, but additional excavations have been halted until after the cooling season. Any repairs to the chilled water piping will have to be made immediately and most likely require the shutdown of customer buildings. Additional excavations are anticipated in the Second Quarter.

The make-up to the cooling towers decreased approximately 15.1% during the quarter. The number of cycles of concentration in the condensing water circuit experienced a 27.8% increase during the current quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

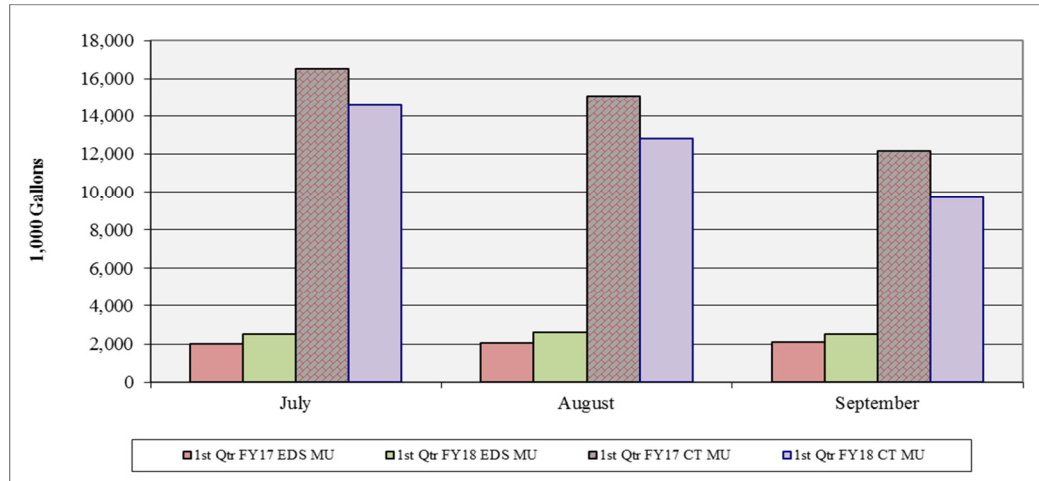


Figure 4. Chilled Water System City Water Usage Comparison

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 satisfactorily.

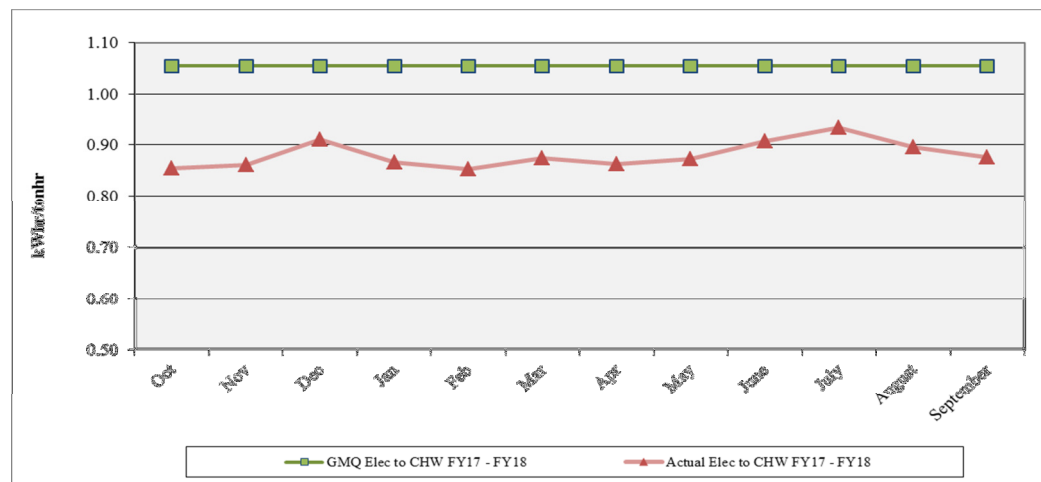


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

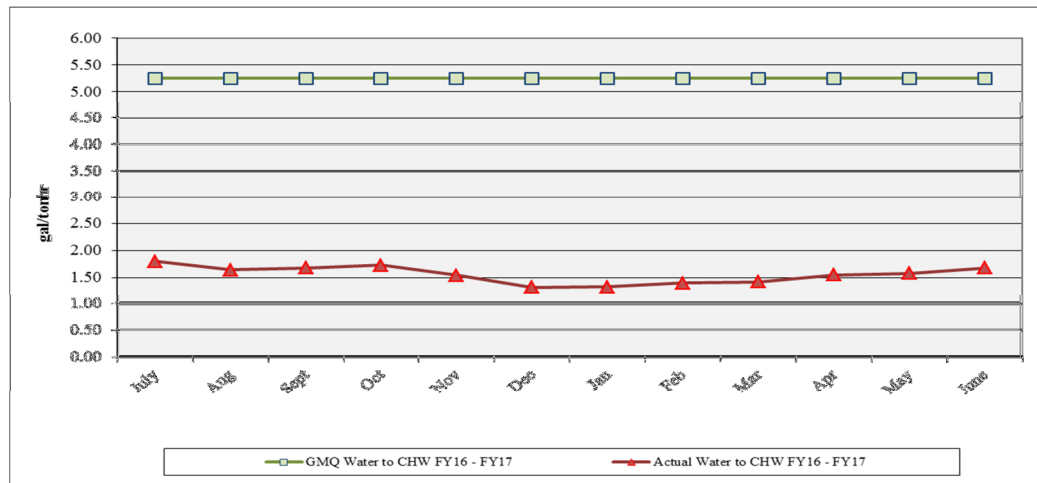


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

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. The electric usage per unit of sales was approximately the same as in the First Quarter for FY17.

The actual chiller plant water conversion factor increased 2.2% over the previous First Quarter. The total consumption of city water for the chiller plant for the current quarter decreased 10.3%.

B. Steam

1. Sales and Sendout

The steam sendout increased by approximately 4.6% over the previous First Quarter (FY17), and the sales also increased by approximately 2.9%. The Quarter experienced an approximate 7.7% decrease in the number of heating degree days. The steam system losses increased 9.2% over the previous First Quarter. A comparison for the First Quarter steam sales is shown in Figure 7.

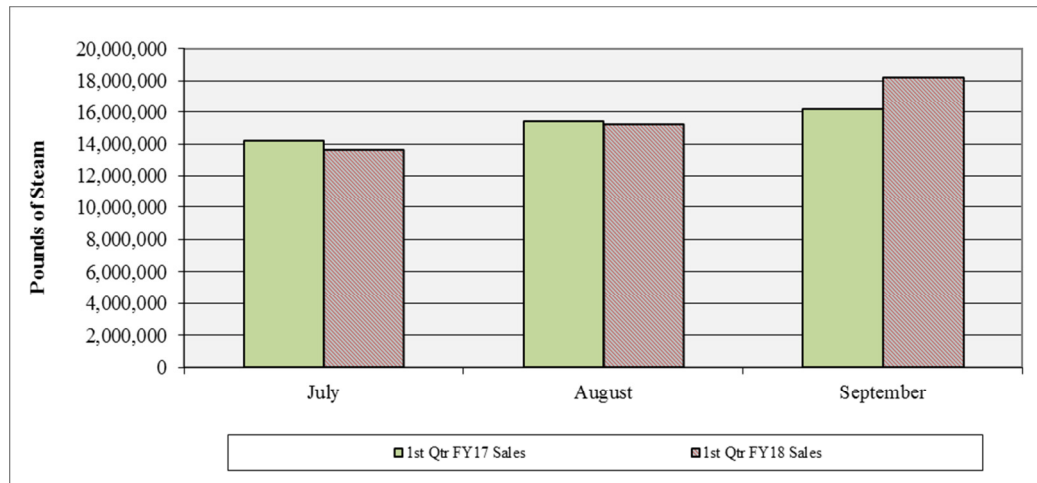


Figure 7. Steam Sales Comparison

The peak steam demand for the current quarter was 51,718 pph, which reflects an approximate 10.6% increase in the peak steam production over the previous First 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.

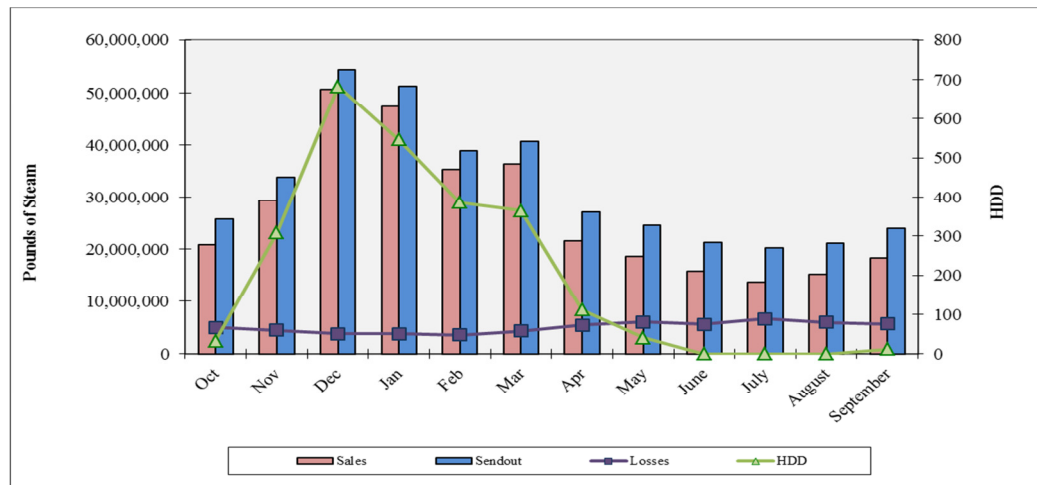


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the First 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. Whenever steam sales decrease from the previous quarter, the percent of system losses can be expected to increase since the majority of these losses are based on a near constant heat loss of the system.

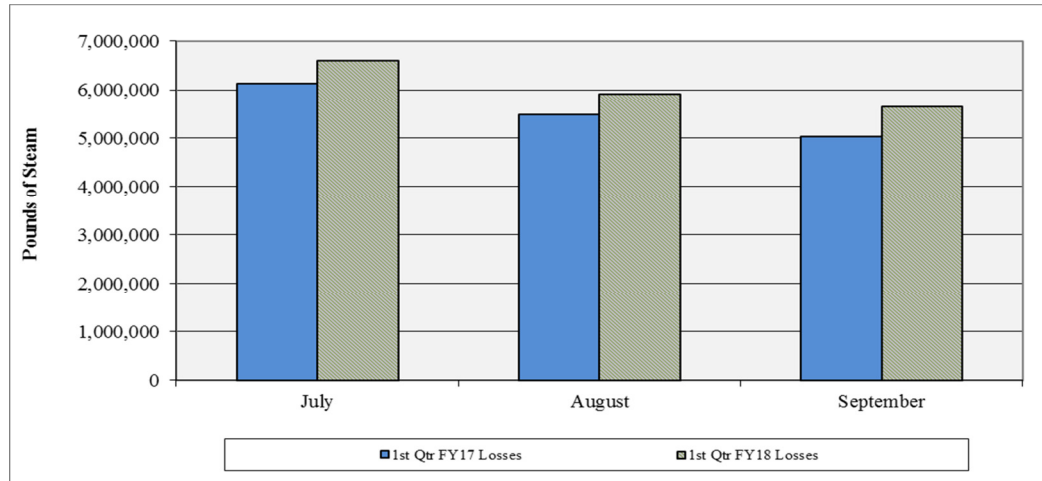


Figure 9. Steam System Losses

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 First Quarter data in Figure 10.



Figure 10. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system 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.

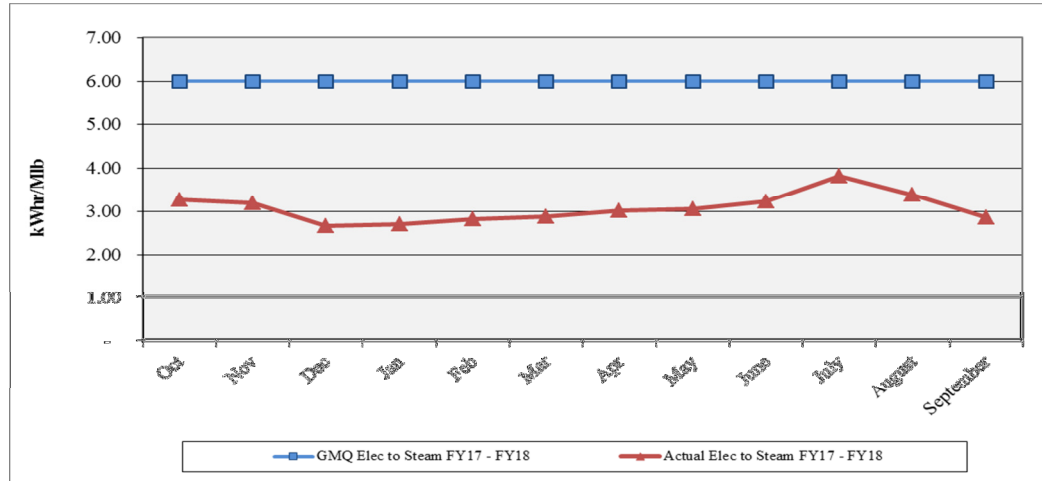


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

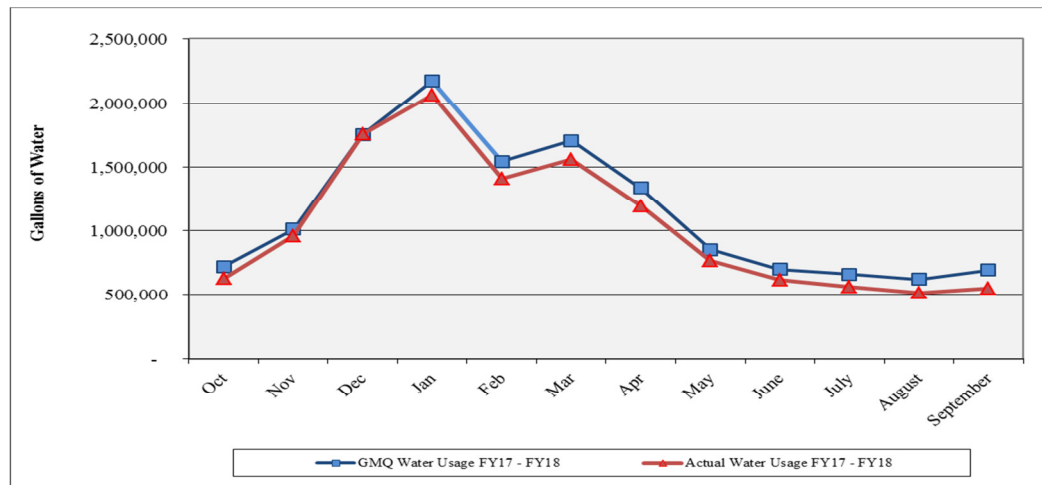


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

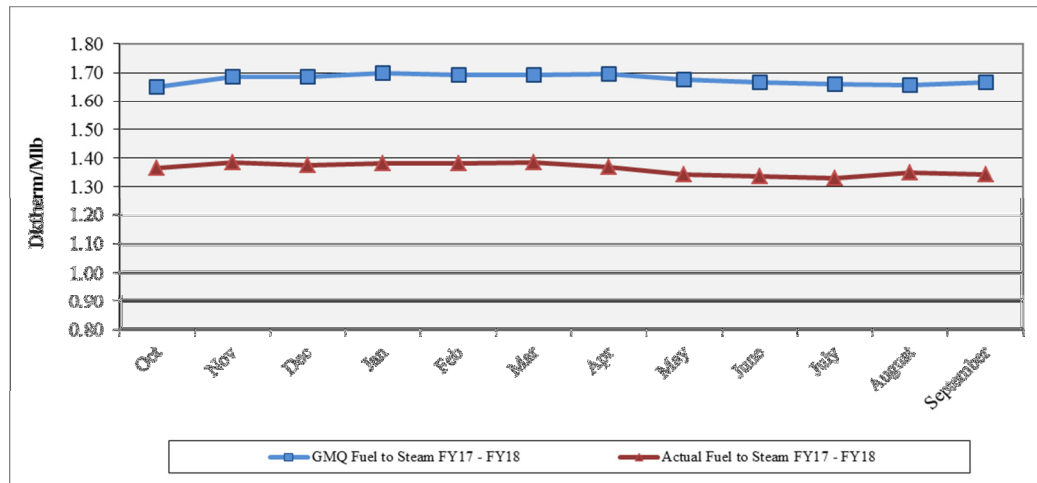


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 4% decrease in the steam plant electric consumption while experiencing an approximate 6.7% decrease in the electric conversion factor. The water consumption for the steam plant decreased 8.1% this quarter as compared to the previous First Quarter. The fuel consumption per unit of steam sales was marginally lower than in the previous First Quarter.

C. Contract Guarantee Performance

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

Table 1. First Quarter FY18 Production, Sales and Consumption Summary

Item	Unit	First Quarter FY18	First Quarter FY17	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	20,436,937	23,282,634	-12.22%
Chilled Water	kWhrs	20,281,477	23,120,725	-12.28%
Steam	kWhrs	155,460	161,909	-3.98%
Total Water Use	kgal	46,375	51,678	-10.26%
Total Chilled Water	kgal	44,770	49,932	-10.34%
EDS Make-up	kgal	7,640	6,164	23.95%
Cooling Towers	kgal	37,130	43,768	-15.17%
Calc CT Evaporation	kgal	30,931	34,843	-11.23%
CT Blowdown	kgal	6,199	8,925	-30.54%
Calc # Cycles		4.99	3.90	27.81%
Steam	kgal	1,605	1,746	-8.08%
Total Fuel Use	mmBTU	87,584	84,227	3.99%
Natural Gas	mmBTU	87,510	84,227	3.90%
Propane	mmBTU	74	0	0.00%
Condensate Return	kgal	6,293	5,866	7.28%
	lbs	51,323,948	47,839,769	7.28%
Avg Temp	°F	188.7	195.3	-3.41%
Sendout				
Chilled Water	tonhrs	23,697,700	27,082,900	-12.50%
Steam	lbs	65,286,000	62,409,000	4.61%
Peak CHW Demand	tons	17,800	20,016	-11.07%
Peak Steam Demand	lb/hr	51,718	46,781	10.55%
CHW LF		60.30%	61.28%	-1.61%
Steam LF		57.17%	60.42%	-5.38%
Sales				
Chilled Water	tonhrs	22,433,020	25,573,135	-12.28%
Steam	lbs	47,122,510	45,775,281	2.94%
Losses				
Chilled Water	tonhrs	1,264,680	1,509,765	-16.23%
Steam	lbs	18,163,490	16,633,719	9.20%
		27.82%	26.65%	4.38%
Degree Days				
CDD		1,140	1,421	-19.77%
HDD		12	13	-7.69%

*positive percent difference values imply an increase from FY17 to FY18

Table 2. First Quarter FY18 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	First Quarter FY18	First Quarter FY17	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	3.30	3.54	-6.73%
GMQ Plant Efficiency	Dth/Mlb	1.663	1.656	
Plant Efficiency	Dth/Mlb	1.342	1.350	-0.60%
Actual %CR		78.61%	76.66%	2.56%
Avg CR Temp	°F	189	195	-3.41%
GMQ Water Conversion	gal	1,968,692	2,054,306	
Water Conversion	gal	1,621,050	1,763,460	-8.08%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.904	0.904	0.00%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.00	1.95	2.21%

*positive percent difference values imply an increase from FY17 to FY18

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 due to the remaining capacity at the EGF that was included in the original construction and remains unsold and the debt service for bonds to which the customers do not directly contribute.

The system operating costs for FY17 to date are \$5,819,103. This value represents approximately 27.56% of the total budgeted operating cost for FY187 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 toward the First Quarter expenses have not been issued or paid at the time of this report. The customer revenues from the sales of

steam and chilled water for FY18 are \$4,824,751 which is approximately 24.8% of the budgeted amount. The MFA transferred to date is \$422,575 (25.0% 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	FY18 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,460,400	\$ 1,107,516	\$ -	\$ -	\$ -	\$ 1,107,516	24.83%
9th Chiller	\$ 41,800	\$ 10,378	\$ -	\$ -	\$ -	\$ 10,378	24.83%
C/O 6A	\$ 82,500	\$ 20,489	\$ -	\$ -	\$ -	\$ 20,489	24.83%
C/O 6B	\$ 72,200	\$ 17,937	\$ -	\$ -	\$ -	\$ 17,937	24.84%
C/O 7	\$ 27,200	\$ 6,757	\$ -	\$ -	\$ -	\$ 6,757	24.84%
C/O 8	\$ 11,800	\$ 2,957	\$ -	\$ -	\$ -	\$ 2,957	25.06%
Pass-thru Charges:	\$ 166,400	\$ 56,099	\$ -	\$ -	\$ -	\$ 56,099	33.71%
Insurance	\$ 37,700	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Marketing:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
FEA:	\$ 69,329	\$ 18,061	\$ -	\$ -	\$ -	\$ 18,061	26.05%
Steam	\$ 177,828	\$ 126,951	\$ -	\$ -	\$ -	\$ 126,951	71.39%
Chilled Water	\$ -	\$ (220,872)	\$ -	\$ -	\$ -	\$ (220,872)	n.a.
Misc:	\$ 64,800	\$ 16,085	\$ -	\$ -	\$ -	\$ 16,085	24.82%
Metro Credit	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
ARFA	\$ 64,800	\$ 16,085	\$ -	\$ -	\$ -	\$ 16,085	24.82%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 5,211,957	\$ 1,383,229	\$ -	\$ -	\$ -	\$ 1,383,229	26.54%
Reimbursed Management Fee + Chem Treatment		\$ 461,128	\$ -	\$ -	\$ -	\$ 461,128	0.00%
Metro Costs							
Pass-thru Charges:	\$ 9,600	\$ 6,648	\$ -	\$ -	\$ -	\$ 6,648	69.25%
Engineering	\$ 275,300	\$ 68,825	\$ -	\$ -	\$ -	\$ 68,825	25.00%
EDS R&I Transfers	\$ 10,600	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Metro Marketing	\$ 36,300	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ 578,400	\$ 131,207	\$ -	\$ -	\$ -	\$ 131,207	22.68%
Metro Incremental Cost	\$ 565,800	\$ 207,514	\$ -	\$ -	\$ -	\$ 207,514	36.68%
Utility Costs:	\$ -	\$ 131	\$ -	\$ -	\$ -	\$ 131	n.a.
Water/Sewer	\$ -	\$ 131	\$ -	\$ -	\$ -	\$ 131	n.a.
EDS Water/Sewer	\$ -	\$ 13,425	\$ -	\$ -	\$ -	\$ 13,425	n.a.
EDS Electricity	\$ 5,888,500	\$ 1,842,726	\$ -	\$ -	\$ -	\$ 1,842,726	31.29%
Electricity	\$ 102,000	\$ 3,000	\$ -	\$ -	\$ -	\$ 3,000	2.94%
Natural Gas Consultant	\$ -	\$ 54,384	\$ -	\$ -	\$ -	\$ 54,384	n.a.
Natural Gas Transport	\$ 3,135,800	\$ 261,475	\$ -	\$ -	\$ -	\$ 261,475	8.34%
Natural Gas Fuel	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Propane	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Metro Costs =	\$ 10,602,300	\$ 2,589,335	\$ -	\$ -	\$ -	\$ 2,589,335	24.42%
Subtotal - Operations =	\$ 15,814,300	\$ 3,972,564	\$ -	\$ -	\$ -	\$ 3,972,564	25.12%
Debt Service							
2012 Bonds	\$ 3,484,400	\$ 870,463	\$ -	\$ -	\$ -	\$ 870,463	24.98%
2005 Bonds -Self Funded	\$ 731,200	\$ 673,857	\$ -	\$ -	\$ -	\$ 673,857	92.16%
2007 Bonds -Self Funded	\$ 193,000	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
2008 Bonds -Self Funded	\$ 192,400	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
2010 Bonds -Self Funded	\$ 192,800	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
MCCC Fund -Self Funded	\$ 680,000	\$ 314,550	\$ -	\$ -	\$ -	\$ 314,550	46.26%
Interest & Misc Revenue	\$ (175,100)	\$ (12,332)	\$ -	\$ -	\$ -	\$ (12,332)	7.04%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Capital =	\$ 5,298,700	\$ 1,846,538	\$ -	\$ -	\$ -	\$ 1,846,538	34.85%
Total =	\$ 21,113,000	\$ 5,819,103	\$ -	\$ -	\$ -	\$ 5,819,103	27.56%
Customer Revenues							
Taxes Collected	\$ 99,571	\$ -	\$ -	\$ -	\$ -	\$ 99,571	n.a.
Taxes Paid	\$ 36,418	\$ -	\$ -	\$ -	\$ -	\$ 36,418	n.a.
Penalty Revenues/Credits	\$ (45,292)	\$ -	\$ -	\$ -	\$ -	\$ (45,292)	n.a.
Energy Revenues Collected	\$ 4,806,890	\$ -	\$ -	\$ -	\$ -	\$ 4,806,890	n.a.
Revenues =	\$ 19,422,700	\$ 4,824,751	\$ -	\$ -	\$ -	\$ 4,824,751	24.84%
Metro Funding Amount =	\$ 1,690,300	\$ 994,351	\$ -	\$ -	\$ -	\$ 994,351	58.83%

The DES serves 28 customers and 41 buildings in downtown Nashville. These customers are divided into three categories: 1) Privately owned 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	\$ 1,179,276	7,371,047	\$ 0.1600	\$ 300,721	12,201	\$ 24.6473
State Government	\$ 1,012,160	5,053,225	\$ 0.2003	\$ 356,070	11,687	\$ 30.4683
Metro Government	\$ 1,557,858	10,008,748	\$ 0.1556	\$ 400,805	23,235	\$ 17.2501
New Customers	\$ 983,063	6,296,093	\$ 0.1561	\$ 270,325	17,721	\$ 15.2547
Total	\$ 3,749,294	22,433,020	\$ 0.1671	\$ 1,057,596	47,123	\$ 22.4435

Total Revenue \$ 4,806,890
 True-up and Adjustments (Net) \$ 17,862
 Net Revenue \$ 4,824,751

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY18. 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.

- CNE reported only one chilled water interruption during the quarter. On August 30, the chilled water system pressure dropped to approximately 79 psig and the chillers tripped. The pressure slowly increased up to 135 psig and then dropped again to 98 psig. CNE dispatched personnel in an attempt at finding a possible leak in the system. The system pressure soon returned to normal. CNE was unable to find the source of the problem and it has not recurred.
- There were no issues with the steam system during the quarter.

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

No environmental violations were reported during the quarter.

Monthly safety meetings were held on Fire Safety, CPR/AED/First Aid and Confined Space Entry.

D. Personnel

The EGF currently has twenty-three full time employees and two relief staff. 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 has completed the cross training of 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 78.6% of the steam sendout during the quarter, which represents a 2.6% increase over the previous First Quarter.
 - Feedwater iron and hardness remained excellent during the quarter.
- Condensing Water System
 - The conductivity of the condensing water continues to be normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - CNE continues to monitor and test for the presence of bacteria in the system. The continuous dosage of the biocide continues. At this point, the biological growth in the system, as measured at the EGF, has become essentially non-existent. The biological growth previously discovered at customer buildings has decreased.
 - The presence of additional fouling material that was discovered at two customer buildings during the Fourth Quarter FY17 was also found at another customer building during the First Quarter. CNE and their water chemistry vendor are preparing a recommendation that should be available and implemented during the Second Quarter FY18.

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 work on repairing the propane vaporizer was completed during the quarter. The propane system was operated for at least one hour to ensure that it was working properly.
- The safety relief valves for boilers #2 and #4 were removed, recertified and re-installed.
- The packing for several pumps were repaired.
- The vibration switch for cooling tower #10 was replaced.
- The vane bearings for chiller #8 were replaced and the refrigerant dryer was repaired.
- Repairs began on the VFD's for chilled water pumps #1 and #3.
- Temperature sensors were replaced on chillers 5B, 6B and 8B.
- Other repairs, maintenance and preventative 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 September 27, 2017, 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.

- During the Fourth Quarter FY17 Walkthrough report, it was noted that additional rust spots were observed on towers #1, #5, #6, #11, #16 and #18. CNE has not made the repairs on the riser tubes. In addition, cooling tower fill is still being stored on the cooling tower deck beneath the basins. Since all of the fill is reported to have been replaced, the remaining fill should be removed.
- CNE has made an effort to remove cobwebs within the EGF; however, this removal process is ongoing.
- The fencing surrounding the garbage dumpster in the parking lot has begun to show cracks and is in need of repair. This item was noted in previous Walkthrough Reports and has not been addressed to date; however, CNE is investigating options.
- The spraying noted in previous reports on the condensing and chilled water pumps has been addressed. However, the calcium or other mineral deposits on the pump casing and piping for the one condensing water pump remains. CNE does not appear to have addressed this issue since the last Walkthrough report.

- In the previous Walkthrough report, it was noted that significant scale was observed on the fill to cooling tower #14. The scale remains on this cooling tower and most of the cells along the west-side of the plant now have significant scale or deposits on the fill. CNE does not appear to have addressed this issue since the last Walkthrough report.
- CNE discovered a leak in the propane vaporizer during the Fourth Quarter and has reported to have completed the repairs. CNE has reported that repairs have been made but a full load test or a test of significant duration has not been reported to have been performed to date. TEG recommends that a full load test lasting no less than one hour be performed prior to the heating season
- In the previous Walkthrough report, it was reported that the sign at the rear of each boiler that reads, “Confined Space,” was noticed to be significantly more discolored for boiler #2 than for the other three boilers. The boiler lagging appeared to be hotter to the touch than normal. CNE reported that they investigated the issue and did not find any missing or damaged lagging or insulation in the boiler. They believed the discoloration was due to a problem with the signs. The signs were replaced during the quarter and in the First Quarter walkthrough, the signs were not discolored.
- The development of the lot to the west of the EGF has been completed. CNE, TEG and Metro communicated throughout recent months and all concerns have been addressed.
- There are plants growing the cold water basins for cooling towers 11, 12, 13 and 18. These plants need to be removed and the water chemistry of the condensing water needs to be verified to prevent the formation and growth of biologicals.
- A loud, harmonic squeaking sound was emanating from cooling tower #15. CNE needs to investigate the source of the sound; a belt may need to be tightened.
- Scaling on the cooling tower fill on the east-side of the plant is present but less significant than on the west-side. The fill in cooling tower #1 appears to be more brittle than the others and has some broken or damaged pieces that the other cells do not appear to have. TEG recommends that CNE address the potential water chemistry issues that may be present to cause the scaling and determine if water chemistry is related to the brittleness.
- There appears to have been a water leak above MCC#3 located between boilers #1 and #2. There are calcium or salt deposits on the floor, on the motor control center panel and on the splash guard above it. CNE needs to clean this area, ensure that the panel is undamaged and ensure that the leak has been repaired.
- Other action items previously noted to be addressed by CNE have been completed.

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. First Quarter FY18 Open Projects

The following projects remained open at the end of the First Quarter FY18.

1. DES111 – DES Combined Heat and Power

This project is currently on hold.

2. DES119 - Chilled Water System Delta T Issue

CNE has returned the Hydroflow device for a refund and is waiting for reimbursement from the vendor for final invoicing to Metro.

3. DES124 - Criminal Justice Center Redevelopment

TEG continues to work with Metro's re-development team in preparation for the re-connection of DES services to the new building once construction is complete. Construction began on the new structure in the Fourth Quarter FY17.

The damage to the AA Birch Tunnel that occurred as a result of the blasting at the site has been documented. Once the construction for the new site progresses to the point that no additional damage to the tunnel is anticipated, the tunnel repairs will be made.

4. DES130 – Repair to Manhole B3

Construction was completed during the Third Quarter FY17. TEG has sent an invoice with back-up documentation to the communications contractor responsible for the damage to the manhole. TEG has had some follow-up communication but to-date, reimbursement for the costs has not been provided.

5. DES133 – Old Convention Center Site Redevelopment

Due to the site development, the vent shaft located at 5th and Broadway that serves as an access point and to provide ventilation air for the DES tunnel system will have to be modified and incorporated into the new parking garage and building structure at the site. Metro began work on the easement identifying this issue in the First Quarter FY18.

TEG has learned that the site excavation includes blasting and that the blasting, at its closest point, will be 15 to 16 feet from the Broadway Tunnel. Because of this, TEG and CNE have had several meetings with the contractor to make them aware

of the presence of the Broadway Tunnel and to review the blasting process and schedule. Meetings were also held to discuss the impact that a chilled water or steam service interruption would have on the DES and DES customers if damage to the tunnel were to result from the blasting shockwaves; specifically the Bridgestone Arena and the Renaissance Hotel since their services are from the area of the Broadway Tunnel immediately adjacent to the construction site. TEG has developed a contingency plan to address emergency/temporary service to these customers. Part of this plan included the installation of an additional steam valve in this section of the tunnel to permit the isolation of the Renaissance Hotel from the area of the tunnel immediately adjacent to the construction site. This valve was installed in late September. Discussions regarding the Bridgestone Arena are ongoing.

Blasting began September 19, 2017, and will continue through mid-February 2018. Blasts occur at daybreak on Tuesdays through Saturdays, weather permitting. Each day after the blasting, CNE inspects the condition of the tunnel and provides TEG and Metro with a report. TEG contacts the blasting contractor each day and distributes a status report to Metro.

6. DES134 – 401 Union Building Service Connection

Chilled water service to the Fairlane Hotel (formerly known as the 401 Union Building) was restored during the First Quarter. Steam service is available to the building, but the building's contractor had not yet completed the in-building steam and hot water piping during the quarter. Full service restoration is anticipated during the Second Quarter. The new hotel is anticipated to be open for the Third Quarter (January 2018).

7. DES135 – CHW Leak at 5th and Union

After several exploratory excavations, the source of the chilled water leak at the James K Polk Building has not been located. To avoid a potential system shutdown, DES ceased active work on this project during the cooling season. Additional investigation, including street excavations, is expected to resume during the Second Quarter FY18. Repairs will be made once the locations of the leaks are confirmed.

8. DES138 – Manhole D Repairs

A limited steam shutdown occurred between August 10 and August 13, 2017 to perform the majority of the work in Manhole D. Additional work took place after these dates with substantial completion occurring September 11, 2017. It is expected that this project will be closed during the Second Quarter FY18.

9. DES139 – DES Options Review

Work began on the evaluation of the long-term options for the DES. Historic operating data and costs were provided to Metro's contractor, FVB, who is performing the evaluation. Preliminary reports were issued during the quarter, but the final report is anticipated during the Second Quarter.

10. DES140 – Manhole N2 Fence

Fencing has been installed around Manhole N2 along with the placement of a weed barrier, gravel and an elevated manway during the First Quarter FY18. It is expected that this project will be closed during the Second Quarter FY18.

11. DES141 – EGF Camera Upgrades

As part of TEG's Fourteen Year Audit of the System Operator (CNE), several improvements were noted and requested. A proposal for the replacement and expansion of the surveillance camera system at the EGF was requested from CNE. Their proposal was accepted during the quarter and the new equipment installation is anticipated during the Second Quarter.

12. DES142 – Bobby Hotel Steam Valve Replacement

The Bobby Hotel (formerly known as Wells Fargo) has been under renovations for the past year. Steam was used by the remaining occupied spaces during this period. However, once the services were isolated, as required by the building's contractor, CNE noted that the DES main steam isolation valve to the building would not seal properly.

The design, bid, award and construction for the replacement of the DES main steam isolation valve were all completed during the First Quarter FY18. DES is waiting final invoicing from CNE for closeout.

13. DES143 – Manholes N1, N2 and S6 Insulation Repair and Replacement

The insulation in these manholes is either non-existent or is in need of repair; therefore, this project addresses the replacement and/or installation of the needed insulation. It is expected that this work will be bid and awarded during the Second Quarter FY18.

B. First Quarter FY18 Closed Projects

DES142 was closed during the quarter.

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.

The \$26,000,000 shown for the bond fund 49116 is only available for the CHP project (DES110). Since this project is currently on hold, the remaining balance of this fund is not available for other projects.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY18 Spending to Date	Total Spent to Date	Remaining Balance
2010 Bond Projects-49109					
DES119	DES Delta T Issue	\$ 67,000	\$ -	\$ 65,447	\$ 1,553
DES139	Options Review	\$ 63,600	\$ 45,398	\$ 48,181	\$ 15,419
MAS	Miscellaneous Development Projects	\$ 46,900	\$ 6,911	\$ 8,667	\$ 38,233
Total Closed Projects		\$ 2,493,661	\$ -	\$ 2,421,305	\$ 72,356
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ (65,246)	\$ -	\$ -	\$ (65,246)
Total 2010 Bond		\$ 2,605,916	\$ 52,310	\$ 2,543,600	\$ 62,316
Customer Connection Fund-49107					
DES124	CJC Redevelopment	\$ 300,000	\$ 13,894	\$ 156,085	\$ 143,915
DES130	MH B3 Repair	\$ 20,000	\$ 356	\$ 12,824	\$ 7,176
DES133	NCC Development	\$ 40,000	\$ 16,780	\$ 37,501	\$ 2,499
DES134	401 Union Hotel Reconnection	\$ 60,000	\$ 1,158	\$ 51,881	\$ 8,119
DES135	Chilled Water Leak 5th and Union	\$ 200,000	\$ 203	\$ 161,448	\$ 38,552
DES138	MH-D	\$ 130,000	\$ 96,800	\$ 110,279	\$ 19,721
DES141	EGF Security Camera Upgrade	\$ 40,000	\$ 267	\$ 267	\$ 39,733
Total Closed Projects		\$ 7,348,827	\$ -	\$ 6,871,466	\$ 477,361
	Metro Project Admin	\$ 330,173	\$ 7,185	\$ 122,694	\$ 207,479
	Project Man, Development, etc	\$ 40,000	\$ -	\$ -	\$ 40,000
Customer Connection Fund		\$ 8,509,000	\$ 136,643	\$ 7,524,445	\$ 984,555
CHP and EDS Repairs-49116					
DES111	DES CHP	\$26,000,000	\$ -	\$ 168,706	\$25,831,294
Total Closed Projects		\$ -	\$ -	\$ -	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ -	\$ -	\$ -	\$ -
CHP and EDS Repairs		\$26,000,000	\$ -	\$ 168,706	\$25,831,294

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

Several EDS repairs and improvements were made during the First 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 \$100,966. Table 6 provides a summary of the FY18 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 FY17						\$ -	\$ 26,260.82	\$ 26,260.82
Interest/Transfer	7/3/2017	-	-	\$ 9.64				
Interest/Transfer	7/3/2017	-	-	\$ (9.64)				
CNE June R&I Invoice	8/21/2017	DES-2320	CNE	\$ 2,677.12				
CNE May R&I Invoice	6/30/2017	-	CNE	\$ 4,672.28				
DES-140	8/31/2017	DES-2322	TEG	\$ 543.53				
DES-142	8/31/2017	DES-2322	TEG	\$ 3,596.49				
DES-143	8/31/2017	DES-2322	TEG	\$ 2,294.26				
Interest/Transfer	8/1/2017	-	-	\$ 21.29				
Interest/Transfer	8/1/2017	-	-	\$ (21.29)				
CNE July R&I Invoice	8/15/2017	DES-2322	CNE	\$ 1,978.44				
Interest/Transfer	9/1/2017	-	-	\$ 34.51				
Interest/Transfer	9/1/2017	-	-	\$ (34.51)				
Sub-Total First Quarter				\$ 15,762.12	\$ 68,825.01	\$ -	\$ 53,062.89	\$ 53,062.89
DES-140	10/03/17	-	TEG	\$ 170.20				
DES-142	10/03/17	-	TEG	\$ 950.88				
DES-143	10/03/17	-	TEG	\$ 177.90				
Sub-Total Second Quarter				\$ 1,298.98	\$ 22,941.67	\$ -	\$ 21,642.69	\$ 21,642.69
Sub-Total Third Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total Fourth Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
FY18 Year to Date				\$ 17,061.10	\$ 91,766.68	\$ -	\$ 100,966.40	\$ 100,966.40

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 Manhole Inspections

- a. The monthly vault and tunnel inspections were held as scheduled.
- b. Communications continue with State personnel regarding needed repairs to the State Tunnel. The State had a registered structural engineer review the two areas which TEG has structural concerns

during the First Quarter FY18 – refer to section VII below for additional information.

- c. Customer metering station calibration checks were completed as scheduled.
- d. Water chemistry samples at customer buildings were taken as scheduled.
- e. CNE is working on repairing the communications failure between MH-18 (Broadway Tunnel) and the EGF.
- f. Lighting and electrical repairs were made in the Broadway and AA Birch Tunnels.
- g. Several trap assemblies were fabricated for several installations within the EDS.
- h. A steam leak was repaired in the Parkway Tower parking garage.
- i. The CX panel screen was replaced at the Metro Library.
- j. The sump pumps in MH-B and D were repaired.
- k. The data collection time increments for the CX panel at the Fairlane Hotel were reset.
- l. The 7th Avenue tunnel fan was repaired.
- m. CNE assisted TEG and the building contractor (Skanska) with inspections and additional shoring in the Broadway Tunnel associated with the blasting at the construction site at 5th and Broadway.

2. Other EDS Inspections

- a. Minor items are included in the CNE monthly reports.

C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walk-through

This walkthrough was conducted on September 14 and 19, 2017. The manholes that were visited included Manholes 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14A and D. The following comments and observations are a result of these visits:

1. Manhole 2

- a. There was water present in this manhole and it required pumping before entry.
- b. There is a build-up of mud in the floor of the manhole from groundwater seepage. TEG will coordinate with CNE to have this mud removed.
- c. A concrete patching material was applied to several small areas on the walls and ceiling in September 2013. Some of these patches are beginning to experience some minor flaking. CNE personnel should monitor these patched areas and notify TEG as the deterioration progresses.

- d. The trap was not functioning. CNE should repair or replace this trap as soon as possible.
2. Manhole 3
 - a. There was water present in this manhole and it required pumping before entry.
 - b. There are some hairline cracks in the concrete walls that should be monitored; one is above the condensate penetration on the east wall; the other is above the steam penetration on the west wall.
 - c. There is some minor mud and debris in the manhole which CNE should remove.
 - d. There is some flaking of the paint on the steel supports. CNE should clean these surfaces with a wire brush/wheel and apply a coating of cold galvanizing paint to prevent the further deterioration of the surface coatings.
 3. Manhole 4
 - a. There was water present in this manhole and it required pumping before entry.
 - b. The paint on the entry ladder and some steel supports is peeling off and there is some moderate corrosion of essential support structures. CNE should assess whether or not they have the time and manpower to clean these surfaces and paint them with cold galvanizing paint and let TEG know their determination.
 - c. There is some missing insulation and insulation repairs that are needed. TEG will coordinate with CNE to have this addressed.
 4. Manhole 5
 - a. There was water present in this manhole and it required pumping before entry.
 - b. Some minor insulation lagging repairs are needed in this manhole. CNE should be able to make these repairs and should present a schedule to TEG to accomplish this work.
 - c. Initially the trap in this manhole was not functioning; CNE was able to get it functioning during the review.
 - d. The strainer upstream of the trap does not have a blowdown valve; a blowdown valve should be installed by CNE.
 - e. There is some minor mud and debris in this manhole. CNE should remove this mud and debris as soon as possible.
 - f. There is a concrete-like material on the stem of the condensate valve located on top of the sparge tube. The presence of this material may prevent the operation of this valve. CNE should clean this material from this valve as soon as possible.

5. Manhole 6

- a. There was water present in this manhole and it required pumping before entry.
- b. The steam slip joint is leaking. CNE should continue monitoring this leak and once the leak is sufficient to warrant repair, make the necessary repair.
- c. The steel structural components in the manhole are corroded and need to be cleaned and coated or possibly replaced. TEG will coordinate with CNE to have these repairs made.
- d. The trap in this manhole is not functioning and needs to be replaced as soon as possible. CNE should provide TEG with a schedule for this repair.
- e. There are some small spalled places in the concrete ceiling where the bottom of the rebar chairs exist. These locations should be cleaned and patched with concrete patching material. TEG will coordinate these repairs with CNE.
- f. A strap that holds an insulation blanket in place on a dripleg is broken. TEG will contact the blanket manufacturer to see if the warranty is still valid.
- g. There is some mud in the manhole floor. CNE should remove this mud as soon as possible.

6. Manhole 9

- a. There wasn't any water in the floor of the manhole. The existing sump pump is functioning properly.
- b. The insulation blanket was removed from the steam expansion joint because of a steam leak at a flange connection several months ago. CNE kept the blanket off to monitor these flanges. No further evidence of the leak exists; therefore, CNE should now re-install the insulation blanket.
- c. There is corrosion on the piping support bases. CNE personnel should remove this corrosion with a wire wheel and paint these bases with cold galvanizing paint before the corrosion progresses. This item first appeared in this report a year; CNE needs to address this matter as soon as possible.
- d. The link seals at the wall penetrations of the steam piping and the City water/drain piping are weeping groundwater. CNE should monitor these link seals and if the seepage worsens the link seals should be tightened; this will involve the removal of some insulation and lagging to access the link seal bolts.
- e. Some cracking has occurred in the underside of the concrete opening which was cut into the northern wall of the "old" manhole. TEG forwarded pictures from the prior review of this manhole to our structural engineer for comment and he is not overly concerned with the crack but does recommend that the crack be sealed. On 4/15/15 an email was sent to CNE which included product information on two recommended crack sealants to see if sealing the crack is a job which CNE could undertake. Although CNE and TEG have had some conversations about this item, to-date CNE has not sealed these cracks. This needs to be a high priority.

7. Manhole 10
 - a. There was no water present in this manhole.
 - b. The condensate anchor has some minor corrosion on it. CNE should clean this anchor with a wire wheel and paint it with cold galvanizing paint before this corrosion progresses. This corrosion was first noted in the January 26, 2015 report; it was again noted in the October 27, 2015 report and CNE was directed to remove the corrosion and paint the anchor; CNE was then reminded of it again in the October 17, 2016 report; to-date there has not been any action on CNE's part. CNE needs to take action on this item before the corrosion worsens.
 - c. The spalling of the grout surrounding the southern steam piping penetration has worsened. CNE should continue to monitor this and inform TEG if it progresses.

8. Manhole 11
 - a. There was water present in this manhole and it required pumping before entry.
 - b. There is some moderate corrosion on the structural members in this manhole. CNE should continue to monitor this corrosion. TEG will prioritize the corrosion in this manhole with the other system manholes and coordinate with CNE to have this corrosion removed and the steel painted.
 - c. There is a steam leak on the trap piping. CNE should repair this leak as soon as possible.
 - d. The "feet" of some of the rebar chairs that were used in the manhole roof construction have corroded and cause minor spalling of the concrete. CNE should monitor this and the next time that there is a project that involves this manhole, these spalled places should be patched.

9. Manhole 12
 - a. No water was present in this manhole.
 - b. No deficiencies to report.

10. Manhole 13
 - a. There was no water present in this manhole.
 - b. A small portion of the grout surrounding the western condensate piping penetration has spalled. CNE should monitor this and inform TEG if the spalling worsens.
 - c. There are some exposed rebar chair feet on the underside of one of the concrete beams and there is some exposed rebar in the lower portion of the east wall. These two areas were supposed to be repaired under DES-122. The substantial completion date for DES-122 was February 9, 2017; therefore, CNE should contact the contractor to schedule them to return and repair these two areas.

11. Manhole 14A
 - a. There was water present in this manhole and it required pumping before entry.
 - b. This is an abandoned concrete manhole located on Charlotte Ave between 3rd and 4th Avenue. Because it has not been filled in, it is reviewed periodically to make sure that the structure is sound. The main manhole houses abandoned steam and condensate return piping. There are two smaller manholes west of the main manhole which house chilled water supply and return piping isolation valves which are closed.
 - c. There is a large amount of mud in the floor of the main manhole.
 - d. No action is required. These manholes should be reviewed annually.

12. Manhole
 - a. This manhole just underwent some extensive repairs and the replacement of all of the piping insulation. The manhole now houses an electric sump pump so no water was present in the manhole.
 - b. No deficiencies to report.

13. Manhole D1
 - a. No deficiencies to report.

Action Items

Action items from the above walk through are presented in the separate quarterly manhole review report presented to CNE.

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 anticipated steam and chilled water loads on the reconstructed Criminal Justice Center and due to the higher than normal system temperature differences that may be related to the chilled water chemistry. TEG and CNE continue to monitor the system temperature difference issue and make recommendations to Metro regarding the availability of any additional capacity.

Negotiations continued with the new development for the old Convention Center during the quarter. At this time, it is not believed that 100% of the capacity used by the

Convention Center will be used for the new development, making additional loads available elsewhere in the system.

The Bobby Hotel (formerly the Wells Fargo building) is currently under redevelopment as a hotel. Service to this building was temporarily stopped during construction during the Third Quarter FY17 and is anticipated to be restored during the Third Quarter FY18 subject to the building's contractor's requirements.

Conversations and meetings were held with CB Ragland and others regarding the development of a new 253 room hotel to be constructed along Molloy Street between 2nd and 3rd Avenues South. It is believed that this hotel will require approximately 250 tons of chilled water. Discussions and negotiations are in the early stages since this hotel is currently in the post-planning phase.

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.

- CNE's CSR was in contact with the personnel of several customer buildings to discuss leaks, building maintenance or building performance during the quarter.
- CNE investigated the low steam usage at the Hermitage Hotel during the quarter. The building was having maintenance repairs made on their steam to domestic water heat exchangers and had been using their back-up, electric domestic water heaters.
- Chilled water service to the Fairlane Hotel was restored during July.
- CNE and TEG have been in frequent contact with the buildings' contractors and the building owners at the Fairlane and Bobby Hotels regarding their ongoing renovation projects and construction.
- The 501 Union Building transferred ownership during the quarter.
- The Sheraton Hotel cleaned their chilled water heat exchanger during the quarter.
- CNE and TEG met with Metro Library personnel to discuss cooling issues and their maintenance and renovation of their cooling coils.
- Other minor issues and customer interactions are noted in the monthly CNE reports.

VII. Recommendations

Based on the review of the First Quarter FY18 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.
- CNE needs to continue to monitor the chilled water chemistry to understand the source of the fouling of the distribution piping (and in some cases the in-building piping) that appears to be contributing to the decrease in cooling performance at customer buildings.
- Insulation which is absent, or in disrepair, in the vaults should be addressed through either additional capital projects, which include work within these vaults.
- Steam traps which need repair or replacement should be addressed as soon as possible.
- Expansion joint leaks should be repaired once the leak(s) is substantial enough to warrant repair.
- Lights in tunnels and/or manholes which are not functioning should be repaired or replaced as soon as possible.
- Concrete repairs need to be made in some manholes. TEG will continue to coordinate this effort with CNE.
- Mud and debris needs to be cleaned from some manholes.
- Communication with the State is continuing regarding the needed repairs in the State Tunnel. During the First Quarter FY18, TEG and CNE personnel met with a licensed structural engineer hired by the State to review the two tunnel areas that TEG has concerns regarding structural integrity. The engineer stated that we should continue to avoid these two areas and meanwhile he will report his findings to the State.