



Operations Monitoring Report

First Quarter FY19

Prepared by:

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October 26, 2018

I. Executive Summary

A review of the fiscal year 2019 (FY19) 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 2019 to date, CNE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

Since the Initial Term of the Amended and Restated Management Agreement (ARMA) between CNE and Metro ends in December 2018, Metro and CNE have begun negotiations into a contract extension. During this extension, Metro anticipates issuing an RFP for qualified entities for the management of the DES or for the sale of the system. This process is part of the conclusions resulting from the Options Review (DES139) project spearheaded by FVB.

For the First Quarter FY19, the chilled water sales increased 12.1% over the previous First Quarter (FY18). The increase in sales may be due to an increase in the number of cooling degree days during the quarter (21.1%) and due to the Fairlane and Bobby Hotels coming online. The chilled water sendout also increased 9.7% over the previous First Quarter. The system losses decreased approximately 33%. The peak chilled water demand for the current quarter was 18,185 tons, which is 2.2% higher than the previous First Quarter.

Steam sendout for the current quarter increased by approximately 5.4% over the previous First Quarter with an 83.3% decrease in heating degree days. Likewise, steam sales also increased by approximately 10.0% over the previous First Quarter. Total steam system losses decreased by 6.5% over the previous First Quarter. The peak steam demand for the current quarter was 64,469 pounds per hour, which represents an increase in the First Quarter demand by approximately 7.4%.

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 FY19. Total chiller plant electric usage increased 12.4% from the previous First Quarter and the unit electric consumption was 0.3% higher than in the previous First Quarter. The steam plant electric consumption per unit of sales also decreased over the previous First Quarter by 0.9%. The total water consumption for the steam and chilled water plants increased 22.0% from the previous First Quarter. The steam plant water usage increased by 23.4% for the quarter.

Work continued on DES Capital and Repair & Improvement Projects during the First Quarter of FY19. Repair and Improvements to the EDS continue as scheduled. Work on DES124, DES133, DES135, DES139 and DES143 is ongoing. Construction was started late in the First Quarter FY19 on DES144 with completion of construction expected to occur early in the Second Quarter FY19.

New projects DES150, DES151, DES152, DES153, DES154, DES155 and DES156 were opened during the First Quarter FY19.

DES119, DES130, DES147 and DES148 were closed during the First Quarter FY19.

The current fiscal year system operating costs to date are \$6,691,731. This value represents approximately 32.2% of the total budgeted operating cost for FY19. The customer revenues from the sales of steam and chilled water for FY19 (to date) are \$5,155,300 which is approximately 26.9% 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 FY19 is \$410,075 (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 12.1% increase in sales for the current quarter over the same quarter of the previous fiscal year.

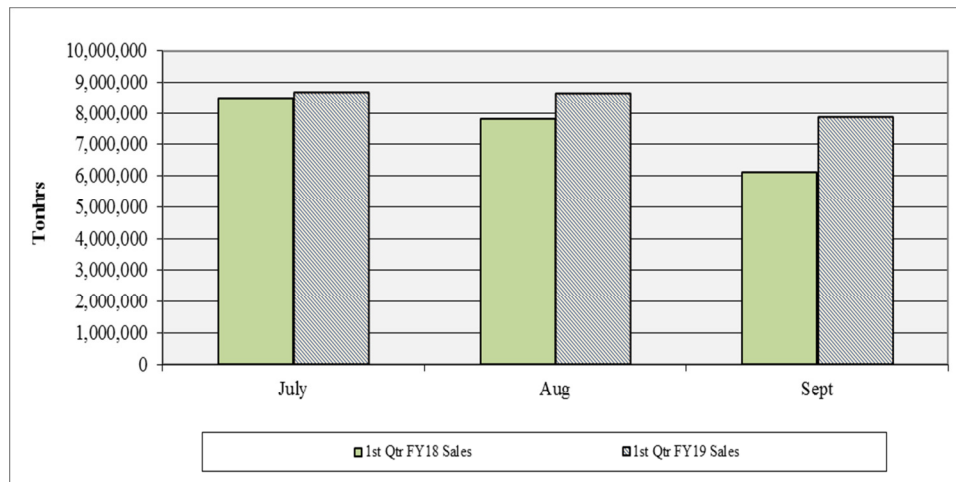


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 18,185 tons, which represents a 2.2% increase 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.

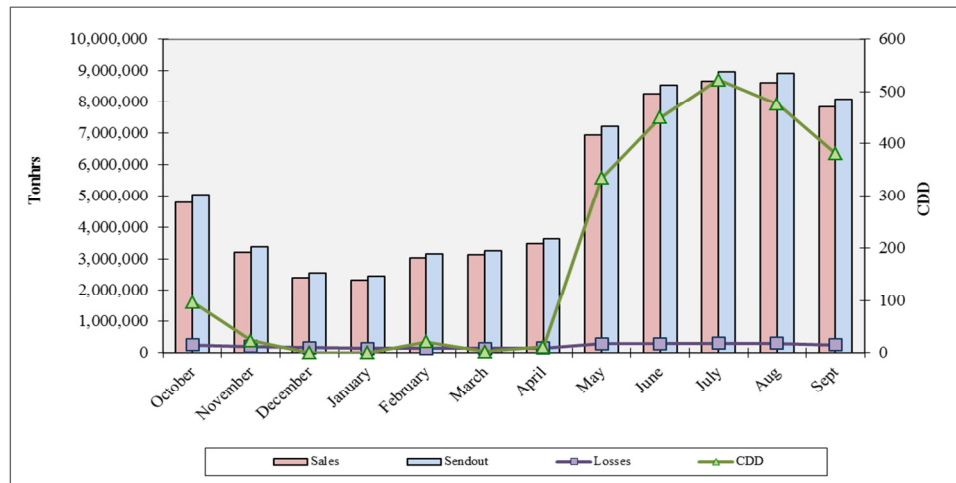


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

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.

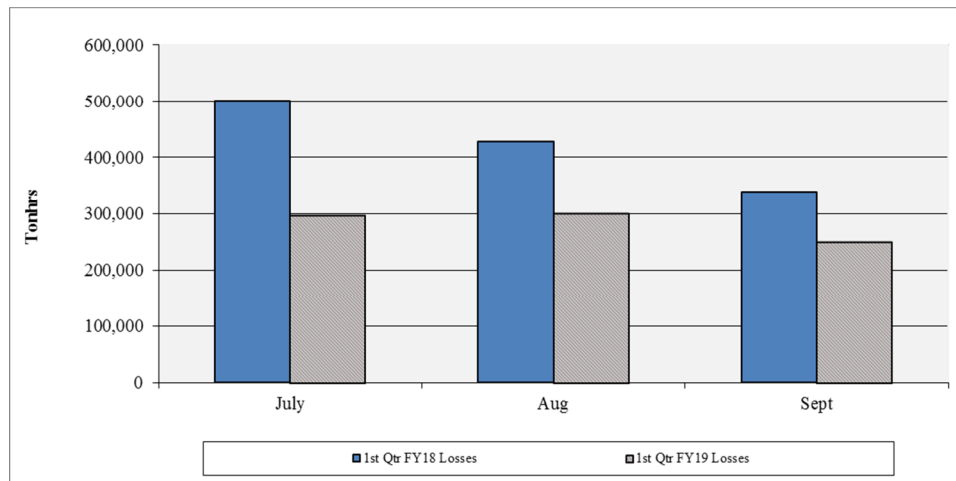


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased by approximately 6.2% over the previous First Quarter. Although a leak was found and repaired during FY18, the flow rates through the remaining leaks have increased or additional leaks may have formed. Excavation at the locations of suspected leaks will begin in the Second Quarter FY19 as the cooling load decreases. Any repairs to the chilled water piping will have to be made immediately and most likely require the shutdown of customer buildings.

The make-up to the cooling towers increased approximately 25.2% during the quarter. The number of cycles of concentration in the condensing water circuit experienced a 5.5% increase during the current quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

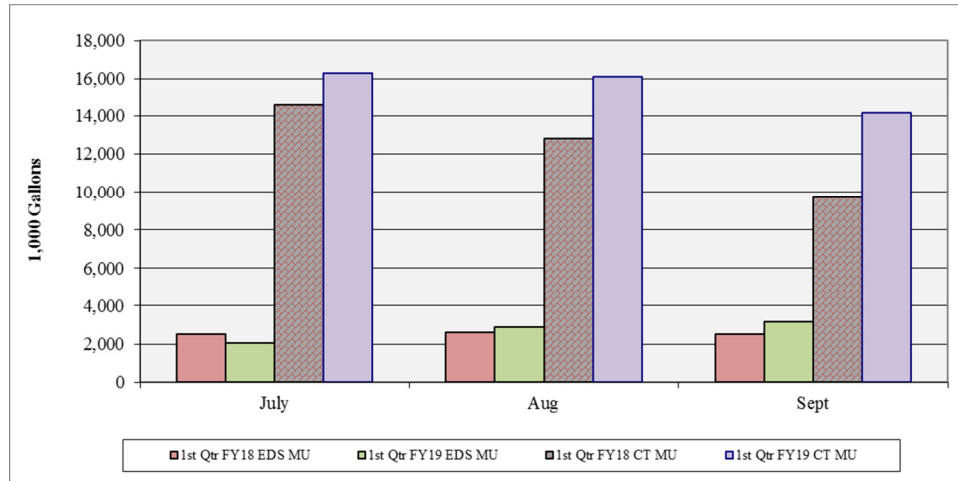


Figure 4. Chilled Water System City Water Usage Comparison

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.

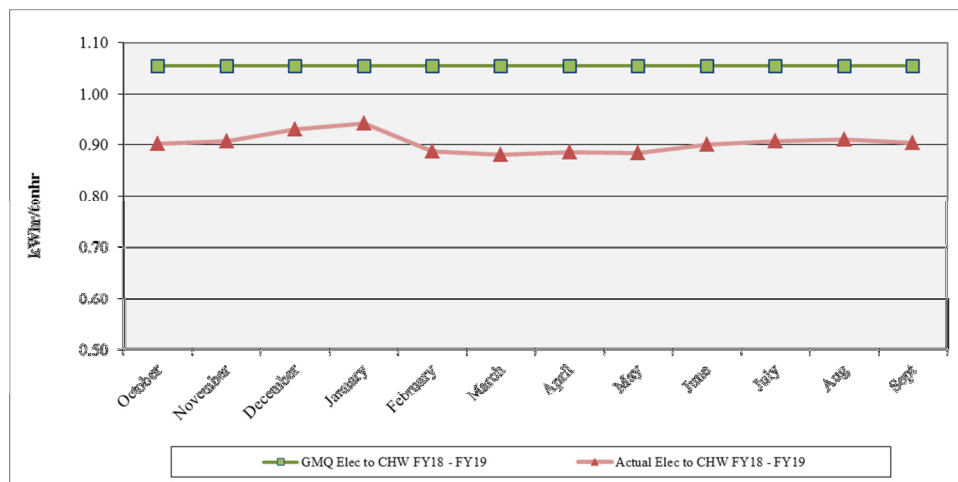


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

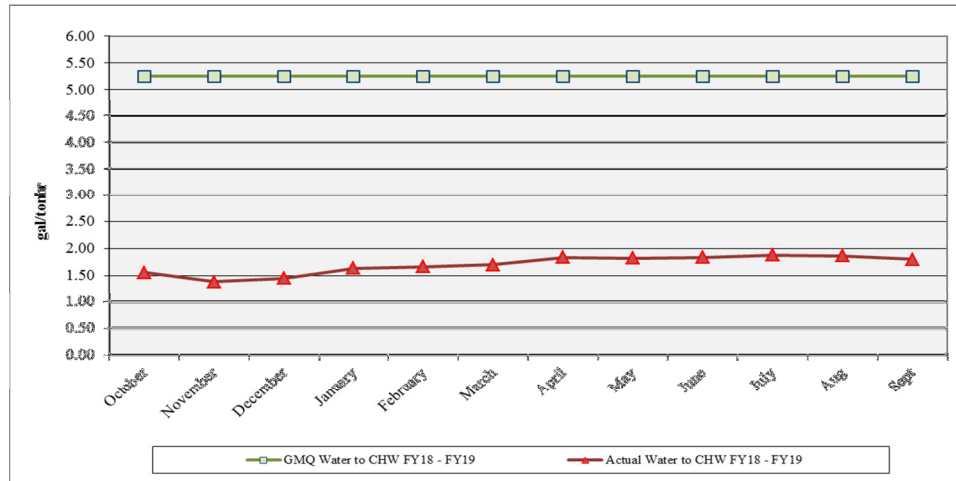


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

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 increased 0.3% over the previous First Quarter.

The actual chiller plant water conversion factor increased 8.8% over the previous First Quarter. The total consumption of city water for the chiller plant for the current quarter increased 22.0%.

B. Steam

1. Sales and Sendout

The steam sendout increased by approximately 5.4% over the previous First Quarter (FY18), and the sales also increased by approximately 10.0%. The Quarter experienced an approximate 83.3% decrease in the number of heating degree days. The steam system losses decreased 6.5% over the previous First Quarter. A comparison for the First Quarter steam sales is shown in Figure 7.

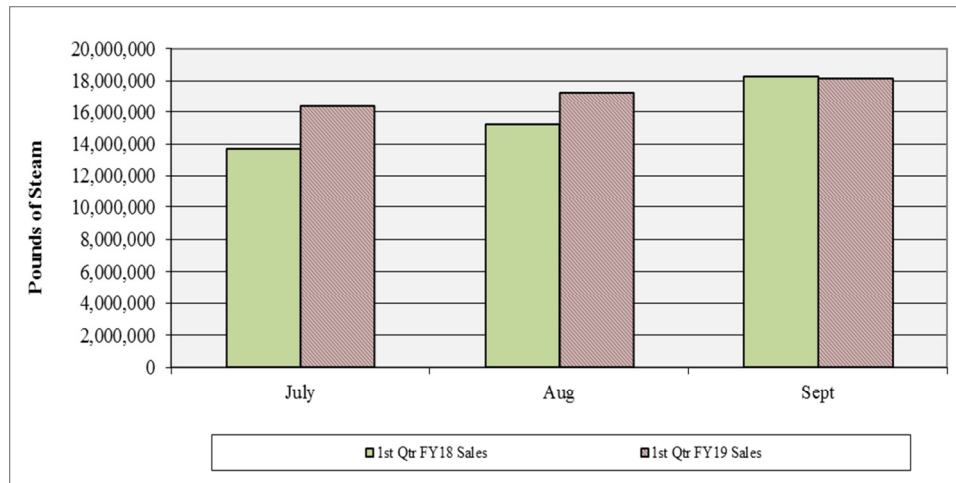


Figure 7. Steam Sales Comparison

The peak steam demand for the current quarter was 64,469 pph, which reflects an approximate 24.7% 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.

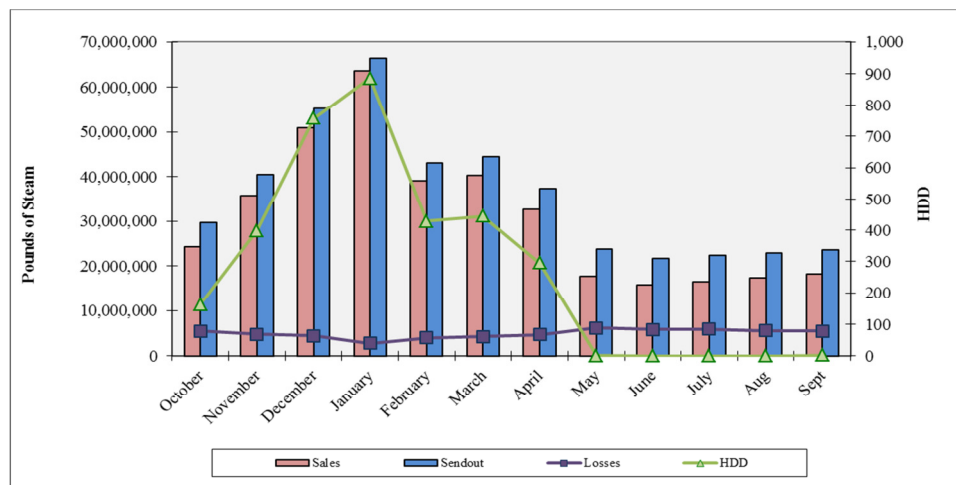


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

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.

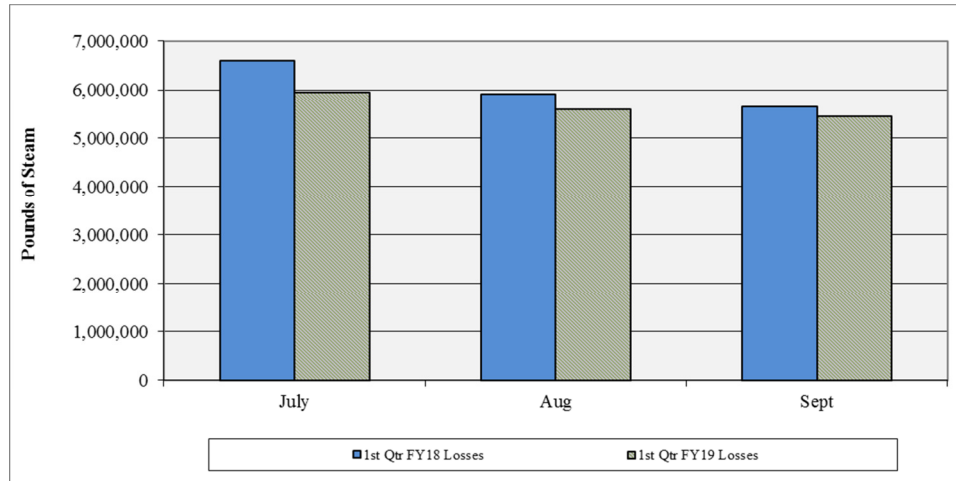


Figure 9. Steam System Losses

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.

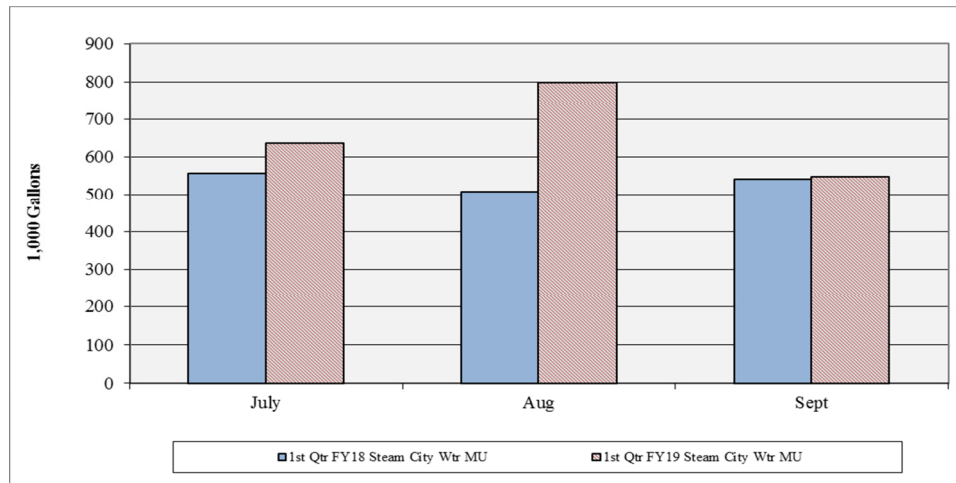


Figure 10. Steam System City Water Make-up Comparison

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.

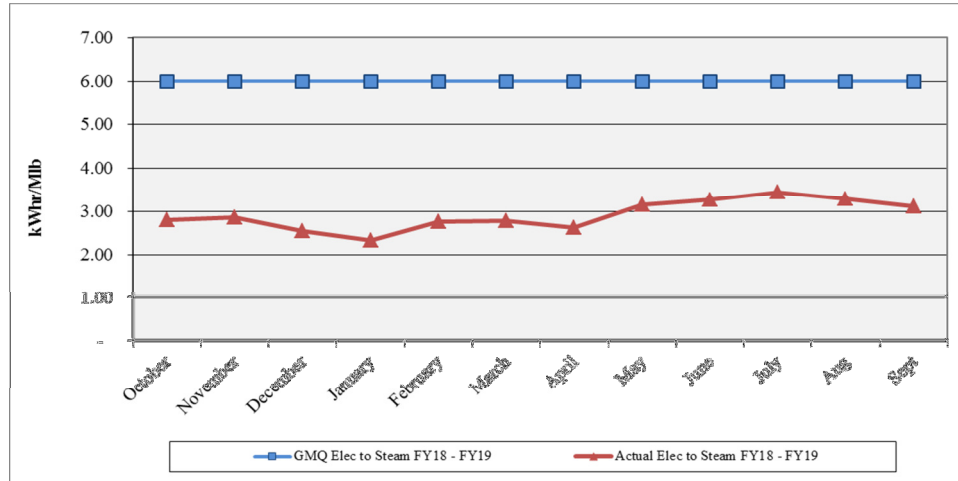


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

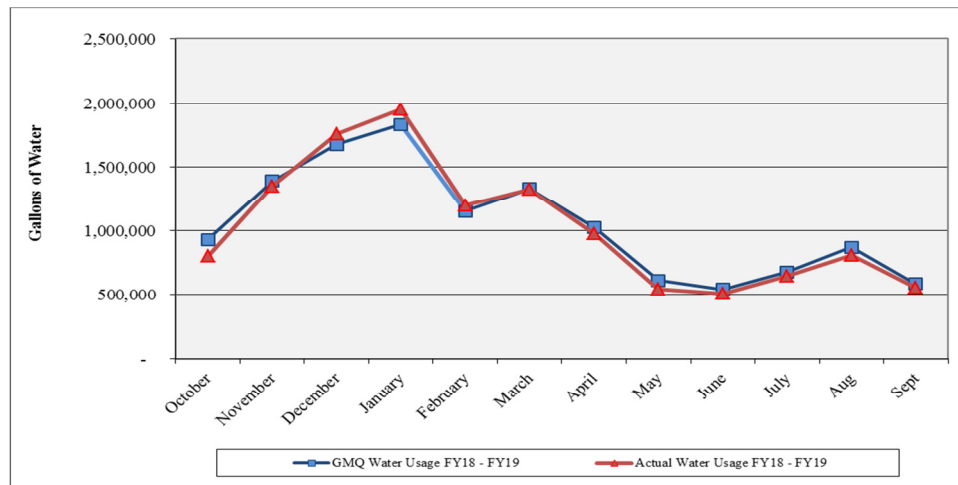


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

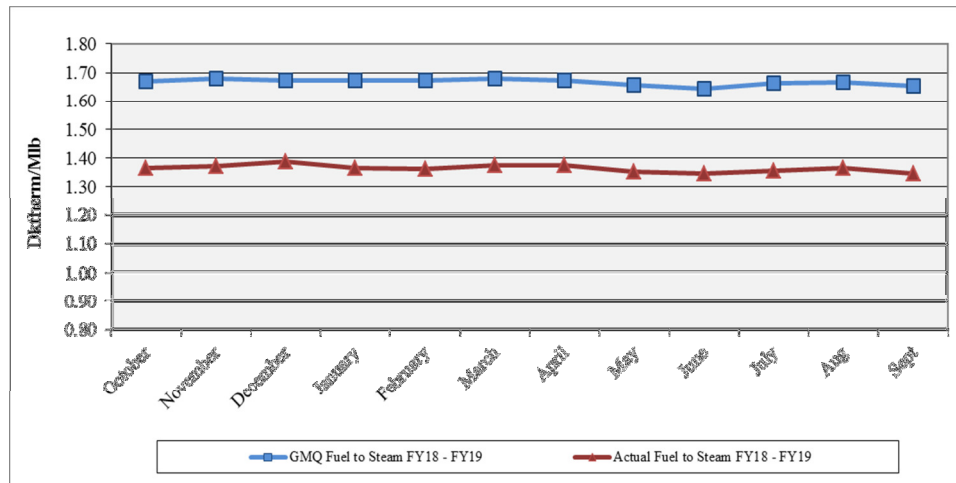


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 9.0% increase in the steam plant electric consumption while experiencing a 0.9% decrease in the electric conversion factor. The water consumption for the steam plant decreased 23.4% this quarter as compared to the previous First Quarter. The fuel consumption per unit of steam sales was 1.1% higher 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 FY19 Production, Sales and Consumption Summary

Item	Unit	First FY19	First FY18	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	22,967,227	20,436,937	12.38%
Chilled Water	kWhrs	22,797,757	20,281,477	12.41%
Steam	kWhrs	169,470	155,460	9.01%
Total Water Use	kgal	56,593	46,375	22.03%
Total Chilled Water	kgal	54,613	44,770	21.99%
EDS Make-up	kgal	8,115	7,640	6.22%
Cooling Towers	kgal	46,498	37,130	25.23%
Calc CT Evaporation	kgal	39,072	30,931	26.32%
CT Blowdown	kgal	7,426	6,199	19.79%
Calc # Cycles		5.26	4.99	5.45%
Steam	kgal	1,980	1,605	23.36%
Total Fuel Use	mmBTU	93,286	87,584	6.51%
Natural Gas	mmBTU	93,286	87,510	6.60%
Propane	mmBTU	0	74	-100.00%
Condensate Return	kgal	6,584	6,293	4.63%
	lbs	53,698,116	51,323,948	4.63%
Avg Temp	°F	188.0	188.7	-0.35%
Sendout				
Chilled Water	tonhrs	25,996,200	23,697,700	9.70%
Steam	lbs	68,795,000	65,286,000	5.37%
Peak CHW Demand	tons	18,185	17,800	2.16%
Peak Steam Demand	lb/hr	64,469	51,718	24.65%
CHW LF		64.74%	60.30%	7.38%
Steam LF		48.33%	57.17%	-15.47%
Sales				
Chilled Water	tonhrs	25,146,572	22,433,020	12.10%
Steam	lbs	51,819,865	47,122,510	9.97%
Losses				
Chilled Water	tonhrs	849,628	1,264,680	-32.82%
Steam	lbs	16,975,135	18,163,490	-6.54%
		24.67%	27.82%	-11.31%
Degree Days				
CDD		1,380	1,140	21.05%
HDD		2	12	-83.33%

*positive percent difference values imply an increase from FY18 to FY19

Table 2. First Quarter FY19 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	First FY19	First FY18	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	3.27	3.30	-0.87%
GMQ Plant Efficiency	Dth/Mlb	1.662	1.663	
Plant Efficiency	Dth/Mlb	1.356	1.342	1.08%
Actual %CR		78.06%	78.61%	-0.71%
Avg CR Temp	°F	188	189	-0.35%
GMQ Water Conversion	gal	2,128,707	1,968,692	
Water Conversion	gal	1,999,800	1,621,050	23.36%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.907	0.904	0.28%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.17	2.00	8.82%

*positive percent difference values imply an increase from FY18 to FY19

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 FY19 to date are \$6,691,731. This value represents approximately 32.2% of the total budgeted operating cost for FY19 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 FY19 are \$5,155,300 which is approximately 26.9% of the budgeted amount. The MFA transferred to date is \$410,075 (25% 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	FY19 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,563,000	\$ 1,130,774	\$ -	\$ -	\$ -	\$ 1,130,774	24.78%
9th Chiller	\$ 42,800	\$ 10,595	\$ -	\$ -	\$ -	\$ 10,595	24.76%
C/O 6A	\$ 84,400	\$ 20,919	\$ -	\$ -	\$ -	\$ 20,919	24.79%
C/O 6B	\$ 73,900	\$ 18,314	\$ -	\$ -	\$ -	\$ 18,314	24.78%
C/O 7	\$ 27,800	\$ 6,899	\$ -	\$ -	\$ -	\$ 6,899	24.82%
C/O 8	\$ 12,100	\$ 3,019	\$ -	\$ -	\$ -	\$ 3,019	24.95%
Pass-thru Charges:							
Chemical Treatment	\$ 245,700	\$ 55,185	\$ -	\$ -	\$ -	\$ 55,185	22.46%
Insurance	\$ 21,200	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Marketing:							
CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
FEA: Steam	\$ 66,400	\$ 17,451	\$ -	\$ -	\$ -	\$ 17,451	26.28%
Chilled Water	\$ 186,400	\$ 134,260	\$ -	\$ -	\$ -	\$ 134,260	72.03%
Misc:							
Metro Credit	\$ -	\$ (233,952)	\$ -	\$ -	\$ -	\$ (233,952)	n.a.
ARFA	\$ 64,800	\$ 16,423	\$ -	\$ -	\$ -	\$ 16,423	25.34%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 5,388,500	\$ 1,413,839	\$ -	\$ -	\$ -	\$ 1,413,839	26.24%
Reimbursed Management Fee + Chem Treatment		\$ 470,328	\$ -	\$ -	\$ -	\$ 470,328	0.00%
Metro Costs							
Pass-thru Charges:							
Engineering	\$ 26,300	\$ 6,785	\$ -	\$ -	\$ -	\$ 6,785	25.80%
EDS R&I Transfers	\$ 281,700	\$ 70,425	\$ 23,475	\$ -	\$ -	\$ 93,900	33.33%
Metro Marketing	\$ 10,900	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 554,900	\$ 158,296	\$ 9,142	\$ -	\$ -	\$ 167,438	30.17%
Utility Costs:							
Water/Sewer	\$ 654,200	\$ 214,678	\$ -	\$ -	\$ -	\$ 214,678	32.82%
EDS Water/Sewer	\$ -	\$ 40	\$ -	\$ -	\$ -	\$ 40	n.a.
EDS Electricity	\$ 39,800	\$ 19,274	\$ -	\$ -	\$ -	\$ 19,274	48.43%
Electricity	\$ 5,537,600	\$ 1,997,041	\$ -	\$ -	\$ -	\$ 1,997,041	36.06%
Natural Gas Consultant	\$ 12,400	\$ 2,000	\$ -	\$ -	\$ -	\$ 2,000	16.13%
Natural Gas Transport	\$ -	\$ 59,610	\$ -	\$ -	\$ -	\$ 59,610	n.a.
Natural Gas Fuel	\$ 2,865,900	\$ 264,902	\$ -	\$ -	\$ -	\$ 264,902	9.24%
Propane	\$ -	\$ 10,704	\$ -	\$ -	\$ -	\$ 10,704	n.a.
Subtotal - Metro Costs =	\$ 9,983,700	\$ 2,803,756	\$ 32,617	\$ -	\$ -	\$ 2,836,372	28.41%
Subtotal - Operations =	\$ 15,372,200	\$ 4,217,595	\$ 32,617	\$ -	\$ -	\$ 4,250,211	27.65%
Debt Service							
2012 Bonds	\$ 3,478,200	\$ 871,313	\$ 290,438	\$ -	\$ -	\$ 1,161,750	33.40%
2005 Bonds -Self Funded	\$ 716,800	\$ 667,444	\$ -	\$ -	\$ -	\$ 667,444	93.11%
2007 Bonds -Self Funded	\$ 187,300	\$ 46,825	\$ 46,825	\$ -	\$ -	\$ 93,650	50.00%
2008 Bonds -Self Funded	\$ 186,900	\$ 46,725	\$ 46,725	\$ -	\$ -	\$ 93,450	50.00%
2010 Bonds -Self Funded	\$ 188,000	\$ 47,000	\$ 46,725	\$ -	\$ -	\$ 93,725	49.85%
MCCC Fund -Self Funded	\$ 663,000	\$ 165,750	\$ 165,750	\$ -	\$ -	\$ 331,500	50.00%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Capital =	\$ 5,420,200	\$ 1,845,057	\$ 596,463	\$ -	\$ -	\$ 2,441,519	45.04%
Total =	\$ 20,792,400	\$ 6,062,652	\$ 629,079	\$ -	\$ -	\$ 6,691,731	32.18%
Customer Revenues							
Taxes Collected		\$ 102,554	\$ -	\$ -	\$ -	\$ 102,554	n.a.
Taxes Paid		\$ 69,333	\$ -	\$ -	\$ -	\$ 69,333	n.a.
Interest & Misc Revenue	\$ 153,600	\$ 36,969	\$ -	\$ -	\$ -	\$ 36,969	24.07%
Penalty Revenues/Credits		\$ 53,355	\$ -	\$ -	\$ -	\$ 53,355	n.a.
Energy Revenues Collected		\$ 5,031,755	\$ -	\$ -	\$ -	\$ 5,031,755	26.55%
Revenues =	\$ 19,152,100	\$ 5,155,300	\$ -	\$ -	\$ -	\$ 5,155,300	26.92%
Metro Funding Amount =	\$ 1,640,300	\$ 907,352	\$ 629,079	\$ -	\$ -	\$ 1,536,431	93.67%

The DES serves 28 customers and 40 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	\$ 1,231,080	8,151,527	\$ 0.1510	\$ 287,082	10,355	\$ 27.7249
State Government	\$ 1,032,737	5,480,462	\$ 0.1884	\$ 387,506	16,301	\$ 23.7726
Metro Government	\$ 1,685,224	11,514,583	\$ 0.1464	\$ 408,127	25,138	\$ 16.2357
New Customers	\$ 1,100,625	7,611,783	\$ 0.1446	\$ 281,958	20,489	\$ 13.7615
Total	\$ 3,949,041	25,146,572	\$ 0.1570	\$ 1,082,714	51,793	\$ 20.9047

Total Revenue	\$	5,031,755
True-up and Adjustments (Net)	\$	123,545
Net Revenue	\$	5,155,300

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY19. 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.

- In July, a faulty feedwater regulating valve caused the steam pressure to swing. The lowest recorded pressure was 130 psig. A factory representative was called and repaired the valve on July 6th.
- On July 11th, an electrical power glitch on NES's 161kV line caused the chillers, condenser water and chilled water pumps to trip offline. All equipment was immediately restarted. The chilled water supply temperature reached a high of 47.2°F before returning to normal approximately 50 minutes later.
- On July 20th during an operation test by Trane, #3 Chiller did not load up properly and the send out temperature gradually rose to 45°F before an additional chiller was started. Trane found a problem with the purge unit and made the necessary repair. The chilled water supply temperature returned to normal in approximately 90 minutes.
- In September, #4 Boiler tripped several times due to a flame failure. The steam pressure fell to as low as 129 psig. CNE is investigating the cause of the failure.
- On September 28th, at approximately 12:10 p.m., the steam pressure dropped to 139 psi while putting another boiler online due to an increase in load demand. The steam system was below 150 psi for approximately 45 minutes.

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 Extinguisher Safety, Tool & Equipment Safety, Compressed Gas Cylinder Safety, Hot Work Permits and Confined Space Entry Safety.

D. Personnel

The EGF currently had twenty-three full time employees and two relief staff for most of the quarter. One CNE employee was dismissed during the quarter. 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.

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 78.1% of the steam sendout during the quarter, which represents a marginal decrease over the previous First Quarter.
- Feedwater iron and hardness remained excellent during the quarter, but hardness was discovered at the Renaissance Hotel and the suspected heat exchangers were isolated.

- 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 and at the customer buildings, has become essentially non-existent.
 - CNE and TEG have reviewed and discussed the proposal to install a side stream filter to the chilled water system. This project is on hold pending funding from Metro.

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.

- Repaired water column leak on #2 Boiler
- Replaced the HVAC unit for the control room
- Repaired refrigerant alarm
- Installed new cooling tower blowdown meter and valve
- Repaired tube leak in #1 Boiler
- Repaired plant lighting
- Fabricated cooling tower make-up line spool piece
- Repaired low water cut out on #1 Boiler
- Repaired low water cut out on #3 Boiler
- Trane reprogrammed Dyna-view on #8 Chiller
- Repaired 1B & 9A Chiller starters
- Installed motorized ball valve to blow down instrument air compressor
- Replaced #2 CWP motor bearing
- Replaced #4 Boiler Walchem probe
- Replaced actuator on cooling tower blow down valve
- Cleared nozzles on #1 and #9 cooling towers
- Repaired float switch on #18 cooling tower
- Repaired cooling tower M/U line leak
- Trane checked 6A Chiller (Thrust bearing needs to be replaced)
- Removed refrigerant from 6A Chiller
- John Bouchard and Son's repaired fire sprinkler system
- Checked & adjusted packing on all pumps

- Other repairs, maintenance and preventative maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

Based on the 14th Year Audit, CNE provided the remaining three years of maintenance costs for the EGF during the quarter.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on September 25, 2018, 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 the entire 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.
- In previous Walkthrough reports, it was noted that significant scale was observed on the fill to several of the cooling towers. The scale remains on these 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 first being noted in the Fourth Quarter FY17 Walkthrough report. The scaling has increased and is apparent on most of the cooling towers. CNE needs to have their water treatment contractor to provide Metro a report explaining why the scale is forming and what actions need to be taken to remedy the issues.
- In previous Walkthrough Reports, it was noted that a drain valve on the condensing water header on the northeast corner of the cooling tower deck was frozen and had apparently been leaking. If this line or valve ruptures, a significant leak of the condensing water system will occur. CNE does not appear to have replaced this valve and the valve was observed to still have a slight leak. Although no leak was observed during the Fourth Quarter FY18 Walkthrough, the valve was leaking during this Walkthrough (First Quarter FY19). It is recommended that CNE replace this valve, plug this valve or reconnect the drain line to the valve.
- In previous Walkthrough reports, it was noted that a leaking chemical feed line was observed on the south side of the southern DA. CNE has yet repaired the leak but has not cleaned the area affected by the spill.
- Green biological growth was noted to be present on the insides of the cooling towers and some plants were noted growing the basin for CT#3 during the previous Walkthrough Report. CNE has cleaned the cooling towers and the biological growth has been removed.

- The water line in the ceiling west of boiler #4 is leaking again. This item was discussed with CNE and they are preparing to make the necessary repairs as the peak cooling season closes.
- Some slight steaming was observed coming from a condensate line on the east side of the DA. A portion of insulation is missing from the condensate line exposing the bare pipe to a possible water drip from above. This item was discussed with CNE and they will investigate to determine if the steaming is due to secondary steaming or if there is a hole in the condensate piping.
- Four of the sycamore trees on the west side of the EGF appear to have died. One smaller tree on the north side of the building has died and CNE has removed the carcass. CNE needs to cut down and remove the dead trees and replace them.
- A bearing on chiller #6 is in need of replacement and will be shut down and repaired when the parts arrive in the coming days.
- 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 FY19 Open Projects

The following projects remained open at the end of the First Quarter FY19.

1. DES111 – DES Combined Heat and Power

This project is currently on hold.

2. DES119 - Chilled Water System Delta T Issue

Due to the inability of the CNE and Metro Legal to make contact with the entity from which the device was purchased, the remaining funds are not expected to be recovered. This project is closed.

3. DES124 - Criminal Justice Center Redevelopment

The Work associated with the reconnection to the DES for the CJC has been completed. CNE has delivered the metering equipment to the building's contractor for their installation. TEG prepared a reimbursement request to Metro General Services for the costs incurred by DES due to the demolition and reconstruction of the CJC.

The damage to the AA Birch Tunnel that occurred as a result of the blasting at the Criminal Justice Center site has been documented. Once funds become available for the repairs, the necessary repairs to the tunnel will be completed.

4. DES130 – Repair to Manhole B3

This project is now closed.

5. DES133 – Old Convention Center Site Redevelopment

Negotiations continue between the new owner of the site and Metro for the acceptance of the customer service agreement. DES anticipates completion of the agreement during the fiscal year since the new owner has expressed the desire for services during construction which are anticipated in May or June 2019.

The 5th and Broadway development team has re-located a NES vault that was proposed on the north side of Broadway above the Broadway Tunnel. The proposed vault location would have interfered with the existing Broadway Tunnel and Bridgestone Arena service tunnel intersection. The new location is now within the bounds of the 5th+Broadway Development.

6. 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. The repair of the leak at the intersection of 3rd and Charlotte had reduced the system make-up, however, based on recent CHW system make-up water quantities, either additional leaks have developed or the existing leaks are now leaking more water. The search will continue for the origin of the chilled water system leaks with a focus on the James K Polk Building area.

7. DES139 – DES Options Review

Although the initial review has been completed and a final report has been issued by FVB, Metro is developing an RFP to solicit proposals for the management of the DES and a possible sale of the system. Metro is also negotiating with CNE for a contract extension during this RFP process.

8. 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. Due to unexpected expenses associated with the reinforcement of the Broadway tunnel, this work remains on hold. However, this project is expected to move forward in the current fiscal year.

9. DES144 – Manhole 6 Repair

The structural steel piping supports in this manhole have experienced severe corrosion due to water infiltration and require replacement/repair to insure the structural integrity of the steam and condensate piping system anchors. The design and specifications were finalized, a pre-bid meeting was held and the project was awarded during the First Quarter FY19. Based on coordination with customers, the work took place in two separate phases during two consecutive extended weekends. The first work phase occurred during the last weekend in September, and the second work phase will take place during the first weekend in October. It is anticipated that this project will be closed during the Second Quarter FY19.

10. DES147 – Repair of Steam Pipe Insulation in 3rd Avenue North

Reimbursement has been received from the contractor that caused the damage. This project is now closed.

11. DES148 – 10 Lea Ave/Rolling Mill Hill Site

The blasting at the site across Peabody St from the EGF completed during the quarter. After several conversations with the new owner and developer of the site, they have elected not to receive DES services in the future. This project is closed.

12. DES149 – Hot Spot at 1st and Molloy

Pending final payment to CNE, this project will be closed in the Second Quarter FY19.

13. DES150 - 7th Avenue Tunnel Monitoring

A new Federal Courthouse is being constructed along 7th Avenue adjacent to the 7th Avenue Tunnel. The Courthouse contractor originally informed DES that their construction plans included excavation blasting. The Courthouse contractor informed DES during the quarter that blasting will not be needed. Therefore, this project is now closed.

14. DES151 – Manhole 23 Repairs

Several of the structural metal piping supports within this manhole and in the 7th Avenue Tunnel immediately below this manhole have experienced severe corrosion. In addition, the structural supports for access grating within this manhole have advanced corrosion. The manhole also has concrete repairs that are needed which include steam and condensate return piping anchor pedestals. This

project addresses these needed repairs including the cleaning and painting of the structural supports, along with other miscellaneous needed repairs.

TEG started the design for these repairs during the First Quarter FY19. It is expected that this work will be bid during the Second Quarter FY19.

15. DES152 – Manhole A and Manhole M Coating Repairs

The structural steel in these manholes were cleaned and painted as part of DES107 in 2015. Portions of the paint is now flaking and coming off of these supports. The paint manufacturer was contacted and reviewed the failing coatings. Their position is that the surface preparation and paint application is to blame. However, TEG employed a painting inspector during this work and records were maintained regarding the ambient conditions, surface preparation and application. Even with this evidence, the paint manufacturer is not willing to warrant the work. Before the existing corrosion progresses, these coating failures need to be repaired and this project addresses these needed repairs.

TEG is preparing repair specifications. It is anticipated that this work will be bid during the Second Quarter FY19.

16. DES153 – Manhole L Repairs

The structural steel in Manhole L is corroded and needs to be cleaned and painted to prevent any additional corrosion. Additionally, the condensate piping in this manhole experiences fairly severe hammering and the piping configuration needs to be modified to try and alleviate this problem.

TEG started the design for these repairs during the First Quarter FY19. It is expected that this work will be bid during the Second Quarter FY19.

17. DES154 – Manhole K Repairs

The structural steel in Manhole K is corroded and needs to be cleaned and painted to prevent any additional corrosion.

TEG started the design for these repairs during the First Quarter FY19. It is expected that this work will be bid during the Third Quarter FY19.

18. DES155 – 7th & Broadway Condensate Leak Repair

The condensate piping at the intersection of the Broadway and 7th Avenue Tunnels is leaking due to a hole in the condensate piping. The leak is located at an anchor “table” in the tunnel therefore the repair will involve the removal and replacement of approximately 6 to 8 feet of piping. A pre-bid meeting with

contractors was held during the First Quarter FY19 with bids to be received early in the Second Quarter FY19. It is anticipated that this work will take place during the Second Quarter FY19.

19. DES156 – Broadway Tunnel Kicker Repair

One of the steam and condensate piping anchors in the Broadway Tunnel has a square tube brace anchored to the floor of the tunnel. Severe corrosion has occurred at the base of this brace and the lower portion needs to be repaired or replaced.

A pre-bid meeting with contractors was held during the First Quarter FY19 with bids to be received early in the Second Quarter FY19. It is anticipated that this work will take place during the Second Quarter FY19.

B. First Quarter FY19 Closed Projects

DES119, DES130, DES147 and DES148 were closed during the First Quarter FY19.

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	FY19 Spending to Date	Total Spent to Date	Remaining Balance
Fund-49109					
DES119	DES Delta T Issue	\$ 67,000	\$ -	\$ 65,447	\$ 1,553
DES139	Options Review	\$ 63,600	\$ 21,205	\$ 21,205	\$ 42,395
MAS	Miscellaneous Development Projects	\$ 46,900	\$ 42	\$ 27,040	\$ 19,860
DES124	CJC Redevelopment	\$ 2,000	\$ 42	\$ 42	\$ 1,958
DES133	NCC Development	\$ 10,000	\$ 2,243	\$ 2,243	\$ 7,757
DES135	Chilled Water Leak 5th and Union	\$ 50,000	\$ 42	\$ 42	\$ 49,958
DES148	89 Peabody	\$ 10,000	\$ 3,803	\$ 3,803	\$ 6,197
	Total Closed Projects	\$ 2,493,661	\$ -	\$ 2,405,553	\$ 88,108
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ (137,246)	\$ -	\$ -	\$ (137,246)
	Total 2010 Bond	\$ 2,605,916	\$ 27,377	\$ 2,525,376	\$ 80,540
Fund-49107					
DES124	CJC Redevelopment	\$ 300,000	\$ 1,403	\$ 359,271	\$ (59,271)
DES130	MH B3 Repair	\$ 20,000	\$ -	\$ 1,468	\$ 18,532
DES133	NCC Development	\$ 40,000	\$ 7,427	\$ 219,513	\$ (179,513)
DES133.3	Broadway Tunnel Reinforcement	\$ 450,000	\$ 212	\$ 435,735	\$ 14,265
DES135	Chilled Water Leak 5th and Union	\$ 200,000	\$ 14,872	\$ 192,629	\$ 7,371
DES138	MH-D	\$ 130,000	\$ -	\$ 121,242	\$ 8,758
DES148	89 Peabody	\$ 10,000	\$ 7,659	\$ 32,737	\$ (22,737)
	Total Closed Projects	\$ 7,458,827	\$ -	\$ 6,964,044	\$ 494,783
	Metro Project Admin	\$ (129,827)	\$ (0)	\$ 171,140	\$ (300,967)
	Project Man, Development, etc	\$ 21,000	\$ -	\$ -	\$ 21,000
	Customer Connection Fund	\$ 8,500,000	\$ 31,573	\$ 8,497,779	\$ 2,221
Fund-49116					
DES111	DES CHP	\$ 25,984,277	\$ -	\$ 168,706	\$ 25,815,571
	Total Closed Projects	\$ 15,723	\$ -	\$ 15,723	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ -	\$ -	\$ -	\$ -
	CHP and EDS Repairs	\$ 26,000,000	\$ -	\$ 184,429	\$ 25,815,571

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 \$57,025. Tables 6A and 6B provide a summary of the FY19 expenditures and revenues to date associated with the R&I budget.

Table 6. FY19 Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Net Market Adjustment	Market Value	Balance
Value at end of FY18						\$ -	\$ 104,285.39	\$ 104,285.39
DES-144	7/28/2018	DES-2346	TEG	\$ 1,920.75				
DES-147	7/28/2018	DES-2346	TEG	\$ 407.03				
DES-149	7/28/2018	DES-2346	TEG	\$ 127.28				
DES-151	7/28/2018	DES-2346	TEG	\$ 4,412.21				
DES-152	7/28/2018	DES-2346	TEG	\$ 127.28				
DES-149	9/1/2018	-	CNE	\$ 88,200.26				
EMR 17-004	8/2/2018	-	CNE	\$ 5,277.44				
Interest/Transfer	07/02/18	-	-	\$ 185.59				
Interest/Transfer	07/02/18	-	-	\$ (185.59)				
CNE July R&I Invoice	09/01/18	-	CNE	\$ 2,324.97				
DES-144	08/27/18	DES-2346	TEG	\$ 2,497.71				
DES-149	08/27/18	DES-2346	TEG	\$ 42.43				
DES-150	08/27/18	DES-2346	TEG	\$ 1,718.35				
DES-151	08/27/18	DES-2346	TEG	\$ 8,132.38				
DES-153	08/27/18	DES-2346	TEG	\$ 5,606.40				
DES-154	08/27/18	DES-2346	TEG	\$ 3,648.55				
DES-147 (Reimbursement from Star Construction)	08/17/18	DES-2346	-	\$ (12,918.11)				
Interest/Transfer	08/01/18	-	-	\$ 193.12				
Interest/Transfer	08/01/18	-	-	\$ (193.12)				
CNE Aug R&I Invoice	09/19/18	-	CNE	\$ 4,017.14				
DES-144	10/01/18	-	TEG	\$ 4,343.33				
DES-150	10/01/18	-	TEG	\$ 726.93				
DES-151	10/01/18	-	TEG	\$ 3,097.58				
DES-153	10/01/18	-	TEG	\$ 6,885.45				
DES-154	10/01/18	-	TEG	\$ 721.23				
DES-155	10/01/18	-	TEG	\$ 489.57				
DES-156	10/01/18	-	TEG	\$ 678.80				
Interest/Transfer	09/04/18	-	-	\$ 230.69				
Interest/Transfer	09/04/18	-	-	\$ (230.69)				
CNE Sept R&I Invoice	10/17/2018	-	CNE	\$ 8,675.15				
		Sub-Total First Quarter		\$ 141,160.11	\$ 70,425.00	\$ -	\$ (70,735.11)	\$ (70,735.11)
		Sub-Total Second Quarter		\$ -	\$ 23,475.00	\$ -	\$ 23,475.00	\$ 23,475.00
		Sub-Total Third Quarter		\$ -	\$ -	\$ -	\$ -	\$ -
		Sub-Total Fourth Quarter		\$ -	\$ -	\$ -	\$ -	\$ -
		FY19 Year to Date		\$ 141,160.11	\$ 93,900.00	\$ -	\$ 57,025.28	\$ 57,025.28

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. Customer metering station calibration checks were completed as scheduled.
 - c. Water chemistry samples at customer buildings were taken as scheduled.
 - d. Several of the vaults continue to require pumping due to the accumulation of either groundwater or surface water.
 - e. Lighting/electrical repairs are needed in some of the manholes.

- f. CNE continues to fabricate and replace trap assemblies within the EDS.
- 2. Other EDS Inspections
 - a. Other items are included in the CNE monthly reports.
- C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walk-through

The First Quarter FY 2019 walkthrough was conducted on September 11, 12, 13 and 14, 2018. The manholes that were visited included Manholes 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 15, 18A, C, D and D1. 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. CNE should schedule 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 flaking. CNE personnel should monitor these patched areas and notify TEG as the deterioration progresses.
 - d. One of the ladder anchor bolts is loose and needs to be replaced. CNE should schedule to have this done as soon as possible.
 - e. The steam and condensate return piping originally passed through this vault. A few years ago, the piping east of this vault (and Manhole 1) was abandoned and both the steam and condensate return piping through the east wall was capped. The capped steam line penetration (wall sleeve and link seals) through the east wall has deteriorated and it is likely that groundwater will start seeping into the manhole at some point. CNE should monitor this penetration (and the abandoned condensate return penetration) and report any changes to TEG. These penetrations will probably need to be sealed with concrete/grout in the near future.
- 2. Manhole 3
 - a. There was water present in this manhole and it required pumping prior to 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. Comparing pictures

from the First Quarter FY18 review, it does not appear that these cracks have progressed.

- c. There is some minor mud and debris in the manhole which CNE should remove. **This statement appeared in last year's quarterly review.**
- d. There is some minor insulation/jacketing damage that should be repaired during the next project that involves this manhole.
- e. There is some corrosion on the steel supports. As soon as possible, CNE should clean these surfaces with a wire brush/wheel and apply a coating of cold galvanizing paint to try and prevent any additional deterioration. **This statement appeared in last year's quarterly review.**

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. As soon as possible, CNE should clean these surfaces with a wire brush/wheel and apply a coating of cold galvanizing paint to try and prevent any additional deterioration. **This statement appeared in last year's quarterly review.**
- c. The trap in this manhole discharges into a sump in the basement of the Fairlane Hotel through buried piping. The buried piping has deteriorated is now leaking. TEG has asked CNE to determine if this pipe can be removed from either the manhole or the Fairlane Hotel basement and a new replacement pipe slip-lined.
- d. There is some missing insulation and insulation repairs that are needed within this manhole. Once the repair of the trap discharge piping is complete, 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. There are some minor insulation jacketing repairs which are needed in this manhole. CNE should be able to make these repairs and should present a schedule to TEG to accomplish this work. **This statement appeared in last year's quarterly review.**
- c. The trap in this manhole was not functioning; CNE should repair or replace this trap as soon as possible.
- d. The strainer upstream of the trap does not have a blowdown valve; a blowdown valve should be installed by CNE. **This statement appeared in last year's quarterly review.**
- e. There is some minor mud and debris in this manhole. CNE should remove this mud and debris as soon as possible. **This statement appeared in last year's quarterly review.**
- 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. **This statement appeared in last year's quarterly review.**

- g. There is a steam piping kicker installed against the southern manhole wall. This kicker is corroded and CNE should clean these surfaces with a wire brush/wheel and apply a coating of cold galvanizing paint to try and prevent any additional deterioration.
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. There is an active project to replace portions of the badly corroded structural steel components in this manhole and also clean and paint the steel within this manhole at the end of September/beginning of October.
 - d. 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. This work is included in the active project for this manhole and is scheduled to be completed at the end of September/beginning of October.
 - e. A strap that holds an insulation blanket in place on a dripleg is broken. TEG contacted the blanket manufacturer and had a replacement strap sent to CNE. CNE should install this new strap as soon as possible.
 - f. There is some mud in the manhole floor. The manhole will be cleaned during the upcoming project.
6. Manhole 9
- a. There wasn't any water in the floor of the manhole, however, the existing sump pump was running continuously and the sump had a lot of leaves and mud in it. The sump was cleaned out and CNE personnel determined that some electrical contacts had fused together, causing the pump to run continuously. Repairs were made and the pump is functioning normally.
 - b. There is corrosion on the piping support bases. As soon as possible, CNE should clean these surfaces with a wire brush/wheel and apply a coating of cold galvanizing paint to try and prevent any additional deterioration. **This item has appeared repeatedly in this report for several years;** CNE needs to make this item a priority and address it within the next quarter.
 - c. 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 jacketing to access the link seal bolts.
 - d. Some cracking has occurred in the underside of the concrete opening which was cut into the northern wall of the "old" manhole. This crack was sealed

by a contractor in early 2018. CNE needs to monitor these seals and report any degradation to TEG.

- e. The southern steam penetration has a small area of spalled concrete. CNE should monitor this until TEG can arrange to have this repaired.
 - f. There is a small steam leak in a socket-weld elbow fitting after the trap. The leak is constant. Therefore, the existing trap is blowing through. The existing trap is an Armstrong series 2000 trap which needs to be replaced anyway due to problems and poor performance. CNE needs to replace this trap and repair this steam leak as soon as possible.
7. Manhole 10
- a. There was a little water present in this manhole, but it did not require pumping.
 - b. There is some mud in this manhole which CNE needs to remove.
 - c. 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 and in the October 17, 2017 report; to-date there has not been any action on CNE's part.** CNE needs to make this item a priority and take action before the corrosion requires the hiring of a contractor to media blast and paint these items. This item should be completed within the next quarter.
 - d. The spalling of the grout surrounding the southern steam piping penetration has worsened and needs to be repaired. TEG will coordinate with CNE to have repairs made. CNE should continue to monitor this and inform TEG if it becomes worse.
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. 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. This was repaired early in 2018. CNE should monitor the ceiling and report any degradation of this repair to TEG.
 - d. This manhole is hot. The majority of the heat gain in this manhole is due to a gap in the eastern steam piping end can which allows heat from the buried piping to escape into this manhole. This should be repaired by removing a portion of this end-can, installing insulation on the piping and re-installing a

new end can shell to eliminate the gap. TEG will coordinate with CNE to have repairs made.

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. There is a small flange leak on the condensate piping in this manhole. This leak should be repaired as soon as it is conveniently possible.
- c. There is corrosion on a condensate pipe support on the 6" condensate piping extending west out of the manhole. This support should be replaced within the next 12 to 18 months. TEG will coordinate this work with CNE.

11. Manhole 15

- a. Neither of the two lights is working. CNE should make the needed repairs as soon as possible – **this item appeared on the last report.**
- b. There is a small breach in the insulation on the eastern chilled water pipe coming up from the 4th Ave Tunnel. Condensate is dripping from this breach. The breach is in the horizontal run at the seam between the horizontal pipe and the elbow. CNE should repair this as soon as possible. **This item appeared on the last report.**
- c. There is some slight corrosion on the support beams in the sidewalk "entry area." These areas need to be wire wheeled/brushed and painted with cold galvanizing paint to prevent further propagation of this corrosion.

12. Manhole 18A

- a. There was water present in this manhole and it required pumping prior to entry.
- b. Most of the piping in this manhole is supported by structural steel. There is some corrosion on this structural steel with the worse corrosion being on a small structural column mounted to the floor of the manhole. CNE recently cleaned and painted this corrosion with cold galvanizing paint but this column is already corroded again. There is some fairly extensive corrosion elsewhere in this manhole that needs to be addressed in addition to this small column. TEG will prioritize the extent of the corrosion in this manhole, and coordinate with CNE to have these metal surfaces cleaned and painted.
- c. The trap in this manhole is an Armstrong Series 20XX which CNE is in the process of replacing due to poor reliability. CNE should present a schedule to TEG for the replacement of this trap as soon as possible.
- d. The strainer upstream of the trap does not have a blowdown valve. Due to its proximity to a structural beam, there might not be enough space to add a blowdown valve. The trap is an Armstrong 2011 series trap which CNE is

in the process of replacing with standard bucket traps. When this trap is replaced, CNE should be sure to install a blowdown valve on the strainer.

13. Manhole C

- a. This manhole is normally reviewed during the 3rd Quarter of the Fiscal Year. However, since Manhole 4 now has to be reviewed early in the morning to lessen the impact to the Fairlane Hotel valet traffic, this manhole will now be scheduled for review during the First Quarter of the Fiscal Year.
- b. There was water present in this manhole and it required pumping before entry.
- c. The link seals on the water line which passes through the vault are leaking slightly. These link seals should be tightened. Requires action within the next quarter. **This item appeared in the April 13, 2018 report.**
- d. There is a pinhole steam leak at the coupling in the trap piping after the second isolation valve; this needs to be repaired. Requires action as soon as possible. **This item appeared in the April 13, 2018 report.**
- e. There is a small accumulation of mud in the floor of this manhole; this mud needs to be removed or cleaned. Requires action within the next quarter. **This item appeared in the April 13, 2018 report.**

14. Manhole D

- 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.

15. Manhole D1 (sump)

- a. There was a leak at a cam lock connection downstream of the sump pumps. This was repaired by CNE personnel during the review.

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 40 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

Negotiations continued with the OMSE (new development for the old Convention Center) during the quarter. At this time, OMSE would only take 1,200 tons of chilled water capacity and do not require any steam. These loads result in a reduction of demand and income for the DES. OMSE has yet to accept their CSA with the DES.

Conversations and meetings have been 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, although, the discussions with the Owner's engineer have revolved around using 400 tons. Discussions and negotiations are in the early stages since this hotel is currently in the design 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 assisted the Nashville City Center with back flushing their plate and frame heat exchanger.
- CNE and TEG met with personnel from the 501 Union St building to discuss and review the recent upgrades to their HVAC system.
- CNE and their chemical treatment vendor met with personnel from the Renaissance Hotel to discuss the DES water treatment program.
- CNE was notified of an electrical issue with the service air system for the State tunnel steam PRV. CNE investigated the issue and made the necessary repairs.
- CNE and TEG reviewed the demolition work in and around the mechanical room for the Renaissance Hotel and Office. The demolition work is related to the new construction of the 5th + Broadway development.
- Other minor issues and customer interactions are noted in the monthly reports from CNE.

VII. Recommendations

Based on the review of the First Quarter FY19 EGF and EDS operations, the following recommendations are made.

- Corroded structural steel within the vaults and tunnels should be cleaned and painted or replaced;

- Insulation which is absent, or in disrepair, in the vaults should be addressed through additional capital and R&I projects, and through regular maintenance provided by CNE.
- Steam traps which need repair or replacement should be addressed as soon as possible.
- Expansion joint leaks should be repaired by either tightening the packing bolts or packing injection 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.
- Minor concrete repairs need to be made in some manholes.
- Mud and debris needs to be cleaned and removed from some manholes.