

Operations Monitoring Report

First Quarter FY24

Prepared by:

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I. Executive Summary

A review of the fiscal year 2024 (FY24) First Quarter performance and contract obligations between Constellation Energy Solutions, LLC. (CES) 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 is also presented.

During the First Quarter FY24, CES improved the performance of the EGF resulting in consistently meeting the chilled water-electric, steam-fuel, and the steam-electric guarantees for the quarter. However, CES did not meet the chilled water-water and steam-water guarantees. CES is required to meet this performance criteria each month in accordance with Paragraph 8.d of Amendment 2 of the Amended and Restated DES Management Agreement (ARMA) between Metro and CES and Section 18 of the ARMA. CES has made operational changes and other improvements to the DES over the past few years which have resulted in improvements to the facility and increased efficiencies. CES and TEG continue to monitor the efficiency and performance of the DES looking for means of improving the system.

For the First Quarter FY24, the chilled water sales decreased 3.8% over the previous First Quarter (FY23). The chilled water sendout also decreased 3.8% over the previous First Quarter. However, the system losses increased only 3.1%. The number of cooling degree days decreased 5.6%. The peak chilled water demand for the current quarter was 19,372 tons, which is 5.5% higher than the previous First Quarter. The reported increase in peak chilled water may be due to meter inaccuracies which CES and TEG investigated during the quarter.

Steam sendout for the current quarter decreased marginally over the previous First Quarter with steam sales decreasing 3.4%. This decrease came with a decrease in heating degree days due to an unseasonably warm September. Total steam system losses increased 8.4% from the previous First Quarter. The peak steam demand for the current quarter is 45,937 pounds per hour, which represents a decrease in the previous First Quarter demand of approximately 23.9%.

Work continued with the DES Capital and Repair & Improvement Projects during the First Quarter. Repair and Improvements to the EDS continue as scheduled. Of the eighteen open projects, CES currently is not involved in eight. Of the remaining ten projects, five are nearing completion. As noted in prior quarterly monitoring reports, the postponement or deferral of some 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 DES211, DES212 and DES213 have been added. Projects DES178, DES180, and DES200 were closed during the quarter.

The current fiscal year system operating costs to date are \$6,321,474. This value represents approximately 28.5% of the total budgeted operating cost for FY24 and includes the First Quarter Self-Funded Debt Service Payments which are believed to have been paid but have not been confirmed as of the date of this report. The customer revenues from the sales of steam and chilled water for FY24 are \$5,599,482 (25.7% of budgeted amount) which includes the annual true-up amount for FY23 and other miscellaneous revenue sources. Although not confirmed at the time of



this report, the First Quarter Metro Funding Amount (\$96,100; 25% of budget) has been transferred. The actual MFA can only be estimated due to outstanding invoices as of the date of this report.

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II. Energy Distribution Sales and Performance

A. Chilled Water

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

1. Sales and Sendout

A comparison for the First Quarter chilled water sales is shown in Figure 1. This data reflects a 3.8% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

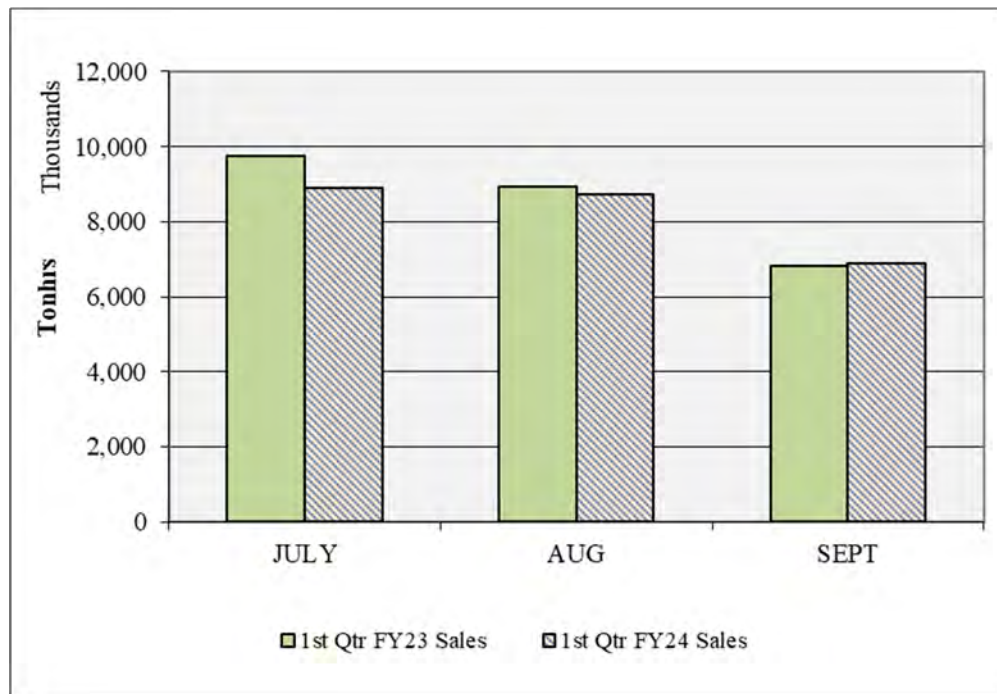


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 19,372 tons, which represents a 5.5% increase over the previous First Quarter. Upon review of the customer meter data for June, July, and August 2023, a more significant difference between the simultaneous chilled water demand as measured by the customer billing meters and that of the sendout meter at the EGF. A portion of this difference may be represented by the system losses, but the difference in the meter readings was considerably higher in August than in previous months. The difference may be attributable to an inaccuracy with the EGF sendout meter. TEG and CES continue to investigate this issue.

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 were 5.6% lower in FY24 than in FY23 and are tracked for comparison.

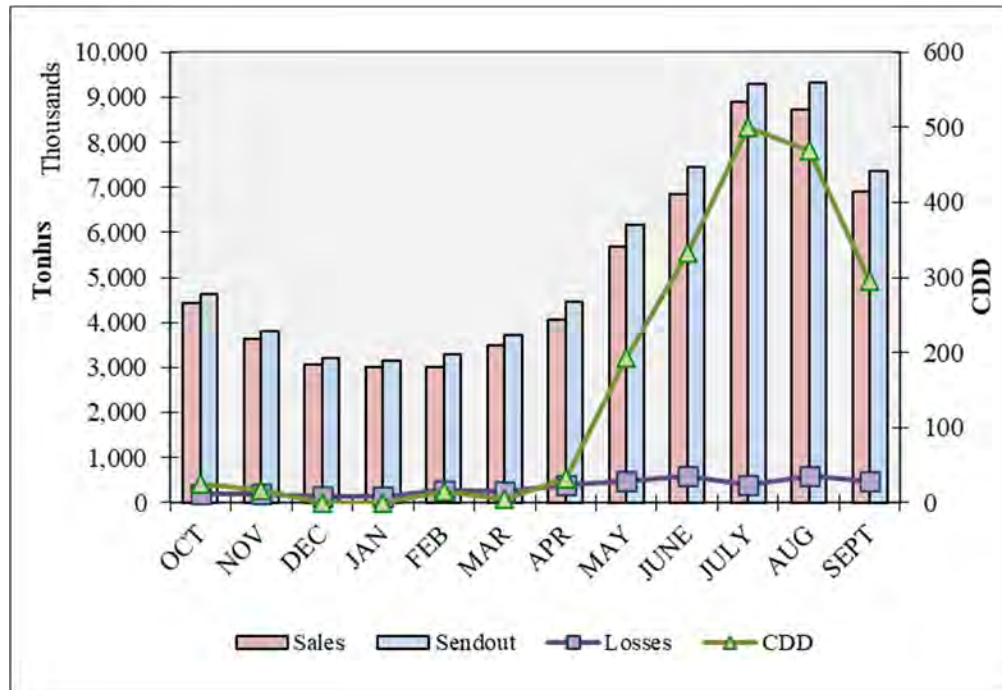


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A significant increase in the chilled water energy losses previously noted for the Fourth Quarter FY23 was determined to be related to an issue with the chilled water meter at the Bridgestone Arena. This issue was resolved prior to the First Quarter. 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 and may reflect differences in the meter accuracy between the EGF sendout meter and the customer meters.

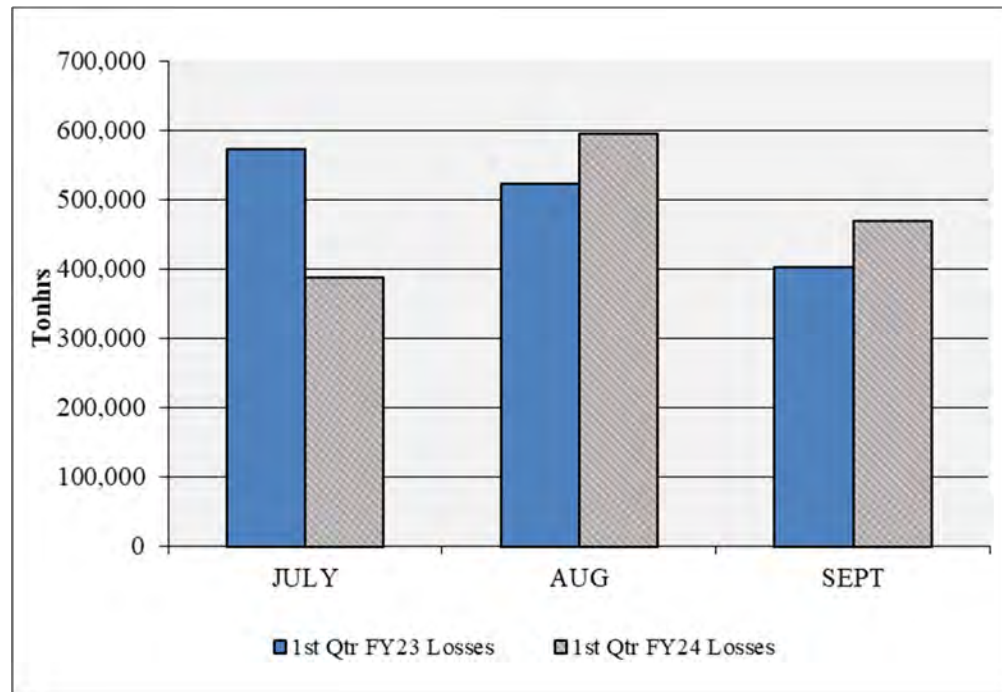


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased by 158.5% over the previous First Quarter as the average daily make-up amounts continue to increase. TEG and CES suspect another leak in 5th Ave N, but previous efforts to locate the actual source of the leak have been unsuccessful. TEG and CES are continuing to monitor the EDS make-up and investigate any potential leaks. If the location of an additional leak is discovered, DES will address the issue promptly.

The make-up to the cooling towers decreased 5.1% over the previous First Quarter. The water usage in the cooling towers is typically proportional to the production of chilled water and should vary with chilled water sales, thus the decrease in cooling tower make-up would be expected with a decrease in sales. The total chiller plant water use decreased 2.5% over the First Quarter FY23. The overall city water make-up comparison for the chilled water system First Quarter is shown in Figure 4.

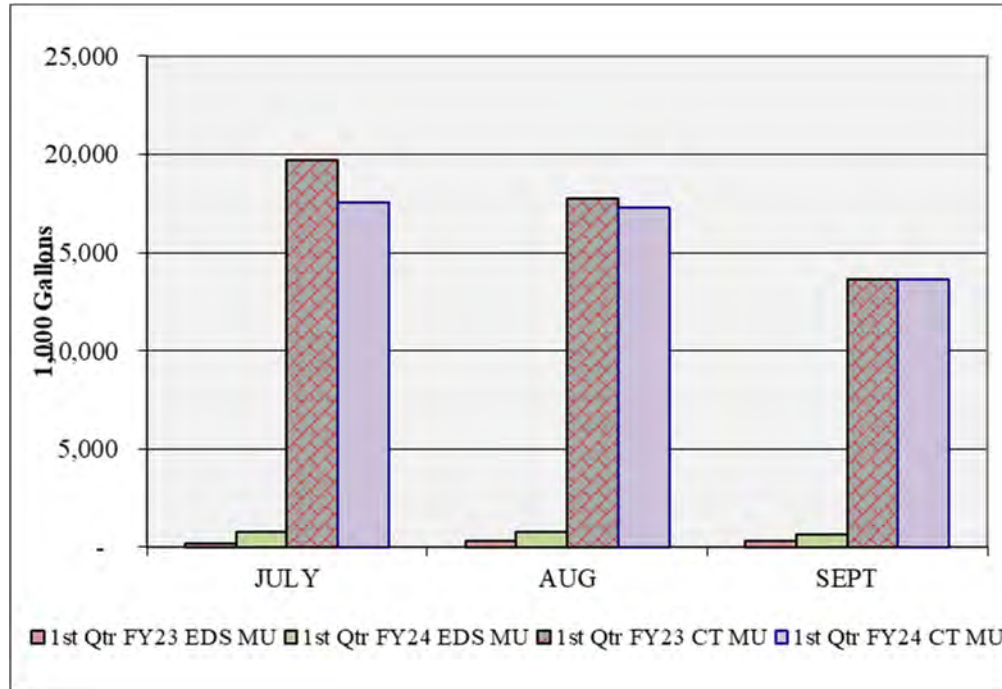


Figure 4. Chilled Water System City Water Usage Comparison

Beginning in March 2023, CES and TEG began monitoring the cooling tower blowdown ratio in earnest. The relationship between the cooling tower blowdown and the chilled water production should be consistent and tracking this relationship may prove helpful in reducing the chiller plant water usage. CES has made operational changes with respect to this metric with the expectation of reducing the water usage and improving their performance relative to the chilled water-water guarantee. When a comparison is made between the First Quarter FY24 and FY23, the ratio decreased 12%. This metric will continue to be tracked and monitored to verify operational changes made by CES at the EGF have resulted in a decrease in chiller plant water usage. Figure 5 shows the comparison of this metric for the First Quarter.

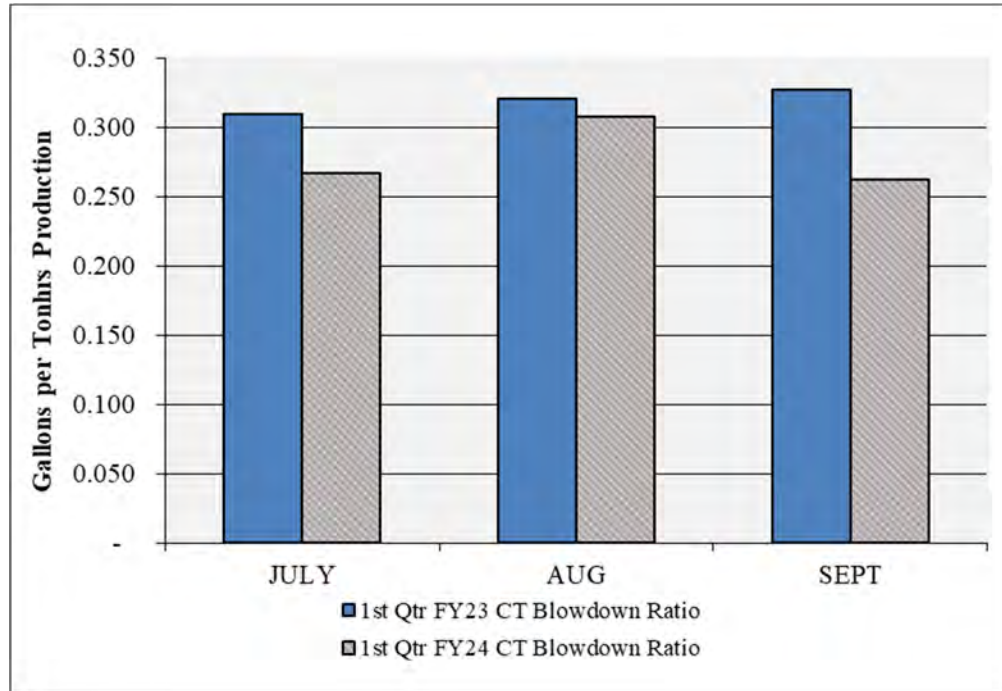


Figure 5. Cooling Tower Blowdown Ratio Comparison

3. Performance

The performance of the chilled water portion of the EGF is presented in the following two charts, Figures 6 and 7, for the previous twelve months. The System Performance Guarantee levels as described in Amendment 2 of the ARMA were consistently achieved for the chilled water-electric for each month of the First Quarter. The chilled water-electric guarantee has also been met for the previous twelve months. The chilled water-water guarantee was not met during the quarter. The values represented below do not include the annual true-up adjustment which occurred in the First Quarter FY24.

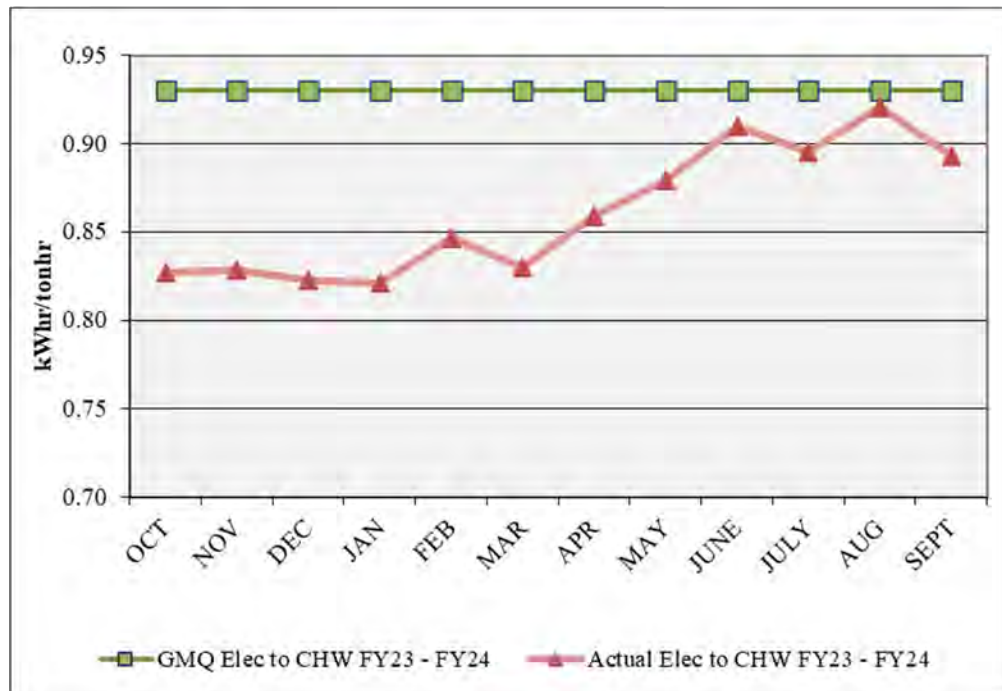


Figure 6. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

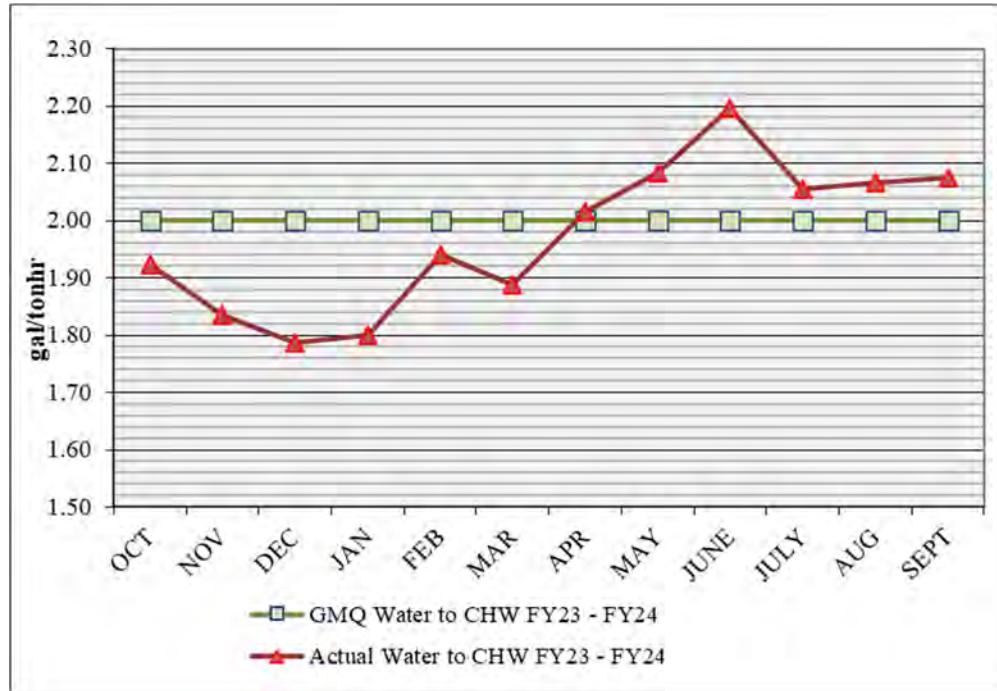


Figure 7. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

The chilled water allocation of the electric consumption falls under the GMQ limit of 0.93 kWhr per tonhr for the current quarter on average with no excursions reported for the current fiscal year. The electric usage per unit of sales increased 2.2% over the previous First Quarter. The increase in the average value of the metric for this quarter may be attributable to the performance of the cooling towers and the warmer-than-usual September. CES and TEG continue to monitor the improvements created by CES’s operational changes.

The total consumption of city water for the chiller plant for the current quarter has decreased over the previous First Quarter due largely to a decrease in chilled water sales. The water conversion factor for the chiller plant increased by 1.4% (on average) over the First Quarter FY23. The guaranteed value was not met in each month of the First Quarter.

B. Steam

1. Sales and Sendout

The steam sendout decreased by approximately 0.4% over the previous First Quarter (FY23), and the sales decreased 3.4%. There were no heating degree days during the quarter due largely to a warmer-than-normal September. The steam system losses increased 8.3%, and the relative amount of condensate return decreased 5.4% during the quarter due to dumping condensate at several customer

buildings and in MH-18 for the work associated with DES198. The peak steam demand for the current quarter was 45,937 pph, which reflects a 23.9% decrease in the peak steam production over the previous First Quarter. A comparison for the First Quarter steam sales is shown in Figure 8.

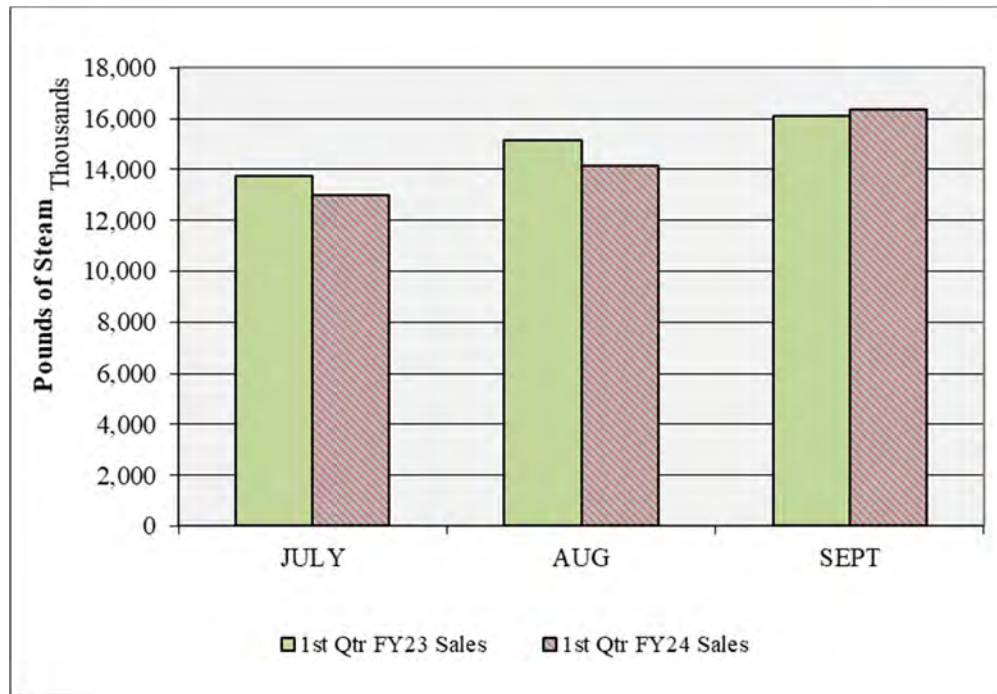


Figure 8. Steam Sales Comparison

Figure 9 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.

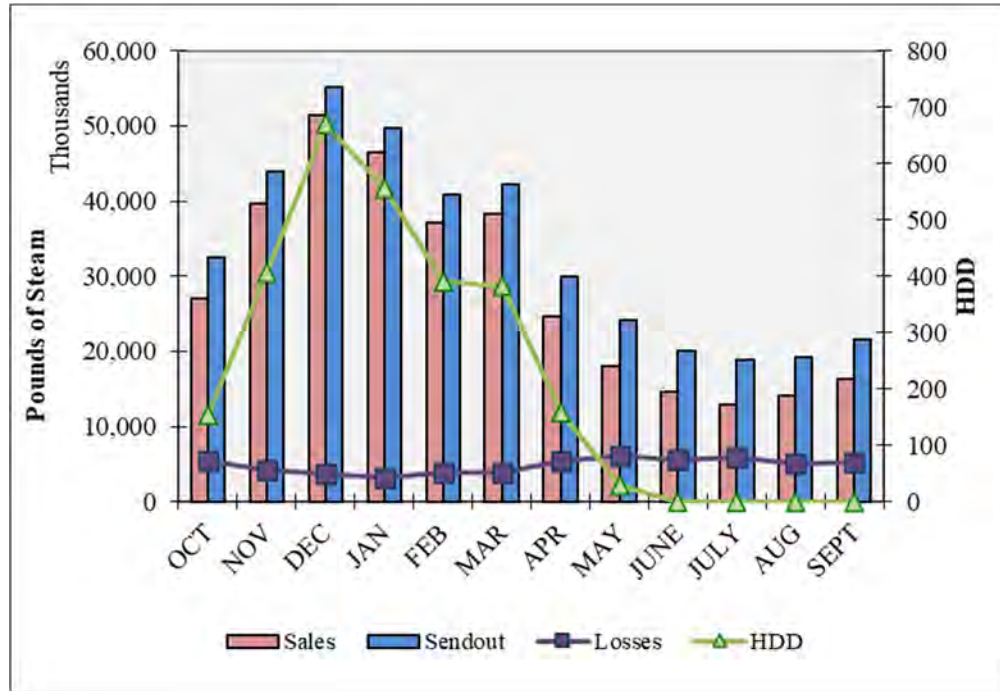


Figure 9. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the First Quarter is shown in Figure 10. 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 percentage of system losses can be expected to increase since most of these losses are based on a near constant heat loss of the system.

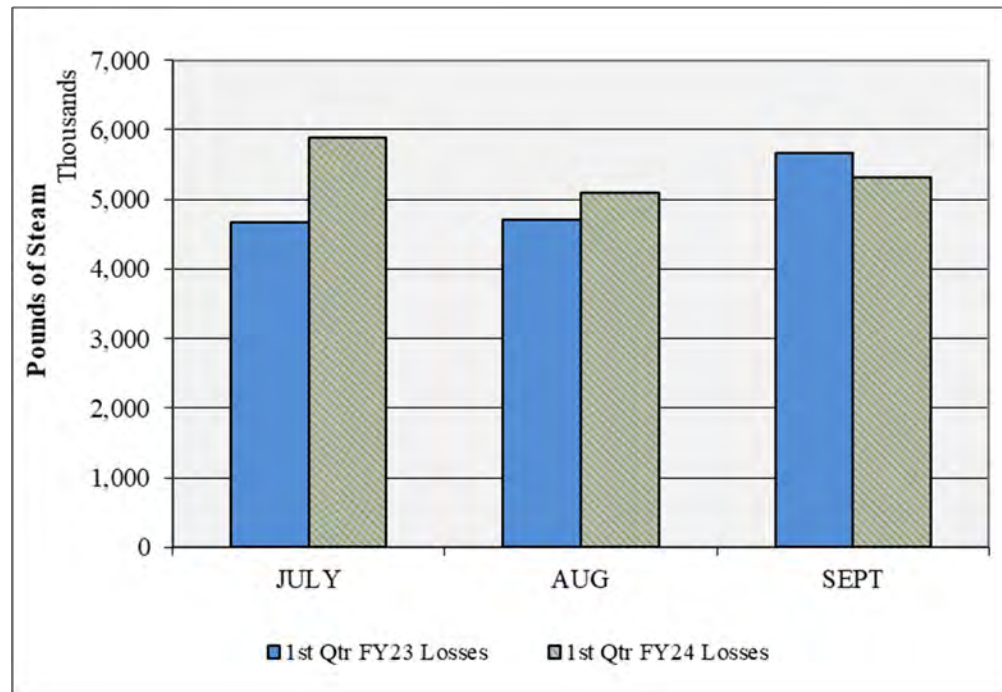


Figure 10. Steam System Losses

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 make-up to the steam system increased 20.8% over the First Quarter FY23. The condensate returned from several customers had to be dumped during the quarter for higher than acceptable levels of iron or hardness. In addition, the condensate was dumped at MH-18 due to work associated with DES198. The corresponding data for steam system make-up is shown in the comparison of First Quarter data in Figure 11.

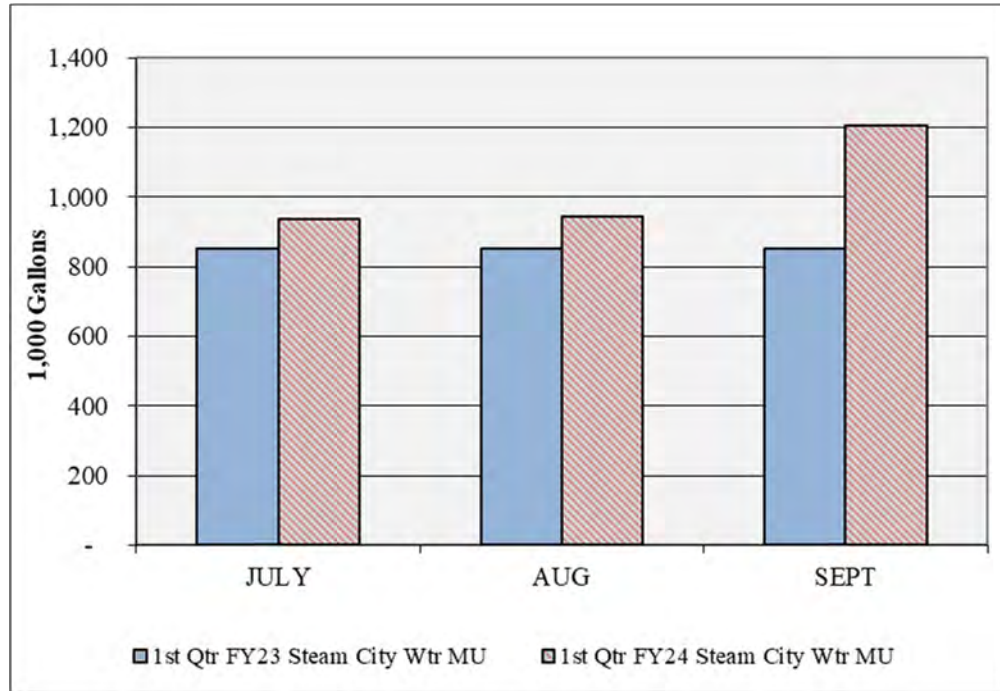


Figure 11. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system of the EGF is presented in the following three charts, Figures 12, 13 and 14. The values represented below do not include the annual true-up adjustment which occurred in the First Quarter FY24.

The steam electric conversion factor was met each month of the quarter. The steam plant electric consumption for the current quarter was 2.2% lower in FY24 than in FY23. The steam-electric metric increased 1.8% over the previous First Quarter. The monthly steam-to-electric conversion factors, along with the guaranteed values, are shown in Figure 12.

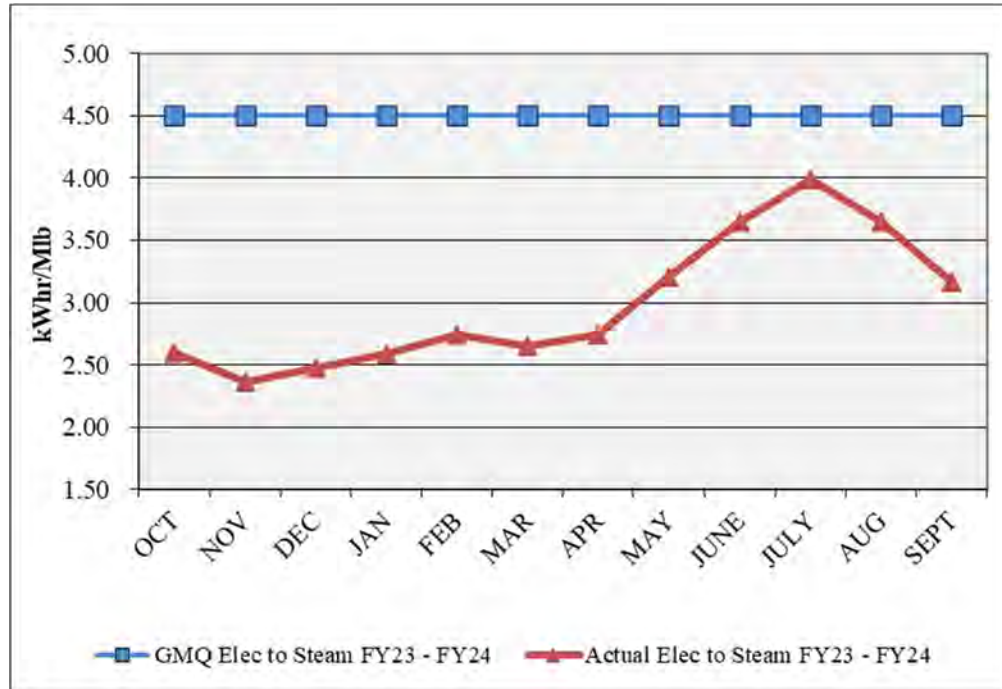


Figure 52. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

The steam water conversion factor exceeded the guaranteed values for each month in the quarter by magnitudes ranging from approximately 8% to 35%. TEG monitors CES’s performance regularly and will continue to report any non-compliance in the EGF’s operation. The steam water conversion factors are shown in Figure 13.

CES and TEG continue to monitor the performance of the EGF as CES makes efforts to improve the DES performance. The guaranteed steam-water performance value is based on an equation which incorporates the amount of steam sendout and condensate return and did not change with the adoption of the new performance values in Amendment 2. CES has verified the accuracy of the meter readings and continues to review the operation.

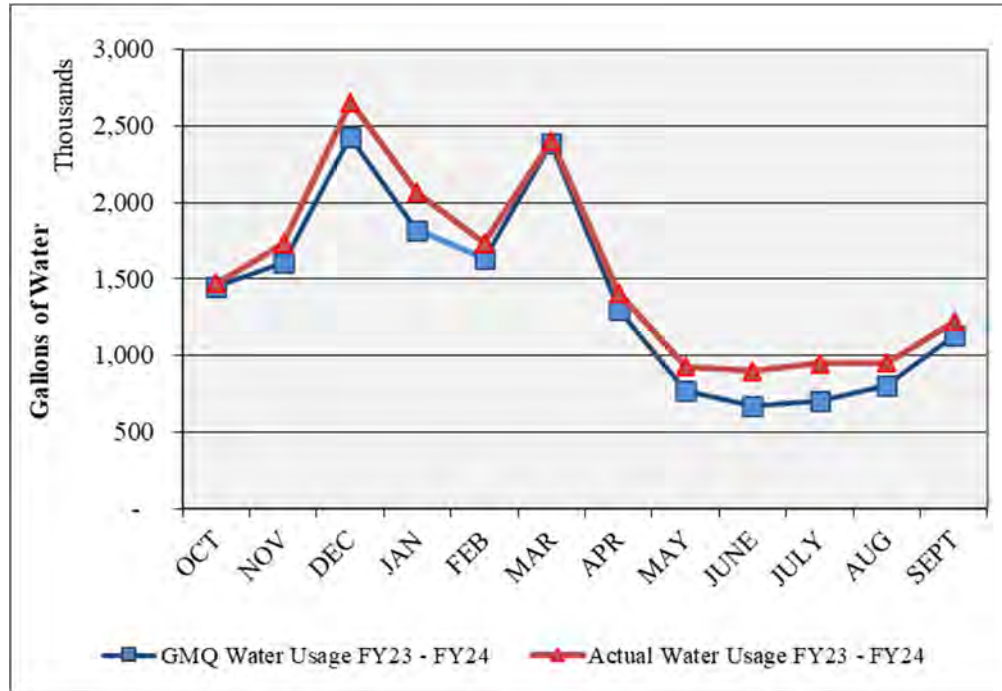


Figure 13. Steam Plant Water Performance Guarantee for the Previous Twelve Months

The steam fuel conversion factor met the guaranteed values for each month in the quarter. The fuel consumption per unit of steam sendout increased 0.6% over the previous First Quarter. The relative amount of condensate return is shown on this graph to reflect the influence that the condensate return has on the plant efficiency. Although the performance level for this metric changed with the adoption of Amendment 2, the equation used to calculate the value relies heavily on readings from the condensate return and steam sendout meters. Figure 14 shows the performance of the conversion factors for the previous twelve months.

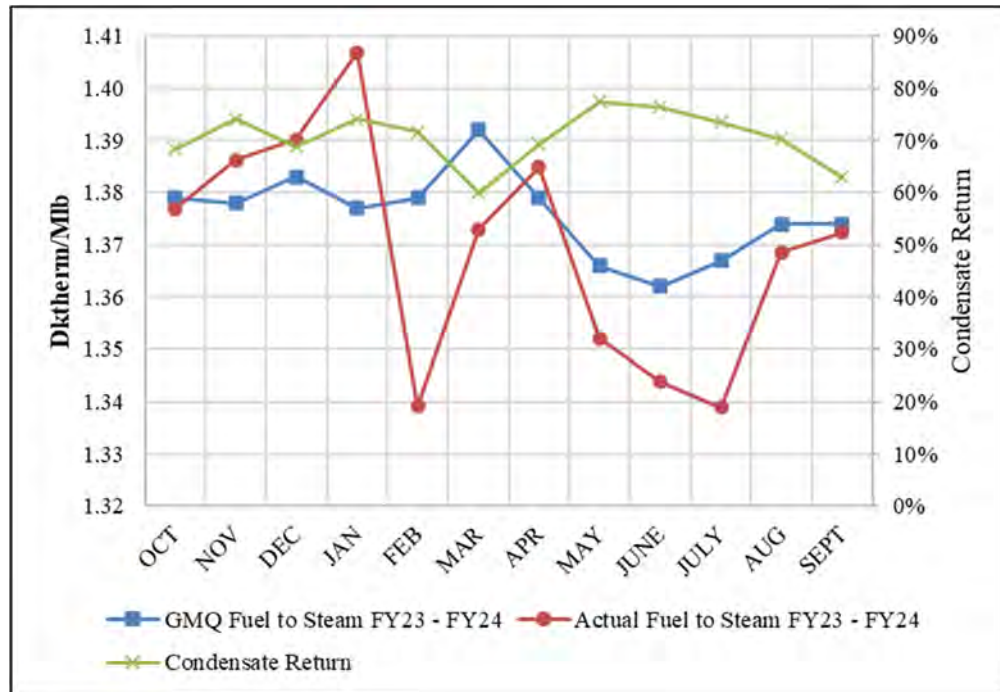


Figure 64. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

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) or System Performance Guarantees of the criteria commodities (fuel, water, and electricity).

Table 1. First Quarter FY24 Production, Sales, and Consumption Summary

Item	Unit	First Quarter FY24	First Quarter FY23	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	22,334,406	22,707,264	-1.64%
Chilled Water	kWhrs	22,179,242	22,548,696	-1.64%
Steam	kWhrs	155,164	158,568	-2.15%
Total Water Use	kgal	53,777	54,518	-1.36%
Total Chilled Water	kgal	50,689	51,961	-2.45%
EDS Make-up	kgal	2,192	848	158.49%
Cooling Towers	kgal	48,497	51,113	-5.12%
Calc CT Evaporation	kgal	41,216	42,516	-3.06%
CT Blowdown	kgal	7,281	8,597	-15.31%
Calc # Cycles		5.66	4.95	14.46%
Steam	kgal	3,088	2,557	20.77%
Total Fuel Use	mmBTU	81,329	82,166	-1.02%
Natural Gas	mmBTU	81,329	82,166	-1.02%
Propane	mmBTU	0	0	0.00%
Condensate Return	kgal	5,032	5,340	-5.78%
	lbs	41,038,484	43,554,988	-5.78%
Avg Temp	°F	185.3	181.0	2.39%
Sendout				
Chilled Water	tonhrs	25,994,100	27,020,600	-3.80%
Steam	lbs	59,785,000	60,047,000	-0.44%
Peak CHW Demand	tons	19,372	18,360	5.51%
Peak Steam Demand	lb/hr	45,937	60,337	-23.87%
CHW LF		60.77%	66.65%	-8.82%
Steam LF		58.94%	45.07%	30.77%
Sales				
Chilled Water	tonhrs	24,542,981	25,523,222	-3.84%
Steam	lbs	43,492,152	45,008,908	-3.37%
Losses				
Chilled Water	tonhrs	1,451,119	1,497,378	-3.09%
Steam	lbs	16,292,848	15,038,092	8.34%
		27.25%	25.04%	8.82%
Degree Days				
CDD		1,264	1,339	-5.60%
HDD		0	12	-100.00%
Cooling Tower Blowdown Ratio				
Cooling Tower Blowdown	gal	7,281,000	8,597,000	-15.31%
Chilled Water Production	tonhrs	25,994,100	27,020,600	-3.80%
Ratio	gal/tonhrs	0.280	0.318	-11.96%

*positive percent difference values imply an increase from FY23 to FY24

Table 2. First Quarter FY24 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	First Quarter FY24	First Quarter FY23	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	4.50	4.50	
Electric Conversion	kWhr/Mlb	3.60	3.54	1.78%
GMQ Plant Efficiency	Dth/Mlb	1.372	1.370	
Plant Efficiency	Dth/Mlb	1.360	1.368	-0.63%
Actual %CR		68.64%	72.53%	-5.36%
Avg CR Temp	°F	185	181	2.39%
GMQ Water Conversion	gal	2,643,317	2,325,425	
Water Conversion	gal	3,118,880	2,582,570	20.77%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	0.930	0.930	
Electric Conversion	kWhr/tonhr	0.903	0.883	2.21%
GMQ Water Conversion	gal/tonhr	2.00	2.00	
Water Conversion	gal/tonhr	2.07	2.04	1.43%

*positive percent difference values imply an increase from FY23 to FY24

D. Operating Costs

The fixed operating costs for the DES include the management fee to CES, 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 CES'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 and are passed onto the customers directly without mark-up. A summary of the total operating costs for the fiscal year-to-date is 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 current fiscal year system operating costs to date are \$6,321,474. This value represents approximately 28.5% of the total budgeted operating cost for FY24 and includes the First Quarter Self-Funded Debt Service Payments which are believed to have been paid but have

not been confirmed as of the date of this report. The customer revenues from the sales of steam and chilled water for FY24 are \$5,599,482 (25.7% of budgeted amount) which includes the annual true-up amount for FY23 and other miscellaneous revenue sources. Although not confirmed at the time of this report, the First Quarter Metro Funding Amount (\$96,100; 25% of budget) has been transferred. The actual MFA can only be estimated due to outstanding invoices as of the date of this report.

Table 3. DES Expenses and Revenues to Date

Item	FY24 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,127,000	\$ 1,031,756	\$ -	\$ -	\$ -	\$ 1,031,756	25.00%
9th Chiller	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 6A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 6B	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
C/O 8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Pass-thru Charges:							
Chemical Treatment	\$ 331,200	\$ 67,460	\$ -	\$ -	\$ -	\$ 67,460	20.37%
Insurance	\$ 30,400	\$ 33,584	\$ -	\$ -	\$ -	\$ 33,584	110.47%
Marketing:							
CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
FEA:							
Steam	\$ 91,400	\$ 10,642	\$ -	\$ -	\$ -	\$ 10,642	11.64%
Chilled Water	\$ 125,800	\$ (8,868)	\$ -	\$ -	\$ -	\$ (8,868)	-7.05%
Misc:							
Metro Credit	\$ -	\$ (504,153)	\$ -	\$ -	\$ -	\$ (504,153)	n.a.
ARFA	\$ 64,900	\$ 16,227	\$ -	\$ -	\$ -	\$ 16,227	25.00%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 4,770,700	\$ 1,150,801	\$ -	\$ -	\$ -	\$ 1,150,801	24.12%
Reimbursed Management Fee + Chem Treatment		\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Metro Costs							
Pass-thru Charges:							
Engineering	\$ 53,900	\$ 18,808	\$ -	\$ -	\$ -	\$ 18,808	34.89%
EDS R&I Transfers	\$ 312,900	\$ 78,225	\$ 26,075	\$ -	\$ -	\$ 104,300	33.33%
Metro Marketing	\$ 62,700	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 491,300	\$ 114,035	\$ 4,658	\$ -	\$ -	\$ 118,693	24.16%
Utility Costs:							
Water/Sewer	\$ 1,132,000	\$ 489,250	\$ -	\$ -	\$ -	\$ 489,250	43.22%
EDS Water/Sewer	\$ -	\$ 48	\$ -	\$ -	\$ -	\$ 48	n.a.
EDS Electricity	\$ 75,300	\$ 14,939	\$ -	\$ -	\$ -	\$ 14,939	19.84%
Electricity	\$ 6,269,000	\$ 1,991,229	\$ -	\$ -	\$ -	\$ 1,991,229	31.76%
Natural Gas Consultant	\$ 12,400	\$ 3,330	\$ -	\$ -	\$ -	\$ 3,330	26.85%
Natural Gas Transport	\$ -	\$ 55,762	\$ -	\$ -	\$ -	\$ 55,762	n.a.
Natural Gas Fuel	\$ 3,904,400	\$ 329,756	\$ -	\$ -	\$ -	\$ 329,756	8.45%
Propane	\$ 140,400	\$ 82,366	\$ -	\$ -	\$ -	\$ 82,366	58.67%
Subtotal - Metro Costs =	\$ 12,454,300	\$ 3,177,748	\$ 30,733	\$ -	\$ -	\$ 3,208,481	25.76%
Subtotal - Operations =	\$ 17,225,000	\$ 4,328,549	\$ 30,733	\$ -	\$ -	\$ 4,359,282	25.31%
Debt Service							
2012A Bonds	\$ 3,035,500	\$ 769,787	\$ 256,596	\$ -	\$ -	\$ 1,026,383	33.81%
2005B Bonds	\$ 599,700	\$ 588,376	\$ -	\$ -	\$ -	\$ 588,376	98.11%
Series 2018	\$ 117,200	\$ 29,300	\$ -	\$ -	\$ -	\$ 29,300	25.00%
Series 2015C	\$ 68,500	\$ 17,125	\$ -	\$ -	\$ -	\$ 17,125	25.00%
Series 2017	\$ 41,800	\$ 10,450	\$ -	\$ -	\$ -	\$ 10,450	25.00%
Series 2013A	\$ 613,500	\$ 153,375	\$ -	\$ -	\$ -	\$ 153,375	25.00%
Series 2021C	\$ 122,000	\$ 30,500	\$ -	\$ -	\$ -	\$ 30,500	25.00%
Series 2022A	\$ 149,500	\$ 37,375	\$ -	\$ -	\$ -	\$ 37,375	25.00%
Series 2022B	\$ 26,300	\$ 6,575	\$ -	\$ -	\$ -	\$ 6,575	25.00%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ 188,200	\$ 47,050	\$ 15,683	\$ -	\$ -	\$ 62,733	33.33%
Subtotal - Capital =	\$ 4,962,200	\$ 1,689,913	\$ 272,279	\$ -	\$ -	\$ 1,962,192	39.54%
Total =	\$ 22,187,200	\$ 6,018,462	\$ 303,012	\$ -	\$ -	\$ 6,321,474	28.49%
Customer Revenues							
Taxes Collected		\$ 125,583	\$ -	\$ -	\$ -	\$ 125,583	n.a.
Taxes Paid		\$ 83,325	\$ -	\$ -	\$ -	\$ 83,325	n.a.
Interest & Misc Revenue	\$ 333,300	\$ 181,927	\$ -	\$ -	\$ -	\$ 181,927	54.58%
Penalty Revenues/Credits		\$ 31,029	\$ -	\$ -	\$ -	\$ 31,029	n.a.
Energy Revenues Collected	\$ 21,469,500	\$ 5,344,278	\$ -	\$ -	\$ -	\$ 5,344,278	24.89%
Revenues =	\$ 21,802,800	\$ 5,599,492	\$ -	\$ -	\$ -	\$ 5,599,492	25.68%
Metro Funding Amount =	\$ 384,400	\$ 418,970	\$ 303,012	\$ -	\$ -	\$ 721,982	187.82%

The DES serves 21 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. The New Customers listed in Table 4 are non-

Initial System private customers. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties, the charges for the FY23 True-up, 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	\$ 1,462,055	8,808,258	\$ 0.1660	\$ 329,088	12,101	\$ 27.1954
State Government	\$ 1,085,171	5,138,180	\$ 0.2112	\$ 415,192	13,025	\$ 31.8765
Metro Government	\$ 1,654,426	10,596,543	\$ 0.1561	\$ 398,553	18,366	\$ 21.7002
New Customers	\$ 1,017,388	5,952,859	\$ 0.1709	\$ 269,143	13,033	\$ 20.6515
Total	\$ 4,201,651	24,542,981	\$ 0.1712	\$ 1,142,833	43,492	\$ 26.2768

Total Revenue	\$ 5,344,484
True-up and Adjustments (Net)	\$ 255,008
Net Revenue	\$ 5,599,492

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CES for FY24. TEG and CES continue to meet monthly and regularly communicate about important issues and on-going projects. CES has reported and managed EGF operations satisfactorily which is reflected in the reduction in the items noted in the EGF Walkthrough reports and in the improvement in meeting the performance guarantees in Amendment 2 of the ARMA.

A. Reliability

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

- In July, on two separate occasions while turning a new chiller on, the guaranteed sendout temperature of 43°F exceeded thirty-eight (38) minutes on each occasion. On July 8, the maximum temperature was 44.1°F, and on July 28, the maximum temperature was 44.5°F.
- While performing maintenance on Chiller 5 on August 3, the chilled water sendout guaranteed temperature was exceeded for approximately 188 minutes resulting in a high temperature of 45.0°F. The maintenance was being performed overnight.
- Boiler 2 tripped on August 9 on low water level. The steam sendout pressure was below 150 psig for approximately forty-five (45) minutes with a low pressure of 129.3 psig.
- Chillers 7 and 9 tripped due to an issue with the condenser water valve. The guaranteed sendout temperature was exceeded for sixty-two (62) minutes with a high value of 45.0°F.

- The annual steam system outage occurred on September 25. The steam system was offline for approximately seventeen (17) hours. The chilled water system was unaffected.
- There were no other reported issues during the quarter.

B. Efficiency

The operation of the EGF did not satisfy the steam-water guaranteed levels for each month during the quarter. The steam-water and chilled water-water guarantees were not met during the quarter. All other performance guarantees were met. 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.

CES has implemented and requires regular attendance of online safety courses for their employees.

D. Personnel

As of the end of the quarter, CES has reported they are currently staffed with nineteen full-time employees, one remote part-time employee and two shared employees. Of the current number of employees, thirteen were previously employed by Nashville Thermal Transfer Corporation.

E. Training

Staff training for this quarter consisted of the Health and Safety and DEI 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 and to aid in the prevention of corrosion. Remote testing of the condensate at the AA Birch, Tennessee Tower and the Andrew Jackson buildings also occurs regularly to monitor the concentration and distribution of the steam system chemicals.

- Steam System
 - The condensate return averaged approximately 68.6% of the steam sendout during the quarter, which represents a 5.4% decrease over the previous First Quarter. A portion of the condensate continues to be dumped due to hardness or iron from a few customer buildings. The Legislative Plaza and
-

- War Memorial buildings are dumping their condensate due to iron levels and do not plan on making repairs until building renovations begin.
- The condensate return was also dumped the week of September 25 due to the condensate pump replacement project (DES198) in MH-18. However, condensate was returned during this time from the Molloy St service.
- Feedwater iron, pH, and hardness (for the portion of the condensate returned) 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.
 - The cooling tower blowdown decreased 15.3% over the previous First Quarter. This decrease resulted in an average increase in the cycles of concentration in the cooling towers of 14.5%.
 - CES began monitoring and tracking the ratio of the cooling tower blowdown to the chilled water production. The average value for the quarter decreased 12.0% over the previous First Quarter. TEG and CES continue to monitor various performance metrics within the EGF and EDS to look for ways to improve system efficiency.
- Chilled Water System
 - CES continues to monitor and test for the presence of bacteria in the system. The biological growth in the system, as measured at the EGF and at the customer buildings, has become essentially non-existent. Chem-Aqua's proprietary biological treatment system continues to function properly.

G. Maintenance and EGF Repairs

CES 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 and are not the responsibility of Metro or the DES customers.

Repairs and As Needed Maintenance

- Office Janitorial Services, equipment room cleanup and pest control;
- Checked, updated, and backed up plant computers and servers;
- Checked and adjusted packing on all pumps;
- Assisted with data acquisition for Plant Efficiency (Skyspark);

Repairs or Replacement

- Repaired softener 2 flow meter;
- Assisted Siemens with Desigo System Repairs;
- Repaired plant lighting and electrical;

- Installed lighting around CHWP's;
- Performed repairs on the forklift/Genie Lift;
- Added refrigerant to chiller 8;
- Repaired 18011 chemical pump leak;
- Assisted with arc flash study;
- Installed heat trace on boiler pressure transmitter lines;
- Repaired backflow preventer;
- Repaired vaporizer electrical switches;
- Replaced ceiling tiles;
- Replaced vent hose on de-aerator 1;
- Replacement blowdown valve on boiler 1;
- Repaired water softener drain valves;
- Other repairs, maintenance and preventative maintenance were made during the quarter and are listed in the monthly reports issued by CES.

H. EGF Walkthrough

The EGF Walkthrough was conducted on September 26, 2023, by Kevin L. Jacobs, P.E. Based on the review of the EGF, the following comments and observations are presented. Constellation Energy Solutions, LLC (CES) and their contractors performed work at the EGF during the scheduled steam outage on September 25. As a result, several repairs were made and some items which had been removed from service remained at the plant. These items are scheduled to be removed within the next few days. Cleanup of the work areas has largely been completed as of the time of the Walkthrough.

- TEG previously reported the louvers and portions of the fill at cooling towers 1, 6 and 15 appeared to have been damaged. Cooling tower 5 was repaired prior to the Fourth Quarter FY23 Walkthrough and cooling tower 15 was repaired prior to the First Quarter FY24 Walkthrough. CES stated the remaining repairs for cooling towers 1 and 6 will be made after the cooling season.
 - The pressure gauge at the expansion tank indicated a pressure of approximately 100 psig. However, the chilled water return pressure was reported to be approximately 130 psig, as indicated on the control room screen. The difference between these two instruments should be approximately equal to their elevation difference. TEG discovered discrepancies with other pressure instrumentation on the city water make-up line during the Walkthrough and found that the valves for the compressed air service to the expansion tanks had been closed. TEG discussed the issues with CES during the Fourth Quarter FY23 Walkthrough. **TEG is still investigating the potential pressure issue to determine if there are any setpoint changes which should be made or if further action is required.**
 - Chemical leaks and build-up were noted between chemical tanks 12900 and 10600 and between tanks 12001 and 34170. **CES has cleaned the affected areas and repaired the leaks between tanks 12900 and 10600. A leak remains between tanks 12001 and 34170. CES should repair this leak.**
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- A rust spot has occurred on the west side of one of the cooling tower support beams near the south end of the cooling tower deck. No other beams appear to have any surface rust. **CES has cleaned and painted this beam. This item will be removed from future reports.**
- Boilers 1 and 3 and de-aerator 2 were offline and open for inspection. The mud drums appear to have excessive corrosion in some locations and chemical residue remains in the bottom of boiler 1 mud drum. **CES, Chem Aqua, and TEG discussed the presence of the residue and the corrosion previously reported. CES installed an additional chemical monitoring port in the steam line during the shutdown and Chem Aqua intends to use this port to measure carry-over more accurately from the boilers. This item will be removed from future reports.**
- The vacuum breaker check valve on DA 2 was venting steam. **CES should repair or replace this valve.**
- Since the new illuminated sign has been installed on the north side of the EGF, the old signs need to be removed. **CES needs to remove these signs.**
- The thermometers on the suction and discharge headers at the condensing water pumps need to be cleaned and are unreadable. **CES needs to clean the thermometer glass.**
- Other action items previously noted to be addressed by CES have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated September 27, 2023, 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. First Quarter FY24 Open Projects

The following projects remained open at the end of the First Quarter FY24.

1. DES163 – New Service to MDHA Parcel K (Peabody Union)

The Peabody Union development includes the construction of Guthrie St that will require the modification to the east retaining wall along the EGF property. The installation of this new road may affect the entrance and exit to the EGF site and result in the loss of DES property. This project number is used to track costs and activities associated with the new road, the on-site construction activities, and their impact on DES.

DES remains in contact with the contractor and the developer regarding construction at this site. CES presented TEG and Metro with a proposal to upgrade the security system which included an additional keycard reader and latch for the

existing north pedestrian gate. This latter proposal was provided to Peabody Union personnel since the addition of the new wall and fencing and the new parking garage will restrict visitor access to the plant site. Peabody Union previously agreed to purchase the new devices for Metro.

TEG and CES remain in contact with the Peabody Union personnel and their contractor regarding the scheduling of activities affecting DES and its operation.

2. DES178 – MH-5 Repairs

The scope of work for this project has been completed and this project is in close-out.

3. DES180 – State Tunnel Pipe Support Repairs

This project is closed.

4. DES191 – MH-20 Repairs

MH-20 houses steam, condensate return and chilled water service piping for Hume Fogg High School, and it sits on top of a vertical shaft that connects to the 7th Ave Tunnel. The pipe supports within the manhole are badly corroded, the existing entry ladder consists of individual embedded rungs which are prone to failure with little warning, a caisson that prevents groundwater from flowing down the vertical shaft is badly corroded, and the condensate return piping is leaking. This project addresses these issues.

A punch list review was conducted on September 21, 2023. All the work on this project has been completed except for capping an abandoned pipe and the restoration/installation of the piping insulation. The re-paving of 7th Avenue has prohibited access to this manhole therefore the project completion has been delayed. It is expected that the project will be completed prior to the end of the 2nd Quarter FY24.

5. DES192 – Peabody Street Development

This project number is used to track expenses with the proposed expansion of the EDS along Peabody Street and into the Rolling Mill Hill area. This project is on hold pending confirmation of additional customers along the proposed route.

6. DES194 – MH- B4 Repairs

The structural steel pipe supports within MH-B4 are corroded and require cleaning and coating. In addition, most of the insulation within MH-B4 needs replacement and the entry ladder needs to be extended. This project addresses these needs.

The coating portion of the scope was completed in April and the insulation began in May. The insulation blankets did not fit properly so the manufacturer had to make some modifications. The modified blankets were installed, and a punch list review was conducted on September 12, 2023. A valve insulation blanket was found to be absent during this review. CES has notified the installing contractor and a blanket for this valve is forthcoming. Once this blanket has been installed, TEG will conduct a final review and this project can then be closed. It is expected that the project will be completed prior to the end of the 2nd Quarter FY24.

7. DES195 – DES Parking Area

This project is on hold pending the completion of the Guthrie Street construction.

8. DES196 – Exploratory Excavation and Condensate Leak Repair at MH-9

CES has identified condensate entering the condensate pipe wall penetration in MH-9. This section of condensate piping between Manholes 9 and 10 has been repaired at least twice in recent years and therefore TEG recommended replacing the entire piping run between the two manholes. The design was completed, and the scope was bid, however only one bidder responded, and the price was significantly higher than expected. TEG and CES have met with a different contractor who provided pricing for the replacement of the entire line between manholes which was substantially less than the bid price. Metro approved proceeding with this contractor/pricing.

Pre-insulated piping has been ordered and is expected to arrive mid-October. Construction should begin shortly thereafter. Construction for this project is expected to extend into the 3rd Quarter FY24.

9. DES198 – MH-18 Condensate Pump Replacement

The onsite construction for this project began on September 25. The work was scheduled to be completed by September 29, but the work carried forward into October. However, the pumps were installed in September and became operational on October 2. The remaining work is ongoing.

10. DES200 – Chilled Water Side Stream Filter

The punch list items reported in the previous quarter's report were completed during the First Quarter. The filter became operational in May 2023. The charges to the customers began in July 2023. Final invoices have been issued by CES. This project is now closed.

11. DES201 – East Bank Development

TEG, the DES Metro Liaison, and Metro’s other engineering consultant, FVB, have been involved during the quarter with meetings and investigations into the developments on the East Bank. These developments include the development of the Oracle campus on River North, and the other potential commercial and residential developments in the area which could benefit from district energy. The options for district energy on the East Bank include the development of one or more new sustainable plants serving multiple customers.

Conversations with MDHA continued during the quarter with the expectation of providing service to their proposed development at Shelby Street and 5th St.

12. DES202 – 7th and Commerce Hotel

The survey work continued during the quarter with final drawings anticipated in October 2023. The work on the project site has been reported by the developer to be on hold pending resolution of issues with the property.

13. DES203 – Printers and Bankers Alley Building

The engineers for the developer reported the project is on hold pending unknown issues between the developer and the property.

14. DES205 (EMR23-001) – Chilled Water Outage

This project is closed.

15. DES206 - 7th Ave Fan Replacement

The 7th Ave ventilation fan broke apart during operation and needs to be replaced. A new fan was ordered and was received by CES. TEG completed the design documents for the fan’s installation and because of the immediate need to have the fan in operation, the project was awarded to a contractor on a T&M basis with cost substantiation. The mechanical work was completed during September but the installation of the variable frequency drive (VFD) for the fan motor was delayed because of water damage to electrical components. Because of this delay, the installing contractor was instructed to wire the fan without the VFD and put it into operation. A mechanical punch list review was conducted on September 22, 2023. It is expected that the electrical components will be installed, and an electrical punch list review will be conducted prior to the end of the 2nd Quarter FY24.

16. DES207 – MH N1 Insulation

This project was moved from DES143 since CES initially intended to address the insulation of this manhole under its Amendment 2 obligations. DES143 was closed. Since the insulation of the piping in this manhole would meet CES's obligations beyond its contract expiration, TEG instructed CES this work would not be completed under CES's Amendment 2 obligations.

CES bid the work and an award was made. However, due to field conditions, some changes needed to be made to the specifications. CES and TEG met with the insulation contractor and reviewed changes to the specifications, and a revised, and lower priced proposal was presented. This work is scheduled to take place during the fall of 2023 to allow the humidity levels to lower so the surface condensation is reduced/eliminated to have a more successful result. It is expected that this project will be completed prior to the end of the 2nd Quarter FY24.

17. DES208 – 2023 Steam Outage

There are some maintenance/repair items at the EGF and in the EDS that cannot be completed without the steam system being off-line. Therefore, CES assembled a list of items to be completed and scheduled a steam system shutdown for September 24-25, 2023. This shutdown took place as scheduled with all work being completed except the re-insulation of piping. Once the piping has been re-insulated, and the cost substantiation reviewed, this project will be closed. It is expected that this project will be completed prior to the end of the 2nd Quarter FY24.

18. DES209 – MH B2 Sump Pump Discharge Repair

The sump pump discharge piping from Manhole B2 is either obstructed or possibly damaged which is preventing the evacuation of the accumulated groundwater in this manhole. TEG researched and found a company that could trace buried piping and located the obstructed/damaged portion of the discharge piping. This company (GPRS) was retained by CES to determine the location of the blockage and GPRS was also able to locate the buried piping beyond the blockage.

This project involves the excavation of the discharge piping to repair/replace the obstructed/damaged portion of the piping and to also determine if the remaining piping still discharges to a nearby catch basin. If not, then the project also involves the re-introduction of this discharge piping to the catch basin.

CES and TEG have met with a contractor and this work is scheduled to take place in October 2023.

19. DES210 – MH C Electric Sump Pump Installation

MH C is in the street adjacent to the MTA bus station. CES reviews this manhole monthly, however its access is complicated due to its proximity to the bus station. Portions of the DES piping in this manhole has been replaced due to corrosion from groundwater accumulation. And CES has had to visit this manhole more than once per month to pump out the groundwater. To reduce the number of visits and lessen the likelihood of corrosion, TEG contacted MTA and asked if DES could obtain electric power from the bus station for a small sump pump. MTA has agreed to this and has signed an agreement.

This project involves the evaluation of the cost to install this sump pump, and if acceptable, the installation of the power and pump. TEG has investigated the electrical cost for this installation, and it isn't prohibitive. Because this work site is within a few feet of DES196, TEG is talking with the DES196 contractor to see how much this project will be as a change order to DES196.

20. DES211 – AA Birch Tunnel and MH D Repairs

The AA Birch Tunnel and MH D include several metal piping and platform supports that are experiencing corrosion. This project addresses the cleaning, coating, and potential replacement of some of these components.

TEG is in the process of compiling a scope of work, drawings, and specifications for this project. It is expected that pricing for this work will be obtained during the 2nd Quarter FY24 with the work taking place during the 2nd and 3rd Quarters of FY24.

21. DES212 – MH 2 End Can Replacement

The existing western end can at the steam piping wall penetration is badly corroded and requires replacement. TEG has provided scope documents to CES and the installing contractor, and TEG has met with the installing contractor on-site to review the work scope. It is expected that this work will take place during the 2nd Quarter FY 24.

22. DES213 – 4th Ave, 7th Ave and Broadway Tunnel Piping Support Slide Repairs

The piping supports in the three main tunnels (4th Ave, 7th Ave, and Broadway) include slides and guides to allow the piping to move freely due to thermal expansion/contraction in a linear direction with little resistance. The slides include Teflon coatings which have been damaged or have become unattached over the years of service. These slides/guides need to be replaced to maintain a low

resistance to expansion/contraction. This project addresses the replacement/repair of these supports.

TEG is preparing a scope, drawings, and specifications for this work. It is anticipated that the design documents will be completed during the 2nd Quarter FY24, with the execution of the work taking place during the 3rd Quarter FY24.

B. First Quarter FY24 Closed Projects

DES178, DES180, and DES200 were closed during the First Quarter FY24.

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 efforts are shown. Projects discussed in this report that are not listed did not have any expenses during the quarter. Total costs for projects that are closed are shown with a gray highlight. Only the funds currently available are shown. All the projects closed during FY24 may not be noted due to outstanding invoices from the contractors.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY24 Spending to Date	Total Spent to Date	Remaining Balance
Fund-49116					
DES163	Parcel K Service	\$ 1,018,802	\$ 1,219	\$ 85,438	\$ 933,363
DES178	MH-5 Repairs	\$ 97,500	\$ 21,385	\$ 53,182	\$ 44,318
DES191	MH 20 Repairs	\$ 94,875	\$ 1,300	\$ 70,355	\$ 24,520
DES192	Peabody Developments	\$ 40,000	\$ -	\$ 28,689	\$ 11,311
DES194	MH-B4 Repairs	\$ 80,000	\$ 562	\$ 30,802	\$ 49,198
DES195	DES Parking Lot	\$ 275,000	\$ -	\$ 12,688	\$ 262,312
DES196	Condensate Line Leak Repair at MH9	\$ 130,000	\$ 7,884	\$ 24,182	\$ 105,818
DES198	MH18 Condensate Return Pump Replacement	\$ 175,000	\$ 62,503	\$ 109,723	\$ 65,277
DES200	Sidestream Filter	\$ 330,000	\$ 396	\$ 5,597	\$ 324,403
DES201	East Bank and Oracle Development	\$ 110,000	\$ 1,006	\$ 34,139	\$ 75,861
DES202	Service to 7th and Commerce	\$ 1,630,000	\$ 13,707	\$ 27,750	\$ 1,602,250
DES203	Service to Printer's Alley Residential	\$ 850,000	\$ 57	\$ 1,564	\$ 848,436
DES206	7th Avenue Fan	\$ 110,000	\$ 4,914	\$ 29,317	\$ 80,683
DES207	MH N1 Insulation	\$ 25,300	\$ 1,067	\$ 4,042	\$ 21,258
DES208	2023 Stm Outage	\$ 33,000	\$ 1,672	\$ 3,923	\$ 29,078
DES209	MH B2 Pump Line Repair	\$ 44,000	\$ 1,803	\$ 1,917	\$ 42,083
DES210	MH C Sump Pump	\$ 125,000	\$ 12,677	\$ 12,677	\$ 112,323
DES211	MHD and AA Birch Tunnel	\$ 141,500	\$ 6,538	\$ 6,538	\$ 134,962
DES212	MH2 Repair	\$ 46,500	\$ 1,286	\$ 1,286	\$ 45,214
DES213	Tunnel Support Repair	\$ 321,500	\$ 114	\$ 114	\$ 321,386
DES214	Chiller 2 R'newel	\$ 330,000	\$ 399	\$ 399	\$ 329,601
	Total Closed Projects	\$ 4,607,490	\$ -	\$4,607,490	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$15,384,533	\$ -	\$ -	\$15,384,533
	Fund Total	\$26,000,000	\$ 140,490	\$5,151,814	\$20,848,186

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

Several EDS repairs and improvements were made during the First 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 \$269,927. Table 6 provides a summary of the FY24 expenditures and revenues to date associated with the R&I budget.

Table 6. FY24 Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Balance
Value at end of FY23				\$ 285,919.91		\$ 278,274.07
Interest	7/3/2023	-	-	\$ 1,960.82		
Interest	7/3/2023	-	-	\$ (1,960.82)		
CES July 2023 R&I	8/24/2023	-	CES	\$ 1,793.89		
Interest	8/1/2023	-	-	\$ 2,182.76		
Interest	8/1/2023	-	-	\$ (2,182.76)		
CES Aug 2023 R&I	9/20/2023	-	CES	\$ 20,361.63		
DES206 7th Ave Fan	9/20/2023	-	CES	\$ 23,182.35		
Interest	9/1/2023	-	-	\$ 2,360.98		
Interest	9/1/2023	-	-	\$ (2,360.98)		
DES206 7th Ave Fan	10/18/2023	-	CES	\$ 34,376.27		
DES208 Steam Outage	10/18/2023	-	CES	\$ 27,529.33		
CES Sept 2023 R&I	10/18/2023	-	CES	\$ 5,403.74		
Sub-Total First Quarter				\$ 112,647.21	\$ 78,225.00	\$ 243,851.86
Sub-Total Second Quarter				\$ -	\$ 26,075.00	\$ 269,926.86
Sub-Total Third Quarter				\$ -	\$ -	\$ 269,926.86
Sub-Total Fourth Quarter				\$ -	\$ -	\$ 269,926.86
FY24 Year to Date				\$ 112,647.21	\$ 104,300.00	\$ 269,926.86

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. CES continues to replace trap assemblies within the EDS as needed.
 - c. CES should continue to clean areas of minor corrosion and then paint those areas with a cold galvanizing paint. If maintained, this

should help reduce/slow down the progression of some areas of corrosion.

- d. Insulation repairs are needed in some vaults; some of these needs will be addressed through capital projects.
 - e. Additional action items and maintenance issues are discussed in the EDS Walkthrough section of this report.
2. Water chemistry samples at customer buildings were taken as scheduled.
 3. Other EDS items are included in the CES monthly reports.

C. Emergencies

There were no emergencies reported during the quarter.

D. EDS Walkthrough

The First Quarter FY24 walkthrough was conducted on September 5, 6 and 7, 2023; Manhole 20 was reviewed on September 21, 2023. The manholes that were visited included Manholes 2, 3, 4, 5, 6, 6A, 9, 10, 11, 12, 13, 18A, 20, C, D and D1.

In summary, 17 separate manholes were reviewed (Manhole 6A consists of two separate manholes, one for the steam service and the other for chilled water service).

- 10 manholes contained too much water to enter and were pumped prior to entry (2, 3, 4, 5, 6, 9, 10, 11, 18A and C; Manholes 9 and 10 have sump pumps but are not able to remove all the water from the manhole floors).
- 4 manholes (6, 10, 12 and 13) had prior piping work done, but the disturbed insulation was never repaired after the piping work was completed.
- 5 manholes have active corrosion (4, 6, 9, 12, and 18A), 3 of which (6, 9 and 12) CES has been addressing with cleaning and the application of cold galvanizing paint (which needs to continue). Of the remaining 2 manholes (4 and 18A), CES needs to clean these areas and apply cold galvanizing paint. (Manhole 4's corrosion is on the entry ladder which was coated by Enecon. Enecon has agreed to re-visit this manhole and clean/re-coat the entry ladder.
- There are several items which have appeared in the prior year's (in some cases the prior two years' reports) that need to be addressed as soon as possible.

The following comments and observations are a result of these visits.

1. Manhole 2
 - a. There was a small amount of water in this manhole which required pumping before entry.
 - b. There was a small amount of mud in this manhole. CES should remove the mud as soon as possible.
 - 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. CES personnel should monitor these patched areas and notify TEG as the deterioration progresses.
- d. The steam end can at the western wall penetration is corroded and deteriorating. There has not been any groundwater infiltration at this penetration. TEG has developed repair drawings/specifications and met with a contractor to review the work under DES212. CES is in the process of scheduling this work to be completed.
 - e. The steam and condensate return piping originally passed through this vault and had service lines going to the Washington Square area. Several 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 service lines to Washington Square are also capped. These capped penetrations (wall sleeve and link seals) are deteriorating, and it is likely that groundwater will start seeping through them at some point. These penetrations should be sealed with concrete. TEG will prioritize this with other EDS projects. Meanwhile, CES should continue to monitor these penetrations and report any changes to TEG.
 - f. TEG recommended the installation of a high temperature caulk in the manhole frame to reduce the amount of water infiltration. It is hoped that this caulk will act like a gasket. While doing this review, CES installed this caulk. This manhole was re-visited a couple of days later and the caulk successfully formed a gasket. CES will now monitor this manhole to see if there is a reduction of water infiltration.
2. Manhole 3
- a. There was water in this manhole, and it required pumping before entry. TEG contacted Water Services to inform them of the presence of water and asked if they knew of a city water leak in the vicinity. Water Services is not aware of any.
 - b. The hairline cracks in the concrete walls noted in prior reports do not appear to be propagating. TEG will continue to note these during its quarterly review.
 - c. The steel piping supports, and entry ladder were cleaned and coated recently and appear to be in good condition.
 - d. The steam service valve for the Bobby Hotel is in this manhole and is inoperable. This valve was replaced during the planned steam outage in late September under DES208.
 - e. This manhole was recently re-insulated. Some of the insulation jacketing was removed in preparation for the steam valve replacement. CES should make sure that this insulation and jacketing is restored.
3. Manhole 4
- a. There was water in this manhole, and it required pumping before entry. TEG contacted Water Services to inform them of the presence of water and

- asked if they knew of a city water leak in the vicinity. Water Services is not aware of any.
- b. The steel piping supports, and entry ladder were recently cleaned and coated by Enecon and are in good condition except for the entry ladder, this coating is failing in several locations. TEG notified Enecon and they have agreed to make the needed repairs. CES should coordinate/schedule this repair as soon as possible with Enecon.
 - c. CES should monitor and clean and re-paint these supports as needed.
 - d. The abandoned condensate trap piping from Manhole 4 to 401 Union is stubbed into Manhole 4 and is open ended. Steam is wafting into Manhole 4 through this abandoned trap piping from either groundwater contacting the steam service line to 401 Union St or the vent line from the flash tank in the basement of 401 Union St. In the prior report, TEG had recommended CES weld a cap on this pipe or plugging it with a wooden plug to prevent the wafting steam from entering the manhole. However, this piping is badly corroded and now has holes in it so plugging or capping this pipe would not be beneficial. TEG will research a remedy for this problem.
4. Manhole 5
- a. There was water in this manhole, and it required pumping prior to entry. TEG contacted Water Services to inform them of the presence of water and asked if they knew of a city water leak in the vicinity. Water Services is not aware of any.
 - b. DES178 was recently completed which included the cleaning and coating of the structural steel pipe supports within this manhole and the repair of insulation and replacement of some insulation blankets. This coating is in good condition. CES should monitor and clean and re-paint these supports as needed and monitor the insulation and make repairs as needed.
 - c. There was some insulation debris in the manhole which was cleaned during this review.
5. Manhole 6
- a. There was water in this manhole, and it required pumping before entry. TEG contacted Water Services to inform them of the presence of water and asked if they knew of a city water leak in the vicinity. Water Services is not aware of any.
 - b. There is a small amount of mud in the floor of the manhole which should be removed by CES personnel.
 - c. There are some holes and cracks in the concrete surfaces in this manhole which CES should monitor and report any deterioration to TEG.
 - d. The structural pipe supports were cleaned and painted in the fall of 2018. Some of the structures are presenting “creep” (the migration of rust stains from concealed surfaces that could not be exposed, cleaned, and painted). Other portions of the steel have active corrosion. Because some of the steel
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surfaces do not show signs of corrosion, CES should obtain a quotation from Enecon with two options:

1. Clean and coat the active corrosion areas on the structural steel within the manhole.
 2. Clean and coat all structural steel within the manhole.
(Depending upon the price difference, it may be prudent to have all the steel cleaned and coated.) Please present these quotations to TEG for review before any work takes place. **This item appeared in the last 2 years' reports.** If Enecon cannot be scheduled to clean/coat the steel in this manhole within the next 2 months, CES should continue to clean these surfaces and coat them with cold galvanizing paint.
- e. The condensate piping valve is underneath the secondary/ventilation manway; therefore, surface water falls on this valve. The yoke of the valve has delaminated due to corrosion caused by this water infiltration. If this valve is necessary, it should be replaced. If it is replaced, this valve should be relocated to avoid being underneath the ventilation manway. TEG will discuss with CES the need for this valve, and if it is needed, check the piping stresses to relocate the replacement valve. TEG has directed CES to use the high temperature caulk to try and seal this secondary manway. CES did this after this review. CES should monitor the water infiltration into this manhole report their findings to TEG.
- f. A portion of the dripleg insulation is absent due to piping repairs, Additionally, the trap piping insulation is in poor condition. CES should have repairs made to this insulation under R&I as soon as possible.
6. Manhole 9
- a. This manhole has an electric sump pump. However, water was present in this manhole because the existing sump pump float/level control position will not allow the pump to remove all the water. **This item appeared in last year's report.** TEG will coordinate a time with CES to review the operation of this pump and the adjustment of the float to try and reduce the amount of standing water in the manhole floor.
 - b. The structural pipe supports/anchors were cleaned and coated with Enecon products to eliminate corrosion. The coating is failing in some locations. TEG notified Enecon about this and they will make the needed repairs. CES should coordinate/schedule these repairs as soon as possible.
 - c. Additional steel angles were added at the eastern condensate piping wall penetration and there is some corrosion starting to form on these members. CES should have Enecon clean and coat these angles while Enecon is making the repairs discussed in item b. above. TEG will send an email to CES requesting that this be done.
 - d. Water is infiltrating this manhole at the western condensate piping penetration. Because this infiltration is cyclic, it is believed that it originates from a hole in the buried condensate piping just west of the manhole. DES196 will address this. DES196 is scheduled to begin sometime in

- October.
- e. The southern steam penetration end can has deteriorated and needs to be rebuilt. This is included in the scope of DES196 which is scheduled to begin construction in October.
 - f. 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. CES should monitor these sealed cracks and report any degradation to TEG.
 - g. The link seals around the city water line within this manhole seep a little water. CES has tried tightening the link seals to no avail. CES should direct Enecon to seal these link seal locations while they are making the needed repairs in item b. above. **This item appeared in the previous two years’ reports.**
7. Manhole 10
- a. There was some water present in this manhole which had to be swept into the sump for removal due to a low point in the manhole floor.
 - b. This manhole is always hot which is indicative of water accumulation around the exterior of the manhole. TEG contacted Water Services to inform them of the presence of water and asked if they knew of a city water leak in the vicinity. Water Services is not aware of any.
 - c. The condensate anchor was recently cleaned and coated and is generally in good condition. However, the coating is failing at the base of the anchor. TEG notified Enecon about this and they have agreed to make the needed repairs. CES should coordinate/schedule these repairs as soon as possible.
 - d. A 90° elbow on the condensate return piping in this manhole was recently replaced due to thinning of the pipe wall. There is also a 45° condensate piping elbow at the western wall penetration that has thinning pipe wall that needs to be replaced. This elbow is scheduled to be replaced under DES196 which will begin construction in October.
 - e. There are two condensate valves that need to be insulated. This is included in the scope of DES196.
 - f. There are some rust “spots” in the ceiling resulting from rebar chairs when the roof was formed. CES should have Enecon clean and patch these locations while they in in this manhole making the repair mentioned in item b. above. TEG will send an email to CES requesting that this be done.
8. Manhole 11
- a. There was water in this manhole, and it required pumping before entry.
 - b. The structural pipe supports were recently cleaned and coated and appear to be in good condition. CES should monitor these coatings and report any observed failures to TEG.
 - c. Spalling of the manhole roof was repaired in 2018. CES should continue to monitor the ceiling and report any degradation of these repairs to TEG.
 - d. The wall penetration end cans were repaired/replaced under DES179 and
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- appear to be in good condition. CES should monitor these end cans, clean/paint as needed and report degradation to TEG.
- e. The western condensate valve is located underneath the secondary/vent manway which allows surface water to enter the manhole. This has resulted in the corrosion of a condensate valve beneath this manway. Additionally, the condensate piping immediately west of this valve which passes through the western manhole wall is corroded and needs replacement. Unfortunately, this piping replacement will require the excavation of the western end of the manhole. This work is included in the scope of DES196 which is scheduled to begin in October.
 - f. TEG recommended the installation of a high temperature caulk in the secondary manhole frame to reduce the amount of water infiltration. It is hoped that this caulk will act like a gasket. CES installed this caulk prior to this review. The caulk successfully formed a gasket. CES should now monitor this manhole to see if there is a reduction of water infiltration.
 - g. There are some insulation/insulation blanket replacements needed within this manhole. These repairs are included in the scope of DES196.
9. Manhole 12
- a. No water was present in this manhole.
 - b. Some structural steel coatings are beginning to fail. CES needs to clean these areas with a wire brush/wheel and paint them with cold galvanizing paint to deter propagation of corrosion. CES should obtain a quotation from Enecon to clean and coat all structural steel within the manhole. **This item appeared in the last two years' reports.** If Enecon cannot be scheduled to clean/coat the steel in this manhole within the next 2 months, CES should continue to clean these surfaces and coat them with cold galvanizing paint.
 - c. The corroded bottom of the rebar chairs is now visible around the primary manway opening. CES should have Enecon include the repair of these areas in the quotation obtained in item b. above.
 - d. The entry ladder is corroded in some locations. CES should have Enecon include the cleaning and coating of the ladder in the quotation obtained in item b. above.
 - e. The grout under the northern base plate on the east end of the manhole has some small cracks. CES should monitor this and report any significant changes to TEG.
 - f. The trap was recently replaced in this manhole and some of the piping insulation had to be removed. This insulation has not been repaired; this includes the dripleg. CES should have this insulation repaired as soon as possible.
10. Manhole 13
- a. No water was present in this manhole.
 - b. The condensate pipe stanchion support on the 6" condensate piping extending west out of the manhole was replaced with a hanger from the
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ceiling over a year ago. The insulation and jacketing around the hanger lug connection to the pipe was never re-insulated. In addition, the pipe insulation immediately east of this new hanger lug needed repair and was supposed to be repaired coincidentally with the hanger lug insulation. Neither of these areas have been addressed. **This item appeared in last year's report.**

- c. The steam piping at the western wall penetration includes an insulation blanket. This blanket has deteriorated. CES should have this blanket removed and investigate if this section of piping can be insulated with standard pipe insulation. If not, this insulation blanket should be replaced. **This item appeared in last year's report.**
- d. There is some water on the manhole floor beneath the chilled water valves at the western wall. This may be condensation which indicates that the chilled water valve should be reinsulated, or it could be groundwater seepage from the wall penetration. CES should remove the insulation at the western wall to determine the source of this moisture. If it is groundwater from the penetration, CES should have Enecon seal the penetration(s). If it is condensation, CES should have the chilled water valves reinsulated. This should be investigated prior to making the insulation repairs in item b. above. **This item appeared in last year's report.**
- e. Because not all the steel surfaces show signs of corrosion, CES should obtain a quotation from Enecon with two options:
 - 1. Clean and coat the active corrosion areas on the structural steel.
 - 2. Clean and coat all structural steel within the manhole.
(Depending upon the price difference, it may be prudent to have all the steel cleaned and coated.) Please present these quotations to TEG for review before any work takes place. **This item appeared in last year's report.** If Enecon cannot be scheduled to clean/coat the steel in this manhole within the next two months, CES should continue to clean these surfaces and coat them with cold galvanizing paint.

11. Manhole 18A

- a. The slip joint insulation blankets are deteriorating. CES should obtain quotes to replace these blankets.
- b. Some minor corrosion is beginning to form on the beam "L" wall brackets. CES should clean these areas and paint it with cold galvanizing paint to deter the propagation of this corrosion. If this is done and maintained, it should prevent the need to have Enecon clean and coat the steel within this manhole for several years.

12. Manhole 20

- a. A review of this manhole was conducted during the punch list review of DES191 (Manhole 20 Repairs).
- b. The punch list for DES191 includes items which need to be addressed.

- c. Now that an aluminum caisson has been installed around the perimeter of the vertical shaft opening in the floor of this manhole, it is apparent that grating needs to be installed over this opening for personnel safety. TEG will develop design drawings and a scope of this and coordinate with CES for its installation.

 - 13. Manhole C
 - a. There was water present in this manhole, and it required pumping before entry.
 - b. TEG is working with the contractor for DES196 to see if an electric sump pump can be economically added to this manhole as a change order to DES196.
 - c. The southern condensate return slip type expansion joint is located underneath the secondary/vent manway. Surface water has flowed through this secondary manway and saturated the expansion joint's insulation blanket. This has resulted in the corrosion of the expansion joint. TEG and CES removed the saturated and damaged insulation blanket during this review. Two actions need to take place: 1) CES should install the high temperature caulking in the frame of this manway to try and prevent the infiltration of surface water through this manway; and 2) CES and TEG need to coordinate a time to revisit this manhole and conduct a thorough review of the expansion joint to determine its condition and continued use.

 - 14. Manhole D
 - a. The coatings on the structural steel pipe supports within this manhole has failed. This failure is primarily due to a chilled water leak water infiltration into this manhole which contacted the steam piping and boiled. TEG is working on drawings/specifications to have these supports cleaned and coated under DES211.
 - b. There is some insulation missing on the condensate piping. This piping insulation should be replaced as soon as possible. **This item appeared in last year's report.**
 - c. There was a plywood form board attached to the western wall where an abandoned pipe penetration was sealed with concrete. **This item appeared in last year's report.** TEG had CES remove this form and cut off the concrete nail heads during this review.
 - d. An electric metal junction box (formerly part of the electrical disconnect) is mounted on the northern wall above a stainless steel disconnect enclosure. This metal junction box is badly corroded. If this enclosure is needed, it should be replaced. If it is not needed, it should be removed.

 - 15. Manhole D1 (Sump)
 - a. The manhole includes two steel electrical boxes that were badly corroded. CES has replaced these boxes with stainless steel boxes and is in the process of replacing and re-landing some wires.
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- b. This manhole was extremely hot and humid which is out of the ordinary. There may be an underground condensate return piping leak that is the cause for this. CES should monitor this situation and immediately report any changes to TEG.

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 21 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 CES in an expeditious and professional manner.

A. Marketing

TEG continues to have discussions with potential developments along the Peabody St corridor and the Rolling Mill Hill area. These potential sites include 1st Ave S and KVB, 4th and Lea, Peabody and Rutledge, and 2nd Ave S and Peabody. In addition to the Peabody St corridor, TEG continues to reach out to other developments within the service area for DES.

Metro Water Services (MWS) participates on the East Bank planning team, which consists of representatives from Metro departments associated with development and infrastructure in the city. The Metro Liaison represents DES infrastructure. The Metro Liaison has been actively promoting the use of district energy in the East Bank planning process by identifying synergies with other utility, transportation, and public recreation agencies. Work associated with the East Bank Development is tracked under the project DES201.

Oracle's development plan for the East Bank has been placed on hold until later this year. DES is also pursuing opportunities to serve other developments and MWS infrastructure in the River North area. DES continues to explore options for serving other potential developments on the East Bank, including proposed developments with MDHA.

TEG and DES presented the first ever DES Energy Savings Webinar on August 2. The webinar consisted of a presentation of energy savings opportunities customers could implement to reduce their usages of chilled water and steam and their pumping energy. The customer turnout was moderate and similar to the annual customer meeting held in May 2023.

B. Customer Interaction

The CES 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 CES, which was provided. Some of these repairs involved isolating the steam or chilled water services to the building for the customers.
- CES and TEG remained in contact with personnel at the AA Birch regarding the replacement and repair of their chilled water heat exchanger. The customer completed the repairs in August.
- CES replaced the steam isolation valve at the Bridgestone Arena in August. Building personnel also performed maintenance on the steam system while the system was offline.
- A leak on the chilled water system on 7th Avenue was found and repaired in August.
- TEG and CES met with personnel from the Sheraton Hotel on several occasions to discuss the control and operation of their chilled water system and to address their concerns regarding their current contract chilled water capacity. CES and TEG also performed a review of the Sheraton mechanical room's chilled water piping and determined a chilled water valve was closed when it should have been open. The valve was left open and tagged to remain open while chilled water was being used.
- CES observed excessive water entering the AA Birch Tunnel and contacted AA Birch personnel to check their potable water, irrigation, and sprinkler systems for leaks.
- The steam system planned outage occurred on September 25.
- Other minor issues and customer interactions are noted in the monthly reports from CES.

VII. Recommendations

CES is obligated to meet the standard of good utility practice and performance guarantees as outlined by the ARMA. CES continues to improve its operation and has succeeded in meeting several of the guaranteed metrics. In TEG's opinion, CES needs to continue their efforts to improve the operations of the EGF to meet the remaining metrics more consistently. In addition, CES has improved its maintenance over the last several quarters reducing the number of previously unaddressed items included in TEG's quarterly walkthrough reports regarding manholes and the EGF. However, there are several outstanding manhole and tunnel items in this report which have appeared in previous reports. CES needs to expeditiously address any long-outstanding items.

Based on the review of the First Quarter FY24 EGF and EDS operations, the following recommendations are made.

- CES needs to address the maintenance items included in the EGF and EDS Walkthrough sections of this report as soon as possible.

- CES needs to increase their preventative maintenance program to decrease the number of equipment malfunctions and trips within the EGF or otherwise improve the operation of the system to prevent such frequent occurrences in the future.
- The structural steel within vaults and tunnels that has been professionally cleaned and coated should be closely monitored so that if deterioration occurs, it can be addressed quickly and cost effectively.
- Structural steel within the vaults and tunnels that have not been professionally cleaned and coated which exhibit evidence of corrosion should be cleaned and coated by CES using cold galvanizing paint to mitigate the progression of corrosion.
- Insulation that is absent or in disrepair in the vaults and tunnels should be repaired or replaced.
- Steam traps which need repair or replacement should be addressed immediately.
- 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.
- CES should continue to remove debris and mud from manholes.