



Operations Monitoring Report

Fourth Quarter FY25

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I. Executive Summary

A review of the fiscal year 2025 (FY25) Fourth Quarter and Annual performance and contract obligations between DE Asset Operations, LLC (DEAO) 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 Fourth Quarter FY25, DEAO consistently met all performance guarantees for the quarter except the steam-electric metric for May. DEAO is required to meet the performance criteria included within Amendments 2 and 3 each month in accordance with Paragraph 8.d of Amendment 2 of the Amended and Restated DES Management Agreement (ARMA) between Metro and DEAO and Section 18 of the ARMA. DEAO has made operational changes and other improvements to the DES over the past few years which have resulted in increased efficiency of the boiler and chiller plants. DEAO and TEG continue to monitor the efficiency and performance of the DES looking for means of improving the system.

The Fourth Quarter FY25 chilled water sales decreased 2.2% compared to the previous Fourth Quarter (FY24). The chilled water sendout decreased 3.0% over the previous Fourth Quarter resulting in a decrease in the system losses. Changes to the chilled water sales may be due to estimating the monthly usage for several customers during the quarter. The number of cooling degree days decreased 2.7%. The peak chilled water demand for the current quarter is 17,588 tons, which is approximately 4.5% higher than in the previous Fourth Quarter.

For the fiscal year, the chilled water sendout remained approximately the same as in FY24. The chilled water sales increased 1.3% over FY24. The system peak chilled water demand was 17,845 tons in FY25 which is 7.9% lower than in FY24. The total number of cooling degree days in FY25 was 4.8% higher than in FY24.

Steam sendout for the current quarter increased 6.7% over the previous Fourth Quarter with steam sales decreasing 2.2%. Changes to the steam sales may be due to estimating the monthly usage for several customers during the quarter. Total steam system losses decreased 13.0% from the previous Fourth Quarter. The peak steam demand for the current quarter is 86,425 pounds per hour, which represents an increase in the previous Fourth Quarter demand of approximately 0.6%. The number of heating degree days increased 12.7% over the previous Fourth Quarter.

Work continued with EDS Projects during the Fourth Quarter. There are twenty-four open projects for which TEG is providing development, design, or construction phase services. During the quarter, seven were closed and four others are in close-out. Of the balance, ten projects have ongoing design or construction activities as of the end of the quarter. DEAO's scope managing the construction phase of projects has ongoing activities in two of these projects with occasional involvement in another five. As noted in prior quarterly monitoring reports, several deficiencies remain deferred or postponed which can result in increased maintenance costs to the DES. No projects were added during the Fourth Quarter FY25.

The current fiscal year operating costs to date are \$20,342,335. This value represents approximately 90.4% of the total budgeted operating cost for FY25. The total system revenues from the sales of steam and chilled water for FY25 are \$20,056,539 (90.7% of budgeted amount) which includes the annual true-up amount for FY24 and other miscellaneous revenue sources. Metro has reported that the Metro Funding Amount (MFA) transfers of \$385,000 (100.0% of budget) have been made to date. 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 Fourth Quarter chilled water sales is shown in Figure 1. This data reflects 2.2% decrease in sales for the current quarter over the same quarter of the previous fiscal year. With a decrease of 2.7% in the number of cooling degree days, the change in chilled water sales may be attributable to a more temperate spring.

In addition, several issues were experienced with several customer meter panels during the quarter resulting in a need to estimate their monthly usage. Estimating a customer's usage includes averaging the previous three-year average of usage which may not accurately reflect the actual usage for the month. DEAO is investigating this issue which may require the replacement of the older meter panels.

The peak chilled water demand for the current quarter is 17,588 tons, which is approximately 4.5% greater than the previous Fourth Quarter.

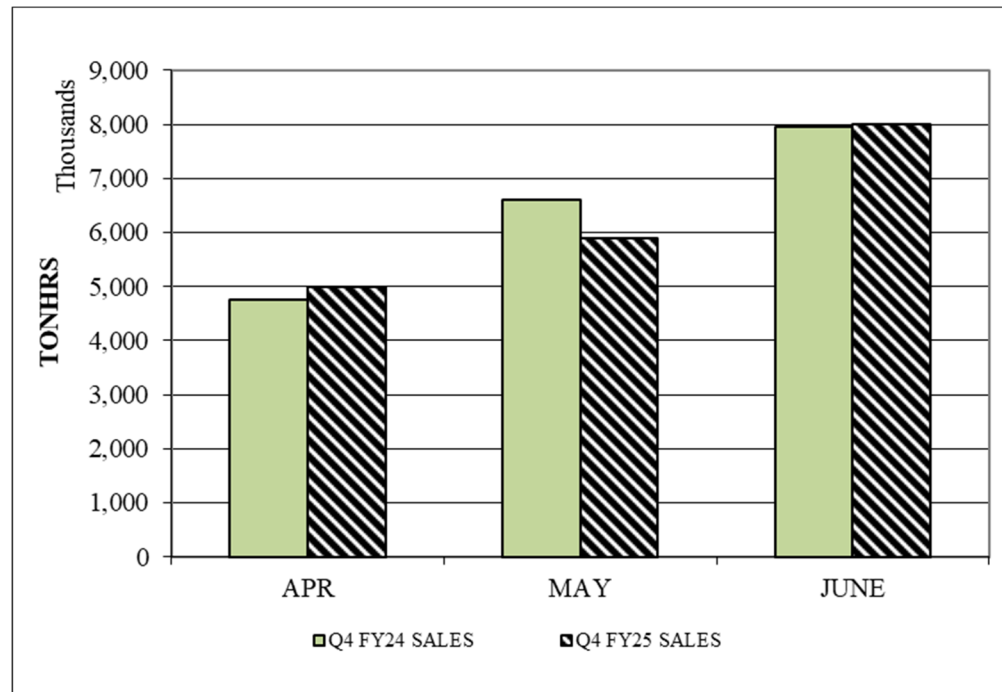


Figure 1. Chilled Water Sales Comparison

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. For FY25, the chilled water sendout was 68,292,400 tonhrs which was approximately the same as in FY24. The annual sales were slightly higher than in FY24 with a 1.3% increase. The peak chilled water demand was 7.9% lower than in FY24 even though the total number of cooling degree days increased 4.8% in FY25. The chilled water losses decreased 22.4% over FY24. The losses in Figure 2 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.

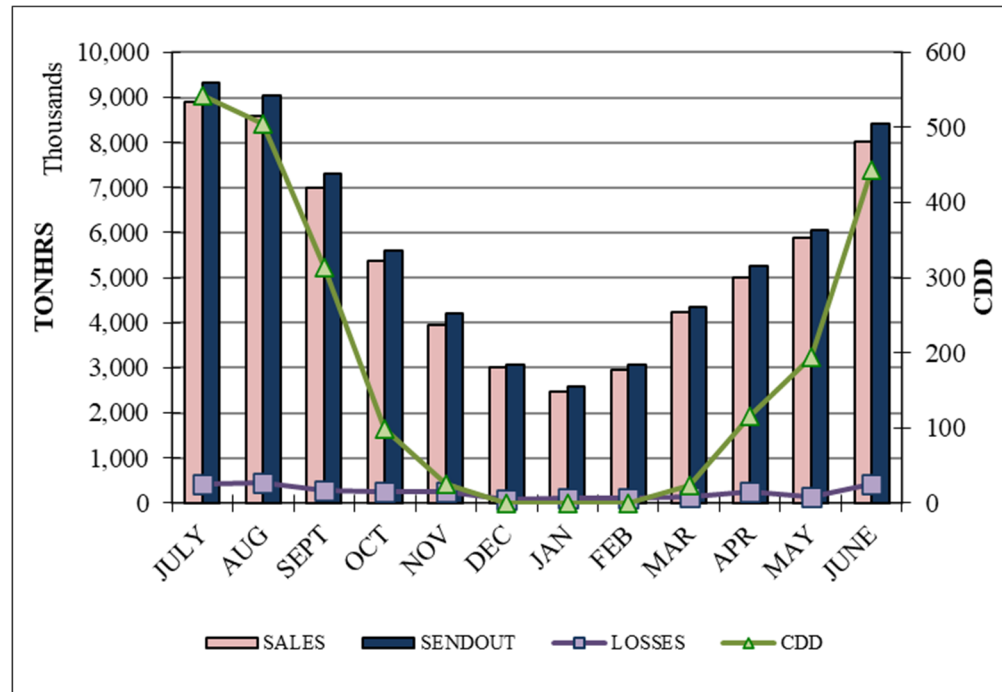


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total chilled water energy losses in the EDS for the Fourth Quarter FY25 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, the customer meters, and the monthly usage estimated for several of the customers. The losses decreased 17.6% over the previous Fourth Quarter.

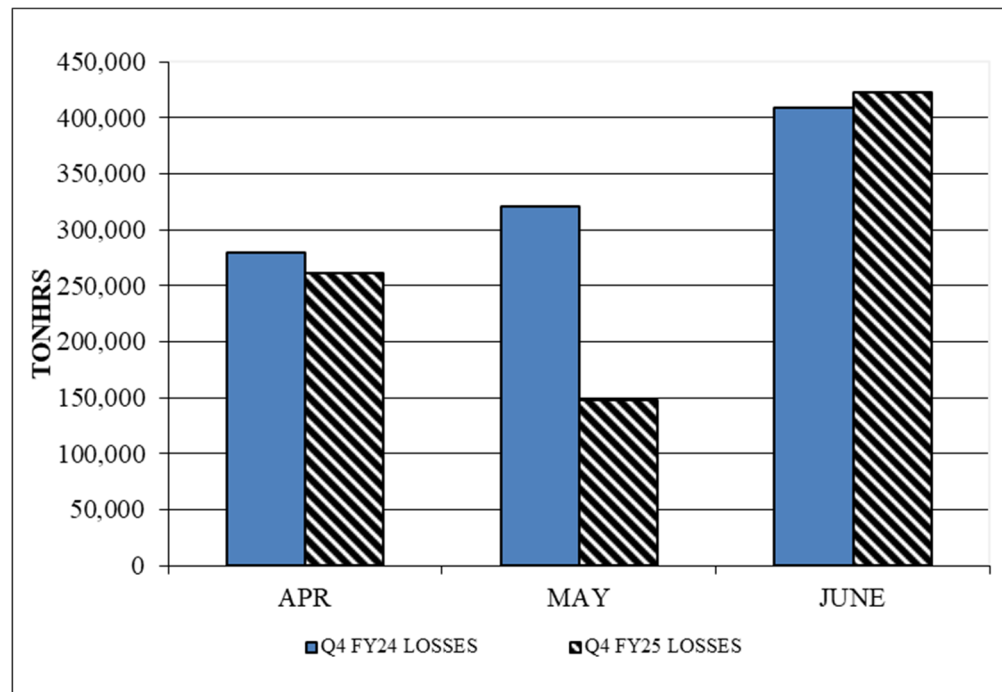


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased 77.5% over the previous Fourth Quarter. This increase was due to a chilled water leak discovered and repaired in April 2025. Of the total 1,477,000 gallons of make-up for the quarter, 1,210,000 (82%) gallons occurred in April. However, the total EDS make-up for FY25 was 15.3% lower than in FY24. The make-up returned to a lower and normal level during May and most of June. However, the make-up began increasing in late June. TEG and DEAO continue to monitor the EDS make-up to locate any additional leaks within the EDS. If additional leaks are discovered, DES will address the issue promptly.

The make-up to the cooling towers decreased 6.0% over the previous Fourth Quarter coinciding with a 3.0% decrease in chilled water production. The water usage in the cooling towers is typically proportional to the production of chilled water and should likewise vary with chilled water sales. Since the chilled water production decreased over the previous quarter, the amount of heat rejection through evaporation in the cooling towers would be expected to decrease. The total chiller plant water use decreased 4.2% over the previous Fourth Quarter. The

overall city water make-up comparison for the chilled water system Fourth Quarter is shown in Figure 4. (Chilled water production is the same as chilled water sendout since there are no in-plant losses for the chilled water.)

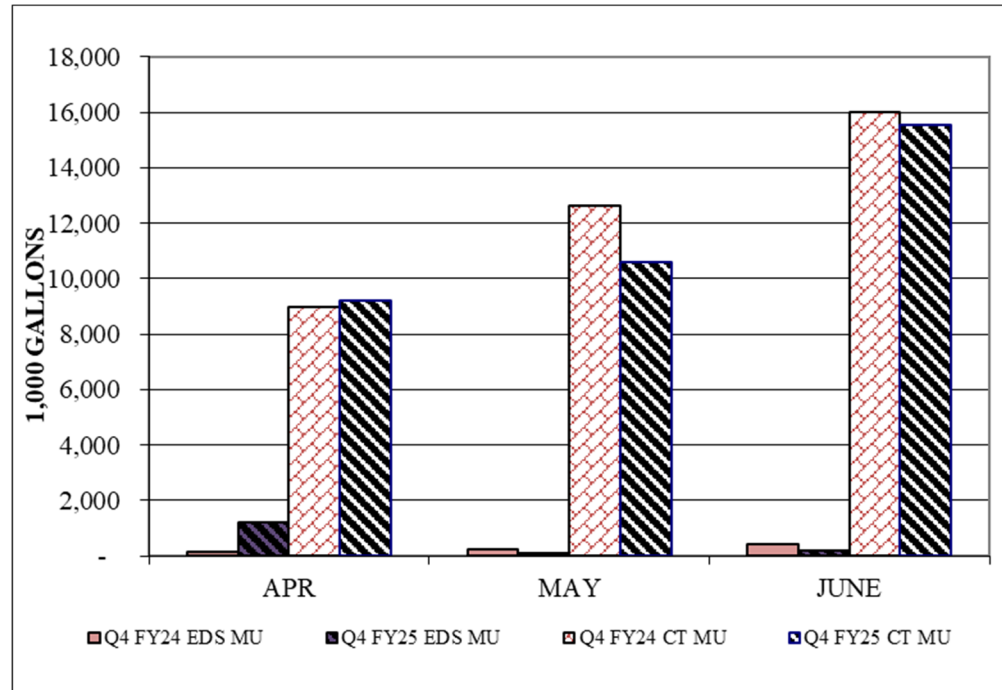


Figure 4. Chilled Water System City Water Usage Comparison

For FY25, the total chiller plant make-up remained approximately the same as in FY24. Even though the EDS make-up increased during the Fourth Quarter, the total EDS make-up for the fiscal year decreased 15.3% over FY24. The make-up to the cooling towers likewise remained approximately the same as in FY24 due to having approximately the same amount of chilled water production in FY25 as in FY24.

The cooling tower blowdown is monitored and controlled to maintain the conductivity of the condensing water within a range of 1,000 to 1,150 micromhos. The relationship between the cooling tower blowdown and the chilled water production should be consistent and tracking this relationship has proven helpful in reducing the chiller plant make-up water usage. DEAO has made operational changes with respect to the ratio of the cooling tower blowdown to the chilled water production over the past several years with the expectation of reducing the water usage and improving their performance relative to the chilled water-water guarantee. A comparison of the Fourth Quarter values between FY24 and FY25 are shown in Figure 5.

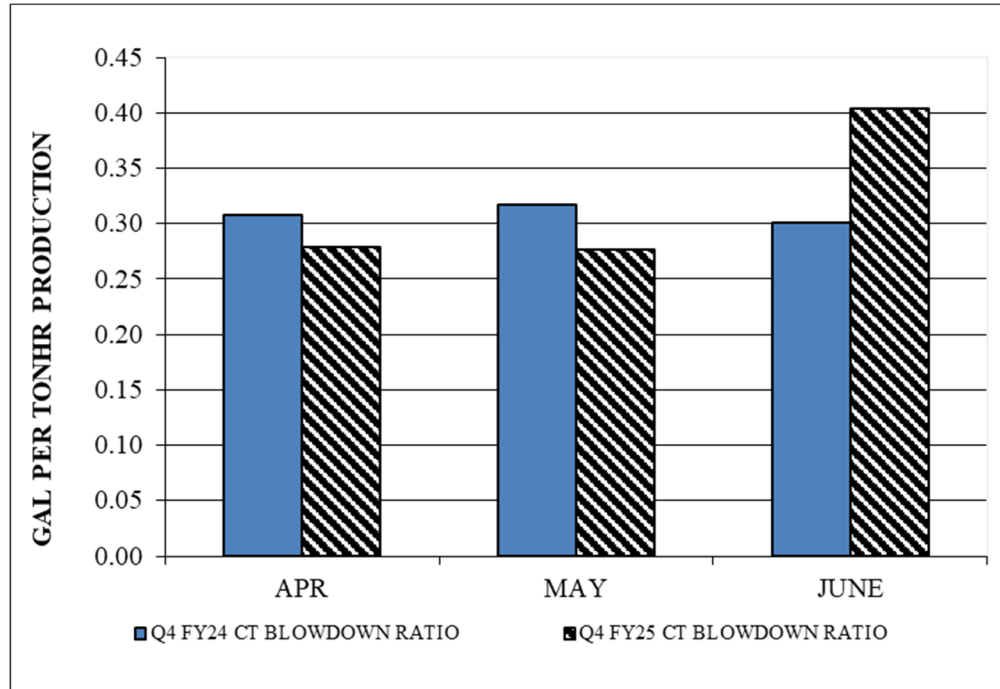


Figure 5. Cooling Tower Blowdown Ratio Comparison

When a comparison is made between the Fourth Quarter FY25 and FY24, the average cooling tower blowdown ratio increased 4.4%. This value corresponds to meeting the chilled water-water performance guarantee for each month during the quarter. The metric averaged 0.306 gallons per ton-hour produced for FY25 representing a 10.2% increase over FY24. Values between 0.27 and 0.30 appear to result in more favorable operation and water usage. The cooling tower blowdown ratio metric will continue to be tracked and monitored to verify the operational changes made by DEAO at the EGF continue to result in a decrease in chiller plant water usage.

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 for both metrics changed with Amendment 3 beginning with July 2024.

The electricity usage per unit of sales decreased 1.2% over the previous Fourth Quarter indicating a consistent efficiency. DEAO and TEG continue to monitor the improvements created by DEAO's operational changes.

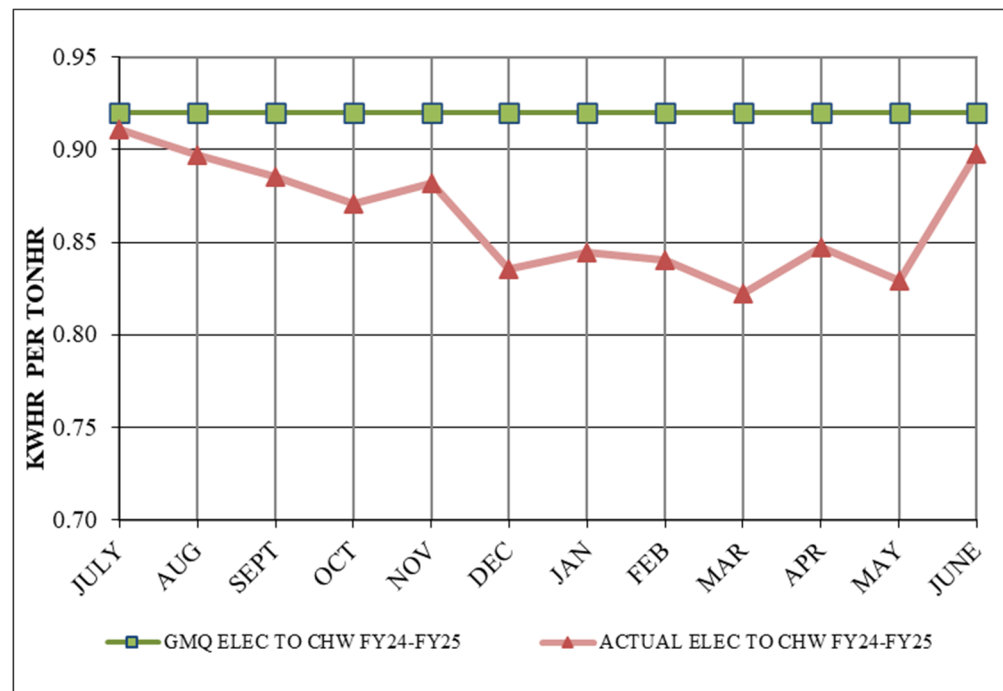


Figure 6. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

The total consumption of city water for the chiller plant for the current quarter decreased 4.2% over the previous Fourth Quarter. The EDS make-up increased significantly due to the leak discovered in April, but the cooling tower blowdown decreased 10.9%. The side stream filter backwash decreased 64.0% indicating cleaner chilled water. DEAO met the new chilled water-water performance metric each month during the quarter and only exceeded the metric in the First Quarter. Figure 7 shows the metric for the previous twelve months. TEG and DEAO continue to monitor the water usage and chiller plant performance with the goal of decreasing the energy and water usage for the system.

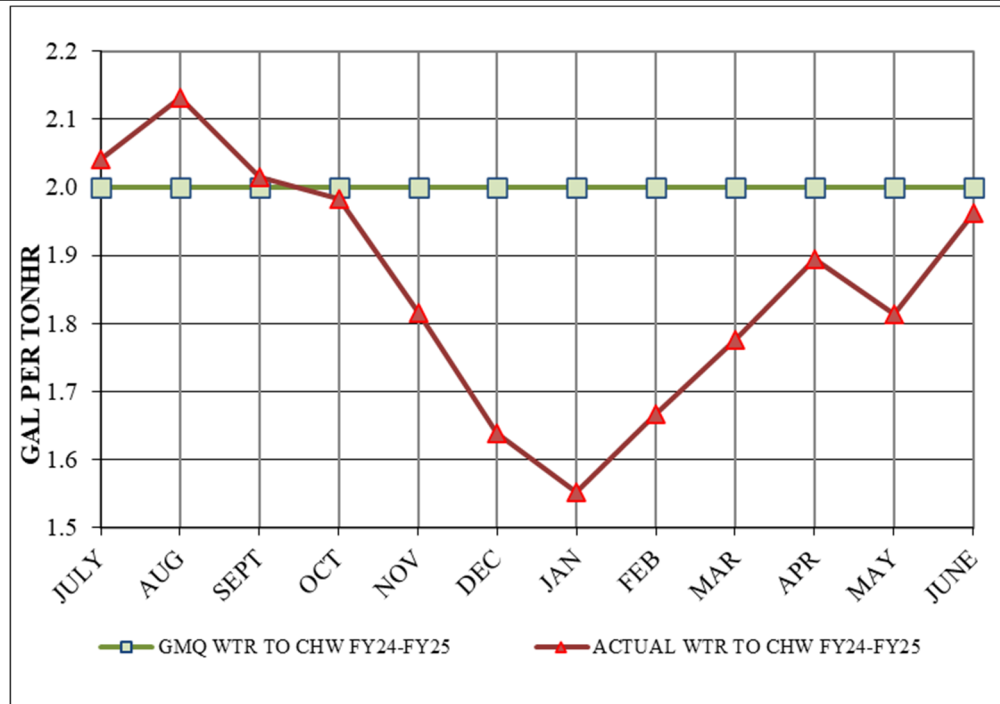


Figure 7. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

B. Steam

1. Sales and Sendout

The steam sendout increased 6.7% over the previous Fourth Quarter, and the sales increased 13.2%. The number of heating degree days increased 12.7% over the previous Fourth Quarter. The steam system losses decreased 13.0%. The relative amount of condensate return remained approximately the same. The peak steam demand for the current quarter is 86,425 pph, which reflects a marginal increase in the peak steam production over the previous Fourth Quarter. The steam usage by the customers is largely driven by colder weather; however, many customer buildings use steam for domestic water heating and even reheat to manage relative humidity. These factors often contribute to higher than expected steam usage during warmer months. A comparison for the Fourth Quarter steam sales is shown in Figure 8.

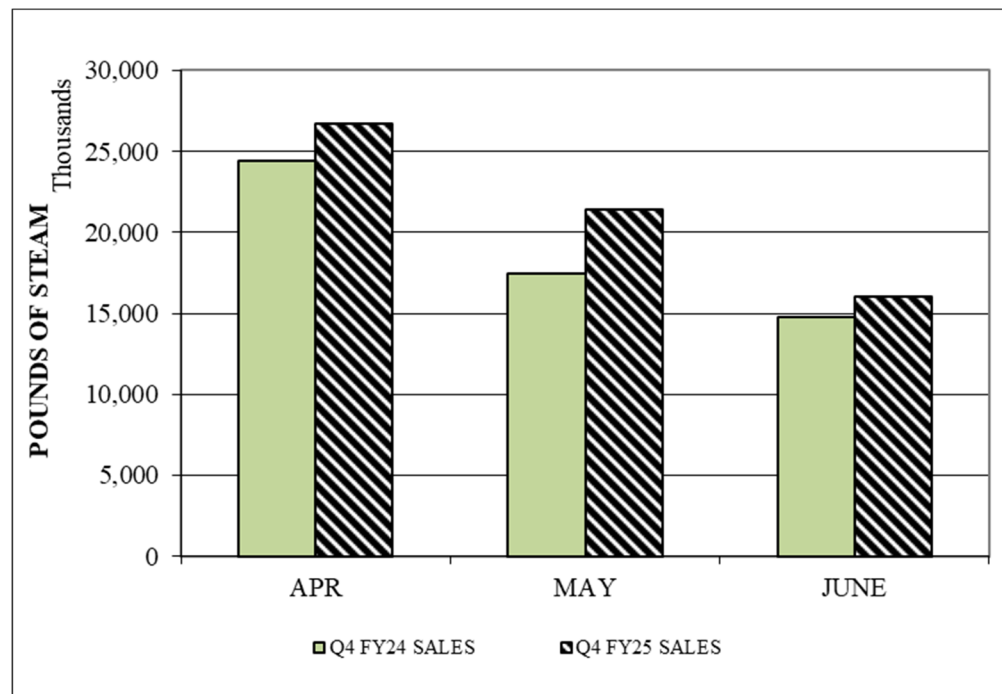


Figure 8. Steam Sales Comparison

For FY25, the steam sendout increased 5.5% over FY24 while the steam sales increased 6.7%. The steam losses decreased 2.3% reflecting a possible improvement in the piping insulation and traps. The relative amount of condensate return increased slightly over FY24.

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.

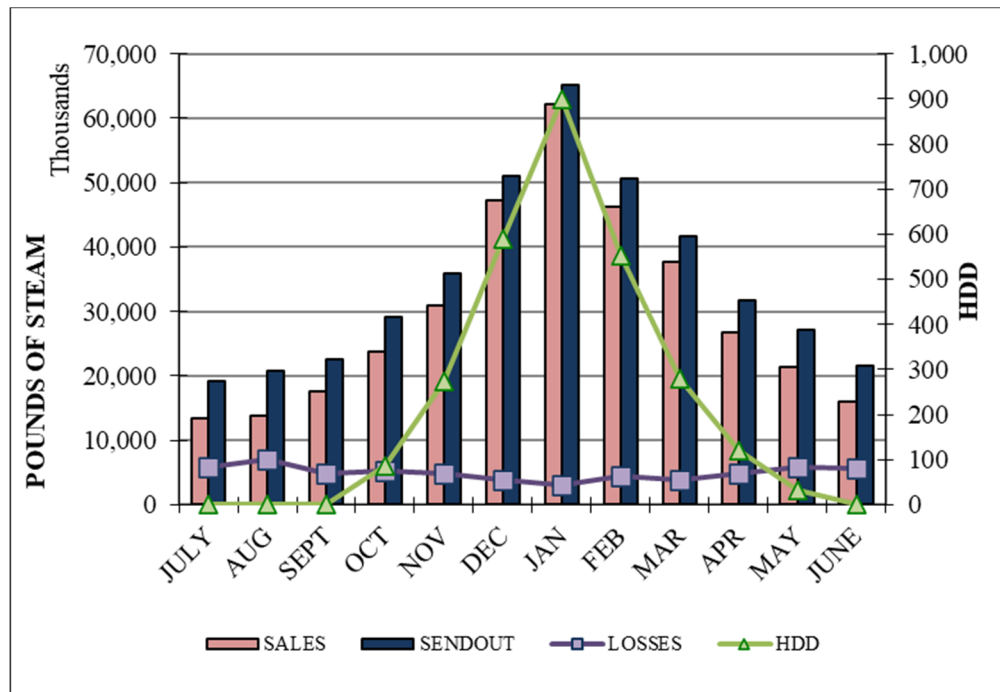


Figure 9. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Fourth 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.

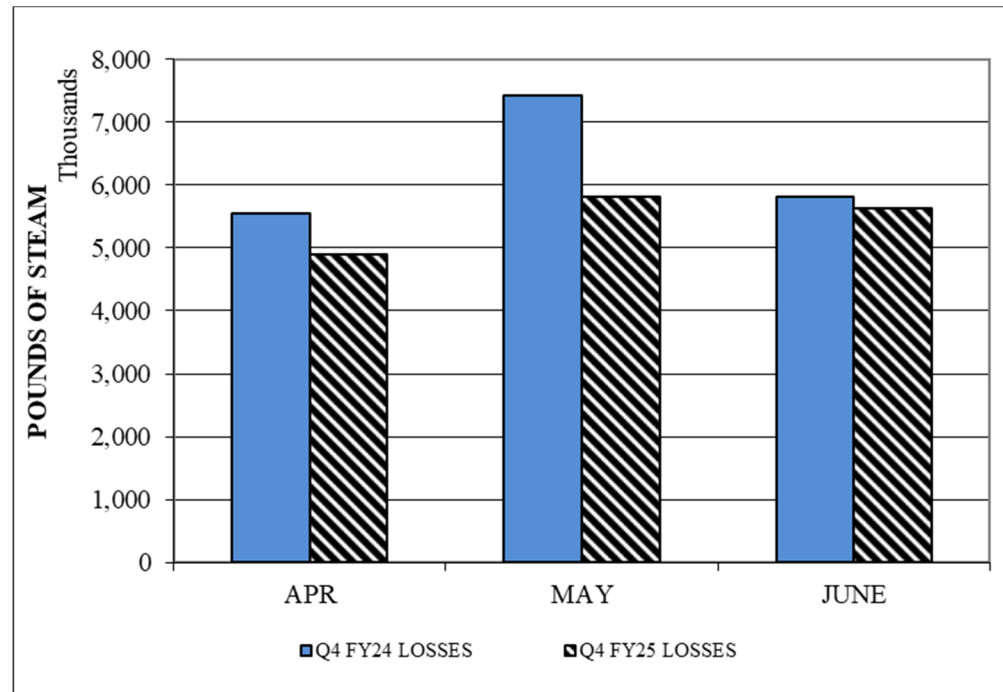


Figure 10. Steam System Losses

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 decreased 14.4% over the Fourth Quarter FY24. However, the relative amount of condensate return remained approximately the same as in the previous Fourth Quarter.

Multiple condensate leaks were found and repaired during the year resulting in a marginal increase in the relative amount of condensate return for the fiscal year. The total make-up to the steam system decreased 10.4% for the fiscal year even though condensate leaks occurred. A decrease in the total make-up to the steam system and an increase in the condensate return are anticipated in future quarters. The corresponding data for steam system make-up is shown in the comparison of Fourth Quarter data in Figure 11.

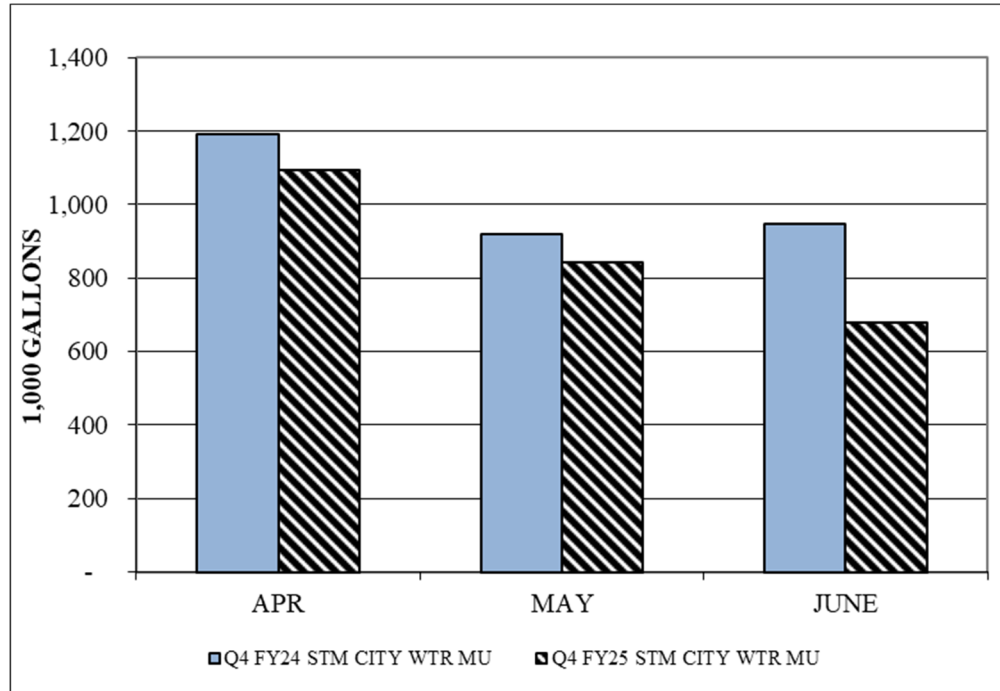


Figure 11. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system of the EGF is presented in the following three charts, Figures 12, 13A, 13B, and 14. With Amendment 3, the steam-electric and steam-fuel metrics and their calculation methodology remain unchanged from Amendment 2. The determination of condensate return with Amendment 3 uses a real time density correction on the condensate return flow rate such that a comparison on the steam sendout and condensate return could be made on a mass basis. DEAO completed the modifications necessary to capture the density-corrected condensate return during the Second Quarter FY25 and completed the necessary changes to determine the monthly condensate return temperature in the Third Quarter.

The steam electric conversion factor was not met in May, possibly due to an electric meter issue, but was met in all other months of the fiscal year. The steam plant electric consumption for the current quarter was 49.1% higher in the Fourth Quarter FY25 than in the previous Fourth Quarter and 16.1% higher in the current fiscal year. The steam-electric metric increased 27.7% over the previous Fourth Quarter and increased 10.4% over the previous fiscal year. The monthly steam-electric conversion factors, along with the guaranteed values, for the previous twelve months are shown in Figure 12.

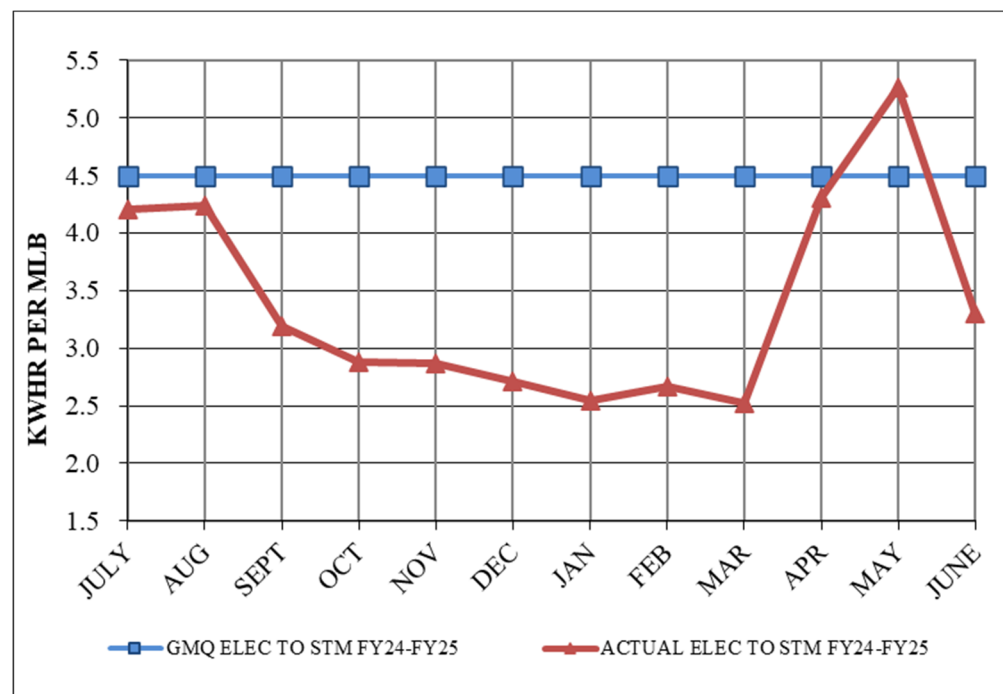


Figure 12. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

Figures 13A and 13B show the steam-water metrics using two different methodologies. Since the Amendment 3 metric is based on pounds of water and the

Amendment 2 metric is based on gallons using a different equation to determine both the GMQ and “actual” values, a comparison is difficult to make between the historic values and the Amendment 3 equation. Therefore, the performance for the previous twelve months is represented by two different graphs.

Figure 13A uses pounds and Figure 13B uses gallons. The guaranteed and actual volumes (gallons) prior to July 2024 use the Amendment 2 methodology. However, the GMQ volumes shown for FY25 convert the pounds values to gallons assuming a density based on the average condensate return temperature. Similarly, the mass values shown for data prior to July 2024 assume a constant density over the month based on the recorded average monthly condensate return temperature and converting the volumetric data to mass (pounds). These conversions will need to be made for FY25 and until enough historic data using the Amendment 3 methodology has been collected such that the real time density correction will be recorded.

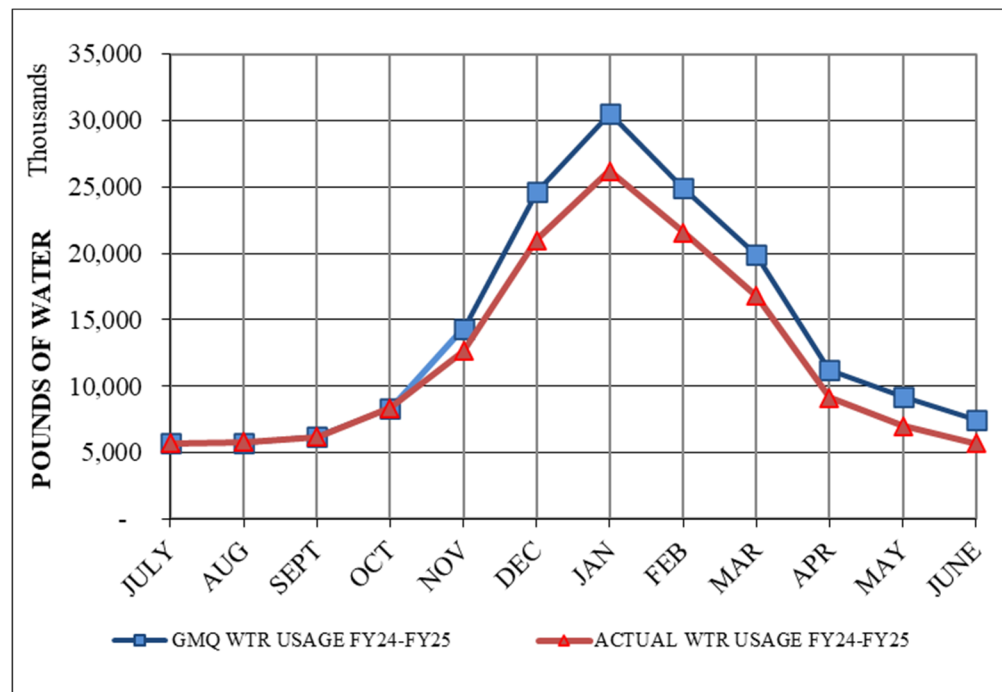


Figure 13A. Steam Plant Water Performance Guarantee for the Previous Twelve Months Using a Mass Comparison

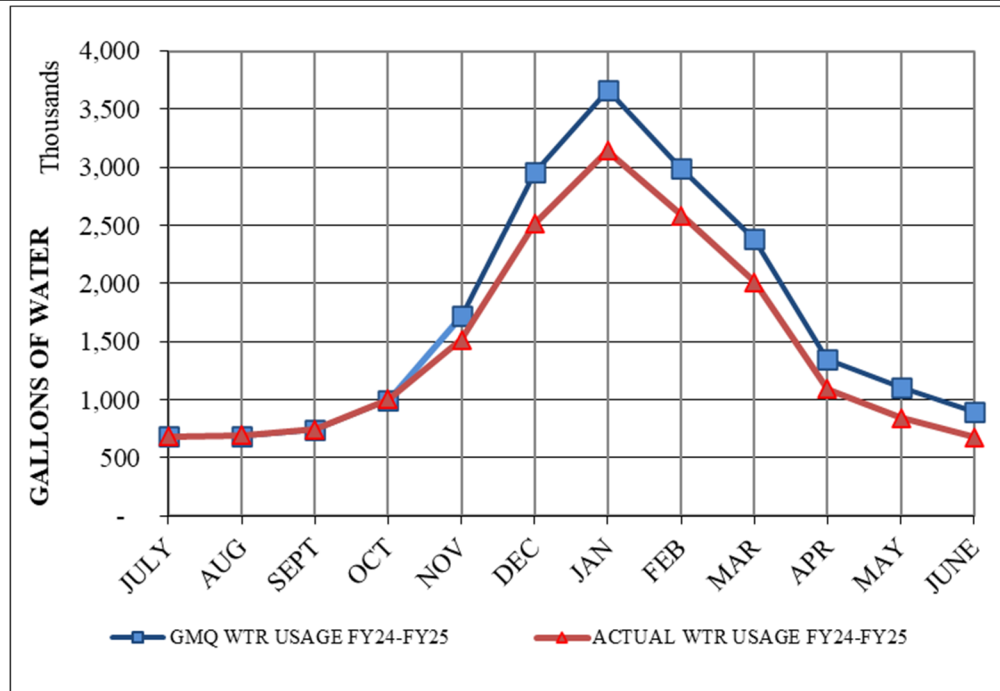


Figure 13B. Steam Plant Water Performance Guarantee for the Previous Twelve Months Using a Volumetric Comparison

For the Fourth Quarter, the boiler plant water usage decreased 14.4%. This decrease resulted in a 14.4% increase in the steam-water metric with the volumetric comparison methodology from Amendment 3. Using the Amendment 3 methodology, the metric was met each month during the quarter. For the fiscal year, the metric was met in all months except August and October with a 10.4% decrease over the fiscal year 2024.

The steam-fuel metric did not change in Amendment 3; however, the relative amount of condensate return is reported using the mass flow determined by the density corrected values used in the steam-water metric. The actual steam-fuel metric was met each month during the Fourth Quarter. The fuel consumption per unit of steam sendout remained approximately the same as in the previous Fourth Quarter. For the fiscal year, the metric remained approximately the same as in the previous fiscal year. However, the metric was not met in October, November, and December.

Figure 14 shows the performance of the conversion factors for the previous twelve months. The relative amount of condensate return is shown on this graph to reflect the influence the condensate return has on the plant efficiency.

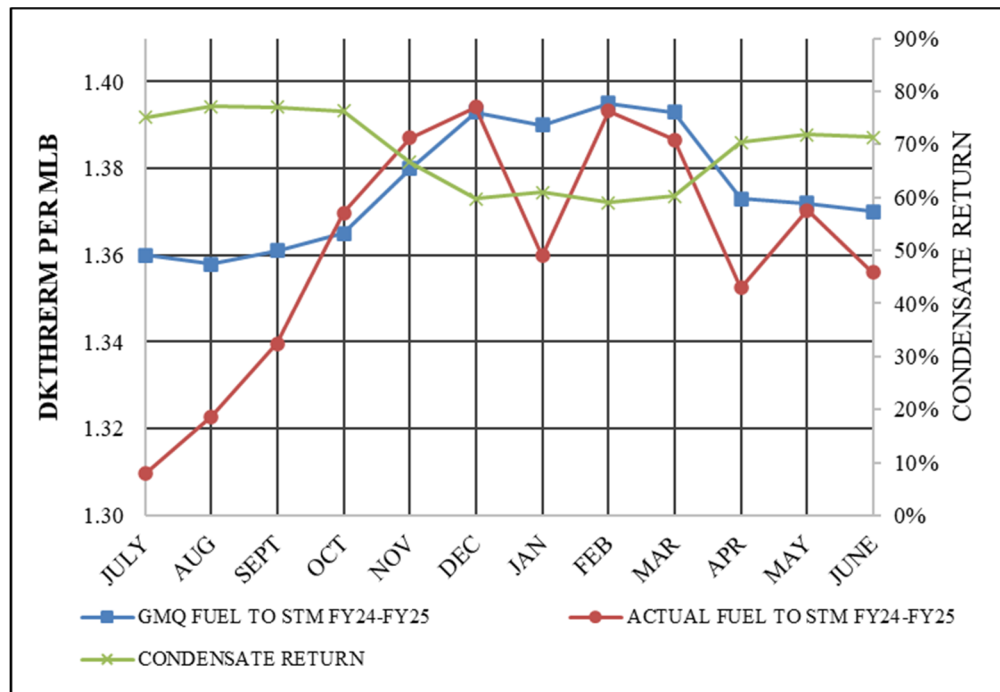


Figure 14. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

C. Contract Guarantee Performance

The production and sales performance for the EGF and EDS are summarized in Table 1 for the current quarter and the fiscal year. Additional parameters, such as cooling tower blow-down and peak demands are listed in this table, as well. Table 2 presents the Fourth Quarter and Annual comparisons of the Guaranteed Maximum Quantities (GMQ) or System Performance Guarantees of the criteria commodities (fuel, water, and electricity). Table 2 lists the steam-water conversions (GMQ and actual) based on the volumetric and mass flow comparisons.

Table 1. Fourth Quarter and Annual Production, Sales, and Consumption Summary

Item	Unit	Fourth Quarter FY25	Fourth Quarter FY24	*Percent Difference	Total Year FY25	Total Year FY24	*Percent Difference
	days	91	91	0.00%	365	366	-0.27%
Total Electric Use	kWhrs	16,599,624	16,976,732	-2.22%	58,148,425	57,356,275	1.38%
Chilled Water	kWhrs	16,318,845	16,788,435	-2.80%	57,033,952	56,396,072	1.13%
Steam	kWhrs	280,779	188,297	49.11%	1,114,473	960,203	16.07%
Total Water Use	kgal	39,456	41,498	-4.92%	143,972	146,459	-1.70%
Total Chilled Water	kgal	36,840	38,441	-4.16%	126,456	126,912	-0.36%
EDS Make-up	kgal	1,477	832	77.52%	4,194	4,949	-15.26%
Cooling Towers	kgal	35,363	37,609	-5.97%	122,261	121,963	0.24%
Calc CT Evaporation	kgal	29,779	31,341	-4.98%	102,096	102,990	-0.87%
CT Blowdown	kgal	5,584	6,268	-10.92%	20,165	18,973	6.28%
Calc # Cycles		5.33	5.00	6.66%	5.06	5.43	-6.72%
Sidestream Filter Backwash	gal	11,301	31,421	-64.03%	44,182	123,686	-64.28%
Steam	kgal	2,616	3,057	-14.42%	17,517	19,547	-10.39%
Total Fuel Use	mmBTU	109,387	102,560	6.66%	570,176	544,448	4.73%
Natural Gas	mmBTU	109,387	102,560	6.66%	570,111	543,563	4.88%
Propane	mmBTU	0	0	0.00%	66	885	-92.58%
Condensate Return	kgal	7,049	6,624	6.43%	34,099	31,999	6.56%
	lbs	57,196,831	54,020,403	5.88%	276,420,758	260,980,080	5.92%
Avg Temp	°F	180.7	179.0	0.93%	179.7	179.0	0.37%
Sendout							
Chilled Water	tonhrs	19,739,700	20,340,000	-2.95%	68,292,400	68,303,000	-0.02%
Steam	lbs	80,463,000	75,444,000	6.65%	416,647,000	395,730,000	5.29%
Peak CHW Demand	tons	17,588	16,833	4.49%	17,845	19,372	-7.88%
Peak Steam Demand	lb/hr	86,425	85,937	0.57%	130,675	145,600	-10.25%
CHW LF		51.39%	55.33%	-7.12%	43.69%	40.14%	8.84%
Steam LF		42.63%	40.20%	6.05%	36.40%	30.94%	17.63%
Sales							
Chilled Water	tonhrs	18,908,258	19,331,012	-2.19%	65,362,185	64,526,548	1.30%
Steam	lbs	64,124,129	56,665,049	13.16%	357,160,239	334,818,903	6.67%
Losses							
Chilled Water	tonhrs	831,442	1,008,988	-17.60%	2,930,215	3,776,452	-22.41%
Steam	lbs	16,338,871	18,778,951	-12.99%	59,486,761	60,911,097	-2.34%
		20.31%	24.89%	-18.42%			
Degree Days							
CDD		754	775	-2.71%	2,262	2,158	4.82%
HDD		151	134	12.69%	2,831	2,481	14.11%
Cooling Tower Blowdown Ratio							
Cooling Tower Blowdown	gal	5,584,000	6,268,004	-10.91%	20,164,754	18,973,160	6.28%
Chilled Water Production	tonhrs	17,351,000	20,340,000	-14.70%	65,903,700	68,303,000	-3.51%
Ratio	gal/tonhrs	0.322	0.308	4.43%	0.306	0.278	10.15%

*positive percent difference values imply an increase from FY24 to FY25

Table 2. Fourth Quarter and Annual Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	Fourth Quarter FY25	Fourth Quarter FY24	*Percent Difference	Total Year FY25	Total Year FY24	*Percent Difference
Steam							
GMQ Elec Conversion	kWhr/Mlb	4.50	4.50		4.50	4.50	
Electric Conversion	kWhr/Mlb	4.29	3.36	27.74%	3.39	3.07	10.38%
GMQ Plant Efficiency	Dth/Mlb	1.372	1.373		1.376	1.380	
Plant Efficiency	Dth/Mlb	1.360	1.359	0.01%	1.368	1.376	-0.53%
Actual %CR		71.08%	71.60%	-0.72%	66.34%	65.95%	0.60%
Avg CR Temp	°F	181	179	0.93%	180	179	0.37%
GMQ Water Conversion	gal	3,346,848	3,020,793		20,171,600	19,000,154	
Water Conversion	gal	2,616,200	3,087,570	-15.27%	17,516,750	19,742,470	-11.27%
GMQ Water Conversion	lbs	27,919,403	26,125,376		168,271,490	163,648,041	
Water Conversion	lbs	21,824,340	25,501,494	-14.42%	146,124,729	163,061,074	-10.39%
Chilled Water							
GMQ Elec Conversion	kWhr/tonhr	0.920	0.930		0.920	0.930	
Electric Conversion	kWhr/tonhr	0.858	0.868	-1.20%	0.864	0.874	-1.19%
GMQ Water Conversion	gal/tonhr	2.00	2.00		2.00	2.00	
Water Conversion	gal/tonhr	1.89	1.98	-4.36%	1.86	1.97	-5.53%

*positive percent difference values imply an increase from FY24 to FY25

D. Operating Costs

The fixed operating costs for the DES include the management fee to DEAO, 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 DEAO'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 resulting in a 100% recovery of the costs by the customers. A summary of the total operating costs for the fiscal year-to-date is shown in Table 3.

Table 3. DES Expenses and Revenues to Date

Item	FY25 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,250,800	\$ 1,062,708	\$ 1,062,708	\$ 1,062,708	\$ 1,062,708	\$ 4,250,834	100.00%
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	\$ 379,300	\$ 83,309	\$ 73,247	\$ 84,518	\$ 80,011	\$ 321,085	84.65%
Insurance	\$ 39,000	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Marketing:							
CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
FEA:							
Steam	\$ 85,100	\$ 2,807	\$ 3,049	\$ 11,248	\$ 1,040	\$ 18,144	21.32%
Chilled Water	\$ 138,700	\$ 5,068	\$ 18,301	\$ 24,603	\$ 28,440	\$ 76,413	55.09%
Misc:							
Metro Credit	\$ -	\$ (435,450)	\$ (229,025)	\$ (187,401)	\$ (272,705)	\$ (1,124,581)	n.a.
ARFA	\$ 66,900	\$ 16,714	\$ 16,714	\$ 16,714	\$ 16,714	\$ 66,855	99.93%
Deferral	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Man Fee =	\$ 4,959,800	\$ 1,170,606	\$ 1,174,019	\$ 1,199,792	\$ 1,188,914	\$ 4,733,331	95.43%
Reimbursed Management Fee + Chem Treatment		\$ 1,155,132	\$ 1,158,545	\$ 1,184,318	\$ 64,537	\$ 3,562,531	0.00%
Metro Costs							
Pass-thru Charges:							
Engineering	\$ 99,500	\$ 22,128	\$ 16,440	\$ 25,597	\$ 28,743	\$ 92,908	93.37%
EDS R&I Transfers	\$ 322,200	\$ 80,550	\$ 80,550	\$ 80,550	\$ 80,550	\$ 322,200	100.00%
Metro Marketing	\$ 74,400	\$ 15,124	\$ 17,837	\$ 8,603	\$ 17,849	\$ 59,412	79.85%
Project Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Metro Incremental Cost	\$ 539,600	\$ 137,834	\$ 117,896	\$ 125,780	\$ 130,158	\$ 511,667	94.82%
Utility Costs:							
Water/Sewer	\$ 1,165,600	\$ 414,723	\$ 209,189	\$ 171,364	\$ 252,817	\$ 1,048,093	89.92%
EDS Water/Sewer	\$ -	\$ 50	\$ 100	\$ 50	\$ 51	\$ 251	n.a.
EDS Electricity	\$ 82,200	\$ 20,935	\$ 20,021	\$ 16,120	\$ 19,887	\$ 76,963	93.63%
Electricity	\$ 6,572,600	\$ 2,012,996	\$ 1,102,904	\$ 900,169	\$ 1,665,562	\$ 5,681,631	86.44%
Natural Gas Consultant	\$ 17,800	\$ 4,320	\$ 4,680	\$ 4,590	\$ 4,320	\$ 17,910	100.62%
Natural Gas Transport	\$ -	\$ 70,450	\$ 117,098	\$ 159,598	\$ 88,418	\$ 435,565	n.a.
Natural Gas Fuel	\$ 3,145,800	\$ 239,415	\$ 536,570	\$ 771,906	\$ 381,890	\$ 1,929,781	61.34%
Propane	\$ 141,400	\$ -	\$ 102,574	\$ -	\$ (55,000)	\$ 47,574	33.64%
Subtotal - Metro Costs =	\$ 12,161,100	\$ 3,018,523	\$ 2,325,860	\$ 2,264,327	\$ 2,615,245	\$ 10,223,955	84.07%
Subtotal - Operations =	\$ 17,120,900	\$ 4,189,129	\$ 3,499,879	\$ 3,464,119	\$ 3,804,159	\$ 14,957,286	87.36%
Debt Service							
2012A Bonds	\$ 3,435,800	\$ 858,950	\$ 881,234	\$ 847,795	\$ 847,795	\$ 3,435,775	100.00%
2005B Bonds	\$ 732,600	\$ 183,150	\$ 183,150	\$ 183,150	\$ 183,065	\$ 732,515	99.99%
Series 2018	\$ 117,200	\$ 29,300	\$ 29,300	\$ 29,300	\$ 29,286	\$ 117,186	99.99%
Series 2015C	\$ 71,500	\$ 17,875	\$ 17,875	\$ 17,875	\$ 17,867	\$ 71,492	99.99%
Series 2017	\$ 41,800	\$ 10,450	\$ 10,450	\$ 10,450	\$ 10,445	\$ 41,795	99.99%
Series 2013A	\$ 673,000	\$ 168,250	\$ 168,250	\$ 168,250	\$ 168,172	\$ 672,922	99.99%
Series 2021C	\$ 122,000	\$ 30,500	\$ 30,500	\$ 30,500	\$ 30,486	\$ 121,986	99.99%
Series 2022A	\$ 149,400	\$ 37,350	\$ 37,350	\$ 37,350	\$ 37,333	\$ 149,383	99.99%
Series 2022B	\$ 26,300	\$ 6,575	\$ 6,575	\$ 6,575	\$ 6,572	\$ 26,297	99.99%
FY25 Addition	\$ 15,700	\$ 3,925	\$ 3,925	\$ 3,925	\$ 3,923	\$ 15,698	99.99%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Capital =	\$ 5,385,300	\$ 1,346,325	\$ 1,368,609	\$ 1,335,170	\$ 1,334,944	\$ 5,385,048	100.00%
Total =	\$ 22,506,200	\$ 5,535,454	\$ 4,868,488	\$ 4,799,289	\$ 5,139,103	\$ 20,342,335	90.39%
Customer Revenues							
Taxes Collected		\$ 123,869	\$ 100,888	\$ 101,034	\$ 127,290	\$ 453,080	n.a.
Taxes Paid		\$ 123,869	\$ 100,888	\$ 105,408	\$ 127,289	\$ 457,454	n.a.
Interest & Misc Revenue	\$ 490,900	\$ 155,035	\$ 161,517	\$ 141,701	\$ 101,252	\$ 559,505	113.98%
Penalty Revenues/Credits	\$ -	\$ 130,974	\$ 1,061	\$ 5,381	\$ (63,997)	\$ 73,418	n.a.
Energy Revenues Collected	\$ 21,630,300	\$ 5,282,366	\$ 4,537,900	\$ 4,593,087	\$ 5,014,635	\$ 19,427,989	89.82%
Revenues =	\$ 22,121,200	\$ 5,568,375	\$ 4,700,478	\$ 4,735,795	\$ 5,051,891	\$ 20,056,539	90.67%
Metro Funding Amount =	\$ 385,000	\$ (32,920)	\$ 168,010	\$ 63,495	\$ 87,212	\$ 285,796	74.23%

The revenues shown in Tables 3 and 4 (Customer Revenue Summary to Date) 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 operating costs to date are \$20,342,335. This value represents approximately 90.4% of the total budgeted operating cost for FY25. The total system revenues from the sales of steam and chilled water for FY25 are \$20,056,539 (90.7% of budgeted amount) which includes the annual true-up amount for FY24 (\$128,967.46) and

other miscellaneous revenue sources. Metro has reported that the Metro Funding Amount (MFA) transfers of \$385,000 (100.0% of budget) have been made to date. The actual MFA can only be estimated due to outstanding invoices as of the date of this report.

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. During the Fourth Quarter, the State sold the Citizen's Plaza building (400 Deaderick St) to a new developer resulting in a partial invoice to each entity for May and June. Credits for the partial month are split between the two resulting in an unusually high value in the Penalty Revenues/Credits row. This row contains values for late fees and penalties, the charges for the FY24 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	\$ 4,714,045	23,080,934	\$ 0.2042		\$ 1,658,827	99,966	\$ 16.5939
State Government	\$ 3,665,662	13,895,340	\$ 0.2638		\$ 2,017,730	114,104	\$ 17.6832
Metro Government	\$ 5,375,689	28,408,337	\$ 0.1892		\$ 1,996,036	143,095	\$ 13.9490
New Customers	\$ 3,440,940	16,778,781	\$ 0.2051		\$ 1,363,300	103,792	\$ 13.1349
Total	\$ 13,755,396	65,384,611	\$ 0.2104		\$ 5,672,593	357,166	\$ 15.8822

Total Revenue \$ 19,427,989
 True-up and Adjustments (Net) \$ 632,923
 Net Revenue \$ 20,060,912

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by DEAO for FY25. TEG continues to provide oversight of the System Operator (DEAO) and continues to meet regularly to communicate about important issues and on-going projects. DEAO has reported and managed EGF operations satisfactorily although improvements in addressing the items noted in the EGF Walkthrough reports are necessary.

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. Due to what TEG deemed to be an excessive number of boiler and chiller plant trips in FY24 and in previous years, TEG provided documentation of experience from other district energy systems showing that few such events should be occurring. During the First Quarter, TEG and DEAO discussed at length the need to address the situation to determine whether the cause was operational or maintenance related and address such issues. As a result of changes made by DEAO during the quarter, the number of reportable thirty-minute periods where the steam sendout pressure was less than 150 psig and where the chilled water sendout temperature exceeded 43.3°F greatly decreased during the fiscal year. However, trips and excursions are noted for the quarter and the fiscal year.

First Quarter:

Boiler 4 tripped on July 6 and would not restart. Boiler 2 was started in its place. DEAO investigated but the cause of the trip could not be replicated. The steam sendout pressure was below 150 psig for sixty minutes reaching a low pressure of 122.5 psig.

Second Quarter:

No excursions were reported.

Third Quarter:

The EGF experienced one chilled water temperature excursion lasting 58 minutes on January 20 due a reported voltage imbalance on condensing water pump 4. The maximum chilled water sendout temperature was 43.9°F.

Fourth Quarter:

Switchgear 1B tripped on April 3. This event caused the boiler and chiller plants to go offline requiring a restart of each system. The steam pressure was below 150 psig for 105 minutes with a low pressure of 109 psig. The chilled water sendout temperature was above 43.3°F for 42 minutes reaching a peak of 48.1°F.

While rotating chillers to allow Trane to perform the annual chiller electrical maintenance on April 22, the chilled water sendout temperature exceeded 43.3°F for 48 minutes reaching a peak of 44.9°F.

During the start-up of switchgear 6B following the completion of the switchgear 1B repairs on May 9, the EGF lost power momentarily. The single operating boiler tripped and was restarted. The system pressure dropped to a low of 129 psig and was below 150 psi for approximately 45 minutes.

Figure 15 shows the duration of the reportable excursions for both the steam and chiller plant for the past fourteen fiscal years. The numerical values shown adjacent to the vertices of the lines on the graph represent the number of reportable excursions. This graph excludes the excursions as a result of utility interruptions, tuning and testing of equipment where excursions would be expected, planned outages, and unexpected issues at customer buildings. The data shows a general decline in reliability (greater values) until FY25 when the number and duration of the excursions reverted back to the FY12 values.

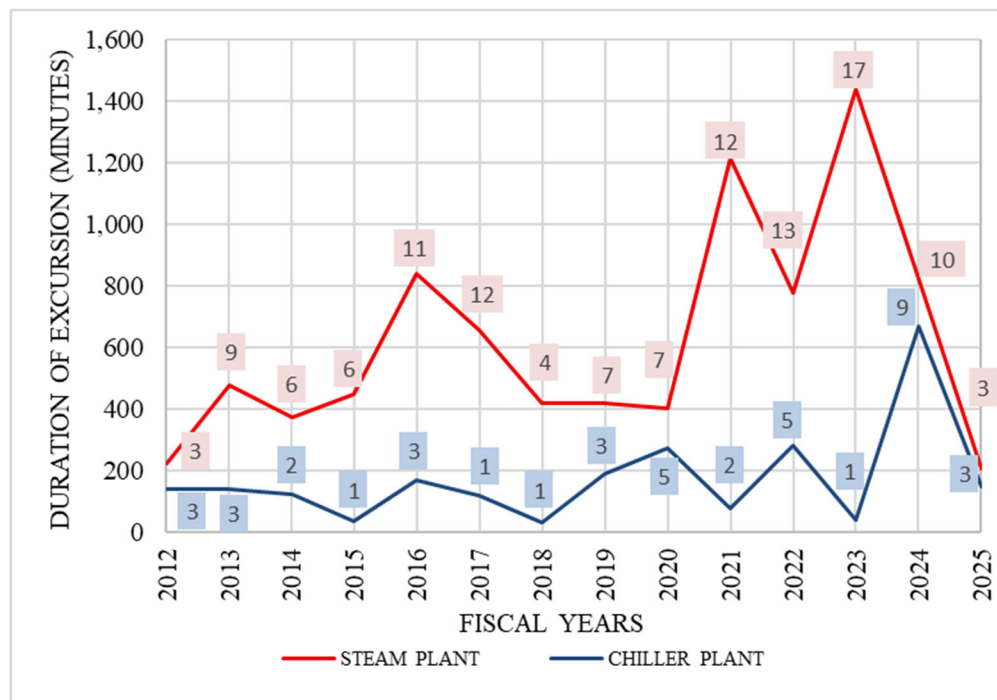


Figure 15. Steam and Chiller Plant Excursion History

B. Efficiency

The operation of the EGF satisfied all of the performance guarantees each month during the quarter except the steam-electric metric for May. 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.

DEAO has implemented and requires regular attendance of online and in-person safety courses for their employees. For the Fourth Quarter, the courses included: Heat Stress, Confined Spaces, and Slips, Trips, and Falls.

D. Personnel

As of the end of the quarter, DEAO 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 discussed previously and other corporate training.

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 relative amount of condensate return averaged approximately 71.1% of the steam sendout during the quarter, which represents a marginal decrease over the previous Fourth Quarter. The amount of condensate return averaged 66.3% for the fiscal year reflecting a marginal increase over FY24.
 - Feedwater iron, pH, and hardness (for the portion of the condensate returned) remained within their acceptable ranges during the quarter and the fiscal year.
- Condensing Water System
 - The conductivity of the condensing water continues to be normal.
 - The cooling tower blowdown decreased 10.9% over the previous Fourth Quarter but the annual average increased 6.3% over FY24. This increase resulted in an average increase in the cycles of concentration in the cooling towers of 6.7% for the quarter but a 6.7% decrease for the fiscal year.
 - DEAO began monitoring and tracking the ratio of the cooling tower blowdown to the chilled water production. The average value for the quarter increased 4.4% over the previous Fourth Quarter. Since the chilled water-

water guarantee was met each month during the quarter, operating with a cooling tower blowdown ratio around 0.27 to 0.30 gallons per tonhr may prove to be an optimum range for the EGF. TEG and DEAO continue to monitor various performance metrics within the EGF and EDS to look for ways to improve system efficiency.

- Chilled Water System

- DEAO 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 has significantly reduced the amount of suspended solids in the chilled water and improved the turbidity of the system.
- Figure 16 shows the results of several measured metrics within the chilled water system which may be affected through the use of the side stream filter. Values shown at or near zero may be at or below the detectable limit and are represented by "zero" on the graph.

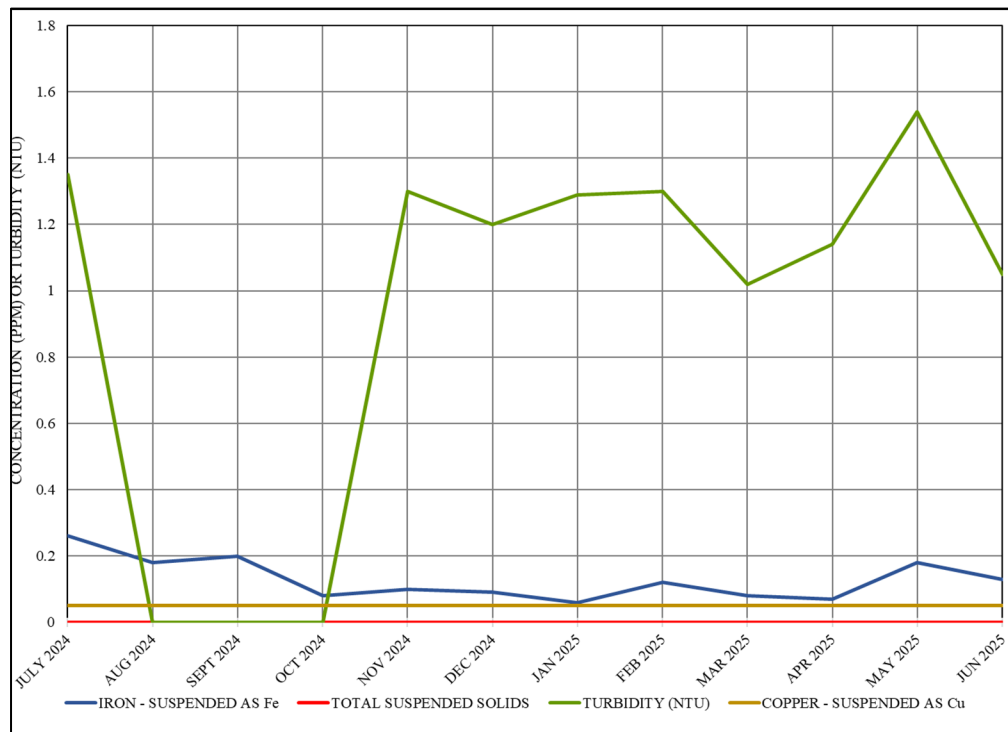


Figure 16. Chilled Water Composition Downstream of Side Stream Filter

G. Maintenance and EGF Repairs

DEAO 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.

Several deficiencies related to the cooling tower maintenance and repair have been noted in several of the previous EGF Walkthrough Reports and in the report provided by McHale and Associates during the Third Quarter. TEG remains convinced that the block-style fill in the cooling towers from Evapco used to replace the OEM fill does not provide the same performance as the OEM fill. This type of fill is prone to collect silt and other deposits further reducing the air flow through the towers. The block-style fill negatively impacts the tower performance which reduces the efficiency and capacity of the chillers and as supported by the McHale and Associates report and associated documents. Furthermore, TEG recommend that DEAO verify the preventative maintenance items from Appendix B.3 of McHale's report are included within the CMMS schedule and add any items which may be missing.

Repairs and As Needed Maintenance

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

Repairs or Replacement

- Repaired switchgear 1B;
- Repaired boiler 2 controller;
- Replaced chiller 9A and 5A purge units;
- Replaced cooling tower 8 fan belt;
- Repaired softener 1 and 2 valve;
- Painted exterior piping and bollards;
- Installed traffic signs at the parking lot entrances;
- Repaired insulation on chilled water pumps 1, 2, and 3 and the plant condensate near the air curtains;
- Performed repairs on the irrigation system;
- Replaced the electric meter on MCC 4;
- Other repairs, maintenance, and preventative maintenance were made during the quarter and are listed in the monthly reports issued by DEAO.

DEAO includes in their monthly reports to Metro the amounts spent for maintenance and repairs at the EGF. These costs are borne by DEAO and are not included in Metro's budget.

Preventive maintenance, equipment replacement, labor, and sub-contractor costs are included in the values shown in Table 5.

Table 5. DEAO Annual EGF Maintenance and PM Reported Costs

Month	Maintenance	Preventive Maintenance
Jul-24	\$68,968	\$15,911
Aug-24	\$69,951	\$13,458
Sep-24	\$54,184	\$17,038
Oct-24	\$92,597	\$20,835
Nov-24	\$74,691	\$12,830
Dec-24	\$41,698	\$40,320
Jan-25	\$32,741	\$19,492
Feb-25	\$112,292	\$20,759
Mar-25	\$24,837	\$21,766
Apr-25	\$59,256	\$19,030
May-25	\$168,502	\$47,573
Jun-25	\$40,808	\$21,368
Annual Totals	\$840,525	\$270,378

H. EGF Walkthrough

The EGF Walkthrough was conducted on June 24, 2025, by Kevin L. Jacobs, P.E. Based on the review of the EGF, the following comments and observations are presented. Mr. Jacobs observed the following items during this Walkthrough which require attention.

- During the Fourth Quarter FY24 Walkthrough, the control valve on the city water makeup was not insulated and was sweating. DEAO reported at that time they would have the valve insulated by their insulator who was onsite during the Walkthrough making insulation repairs elsewhere in the EGF. During the Fourth Quarter a bucket with a drain hose was noted as having been installed beneath the valve to collect the condensation from the valve and a small leak from the flange. DEAO repaired the leak and removed the bucket prior to the Second Quarter Walkthrough. DEAO needs to repair the insulation to the control valve. This insulation was not repaired as of the Second Quarter Walkthrough. **The valve was insulated during the Third Quarter FY25, but the adjoining isolation and bypass valves have not been insulated. DEAO needs to address the insulation of these valves to prevent condensation and reduce the occurrence of further corrosion.**
- Insulation was damaged or missing on several of the chilled water drain lines near the chilled water pumps causing the pipes to sweat and water to pool nearby. **The insulation was replaced during the quarter, but water remained on the floor. DEAO needs to clean the water from the floor. This item will be removed from future reports.**
- As noted in the Second Quarter FY25 Walkthrough report, the gate in the stairway to the operating floor has a damaged hinge and is not automatically closing. The pin to the lower hinge appears to have fallen out, but other problems may be present. **The hinges and pin were repaired during the quarter. This item will be removed from future reports.**
- The insulation on the condensate and feedwater lines south of boiler B4 needs to be repaired in several locations. The insulation on the steam line west of boiler B4 also needs to be repaired. The hangers on these pipes need to be adjusted and tightened if necessary. **DEAO has repaired much of this insulation but a section of insulation on the piping beneath the make-up valve west of boiler 4 needs repair.**
- Cooling tower 11 began overflowing from the hot deck during the walkthrough. After the flow to the tower was shut off, portions of the hot deck were reviewed. Mud and debris, which was most likely pieces of cooling tower fill, were discovered plugging the nozzles. The mud and debris would most likely have had to pass through the condensing water pumps and the chiller condensers in order to be in the hot water basin. **DEAO reported they cleaned the hot water basin for cooling tower 11 subsequent to the Third Quarter Walkthrough. They have not inspected or cleaned the chiller condensers since they had been recently cleaned (prior to the Third Quarter Walkthrough). They will perform the chiller condenser cleaning and inspection after the cooling season. This item will be removed from future reports unless an issue recurs.**

- The water distribution box for cooling tower 11 may be leaking. This leak is similar to the leak noted in cooling towers 12 and 18 and reported in the McHale and Associates report on the cooling towers dated March 6, 2025. **DEAO reported they have investigated the issue and will make repairs after the cooling season. It could not be determined during the Fourth Quarter Walkthrough if the boxes were leaking since all of the towers were operating.**
- DEAO was provided a list of maintenance action items to be completed related to the McHale and Associates report on the cooling towers dated March 6, 2025. **DEAO responded to the scheduling noted in the March 18, 2025, memo from TEG. This item will be removed from future reports.**
- Damage to the inboard side fill of cooling tower 1 was previously noted. This damage included broken louvers and separated sections of the fill. In addition, similar damage was noted during the Third Quarter FY25 Walkthrough of the outboard side of cooling tower 18 and the inboard sides of towers 4, 10, 14, and 18. “Inboard” refers to the side of the towers facing one another. “Outboard” refers to the side of the towers facing toward the outside of the EGF. **DEAO needs to schedule the replacement and repair of the fill. This item will remain in the Walkthrough reports until such time as the replacement and repairs have been made.**
- Chilled water pump 2 was spraying water from the inboard packing gland. **DEAO needs to tighten this gland or make whatever repairs may be necessary.**
- DEAO previously made repairs to the ceiling on the operating floor above motor control center 4 and near boiler 3. The ceiling decking (corrugated metal panels) between boilers 1 and 2 and above motor control center 3 appears to be showing signs of rusting which may lead to further degradation of the decking or damage to structure and equipment below. **DEAO needs to investigate this area for potential leaks and make repairs, as necessary.**
- TEG previously discussed with DEAO the depression in the roof membrane near the ladder between cooling towers 6 and 7. The ceiling decking (corrugated metal panels) above the mezzanine level and directly below the depressed spot on the roof is beginning to show signs of oxidation. **DEAO needs to investigate the cause of the depression, make repairs as necessary, and mitigate any leaks which may be occurring.**
- The paint on the natural gas lines on the east side of the EGF is peeling and missing in some locations. **DEAO has repainted these lines. This item will be removed from future reports.**
- Unused wooden pallets were sitting in the parking lot during the walkthrough. **DEAO needs to remove these pallets.**
- Calcium buildup on the condensing water pumps 4 and 5 was noted on the volutes and adjoining piping. The buildup was not present on the other condensing water pumps. **DEAO needs to clean these areas and repaint the pumps and piping, as necessary.**
- One of the bumpers and some of the caution tape on the beam flanges located on the south side of the cooling tower deck have become detached from the beams. **DEAO needs to replace the tape and re-attach the bumpers.**

- **DEAO should review the IMaint attachments on the Metro drive and verify the most recent files have been updated so that they can be backed-up. IMaint attachments should be included when available and updated as maintenance items are addressed. Some recent items have been updated over the previous few quarters, but these may not be indicative of the maintenance performed by DEAO.**
- **The customer building and EGF meter and instrumentation calibrations need to be updated. The newest entries are from 2022. The customer building meter and instrumentation calibrations have been provided to TEG. However, the EGF meter and instrumentation calibrations have never been provided. These calibration reports need to be saved to the Metro drive so they can be backed-up and reviewed by TEG.**
- Other action items previously noted to be addressed by DEAO may have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated June 25, 2025, 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. Fourth Quarter FY25 Open Projects

The following projects remained open at the end of the Third Quarter FY25.

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

The Peabody Union development includes the construction of Guthrie St that has required modification to the east retaining wall along the EGF property. The installation of this new road will 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 by the Peabody Union contractors, and the overall impact on DES.

TEG reviewed the installation of the fencing and work on the DES performed by Peabody Union's contractor (Turner Construction Company) and provided a punch list of incomplete or unacceptable items to Turner and AR Coleman on February 27. A follow-up punch list was issued on June 3, 2025. As of the end of the Fourth Quarter, some punch list items were not completed.

DES believes the poor visibility while entering and exiting the parking lot at the EGF creates a potentially hazardous condition which needs to be addressed by Peabody Union. Communications with NDOT and Peabody Union occurred during the quarter attempting to address this issue. As of the end of the quarter, no action has been taken by NDOT or Peabody Union.

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 closed due to indeterminate delay.

3. DES195 – DES Parking Area

This project is closed due to indeterminate delay.

4. DES201 – East Bank Development

This project is closed due to indeterminate delay.

5. DES202 – 7th and Commerce Hotel

The developer for the new hotel has reported their project is progressing with financing and the project should be re-starting in the coming quarters.

6. DES203 – Printers and Bankers Alley Building

The engineers for the developer reported the project is moving forward and that chilled water service from DES is included in the design.

7. 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 and 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. TEG has modeled these supports to determine the resulting forces on the supports based on varying friction factors. As a result of the modeling, TEG determined these slides and guides need to be repaired, restoring the low resistance to thermal movements as originally designed thereby preventing excessive forces on the supports and anchors. This project addresses the replacement or repair of these supports.

TEG conducted a site review to confirm the extent of the work needed; 208 supports were found to be worn or damaged. The design documents for these support modifications were completed during the Fourth Quarter FY24. Due to other project schedules, DEAO has postponed the bidding of this work. TEG has agreed to a temporary delay provided the work proceeds in the First Quarter FY26.

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

TEG retained a surveyor to provide a survey of the proposed route to the new hotel site. TEG submitted comments to the surveyor on their latest revision during the quarter and is anticipating issuing a final set of drawings in July.

The building's contractor noted a postponement of the building's construction of five to six months. Therefore, the design and construction of the new service will not be required until CY26.

9. DES219 – 7th Ave Tunnel Shotcrete Expansion

This project involved the extension of the existing shotcrete and drainage wicks in a 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 DEAO assistance, TEG met with a specialty contractor to review the work scope in the 7th

Ave Tunnel. The work scope area was impeded by the steam and condensate return service piping to the Metro Library. Upon evaluation of the options, the relocation of this service piping to facilitate the shotcrete work was determined to be the most cost-effective solution. In addition, the relocation of this piping eliminates obstructions in the tunnel pathway and improves the safety aspect of this tunnel section.

TEG prepared drawings and specifications for the relocation of the service piping and the work scope was executed in late September 2024. The insulation and punch list work was completed early in the Second Quarter FY25.

The shotcrete contractor completed the shotcrete expansion in December 2024. This project is closed with final invoices anticipated to occur during the First Quarter FY26.

10. DES221 – War Memorial Service Modifications

The installation of the DES instruments were completed during the quarter. Chilled water service was restored on May 8 and steam service restored on June 12. DES work related to the ongoing renovations is complete. This project is in close-out.

11. DES222 – Valve Tagging

To facilitate identification of the valves in the EDS, and more efficient tracking of their maintenance, TEG recommended the development of manhole and tunnel drawings to identify all EDS valves and their locations. After discussions with DEAO and the DES liaison, this project was established.

TEG began and completed the development of the valve identification drawings during the Fourth Quarter FY24, and they were transmitted to DEAO. During the Second Quarter FY25, DEAO began tagging the valves. This process will be done over several months. This project will remain open until the valves have been tagged.

12. DES223 – Manhole 18 Electrical Repair

Several electrical components in Manhole 18 were corroded and required replacement. DEAO and TEG met with an electrical contractor and reviewed the Manhole 18 components needing replacement. This contractor developed an estimate to complete the needed work, and after addressing several questions regarding the scope and options, an acceptable cost was negotiated with the contractor during the First Quarter FY25.

To replace the corroded components, the power to the existing Manhole 18 sump pumps had to be turned off. Fortunately, there are two electrical feeds to Manhole

18. Therefore, to address the accumulation of groundwater during the electrical service shut down, DEAO installed a temporary power source for the sump pumps.

The new replacement electrical enclosure for a new controller had an extended delivery time and was delivered during the Third Quarter FY25. This work was scheduled and completed during the Fourth Quarter FY25.

This project is in close-out.

13. DES226 – State PRV Replacement

The replacement pneumatic actuated valve was installed on June 21. However, the valve did not operate as anticipated. DEAO and TEG adjusted the valve and its controls but were unsatisfied with the valve's operation and isolated the State's steam system. DEAO and TEG communicated with the vendor and manufacturer on June 23 and 24 to determine the cause of the valve's erratic operation. These conversations revealed the manufacturer had not programmed the loop controller, and the valve positioner remained with the default settings. DEAO programmed the loop controller, and TEG changed the settings on the valve positioner on June 24. The valve began operating as anticipated and has remained modulating since June 24. This project is in close-out.

14. DES227 – Manhole 16 Condensate Return Piping Replacement

Manhole 16 is a vertical shaft which connects with the 4th Avenue Tunnel. Due to the surface water entering the manway at the top of this shaft, the condensate return piping in Manhole 16 was corroded and needed replacement. Because of the field conditions, the replacement of this piping would be difficult, so TEG directed DEAO to replace this piping with a high temperature hose in lieu of steel piping.

This work was completed during the Second Quarter FY25, however the insulation of piping segments had to be delayed due to other project work at the same location (DES232). Insulation was completed during the Third Quarter FY25 with one punch list item expected to be completed early in the Fourth Quarter FY25. This punch list item was addressed, and this project is in close-out.

15. DES228 - Manholes B2 and B3 Dripleg Modification

Manholes B2 and B3 were designed and installed in 2003 to serve the Schermerhorn Symphony. The elevation of the driplegs resulted in the drain piping and dripleg cap being close to the manhole floor. Water infiltration has caused the lower piping elements to corrode. TEG recommended the "shortening" of these driplegs to reduce their exposure to accumulated groundwater. The modification of these driplegs was scheduled to take place during a planned outage sometime in calendar year 2025. However, due to an in-building steam leak nearby, the modification of Manhole B3's dripleg was completed during the Second Quarter

FY25. Portions of Manhole B2's dripleg modifications have been prefabricated to have on hand in case an emergency outage is needed due to a steam leak resulting from corrosion. Manhole B2's dripleg will be modified during a planned steam outage scheduled for August 10, 2025.

Additional dripleg modifications in Manholes B6 and B8 have been added to this project along with the addition of a steam isolation valve in Manhole B.

This project will remain open until this work is completed.

16. DES229 – Miscellaneous Manhole Insulation Repairs

Several manholes in the EDS need insulation repairs to portions of the piping. These Manholes include: 6, 10, 11, 12, 15, 18A, B6, B7, D, K, L, and Viridian. This project addresses these needs.

Insulation repairs were completed in several of the listed manholes during the Third and Fourth Quarters FY25. However, the insulation repairs in Manhole 6 will be delayed due to a valve needing replacement and relocation (included in DES230). Therefore, Manhole 6's insulation repairs will not be completed until this valve work is complete.

17. DES230 – Manhole 6A Investigation

Manhole 6A consists of two separate manholes which house the Hermitage Hotel's service valves for chilled water (first manhole) and steam/condensate (second manhole). Each of these manholes have only one manway and the floors are dirt. Because each manhole only has one manway, if maintenance personnel need to access either manhole, ventilation ducting must be introduced through this single manway which can be a safety hazard with the elevated ambient temperature of the steam manhole heightening the safety risk. Additionally, the steam service valve is not operational and needs replacement.

TEG and DEAO met with Hermitage Hotel personnel in May and reviewed their changes to the mechanical space which, in TEG and DEAO's belief, presented safety and accessibility issues (this space also includes service piping isolation valves). Hotel personnel, DEAO, and TEG agreed on a course of action to resolve safety and accessibility issues which were presented to the Hotel in March. TEG followed-up with a summary of the meeting. On June 17, Hotel personnel stated they would address DES's concerns. DEAO is tasked with modifying the gear boxes on the two DES chilled water valves and possibly installing chain wheel operators.

The steam and condensate return service to the Hermitage Hotel can be isolated in Manholes 6 and 23. However, the condensate return service isolation valve in Manhole 6 is corroded and needs replacement. Therefore, TEG prepared drawings

to obtain pricing for the replacement of this valve. The pricing received was higher than TEG's estimate, therefore TEG has requested that DEAO bid out this work. Bids were received and TEG recommended awarding a contract on time and material terms. This work is expected to be completed in August 2025.

Once the valve in Manhole 6 is successfully replaced, and the hotel has made modifications to its mechanical room, a decision regarding Manhole 6A will be made.

18. DES231 – Tennessee Tower Service Piping Relocation

The DES service piping to the Tennessee Tower passes through the State's Gold Parking Lot adjacent to the tower. The State of Tennessee unknowingly located a new back-up generator over top of a portion of these service lines. To ensure accessibility to this piping for future maintenance or replacement, the State asked DES to relocate a portion of these service lines such that none of the piping is underneath this generator.

The State has agreed to reimburse Metro for the costs of relocating these lines.

Bids were received for this work during the Third Quarter FY25, and documentation was forwarded to the State, with a recommendation for review. The State agreed with the recommendation and site work is scheduled to begin July 28, 2025. To reduce the potential impact of this relocation to Tennessee Tower, the steam piping relocation work is scheduled to be executed September 5, 6 and 7, 2025 and the chilled water piping relocation work is tentatively scheduled for October 31, November 1 and 2, 2025.

19. DES232 - 4th Avenue Tunnel Water Infiltration Remediation

With the replacement of the 4th and Church's building condensate return piping (DES227), shotcrete had not been applied to a portion of the vertical shaft wall section in Manhole 16 in a prior project because of inaccessibility. This "void" also exposed some reinforcing material that had surface corrosion. This project addresses the installation of this shotcrete.

In addition, this project includes applying shotcrete along approximately 175 feet of the 4th Avenue Tunnel floor to eliminate deep divots in the rock formations to reduce groundwater damage to these areas and improves safety for maintenance personnel.

The construction of this project began late in the Second Quarter FY25 and was completed during the Third Quarter FY25.

This project is now closed.

20. DES233 – Manhole 12 to Manhole 15 Hotspot Investigation

Water intrusion into Manhole 15 increased dramatically during the Second Quarter FY25, and the water's temperature was unacceptably hot. TEG directed DEAO to schedule a thermographic scan of the area around Manhole 15. This scan was conducted and indicated that a hot spot existed east of Manhole 15, between Manhole 12 and Manhole 15. TEG directed DEAO to hire an excavation contractor to excavate the hot spot. This revealed a leak in the condensate return piping. TEG developed a design for the replacement of this piping.

The replacement of this piping and site restoration was completed during the Third Quarter FY25. The manhole wall penetration sealing in Manhole 15 and Manhole 12 was completed during the Fourth Quarter FY25.

This project is in close-out.

21. DES234 – Manhole 9 and Manhole 18 Repairs

This project is closed.

22. DES235 – Condensate Return Leaks next to DDC (formerly CJC)

DEAO detected a hot spot in 3rd Ave North adjacent to the DDC which had caused a breach in the road pavement. Upon excavation, holes were discovered in the condensate piping that appeared to be the result of corrosion on the outside of the piping. (This was confirmed by a failure analysis that was conducted on piping samples.) This section of piping was replaced in 2003 and uninsulated "gas wrap" piping was utilized. It was evident that the epoxy coating of the "gas wrap" piping had deteriorated because of the operating temperature of the system indicating that this was not a good application for this type of piping.

Repairs were made and upon re-energization of the piping, additional leaks were discovered and then repaired. Approximately 90 feet of piping in total was replaced.

Because of the excavations associated with this project and DES237, NDOT required the milling and paving of portions of 3rd Avenue. Paving was completed during the Fourth Quarter FY25.

This project is closed.

23. DES236 – 3rd Ave Condensate Return Replacement

Because of the condensate piping leaks/failures associated with DES235, this project was initiated to replace the remainder of the uninsulated "gas wrap" piping

that was installed in 2003. The scope will include the portion of 3rd Ave North from Deaderick Street to a point just north of James Robertson Parkway.

TEG is preparing construction documents based upon the installation of Metro-furnished pre-insulated piping. DEAO is in the process of qualifying the pipe manufacturer. This scope shall be bid during the First Quarter FY26 with the work executed during late First Quarter FY26 or early Second Quarter FY26.

24. DES237 – DDC (formerly CJC) Area Chilled Water Leak

A major chilled water leak occurred early in April 2025. The leak was repaired during the Fourth Quarter FY25. New isolation valves had to be installed because the existing valves did not close adequately.

NDOT required the milling and paving of portions of 3rd Avenue North because of this excavation and the excavation work associated with DES235. Paving was not completed during the Fourth Quarter FY25.

25. McHale and Associates, Inc. DES Inspection Report

Several deficiencies related to the cooling tower maintenance and repair have been noted in several of the previous EGF Walkthrough Reports and in the report provided by McHale and Associates during the Third Quarter. Although TEG remains convinced the block-style fill in the cooling towers from Evapco used to replace the OEM fill does not provide the same performance as the OEM fill and is prone to collect silt and other deposits further reducing the air flow through the towers and negatively impacting their performance which decreases the capacity and efficiency of the chillers. Furthermore, TEG recommend that DEAO verify the preventative maintenance items from Appendix B.3 of McHale's report are included within the CMMS schedule and add any items which may be missing. This project is closed.

B. Fourth Quarter FY25 Closed Projects

DES192, DES195, DES201, DES219, DES232, DES234 and DES235 were closed during the Fourth Quarter along with the McHale and Associates, Inc. DES Inspection Report.

DES221, DES223, DES226, DES227, and DES233 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 FY25 may not be noted due to outstanding invoices from the contractors.

Table 6. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY25 Spending to Date	Total Spent to Date	Remaining Balance
Fund-49116					
DES163	Parcel K Service	\$ 1,018,802	\$ 14,747	\$ 114,199	\$ 904,603
DES192	Peabody Developments	\$ 40,000	\$ -	\$ 28,803	\$ 11,197
DES195	DES Parking Lot	\$ 275,000	\$ -	\$ 12,688	\$ 262,312
DES196	Condensate Line Leak Repair at MH9	\$ 715,000	\$ 57	\$ 728,728	\$ (13,728)
DES201	East Bank and Oracle Development	\$ 110,000	\$ 493	\$ 42,201	\$ 67,799
DES202	Service to 7th and Commerce	\$ 1,630,000	\$ 16,313	\$ 44,841	\$ 1,585,159
DES203	Service to Printer's Alley Residential	\$ 850,000	\$ 112	\$ 1,675	\$ 848,325
DES211	MHD and AA Birch Tunnel	\$ 141,500	\$ 61,761	\$ 77,661	\$ 63,839
DES213	Tunnel Support Repair	\$ 321,500	\$ 20,294	\$ 49,270	\$ 272,230
DES214	Chiller 2 R'newel	\$ 330,000	\$ -	\$ 220,313	\$ 109,687
DES216	MH6, 11 and 12 Coating	\$ 37,400	\$ -	\$ 3,572	\$ 33,828
DES217	DES Service to AutoNashville Hotel, LLC	\$ 3,079,000	\$ 24,239	\$ 30,766	\$ 3,048,234
DES218	MH B2,B6,B7,B8,B9 and 23B Cleanout/Coatings/Repairs	\$ 60,500	\$ 180	\$ 7,083	\$ 53,417
DES219	7th Ave Tunnel Repairs	\$ 391,600	\$ 116,445	\$ 150,275	\$ 241,325
DES220	MH20 Cond Repair & Grating	\$ 51,700	\$ 12,489	\$ 20,663	\$ 31,037
DES221	WM/LP Service Modifications	\$ 160,000	\$ 38,492	\$ 56,864	\$ 103,136
DES222	EDS Tagging Program	\$ 44,000	\$ 4,698	\$ 31,904	\$ 12,096
DES223	MH-18 Electrical Repair	\$ 121,000	\$ 4,875	\$ 8,239	\$ 112,761
DES224	EGF Optimization Evaluation	\$ 120,000	\$ 101,393	\$ 104,002	\$ 15,998
DES225	1st Ave and Molloy Hot Spot	\$ 330,000	\$ 277,385	\$ 277,385	\$ 52,615
DES226	State PRV Replacement	\$ 110,000	\$ 39,514	\$ 39,514	\$ 70,486
DES227	MH-16 CND Line	\$ 55,000	\$ 13,946	\$ 13,946	\$ 41,054
DES228	MH-B2 & B3 Dripleg Mod	\$ 82,500	\$ 9,502	\$ 9,502	\$ 72,998
DES229	MH Insulation Repair	\$ 75,000	\$ 3,585	\$ 3,585	\$ 71,415
DES230	MH 6A Evaluation	\$ 404,000	\$ 12,845	\$ 12,845	\$ 391,155
DES231	TN Tower Service Relocation	\$ 510,000	\$ 69,478	\$ 69,478	\$ 440,522
DES232	4th Ave Shotcrete Repairs	\$ 100,000	\$ 84,329	\$ 84,329	\$ 15,671
DES233	MH12 to MH15 Hot Spot	\$ 110,000	\$ 12,424	\$ 12,424	\$ 97,576
DES234	MH9 & 18 Repair	\$ 28,000	\$ 1,677	\$ 1,677	\$ 26,323
DES235	Condensate Leak at CJC	\$ 185,000	\$ 214,439	\$ 214,439	\$ (29,439)
DES236	3rd Ave Condensate Replacement	\$ 1,100,000	\$ 10,739	\$ 10,739	\$ 1,089,261
DES237	3rd Ave Chilled Water Leak	\$ 375,000	\$ 272,040	\$ 272,040	\$ 102,961
Total Closed Projects		\$ 5,144,600	\$ -	\$ 5,144,600	\$ -
Metro Project Admin		\$ -	\$ -	\$ -	\$ -
Project Man, Development, etc		\$ 7,893,898	\$ -	\$ -	\$ 7,893,898
Fund Total		\$ 26,000,000	\$ 1,438,490	\$ 7,900,250	\$ 18,099,750

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

Several EDS repairs and improvements were made during the Fourth 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 \$55,337. Table 7 provides a summary of the FY25 expenditures and revenues to date associated with the R&I budget.

Table 7. FY25 Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Balance
Value at end of FY24				\$ 513,650.54		\$ 77,523.53
Interest	7/1/2024	-	-	\$ 1,904.08		
Interest	7/1/2024	-	-	\$ (1,904.08)		
DEAO July 2024 R&I	8/23/2024	DES2471	DEAO	\$ 48,510.21		
Interest	8/1/2024	-	-	\$ 1,985.76		
Interest	8/1/2024	-	-	\$ (1,985.76)		
DEAO Aug 2024 R&I	9/20/2024	DES2471	DEAO	\$ 1,538.28		
Interest	9/1/2024	-	-	\$ 2,078.16		
Interest	9/1/2024	-	-	\$ (2,078.16)		
DEAO Sept 2024 R&I	10/23/2024	-	DEAO	\$ 5,769.51		
DEAO Sept 2024 R&I	10/23/2024	-	DEAO	\$ (5,769.51)		
	Sub-Total First Quarter			\$ 50,048.49	\$ 80,550.00	\$ 108,025.04
Interest	10/1/2024	-	-	\$ 2,054.49		
Interest	10/1/2024	-	-	\$ (2,054.49)		
DEAO Oct 2024 R&I	11/27/2024	DES2475	DEAO	\$ 12,370.06		
Interest	11/1/2024	-	-	\$ 1,978.58		
Interest	11/1/2024	-	-	\$ (1,978.58)		
DEAO Nov 2024 R&I	12/17/24	DES2473	DEAO	\$ 5,012.68		
DES-233 MH-15 Condensate Repair	01/17/24	DES2475	DEAO	\$ 750.00		
DES-234 MH-18 and 9 Enecon	01/17/24	DES2475	DEAO	\$ 2,945.75		
DEAO Dec 2024 R&I	01/17/24	DES2475	DEAO	\$ 7,176.94		
Interest	12/02/24	-	-	\$ 797.67		
Interest	12/02/24	-	-	\$ (797.67)		
	Sub-Total Second Quarter			\$ 28,255.43	\$ 80,550.00	\$ 160,319.61
Interest	01/02/25	-	-	\$ 832.30		
Interest	01/02/25	-	-	\$ (832.30)		
DES-226 State PRV Replacement	06/16/25	DES2479	DEAO	\$ 1,369.91		
DES-228 MH B2 and B3 Drip Legs	06/16/25	DES2477	DEAO	\$ 11,907.25		
DES-234 MH-18 and 9 Enecon	02/18/25	-	DEAO	\$ 15,320.76		
DES-235 CJC Area Condensate Repairs	06/16/25	DES2477	DEAO	\$ 2,853.67		
DES-223 MH18 Electrical Project	06/16/25	DES2477	DEAO	\$ 4,967.89		
DEAO Jan 2025 R&I	06/16/25	DES2477	DEAO	\$ 8,693.36		
Interest	02/03/25	-	-	\$ 893.77		
Interest	02/03/25	-	-	\$ (893.77)		
DES-234 MH-18 and 9 Enecon	06/16/25	DES2479	DEAO	\$ 15,320.76		
DES-222 EDS Tagging Program	06/16/25	DES2479	DEAO	\$ 708.75		
DEAO Feb 2025 R&I	03/20/25	DES2481	DEAO	\$ 5,832.31		
Interest	03/03/25	-	-	\$ 867.78		
Interest	03/03/25	-	-	\$ (867.78)		
Modifications	04/21/25	DES2481	DEAO	\$ 436.71		
DES-235 CJC Area Condensate Repairs	04/21/25	DES2481	DEAO	\$ 8,608.98		
DES-219 7th Ave Tunnel Repairs	04/21/25	DES2481	DEAO	\$ 67,500.00		
DES-231 TN Tower Service Relocation	04/21/25	DES2481	DEAO	\$ 22,406.18		
DEAO Mar 2025 R&I	04/21/25	DES2481	DEAO	\$ 15,382.95		
	Sub-Total Third Quarter			\$ 181,309.48	\$ 80,550.00	\$ 59,560.13
Interest	04/01/25	-	-	\$ 883.24		
Interest	04/01/25	-	-	\$ (883.24)		
DES-235 CJC Area Condensate Repairs	05/21/25	-	DEAO	\$ 1,733.75		
DEAO Apr 2025 R&I	05/21/25	-	DEAO	\$ 50,318.04		
Modifications	05/21/25	-	DEAO	\$ 7,159.18		
Interest	05/01/25	-	-	\$ 931.63		
Interest	05/01/25	-	-	\$ (931.63)		
DEAO May 2025 R&I	06/23/25	-	DEAO	\$ 6,352.73		
Modifications	07/15/25	-	DEAO	\$ 8,310.00		
DEAO June 2025 R&I	07/15/25	-	DEAO	\$ 4,220.07		
DES-226 AJ PRV Replacement	07/21/25	-	DEAO	\$ 6,679.55		
Interest	06/01/25	-	-	\$ 967.86		
Interest	06/01/25	-	-	\$ (967.86)		
	Sub-Total Fourth Quarter			\$ 84,773.32	\$ 80,550.00	\$ 55,336.81
	FY25 Year to Date			\$ 344,386.72	\$ 322,200.00	\$ 55,336.81

Included within the costs listed above DEAO performs regular maintenance of the EDS and occasional maintenance at customer buildings. The material costs, equipment rental, and overtime labor costs realized by DEAO for these efforts are reimbursable by Metro. Each month DEAO invoices Metro for these R&I expenses. The total for these reimbursable expenses is \$165,408 for FY25. This total includes a credit of \$20,000 for Metro as part of the Amendment 3 of the ARMA. Additional project costs are also included in Table 7, which are not part of this total.

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 and tunnel reviews were conducted as scheduled.
 - b. The monthly thermographic scans were performed.
 - c. DEAO continues to replace trap assemblies within the EDS as needed and any removed or damaged insulation should be repaired or replaced after the trap is replaced. This insulation repair or replacement has not been taking place in some instances, and the insulation of these traps are now included in DES229.
 - d. DEAO should continue to clean areas of minor corrosion and then paint those areas with cold galvanizing paint. If maintained, this should help reduce or slow down the progression of some areas of corrosion.
 - 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. DEAO continues to perform thermographic surveys of the EDS each month.
4. Recent projects and repairs have required the isolation of specific sections of the EDS. The repairs have involved chilled water, steam, and condensate return systems. In several of these instances, the isolation valves unexpectedly did not close adequately. Additional isolation valves upstream of the project and repair area had to be closed to perform the work needed. This situation resulted in requiring isolation of additional customers who would otherwise not have been impacted if adequate isolation could have been achieved as planned. On numerous occasions over the past several years, TEG has directed DEAO to include in their EDS maintenance program the semi-annual exercising and testing of all valves to identify deficiencies. To date, DEAO has not implemented such a program nor included any regular maintenance inspection of valves in their CMMS. Based upon recent attempts to isolate portions of the EDS, TEG has directed DEAO to identify all valves within the EDS that either do not function properly or do not adequately isolate and therefore, need maintenance, repair, or replacement. Once this task is complete, TEG will coordinate

with DEAO and develop a comprehensive maintenance, repair, and replacement plan for deficient valves.

DEAO reports their total cost for maintenance in the EDS in their monthly reports. These costs include the non-reimbursable expenses and the reimbursable expenses shown in Table 7. DEAO's total reported costs are shown in Table 8.

Table 8. DEAO Annual EDS Maintenance and PM Reported Costs

Month	Maintenance	Preventive Maintenance
Jul-24	\$25,267	\$12,417
Aug-24	\$20,314	\$9,082
Sep-24	\$18,103	\$11,666
Oct-24	\$18,304	\$18,323
Nov-24	\$16,629	\$11,859
Dec-24	\$23,043	\$4,891
Jan-25	\$17,366	\$9,845
Feb-25	\$19,912	\$11,752
Mar-25	\$19,108	\$9,561
Apr-25	\$19,230	\$18,860
May-25	\$23,336	\$8,101
Jun-25	\$16,852	\$11,673
Annual Totals	\$237,464	\$138,031

C. Emergencies

There were no emergencies during the quarter.

D. EDS Walkthrough

This quarter's walkthrough was conducted on May 14 and 19, 2025. The tunnels and 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, 19 (integral to the Broadway Tunnel). The tunnels that were visited include 4th Avenue, 7th Avenue, Broadway, AA Birch, and State. The following comments and observations are a result of these visits.

All the tunnels and most of the manholes reviewed this quarter have steel piping supports which have been part of our ongoing effort to remediate, repair, and prevent corrosion and have been cleaned and coated as a part of this effort. The coating appears to be performing relatively well however it is important that these supports be monitored closely by DEAO, and any degradation observed be reported immediately to TEG and repairs made quickly. This should result in instances of corrosion being addressed at minimal cost to Metro.

There is an action item list included at the end of the Quarterly EDS Walkthrough Report which identifies forty-seven (47) high priority items that need to be addressed by DEAO, four (4) of which have been reported multiple times.

1. State Tunnel

- a. There are numerous locations that require repair to the concrete tunnel structure. The damage ranges from cracks in the concrete with calcium deposits to spalled concrete and exposed, corroded rebar. Most locations include calcium deposits which indicate that groundwater is infiltrating the concrete which results in corrosion of the reinforcing rebar. If this damage is not addressed, the cracks widen, and the calcium deposits expand resulting in flaking and concrete separation. Further progression results in concrete spalling from the ceiling and walls which not only results in additional structural damage but also creates a safety hazard to maintenance personnel within the tunnel. All these conditions need to be repaired. Cracking, water infiltration and calcium deposits have occurred at the following locations: E4, E7, E8, E18, E19, E23, E25, E27, E29, E30, E31, E38, E44, E47, E48, E52, E55, E60, E62, 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. Larger cracks, water infiltration, calcium deposits, and flaking of concrete have occurred at the following locations: E11, E12, E13, E26, E28, E37, E47, E51, E61, 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. Cracking, spalling, fallen concrete, calcium deposits and corroded rebar have occurred at the following locations: E26, E66, N7, N19, N20, N53, N54, N63, N64, W26, W43, W44 and W45. Maintenance of the tunnel structure is the State's responsibility. In late 2018/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 at E1 is now more difficult to maneuver with a lower manhole ceiling and additional obstructions due to the addition of galvanized steel. About 3 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 there 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 establish 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 establish budgets for the repairs.

- b. Several of the pipe support columns and beams are corroded. Corrosion exists at the following locations: E1, E2, E3, E4, E5, E9, E11, E15, E17, E18, E19, E20, E23, E24, E25, E26, E28, E29, E31, E34, E37, E38, E44, E46, E47, E51, E52, E53, E54, E55, E56, E58, E59, E60, E62, E63, E64, E65, E69, N2, N3, N4, N5, N6, N11, N12, N15, N16, N17, N18, N21, N22, N23, N24, N25, N26, N27, N28, N29, N30, N31, N32, N34, N35, N36, N37, N38, N39, N40, N41, N42, N43, N44, N45, N46, N47, N48, N49, N50, N51, N52, N53, N54, N55, N56, N57, N58, N64, W1, W2, W4, W5, W6, W8, W8, W9, W13, W14, W17, W19, W54, W55, W56, W59, W60, W63, W64, W65, W67, W69, W70, W71 and W73. 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 in June 2023. 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. There are small steam expansion joint leaks at Stations E1 and E44. Once these leaks are large enough to be sealed, DEAO should schedule these repairs.
- d. The broken steam guide support at Station W18 was repaired in August 2022, however the disturbed piping insulation still has not been repaired. DEAO should schedule this repair as soon as possible. **This item has not been addressed in almost 3 years.**
- e. TEG has requested that DEAO obtain pricing to insulate the expansion joints at locations: W17, W18, W64, W74, N19, N20, N64, E1 and E44.
- f. TEG has requested that DEAO obtain pricing to insulate the condensate return piping from the State Supreme Court/Library and Archives at W18 and the condensate return piping from the State Capital at W57
- g. TEG has requested that DEAO obtain pricing to insulate the uninsulated piping at E1.
- h. The tunnel sump pump at N64 is not functioning properly. This sump pump is maintained by the State. DEAO should notify the State that the pump has malfunctioned.
- i. There is an appreciable amount of mud in the floor of the tunnel at N64 (this may be why the sump pump is not functioning properly – item above). Maintenance of the tunnel is the responsibility of the State. DEAO should notify the State that this area needs to be cleaned.
- j. There is a small steam leak in the trap piping at N19/20. DEAO should repair this leak as soon as possible.
- k. The following lights were not functioning during this review: N48, N43 and E22. Maintenance of the lighting is the responsibility of the State and CES should continue to inform the State of faulty lighting.

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2. AA Birch Tunnel
- a. There is a stainless steel disconnect enclosure in the southeast corner of Manhole D3 that has some minor surface corrosion (apparently it is 304 stainless steel). DEAO should periodically clean this corrosion. The wall anchors attaching this enclosure to the wall are corroded. DEAO should investigate the replacement of these anchors with 316 stainless steel anchors as soon as possible.
 - b. There is a stainless steel electrical enclosure in the northeast corner of Manhole D3 that has some surface corrosion (apparently it is 304 stainless). DEAO should clean this corrosion. The wall anchors attaching this enclosure to the wall are corroded. DEAO should investigate the replacement of these anchors with 316 stainless steel anchors as soon as possible.
 - c. Some of the insulation jacketing in Manhole D3 is damaged. DEAO should obtain pricing to make these repairs.
 - d. The chilled water vents and drains in Manhole D3 and at the west end of the tunnel are not insulated. DEAO should obtain pricing to have these insulated.
 - e. Some of the entry ladder anchor bolts are corroded. DEAO should clean these and paint them with cold galvanizing paint as soon as possible.
 - f. The trap at the east end of the tunnel had recently been cycling continuously. This was probably due to the chilled water leak that was near the west end of the tunnel which caused abnormal condensing in the steam piping. During this review, the trap was not continuously cycling. DEAO should continue to monitor this trap and immediately report any abnormal operation to TEG.
 - g. There is some scrap metal and two presumed non-operational sump pumps at the east end of the tunnel which need to be removed.
 - h. The emergency light at STA 0+28 is not functioning properly. DEAO should repair or replace this light as soon as possible.
 - i. The PVC drain piping that runs from the west end of the tunnel to the east end to divert incoming groundwater came apart at a coupling joint. DEAO has repaired the PVC piping, however, additional clamp supports need to be added to keep this piping out of the floor of the tunnel. The new clamps that are added should be 316 stainless steel with 316 stainless steel anchor screws.
 - j. During this review, groundwater was seeping into Manhole D2 at the chilled water piping penetrations on the southern wall. Enecon has installed hydraulic cement in the link-seal cavities of the pipe penetrations, however due to the recent chilled water leak in the area, these penetrations began leaking again. DEAO engaged Enecon to re-visit these wall penetrations which had not occurred as of this review; however, it did occur the day after this review. DEAO should monitor these wall penetrations and report any water seepage to TEG.

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- k. There are some hairline cracks radiating from the chilled water piping penetrations in Manhole D2. DEAO should continue to monitor these cracks and report any significant changes to TEG.
 - l. The light in Manhole D2 was not functioning properly during this review. DEAO should repair or replace this light as soon as possible.
 - m. Some of the conduit fittings and conduit in Manholes D2, D3 and the tunnel are corroded to different degrees. DEAO should monitor these items and replace them as needed.
 - n. Some of the conduit fittings and conduit in Manholes D2, D3 and the tunnel are corroded to different degrees. DEAO should monitor these items and replace them as needed.
3. 4th Avenue Tunnel
- a. The steam elbow at the north end of the tunnel (STA 4-94) was exposed to a lot of water intrusion due to the condensate leak between Manholes 12 and 15 in Deaderick St that was recently repaired. This has taken its toll on this elbow's insulation. DEAO should have this insulation replaced as soon as possible.
 - b. A portion of the steam trap piping at STA 4-46 and 4-79 is uninsulated and presents a safety hazard to maintenance personnel walking in the aisle. This piping should be insulated as soon as possible.
 - c. The emergency lights at STA 4-24 and 4-74 are not functioning properly. DEAO should repair or replace these lights as soon as possible.
 - d. There is a "patch" of aluminum insulation lagging on the steam piping at STA 4-57, 4-70 and 4-73 which has been installed poorly and due to its proximity to the piping support column is damaged. DEAO should have these "patches" removed and have Aerogel insulation installed at these locations resulting in a smaller diameter than the adjacent insulation. DEAO should have these repairs completed as soon as possible.
 - e. There is some insulation lagging damage at STA 4-71. DEAO should have this repaired as soon as possible.
 - f. About 3 feet of insulation is absent on the steam piping at the lower platform in the Manhole 16 vertical shaft. DEAO should have this insulated as soon as possible.
 - g. Groundwater is ponding in the floor at the eastern end of the 4th & Church Building access tunnel. The water appears to be originating from behind the tunnel panel plates towards the western end of the tunnel. TEG will investigate grout injection behind the tunnel wall plates with Proshot.
 - h. The lights at STA 4-22, 4-45 and 4-46 are either not working or are dim. DEAO should repair these lights as soon as possible.
 - i. The baseplate grout at STA 4-34 is crumbling and cracked. DEAO should repair this grout as soon as possible.
 - j. There is some badly corroded electrical conduit at STA 4-15. DEAO should replace this conduit as soon as possible.

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- k. The insulation on the eastern chilled water service valve which used to serve the AT&T building in MH 17 is damaged and needs repair. DEAO should have this insulation repaired as soon as possible.
 - l. The overhead electrical enclosures at the north and south ends of Manhole 17 are corroded. It appears that this corrosion may just be surface corrosion and can be cleaned and painted to achieve additional years of service. DEAO should investigate if these enclosures can be cleaned and re-painted. If the condition of these enclosures is poor, DEAO should replace these enclosures with 316 stainless steel enclosures. This evaluation/repair should be done as soon as possible.
 - m. There is a badly corroded portion of a large conduit (3" dia. ?) entering/exiting the south side of the southern enclosure mentioned in the item above. The conduit is completely corroded, and the internal cables are visible. The corrosion appears to be due to groundwater intrusion. DEAO should replace the portion of conduit exposed to the groundwater with 316 stainless steel conduit as soon as possible.
 - n. There is a dripleg on the steam piping underneath the 4th Avenue crossover bridge which is uninsulated. DEAO should have this dripleg and trap piping insulated to match the existing insulation and lagging as soon as possible.
 - o. The trap at the intersection of the 4th Avenue and Broadway Tunnels was making a lot of noise. DEAO should investigate the reason for this noise and repair or replace this steam trap as needed as soon as possible.
 - p. There is some corrosion at the base of the pipe supports at Stations 4-1, 4-3, 4-9, 4-12, 4-18, 4-37, 4-38, 4-42, 4-43 and 4-69. DEAO 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 DEAO to have Enecon clean and coat these areas in a future project. Meanwhile, DEAO should continue to clean and coat these areas as needed.
 - q. There are corroded overhead steel structures at Station 4-13 and 4-15. TEG will include this in the scope to be prepared for Enecon.
 - r. The gearbox and handwheel of the butterfly valve on the western side of the tunnel at Station 4-13 is corroded. DEAO has cleaned and painted this gearbox with cold galvanizing paint, but the paint has not held up very well. TEG will investigate whether Enecon products are suitable for this application. DEAO should continue to clean and paint these gearboxes as needed.
 - s. The steam expansion joints at Stations 4-17 and 4-62 are leaking. DEAO should first tighten the packing injection bolts to try and stop these leaks. If this is not successful, DEAO should make repairs once the leaks are large enough that injection repairs will be successful.
 - t. The station identification tags are missing at the following locations: 4-74 and 4-88 (the 4-74 tag is still at the station, but it has fallen off the column and needs to be re-attached.) DEAO should furnish and install new tags at these locations sometime in the next quarter. **This item appeared in the 2/16/24 report.**
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- u. 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 has prepared project drawings for the repair of these supports under project DES-213 which is waiting to be bid.
4. 7th Avenue Tunnel
- a. There is some corrosion at the bases of the pipe supports at Stations 0+10, 7-5, 7-11, 7-17, 7-18, 7-19, 3+90 (no tag), 7-23, 7-27, 7-28, 7-29, 7-30, 7-31, 7-32, 7-34, 7-35, 7-36, 7-38, 7-39, 7-40, 7-42, 7-43, 7-45, 7-48, 7-49, 7-50, 7-51, 7-57, 7-62, 7-64, 7-65, 7-68 and 7-79. DEAO 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. There is corrosion on horizontal pipe supports at STA 7-43 and 7-44. TEG will add these locations to a scope being prepared for Enecon to clean and coat structural members.
 - c. 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 has prepared project drawings for the repair of these supports under project DES-213 which is waiting to be bid.
 - d. The emergency lights at STA 7-32, 7-41, 7-71, 7-81 are not functioning properly. DEAO should repair or replace these lights as soon as possible.
 - e. There is a light switch mounted on the column at STA 7-61 that is missing its cover plate. If this switch functions, a cover plate should be installed at this location.
 - f. Areas of the tunnel walls and ceiling at STA 7-42, 7-53 and 7-58 are experiencing water infiltration through the shotcrete. TEG will contact Proshot to schedule a site visit to review these areas.
 - g. DEAO has reported that the lower chilled water service valve to the Metro Library at STA 7-46 is not functioning properly. TEG will include this valve in a list of non-operational valves in the EDS system which will become part of a valve repair/replacement plan.
 - h. The Metro Library service piping is housed in a ~6 foot diameter vertical shaft which connects the 7th Ave Tunnel with Manhole 22B at grade. Water is infiltrating this vertical shaft and dripping onto newly relocated and insulated steam and condensate return piping, along with the existing chilled water piping. This water needs to be diverted to minimize damage to these insulated pipes. DEAO should arrange an on-site meeting with TEG and a contractor to review the modifications needed at this location. This on-site meeting needs to occur soon.
 - i. One of the station ID tags is missing at STA 7-45. DEAO should furnish and install a new tag at this location.

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- j. There is a light fixture mount at STA 7-42 that is disconnected from its junction box exposing the internal wires. This mount needs to be re-connected to the junction box as soon as possible.
 - k. There is an electrical enclosure in the tunnel ceiling near STA 7-23 (at the north end of Manhole 22) that is corroded. The corrosion may only be surface corrosion. DEAO should investigate the condition of this enclosure to determine if the surfaces can be cleaned and the enclosure re-painted to extend the life of the enclosure. DEAO should also review the mounting mechanism for the enclosure to see if any of those components require replacement.
 - l. There is a conduit that is open ended on the northwest side of the electrical enclosure in the tunnel ceiling near STA 7-23 (at the north end of Manhole 22) that has cable coming out of it and is coiled up and attached to an adjacent conduit. DEAO should determine the purpose (or past purpose) of this cable/conduit and determine the need to keep it.
 - m. There is a conduit that enters the electrical enclosure in the tunnel ceiling near STA 7-23 (at the north end of Manhole 22) from the east that is corroded. DEAO should determine if this conduit needs to be replaced or if it just needs to be cleaned and painted to extend its service life.
 - n. There is an electrical enclosure in the tunnel ceiling near STA 7-21 (at the south end of Manhole 22) that is corroded. The corrosion may only be surface corrosion. DEAO should investigate the condition of this enclosure to determine if the surfaces can be cleaned and the enclosure re-painted to extend the life of the enclosure. DEAO should also review the mounting mechanism for the enclosure to see if any of those components require replacement.
 - o. There is a painted electrical enclosure on the mezzanine in Manhole 22 that is corroded. The corrosion may only be surface corrosion. DEAO should investigate the condition of this enclosure to determine if the surfaces can be cleaned and the enclosure re-painted to extend the life of the enclosure. DEAO should also review the mounting mechanism for the enclosure to see if any of those components require replacement.
 - p. There is a piping support angle on the west side of the 7th Ave Tunnel at the intersection with the Broadway Tunnel that is corroded. TEG will add this item to the Enecon scope being developed.
 - q. The dripleg and a portion of the trap piping at Station 7-81 is not insulated. DEAO should have this piping insulated as soon as possible. **This item appeared in the reports dated 3/27/23 and 2/16/24.**
 - r. Remove the dirt/soil buildup around the pipe support stanchion bases at Station 7-81 to prevent the retention of moisture.
 - s. Continue to monitor the groundwater infiltration and notify TEG of any significant changes.

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5. Broadway Tunnel
- a. The station number identification tags are missing at locations 2+70, B-32, B-59, and B-65. DEAO should furnish and install new tags at these locations sometime in the next year. **This item appeared in the 2/16/24 report.**
 - b. There is corrosion on the supports at Stations B-7, B-10, B-15, B-16, B-21, B-22, B-24, B-25, B-27, B-28, B-30, B-31, B-33, B-34, B-35, B-37, B-39, B-49, B-60, B-62, B-63, B-64, B-65, B-66, B-68, B-69, B-71, B-73, B-82, B-83, B-85, B-88, B-91, B-92, B-95 and B-96 . DEAO 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.
 - c. The bottom 12” of the piping supports in the Bridgestone Arena service tunnel are corroded and should be cleaned and coated. TEG will add this to the scope being prepared for Enecon.
 - d. There is water seepage in the Bridgestone service tunnel at the chilled water emergency connections which has caused calcium build-up. DEAO should investigate the sidewalk access to these connections to determine if water is entering around this access. If water enters this point, DEAO should caulk the opening’s seams to stop the flow of water.
 - e. There are some wooden pallets and some other minor debris in the Bridgestone Service Tunnel that need to be removed.
 - f. The room located at the 5th + Broadway complex needs to be cleaned and pumped out. A sump and sump pump needs to be added to this area. TEG will develop a plan for this room and share details with DEAO once completed.
 - g. The northern support on the east side of the crossover bridge at the 4th Ave/Broadway intersection is corroded at the base and is no longer attached to the tunnel floor. TEG will develop a design to re-attach this member to the tunnel floor.
 - h. The light is not working at Stations B-20. DEAO should repair this light as soon as possible.
 - i. The steam expansion joint at STA B-20 is leaking. DEAO should first tighten the packing injection bolts to try and stop these leaks. If this is not successful, DEAO should make repairs once the leaks are large enough that injection repairs will be successful.
 - j. There is an emergency light at Station B-29 that is not working properly. DEAO should repair/replace this emergency light as soon as possible.
 - k. 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. **This appeared in the 2/16/24 report.**
 - l. The chilled water drain piping at Manhole 18 and Station B-62 are 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 DEAO’s Amendment 3 obligation or

by a contractor with the expense included in DEAO's monthly R&I charges. **STA B-82 has appeared in the 4/22/21, 4/13/22 3/27/23 and 2/16/24 reports.**

- m. Insulation is needed at the following locations:
 - i. STA B-96 – steam trap piping
 - ii. STA B-83 – steam trap piping
 - iii. STA B-50 – small dripleg and drain
- n. The insulation lagging at STA B-80 is slightly damaged and should be repaired when other insulation repairs are conducted in the tunnel.
- o. The light at B-78 is not functioning properly. DEAO should repair or replace this light as soon as possible.
- p. There is a lot of debris in Manhole 18 and in the sump area which appears to be left from DES-223. This debris needs to be cleaned as soon as possible.
- q. The grating at the base of the entry ladder on the mezzanine level has a depression. This panel of grating should be replaced with identical grating as soon as possible.
- r. 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 has prepared project drawings for the repair of these supports under project DES-213 which is waiting to be bid.
- s. There is a small hole in the northern wall at station B-49, next to the upper horizontal support connection. DEAO should monitor this hole and notify TEG if there are any significant changes.

6. Manhole 15

- a. DEAO has been cleaning and applying cold galvanizing paint to the beams in the sidewalk intake area of Manhole 15. Additional chipping and flaking is occurring on the beams and the angle clips connecting the beams to the intake walls. DEAO should clean and re-paint these areas with cold galvanizing paint and then continue to monitor these beams and clean/paint areas of corrosion as needed.
- b. The eastern steam wall penetration was disturbed during the implementation of DES-233 which resulted in backfill gravel entering the manhole at the penetration. The loose gravel has been removed, however the annular space around the penetration needs to be stabilized to prevent additional gravel/backfill from entering the manhole. TEG will develop a plan to resolve this issue.
- c. There is some insulation damage (~2-3 feet) on the steam piping at the eastern wall penetration. DEAO should repair this insulation within the next 6 months.
- d. 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 DEAO to have this work done.

- e. 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. DEAO 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. This leak sounds significant enough for an injection to be successful. DEAO should investigate if this leak can be successfully sealed and if so, seal the leak.
- c. The drain in the air intake area in the sidewalk area is not draining and water has accumulated. Several years ago, 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. DEAO 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. DEAO 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. DEAO 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. DEAO should monitor these joints and report any major changes to TEG. TEG will investigate to determine an effective method of sealing these joints.

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- 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 DEAO.
 - h. Concrete has spalled on the lower eastern wall just north of the access ladder to 7th Ave. This needs to be repaired to prevent additional deterioration of the wall. TEG will develop a scope for this repair.
 - i. A small portion of the chilled water supply and return piping in the northwestern corner of the manhole is uninsulated. DEAO should have this insulated as soon as possible.
 - j. The air inlet grating in the 7th Ave sidewalk area is blocked by War Memorial construction supplies and/or equipment. This is affecting the air circulation through the tunnel. DEAO should contact the construction manager for the War Memorial work and have this grating cleared to restore needed airflow.
 - k. The support beams for the air intake area in the 7th Ave sidewalk should be reviewed to determine if corrosion is present.

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 DEAO in an expeditious and professional manner.

A. Marketing

TEG continues to research and investigate potential developments along the Peabody St corridor and in the Rolling Mill Hill area. In addition, discussions with other buildings and developments north of KVB occurred during the quarter. Overall, TEG has contacted or discussed services with seventeen new developments within the past year and six existing buildings. Most of the new developments are in the preliminary phases of their projects which delay firm decisions in choosing DES. TEG has also continued its conversations with Washington Square about possible chilled water service in lieu of replacing their existing air-cooled chiller.

With possible service connections to Washington Square and the planned 7th and Commerce Hotel, the remaining DES chilled water capacity will be sold. The prospect of adding plate and frame heat exchangers to several buildings to reduce the hydraulic impact those customers have on the system (known as the Decoupling Project) remains a possibility. However, with the addition of these customers, implementation of the Decoupling Project will only enable the DES to operate the chilled water system at lower pressures and to dispatch a minor amount of additional chilled water out through the existing distribution system, which will have little impact on the ability to serve additional loads in the near-term.

The loss of Nissan Stadium in FY28 as a customer will allow for additional sales depending on where within the system the potential new customers are located. The loads previously served to the Stadium can be re-allocated to the potential expansion of the Bridgestone Arena or Music City Center if these proposed projects come to fruition.

Otherwise, significant increase in the customer base will require the expansion of new piping within the system and the installation of new capacity at the EGF. Metro has several options for future expansion which include the expansion of services into the Rolling Mill Hill area which can also be interconnected to the existing distribution system north of Korean Veterans Boulevard. Such expansions of the distribution pipe and the addition of equipment at the EGF may not result in an immediate return on capital expenditures. Metro has yet to decide if such expansions are warranted.

Metro Water Services (MWS) participates on the East Bank coordinating staff, 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 utilities, transportation, and public recreation agencies. DES continues to pursue options and potential customers on the East Bank.

B. Customer Interaction

DEAO's customer service representative (CSR) had regular communications with the DES customers which often entailed discussions of a technical nature, scheduling outages, and ongoing projects. However, some communication DEAO had with the customers involved minor problems with the customers' heating and cooling systems that are unrelated to DES service. Other more significant issues are summarized herein.

- TEG presented the Annual Customer Meeting on May 29, 2025.
- DEAO's CSR responded to a report from James K Polk building personnel on May 28 regarding low chilled water flow to their building. DEAO's CSR and maintenance personnel assisted building personnel in their investigation and determined a valve operator on the return piping was not functioning properly. The valve was re-opened, and the correct flow was established to the customer.
- Hume Fogg personnel asked DEAO to investigate a potential issue with their steam valve on May 30. Upon investigation, DEAO determined the valve was closed enough for Hume Fogg's contractors to make repairs within the building.
- DEAO's CSR and Maintenance personnel met with the MCCC building engineer to review the chilled water heat exchanger operation on June 2. On June 5, TEG and DEAO met with MCC building personnel to discuss their operation and potential reasons for their reported inability to cool their building. TEG investigated the issue further and began monitoring and tracking the building's operation. An additional meeting was held on June 19 between TEG, DEAO, and MCC to perform a number of tests to assist in determining the cause of their reported issues. DEAO began a trend of the chiller plant data at the request of TEG in June. TEG continued to investigate the potential issues by reviewing historic data. Subsequent meetings are anticipated for July.
- Additional communications between DEAO and the DES customers are included in their monthly reports.

VII. Recommendations

DEAO is obligated to meet the standard of good utility practice and performance guarantees as outlined by the ARMA. DEAO continues to improve its operation and has succeeded in meeting the guaranteed metrics during the quarter. In TEG's opinion, DEAO needs to continue their efforts to improve the operations of the EGF to meet the performance metrics more consistently. In addition, several outstanding and unaddressed issues noted in the EDS and EGF Walkthrough reports need to be addressed by DEAO, especially the long-outstanding items.

Based on the review of the Fourth Quarter FY25 EGF and EDS operations, the following recommendations are made. Several of the following items have been reported in previous Monitoring Reports and remain unresolved.

- DEAO needs to address the maintenance items included in the EGF and EDS Walkthrough sections of this report as soon as possible.
- DEAO needs to ensure the regular and preventive maintenance plan for the cooling towers covers all item recommended by the tower manufacturer (Baltimore Air Coil).
- The inability to properly and sufficiently isolate sections of the EDS results in additional expenses to Metro and requires the isolation of additional customers which would not have otherwise needed to be isolated. To mitigate this problem, DEAO needs to address the maintenance of the distribution valves and identify which valves need repair or replacement.
- 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 DEAO 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.
- DEAO should continue to remove debris and mud from the tunnels and manholes.