



Operations Monitoring Report

Third Quarter FY24

Prepared by:

**Thermal Engineering Group, Inc.
105 Hazel Path Court, Ste 2
Hendersonville, TN 37075**

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I. Executive Summary

A review of the fiscal year 2024 (FY24) Third 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 Third Quarter FY24, CES has continued to improve the performance of the EGF resulting in consistently meeting the chilled water-electric, the steam-electric, and chilled water-water guarantees for the quarter. 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. These changes have resulted in CES more consistently meeting these metrics each month of the quarter. CES and TEG continue to monitor the efficiency and performance of the DES looking for means of improving the system.

For the Third Quarter FY24, the chilled water sales decreased 2.4% over the previous Third Quarter (FY23). The chilled water sendout also decreased 3.2% over the previous Third Quarter. However, the system losses decreased 14.3%. The number of cooling degree days decreased 10.5% which is representative of cooler weather. The peak chilled water demand for the current quarter was 10,996 tons, which is 8.9% lower than the previous Third Quarter.

Steam sendout for the current quarter increased 9.5% over the previous Third Quarter with steam sales also increasing 7.8%. This increase came with a 3.6% decrease in heating degree days reflective of warmer weather. Overall, the Third Quarter was milder than usual. Total steam system losses increased 28.9% from the previous Third Quarter. The peak steam demand for the current quarter is 145,600 pounds per hour, which represents an increase in the previous Third Quarter demand of approximately 7.7%.

Work continued with the DES Capital and Repair & Improvement Projects during the Third Quarter. Repair and Improvements to the EDS continued as scheduled. Of the sixteen open projects, CES currently is only involved in seven. Of these seven projects, two will be closed during the Fourth Quarter. 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 DES218, DES219, DES220 and DES221 have been added. Projects DES206, DES207, DES208, DES209, DES215 and DES216 were either closed or are now in close-out.

The current fiscal year system operating costs to date are \$14,836,423. This value represents approximately 66.9% of the total budgeted operating cost for FY24 and includes all Self-Funded Debt Service Payments to date. The customer revenues from the sales of steam and chilled water for FY24 are \$14,906,004 (68.4% 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, Metro has reported the transfers for the Metro Funding Amount (\$288,300; 75% of budget) has been made. 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 Third Quarter chilled water sales is shown in Figure 1. This data reflects a 2.4% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

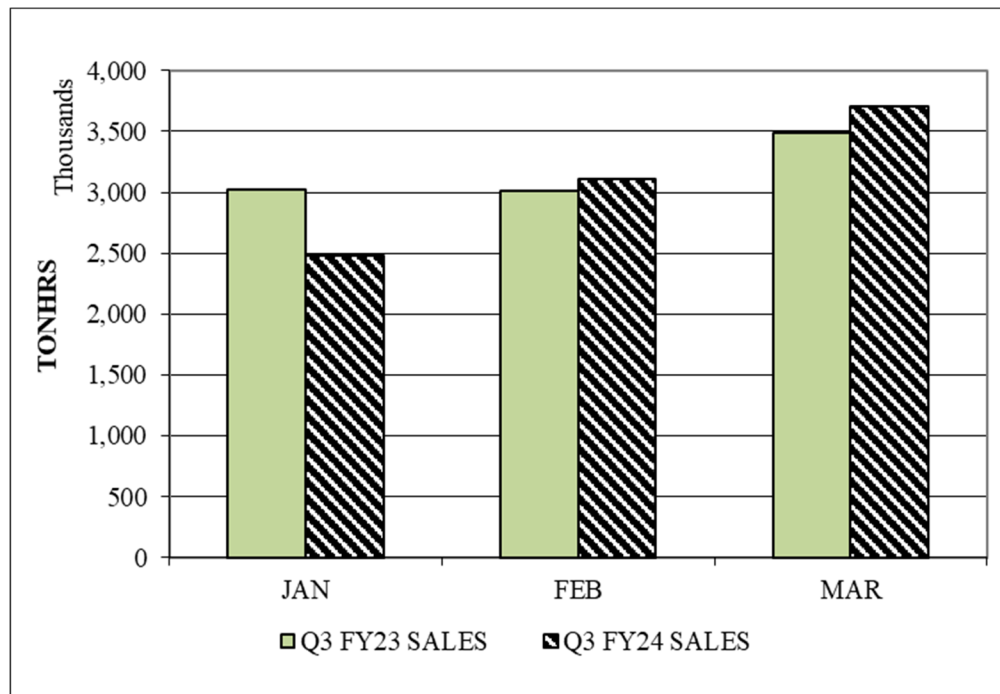


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 10,996 tons, which represents an 8.9% decrease over the previous Third Quarter.

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS. The number of cooling degree days were 10.5% lower in FY24 than in FY23 and are tracked for comparison.

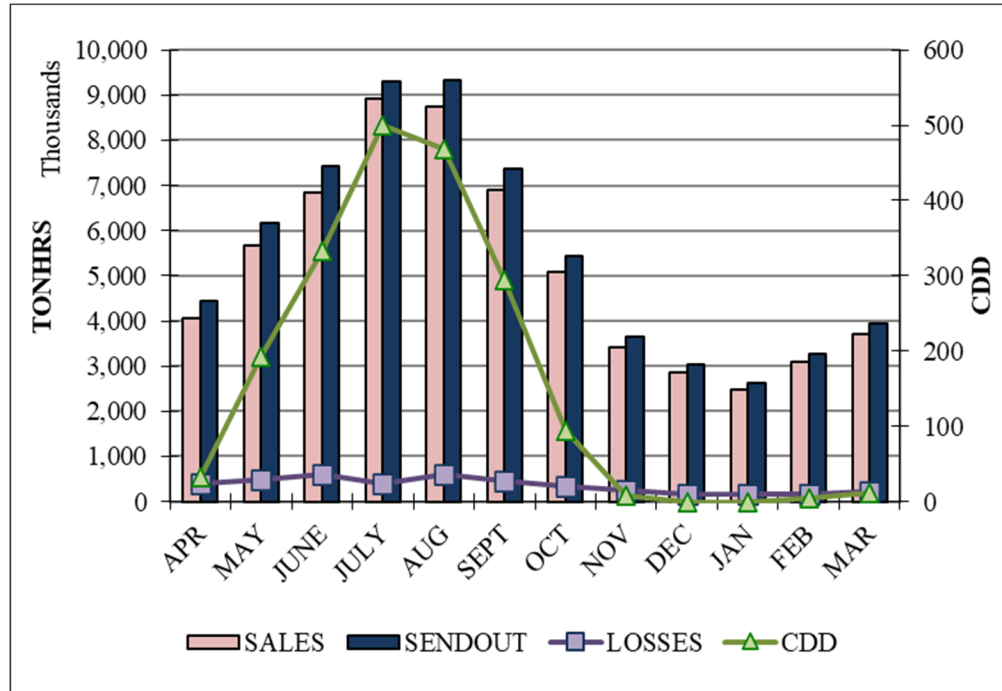


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

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 FY24. However, the losses for the Third Quarter have decreased (14.3%).

A comparison of the total chilled water energy losses in the EDS for the Third 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.

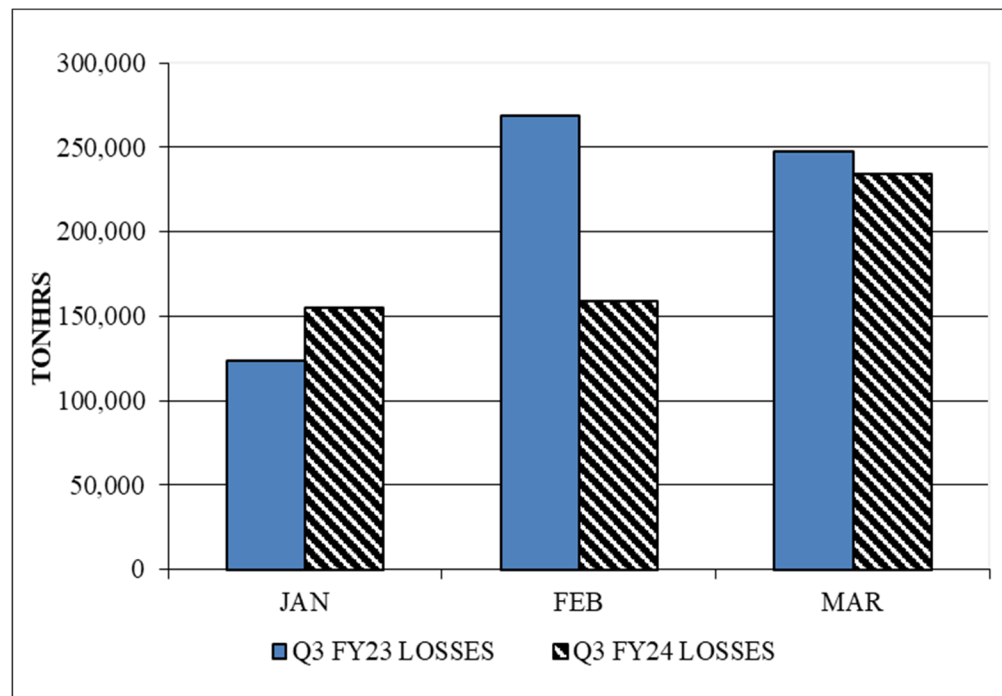


Figure 3. Chilled Water System Loss Comparison

The EDS make-up decreased 57.1% over the previous Third Quarter as the average daily make-up amounts have dropped to less than 9,000 gallons per day (on average for the quarter). 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 5.7% over the previous Third Quarter. The water usage in the cooling towers is typically proportional to the production of chilled water and should vary with chilled water sales. The total chiller plant water use decreased 10.6% over the Third Quarter FY23 (due to a decrease in sales). The

overall city water make-up comparison for the chilled water system Third Quarter is shown in Figure 4.

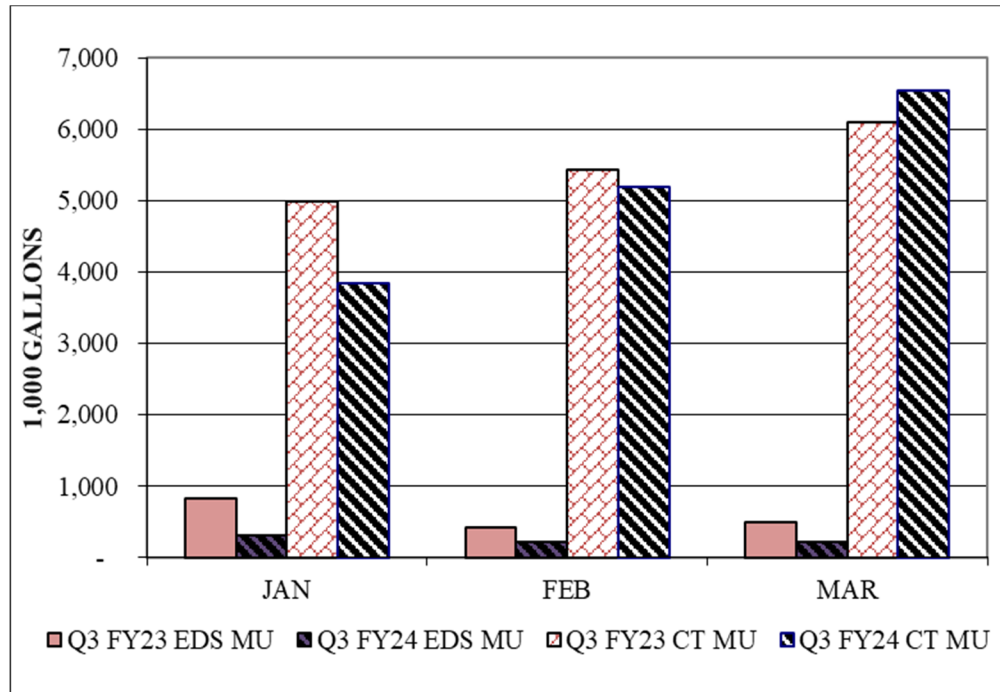


Figure 4. Chilled Water System City Water Usage Comparison

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. Improvements in this metric are shown in Figure 5. When a comparison is made between the Third Quarter FY24 and FY23, the ratio increased 28.3%. 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. The data shown in Figure 5 indicates a more consistent ratio in the Third Quarter.

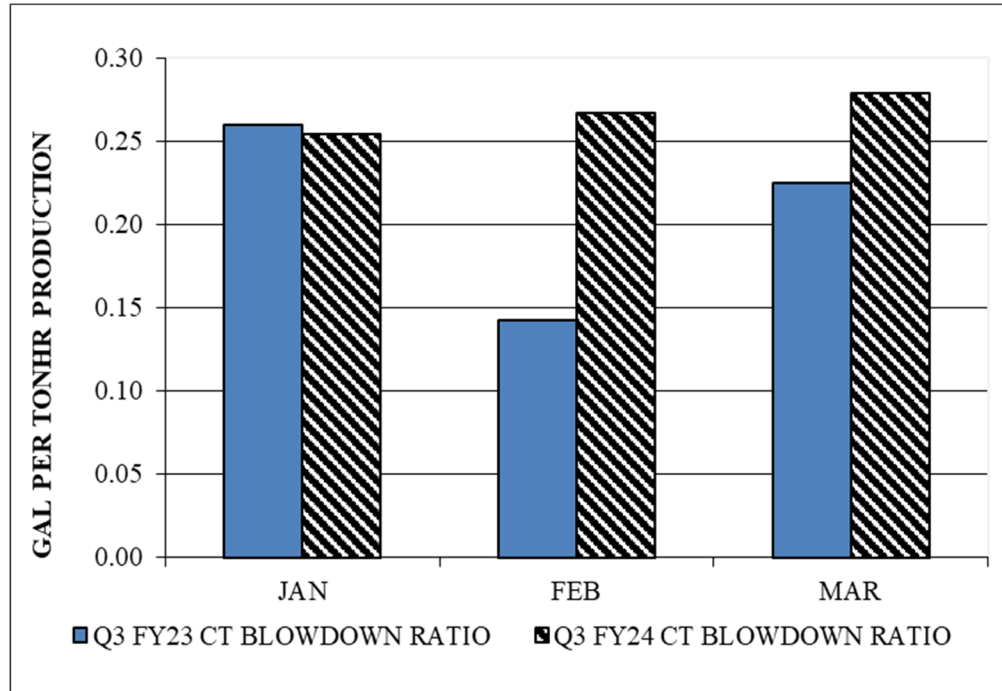


Figure 5. Cooling Tower Blowdown Ratio Comparison

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 these two chilled water metrics for each month of the Third Quarter. The chilled water-electric guarantee has also been met for the previous twelve months. The chilled water-water guarantee was met each month during the quarter.

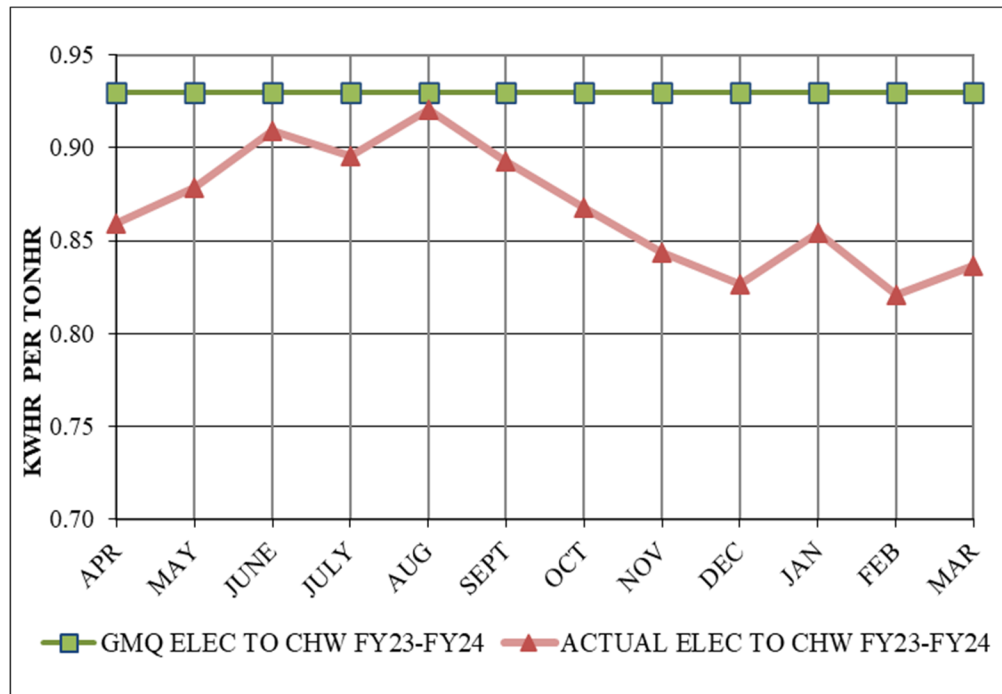


Figure 6. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

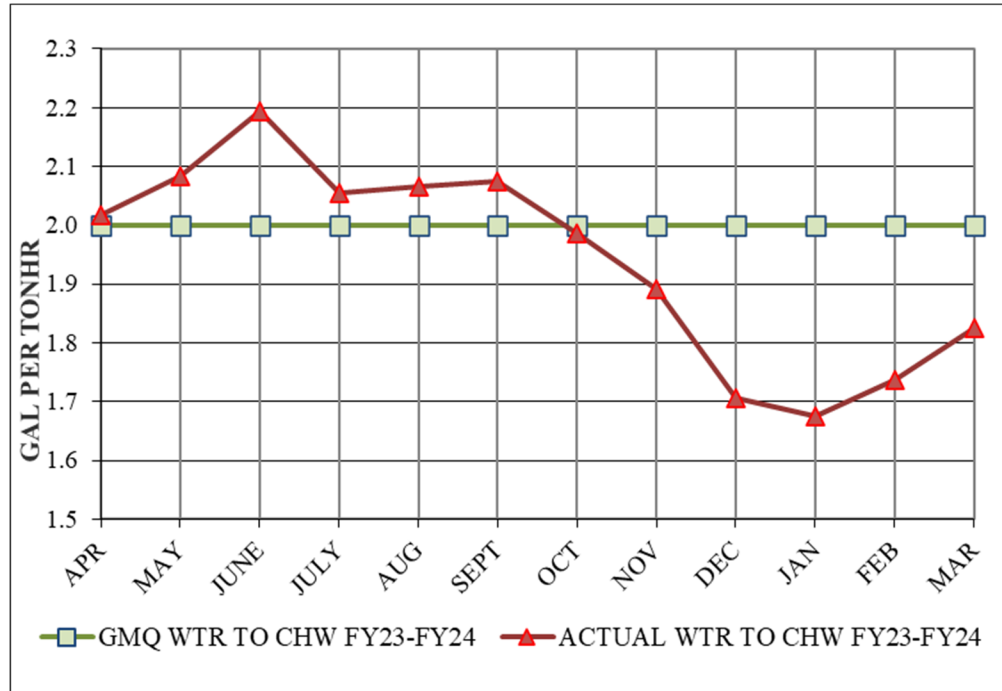


Figure 7. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

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 slightly over the previous Third Quarter. 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 Third Quarter due largely to a decrease in chilled water sales. The water conversion factor for the chiller plant increased 7.0% (on average) over the Third Quarter FY23. The guaranteed value was met in each month of the quarter.

B. Steam

1. Sales and Sendout

The steam sendout increased by 9.5% over the previous Third Quarter (FY23), and the sales also increased 7.8%. However, the heating degree days during the quarter decreased 3.6% due largely to a milder than normal quarter. The steam system losses increased 28.9%, and the relative amount of condensate return increased slightly during the quarter. Condensate was dumped at a few customer buildings. Otherwise, the replacement of the condensate return pumps in MH-18 has improved the amount and consistency of the condensate return from the system. The peak steam demand for the current quarter was 145,600 pph, which reflects a 7.7% increase in the peak steam production over the previous Third Quarter. A comparison for the Third Quarter steam sales is shown in Figure 8.

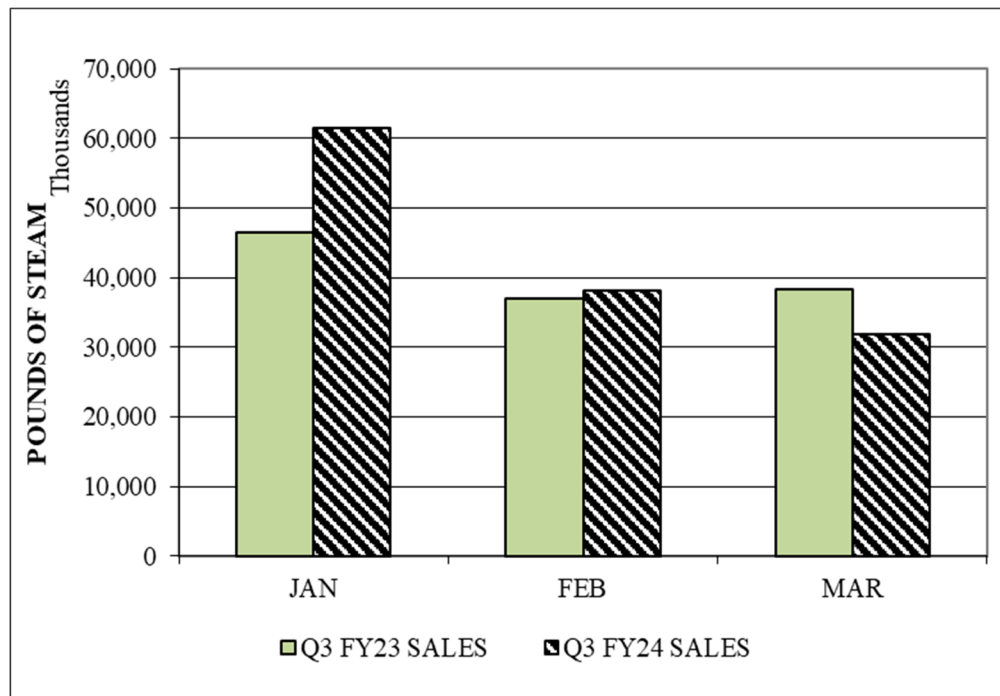


Figure 8. Steam Sales Comparison

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.

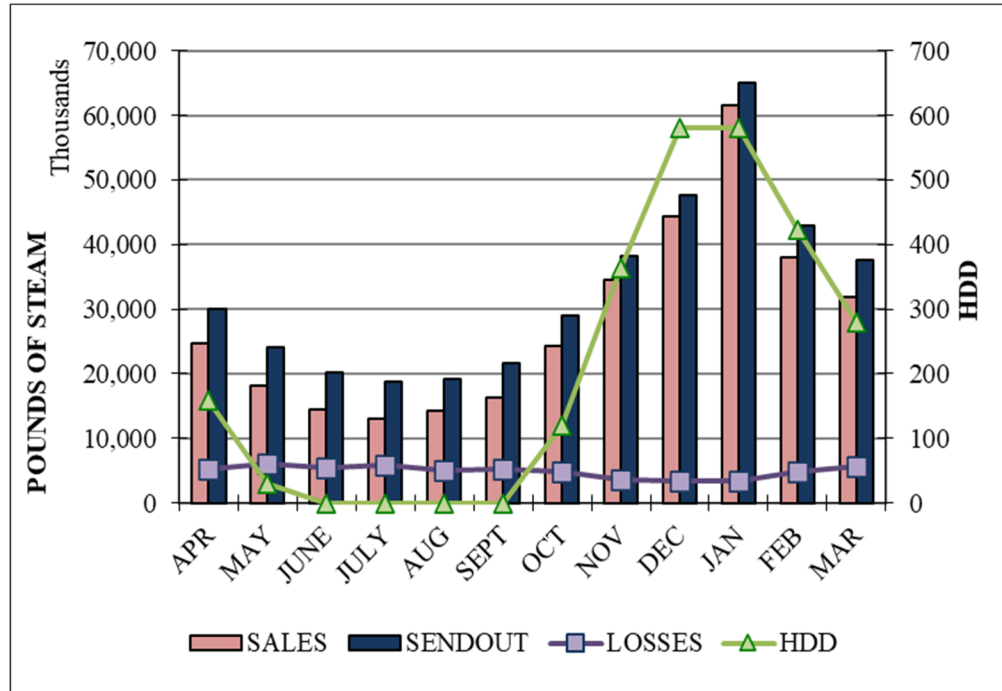


Figure 9. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Third 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 are low, steam losses are typically higher, which is reflected in the values for March in Figure 10.

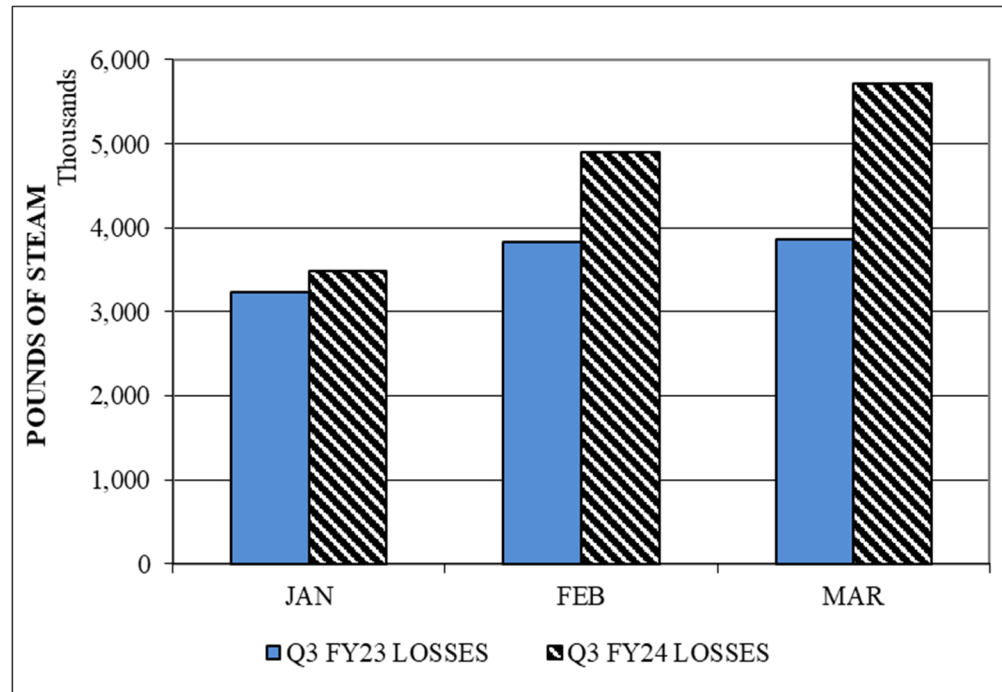


Figure 10. Steam System Losses

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 8.7% over the Third Quarter FY23. Condensate was dumped for project DES196 and at a few customer buildings. The corresponding data for steam system make-up is shown in the comparison of Third Quarter data in Figure 11.

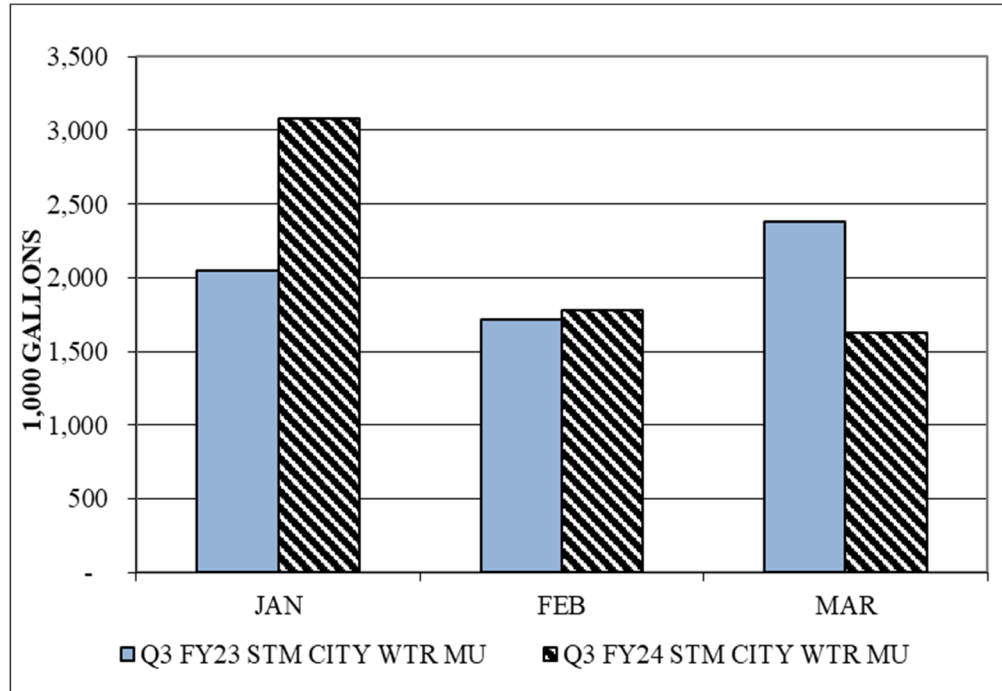


Figure 11. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system of the EGF is presented in the following three charts, Figures 12, 13 and 14. The steam electric conversion factor was met each month of the quarter. The steam plant electric consumption for the current quarter was 8.7% higher in FY24 than in FY23. The steam-electric metric increased 4.1% over the previous Third Quarter. The monthly steam-to-electric conversion factors, along with the guaranteed values, are shown in Figure 12.

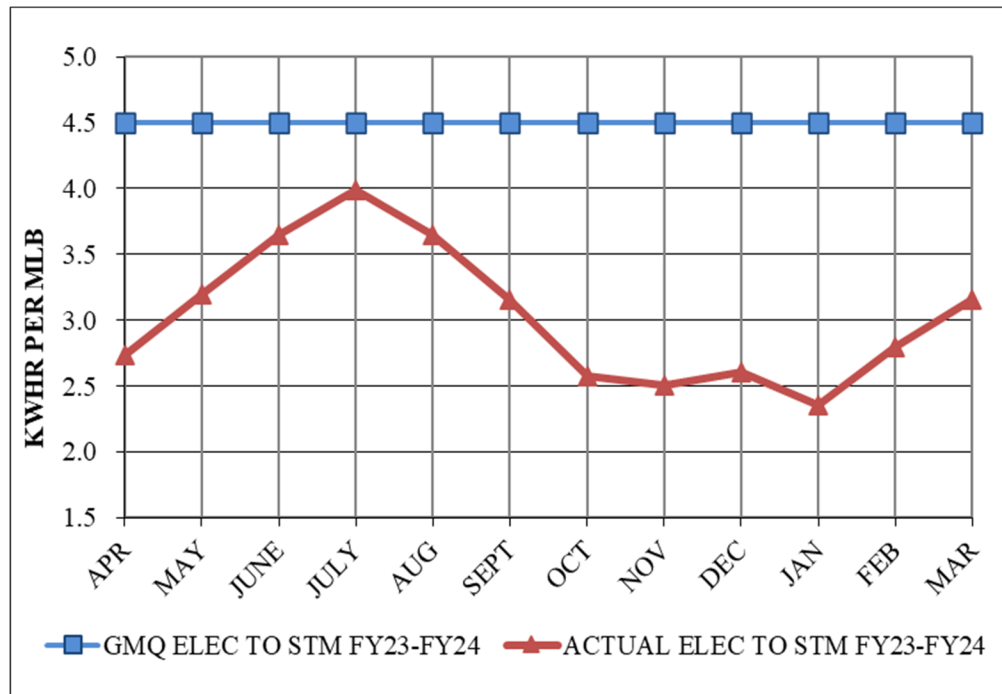


Figure 12. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

The steam water conversion factor exceeded the guaranteed values for each month during the quarter. 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. The steam water conversion factors are shown in Figure 13.

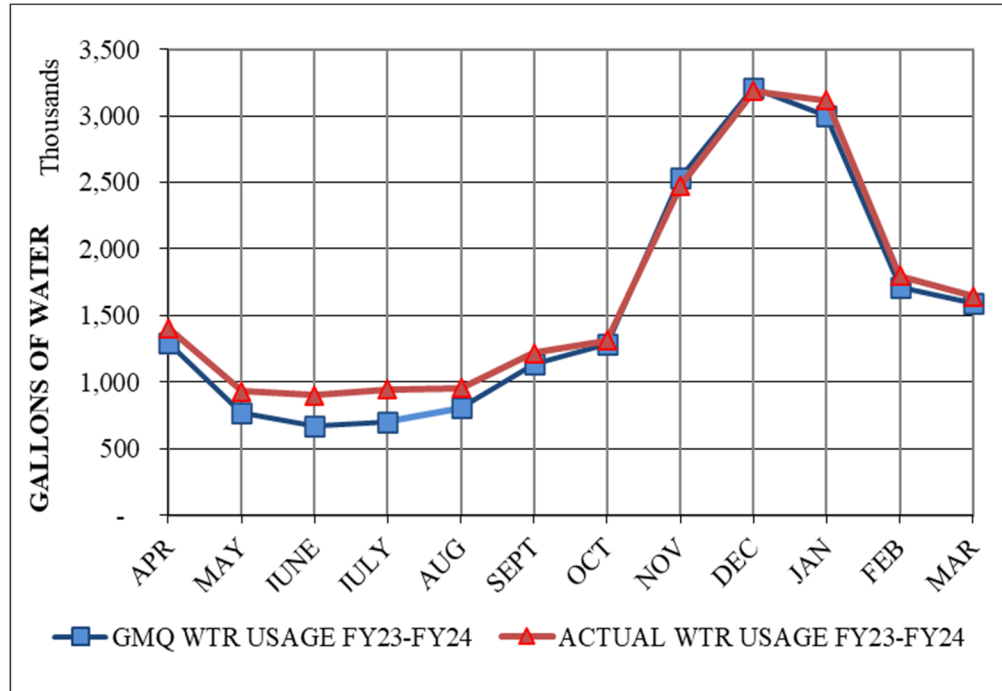


Figure 13. Steam Plant Water Performance Guarantee for the Previous Twelve Months

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 Third 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.

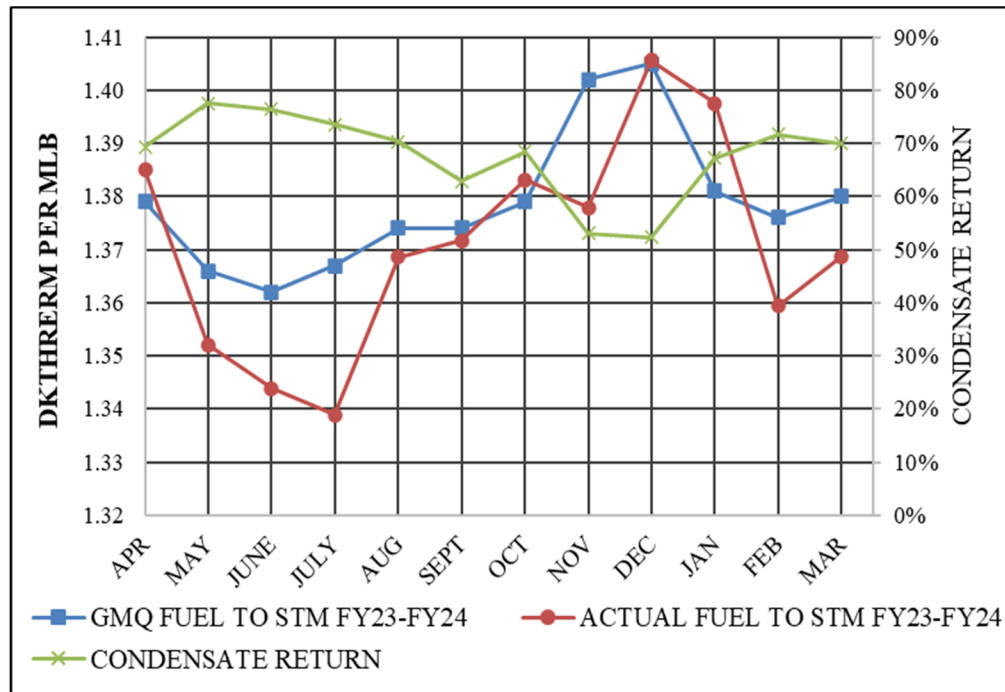


Figure 14. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

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

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

Item	Unit	Third Quarter FY24	Third Quarter FY23	*Percent Difference
	days	91	90	1.11%
Total Electric Use	kWhrs	8,118,538	8,246,525	-1.55%
Chilled Water	kWhrs	7,766,657	7,922,749	-1.97%
Steam	kWhrs	351,881	323,776	8.68%
Total Water Use	kgal	22,815	24,395	-6.48%
Total Chilled Water	kgal	16,323	18,253	-10.57%
EDS Make-up	kgal	749	1,744	-57.05%
Cooling Towers	kgal	15,574	16,509	-5.66%
Calc CT Evaporation	kgal	12,933	14,164	-8.69%
CT Blowdown	kgal	2,641	2,345	12.61%
Calc # Cycles		4.90	6.04	-18.91%
Sidestream Filter Backwash	gal	35,420	0	0.00%
Steam	kgal	6,492	6,142	5.70%
Total Fuel Use	mmBTU	200,664	182,724	9.82%
Natural Gas	mmBTU	199,861	182,692	9.40%
Propane	mmBTU	803	33	2333.33%
Condensate Return	kgal	12,356	11,215	10.17%
	lbs	100,774,596	91,470,248	10.17%
Avg Temp	°F	175.0	173.0	1.16%
Sendout				
Chilled Water	tonhrs	9,838,600	10,159,500	-3.16%
Steam	lbs	145,528,000	132,864,000	9.53%
Peak CHW Demand	tons	10,996	12,066	-8.87%
Peak Steam Demand	lb/hr	145,600	135,150	7.73%
CHW LF		40.97%	38.98%	5.10%
Steam LF		45.76%	45.51%	0.55%
Sales				
Chilled Water	tonhrs	9,290,081	9,519,430	-2.41%
Steam	lbs	131,428,062	121,922,304	7.80%
Losses				
Chilled Water	tonhrs	548,519	640,070	-14.30%
Steam	lbs	14,099,938	10,941,696	28.86%
		9.69%	8.24%	17.65%
Degree Days				
CDD		17	19	-10.53%
HDD		1,283	1,331	-3.61%
Cooling Tower Blowdown Ratio				
Cooling Tower Blowdown	gal	2,640,656	2,345,000	12.61%
Chilled Water Production	tonhrs	9,838,600	11,205,000	-12.19%
Ratio	gal/tonhrs	0.268	0.209	28.25%

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

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

GMQ Calculations	Unit	Third Quarter FY24	Third Quarter FY23	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	4.50	4.50	
Electric Conversion	kWhr/Mlb	2.77	2.66	4.05%
GMQ Plant Efficiency	Dth/Mlb	1.379	1.383	
Plant Efficiency	Dth/Mlb	1.375	1.375	0.00%
Actual %CR		69.25%	68.85%	0.58%
Avg CR Temp	°F	175	173	1.16%
GMQ Water Conversion	gal	6,310,368	5,836,647	
Water Conversion	gal	6,556,920	6,203,420	5.70%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	0.930	0.930	
Electric Conversion	kWhr/tonhr	0.837	0.832	0.60%
GMQ Water Conversion	gal/tonhr	2.00	2.00	
Water Conversion	gal/tonhr	1.75	1.88	-6.98%

*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 \$14,836,423. This value represents approximately 66.9% of the total budgeted operating cost for FY24 and includes all Self-Funded Debt Service Payments to date. The customer revenues from the sales of steam and chilled water for FY24 are \$14,906,004 (68.4% 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, Metro has reported the transfers for the Metro Funding Amount (\$288,300; 75% of budget) has been made. 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	\$ 1,031,756	\$ -	\$ 3,095,267	75.00%
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	\$ 82,934	\$ 67,911	\$ 57,548	\$ -	\$ 208,394	62.92%
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	\$ 5,136	\$ 781	\$ -	\$ 16,559	18.12%
Chilled Water	\$ 125,800	\$ (8,868)	\$ 22,361	\$ 23,939	\$ -	\$ 37,432	29.76%
Misc:							
Metro Credit	\$ -	\$ (504,153)	\$ (236,242)	\$ (182,548)	\$ -	\$ (922,943)	n.a.
ARFA	\$ 64,900	\$ 16,227	\$ 16,227	\$ 16,227	\$ -	\$ 48,681	75.01%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 4,770,700	\$ 1,166,275	\$ 1,143,391	\$ 1,130,251	\$ -	\$ 3,439,917	72.11%
Reimbursed Management Fee + Chem Treatment		\$ 1,150,801	\$ 755,260	\$ -	\$ -	\$ 1,906,061	0.00%
Metro Costs							
Pass-thru Charges:							
Engineering	\$ 53,900	\$ 18,808	\$ 28,703	\$ 24,381	\$ -	\$ 71,892	133.38%
EDS R&I Transfers	\$ 312,900	\$ 78,225	\$ 78,225	\$ 78,225	\$ -	\$ 234,675	75.00%
Metro Marketing	\$ 62,700	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 491,300	\$ 141,840	\$ 126,573	\$ 162,063	\$ 4,706	\$ 435,182	88.58%
Utility Costs:							
Water/Sewer	\$ 1,132,000	\$ 489,250	\$ 216,973	\$ 165,391	\$ -	\$ 871,614	77.00%
EDS Water/Sewer	\$ -	\$ 48	\$ 184	\$ 227	\$ -	\$ 459	n.a.
EDS Electricity	\$ 75,300	\$ 14,939	\$ 19,405	\$ 17,240	\$ -	\$ 51,585	68.51%
Electricity	\$ 6,269,000	\$ 1,991,229	\$ 950,244	\$ 834,058	\$ -	\$ 3,775,530	60.23%
Natural Gas Consultant	\$ 12,400	\$ 3,330	\$ 4,500	\$ 6,120	\$ 1,620	\$ 15,570	125.56%
Natural Gas Transport	\$ -	\$ 55,762	\$ 110,894	\$ 129,004	\$ -	\$ 295,660	n.a.
Natural Gas Fuel	\$ 3,904,400	\$ 329,756	\$ 682,031	\$ 866,619	\$ -	\$ 1,878,406	48.11%
Propane	\$ 140,400	\$ 82,366	\$ -	\$ (70,820)	\$ -	\$ 11,546	8.22%
Subtotal - Metro Costs =	\$ 12,454,300	\$ 3,205,553	\$ 2,217,733	\$ 2,212,506	\$ 6,326	\$ 7,642,118	61.36%
Subtotal - Operations =	\$ 17,225,000	\$ 4,371,828	\$ 3,361,124	\$ 3,342,757	\$ 6,326	\$ 11,082,035	64.34%
Debt Service							
2012A Bonds	\$ 3,035,500	\$ 769,787	\$ 769,787	\$ 769,787	\$ -	\$ 2,309,362	76.08%
2005B Bonds	\$ 599,700	\$ 149,925	\$ 149,925	\$ 149,925	\$ -	\$ 449,775	75.00%
Series 2018	\$ 117,200	\$ 29,300	\$ 29,300	\$ 29,300	\$ -	\$ 87,900	75.00%
Series 2015C	\$ 68,500	\$ 17,125	\$ 17,125	\$ 17,125	\$ -	\$ 51,375	75.00%
Series 2017	\$ 41,800	\$ 10,450	\$ 10,450	\$ 10,450	\$ -	\$ 31,350	75.00%
Series 2013A	\$ 613,500	\$ 153,375	\$ 153,375	\$ 153,375	\$ -	\$ 460,125	75.00%
Series 2021C	\$ 122,000	\$ 30,500	\$ 30,500	\$ 30,500	\$ -	\$ 91,500	75.00%
Series 2022A	\$ 149,500	\$ 37,375	\$ 37,375	\$ 37,375	\$ -	\$ 112,125	75.00%
Series 2022B	\$ 26,300	\$ 6,575	\$ 6,575	\$ 6,575	\$ -	\$ 19,725	75.00%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ 188,200	\$ 47,050	\$ 47,050	\$ 47,050	\$ -	\$ 141,150	75.00%
Subtotal - Capital =	\$ 4,962,200	\$ 1,251,462	\$ 1,251,462	\$ 1,251,462	\$ -	\$ 3,754,387	75.66%
Total =	\$ 22,187,200	\$ 5,623,291	\$ 4,612,587	\$ 4,594,220	\$ 6,326	\$ 14,836,423	66.87%
Customer Revenues							
Taxes Collected		\$ 125,583	\$ 100,032	\$ 99,371	\$ -	\$ 324,987	n.a.
Taxes Paid		\$ 123,002	\$ 100,032	\$ 66,530	\$ -	\$ 289,564	n.a.
Interest & Misc Revenue	\$ 333,300	\$ 181,927	\$ 169,516	\$ 160,245	\$ -	\$ 511,688	153.52%
Penalty Revenues/Credits		\$ 31,029	\$ 2,212	\$ 4,915	\$ -	\$ 38,155	n.a.
Energy Revenues Collected	\$ 21,469,500	\$ 5,344,278	\$ 4,466,591	\$ 4,509,870	\$ -	\$ 14,320,738	66.70%
Revenues =	\$ 21,802,800	\$ 5,559,815	\$ 4,638,318	\$ 4,707,871	\$ -	\$ 14,906,004	68.37%
Metro Funding Amount =	\$ 384,400	\$ 63,476	\$ (25,732)	\$ (113,651)	\$ 6,326	\$ (69,581)	-18.10%

The DES serves 22 customers and 43 buildings in downtown Nashville (including the Auto Nashville Hotel). 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	\$ 3,335,078	15,842,114	\$ 0.2105	\$ 1,316,848	80,012	\$ 16.4581
State Government	\$ 2,626,485	9,570,800	\$ 0.2744	\$ 1,618,596	87,930	\$ 18.4079
Metro Government	\$ 3,818,543	19,782,622	\$ 0.1930	\$ 1,605,393	110,212	\$ 14.5664
New Customers	\$ 2,428,071	11,412,140	\$ 0.2128	\$ 1,136,172	82,741	\$ 13.7317
Total	\$ 9,780,107	45,195,536	\$ 0.2164	\$ 4,540,837	278,154	\$ 16.3249

Total Revenue \$ 14,320,944
 True-up and Adjustments (Net) \$ 585,060
 Net Revenue \$ 14,906,004

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. There were three (3) unscheduled chiller issues and five (5) boiler incidents during the quarter. The following disruptions in service occurred during the quarter.

- As chiller 4 was started on January 11, compressor A loaded but compressor B did not which caused the chilled water sendout temperature to exceed 43.3°F reaching a maximum sendout temperature of 47.8°F for eight-eight minutes. The control system did not issue an alarm, but an investigation into the issue led Trane to replace the control board on January 13.
- Boiler 3 tripped due to low water on January 17 and was immediately restarted. The trip caused the steam sendout pressure to drop to a low of 134.6 psig and was below 150 psig for forty-five minutes.
- Boiler 2 tripped due to low water on January 24. The trip caused the steam sendout pressure to drop to a low of 137 psig and was below 150 psig for sixty minutes.
- As chiller 8 was being started on February 21, the condensing water inlet valve failed to open. Another chiller was placed into service, but the delay caused the chilled water temperature sendout to exceed 43.3°F for forty-two minutes and reached a maximum temperature of 44.9°F. An investigation revealed that the inlet valve had been manually closed preventing the actuator from opening.
- A scheduled chilled water outage occurred on February 25 to 26 to replace the condensing water isolation valves on chillers 2, 3, and 8. The chilled water sendout temperature was above 43.3°F for four hours and eighteen minutes.
- Due to an issue with the boiler feedwater pump 3 on February 26, boiler 4 tripped causing the steam sendout pressure to drop below 150 psig for forty-five minutes reaching a low pressure of 128 psig. On the same day and prior to the discovered issue with boiler feedwater pump 3, the steam sendout pressure fell below 150 psig for seventy-five minutes while placing an additional boiler online. The pressure reached a low of 145 psig.
- The chilled water inlet valve on chiller 8 failed to open on March 4 as the unit was placed into service. Another chiller was immediately started, but the chilled water sendout temperature exceeded 43.3°F for thirty-two minutes reaching a high temperature of 44.6°F. An investigation revealed the inlet valve failed due to a defective solenoid valve which was replaced.

- On March 15 and 18, the safety interlocks were tested on boilers 2 and 4. These tests resulted in appropriate boiler trips, but the steam sendout pressure fell below 150 psig for forty-five minutes in each instance.
- Boilers 2 and 4 tripped simultaneously on March 19. These trips resulted in the steam sendout pressure falling below 150 psig for 120 minutes reaching a low pressure of 64 psig. The cause of the trip was believed to be caused by erratic swings in the customer load.
- 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 and in-person safety courses for their employees. Eleven employees completed their three-year refresher course on Forklift and Aerial Work Platforms.

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 69.3% of the steam sendout during the quarter, which represents a 0.6% increase over the previous Third Quarter. A portion of the condensate continued to be dumped due to project DES196 during January, and a few customers continued to dump their condensate during the quarter due to iron or hardness issues.
 - Steam and chilled water service to the Legislative Plaza and War Memorial buildings were isolated during the quarter prior to the commencement of the building's demolition activities.
 - 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 increased 12.6% over the previous Third Quarter. This increase resulted in an average decrease in the cycles of concentration in the cooling towers of 18.9%.
 - CES began monitoring and tracking the ratio of the cooling tower blowdown to the chilled water production. The average value for the quarter increased 28.3% over the previous Third 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 non-existent. Chem-Aqua's proprietary biological treatment system continues to function properly.
 - The side stream filter was installed in FY23 and became operational on May 9, 2023.
 - Although the filter has significantly reduced the amount of suspended solids in the chilled water and improved the turbidity of the system, the turbidity and iron levels have increased slightly in March and April. These results may be indicative of customers re-opening portions of their in-building systems which have been isolated during the winter months.
 - Figure 15 shows the results of several measured metrics within the chilled water system.

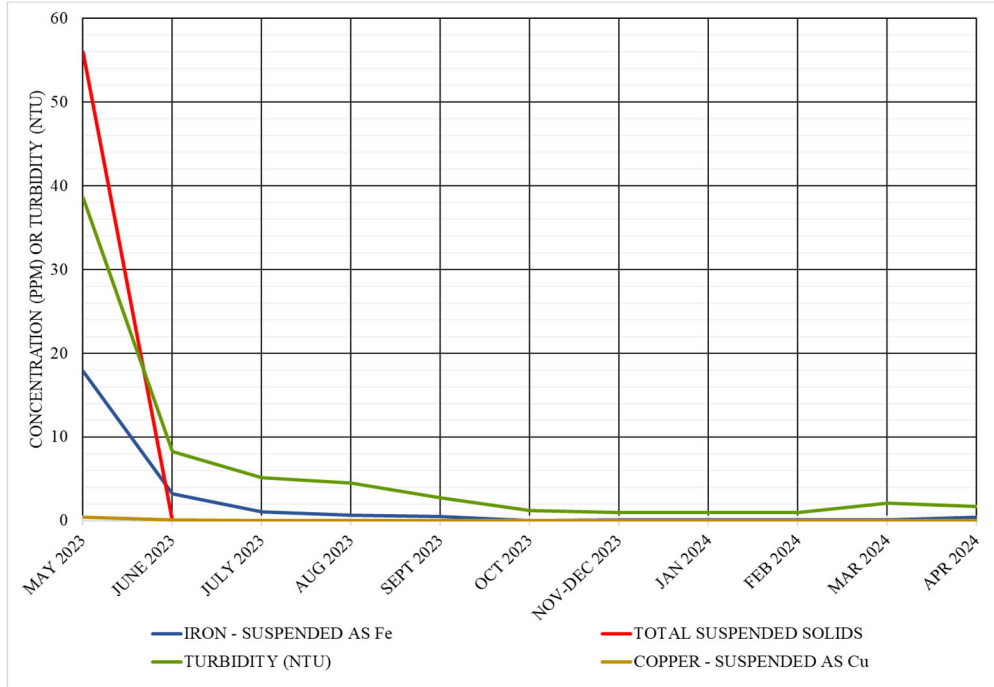


Figure 15. Chilled Water Composition Downstream of Side Stream Filter

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

- Replaced the blowdown valves on boilers 2 and 3;
- Repaired plant lighting and electrical;
- Performed annual boiler run inspections;
- Repaired softener drain line;
- Repaired air curtains 3, 4, and 5 and performed additional winterization activities;
- Installed new cooling tower makeup meter valve;
- Began annual chiller tube cleaning;

- Replaced condenser valves on chillers 2, 3, and 8;
- Installed electric transfer switch at plant air compressor;
- Repaired softener 2 controls;
- Removed and inspected rotating assembly for boiler feedwater pump 3;
- Replaced breaker on cooling tower 16;
- Replaced coupling on condensate pump;
- 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 March 27, 2024, 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) has made a significant effort to improve the cleanliness and appearance of the EGF. However, the following items were observed during this Walkthrough which require attention.

- The louvers and portions of the fill at cooling towers 1, 6 and 15 appear to have been damaged. Towers 5 and 15 have been repaired. ***CES previously stated they will wait until after the cooling season to repair towers 1 and 6; as of the date of the Walkthrough, this work has not been performed.***
- The vacuum breaker check valve on DA 2 was venting steam. **CES has purchased a replacement valve, bolts, nuts, and gasket and intends to replace the existing valve once DA 2 can be shut down. At the time of the Walkthrough, the valve had not been replaced.**
- Since the new illuminated sign has been installed on the north side of the EGF, the old signs need to be removed. **MWS, CES, and TEG have discussed this issue and are awaiting a decision from MWS.**
- Cooling Towers 14 and 15 have algae present on the louvers, fill, and/or basins. **CES was in the process of cleaning the cooling towers at the time of the Walkthrough. This item will be reviewed again in the Fourth Quarter Walkthrough.**
- The insulation on the 42” chilled water piping at the north end of the plant is damaged. **CES has repaired this insulation. This item will be removed from future reports.**
- Water is leaking from or around a roof drain or sanitary vent onto the main operating floor near boiler 3. Water was found pooling on the floor next to the switchgear panel. **CES has addressed the leak and cleaned up the area on the floor. However, corrosion on the ceiling paneling was observed. CES stated they will work to determine the source of the corrosion and investigate making repairs to the paneling.**
- The paper warning signs on the cooling tower access doors were either missing or in need of replacement. **CES needs to replace these signs.**

- Other action items previously noted to be addressed by CES have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated April 1, 2024, 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. Third Quarter FY24 Open Projects

The following projects remained open at the end of the Third 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 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. Demolition of the wall and fence by Peabody Union’s contractor (Turner) along the east side of the EGF property began in January 2024. In addition, Turner made modifications to the sewer and installed new curb inlets along the DES property line during the quarter.

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 earlier in FY24 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 agreed to pay DES for one-half the price of the latch and card reader on the north pedestrian gate previously and submitted the payment to the Trustee during the quarter.

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. 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.

3. DES195 – DES Parking Area

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

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

CES identified condensate entering the western condensate pipe wall penetration in MH-9. The 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. (This section of piping contains the condensate return from most of the State buildings.)

Construction began during the Second Quarter FY24. During construction it was discovered that some of the exposed casing of the adjacent steam piping was found to be in very poor condition and had to be repaired.

The condensate return piping was put back into service on January 10, 2024. Site restoration continued and a punch list review was conducted in late February. Punchlist items were to be addressed in March with a final walkthrough to be conducted in April 2024. Final paving is awaiting direction from NDOT. It is anticipated that this project will be closed during the 4th Quarter FY24 pending final paving and review of cost substantiation for change order items.

5. 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.

MDHA has placed their proposed development at Shelby Street and 5th St on hold. There were no other activities for this project during the quarter.

6. DES202 – 7th and Commerce Hotel

The developer for the new hotel has reported their work on the site remains on hold.

7. DES203 – Printers and Bankers Alley Building

The engineers for the developer reported the project is on hold.

8. DES206 - 7th Ave Fan Replacement

Punch list items were completed during the Third Quarter FY 24. This project is in close-out.

9. DES207 – MH N1 Insulation

This project was completed during the Third Quarter FY24 and is now closed.

10. DES208 – 2023 Steam Outage

The cost substantiation review was completed during the Third Quarter FY24. This project is now closed.

11. DES209 – MH B2 Sump Pump Discharge Repair

The cost substantiation review was completed during the Third Quarter FY24. This project is now closed.

12. 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 developed a scope of work, drawings, and specifications for this project and presented the same to CES for pricing. Pricing was received from CES and was approved. The work is being scheduled and it is anticipated that this work will take place during the Fourth Quarter FY24.

13. DES212 – MH 2 End Can Replacement

The existing western end can at the steam piping wall penetration is badly corroded and requires replacement. TEG provided scope documents to CES and the installing contractor, and TEG met with the installing contractor on-site to review the work scope. Most of this work took place during the Second Quarter FY 24. TEG performed a review of the work and noted some punch list items. Additionally, concrete damage to the interior wall of this manhole was discovered during this work. The concrete was repaired during the Third Quarter FY 24 along with final repairs to the wall penetration.

TEG is awaiting final cost substantiation for review. It is anticipated that the cost substantiation will be completed during the Fourth Quarter FY24, and this project will then be closed.

14. 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 movements. This project addresses the replacement/repair of these supports.

TEG conducted a site review to confirm the extent of the work needed; 208 supports were found to be worn/damaged. TEG has modeled these supports to determine the resulting forces on the supports based on varying friction factors. Due to the high number of worn/damaged supports, TEG will initially concentrate on completing a repair design for the highest priority supports. It is anticipated that the design documents will be completed during the Fourth Quarter FY24, followed by bidding of the work.

15. DES214 – Trane “R’newal” of Chiller 2

During the Second Quarter, CES observed anomalous operation with chiller 2. The chiller was shut down and Trane investigated the apparent issues. As a result, significant repairs to the unit became necessary. Trane and CES reported a plan to DES which would result in replacing the motors, compressors, most of the rotating parts, and several other components of the chiller while offering DES a seven-year warranty on the twenty-year-old chiller. Metro accepted this offer and agreed to pay approximately two-thirds of the “R’newal” program cost while CES pays for the remaining portion.

The work on the chiller began in January 2024 with CES performing an initial startup on the chiller on March 15. TEG witnessed the startup and operation of the chiller until it achieved its leaving chilled water setpoint on March 19. Chiller 2 was observed to have satisfied its leaving chilled water set point temperature without fault. Adequate documentation for the start date of the warranty has not been provided by Trane as of the end of the quarter.

16. DES215 – State Utility Survey

The State of Tennessee conducted a survey of all the underground utilities on the State Capitol property which includes the State Tunnel System. TEG attended a few meetings regarding the State Tunnel System and CES has been asked to provide One-Call markings of the piping/tunnel. Not knowing the extent of TEG’s participation, this project number was established to track TEG’s time and expenses related to this project. The survey work has been completed therefore this project is being closed.

17. DES216 – Manholes 6, 12 and 13 Repairs

The structural steel in Manholes 6, 12 and 13 has some active corrosion that needs to be addressed before metal replacement is required. The work began during the Second Quarter FY24 and was completed during the Third Quarter FY24. This project is now in close-out.

18. DES217 – Auto Nashville Hotel, LLC DES Service Connection

A new customer, Auto Nashville Hotel, LLC, will be constructing a new hotel at the intersection of 8th Avenue South and Demonbreun St within the next few years. The executed Customer Service Agreement for chilled water service to this customer was returned in January 2024. Based on the customer's current schedule, service during construction will be required in October 2025. This project will track costs associated with the post-marketing efforts, engineering, surveying, and construction of the new service.

19. DES218 – Manholes B2, B6, B7, B8, B9 and 22B Steel Cleaning/Coating

The piping support steel in manholes B2, B6, B7, B8 and B9 has areas of corrosion that need to be professionally cleaned and coated, this project addresses those needs.

Manhole 22B has 4 piping wall penetrations which is experiencing water intrusion from a city water leak. Metro Water Services has investigated the area for piping leaks but has been unsuccessful in identifying the leak location. CES has also tightened the link seals at these penetrations, but this has not stopped the inflow of water. This water is flowing down a vertical shaft to the 7th Ave Tunnel and is causing damage to DES piping and piping supports. Therefore, this project also includes the sealing of these penetrations with hydraulic cement to stop the inflow of water.

Work has begun on this project, and it is anticipated that all work will be completed during the Fourth Quarter FY24.

20. DES219 – 7th Ave Tunnel Shotcrete Expansion

There is an area in the 7th Ave Tunnel that is about 100 feet in length that has experienced water infiltration for several years due to a city water leak. (This is in the same area as Manhole 22B – project DES218 above.) Metro Water Services has investigated the area for piping leaks but has been unsuccessful in identifying the leak location.

DES has completed projects to protect and preserve the DES piping and pipe supports in this area, but the water inflow has increased in recent months, and it is

apparent that action needs to be taken before major damage to DES piping and piping supports occurs.

This project involves the extension of the existing shotcrete and drainage wicks in this 100-foot-long tunnel section to contain and direct the water inflow to the tunnel floor and prevent it from impacting the pipe and piping supports. With CES assistance, TEG met with a specialty contractor to review the work scope in the 7th Ave Tunnel. The work scope is impeded by the steam and condensate return service piping to the Metro Library. Upon evaluation of the options, TEG expects the relocation of the piping to facilitate the shotcrete work will be the most cost-effective solution.

TEG is preparing drawings and specifications for the relocation of this service piping. It is anticipated that this work scope will be bid during the Fourth Quarter FY24 at which time a decision will be made to proceed with this option or extend the shotcrete and wicking with the current service piping in-place.

21. DES220 – MH 20 Condensate Return Repair and Grating Addition

The condensate return piping in the vertical shaft of Manhole 20 failed due to corrosion and required replacement. In addition, the vertical shaft opening in the floor of Manhole 20 presents a safety hazard to maintenance personnel. This project addresses both needs.

Work began on the piping replacement during the Third Quarter FY24, with work on the grating addition to take place during the Fourth Quarter FY24.

22. DES221 – War Memorial Service Modifications

The State of Tennessee is completely renovating the interior of the War Memorial Auditorium and adjacent Legislative Plaza. This renovation work will involve the removal and replacement of the interior chilled water, steam and condensate return piping. This work will require the isolation of this building from the DES system which involves time and planning on the part of CES and TEG and may involve the partial draining of chilled water service piping. Therefore, a project number was assigned to this project.

The renovations will be ongoing for several months, with intermittent participation on the part of TEG and/or CES. This project will remain open for the duration of the renovations.

B. Third Quarter FY24 Closed Projects

DES191, 194, 207, 208, 209, and 215 are closed. DES206 and 216 are in close-out.

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	\$ 7,995	\$ 92,215	\$ 926,587
DES178	MH-5 Repairs	\$ 97,500	\$ 21,385	\$ 53,182	\$ 44,318
DES191	MH 20 Repairs	\$ 94,875	\$ 47,453	\$ 116,508	\$ (21,633)
DES192	Peabody Developments	\$ 40,000	\$ 114	\$ 28,803	\$ 11,197
DES194	MH-B4 Repairs	\$ 80,000	\$ 888	\$ 31,129	\$ 48,872
DES195	DES Parking Lot	\$ 275,000	\$ -	\$ 12,688	\$ 262,312
DES196	Condensate Line Leak Repair at MH9	\$ 715,000	\$ 581,339	\$ 597,637	\$ 117,363
DES198	MH18 Condensate Return Pump Replacement	\$ 175,000	\$ 181,248	\$ 228,468	\$ (53,468)
DES200	Sidestream Filter	\$ 330,000	\$ 396	\$ 5,597	\$ 324,403
DES201	East Bank and Oracle Development	\$ 110,000	\$ 8,575	\$ 41,708	\$ 68,292
DES202	Service to 7th and Commerce	\$ 1,630,000	\$ 14,486	\$ 28,528	\$ 1,601,472
DES203	Service to Printer's Alley Residential	\$ 850,000	\$ 57	\$ 1,564	\$ 848,436
DES206	7th Avenue Fan	\$ 110,000	\$ 41,227	\$ 65,629	\$ 44,371
DES207	MH N1 Insulation	\$ 25,300	\$ 5,128	\$ 8,103	\$ 17,197
DES208	2023 Stm Outage	\$ 33,000	\$ 2,360	\$ 4,611	\$ 28,389
DES209	MH B2 Pump Line Repair	\$ 44,000	\$ 3,353	\$ 3,467	\$ 40,533
DES210	MH C Sump Pump	\$ 125,000	\$ 13,321	\$ 13,321	\$ 111,679
DES211	MHD and AA Birch Tunnel	\$ 141,500	\$ 14,476	\$ 14,476	\$ 127,024
DES212	MH2 Repair	\$ 46,500	\$ 5,659	\$ 5,659	\$ 40,841
DES213	Tunnel Support Repair	\$ 321,500	\$ 21,777	\$ 21,777	\$ 299,723
DES214	Chiller 2 R'newel	\$ 330,000	\$ 3,559	\$ 3,559	\$ 326,441
DES215	State Utility Mapping	\$ 4,000	\$ 725	\$ 725	\$ 3,275
DES216	MH6, 11 and 12 Coating	\$ 37,400	\$ 3,516	\$ 3,516	\$ 33,884
DES217	DES Service to AutoNashville Hotel, LLC	\$ 3,079,000	\$ 4,755	\$ 4,755	\$ 3,074,245
DES218	MH B2,B6,B7,B8,B9 and 23B Cleanout/Coatings/Repairs	\$ 60,500	\$ 2,740	\$ 2,740	\$ 57,760
DES219	7th Ave Tunnel Repairs	\$ 391,600	\$ 22,684	\$ 22,684	\$ 368,916
DES220	MH20 Cond Repair & Grating	\$ 51,700	\$ 5,971	\$ 5,971	\$ 45,729
DES221	WM/LP Service Modifications	\$ 100,000	\$ 3,765	\$ 3,765	\$ 96,235
Total Closed Projects		\$ 4,607,490	\$ -	\$ 4,607,490	\$ -
Metro Project Admin		\$ -	\$ -	\$ -	\$ -
Project Man, Development, etc		\$ 11,075,333	\$ -	\$ -	\$ 11,075,333
Fund Total		\$ 26,000,000	\$ 1,018,950	\$ 6,030,274	\$ 19,969,726

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

Several EDS repairs and improvements were made during the Third 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 \$199,684. 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	DES-2450	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	DES-2448	CES	\$ 20,361.63		
DES206 7th Ave Fan	9/20/2023	DES-2448	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	DES-2450	CES	\$ 34,376.27		
DES208 Steam Outage	10/18/2023	-	CES	\$ 27,529.33		
CES Sept 2023 R&I	10/18/2023	DES-2450	CES	\$ 5,403.74		
Sub-Total First Quarter				\$ 112,647.21	\$ 78,225.00	\$ 243,851.86
Interest	10/02/23	-	-	\$ 2,405.30		
Interest	10/02/23	-	-	\$ (2,405.30)		
CES Oct 2023 R&I	11/15/23	DES-2452	CES	\$ 1,703.69		
Interest	11/01/23	-	-	\$ 2,607.47		
Interest	11/01/23	-	-	\$ (2,607.47)		
CES Nov 2023 R&I	12/21/23	-	CES	\$ 7,113.55		
DES-194 MHB4 Steel	12/22/23	-	CES	\$ 46,170.00		
DES-198 MH18 Cond Pumps	12/22/23	-	CES	\$ 1,400.26		
Interest	12/01/23	-	-	\$ 1,707.22		
Interest	12/01/23	-	-	\$ (1,707.22)		
CES Dec 2023 R&I	01/18/24	-	CES	\$ 1,446.77		
Sub-Total Second Quarter				\$ 57,834.27	\$ 78,225.00	\$ 264,242.59
Interest	01/02/24	-	-	\$ 1,831.04		
Interest	01/02/24	-	-	\$ (1,831.04)		
DES-207 MH-N1 Insulation	02/21/24	-	CES	\$ 6,321.76		
DES-208 Steam Outage	02/21/24	-	CES	\$ 10,106.98		
DES-216 MH6,12,13	02/21/24	-	CES	\$ 20,501.25		
CES Jan 2024 R&I	02/21/24	-	CES	\$ 25,277.61		
Interest	02/01/24	-	-	\$ 1,925.65		
Interest	02/01/24	-	-	\$ (1,925.65)		
DES-163 Payment for Gate	03/14/24	-	-	\$ (2,534.00)		
CES Feb 2024 R&I	03/25/24	-	CES	\$ 32,237.45		
Interest	03/01/24	-	-	\$ 1,901.43		
Interest	03/01/24	-	-	\$ (1,901.43)		
CES Mar 2024 R&I	04/23/24	-	CES	\$ 28,473.25		
DES-206 7th Ave Fan	04/22/24	-	CES	\$ 2,860.45		
DES-209 MH-B2 Sump Pump Repair	04/22/24	-	CES	\$ 41,617.50		
DES-212 MH-B2 End Can Repair	04/23/24	-	CES	\$ 3,996.29		
Sub-Total Third Quarter				\$ 168,858.54	\$ 78,225.00	\$ 173,609.05
Sub-Total Fourth Quarter				\$ -	\$ 26,075.00	\$ 199,684.05
FY24 Year to Date				\$ 339,340.02	\$ 260,750.00	\$ 199,684.05

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 tunnels; CES is planning to address some of these areas in the very near future.
 - 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

This quarter's walkthrough was conducted on January 23 and 24, 2024. The manholes that were visited include Manholes 15, 16 (both integral to the 4th Ave Tunnel), 22 and 23 (both integral to the 7th Avenue Tunnel), and 18 (integral to the Broadway Tunnel). The tunnels that were visited include 4th Avenue, 7th Avenue, Broadway, AA Birch, and State. As a reminder, TEG reviews ~25% of the manholes/tunnels each quarter so that all manholes and tunnels are reviewed, at a minimum, once per year.

In summary, three tunnel systems and five manholes were reviewed.

- State Tunnel
 - There are several locations within the tunnel with minor, moderate or major instances of concrete cracking and/or spalling, shifting of structures and/or groundwater infiltration - The State has not started the needed repairs to the tunnel structure.
 - As a result of water infiltration, several of the structural steel pipe supports have varying degrees of corrosion. The plan is to wait until the State has completed its repairs before these supports are cleaned and coated.
 - There are some insulation repairs needed along with some anchor bolt issues that need to be addressed.

- AA Birch Tunnel
 - There is some corrosion on the piping supports which CES has been addressing with wire brush cleaning and the application of cold galvanizing paint. TEG has developed scope documents to have these areas professionally cleaned and coated and this project has been awarded.
 - Other minor maintenance issues that need to be addressed include groundwater seepage at pipe penetrations which will be addressed in the cleaning and coating scope.
- 4th Avenue, 7th Avenue and Broadway Tunnels
 - There are some minor insulation repairs/additions needed.
 - There is some piping support corrosion that needs to be addressed.
 - There are some lights out that need to be addressed.
 - Some of the electrical cabinets and conduits are corroded and need replacement which CES is in process of addressing.
 - Several of the pipe supports Teflon slides are worn and/or damaged. TEG is investigating the impact of the condition of these supports on the system operation and repair solutions.
- Manholes 15 and 23
 - Groundwater intrusion in Manhole 15 is impacting the 4th Ave Tunnel - TEG is working on a remedy.
 - Some grating in Manhole 15 needs replacement.
 - Manhole 23 is experiencing corrosion “creep” at several pipe supports.
 - An end can in Manhole 23 is corroded and needs replacement.

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

1. State Tunnel
 - a. There are several locations, where the concrete tunnel structure has minor, moderate and major cracking, spalling, exposed/corroded rebar and/or shifting of structures. Some of these locations have also experienced, or are currently experiencing, water intrusion. Minor repairs are needed at the following locations: E4, E7, E8, E18, E19, E23, E25, E27, E29, E30, E31, E38, E44, E47, E48, E52, E55, E60, E63, E68, N28, N30, N37, N39, N48, W1, W8, W10, W11, W17A, W18, W26, W29, W37, W41, W46, W48, W50, W53, W57, W63, W65, W68, W70, W72 and W73. Moderate repairs are needed at the following locations: E11, E12, E13, E26, E28, E37, E47, E51, E67, E69, N4, N5, N6, N7, N11, N31, N45, N49, N50, N51, N53, N54, N55, N59, N60, N61, N62, W4, W5, W15, W43, W44, W59, W67 and W71. Major repairs are needed at the following locations: E26, E66, N19, N20, N53, N54, N63, N64, W26, W43, W44 and W45. Maintenance of the tunnel structure is the State’s responsibility. In late 2018 or early 2019, the State hired a professional structural engineer to review the major repair areas at E1 and N19/N20. Repairs were made in these areas, however, not all deficiencies at N19/N20 were addressed. The original plans for repairs at E1 included the demolition of the existing manhole and the construction

of a new cast-in-place manhole. Instead, the actual construction included the application of concrete to areas of exposed rebar, the addition of galvanized steel supports to support the existing manhole roof, and the installation of a new precast manhole upper section. However, what was originally a difficult point of exit is now even more complicated with a lower manhole roof (due to the addition of galvanized steel) which makes egress more difficult. About 2 years ago, the State hired a different structural engineer who reviewed the tunnel. At that time, a representative of the State told TEG that the purpose of the review was to evaluate the structural needs of the tunnel and then budget funds for repairs in the next 2-3 years. TEG responded that that were a couple of areas in the tunnel that probably cannot wait 2-3 years to be addressed. Since that time, the State's engineer has been back on-site at least once to perform an additional review and update their findings to put together a construction estimate. A State representative has told TEG that the State has divided the work into different phases and the State is working with the structural engineer to get the budget for each phase below \$250,000.

- b. Several of the pipe support columns/beams have minor, moderate and severe corrosion. Locations with minor corrosion include: E5, E7, E8, E11, E15, E18, E19, E20, E23, E24, E25, E29, E31, E34, E38, E46, E47, E51, E52, E53, E54, E55, E56, E58, E59, E60, E62, E63, E65, E66, N2, N3, N6, N9, N10, N11, N21, N22, N27, N28, N46, N60, W1, W5, W6, W8, W13, W14, W17, W19, W27, W64, W65, W69 and W70. Moderate corrosion exists at the following locations: E1, E2, E3, E4, E9, E17, E26, E28, E37, E44, E64, E69, N4, N5, N7, N8, N12, N13, N14, N15, N16, N17, N18, N23, N24, N25, N26, N29, N30, N31, N32, N34, N35, N36, N37, N38, N39, N40, N41, N42, N43, N44, N45, N47, N48, N49, N50, N51, N52, N53, N54, N55, N56, N57, N58, N59, N61, N63, N64, W2, W4, W8, W9, W54, W55, W56, W59, W60, W62, W63, W67, W71, W73 and W74. Major corrosion locations were addressed with DES180. These members support DES piping and are not considered part of the State's responsibility and need to be cleaned and coated. This corrosion is due to leaks in the tunnel structure and ideally, should not be repaired until the leaks are repaired (as stated above, it is the State's responsibility to repair structure leaks). The most severe areas of corrosion were cleaned and coated under DES-180. However, of those areas coated, additional corrosion has now taken place at the following locations: W27, N9, N10, N60, N62, E7 and E66 due to groundwater infiltration that is still occurring.
- c. The steam valve at station W1 had a packing leak, however CES repaired this leak during the fall 2023 steam outage.
- d. There was a small condensate piping leak near W75 that was repaired during the fall 2023 steam outage.
- e. The concrete underneath the base plate of the piping support column at Station N33 needs to be repaired. TEG has confirmed that the use of Enecon's Duraquartz product is suitable for this repair. Because Enecon is

- an approved vendor, CES should retain Enecon to make this repair and submit it as an R&I expense. **This item appeared in the 4/30/19, 4/13/20, 4/27/21, 4/13/22 and 3/27/23 reports.**
- f. There is a small steam expansion joint leak at Station W17. Once this leak is large enough to be sealed, CES should schedule this repair.
 - g. The broken steam guide support at Station W18 has been repaired, however the disturbed piping insulation has not been repaired. CES should schedule this repair as soon as possible.
 - h. The anchor bolt nuts are missing on the baseplate at Stations W18; CES should furnish and install nuts on these anchor bolts as soon as possible.
 - i. A gap exists between the base plate anchor bolt nuts and the base plate at Station W26 (the nuts are not sufficiently tightened). CES should tighten these nuts as soon as possible, or report that they cannot be tightened.
 - j. The following lights were not functioning during this review: W46/W47, N64. Maintenance of the lighting is the responsibility of the State and CES should continue to inform the State of faulty lighting. (During this review, the State had an electrical contractor in the tunnel replacing light fixtures and light bulbs.)
 - k. There is mud on the floor at the intersection of the west and north tunnel legs. The mud is the result of the city water leak that caused water infiltration at this location. The mud presents a slip hazard and can contribute to corrosion in the tunnel and should be removed. CES should contact the State and ask them to remove this mud.
 - l. One of the anchor bolts on the top plate of the pipe support column at station E19 is missing. CES should investigate if the bolt can be reinstalled and notify TEG of its findings. **This item appeared in the 4/30/20, 4/27/21, 4/13/22 and 3/27/23 reports.**
 - m. There is some insulation damage and missing insulation at Station N20. CES should address this either through their obligation under Amendment 2 or by having an insulation contractor make these repairs and submitting it as an R&I expense. **This item appeared in the 4/27/21, 4/13/22 and 3/27/23 reports.**
 - n. There is a duplex condensate pump unit at Station N20. One of the two pumps has a bad bearing and is making a lot of noise. CES should replace this pump soon before it fails.
 - o. The expansion joints at Stations W17, W64, W75, E1, E44 are not insulated. CES should obtain quotes for insulation blankets for these joints and present it to TEG. Additionally, some of the piping in these areas also need to be insulated either under CES Amendment 2 obligation or by hiring a contractor and submitting the cost as an R&I expense.
 - p. Several piping supports were cleaned and coated due to excessive corrosion. The station numbers that were handwritten on the columns are now absent from these locations. CES should re-write these station numbers on these columns. The columns missing their station numbers are at the following

locations: W4, W27, W62, W74, W75, N8, N9, N10, N13, N14, N19, N20, N61, N62, N63, E2, E12, E13, E14, E26, E29, E37, E66, and E70.

2. AA Birch Tunnel

- a. The tunnel was experiencing a fair amount of groundwater infiltration during this review due to rain that had fallen prior to, and during this review.
- b. CES should continue to monitor the active groundwater infiltration locations and report any significant changes to TEG.
- c. There is corrosion on the piping supports at several of the stations in the tunnel. CES has been addressing this by cleaning and coating these areas with cold galvanizing paint. These areas need to be professionally cleaned and coated with Enecon products. DES-211 addresses this issue and TEG will soon issue scope documents for pricing.
- d. Groundwater is seeping into Manhole D2 at the chilled water piping penetrations on the southern wall. CES has tightened the link seals to try and reduce or eliminate the leaks, however these attempts were unsuccessful. CES hired Enecon to install hydraulic cement in the linkseal cavities of the pipe penetrations. It appears that this was done; however, it looks as though a portion of the western penetration was not adequately filled. DES211 addresses this issue.
- e. There are some hairline cracks radiating from the chilled water piping penetrations in Manhole D2. CES should continue to monitor these cracks and report any significant changes to TEG.
- f. The grating and some of the structural members supporting the grating in Manhole D2 is severely corroded. DES211 addresses this issue.
- g. Some of the insulation jacketing in Manhole D3 is damaged. The next time that insulation work is needed in this tunnel, these jacketing areas should be replaced.
- h. The manway frame at Manhole D3 is chipped and should be replaced as soon as possible either under CES's Amendment 2 obligation or as an R&I expense.

3. 4th Avenue Tunnel

- a. Insulation is either damaged, absent or in need of repair at the following stations: 4-12, 4-16, 4-61/62 (see next item), 4-79, 4-87, and 4-94. These repairs should be made under CES's Amendment 2 obligations or through monthly R&I reimbursements. **Some of these items appeared in the 4/13/22 and 3/27/23 reports.**
- b. The branch steam piping insulation at station 4-62 in the bottom of the vertical shaft (Manhole 16) at the 4th and Church Building is in dis-repair. CES needs to have this insulation repaired to match the existing insulation and jacketing as soon as possible under CES's Amendment 2 obligations or through monthly R&I reimbursements.
- c. There is some minor corrosion at the base of the pipe supports at Stations 4-1, 4-3, 4-12, 4-37, 4-38, 4-42, and 4-43. CES has been cleaning and

painting some of these supports, but not all of them. Because there are some other locations experiencing some corrosion within the 7th Avenue and Broadway Tunnels, TEG will develop a scope for CES to have Enecon clean and coat these areas in a future project. Meanwhile, CES should continue to clean and coat these areas as needed.

- d. There are corroded overhead steel structures at Station 4-13. TEG will include this in the scope to be prepared for Enecon.
- e. The gearbox and handwheel of the butterfly valves at Station 4-13 were corroded. CES has cleaned and painted these gearboxes with cold galvanizing paint. CES also installed some aluminum sheet metal above one of the valves to divert groundwater. The cold galvanizing paint has not held up very well. TEG will investigate if Enecon products are suitable for this application. CES should continue to clean and paint these gearboxes as needed.
- f. The steam expansion joints at Stations 4-16, 4-45, 4-62 and 4-79 are leaking. CES should first tighten the packing injection bolts to try and stop these leaks. If this is not successful, CES should make repairs once the leaks are large enough that injection repairs will be successful.
- g. Lights are not working at the following locations: 4-12, 4-33, 4-60, 4-61, and the vertical shaft at the 4th & Church building. CES should repair these as soon as possible.
- h. Emergency lights are not working at the following locations: 4-24 and 4-74. CES should repair these lights as soon as possible.
- i. The station identification tags are missing at the following locations: 4-74 and 4-88. CES should furnish and install new tags at these locations sometime in the next year.
- j. The piping slide supports at locations 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-9, 4-10, 4-11, 4-12, 4-26, 4-27, 4-28, 4-29, 4-30, 4-32, 4-35, 4-39, 4-40, 4-42, 4-45, 4-49, 4-57, 4-68, 4-69, 4-70, 4-71, 4-72, 4-74, 4-77, 4-79, 4-84, 4-85, 4-87, 4-88, 4-89, 4-90, 4-91, 4-93, 4-94 and 4-95 are damaged. TEG is investigating the impact of these supports on the system operation and, if necessary, a repair solution.

4. 7th Avenue Tunnel

- a. There is some corrosion at the bases of the pipe supports at Stations 7-29, 7-30, 7-31, 7-34, 7-38, 7-42, 7-43, 7-45, 7-48, 7-49, 7-51, 7-57, 7-62, 7-64, 7-65, 7-68 and 7-79. CES should clean these areas with a wire brush and apply cold galvanizing paint to slow the corrosion until they can be professionally cleaned and coated by Enecon.
 - b. The piping slide supports at locations 7-1, 7-3, 7-5, 7-6, 7-9, 7-11, 7-12, 7-14, 7-15, 7-17, 7-18, 7-19, 7-20, 7-21, 7-22, 7-24, 7-27, 7-28, 7-29, 7-32, 7-35, 7-37, 7-38, 7-40, 7-41, 7-43, 7-44, 7-45, 7-46, 7-48, 7-51, 7-52, 7-54, 7-55, 7-56, 7-57, 7-59, 7-62, 7-65, 7-67, 7-68, 7-73, 7-74, 7-76 and 7-77 are damaged. TEG is investigating the impact of these supports on the system operation and, if necessary, a repair solution.
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- c. An electrical junction box at the southern end of Manhole 22 (Station 7-22) is corroded. There are also some conduits in this area that are corroded. CES should schedule to replace this enclosure and conduits within the next year with non-corrosive materials such as stainless steel. **This item appeared in the 3/27/23 report.**
 - d. The condensate piping anchor bolt nuts at Station 7-42 need to be tightened. CES should tighten these nuts as soon as possible.
 - e. The electrical junction box at Station 7-71 is not anchored. The anchoring “tab” is broken off. CES should investigate the needed repairs/replacements for this conduit and make the repair as soon as possible. **This item appeared in the 4/27/21, 4/13/22 and 3/27/23 reports.**
 - f. The steam expansion joints at Station 7-22 and 7-62 are leaking. CES should tighten the packing bolts to see if this stops the leak. If this is not successful in stopping the leak, CES should make repairs once the leak is sufficient that injection repairs will be successful.
 - g. The dripleg and a portion of the trap piping at Station 7-81 is not insulated. CES should have this piping insulated as soon as possible. **This item appeared in the 3/27/23 report.**
 - h. Remove the dirt/soil buildup around the pipe support stanchion bases at Station 7-81 to prevent the retention of moisture.
 - i. Continue to monitor the groundwater infiltration and notify TEG of any significant changes.
5. Broadway Tunnel
- a. The station number identification tags are missing at locations 02+70 and B-32. CES should furnish and install new tags at these locations sometime in the next year.
 - b. The steam expansion joints at Stations B-65, B-96 and in the Bridgestone Arena’s Service Tunnel are leaking. CES should tighten the packing bolts to see if this stops the leak. If this is not successful in stopping the leak, CES should make repairs once the leak is sufficient that injection repairs will be successful.
 - c. There is corrosion on the supports at Stations B-16, B-25, B-28, B-31, B-33, B-34, B-49, B-63, B-66, B-68, B-71, B-85, and B-95. CES should clean these areas with a wire brush and paint them with cold galvanizing paint until Enecon is scheduled to professionally clean and coat these areas.
 - d. Several of the piping supports in the Bridgestone Arena service tunnel are experiencing corrosion. These areas should be cleaned and painted with cold galvanizing paint until Enecon is scheduled to professionally clean and coat these areas.
 - e. There is debris in the Bridgestone Service Tunnel that needs to be removed.
 - f. Lights are not working at Stations B-28 and B-58. CES should repair these lights as soon as possible.
 - g. There is an emergency light at Station B-66 that is not working properly. CES should repair/replace this emergency light as soon as possible.
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- h. Some insulation is missing on the Bridgestone Arena service lines near the Arena’s mechanical room. This insulation was removed which appears to have occurred when instrumentation was installed, and when maintenance was performed on a valve. This insulation should be replaced under CES’s Amendment 2 obligation or by a contractor with the expense included in CES’s monthly R&I charges. **This item has appeared in several prior reports.**
- i. There is a thermometer on the Bridgestone Arena chilled water piping that is broken. If there is not another thermometer nearby which “reads” the same temperature (Bridgestone mechanical room?), this thermometer should be replaced as soon as possible.
- j. There is some insulation damage at Stations B-49 and B-50. This is the result of the contraction/expansion of the piping from system shutdowns. CES should have repairs made to these areas using aerogel insulation to reduce the diameter of the insulated piping to eliminate interference with the piping supports. When this is done, a smooth transition should be made between the existing insulation and the new insulation. The smaller diameter aerogel insulated piping should extend a minimum of 12” beyond the piping support column in both directions, not including the transition to the existing insulation. This insulation should be replaced under CNE’s Amendment 2 obligation or by a contractor with the expense included in CNE’s monthly R&I charges.
- k. The chilled water drain piping at Station B-62 is uninsulated. This piping should be insulated to prevent sweating and potentially prevent freezing of this piping in the winter months. This insulation should be replaced under CES’s Amendment 2 obligation or by a contractor with the expense included in CES’s monthly R&I charges. **This item appeared in the 4/22/21, 4/13/22 and 3/27/23 reports.**
- l. The condensate piping slide support at Station B-20 came out of its guide. The position of this support outside of its guide could have resulted in damage to the piping system if the condensate system had to be shut down. Therefore, TEG instructed CES to have the support re-positioned in the guide. The existing support is 8” long and the potential thermal movement at this position is 6”+. To avoid this situation from re-occurring, TEG will specify a replacement support/guide that is 12” long for CES to furnish/install. Once this new slide/guide is installed, CES should have the piping insulation re-installed.
- m. The condensate slide/guide support at B-37 recently broke loose. Upon inspection, both the support and the guide were only tacked in place. TEG instructed CES to have the slide/guide re-installed with full welds. The piping insulation was partially removed for this work. This insulation can now be re-installed.

- n. Manhole 18:
 - i. The Enecon coating on the northeastern portion of the upper beam flange at the entrance to the sump area is beginning to fail. CES should schedule Enecon to clean and re-coat this area as soon as possible.
 - ii. The Enecon coating on the bottom flange of a horizontal beam on the mezzanine level has some corrosion. CES should schedule Enecon to clean and re-coat this area as soon as possible.
 - iii. There is a beam high in the ceiling on the east end of Manhole 18 that needs to be cleaned and coated by Enecon. CES should schedule Enecon to clean and coat this area as soon as possible.
 - iv. There is some missing insulation on the vertical condensate piping in the east end of the mezzanine area. CES should have this repaired as soon as possible.
 - v. Electrical
 - 1. The sump pump electrical control enclosure on the mezzanine level is badly corroded and needs to be replaced with a non-corrosive material such as stainless steel.
 - 2. The trough box underneath the sump pump electrical control enclosure on the mezzanine level is corroded and requires replacement with a non-corrosive material such as stainless steel.
 - 3. The 3” conduit that is above the entrance to the sump area is corroded and requires replacement. (The repair plan may allow this conduit to be abandoned.)
 - 4. There is an electrical junction box located in the “ceiling” of the tunnel at the western entrance to Manhole 18 that is corroded. Some of the electrical conduits entering this junction box from the tunnel are badly corroded also.
 - 5. **CES is obtaining pricing from a contractor for the items listed above.**
 - o. The piping support Teflon slides at locations B-7, B-13, B-16, B-17, B-19, B-20, B-21, B-24, B-25, B-26, B-29, B-30, B-31, B-32, B-33, B-34, B-35, B-39, B-41, B-43, B-46, B-47, B-51, B-53, B-55, B-57, B-60, B-62, B-63, B-65, B-66, B-68, B-69, B-72, B-74, B-75, B-76, B-77, B-78, B-80, B-81, B-82, B-85, B-86, B-88, B-89, B-92, B-93, B-94, B-95, B-96 and B-97 are damaged. TEG is investigating the impact of these supports on the system operation and, if necessary, a repair solution.
 - p. There is a small hole in the northern wall at station B-49, next to the upper horizontal support connection. CNE should monitor this hole and notify TEG if there are any significant changes.
6. Manhole 15
- a. CES has been cleaning and applying cold galvanizing paint to the beams in the sidewalk intake area of Manhole 15. CES should continue to monitor these beams and clean/paint areas of corrosion as needed.
 - b. Groundwater is leaking into Manhole 15 and is flowing down the vertical
-

shaft resulting in ponding water and mud in the floor of the northern section of the 4th Avenue Tunnel. It was originally thought that this water was entering through a piping wall penetration or between the manhole floor and walls, however, the water is coming through the rock in the vertical shaft just below Manhole 15's floor. This area is extremely difficult to access. Samples of this water were analyzed by Chem Aqua and test results indicated that the source is city water. TEG will follow-up with Metro Water Services to see if they are still searching for a leak in this area.

- c. Some of the "openings" in the grating at the top of the 4th Avenue Tunnel vertical shaft are clogged with debris (this is an air intake for the 4th Ave Tunnel fans. Therefore, these openings should be cleared) and portions of the grating are corroded and need to be repaired or replaced. TEG will develop a scope for the repair/replacement of the grating and coordinate with CES to have this work done.
- d. Continue to monitor/inspect the sidewalk intake grating. If portions of the grating become damaged or warped resulting in a pedestrian trip hazard, replace grating sections as needed.

7. Manhole 23

- a. There are some surface cracks in the steam and condensate slip joint concrete pedestal on the east side of the manhole. CES should monitor these cracks and notify TEG of any significant changes.
- b. There is a steam valve in this manhole with the outlet blind flanged. The pipe blind flange connection is leaking. This flange has a clamp on it with injection nozzles because of prior leaks. CES should monitor this steam leak and make repairs once the leak is sufficient that injection repairs can seal the leak.
- c. The drain in the air intake area in the sidewalk is not draining and water has accumulated. A camera was used to scope this drain piping and it was discovered that this drain line has collapsed so the drain is not able to drain continuously and at times water will accumulate in this area. The location of the drain line collapse is about 15 feet below grade in 7th Ave. CES should monitor this floor drain and pump out this area on an as-needed basis.
- d. The upper two steps of the grating staircase which lead to the ventilation opening are corroded because they are not galvanized. CES should monitor these steps and before they become a safety hazard, replace them with new galvanized grating sections.
- e. Several of the pipe support slides have rust stains. This is referred to as "creep." This occurs because some areas of the metal could not be accessed to be cleaned and coated so the corrosion in the inaccessible area will "stain" the coated areas. The few accessible areas can be cleaned and coated, and the rust stains can be cleaned from the coated surfaces, however the only way to eliminate the creep is to replace the corroded metal. Because there are some areas within the 4th, 7th and Broadway Tunnels that require

cleaning and coating by Enecon, these areas in Manhole 23 can be addressed at that time. However, eventually, the pipe slide supports will need to be replaced. CES should monitor these support slides and report any significant deterioration to TEG.

- f. The ceiling is comprised of individual concrete slabs to allow their removal for maintenance. Groundwater is seeping through these joints and resulting in calcium deposits. CES should monitor these joints and report any major changes to TEG. TEG will investigate with Enecon to determine if one of their products can seal these joints.
- g. The steam penetration end can on the north wall, west of the stairs leading to the ventilation opening is corroded. TEG will develop a repair and provide it to CES.

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 22 customers, comprised of 43 different buildings (including the Auto Nashville Hotel) connected to the EDS. Service to each of these buildings continues to prove satisfactory, and the responsiveness to customer issues is managed by CES in an expeditious and professional manner.

A. Marketing

The developer for the site at 8th and Demonbreun executed a Customer Service Agreement in January 2024. Auto Nashville Hotel, LLC intends to construct a new hotel on the site. Work for this project is tracked under DES217.

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.

TEG began discussions with the Washington Square building during the quarter for potential chilled water service. This building was previously connected to the old system (Nashville Thermal Transfer Corporation) and is investigating potential service from DES in lieu of replacing their existing chiller.

Metro Water Services (MWS) participates on the East Bank planning team, which consists of engineering consultants and 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. DES continues to pursue options and potential customers on the East Bank, Activities are tracked under the project DES201.

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.

- Meetings between TEG, CES, and the contractors (Comfort Group Mechanical and Skanska) and the engineers (SSR) for the War Memorial and Legislative Plaza renovations began during the Second Quarter. Demolition work began during the Third Quarter and TEG and CES have remained in contact with them and have been assisting them with issues impacting the DES. Activities for this project will be tracked under DES221.
- Hume Fogg reported they were having issues with their steam regulator and were only using steam when necessary resulting in a lower-than-normal January steam usage. They made repairs to their regulator in January.
- CES personnel placed the Hume Fogg condensate to drain in February in preparation for condensate line repairs which occurred on February 24.
- The War Memorial and Legislative Plaza steam and condensate lines were isolated in preparation for their contractor's work on the buildings' renovations on February 29.
- The Music City Center reported to CES they did not have steam at their building on March 19. CES and building personnel investigated the issue and determined the building's PRV stations were not operating. The customer made repairs on March 22 and service was restored.
- The Symphony reported their condensate return pumps were cycling continuously on March 22. CES and building personnel investigated the issue and determined their check valves had failed. Building personnel intend to replace the faulty check valves.
- 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 items in this report which have appeared in previous reports. CES needs to expeditiously address the long-outstanding items.

Based on the review of the Third 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 continue to address the cooling tower repairs and other maintenance items noted in the EGF Walkthrough Reports.
- 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.