



Operations Monitoring Report

First Quarter FY20

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I. Executive Summary

A review of the fiscal year 2020 (FY20) 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 2020 to date, CNE has met their contract obligations to Metro and has had no contract violations.

For the First Quarter FY20, the chilled water sales decreased 1.8% over the previous First Quarter (FY19) despite a 6.2% increase in cooling degree days and a warmer than normal September. The chilled water sendout increased 1.4% over the previous First Quarter. The system losses increased approximately 95.3%. The peak chilled water demand for the current quarter was 17,711 tons, which is 2.6% lower than the previous First Quarter.

Steam sendout for the current quarter decreased by approximately 7.8% over the previous First Quarter with a decrease in heating degree days. Likewise, steam sales also decreased by approximately 15.1% over the previous First Quarter. Total steam system losses increased by 14.6% over the previous First Quarter. The peak steam demand for the current quarter was 57,344 pounds per hour, which represents a decrease in the First Quarter demand by approximately 11.1%.

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 better than the guaranteed levels for the quarter, however the chiller plant efficiency has declined over the past year. Total chiller plant electric usage increased 1.1% from the previous First Quarter. The trend for the unit electric consumption for chilled water has increased over the past twelve months and was 3.0% higher in the First Quarter FY20 than in FY19. TEG believes that the decline in performance of the chiller plant is related to a decrease in the condition, maintenance and operation of the cooling towers and chillers by CNE.

The steam plant electric consumption per unit of sales increased over the previous First Quarter by 14.4%. The total water consumption for the steam and chilled water plants increased marginally from the previous First Quarter. The steam plant water usage increased by 8.1% for the quarter.

Work continued with the DES Capital and Repair & Improvement Projects during the First Quarter. Repair and Improvements to the EDS continue as scheduled. DES133.1, DES135, DES139, DES152, DES153, DES154, DES157, DES159, DES160, DES161, DES162, DES163, DES168, DES169 and DES170 are ongoing. DES158 was closed during the First Quarter FY20.

Recurring maintenance items are included in the EDS Walkthrough section of this report. CNE continues to inadequately address these items. Postponing or deferring these items will result in

an increase in maintenance costs to the DES and could impact the delivery of steam and chilled water.

The current fiscal year system operating costs to date are \$5,316,310. This value represents approximately 26% of the total budgeted operating cost for FY20. The customer revenues from the sales of steam and chilled water for FY20 (to date) are \$4,823,220 which is approximately 23.7% 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. For FY20, no MFA has been budgeted. However, the required shortfall has been allocated from the Undesignated Fund Balance. The fiscal year to date amount required is \$493,090.

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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 1.8% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

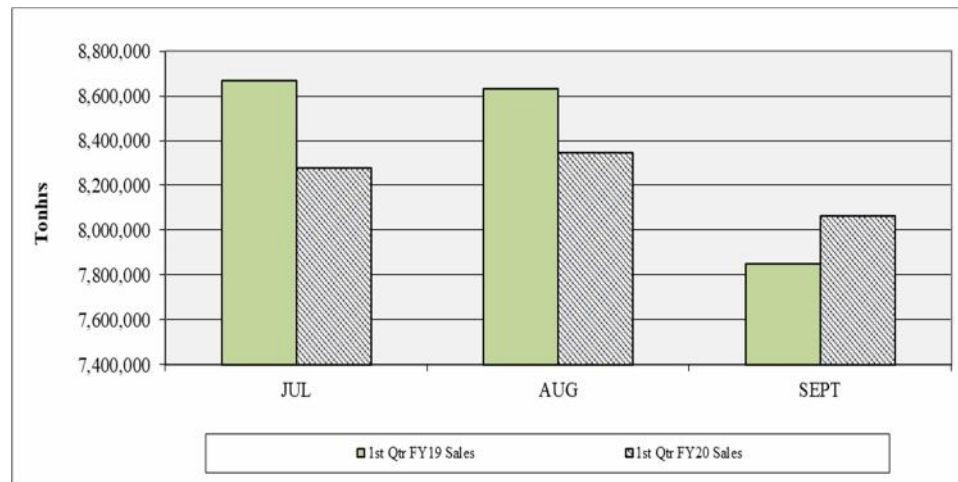


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 17,711 tons, which represents a 2.6% 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.

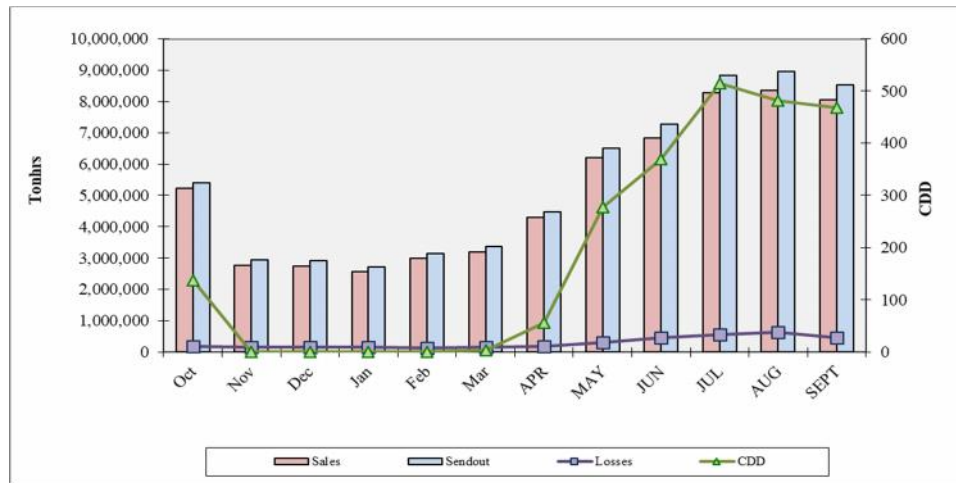


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

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.

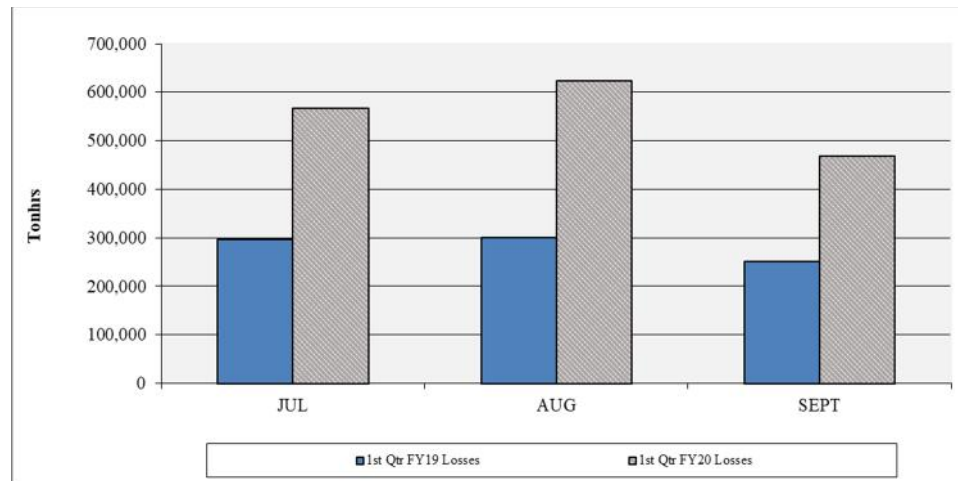


Figure 3. Chilled Water System Loss Comparison

The EDS make-up decreased by 50.5% over the previous First Quarter. Several distribution leaks have been found and repaired in that past year, but remaining leaks are suspected in the distribution system. However, the increase in losses, as shown in Figure 3, cannot be solely attributed to leaks in the distribution system. TEG is investigating this issue and will continue to monitor the system losses to determine the cause.

The make-up to the cooling towers increased 7.8% over the previous First Quarter. The number of cycles of concentration in the condensing water circuit increased 104.4%; however, CNE had to replace the faulty blowdown meter in September 2019, thus the number of cycles presented includes erroneous readings. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

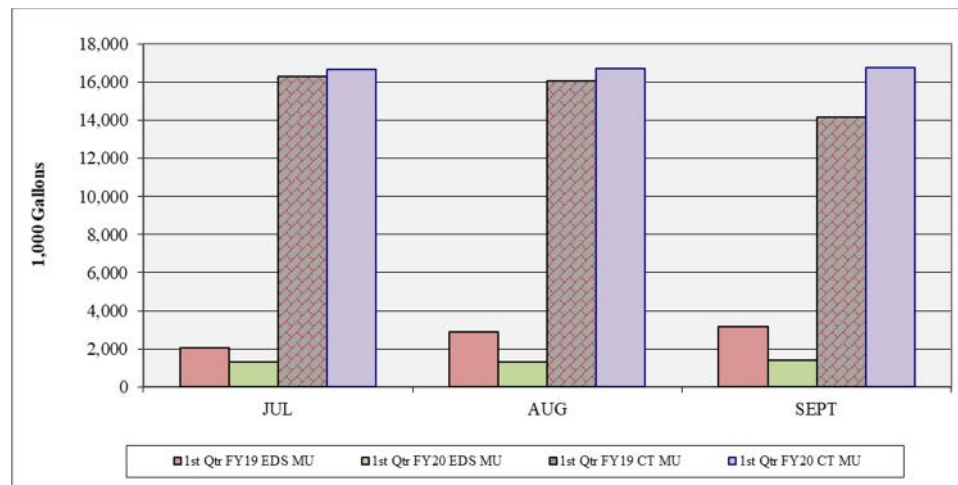


Figure 4. Chilled Water System City Water Usage Comparison

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.

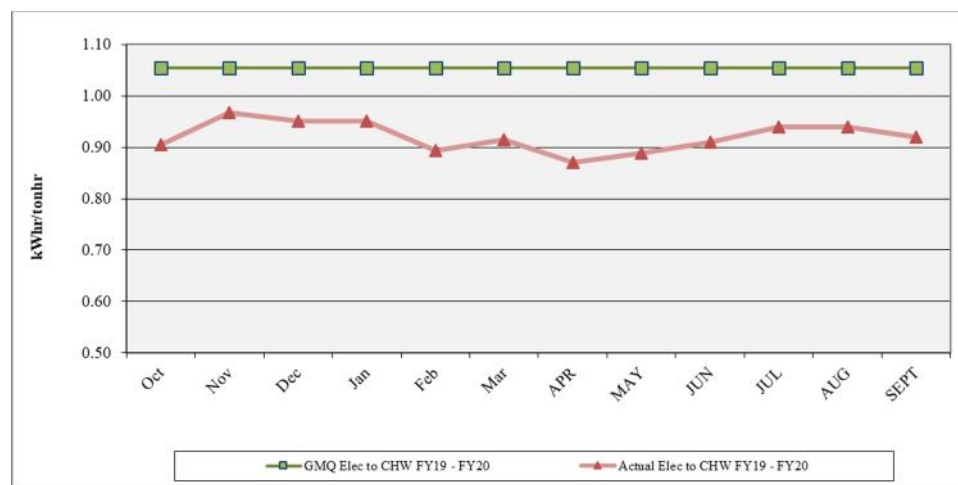


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

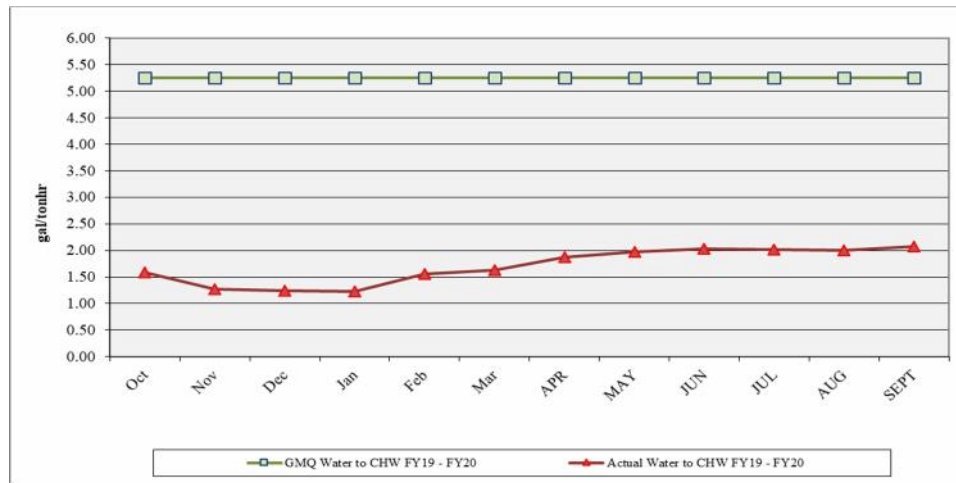


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

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 3.0% over the previous First Quarter. This increase reflects a trend of decreased chiller plant efficiency over the past year. TEG believes this decrease in performance is related to a decrease in the condition, maintenance and operation of the cooling towers and chillers. CNE and TEG have had several conversations regarding this issue within the past year and TEG does not believe that CNE has adequately addressed this issue.

The total consumption of city water for the chiller plant for the current quarter has increased by less than 1%.

B. Steam

1. Sales and Sendout

The steam sendout decreased by approximately 7.8% over the previous First Quarter (FY19), and the sales also decreased by approximately 15.1%. The Quarter experienced a significant decrease in the number of heating degree days. The steam system losses increased 14.6% over the previous First Quarter. A comparison for the First Quarter steam sales is shown in Figure 7.

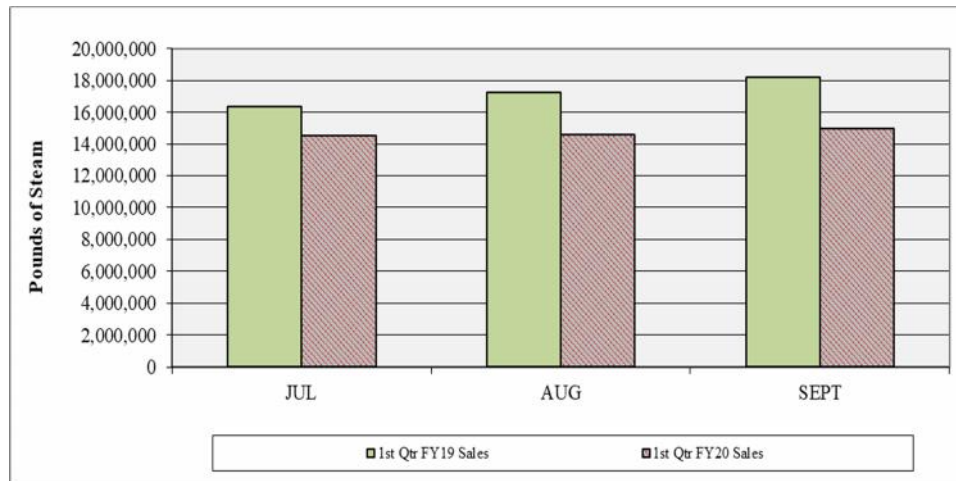


Figure 7. Steam Sales Comparison

The peak steam demand for the current quarter was 57,344 pph, which reflects an approximate 11.1% decrease 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.

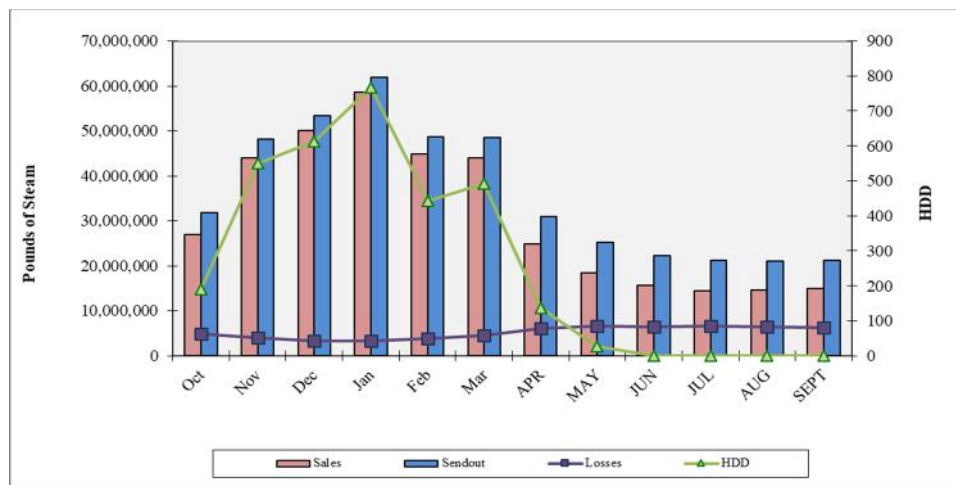


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

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 most of these losses are based on a near constant heat loss of the system.

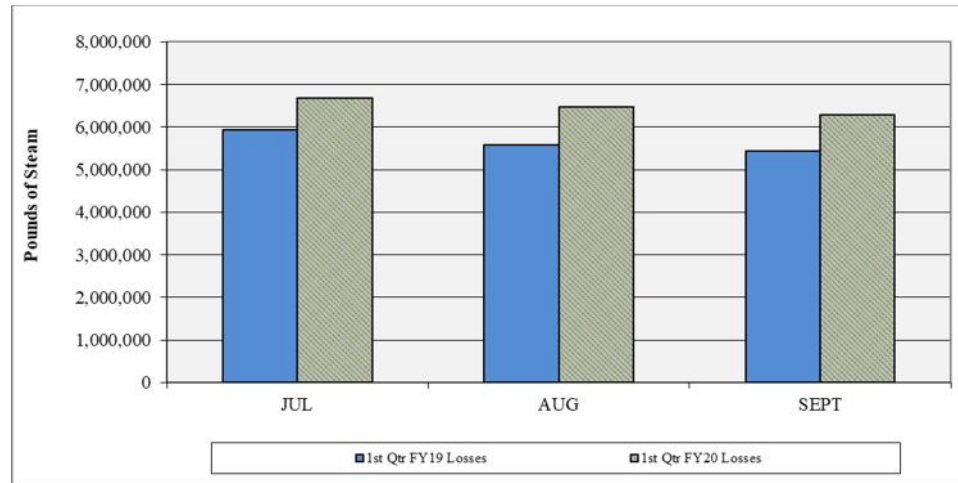


Figure 9. Steam System Losses

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. The amount of condensate return decreased during the First Quarter due to the mechanical and operational issues at several of the customer buildings. These issues have been repaired or are expected to be repaired soon. This data is shown in the comparison of First Quarter data in Figure 10.

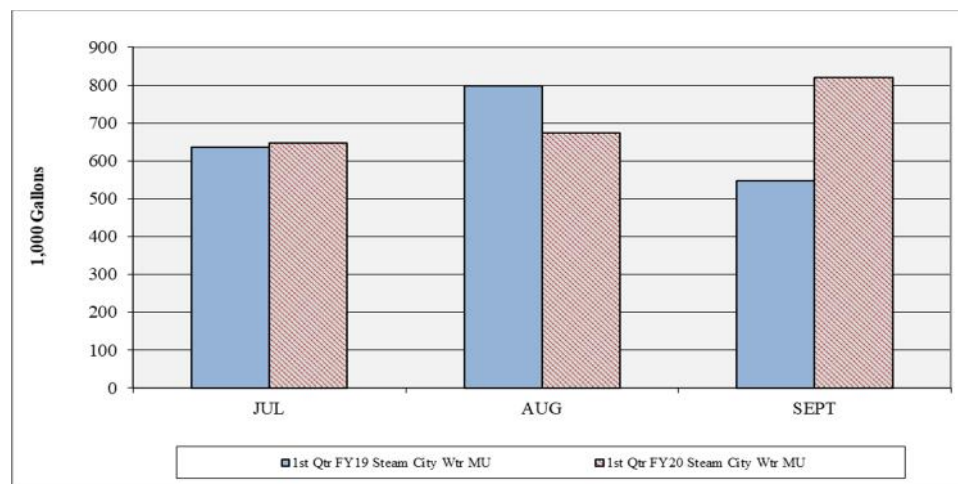


Figure 10. Steam System City Water Make-up Comparison

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.

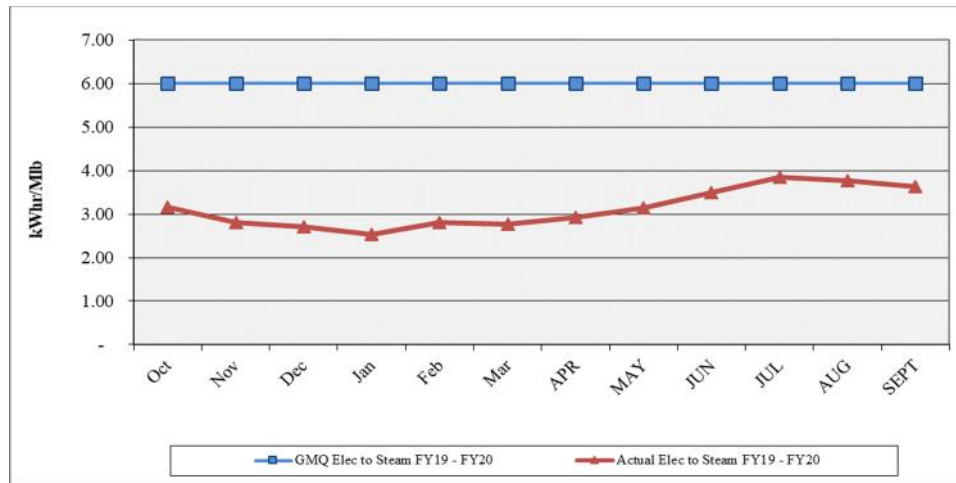


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

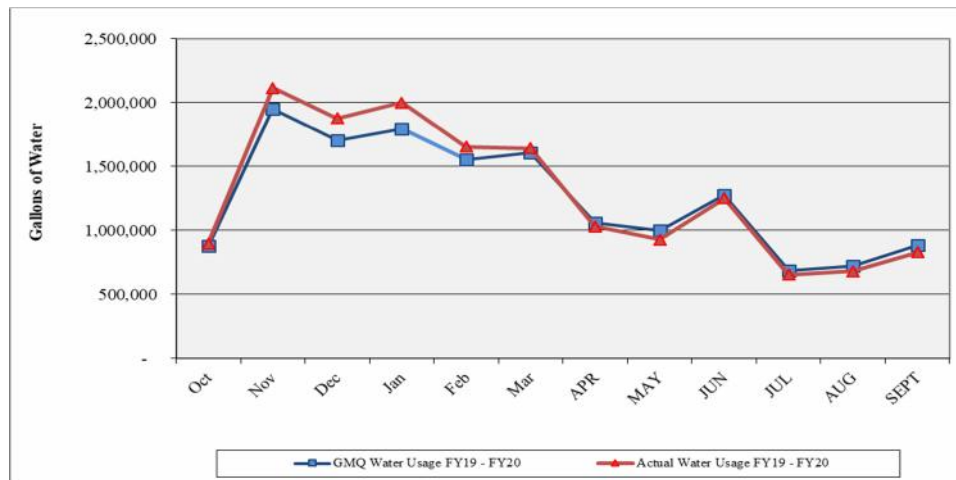


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

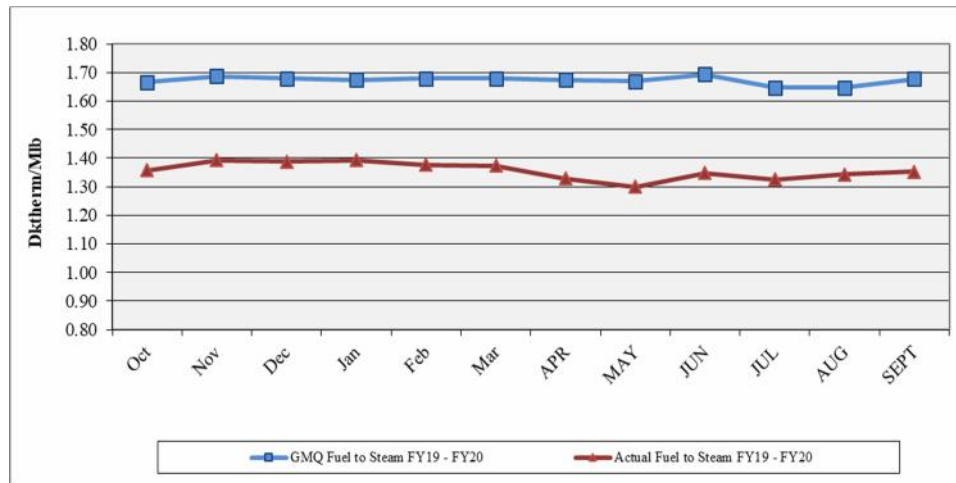


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 2.8% decrease in the steam plant electric consumption while experiencing a 14.4% increase in the electric conversion factor. The water consumption for the steam plant increased 8.1% this quarter as compared to the previous First Quarter. The fuel consumption per unit of steam sales was 1.2% 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 FY20 Production, Sales and Consumption Summary

Item	Unit	First Quarter FY20	First Quarter FY19	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	23,211,838	22,967,227	1.07%
Chilled Water	kWhrs	23,047,157	22,797,757	1.09%
Steam	kWhrs	164,681	169,470	-2.83%
Total Water Use	kgal	56,277	56,593	-0.56%
Total Chilled Water	kgal	54,136	54,613	-0.87%
EDS Make-up	kgal	4,018	8,115	-50.49%
Cooling Towers	kgal	50,118	46,498	7.79%
Calc CT Evaporation	kgal	45,855	39,072	17.36%
CT Blowdown	kgal	4,263	7,426	-42.59%
Calc # Cycles		10.76	5.26	104.44%
Steam	kgal	2,141	1,980	8.13%
Total Fuel Use	mmBTU	85,012	93,286	-8.87%
Natural Gas	mmBTU	84,954	93,286	-8.93%
Propane	mmBTU	58	0	0.00%
Condensate Return	kgal	5,789	6,584	-12.08%
	lbs	47,211,769	53,698,116	-12.08%
Avg Temp	°F	196.7	188.0	4.61%
Sendout				
Chilled Water	tonhrs	26,350,300	25,996,200	1.36%
Steam	lbs	63,453,000	68,795,000	-7.77%
Peak CHW Demand	tons	17,711	18,185	-2.61%
Peak Steam Demand	lb/hr	57,344	64,469	-11.05%
CHW LF		67.38%	64.74%	4.07%
Steam LF		50.11%	48.33%	3.70%
Sales				
Chilled Water	tonhrs	24,691,070	25,146,572	-1.81%
Steam	lbs	44,003,358	51,819,865	-15.08%
Losses				
Chilled Water	tonhrs	1,659,230	849,628	95.29%
Steam	lbs	19,449,642	16,975,135	14.58%
		30.65%	24.67%	24.22%
Degree Days				
CDD		1,466	1,380	6.23%
HDD		0	2	-100.00%

*positive percent difference values imply an increase from FY19 to FY20

Table 2. First Quarter FY20 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	First Quarter FY20	First Quarter FY19	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	3.74	3.27	14.44%
GMQ Plant Efficiency	Dth/Mlb	1.658	1.662	
Plant Efficiency	Dth/Mlb	1.340	1.356	-1.20%
Actual %CR		74.40%	78.06%	-4.68%
Avg CR Temp	°F	197	188	4.61%
GMQ Water Conversion	gal	2,290,064	2,128,707	
Water Conversion	gal	2,162,410	1,999,800	8.13%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.933	0.907	2.96%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.19	2.17	0.96%

*positive percent difference values imply an increase from FY19 to FY20

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. Most 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 covered 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 current fiscal year system operating costs to date are \$5,316,310. This value represents approximately 26% of the total budgeted operating cost for FY20. The customer revenues from the sales of steam and chilled water for FY20 (to date) are \$4,823,220 which is approximately 23.7% 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. For FY20, no MFA has been budgeted. However, the required shortfall has been allocated from the Undesignated Fund Balance. The fiscal year to date amount required is \$493,090.

Table 3. DES Expenses and Revenues to Date

Item	FY20 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,357,000	\$ 1,096,984	\$ -	\$ -	\$ -	\$ 1,096,984	25.18%
9th Chiller	\$ 42,800	\$ 10,754	\$ -	\$ -	\$ -	\$ 10,754	25.13%
C/O 6A	\$ 86,200	\$ 21,233	\$ -	\$ -	\$ -	\$ 21,233	24.63%
C/O 6B	\$ 75,500	\$ 18,588	\$ -	\$ -	\$ -	\$ 18,588	24.62%
C/O 7	\$ 27,800	\$ 7,003	\$ -	\$ -	\$ -	\$ 7,003	25.19%
C/O 8	\$ 12,300	\$ 3,065	\$ -	\$ -	\$ -	\$ 3,065	24.92%
Pass-thru Charges: Chemical Treatment	\$ 253,100	\$ 47,826	\$ -	\$ -	\$ -	\$ 47,826	18.90%
Insurance	\$ 31,400	\$ 5,178	\$ -	\$ -	\$ -	\$ 5,178	16.49%
Marketing: CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
FEA: Steam	\$ 65,075	\$ 13,126	\$ -	\$ -	\$ -	\$ 13,126	20.17%
Chilled Water	\$ 177,124	\$ 109,741	\$ -	\$ -	\$ -	\$ 109,741	61.96%
Misc: Metro Credit	\$ -	\$ (202,506)	\$ -	\$ -	\$ -	\$ (202,506)	n.a.
ARFA	\$ 66,300	\$ 16,587	\$ -	\$ -	\$ -	\$ 16,587	25.02%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 5,194,600	\$ 1,350,083	\$ -	\$ -	\$ -	\$ 1,350,083	25.99%
Reimbursed Management Fee + Chem Treatment		\$ 451,819	\$ -	\$ -	\$ -	\$ 451,819	0.00%
Metro Costs							
Pass-thru Charges: Engineering	\$ 27,100	\$ 17,333	\$ -	\$ -	\$ -	\$ 17,333	63.96%
EDS R&I Transfers	\$ 287,600	\$ 71,900	\$ 23,967	\$ -	\$ -	\$ 95,867	33.33%
Metro Marketing	\$ 10,900	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 324,200	\$ 78,475	\$ 89	\$ -	\$ -	\$ 78,564	24.23%
Utility Costs: Water/Sewer	\$ 620,000	\$ 189,195	\$ -	\$ -	\$ -	\$ 189,195	30.52%
EDS Water/Sewer	\$ -	\$ 273	\$ -	\$ -	\$ -	\$ 273	n.a.
EDS Electricity	\$ 59,200	\$ 13,414	\$ -	\$ -	\$ -	\$ 13,414	22.66%
Electricity	\$ 5,814,700	\$ 1,829,987	\$ -	\$ -	\$ -	\$ 1,829,987	31.47%
Natural Gas Consultant	\$ 12,400	\$ 1,000	\$ -	\$ -	\$ -	\$ 1,000	8.06%
Natural Gas Transport	\$ -	\$ 40,856	\$ -	\$ -	\$ -	\$ 40,856	n.a.
Natural Gas Fuel	\$ 2,959,100	\$ 185,302	\$ -	\$ -	\$ -	\$ 185,302	6.26%
Propane	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Metro Costs =	\$ 10,115,200	\$ 2,427,735	\$ 24,056	\$ -	\$ -	\$ 2,451,791	24.24%
Subtotal - Operations =	\$ 15,309,800	\$ 3,777,818	\$ 24,056	\$ -	\$ -	\$ 3,801,874	24.83%
Debt Service							
2012 Bonds	\$ 3,485,800	\$ 868,963	\$ 298,075	\$ -	\$ -	\$ 1,167,038	33.48%
2005 Bonds -Self Funded	\$ 401,100	\$ 49,323	\$ -	\$ -	\$ -	\$ 49,323	12.30%
2007 Bonds -Self Funded	\$ 181,700	\$ 45,425	\$ -	\$ -	\$ -	\$ 45,425	25.00%
2008 Bonds -Self Funded	\$ 181,400	\$ 45,350	\$ -	\$ -	\$ -	\$ 45,350	25.00%
2010 Bonds -Self Funded	\$ 183,200	\$ 45,800	\$ -	\$ -	\$ -	\$ 45,800	25.00%
Fund 49107 -Self Funded	\$ 646,000	\$ 161,500	\$ -	\$ -	\$ -	\$ 161,500	25.00%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Capital =	\$ 5,079,200	\$ 1,216,361	\$ 298,075	\$ -	\$ -	\$ 1,514,436	29.82%
Total =	\$ 20,389,000	\$ 4,994,179	\$ 322,131	\$ -	\$ -	\$ 5,316,310	26.07%
Customer Revenues							
Taxes Collected		\$ 96,963	\$ -	\$ -	\$ -	\$ 96,963	n.a.
Taxes Paid		\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Interest & Misc Revenue	\$ 192,400	\$ 45,476	\$ -	\$ -	\$ -	\$ 45,476	23.64%
Penalty Revenues/Credits		\$ 22,252	\$ -	\$ -	\$ -	\$ 22,252	n.a.
Energy Revenues Collected		\$ 4,658,529	\$ -	\$ -	\$ -	\$ 4,658,529	24.79%
Revenues =	\$ 20,389,000	\$ 4,823,220	\$ -	\$ -	\$ -	\$ 4,823,220	23.66%
Metro Funding Amount =	\$ -	\$ 170,959	\$ 322,131	\$ -	\$ -	\$ 493,090	0.00%

The DES serves 29 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	\$ 1,171,746	8,134,188	\$ 0.1441	\$ 264,261	9,433	\$ 28.0151
State Government	\$ 955,958	4,940,155	\$ 0.1935	\$ 348,338	12,773	\$ 27.2709
Metro Government	\$ 1,565,842	11,616,727	\$ 0.1348	\$ 352,383	21,797	\$ 16.1664
New Customers	\$ 1,006,349	7,326,837	\$ 0.1374	\$ 237,051	16,986	\$ 13.9558
Total	\$ 3,693,546	24,691,070	\$ 0.1496	\$ 964,983	44,003	\$ 21.9298

Total Revenue \$ 4,658,529
 True-up and Adjustments (Net) \$ 164,691
 Net Revenue \$ 4,823,220

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY20. TEG and CNE continue to meet monthly and regularly communicate about important issues. CNE has reported and managed EGF operations satisfactorily and according to the ARMA with no contract violations; however, chiller plant performance has continued to decline in the past year.

A. Reliability

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

-) A damper air regulator failed on boiler 3 causing the unit to trip offline on August 5. The air regulator was replaced the next day. The steam pressure dropped to a low of 111 psi and was below the guarantee for approximately 60 minutes.
-) Chiller 8B compressor tripped on August 13 causing the supply temperature to exceed the guarantee for approximately 75 minutes. The highest supply temperature was 44.1 °F.
-) The steam system pressure dropped to a low of 146 psig while re-energizing the steam system after repairs in Manholes 9 and C were made in September. The steam pressure was below 150 psig 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, CPR, AED and First Aid and Confined Space.

D. Personnel

The EGF currently had twenty-one full time employees, one part-time employee 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.

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 74.4% of the steam sendout during the quarter, which represents a 4.7% decrease over the previous First Quarter.
- Condensate was dumped for two days in September in the distribution system during the repairs in Manholes L and K and at the Widhorse.
- Due to a faulty heat exchanger at the Hermitage, condensate was dumped until the heat exchanger was located. The repairs were made and CNE checked the hardness and allowed the condensate return to DES to be restored.
- Feedwater iron, pH and hardness remained within their acceptable ranges 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. The biological

growth in the system, as measured at the EGF and at the customer buildings, has become essentially non-existent.

- The project to install a side stream filter at the EGF remains 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.

- ✓ Cleared debris around exterior of EGF and mowed lawn;
- ✓ Checked and repaired plant computers and servers;
- ✓ Checked and adjusted packing on all pumps;
- ✓ Repaired leak on boiler 4 low water cut out;
- ✓ Replaced oil heater on chiller 3;
- ✓ Installed condensing water pump 2 motor;
- ✓ Replaced #10 Security Camera;
- ✓ Repaired boiler 4 sensing line;
- ✓ Repaired cooling tower blow down meter;
- ✓ Repaired chiller 6 starter;
- ✓ Replaced chiller 2A purge condenser fan motor;
- ✓ Replaced drive pin on chiller 2B;
- ✓ Replaced temperature sensor on chiller 3A;
- ✓ Replaced chiller 6 evaporator flow sensor;
- ✓ Repaired pressure switch boiler 3;
- ✓ Replaced oil heater on chiller 6;
- ✓ Repaired cooling tower 12 breaker;
- ✓ Repaired condensing water pump 5 outboard packing gland;
- ✓ Added refrigerant to chiller 6;
- ✓ Repaired low water cut out switch on boiler 4;
- ✓ Replaced low level indicator light on boiler 2;
- ✓ Adjusted belts on cooling towers 4, 6 and 10;
- ✓ Replaced BFW pump 5 motor;

-) Repaired cooling tower chemical pump;
-) Replaced cooling tower blow down meter;
-) Trane replaced chiller 6 flow switch;
-) Other repairs, maintenance and preventative maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

H. EGF Walkthrough

A quarterly Walkthrough of the EGF was performed on September 24, 2019, 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. The items noted in this section need to be completed prior to the end of the operating contract for the System Operator in accordance with the ARMA paragraph 12.03.

-) During the Fourth Quarter FY17 Walkthrough report, it was noted that additional rust spots were observed on the riser tubes for cooling towers #1, #5, #6, #11, #16 and #18. CNE has not made the repairs on the riser tubes. In addition, cooling tower fill being stored on the cooling tower deck beneath the basins has been noted by CNE as being of the new style. No old or damaged fill is currently being stored. No additional work has been performed on the riser tubes since the First Quarter Walkthrough FY18.
-) In previous Walkthrough reports, it was noted that significant scale was observed on the louvers to several of the cooling towers. The scale remains on these cooling towers and all the cells now have scale or deposits on these louvers. CNE has not addressed this issue since first being noted in the Fourth Quarter FY17 Walkthrough report. The louvers have become so brittle that cleaning may seriously damage or destroy them. TEG has been investigating the EGF performance and has determined that the chiller plant efficiency has declined in the past year relative to the previous three (3) and five (5) year averages of the data. If there has been a recent change. TEG has repeatedly requested EGF operating data to assist CNE in determining the role the cooling tower performance may have in the chiller plant efficiency. CNE has not provided such data to date. TEG suspects that the cause of the decrease in chiller plant efficiency is directly related to the condition of the cooling towers.
-) In previous Walkthrough reports, it was noted that a leaking chemical feed line was observed on the south side of the southern DA. CNE repaired the original leak but has not cleaned the area affected by the spill. An additional leak has returned but CNE had not repaired it at the time of the Walkthrough. An additional leak with salt build-up was noted on a valve at the sulfite (oxygen scavenger) tank on the mezzanine level. CNE has not addressed either of these issues.
-) A leak was previously noted on the check valve on the southern de-aerator (DA2). CNE has repaired this leak.

-) A new leak on the condensate line between the two de-aerators was noted during the Walkthrough. CNE noted that they were aware of the leak and were planning to address it soon.
-) It was previously reported that four of the trees on the west side of the EGF appear had died. One of these trees fell over during storms in June. CNE stacked the trunk and broken limbs against the west wall of the EGF but have not removed the material. The remaining dead trees need to be cut down and all the debris should be removed from the site. The dead trees should be replaced. CNE stated that they plan to hire a tree removal contractor to address this issue.
-) Other action items previously noted to be addressed by CNE have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated September 26, 2019, by TEG for additional information.)

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 FY20 Open Projects

The following projects remained open at the end of the First Quarter FY20.

1. DES111 – DES Combined Heat and Power

This project is currently on hold.

2. DES124 - Criminal Justice Center Redevelopment

TEG has prepared a reimbursement request to Metro General Services for the costs incurred by DES due to the demolition and re-construction of the CJC.

3. DES133.1 - Old Convention Center Site Redevelopment: Monitoring of Broadway Tunnel

This project involved the monitoring/reporting on the condition of the Broadway Tunnel related to the construction and blasting at the 5th + Broadway Development. Because the City is pursuing reimbursement from the contractor(s) responsible for the blasting and subsequent damage to the tunnel, including the need for the City to reinforce the tunnel and make repairs after the completion of the blasting, this project remains open. The repairs for tunnel damage were completed under project DES164.

4. DES135 – CHW Leak at 5th and Union

CNE was contacted regarding green water flowing into a communications contractor's open trench. CNE responded immediately and upon review of the area and consultation with TEG, the decision was made to conduct an emergency excavation to find the source of the water. It was found that an existing drain line from the 20" chilled water piping in Union Street had a hole in it. This hole was repaired during the first week of the 1st Quarter FY20. The repair of this leak reduced the system make-up significantly and reduced the inflow at the JK Polk building. However, other leaks still exist in the chilled water system.

In September, green dye was added to the chilled water system to determine if water found in the elevator sump of the JK Polk building was DES chilled water. It was determined that the water in the sump was not DES chilled water. During this investigation, CNE reviewed the water infiltration at the JK Polk's building foundation. Water is still infiltrating at the building's foundation but, no green-tinted water was found. Therefore, with the repair noted in the prior paragraph, the source of the green tinted water infiltration has been repaired and DES chilled water is no longer infiltrating at the JK Polk.

TEG and CNE will continue to monitor the system and its make-up rate. TEG will also remain in contact with the water department regarding the replacement of the water main in 5th Avenue North, one block south of the JK Polk Building.

5. DES139 – DES Options Review

TEG and Metro have continued to assist Engie with their due diligence for the purchase of the DES.

6. 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 on these supports. The paint manufacturer reviewed the failing coatings. Their position is that the surface preparation and paint application was at fault. However, TEG employed a painting inspector during this work and records were maintained regarding the ambient conditions, surface preparation and coating application process. 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.

This work has been put on hold but is included in the FY20 capital budget request.

7. 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 severe hammering and the piping configuration needs to be modified to try and alleviate this problem.

TEG has completed the design for these repairs and is awaiting CNE to schedule a pre-bid meeting.

8. 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, however, due to higher priority projects this work was postponed until FY20.

9. DES157 – Manhole 9 Structural Steel Repairs

The structural steel piping supports in Manhole 9 are badly corroded and need to be replaced and/or cleaned and painted to maintain the integrity of the steam and condensate piping system. The design, bidding and award for this project took place during the First Quarter FY20. It is anticipated that this work will take place during the Second Quarter FY20.

10. DES158 – Manhole 18A Structural Steel Repairs

This project was closed during the First Quarter FY20.

11. DES159 – Manhole B2 Structural Steel Repairs

The structural steel piping supports in Manhole B2 are badly corroded and need to be cleaned and coated to maintain the integrity of the steam and condensate piping system. Due to higher priority projects, this project was delayed.

This project was bid and awarded during the First Quarter FY20. It is anticipated that this work will take place during the Second Quarter FY20.

12. DES160 – New Service to 5th + Broadway Development

The instrumentation and metering system were delivered to the building's contractor during the Fourth Quarter FY19. Chilled water is expected to be used by the contractor during construction; however, the contractor has not completed enough of the HVAC system to utilize chilled water as of the date of this report.

The building's substantial completion date is not expected to be until January 2020, at which time, the normal service will begin to the conditioned spaces within the building. However, the date of actual chilled water service usage remains unknown and subject to the building's requirements.

13. DES161 – Manhole S6 Insulation

This project addresses the installation of insulation in Manhole S6 which is a small manhole in the State distribution system. Due to higher priority projects, this project was not done as anticipated during the First Quarter FY20. It is anticipated that this work will be completed during the Second or Third Quarter FY20.

14. DES162 – Service to New Hotel at 3rd Ave & Molloy

The CSA for this new customer, Hyatt Centric, was executed during the First Quarter FY20. Construction of the chilled water extension has been designed, bid and awarded. Completion of the wet taps on the DES chilled water mains near 2nd Avenue South and Molloy St occurred during the First Quarter FY20. The delivery and installation of the piping is anticipated in the Second Quarter FY20. Service should be available by the Spring of 2020 if required by the building's owner or contractor. The Hyatt Centric is expected to open in April 2021.

15. DES163 – New Service to MDHA Parcel K

Negotiations with this potential customer are in the early stages.

16. DES168 – DES Service to 1st and KVB Hotels

TEG began discussions with the engineer and architect for two new hotels proposed to be developed at 1st Ave S and KVB during the Fourth Quarter FY19. The site load may be 1,500 tons of chilled water and 20,000 pph of steam. Negotiations are in the early stages since the proposed development is preliminary.

17. DES169-Manhole 20 Repairs

Manhole 20 is connected to the 7th Avenue Tunnel and houses the steam, condensate return and chilled water service piping to Hume Fogg High School. The pipe support stanchions in this manhole (adjacent to the 7th Avenue Tunnel), are badly corroded and require replacement. This project addresses the replacement of these pipe supports.

Design is complete and the project is awaiting CNE to schedule a pre-bid meeting.

18. DES170 – Manhole 18 Anchor Repairs Phase II

It was discovered that a steam/condensate anchor at the east end of the Broadway Tunnel at Manhole 18 had moved to the east 3 to 4 inches. TEG reviewed the piping/anchor and determined that a partial anchor failure had occurred. TEG also analyzed the piping configuration and determined that additional undesirable movement could occur with this piping which could jeopardize the integrity and operation of the steam and condensate system. A Change Directive was issued on project DES158 (Manhole 18A Repairs) to install bracing to prevent further movement of the steam piping and this work was substantially completed on March 19, 2019. DES170 addresses the additional work needed to re-position both the steam and condensate return piping and permanently re-anchor this piping.

This work was designed, bid and awarded during the First Quarter FY20. A steam system shutdown is repaired to make these repairs which is scheduled to occur November 10-11, 2019.

B. First Quarter FY20 Closed Projects

DES158 was closed during the First Quarter FY20.

C. Capital Projects Budget

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

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY20 Spending to Date	Total Spent to Date	Remaining Balance
Fund-49109					
DES139	Options Review	\$ 63,600	\$ -	\$ 44,019	\$ 19,581
DES133	NCC Development	\$ 10,000	\$ 47	\$ 8,808	\$ 1,192
DES133.3	Broadway Tunnel Reinforcement	\$ -	\$ -	\$ 1,427	\$ (1,427)
DES135	Chilled Water Leak 5th and Union	\$ 50,000	\$ 1,132	\$ 28,801	\$ 21,199
DES151	MH 23 Repairs	\$ -	\$ 47	\$ 7,446	\$ (7,446)
	Total Closed Projects	\$ 2,493,661	\$ -	\$ 2,507,423	\$ (13,762)
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ (11,346)	\$ -	\$ -	\$ (11,346)
	Total 2010 Bond	\$ 2,605,916	\$ 1,227	\$ 2,597,925	\$ 7,991
Fund-49107					
	Total Closed Projects	\$ 8,497,779	\$ -	\$ 8,497,779	\$ 0
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 2,221	\$ -	\$ -	\$ 2,221
	Customer Connection Fund	\$ 8,500,000	\$ -	\$ 8,497,779	\$ 2,221
Fund-49116					
DES111	DES CHP	\$22,784,277	\$ -	\$ 168,706	\$22,615,571
DES133.1	NCC Blasting Issue	\$ -	\$ 936	\$ 936	\$ (936)
DES135	Chilled Water Leak	\$ 100,000	\$ -	\$ 42,819	\$ 57,181
DES139.1	Options Review	\$ 75,000	\$ 26,546	\$ 104,855	\$ (29,855)
DES151	MH 23 Repairs	\$ 175,000	\$ 180,757	\$ 257,878	\$ (82,878)
DES152	MH A & M Repairs	\$ -	\$ -	\$ -	\$ -
DES153	MH L Repairs	\$ 110,000	\$ 4,453	\$ 7,387	\$ 102,613
DES154	MH K Repairs	\$ 100	\$ -	\$ 85	\$ 15
DES157	MH 9 Repairs	\$ 75,000	\$ 1,487	\$ 20,707	\$ 54,293
DES158	MH 18A Repairs	\$ 110,000	\$ -	\$ 64,662	\$ 45,338
DES159	MH B2 Repairs	\$ 110,000	\$ 1,390	\$ 13,077	\$ 96,923
DES160	5th + Broadway Service	\$ 60,000	\$ 616	\$ 48,573	\$ 11,427
DES161	MH S6 Insulation	\$ 30,000	\$ -	\$ -	\$ 30,000
DES162	3rd and Molloy Service	\$ 220,000	\$ 9,897	\$ 43,714	\$ 176,286
DES163	Parcel K Service	\$ 707,300	\$ -	\$ 1,124	\$ 706,176
DES164	Broadway Tunnel Repairs	\$ 180,000	\$ -	\$ 175,329	\$ 4,671
DES165	AA Birch Tunnel Repairs	\$ 115,000	\$ -	\$ 63,242	\$ 51,758
DES166	Misc. Tunnel Repairs	\$ 195,000	\$ -	\$ -	\$ 195,000
DES167	EDS Fiber Optic Installation	\$ 5,000	\$ -	\$ 4,443	\$ 557
DES168	1st and KVB Hotels	\$ 10,000	\$ 190	\$ 5,600	\$ 4,400
DES169	MH-20 Repairs	\$ 40,000	\$ 442	\$ 10,174	\$ 29,826
	Total Closed Projects	\$ 15,723	\$ -	\$ 15,723	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 882,600	\$ -	\$ -	\$ 882,600
	CHP and EDS Repairs	\$ 26,000,000	\$ 237,202	\$ 1,059,522	\$ 24,940,478

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 account to date is \$58,380. Table 6 provides a summary of the FY20 expenditures and revenues to date associated with the R&I budget.

Table 6. FY20 Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Net Market Adjustment	Market Value	Balance
Value at end of FY19				\$ 322,271.31		\$ -	\$ 63,714.08	\$ 63,714.08
Interest/Transfer	07/01/19	-	-	\$ 151.26				
Interest/Transfer	07/01/19	-	-	\$ (151.26)				
CNE July 2019 Invoice	09/11/19	-	CNE	\$ 11,319.33				
EMR19-003	08/26/19	-	CNE	\$ 46,254.14				
Interest/Transfer	08/01/19	-	-	\$ 187.92				
Interest/Transfer	08/01/19	-	-	\$ (187.92)				
CNE Aug 2019 Invoice	09/19/19	-	CNE	\$ 8,278.99				
Interest/Transfer	09/03/19	-	-	\$ 208.87				
Interest/Transfer	09/03/19	-	-	\$ (208.87)				
EMR19-005 CND Leak Repair	10/22/19	-	CNE	\$ 2,850.00				
CNE Sept 2019 Invoice	10/22/19	-	CNE	\$ 8,531.49				
Sub-Total First Quarter				\$ 77,233.95	\$ 71,900.01	\$ -	\$ (5,333.94)	\$ (5,333.94)
Sub-Total Second Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total Third Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total Fourth Quarter				\$ -	\$ -	\$ -	\$ -	\$ -
FY20 Year to Date				\$ 77,233.95	\$ 71,900.01	\$ -	\$ 58,380.14	\$ 58,380.14

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 reviews were conducted as scheduled. However, with the amount of construction taking place within the downtown area, some manholes were not accessible.
 - b. Several of the vaults continue to require pumping due to the accumulation of either groundwater or surface water.
 - c. CNE continues to fabricate and replace trap assemblies within the EDS.
2. Customer metering station calibration checks were completed as scheduled.
3. Water chemistry samples at customer buildings were taken as scheduled.
4. Other EDS Inspections
 - a. Other items are included in the CNE monthly reports.

C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walkthrough

The First Quarter FY20 walkthrough was conducted on October 22, 23 and 25. The manholes that were visited included Manholes 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 15, S6 and C. Ordinarily, Manholes D and D1 would be included in this quarterly review, however the streets where these manholes are located are being repaved. Therefore, these manholes were not accessible at the time. The following comments and observations are a result of these visits.

1. Manhole 2

- a. There was water in this manhole, and it required pumping prior to 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. 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 future.

2. Manhole 3

- a. There was water 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 prior reviews, 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 the last two 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 the last two year's quarterly review.**

3. Manhole 4

- a. There was water in this manhole, and it required pumping prior to 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 the last two 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. CNE was going to try and remove the trap piping to determine if a new replacement pipe can be slip-lined. **CNE needs to make this a high priority**, otherwise the only alternative will be that the line will need to be replaced with excavation.
- d. There is some missing insulation and insulation repairs that 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 in this manhole which required pumping prior to entry.
- b. There are some 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 the last two year's quarterly review.**
- c. The strainer upstream of the trap does not have a blowdown valve; a blowdown valve should be installed by CNE. **This statement appeared in the last two year's quarterly review.**
- d. There is some mud and debris in this manhole. CNE should remove this mud and debris as soon as possible.
- e. 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. **This statement appeared in last year's quarterly review.**
- f. There is a pinhole steam leak on the trap piping's weld-o-let at the dripleg. This repair will require a partial or full system shutdown. This should be repaired during the upcoming November 10, 2019 system shutdown.

5. Manhole 6

- a. There was water in this manhole which required pumping prior to entry.
- b. There is some a minor amount of mud in the floor of the manhole.

- c. There is a current emergency repair project addressing the replacement of the insulation and insulation blankets in the manhole. Most of this work is complete, however CNE is still addressing some items: 1) adjustments/additions are being made to the insulation blankets; and 2) the underside of the steam dripleg needs to be insulated.
6. Manhole 9
 - a. There was water in this manhole, and it had to be pumped prior to entry. The existing sump pump was not functioning. CNE electricians arrived and repairs were made.
 - b. There is a project underway to make repairs to the structural steel and concrete surfaces and to replace the piping insulation (DES-157).
 - 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 sealed cracks and report any degradation to TEG.
 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 removed while the review was being conducted.
 - c. The condensate anchor has some 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 and September 25, 2018 report; to-date there has not been any action taken 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.
 - e. There is a small area of concrete spalling on the southern wall. CNE should monitor this and notify TEG if it worsens.

- f. The sump pump was not working in this manhole. CNE electricians made repairs during this review, however a new float is needed. CNE will order a new float and install it when it arrives.
8. Manhole 11
- a. There was water 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. The eastern steam penetration includes an end can which projects into the manhole several feet. There is a gap between the end can endplate and the “barrel” of the end can where it appears the end plate broke loose some time ago. In addition, the barrel of the end can is corroded resulting in some holes. The proper way to repair this involves the replacement of the end can which would require excavation on the east side of the manhole. If/when this is done, it is likely that several feet of the buried steam line will require the replacement/repair of the outer conduit, or the complete replacement of several feet of the steam line. Hot air is entering the manhole from the gap and holes in this end can resulting in elevated temperatures in the manhole. Until excavation/repair/replacement of the buried steam piping is undertaken, to reduce the infiltration of this hot air into the manhole, a temporary repair should be completed. This temporary repair involves CNE wrapping the end can with two layers (minimum) of 10 mm thick Aerogel insulation with the east end butted against the manhole wall and the west end overlapping the adjoining pipe insulation. CNE should make this repair as soon as possible.
 - e. The trap discharge piping between the trap and the sparge tube has two pinhole leaks; one on a socket-welded elbow, the other on a socket welded coupling. CNE should repair these leaks as soon as possible.
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 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. There is a small breach in the insulation on the eastern chilled water pipe coming up from the 4th Ave Tunnel. During the summer months, condensate drips 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 two reports.**
 - b. 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 C
 - a. There was water present in this manhole, and it required pumping before entry.
 - b. The link seals on the water line which passes through the vault are leaking slightly. These link seals should be tightened. **This item appeared in the last two reports and requires immediate action.**
 - c. There is a pinhole steam leak at the 90-degree elbow prior to the trap. CNE personnel verified that the isolation valve was working properly. This is a new leak which has developed since the last pin hole leak on the trap piping was repaired. This requires action as soon as possible.
 - d. The dripleg is not insulated; the insulation was apparently removed to repair the steam leak(s) on the trap piping. CNE should get pricing to have this insulation installed and present it to TEG.

13. Manhole D
 - a. This manhole was not accessible due to street re-paving. This manhole will be added to a subsequent quarterly inspection.

14. Manhole D1
 - a. In preparation for street re-paving, it was discovered that the concrete roof of this manhole was failing. TEG reviewed the condition of the roof and CNE opened an emergency repair project to replace the roof with a new precast roof so the re-paving of the street would not be impacted. A formal review of the manhole was not conducted, and this manhole will be added to a subsequent quarterly inspection.

Action Items

Action items from the above walkthrough are presented in the separate quarterly manhole review report presented to CNE. The separate quarterly manhole review report also includes a discussion regarding the importance of CNE’s quick response to remove corrosion from manhole steel members before the situation requires the replacement of steel members.

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 29 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 CSA between the DES and CB Ragland (Hyatt Centric) has been executed. The DES anticipates having service to the building (DES-162) available for the building by the Spring of 2020, but the building is not expected to be open until April 2021.

Conversations with the engineering team for two proposed hotels at 1st Ave S and KVB continued during the quarter. This project is tracked under DES-168.

The developer and engineering team for Lot K reported that they remain interested in DES service but are continuing to work through a revised building plan.

The Four Seasons is a new potential DES customer who began demolition and construction within the block of 1st Avenue South and Demonbreun St. TEG has had several conversations with this potential customer regarding service. The proposed building is a 40+ story hotel and condominium tower with a parking structure and retail space.

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 found and repaired a failed chilled water RTD well at the Municipal Auditorium.
-) A partial chilled water outage was coordinated with five customers in order to excavate and repair a significant chilled water leak at the intersection of 5th Avenue North and Union Street. The permanent repair clamp was installed on July 5. This repair reduced the chilled water makeup from approximately 98,000 gallons per day (gpd) to approximately 40,000 gpd.
-) CNE and TEG personnel met with City Center (511 Union) personnel to discuss reported cooling issues within the building. After meeting with the customer, the customer began preparations for cleaning their heat exchanger. The unit was chemically cleaned on August 10.
-) CNE replaced a failed chilled water RTD at the Symphony in July.

-) CNE assisted Metro Courthouse personnel in cleaning their heat exchanger.
-) CNE discussed with Hume Fogg reported cooling issues and began preparations for cleaning their heat exchanger.
-) CNE assisted the Fairlane Hotel in isolating their steam system so that the building's personnel could make repairs.
-) CNE coordinated a steam service isolation at the Renaissance Hotel so that a block valve could be added to a pressure transmitter.
-) CNE coordinated the steam service shutdowns for the affected customers related to Manhole L and Manhole 9 repairs.
-) Other minor issues and customer interactions are noted in the monthly reports from CNE.

VII. Recommendations

Based on the review of the First Quarter FY20 EGF and EDS operations, the following recommendations are made.

-) The items noted in the Walkthrough Reports as in need of repair need to be completed prior to the end of the operating contract for the System Operator in accordance with the ARMA paragraph 12.03.
-) TEG is continuing to monitor the increase in chilled water system losses, the water usage at the EGF and the decrease in chiller plant electric efficiency. CNE needs to address the maintenance issues related to the cooling towers and work towards restoring the chiller plant efficiency to its historic values.
-) CNE needs to adequately address the recurring maintenance items included in the EDS Walkthrough section of this report.
-) Corroded structural steel within the vaults and tunnels should be cleaned and coated or replaced.
-) Insulation that 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 injection of packing once the leak(s) is substantial enough for the repair to be effective.
-) Debris needs to be cleaned and removed from some manholes.