



## **Operations Monitoring Report**

**Second Quarter FY21**

**Prepared by:**

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**January 29, 2021**

## **I. Executive Summary**

A review of the fiscal year 2021 (FY21) Second 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 2021 to date, CNE has not met their contract obligations to Metro in the following categories. TEG will continue to monitor CNE's operations.

- 1) they have not met their performance guarantees for multiple months as defined in Paragraph 8.d.;
- 2) they have not met the staffing requirements per Paragraph 7.xvi due to failing to refill vacant positions left by retiring employees; and
- 3) there were five days that boilers 3 and 4 were both unavailable in December due to electrical issues with the force draft fans causing them to not meet the capacity requirements of Paragraph 8.b.i.

(All paragraph references relate to the Amendment 2 of the Amended and Restated DES Management Contract between Metro and CNE.)

For the Second Quarter FY21, the chilled water sales decreased 23.9% over the previous Second Quarter (FY20). The chilled water sendout also decreased 21.9% over the previous Second Quarter. The system losses increased approximately 19.4%. The number of cooling degree days was 36.7% lower than in FY20. The peak chilled water demand for the current quarter was 9,896 tons, which is 42.1% lower than the previous Second Quarter. Although the Second Quarter was cooler than the previous year, the decline in chilled water sales is attributed to customer occupancies being lower than normal due to the nCOVID-19 pandemic.

Steam sendout for the current quarter decreased by approximately 14.3% over the previous Second Quarter and steam sales, likewise, decreased by approximately 17.1%. This decrease came with a 3.5% decrease in heating degree days thus the quarter was much cooler than in FY20. Total steam system losses were approximately 8.4% less than in the previous Second Quarter. The peak steam demand for the current quarter was 122,719 pounds per hour, which represents a decrease in the Second Quarter demand by approximately 9.4%. The total steam sales have also been impacted by the pandemic.

With the implementation of the new System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels beginning in this quarter, CNE has failed to consistently meet the chilled water-water conversion, the steam fuel conversion, and the steam electric conversion during the quarter. The chilled water plant electric consumption per unit of sales continues to perform better than the guaranteed levels for the quarter but higher than many of the historic values. CNE continues to make changes to their operation at the EGF to address the decline in the chiller plant efficiency and to meet the new performance criteria.

These changes have resulted in the quarterly average chiller plant efficiency being approximately 4.9% better than in the Second Quarter FY20. The chilled water-water conversion improved in

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the Second Quarter, compared to the First Quarter FY21. However, the required standard has not been met in four out of the first six months of FY21. The steam water conversion has operated similar to historic values with only one excursion above the guarantee for FY21. The steam fuel guarantee was exceeded four of the first six months of FY21. The steam electric conversion guarantee was exceeded in the First Quarter FY21, but there were no excursions in the Second Quarter. TEG is continuing to monitor CNE's efforts in improving the system's performance.

Work continued with the DES Capital and Repair & Improvement Projects during the Second Quarter. Repair and Improvements to the EDS continue as scheduled. DES133.1, DES139, DES153, DES163, DES168, DES171, DES172, DES173, DES174 and DES175 are ongoing. Projects DES152, DES154, DES161, DES177, DES178, DES179 and DES180 are awaiting approval by Metro. As noted in prior quarterly monitoring reports, the postponement or deference of these items will result in an increase in maintenance costs to the DES and could impact the delivery of steam and chilled water. Projects DES181, DES182 and DES183 have been added. DES157 and DES159 are in close-out.

The current fiscal year system operating costs to date are \$9,105,466. This value represents approximately 47.9% of the total budgeted operating cost for FY21. The customer revenues from the sales of steam and chilled water for FY21 are \$8,000,704 (43.5% of 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 FY21 is \$315,350 (50% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices as of the date of this report.

The DES response to the nCOVID-19 pandemic included the potential deferral of customer invoices and the waiving late fees. The option to take the deferral and the late fee waiver period expired at the end of the First Quarter. Two customers took advantage of the deferral option and were able to reduce a portion of the invoices. The repayments of the deferred amounts began in the First Quarter FY21 and the revenues shown include those amounts. The DES Advisory Board recommended to continue waiving the late fees to customers through February 2021.

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## II. Energy Distribution Sales and Performance

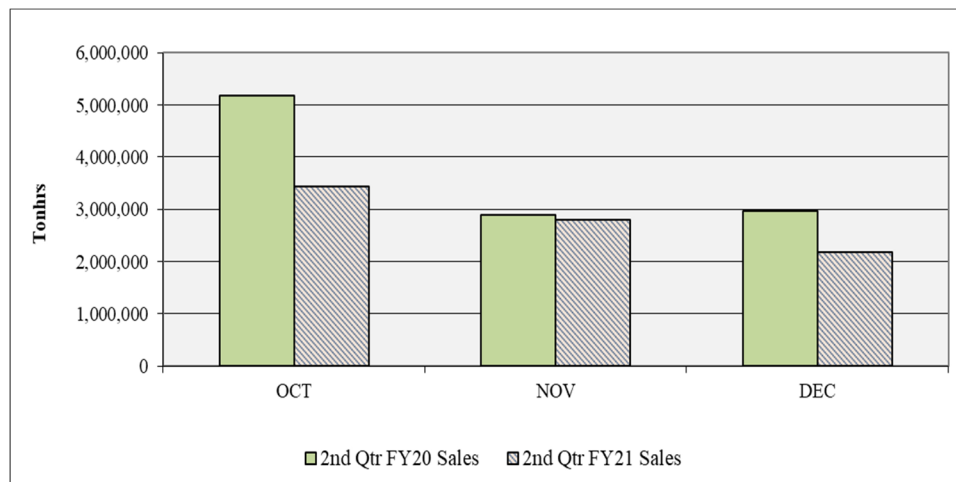
### A. Chilled Water

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.

The decline in business operations, office building occupancies and group events due to the COVID-19 pandemic has impacted the DES by creating a significant decrease in the steam and chilled water energy usage and demand during the quarter. The venue-driven customers have had no events since early March 2020, restaurants, bars, and hotels have had few patrons and many of the office buildings have experienced a decline in tenant occupancies due to more employees working from home. These factors have contributed to a decline in the energy use normally experienced. However, the decline in usage does not impact the MFA, provided that the customers are paying their invoices, since the energy costs incurred by the system are passed through to the customers.

#### 1. Sales and Sendout

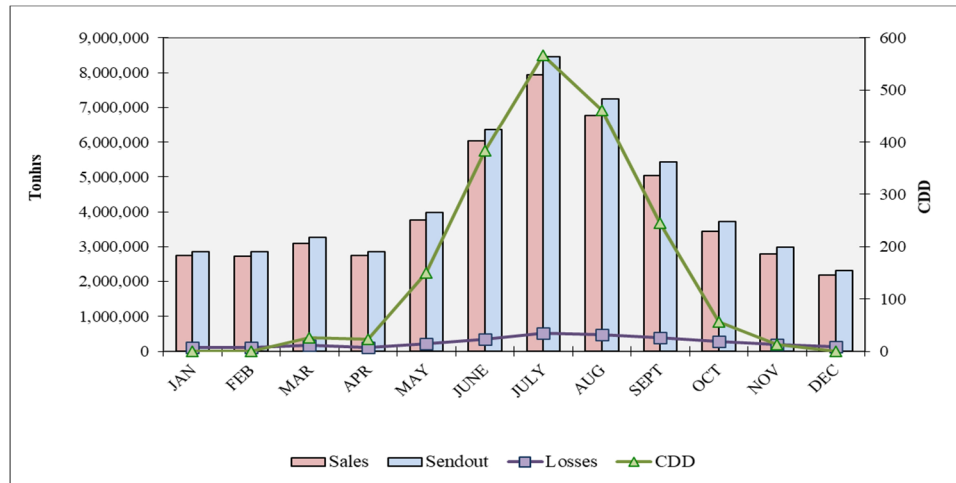
A comparison for the Second Quarter chilled water sales is shown in Figure 1. This data reflects a 23.9% decrease in sales for the current quarter over the same quarter of the previous fiscal year.



**Figure 1. Chilled Water Sales Comparison**

The peak chilled water demand for the current quarter was 9,896 tons, which represents a 42.1% decrease over the previous Second Quarter. Although the chilled water demand is affected by building occupancies, which have decreased, the quarter experienced a 36.7% decrease in the number of cooling degree days which also play a significant role in chilled water demand and usage.

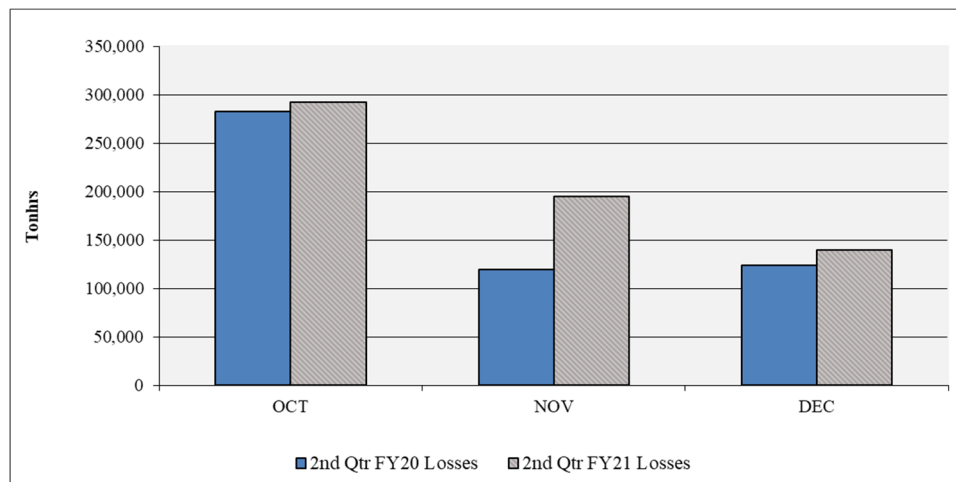
Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS. The number of cooling 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 Second Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales.



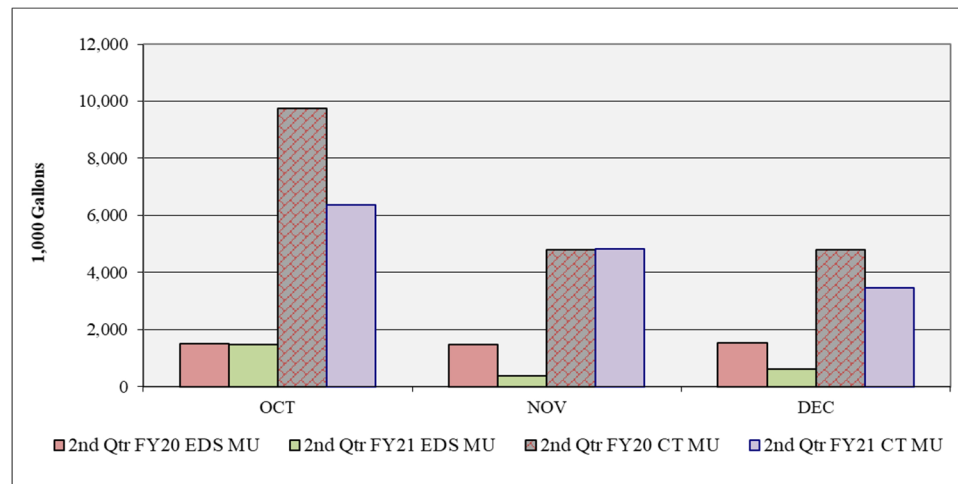
**Figure 3. Chilled Water System Loss Comparison**

The EDS make-up decreased by 45.0% over the previous Second Quarter. A distribution leak was discovered and repaired during the Quarter. Subsequent to the

repairs, there was no EDS make-up for several days which was believed due to a customer adding city water to the system. In December, the make-up returned and maintained approximately 15,000 gallons per day.

A leak is still suspected on 5<sup>th</sup> Ave N, but previous efforts to locate the actual source of the leak have been unsuccessful. Since the magnitude of the EDS make-up is so low, it may not prove cost beneficial to the DES to continue any exploratory excavations at this time. However, CNE and TEG will continue to monitor the EDS make-up and investigate any potential leaks. If the specific location of an additional leak were discovered, DES would address the issue promptly.

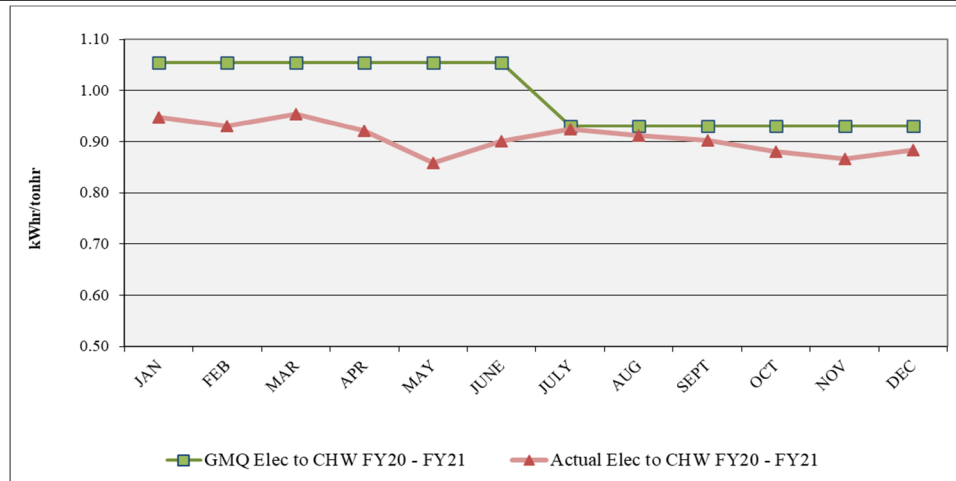
The make-up to the cooling towers decreased 24.3% over the previous Second Quarter. The water usage in the cooling towers is largely due to the consumption of chilled water and should vary with chilled water sales. The number of cycles of concentration in the condensing water circuit decreased 18.4%. The total chiller plant water use decreased 11.8% over the Second Quarter FY20. The overall city water make-up comparison for the chilled water system Second Quarter is shown in Figure 4.



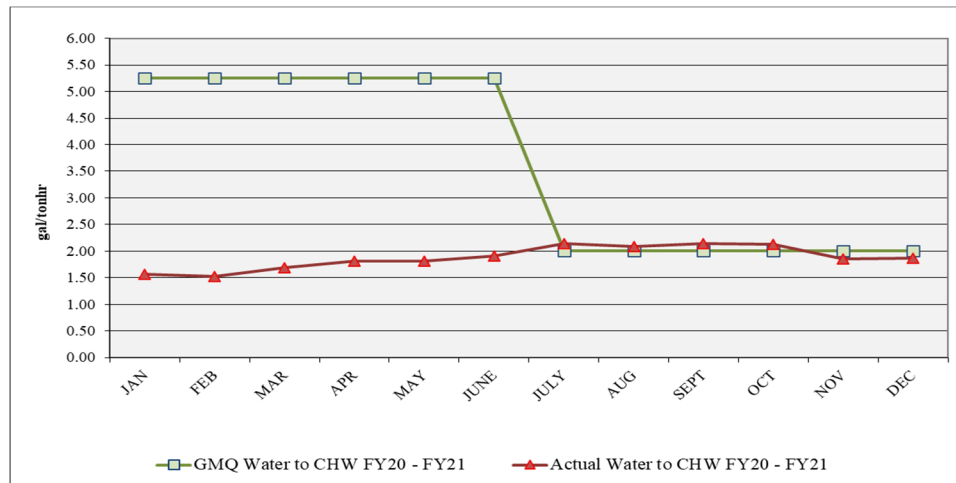
**Figure 4. Chilled Water System City Water Usage Comparison**

### 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. The System Performance Guarantee levels as described in Amendment 2 of the ARMA were not achieved for the chilled water-water conversion for one month of the quarter and four months out of the six months in FY21.



**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 0.93 kWhr per tonhr for the current quarter, and no excursion is reported for the current fiscal year. The electric usage per unit of sales decreased 4.9% over the previous Second Quarter.

CNE has worked to address some operational issues within the plant in an additional effort to improve efficiency. CNE and TEG are continuing to monitor the improvements created by these changes.

The total consumption of city water for the chiller plant for the current quarter has decreased by approximately 28.2% due largely to the decrease in chilled water sales. The water conversion factor for the chiller plant increased by approximately

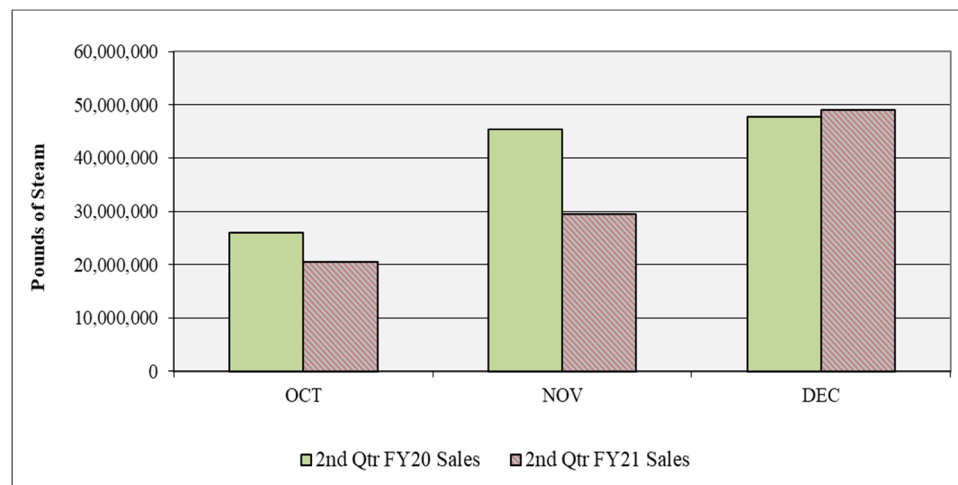


13.5% over the previous Second Quarter. However, a new equation for calculating the chilled water-water conversion factor came into use with the implementation of Amendment 2. When a month-to-month comparison is made for the months of FY21, this conversion factor appears consistent and decreased below the guarantee only after the cooler months arrived and the EDS leak was found and repaired.

**B. Steam**

**1. Sales and Sendout**

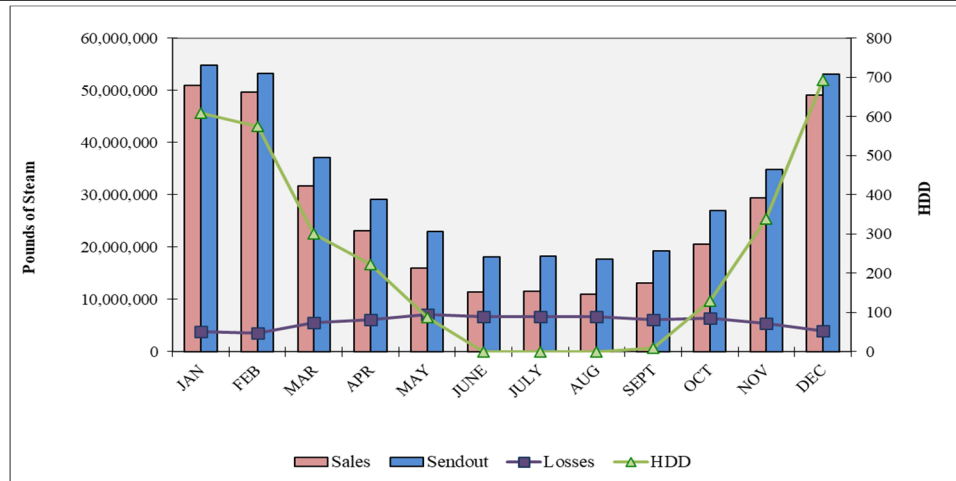
The steam sendout decreased by approximately 14.3% over the previous Second Quarter (FY20), and the sales also decreased by approximately 17.1%. The Quarter experienced a 3.5% decrease in the number of heating degree days. The steam system losses increased 8.4%, and the relative amount of condensate return decreased 34.3% due to the dumping of condensate on 4<sup>th</sup> Ave N during a portion of the quarter. A comparison for the Second Quarter steam sales is shown in Figure 7.



**Figure 7. Steam Sales Comparison**

The peak steam demand for the current quarter was 122,719 pph, which reflects an approximate 9.4% decrease in the peak steam production over the previous Second 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.

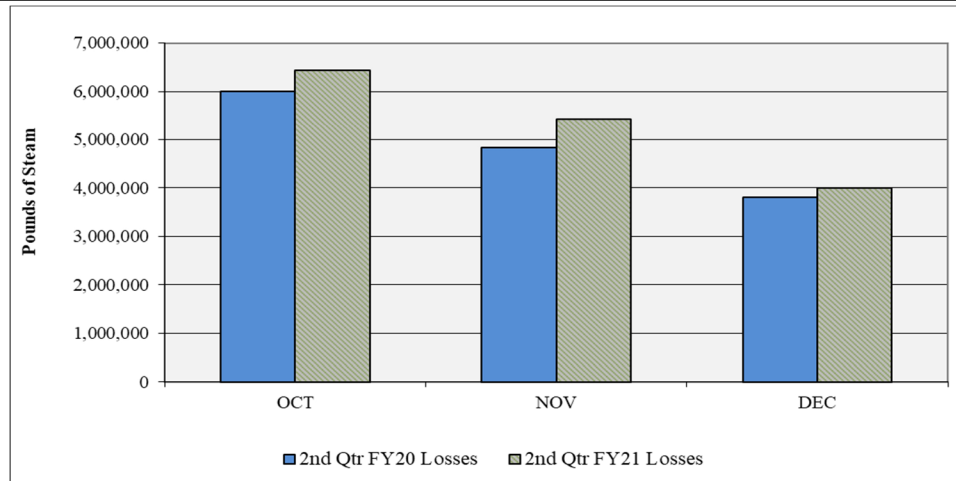


**Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months**

## 2. Losses

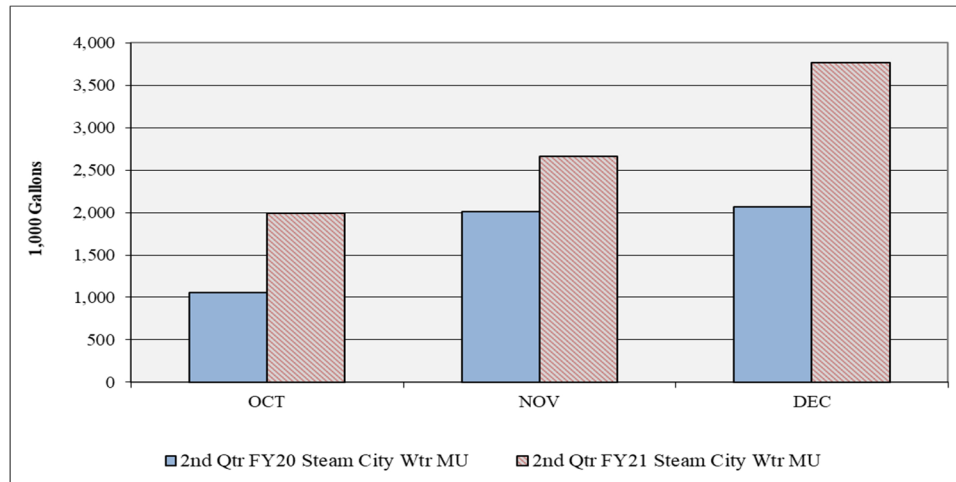
A comparison of the total steam mass losses in the EDS for the Second Quarter is shown in Figure 9. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing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

The increase in the losses and make-up shown in Figures 9 and 10 was largely due to a leak in the condensate system near MH-9 on Deaderick St and the repair of an additional leak near MH-D on 3<sup>rd</sup> Ave N. The Deaderick St leak was repaired in the First Quarter, but CNE continued to record high hardness levels in the condensate return from this area through the Second Quarter. Additional tests performed by CNE at customer buildings also revealed additional sources of hardness. Therefore, a significant portion of the condensate return was dumped in the 4<sup>th</sup> Ave tunnel to prevent the hard water from returning to the EGF. CNE is continuing to monitor the hardness levels of the condensate return throughout the EDS.



**Figure 9. Steam System Losses**

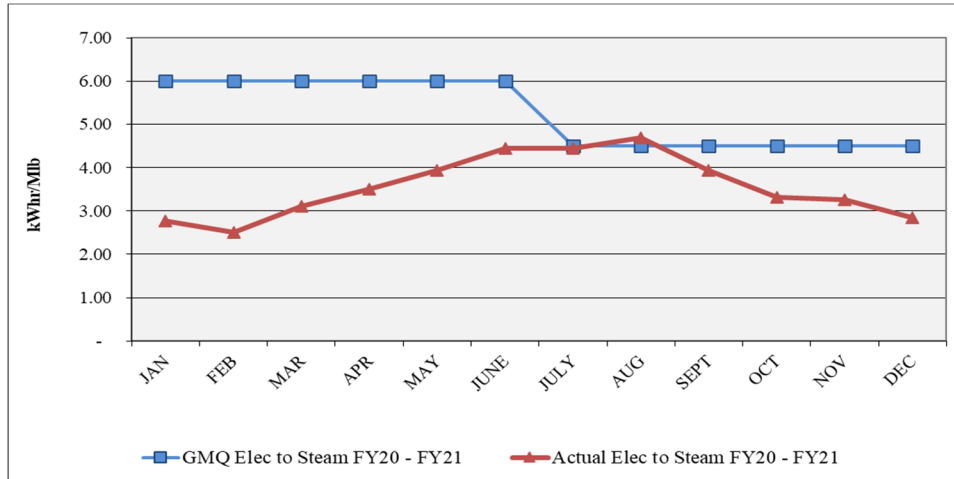
The amount of city water make-up (MU) to the steam system consists of the loss in mass between the EGF and the customers, in the condensate return from the customers to the EGF and losses at the EGF. The corresponding data for steam system make-up is shown in the comparison of Second Quarter data in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



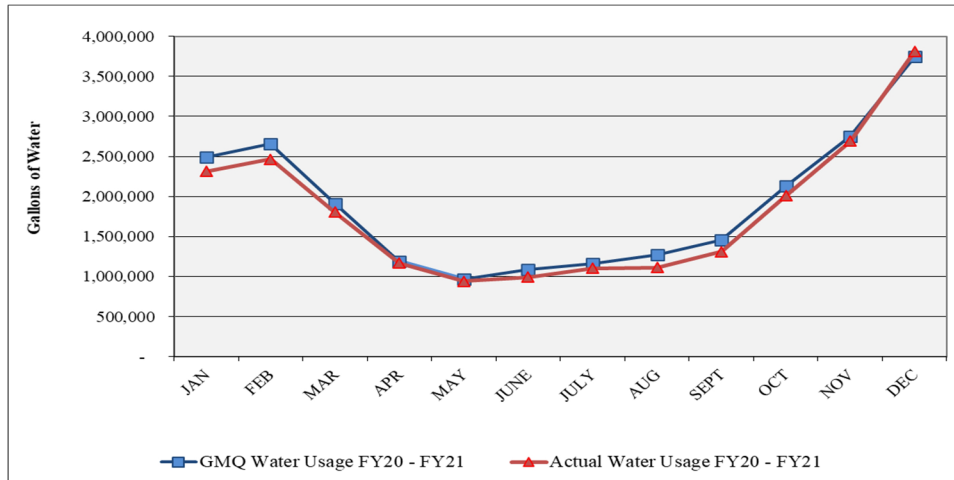
**Figure 10. Steam System City Water Make-up Comparison**

### 3. Performance

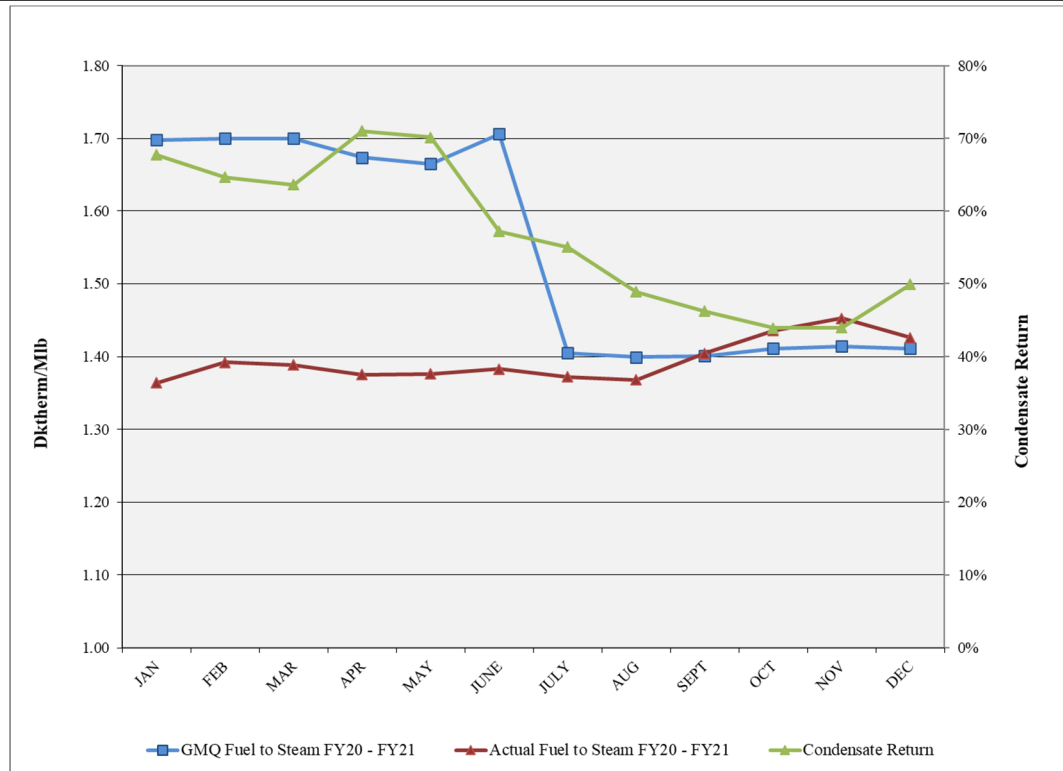
The performance of the steam system of the EGF is presented by the following three charts, Figures 11, 12 and 13. The steam fuel conversion factor exceeded the guaranteed values in October, November, and December 2020. The steam electric conversion factor was exceeded in July and August (First Quarter) but there was no excursion during the Second Quarter. TEG monitors CNE’s performance regularly and will continue to report any non-compliance in the EGF’s operation.



**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 10.2% decrease in the steam plant electric consumption while experiencing a 7.8% increase in the electric conversion factor. The water consumption for the steam plant increased 64.4% this quarter as compared to the previous Second Quarter due largely to the condensate leak and the dumping of condensate due to hardness levels.

The fuel consumption per unit of steam sales was 4.7% higher than in the previous Second Quarter. The relative amount of condensate return in Figure 13 shows that this quantity influences the actual boiler plant efficiency but does not explain all of the change in efficiency in recent months. Other factors in the boiler plant, such as combustion control and in-plant steam usage, may be contributing to the decline. The increase in the fuel consumption per unit of sales represents a decrease in boiler plant efficiency.

### 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 Second Quarter comparisons of the Guaranteed Maximum Quantities (GMQ) or System Performance Guarantees of the criteria commodities (fuel, water, and electricity).

**Table 1. Second Quarter FY21 Production, Sales and Consumption Summary**

Item	Unit	Second Quarter FY21	Second Quarter FY20	*Percent Difference
	days	92	92	0.00%
<b>Total Electric Use</b>	kWhrs	7,671,702	10,513,955	-27.03%
Chilled Water	kWhrs	7,368,077	10,175,942	-27.59%
Steam	kWhrs	303,625	338,013	-10.17%
<b>Total Water Use</b>	kgal	25,554	28,982	-11.83%
Total Chilled Water	kgal	17,130	23,857	-28.20%
EDS Make-up	kgal	2,477	4,501	-44.97%
Cooling Towers	kgal	14,653	19,356	-24.30%
Calc CT Evaporation	kgal	12,530	17,004	-26.31%
CT Blowdown	kgal	2,123	2,352	-9.74%
Calc # Cycles		5.90	7.23	-18.36%
Steam	kgal	8,424	5,125	64.37%
<b>Total Fuel Use</b>	mmBTU	164,928	184,041	-10.39%
Natural Gas	mmBTU	164,797	183,934	-10.40%
Propane	mmBTU	131	107	22.43%
<b>Condensate Return</b>	kgal	6,574	11,666	-43.65%
	lbs	53,619,004	95,146,146	-43.65%
Avg Temp	°F	178.3	178.3	0.00%
<b>Sendout</b>				
Chilled Water	tonhrs	9,034,400	11,566,300	-21.89%
Steam	lbs	114,822,000	133,974,000	-14.30%
Peak CHW Demand	tons	9,896	17,078	-42.05%
Peak Steam Demand	lb/hr	122,719	135,438	-9.39%
CHW LF		41.35%	30.67%	34.80%
Steam LF		42.38%	44.80%	-5.41%
<b>Sales</b>				
Chilled Water	tonhrs	8,407,281	11,040,871	-23.85%
Steam	lbs	98,966,175	119,346,942	-17.08%
<b>Losses</b>				
Chilled Water	tonhrs	627,119	525,429	19.35%
Steam	lbs	15,855,825	14,627,058	8.40%
		13.81%	10.92%	26.48%
<b>Degree Days</b>				
CDD		69	109	-36.70%
HDD		1,163	1,205	-3.49%

\*positive percent difference values imply an increase from FY20 to FY21

**Table 2. Second Quarter Performance Guarantee Comparison for Steam and Chilled Water**

GMQ Calculations	Unit	Second Quarter FY21	Second Quarter FY20	*Percent Difference
<b>Steam</b>				
GMQ Elec Conversion	kWhr/Mlb	4.50	6.00	
Electric Conversion	kWhr/Mlb	3.14	2.92	7.80%
GMQ Plant Efficiency	Dth/Mlb	1.412	1.687	
Plant Efficiency	Dth/Mlb	1.438	1.374	4.69%
Actual %CR		46.70%	71.02%	-34.25%
Avg CR Temp	°F	178	178	0.00%
GMQ Water Conversion	gal	8,629,811	5,474,847	
Water Conversion	gal	8,508,240	5,176,250	64.37%
<b>Chilled Water</b>				
GMQ Elec Conversion	kWhr/tonhr	0.930	1.055	
Electric Conversion	kWhr/tonhr	0.877	0.922	-4.89%
GMQ Water Conversion	gal/tonhr	2.00	5.25	
Water Conversion	gal/tonhr	1.95	1.72	13.45%

\*positive percent difference values imply an increase from FY20 to FY21

#### 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 Initial System Customers (ISCs) relative to their contract demand. For all non-ISCs, their fixed costs are principally based on a value established by their contracts and are not tied directly to the actual costs of the debt service or CNE's management fee.

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). Therefore, the reduction in monthly energy usage decreases the revenue for the DES but has negligible impact on the required Metro Funding Amount. A summary of the total operating costs for the fiscal year to date are shown in Table 3.

The revenues shown in Tables 3 and 4 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 unsold capacity at the EGF and the debt service for bonds to which the customers do not directly contribute.

The DES response to the nCOVID-19 pandemic included the potential deferral of customer invoices and waiving late fees. Only two customers took advantage of the deferrals. These two customers are being invoiced one-twelfth of the total deferred amounts. Although the nCOVID-19 deferral period ended with the First Quarter, the DES Advisory Board recommended continuing to waive late fees from the customers through at least the end of February 2021.

For FY21, the current fiscal year system operating costs to date are \$9,105,466. This value represents approximately 47.9% of the total budgeted operating cost for FY21 and includes some costs occurring in the Second Quarter. The customer revenues from the sales of steam and chilled water for FY21 are \$8,000,704 (43.5% of 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 FY21 is \$315,350 (50% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices as of the date of this report. The total revenue list includes the costs associated with the FY20 customer true-up and repayment of the nCOVID-19 deferrals for the two customers who elected for this option.



**Table 3. DES Expenses and Revenues to Date**

Item	FY21 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
<b>Operating Management Fee</b>							
FOC: Basic	\$ 3,776,800	\$ 944,203	\$ 944,203	\$ -	\$ -	\$ 1,888,405	50.00%
9th Chiller	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 6A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 6B	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
<b>Pass-thru Charges:</b> Chemical Treatment	\$ 260,700	\$ 68,435	\$ 71,706	\$ -	\$ -	\$ 140,141	53.76%
Insurance	\$ 14,800	\$ 16,013	\$ -	\$ -	\$ -	\$ 16,013	108.19%
<b>Marketing:</b> CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
<b>FEA:</b> Steam	\$ 125,000	\$ 890	\$ (6,066)	\$ -	\$ -	\$ (5,176)	-4.14%
Chilled Water	\$ 73,800	\$ (2,741)	\$ 8,642	\$ -	\$ -	\$ 5,901	8.00%
<b>Misc:</b> Metro Credit	\$ -	\$ (347,378)	\$ (206,007)	\$ -	\$ -	\$ (553,386)	n.a.
ARFA	\$ 59,400	\$ 14,850	\$ 14,850	\$ -	\$ -	\$ 29,700	50.00%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
<b>Subtotal - Man Fee =</b>	<b>\$ 4,310,500</b>	<b>\$ 1,041,650</b>	<b>\$ 1,033,335</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 2,074,985</b>	<b>48.14%</b>
<b>Reimbursed Management Fee + Chem Treatment</b>		\$ 1,025,637	\$ 358,750	\$ -	\$ -	\$ 1,384,387	0.00%
<b>Metro Costs</b>							
<b>Pass-thru Charges:</b> Engineering	\$ 37,300	\$ 6,136	\$ 14,296	\$ -	\$ -	\$ 20,432	54.78%
EDS R&I Transfers	\$ 291,900	\$ 72,258	\$ 73,692	\$ 24,325	\$ -	\$ 170,275	58.33%
Metro Marketing	\$ 10,900	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 330,900	\$ 70,051	\$ 56,323	\$ 5,000	\$ -	\$ 131,374	39.70%
<b>Utility Costs:</b> Water/Sewer	\$ 633,400	\$ 326,528	\$ 187,694	\$ -	\$ -	\$ 514,222	81.18%
EDS Water/Sewer	\$ -	\$ (256)	\$ 152	\$ -	\$ -	\$ (104)	
EDS Electricity	\$ 59,400	\$ 20,223	\$ 18,313	\$ -	\$ -	\$ 38,536	64.88%
Electricity	\$ 5,919,500	\$ 1,461,598	\$ 679,802	\$ -	\$ -	\$ 2,141,399	36.18%
Natural Gas Consultant	\$ 12,400	\$ -	\$ 1,000	\$ -	\$ -	\$ 1,000	8.06%
Natural Gas Transport	\$ -	\$ 36,211	\$ 58,880	\$ -	\$ -	\$ 95,091	n.a.
Natural Gas Fuel	\$ 2,305,000	\$ 150,093	\$ 445,716	\$ -	\$ -	\$ 595,809	25.85%
Propane	\$ -	\$ 77,271	\$ -	\$ -	\$ -	\$ 77,271	n.a.
<b>Subtotal - Metro Costs =</b>	<b>\$ 9,600,700</b>	<b>\$ 2,220,111</b>	<b>\$ 1,535,868</b>	<b>\$ 29,325</b>	<b>\$ -</b>	<b>\$ 3,785,304</b>	<b>39.43%</b>
<b>Subtotal - Operations =</b>	<b>\$ 13,911,200</b>	<b>\$ 3,261,761</b>	<b>\$ 2,569,203</b>	<b>\$ 29,325</b>	<b>\$ -</b>	<b>\$ 5,860,289</b>	<b>42.13%</b>
<b>Debt Service</b>							
2012 Bonds	\$ 3,486,100	\$ 879,026	\$ 869,336	\$ 289,768	\$ -	\$ 2,038,130	58.46%
2005 Bonds -Self Funded	\$ 377,700	\$ 337,647	\$ -	\$ -	\$ -	\$ 337,647	89.40%
2007 Bonds -Self Funded	\$ 176,000	\$ 44,000	\$ 44,000	\$ 44,000	\$ -	\$ 132,000	75.00%
2008 Bonds -Self Funded	\$ 175,900	\$ 43,975	\$ 43,975	\$ 43,975	\$ -	\$ 131,925	75.00%
2010 Bonds -Self Funded	\$ 178,300	\$ 44,575	\$ 44,575	\$ 44,575	\$ -	\$ 133,725	75.00%
Fund 49107 -Self Funded	\$ 629,000	\$ 157,250	\$ 157,250	\$ 157,250	\$ -	\$ 471,750	75.00%
Fund 49116 -Self Funded	\$ 75,000	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
<b>Subtotal - Capital =</b>	<b>\$ 5,098,000</b>	<b>\$ 1,506,473</b>	<b>\$ 1,159,136</b>	<b>\$ 579,568</b>	<b>\$ -</b>	<b>\$ 3,245,177</b>	<b>63.66%</b>
<b>Total =</b>	<b>\$ 19,009,200</b>	<b>\$ 4,768,234</b>	<b>\$ 3,728,339</b>	<b>\$ 608,893</b>	<b>\$ -</b>	<b>\$ 9,105,466</b>	<b>47.90%</b>
<b>Customer Revenues</b>							
Taxes Collected		\$ 92,533	\$ 77,468	\$ -	\$ -	\$ 170,001	n.a.
Taxes Paid		\$ 92,533	\$ 77,467	\$ -	\$ -	\$ 170,000	n.a.
Interest & Misc Revenue	\$ 230,900	\$ -	\$ 624	\$ -	\$ -	\$ 624	0.27%
Penalty Revenues/Credits		\$ 30,813	\$ 20,239	\$ -	\$ -	\$ 51,053	n.a.
Energy Revenues Collected		\$ 4,261,488	\$ 3,687,538	\$ -	\$ -	\$ 7,949,026	42.30%
<b>Revenues =</b>	<b>\$ 18,378,500</b>	<b>\$ 4,292,301</b>	<b>\$ 3,708,403</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 8,000,704</b>	<b>43.53%</b>
<b>Metro Funding Amount =</b>	<b>\$ 630,700</b>	<b>\$ 475,933</b>	<b>\$ 19,936</b>	<b>\$ 608,893</b>	<b>\$ -</b>	<b>\$ 1,104,762</b>	<b>175.16%</b>

The DES serves 29 customers and 42 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	\$ 1,920,538	9,665,094	\$ 0.1987	\$ 590,199	32,603	\$ 18.1025
State Government	\$ 1,680,697	7,162,287	\$ 0.2347	\$ 817,668	44,486	\$ 18.3802
Metro Government	\$ 2,175,468	11,348,498	\$ 0.1917	\$ 764,456	57,600	\$ 13.2718
New Customers	\$ 1,402,505	6,736,118	\$ 0.2082	\$ 533,539	43,457	\$ 12.2775
<b>Total</b>	<b>\$ 5,776,704</b>	<b>28,175,879</b>	<b>\$ 0.2050</b>	<b>\$ 2,172,323</b>	<b>134,690</b>	<b>\$ 16.1284</b>

Total Revenue \$ 7,949,027  
 True-up and Adjustments (Net) \$ 51,677  
 Net Revenue \$ 8,000,704

### III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY21. TEG and CNE continue to meet monthly and regularly communicate about important issues and on-going projects. CNE has reported and managed EGF operations satisfactorily; however, they have failed to consistently meet all of the new performance guarantees in Amendment 2, have not reestablished their staffing after losing two employees to retirement during the quarter and were not able to maintain the steam production capacity for five days during December 2020.

#### A. Reliability

The principal 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.

- ) Boiler 2 tripped offline on October 7 while putting Deaerator 2 into service. The steam pressure was below 150 psig for forty-five minutes.
- ) The steam system was isolated on November 20 to repair a steam leak in MH-B2 that occurred while a contractor was working in the vault. The leak was repaired, but the system pressure was below 150 psig for two-and-a-half hours.
- ) All of the operating boilers tripped on November 25 due an electrical issue with the emergency stops. Upon investigation by CNE personnel, they discovered a shorted wire in the electrical system. Repairs were made and the boilers were restarted. The system pressure was below 150 psig for two-and-three-quarter hours.
- ) A scheduled steam outage occurred on November 29-30 so that work could be performed in MH-L and MH-M. The system was down for twenty-four hours.
- ) The damper linkage on boiler 1 stuck on December 2 causing the safety valve to open. The steam pressure dropped to a low of 135 psig and was below 150 psig for approximately one-and-a-half hours.
- ) The failure of the forced draft fan motor for boiler 4 caused the steam pressure to be below 150 psig for two-and-a-half hours. The repairs and replacement of the motor caused the boiler to be non-operation until December 14.

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- ) A similar failure occurred in the forced draft fan motor for boiler 3 on December 9. The failure caused the system pressure to be below 150 psig for two hours. Boiler 3 remained non-operational until December 14 until repairs were completed.
  - ) Following the replacements and repairs for boilers 3 and 4, CNE performed the annual combustion tuning for all of the boilers. This tuning caused the system pressure to be below 150 psig for a total of ten-and-a-half hours between December 14 and December 22.
  - ) In total, the steam system pressure was below 150 psig for forty-four hours during the Quarter.
  - ) Due to the failure of a chiller to respond to its start command, the chilled water sendout temperature was above 43.3°F for forty-five minutes on December 25.
  - ) There were no other reported issues.

#### B. Efficiency

The operation of the EGF did not satisfy all of the guaranteed levels for all commodity usage during the quarter. There were 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.

In order to maintain the COVID-19 social distancing guidelines, CNE has implemented and is requiring regular attendance for online safety courses for their employees.

#### D. Personnel

CNE is currently staffed with nineteen full time employees and one relief staff. This current level of staffing falls short of one part-time employee from the level listed in the Amendment 2 of the ARMA. Of the current number of employees, fourteen 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

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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.

CNE's contract with their water treatment vendor, Nashville Chemical, was set to expire on December 31, thus they began soliciting bids from several vendors for a five-year contract to perform these necessary services. Chemaqua was selected by CNE as their new water treatment vendor. Their contract becomes effective in January 2021.

) Steam System

- o The condensate return averaged approximately 46.7% of the steam sendout during the quarter, which represents a 34.3% decrease over the previous Second Quarter. The decline in condensate return was due to the increase in the measured levels of hardness in the condensate prompting CNE to dump the condensate in the tunnel.
- o Feedwater iron, pH, and hardness (otherwise) remained within their acceptable ranges during the quarter.

) Condensing Water System

- o 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

- o 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.
- o Metro and CNE are evaluating options for the installation of a side stream filter at the EGF.

G. Maintenance and EGF Repairs

CNE continues to report on the routine and preventative maintenance activities performed on the EGF primary and ancillary equipment. The principal 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;
- ) Checked and repaired plant computers and servers;
- ) Checked and adjusted packing on all pumps;
- ) Repaired plant lighting;
- ) Repaired chilled water sample line leaks;
- ) Repaired several chemical feed pumps and associated piping;
- ) Repaired boiler 2 conductivity meter;

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- ) Replaced chiller 2 evaporator sensor;
  - ) Rewired boiler 3;
  - ) Replaced missing refractory in boiler 2;
  - ) Replaced flat gaskets on chiller 9, purge sensor on chiller 8, rebooted controller on chiller 8, replaced diaphragm on chiller 6 purge unit and replaced the refrigerant temperature sensor on chiller 5;
  - ) Replaced the forced draft fan motor on boiler 3;
  - ) Replaced the forced draft fan motor on boiler 4;
  - ) Repaired the burner ignitor on boiler 4;
  - ) Tuned all boilers;
  - ) Replaced the transformer on boiler 4 forced draft fan motor starter;
  - ) Replaced the blow down valve on boiler 4;
  - ) Replaced flat gaskets on chiller 4;
  - ) Other repairs, maintenance and preventative maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

#### H. EGF Walkthrough

The Second Quarter EGF Walkthrough was conducted on January 5, 2021, by Kevin L. Jacobs, P.E. Based on the review of the EGF, the following comments and observations are presented. 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.

- ) CNE has reported in the previous quarters that the riser tubes in all of the cooling towers had been painted and that the cooling tower fill had all been replaced. Rust spots on the riser tubes remained present in the Fourth Quarter FY19 Walkthrough and have continued to worsen. CNE applied a test coat of a new material on the riser tube for cooling tower 1 during the Fourth Quarter FY20. CNE continues to monitor the status of the new coating. No additional work has been performed on the riser tubes since the previous Walkthrough.
- ) In previous Walkthrough reports, it was noted that significant scale was observed on the fill (louvers) to several of the cooling towers. CNE began a thorough cleaning of the towers in FY20. The cleaning of the scale and building on the louvers has been significantly reduced. However, towers 11, 12, 13 and 15 need additional cleaning. No new work was performed since the previous Walkthrough.
- ) In previous Walkthrough reports, it was noted that a leaking chemical feed line was observed on the south side of the southern DA. The salt buildup noted in the previous Walkthrough report has not been addressed. Additional repairs and cleanup are necessary.
- ) Four of the trees on the west side of the EGF have died and been removed. CNE and Metro have discussed the plan to potentially replace the trees and this issue is

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a recurring item for discussion during the monthly Operations Meetings. CNE plans to meet with the city's Urban Forester to determine the appropriate tree density required by the city for the EGF site and the proper species to replant. CNE has continued to postpone this meeting due to the COVID-19 safety protocols. CNE needs to address this issue as soon as possible.

- J Salts from the chemicals used at the chemical Tank 8 were noted scattered around the chemical feed pump and the floor. **This area appeared to have been cleaned since the previous Walkthrough. This item will be removed from future reports unless the issue returns.**
- J Salt build-ups and leaks were noted on the valves and gauges to the chemical feed lines at Tank 3 and BWT6130. **These leaks have not been cleaned or repaired since the previous Walkthrough. This issue remains to be addressed.**
- J The louvers and portions of the fill at cooling towers 1, 6 and 15 appear to have been damaged. **No additional work appears to have been completed since the previous Walkthrough. The damaged portions need to be repaired or replaced.**
- J As noted in the previous Walkthrough report, water was dripping/running along the east and west faces of the louvers and tower structure to cooling tower 14. These leaks may be originating from the hot water deck. **Water was still dripping along the faces of the louvers from the tower structure during the Second Quarter Walkthrough. CNE needs to address the source of the leaks and make the necessary repairs.**
- J The fluid level line/overflow adjacent to cooling tower 6 was oozing foam and slime during the First Quarter FY21 Walkthrough. Foam and algae build-up was also noted in many of the cooling towers (CT 14 may have had the greatest presence of algae). **CNE appears to have addressed the issue with the fluid level line/overflow adjacent to cooling tower 6, but the presence of foaming and algae growth in several of the cooling towers remained during this Walkthrough. CNE needs to address the condensing water treatment.**
- J As noted in the previous Walkthrough report, the insulation on the feedwater piping at the boiler 4 economizer appears to have been damaged. **CNE has not repaired this insulation.**
- J CNE, Metro and TEG have discussed the need for CNE to perform additional cleaning of the EGF and to maintain an increased level of cleanliness through the plant. CNE stated in the First Quarter FY21 that they intended to address the overall cleanliness of the EGF. **No noticeable improvement is noted in this Second Quarter Walkthrough Report. CNE needs to address this issue promptly.**
- J CNE needs to address the presence and recurring algae growth on the cooling towers and the roofing deck. **This item was noted in previous Walkthrough reports and remains unaddressed.**
- J Miscellaneous trash and debris were noted throughout the EGF. Two broken signs were noted near the deaerator and the exterior sign on the southwest corner of the EGF has blackened. **CNE needs to address these issues.**

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- ) Other action items previously noted to be addressed by CNE have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated January 5, 2021, 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 status of the projects is discussed, and the project cost-to-date and bond balances are also presented.

##### **A. Second Quarter FY21 Open Projects**

The following projects remained open at the end of the Second Quarter FY21.

1. DES111 – DES Combined Heat and Power

This project has been deferred and will be removed from future reports.

2. 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 5<sup>th</sup> + Broadway Development. Metro is pursuing reimbursement from the contractor(s) responsible for the blasting and subsequent damage to the tunnel through legal means. This project remains open. The repairs for tunnel damage were completed under project DES164.

3. DES139 – DES Options Review

TEG, the Metro Liaison and Metro Water Services (MWS) have discussed the Business and Marketing Plans proposed by TEG during the quarter. The draft of these documents remain under review by MWS, but TEG is working under this project number to address the questions and comments raised by MWS during this meeting and is preparing other documentation that presents recommendations for the DES moving into the future while remaining under Metro ownership.

4. DES152 – Manhole A and Manhole M Coating Repairs

The structural steel in these manholes was cleaned and painted as part of DES107 in 2015. Portions of the paint are failing, resulting in spots or corrosion on these supports. The paint manufacturer reviewed the failing coatings. Their position was 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 paint. To prevent progression of this corrosion, these areas need to be repaired. This project addresses these needed repairs. Due to similar issues resulting from DES107 work, Manhole B has been added to this scope.

TEG has prepared construction documents to have this work completed; however, this project is awaiting approval from Metro.

5. DES153 – Manhole L Repairs

The structural steel in Manhole L is corroded and needs to be cleaned and painted to prevent additional corrosion. The condensate piping in this manhole experiences some hammering, and therefore the piping configuration needs to be modified to alleviate this problem. In addition, the condensate piping's current routing interrupts the access ladder creating a safety concern.

This project was bid late in the First Quarter FY21; the project was awarded, and work began during the Second Quarter FY21. Construction has been delayed because of a 2<sup>nd</sup> Avenue North bomb explosion on Christmas morning. It is expected that authorities will allow the construction to resume during the Third Quarter FY21.

6. DES154 – Manhole K Repairs

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

TEG started the design for these repairs during the First Quarter FY19; however, due to higher priority projects, this work has been postponed. It is anticipated that this work will take place during calendar year 2021.

7. DES143/161 – Manhole N1, N2 and S6 Insulation

This project addresses the installation of insulation in three (3) manholes: Manhole N1, Manhole N2 and Manhole S6. Manhole N1 and N2 house chilled water piping which is partially uninsulated. Manhole S6 is a small manhole that is a part of the State distribution system which houses steam and condensate return piping which is uninsulated. These projects address the insulation of this uninsulated piping.

This project is awaiting approval from Metro.

8. DES163 – New Service to MDHA Parcel K

Negotiations with this potential customer are in the early stages.



9. DES168 – DES Service to 1<sup>st</sup> and KVB Hotels

The development of the two new hotels proposed at 1<sup>st</sup> Ave S and KVB remains on hold. The building's preliminary design is reported to include service from the DES but is currently on hold pending direction from the building's developer/owner.

10. DES171 – Broadway Tunnel Pipe Support & Safety Items Repairs

Some of the steel pipe supports, guides, and anchors in the Broadway Tunnel are corroded and need to be repaired or replaced. Additionally, the access ladder in Manhole 18 needs to be re-positioned so that it properly aligns with the manway. A pre-bid meeting was held during the First Quarter FY21 and a verbal award has been made. Work began on this project during the Second Quarter FY21. Construction has been delayed on this project because of a 2<sup>nd</sup> Avenue North bomb explosion on Christmas morning. It is expected that authorities will allow the construction to resume during the Third Quarter FY21.

11. DES172 – Viridian and 4<sup>th</sup> Avenue Tunnel Pipe Support Repairs

Some of the steel pipe supports, guides, and anchors in the 4<sup>th</sup> Avenue Tunnel and the supports for the Viridian service are corroded and either need to be repaired or replaced. Additionally, the access ladder in Manhole 17 needs to be re-positioned so that it properly aligns with the manway. A pre-bid meeting was held during the First Quarter FY21 and a verbal award has been made. Work began on this project during the Second Quarter FY21. Construction has been delayed on this project because of a 2<sup>nd</sup> Avenue North bomb explosion on Christmas morning. It is expected that authorities will allow the construction to resume during the Third Quarter FY21.

12. DES173 – Manhole B3 Structural Repairs

This project involved the cleaning and coating of structural steel, the repair of some concrete surfaces, and the modification of the entry ladder. This project was awarded and was substantially complete during the Second Quarter FY21 with the issuance of a punch list. TEG is awaiting a final punch list review to be scheduled. It is expected that this final review will take place during the 3<sup>rd</sup> Quarter FY21.

13. DES174 – 7<sup>th</sup> Avenue Tunnel Pipe Support Repairs

Some of the steel pipe supports, guides, and anchors in the 7<sup>th</sup> Avenue Tunnel are corroded and either need to be repaired or replaced. Additionally, the access ladder in Manhole 22 needs to be re-positioned so that it properly aligns with the manway. A pre-bid meeting was held during the First Quarter FY21 and a verbal award has been made. Work began on this project during the Second Quarter FY21.

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Construction has been delayed on this project because of a 2<sup>nd</sup> Avenue North bomb explosion on Christmas morning. It is expected that authorities will allow the construction to resume during the Third Quarter FY21.

14. DES175 – Manhole 4 Condensate Return Repairs

The condensate return piping between Manholes 3 and 4 on Union Street failed several years ago. Because of the limited number of customers connected to this part of the condensate return system, the costs to replace this piping segment results in a very long payback. In lieu of replacing this piping segment, and, in order to safely discharge the condensate from Manhole 4's trap, a short piping run was installed between Manhole 4 and the basement of 401 Union Street (Fairlane Hotel) in order to discharge the trap's condensate to drain. After several years of service, this trap discharge piping between Manhole 4 and 401 Union Street has now failed. TEG has developed a solution for the failed trap discharge piping which includes modification of the piping within Manhole 4 which was executed during the Second Quarter FY21. TEG reviewed the piping modifications during the Second Quarter FY21 and is awaiting the scheduling of a review of the insulation work which is expected to take place during the Third Quarter FY21. TEG has also developed a solution to recover the condensate from 401 Union St. which will be re-visited as a separate project in the future.

15. DES177 – Manhole B1 Ladder and Platform

Manhole B1 is located in 1<sup>st</sup> Ave South and houses a groundwater sump pump to alleviate the amount of groundwater that infiltrates into Manhole B. Manhole B1 is a 4 ft diameter, precast manhole with individual embedded rung access ladder. Currently, personnel stand on partially submerged concrete blocks when maintenance is required within this manhole. This project addresses the installation of a platform and ladder for maintenance.

This project is awaiting approval from Metro.

16. DES178 – Manhole 5 Repairs

Manhole 5 has several structural steel piping supports which are corroded and need to be cleaned and coated. This project addresses the cleaning and coating of these components.

This project is awaiting approval from Metro.

17. DES179 – Manhole 11 Repairs

Manhole 11 has structural steel piping anchors/supports which are corroded and need to be cleaned and coated. This project addresses the cleaning and coating of these components.

This project is awaiting approval from Metro.

18. DES180 – State Tunnel Pipe Support Repairs

The State Tunnel has several steel piping supports which are corroded and need to be cleaned and coated. This project addresses the cleaning and coating of these components.

This project is awaiting approval from Metro.

19. DES181 – 3<sup>rd</sup> Ave Exploratory Excavation for a Chilled Water and Condensate Return Leak

A substantial inflow of chilled water was discovered infiltrating into Manhole D through an abandoned pipe wall penetration in the west wall of the structure. (Manhole D is located in 3<sup>rd</sup> Avenue, just north of James Robertson Parkway.) An exploratory excavation was approved to locate and repair this leak. The leak was found on a chilled water tapping sleeve just west of Manhole D. A partial isolation of the chilled water system was executed, and the leak was repaired. Upon completion of this repair, hot water was then discovered leaking into Manhole D through another pipe wall penetration. Approval was given to expand the exploratory excavation to include the area immediately south of Manhole D. Several holes due to corrosion were discovered in the condensate return piping immediately south of Manhole D. A section of the condensate return piping was replaced. It is expected that the cost substantiation for this work will be presented and reviewed during the Third Quarter FY21.

20. DES182 – Manhole B10 Expansion Joint Replacement

On the afternoon of January 7, 2021, CNE discovered some potential steam anchor movement in Manhole B9 and notified TEG. TEG reviewed this manhole the next morning and determined that the steam expansion joint in Manhole B10 was bound and caused some movement and damage to the anchors in Manholes B9 and B10. TEG returned to these manholes two business days later with a structural engineer. The structural engineer confirmed TEG's findings and is in process of preparing drawings to make repairs to both of these manholes. A new steam expansion joint is needed in Manhole B10 which has been ordered by CNE and is expected to arrive on or about February 5, 2021.

Both TEG and the structural engineer do not believe that there is any imminent danger of either of these anchors failing as long as the system status remains relatively constant. However, instructions have been conveyed to CNE to isolate this section of distribution piping under specific system upset conditions. This isolation would only affect the Music City Center (MCC).

With input from the structural engineer, TEG is preparing construction documents defining the replacement of the steam expansion joint and related repairs. Because of the urgency of this repair and the uncertainty of the entire scope, it is impractical to bid this repair work. Therefore, TEG will consult with CNE regarding the experience and availability of approved contractors. Upon selection of a contractor, a meeting will be scheduled to review the scope of work and develop an estimated schedule. The completion of the construction drawings and the meeting with the contractor should take place prior to the arrival of the new expansion joint. With knowledge from this meeting, CNE will schedule a meeting with MCC to inform them of the situation and review needed repairs. This meeting will also focus on scheduling repairs with the intent to complete necessary work with as little impact as possible to MCC. If an upset condition occurs that requires the isolation of this section of the distribution system, the repairs would need to take place immediately.

#### 21. DES183 – Hermitage Hotel Service Line Relocation

The Hermitage Hotel is installing a grease trap. This installation may require the relocation of the DES steam, condensate return and chilled water services to this building. TEG is discussing the situation with the Heritage Hotel’s contractor and once a design for the installation of the grease trap is finalized, the scope of this DES project will be determined.

#### B. Second Quarter FY21 Closed Projects

DES157 and DES159 were closed during the Second Quarter FY21.

#### 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	FY21 Spending to Date	Total Spent to Date	Remaining Balance
<b>Fund-49109</b>					
	Total Closed Projects	\$ 2,600,602	\$ -	\$2,600,602	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 5,314	\$ -	\$ -	\$ 5,314
	<b>Fund Total</b>	<b>\$ 2,605,916</b>	<b>\$ -</b>	<b>\$2,605,916</b>	<b>\$ (0)</b>
<b>Fund-49107</b>					
	Total Closed Projects	\$ 8,499,961	\$ -	\$8,499,961	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 39	\$ -	\$ -	\$ 39
	<b>Fund Total</b>	<b>\$ 8,500,000</b>	<b>\$ -</b>	<b>\$8,499,961</b>	<b>\$ 39</b>
<b>Fund-49116</b>					
DES111	DES CHP	\$ 168,706	\$ -	\$ 168,706	\$ -
DES133.1	NCC Blasting Issue	\$ 72,151	\$ 8,039	\$ 45,190	\$ 26,961
DES139	Options Review	\$ 211,250	\$ 179,401	\$ 315,651	\$ (104,401)
DES143	MH N1, N2 and S6 Insulation	\$ 1,700	\$ 679	\$ 2,114	\$ (414)
DES151	MH 23 Repairs	\$ 219,388	\$ -	\$ 219,388	\$ -
DES152	MH A & M Repairs	\$ 28,000	\$ 4,395	\$ 6,884	\$ 21,116
DES153	MH L Repairs	\$ 129,893	\$ 23,916	\$ 32,834	\$ 97,059
DES154	MH K Repairs	\$ 75,085	\$ 543	\$ 628	\$ 74,457
DES157	MH 9 Repairs	\$ 127,509	\$ 13,945	\$ 118,455	\$ 9,055
DES159	MH B2 Repairs	\$ 92,281	\$ 1,472	\$ 58,753	\$ 33,528
DES161	MH S6 Insulation	\$ 38,000	\$ -	\$ -	\$ 38,000
DES162	3rd and Molloy Service	\$ 120,885	\$ 26,210	\$ 142,095	\$ (21,210)
DES163	Parcel K Service	\$ 1,018,802	\$ -	\$ 1,302	\$ 1,017,500
DES168	1st and KVB Hotels	\$ 5,365,777	\$ -	\$ 5,777	\$ 5,360,000
DES169	MH-20 Repairs	\$ 17,500	\$ 16,827	\$ 32,015	\$ (14,515)
DES171	Broadway Tunnel Support Repair	\$ 268,907	\$ 28,771	\$ 58,928	\$ 209,979
DES172	Viridian Pipe Support Repair	\$ 190,128	\$ 8,041	\$ 26,919	\$ 163,209
DES173	MH-B3 Structural Repair	\$ 31,823	\$ 43,553	\$ 45,377	\$ (13,553)
DES174	7th Ave Pipe Support Repairs	\$ 160,534	\$ 8,902	\$ 29,437	\$ 131,098
DES175	MH4 Condensate Repair	\$ 118,090	\$ 12,465	\$ 18,805	\$ 99,285
DES176	Condensate Leak at MH9	\$ 75,000	\$ 125,331	\$ 125,946	\$ (50,946)
DES177	MHB1 Ladder & Platform	\$ 45,500	\$ 2,335	\$ 2,335	\$ 43,165
DES178	MH-5 Repairs	\$ 97,500	\$ 3,756	\$ 3,756	\$ 93,744
DES179	MH-11 Repairs	\$ 58,500	\$ 3,892	\$ 3,892	\$ 54,609
DES180	State Tunnel Support Repairs	\$ 140,000	\$ 282	\$ 282	\$ 139,719
DES181	3rd Ave Leak Repair	\$ 140,000	\$ 1,913	\$ 1,913	\$ 138,087
	Total Closed Projects	\$ 615,678	\$ 97	\$ 615,775	\$ (97)
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$16,371,413	\$ -	\$ -	\$16,371,413
	<b>Fund Total</b>	<b>\$26,000,000</b>	<b>\$ 514,766</b>	<b>\$2,083,155</b>	<b>\$23,916,845</b>

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

Several EDS repairs and improvements were made during the Second Quarter. The principal 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 \$175,826. Table 6 provides a summary of the FY21 expenditures and revenues to date associated with the R&I budget.

**Table 6. FY21 Repair and Improvement Expenditure and Revenue Summary**

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Balance
<b>Value at end of FY20</b>				<b>\$ 211,925.09</b>		<b>\$ 139,389.03</b>
CNE July 2020 R&I	12/7/2020	DES-2391	CNE	\$ 1,585.35		
CNE Aug 2020 R&I	12/7/2020	DES-2389	CNE	\$ 3,709.28		
CNE Sept 2020 R&I	11/30/2020	-	CNE	\$ 6,105.10		
			<b>Sub-Total First Quarter</b>	<b>\$ 11,399.73</b>	<b>\$ 72,258.34</b>	<b>\$ 200,247.64</b>
CNE Oct 2020 R&I	12/15/20	-	CNE	\$ 5,283.66		
CNE Nov 2020 R&I	12/16/20	-	CNE	\$ 5,343.65		
DES 171 BW Tunnel	12/16/20	-	CNE	\$ 93,660.00		
DES159.1 MHB2	12/16/20	-	CNE	\$ 4,313.55		
CNE Dec 2020 R&I	01/20/21	-	CNE	\$ 9,837.57		
			<b>Sub-Total Second Quarter</b>	<b>\$ 118,438.43</b>	<b>\$ 73,691.66</b>	<b>\$ 155,500.87</b>
			<b>Sub-Total Third Quarter</b>	<b>\$ -</b>	<b>\$ 24,325.00</b>	<b>\$ 179,825.87</b>
			<b>Sub-Total Fourth Quarter</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 179,825.87</b>
			<b>FY21 Year to Date</b>	<b>\$ 129,838.16</b>	<b>\$ 170,275.00</b>	<b>\$ 179,825.87</b>

### B. Preventive Maintenance

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

1. EDS Manhole/Tunnel Inspections
  - a. The monthly vault/tunnel reviews were conducted as scheduled.
  - b. Several of the vaults continue to require pumping due to the accumulation of either groundwater or surface run-off.
  - c. CNE continues to fabricate and replace trap assemblies within the EDS.
  - d. CNE has been cleaning areas of minor corrosion and then painting those areas with a cold galvanizing paint. If maintained, this should help alleviate the progression of some areas of corrosion.
2. Customer metering station calibration checks were completed as scheduled.

3. Water chemistry samples at customer buildings were taken as scheduled.
4. Other EDS items are included in the CNE monthly reports.

C. Emergencies

There were no emergencies reported during the quarter.

D. EDS Walkthrough

This quarter's walkthrough was divided over several dates due to ongoing capital and repair projects. Reviews were conducted on October 22 and November 2, 3, 9, 10 and 16, 2020. The manholes that were visited include Manholes B1, B2, B3, B4, B6, B7, B8, B9, B10, 14A, 16A, 22B, Viridian, S4A, and U. The following comments and observations are a result of these visits:

1. Manhole B1

- a. This is a sump pump manhole located in 1<sup>st</sup> Avenue South to the west of Manhole B. It was constructed a few years ago to reduce the amount of groundwater infiltration in Manhole B.
- b. The ladder in this manhole is comprised of individual rungs embedded in the manhole concrete wall. Our experience with these ladders is that an individual rung might fail without warning. Therefore, this ladder should be replaced with a siderail type ladder. TEG will coordinate with CNE to have this replacement scheduled.
- c. There is not a working platform in this manhole to enable maintenance personnel to maintain the sump pump and its controls. A working platform should be added to this manhole. TEG will coordinate with CNE to have this platform installed.
- d. The union on the sump pump discharge piping was leaking during this review. CNE personnel repaired this fitting during this review.

2. Manhole B2

- a. This manhole has an electric sump pump. However, the sump is not deep enough to enable the removal of all water before the level control stops the pump. As a result, there is always a small amount of water in the floor of this manhole. TEG investigated deepening this sump to eliminate this problem, but a well point needs to be installed to prevent the groundwater from flooding the manhole. The addition of a well point would add substantially to the construction cost, so this idea was abandoned.
- b. The piping support steel in this manhole was recently cleaned and coated to eliminate corrosion. The new coating has some minor cracking. TEG notified the coating representative of this and the coating manufacturer has agreed to repair these areas of cracking under warranty. CNE should monitor the structural steel coatings and report any additional degradation to TEG.

- c. The interior concrete surfaces were recently repaired and patched. CNE should monitor the concrete surfaces and report any degradation to TEG.
  - d. The western steam penetration pre-insulated piping end can was badly corroded and allowing groundwater to enter the manhole. This penetration was repaired using Enecon products to rebuild the end can and then form a “donut” around the penetration with an Enecon hydraulic cement material. There is a small hairline crack in this cement that Enecon has agreed to repair under warranty. CNE should monitor this penetration and report any degradation to TEG.
  - e. The insulation was removed from the steam isolation valve next to the western steam wall penetration which was repaired. This insulation will not be repaired/replaced until the wall penetration repair has been monitored and it is determined that the repair was effective.
3. Manhole B3
- a. There was not any water present in this vault.
  - b. DES-173 was completed just prior to this review. This project addressed the need to clean and coat the piping support structural steel and patching/repair of the concrete surfaces.
  - c. There is some minor insulation repair needed in this vault which CNE is going to address as part of their expanded responsibilities under Amendment 2 of the revised contract with the City.
4. Manhole B4
- a. There was water present in this manhole, and it required pumping prior to entry.
  - b. There is some corrosion of the structural components in this manhole. CNE personnel has cleaned and applied cold galvanizing paint to some components in this manhole and did some additional cleaning and painting of these components during this review. CNE should continue to monitor these components and clean/paint them as needed. However, these structural components need to be professionally cleaned and coated to prevent additional corrosion/degradation. TEG will prioritize this work with the other corrosion repair/prevention needs within the system.
  - c. Most of the insulation in this manhole needs to be repaired/replaced; TEG will prioritize these repairs with the other insulation repair needs within the system.
  - d. There are several hairline cracks in the ceiling of this vault; CNE should monitor these cracks report any significant changes to TEG.
  - e. Some of the foam sealant used at the piping wall penetrations has shrunk and “pulled away” from the penetration holes. Currently, no groundwater is leaking through any of these penetrations. TEG will coordinate the repair of these seals with CNE. Until they are repaired, CNE should continue to monitor these seals and report any changes to TEG.
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5. Manhole B6
    - a. There was water present in this manhole, and it required pumping prior to entry.
    - b. Some minor deterioration of the grout behind the anchor beam baseplates has occurred. CNE should monitor this and report any significant deterioration to TEG.
    - c. There was a small amount of mud in the manhole floor that was removed by CNE personnel during this review.
    - d. There is some corrosion on the steel components within this manhole. CNE has cleaned and painted these areas with cold galvanizing paint. CNE should continue to monitor these components and clean/paint them as needed.
    - e. The trap piping stanchion support has corroded and failed. The trap piping is close to the southern manhole wall. A new wall bracket can be added to support the pipe which would not be subject to the groundwater accumulation in the manhole floor. TEG will coordinate this repair with CNE.
    - f. The trap was recently replaced by CNE.
    - g. There is some hairline cracking of the concrete. CNE should monitor this cracking and notify TEG of any significant changes.
  
  6. Manhole B7
    - a. There was water in this manhole, and it required pumping prior to entry.
    - b. Some minor amounts of mud and debris was removed from this manhole during this review.
    - c. CNE repaired the insulation on the sparge tube which was noted in the prior quarterly report.
    - d. Some deterioration of the grout behind the anchor beam baseplates has occurred and this grout needs to be replaced. TEG will coordinate this repair with CNE.
    - e. There was some corrosion on the anchor beam support in this manhole. These areas were cleaned and painted by CNE personnel during this review. CNE should continue to clean/paint the structural steel as needed.
    - f. There was some corrosion on the entry ladder. CNE cleaned and painted the ladder during this review. CNE should continue to clean/paint this ladder as needed.
    - g. The trap was recently replaced by CNE.
  
  7. Manhole B8
    - a. There was water in this manhole, and it required pumping prior to entry.
    - b. There are some hairline cracks in the ceiling; these should be monitored by CNE and any significant changes reported to TEG.
    - c. Some deterioration of the grout behind the anchor beam baseplates has occurred and some portions of the grout is missing. TEG will coordinate with CNE to have this grout repaired/replaced.
    - d. There was dirt covering the steam and condensate slip joint welds to the anchor beams. CNE personnel removed the dirt and discovered corrosion on
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- these welds. These welds and other corroded portions of the anchor beam were cleaned and painted by CNE personnel during this review.
- e. The isolation valve downstream of the trap is missing its handwheel. CNE has searched for a suitable replacement handwheel but has not located one that will fit. CNE should continue to search for a replacement handwheel; if a suitable replacement cannot be found, the valve should be replaced.
  - f. The strainer downstream of the trap does not have a blowdown valve. CNE should install a blowdown valve on this strainer.
8. Manhole B9
- a. There was water in this manhole, and it required pumping prior to entry.
  - b. There are some hairline cracks in the ceiling of this vault. CNE should monitor these cracks and report any significant changes to TEG.
  - c. Some deterioration of the grout behind the anchor beam baseplates has occurred and some portions of the grout is missing. TEG will coordinate with CNE to have this grout repaired/replaced.
  - d. There is some corrosion on portions of the anchor beam support in this manhole. These areas were cleaned and painted by CNE personnel during this review.
  - e. The union upstream of the trap was leaking. CNE personnel were able to stop the leak during this review, however CNE reported that the union has leaked previously. This union may need to be replaced if this leak re-occurs.
9. Manhole B10
- a. There was water in this manhole, and it required pumping prior to entry.
  - b. Some deterioration of the grout behind the anchor beam baseplates has occurred and some portions of the grout is missing. TEG will coordinate with CNE to have this grout repaired/replaced.
  - c. CNE has cleaned and painted areas of corrosion on the structural steel. CNE should continue to monitor the steel and clean/paint it as needed.
  - d. There are some hairline cracks in the ceiling of this vault. CNE should monitor these cracks and report any significant changes to TEG.
10. Viridian Manhole
- a. There was a lot of water in the manhole and it required pumping prior to entry.
  - b. There are insulation and insulation jacketing repairs needed in this manhole. TEG will coordinate having these repairs take place with CNE.
11. Manhole 14A
- a. There was water present in this manhole, and it required pumping before entry.
  - b. This manhole is no longer in service. It is located on Charlotte Ave between 3<sup>rd</sup> and 4<sup>th</sup> Avenue. It is reviewed annually to make sure that the structure is sound. The main manhole houses abandoned steam and condensate return
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- piping. There are two smaller manholes west of the main manhole which house abandoned chilled water supply and return piping isolation valves.
- c. There is a large amount of mud in the floor of the main manhole.
  - d. No action is required.
12. Manhole 16A
- a. There is some minor corrosion on the shear lugs attached to the chilled water piping. These shear lugs will be removed under DES-172.
  - b. New chilled water pipe supports will be added to this manhole under DES-172 to replace badly corroded pipe supports in the 4<sup>th</sup> Ave Tunnel below.
13. Manhole 22B
- a. The end can on the steam service piping to the Library has corroded and the end plate is partially detached from the can. Groundwater is leaking into the manhole from the steam piping casing. At times, secondary steam from this groundwater infiltration is wafting from the damaged end can inside the manhole. The buried steam piping just outside of this manhole needs to be excavated and any breaches in the outer casing need to be repaired. A complication to this excavation is that there is a steam anchor in this area. TEG will evaluate what repair remedies are available. Once the breach in the buried steam piping casing is repaired, the end can be repaired.
  - b. There is some insulation repair needed in this vault. TEG will coordinate these needed repairs with CNE.
  - c. New chilled water pipe supports will be added to this manhole under DES-174 to replace badly corroded pipe supports on these pipes in the 7<sup>th</sup> Ave Tunnel below.
  - d. Some of the grating around the pipe penetrations in the floor is corroded and the grating support beams also have some corrosion present. DES174 addresses these issues.
14. Manhole S4A
- a. There was not any water present in this manhole.
  - b. The concrete sidewalk above this manhole was recently replaced. As a result of this replacement, some of the brick spacers that support the manway frames have become dislodged. CNE should monitor this condition and report any changes to TEG. TEG will coordinate the repair of these frame supports with CNE.
  - c. There are hairline cracks in the walls of this manhole. CNE should monitor these cracks and report any significant changes to TEG.
  - d. There is some minor spalling of the concrete walls in this manhole. CNE should monitor this spalling and notify TEG of any significant changes.
  - e. CNE recently replaced the trap in this manhole; this work involved the removal of insulation from the trap piping. Because the uninsulated pipe is not extensive and does not pose an immediate hazard to CNE personnel, and

because it is desirable for the condensate to cool as much as possible before entering the condensate main, this piping can remain uninsulated.

15. Manhole U

- a. There was a small amount of water present in this manhole.
- b. One of the manway lids was dislodged and broke in half at some point in the past and vehicular traffic rode over the open manway, hitting and damaging the access ladder. In addition, the lower rung of the ladder has failed due to corrosion. TEG will coordinate with CNE to furnish/install a new access ladder.
- c. Because of groundwater infiltration into this manhole, secondary steam results and the roadway area above this manhole remains hot. This heat has caused settlement and some depression of the asphalt above the manhole and may result in damage to one, or both, of the manway lids/frames. CNE should monitor this condition and report any significant changes to TEG.
- d. The condensate return piping that passes through this manhole began leaking 3 years ago so a repair clamp was installed. This repair clamp was not leaking during this review. CNE should continue to monitor this clamp and report any leaks/changes to TEG.

**Action Items**

Action items from the above walkthrough 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 and prominent existing customer interactions. The topics of interactions, meetings and training seminars with the customers are also discussed. There are currently 29 customers, comprised of 42 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 design of the two proposed hotels at 1<sup>st</sup> Ave S and KVB have been placed on hold. TEG will continue to remain in contact with the engineering team. This project is tracked under DES168.

The architect for Lot K reported that they remain interested in DES service but are continuing to work through a revised building plan. Additional discussions for receiving DES service are anticipated in the coming months.

TEG remained in contact with the potential customer at 333 Union St. This small boutique hotel is currently in the design phase but demolition and renovation work on the property began during the quarter. This development remains on hold pending approval of financing from the developer.

Discussions with the entities involved in the construction of an apartment complex to be constructed north of Gay St near 2<sup>nd</sup> Ave North continued during the quarter. At this time, it appears the development team has elected to proceed with the project not using DES chilled water.

Another potential customer is a proposed hotel to be located near Peabody and 8<sup>th</sup> Ave S. Although initial discussions with this potential customer were favorable, it is believed that progress on this development has slowed due to the pandemic.

#### 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.

- ) Several customers made repairs within their buildings during the Quarter and requested assistance from CNE, which was provided. Some of these repairs involved isolating the steam or chilled water services to the building for the customers.
- ) CNE was informed by the CJC's (DCSO) building personnel that their safety relief valve was lifting on their heat exchanger. After investigating the issue, CNE reported that a bypass valve had been opened inadvertently. Once the valve was closed, the system returned to normal operation.
- ) CNE coordinated and scheduled the partial and full system shutdowns with all of the customers during the quarter.
- ) The condensate return system experienced high hardness levels during the quarter. Condensate return samples were taken at several of the DES customers in order to determine the source of the hardness. CNE concluded that the condensate return from 4<sup>th</sup> Ave N had high hardness levels and that condensate from several of the customers also had high hardness levels.
- ) CNE responded to a failure in the PRV for the State steam loop in the Andrew Jackson building. They noted that the breaker serving the DES air compressor had tripped. Once the unit was re-started, the PRV began working again and the system pressure returned to normal.
- ) Other minor issues and customer interactions are noted in the monthly reports from CNE.

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## VII. Recommendations

CNE is obligated to meet the standard of good utility practice as required by the ARMA. In TEG's opinion, CNE needs to continue to improve the operations of the EGF to ensure compliance with the ARMA; however, they have improved in their maintenance of the EDS in the Second Quarter. Based on the review of the Second Quarter FY21 EGF and EDS operations, the following recommendations are made.

- ) CNE needs to address the maintenance and repair items included in the EGF and EDS Walkthrough sections of this report as soon as possible.
- ) Although CNE had performed some of the previously noted work on the cooling towers, they need to complete the remaining items and work towards restoring the chiller plant efficiency and water usage to its historic values.
- ) CNE needs to address their inability to meet the new performance guarantees for the EGF. Failure to meet the performance guarantees for twelve consecutive months may be considered an Event of Default according to section 18.02 (4) of the ARMA.
- ) CNE needs to improve the overall cleanliness and orderliness of the EGF.
- ) Corroded structural steel within the vaults and tunnels should be cleaned and coated and/or repaired/replaced.
- ) Insulation that is absent or in disrepair in the vaults and tunnels should be repaired/replaced through Amendment 2 of CNE's contract or through capital and R&I projects.
- ) Steam traps which need repair or replacement should be addressed as soon as possible.
- ) Expansion joint leaks should be repaired by either re-packing the joint or injection of a sealant once the leak(s) is sufficient for the repair to be effective.
- ) CNE should continue to remove debris and mud from manholes.