



Operations Monitoring Report

Third Quarter FY25

Prepared by:

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I. Executive Summary

A review of the fiscal year 2025 (FY25) Third Quarter 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 Third Quarter FY25, DEAO consistently met all performance guarantees for the quarter. DEAO is required to meet the performance criteria each month in accordance with Paragraph 8.d of Amendment 2 of the Amended and Restated DES Management Agreement (ARMA) between Metro and 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 improvements to the facility and 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 Third Quarter FY25 chilled water sales increased 4.1% compared to the previous Third Quarter (FY24). The chilled water sendout increased 1.7% over the previous Third Quarter resulting in a decrease in the system losses. The number of cooling degree days increased 35.3%. The peak chilled water demand for the current quarter is 12,488 tons, which is approximately 13.6% higher than in the previous Third Quarter.

Steam sendout for the current quarter increased 8.2% over the previous Third Quarter with steam sales increasing 11.1%. Total steam system losses decreased 18.3% from the previous Third Quarter. The peak steam demand for the current quarter is 130,675 pounds per hour, which represents a decrease in the previous Third Quarter demand of approximately 10.3%. However, the number of heating degree days increased 35.0% over the previous Third Quarter.

Work continued with the DES Capital and Repair & Improvement Projects during the Third Quarter. Repair and Improvements to the EDS continued as scheduled. Of the twenty-six open projects, two are now closed and five are in close-out. DEAO is currently only involved in eight of the open projects with active involvement in only five and occasional involvement in three. As noted in prior quarterly monitoring reports, the postponement or deferral of some of these items will result in an increase in maintenance costs to the DES and could impact the delivery of steam and chilled water. The following projects DES235, DES236, and DES237 have been added.

The current fiscal year operating costs to date are \$15,243,607. This value represents approximately 67.7% of the total budgeted operating cost for FY25. The total system revenues from the sales of steam and chilled water for FY25 are \$15,009,021 (67.9% of budgeted amount) which includes the annual true-up amount for FY24 and other miscellaneous revenue sources. Metro has reported the Metro Funding Amount (MFA) transfers of \$288,750 (75.0% 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 Third Quarter chilled water sales is shown in Figure 1. This data reflects 4.1% increase in sales for the current quarter over the same quarter of the previous fiscal year. With an increase of 35.3% in the number of cooling degree days, the change in chilled water sales may be attributable to unusually warm winter.

The peak chilled water demand for the current quarter is 12,488 tons, which is approximately 13.6% greater than the previous Third Quarter.

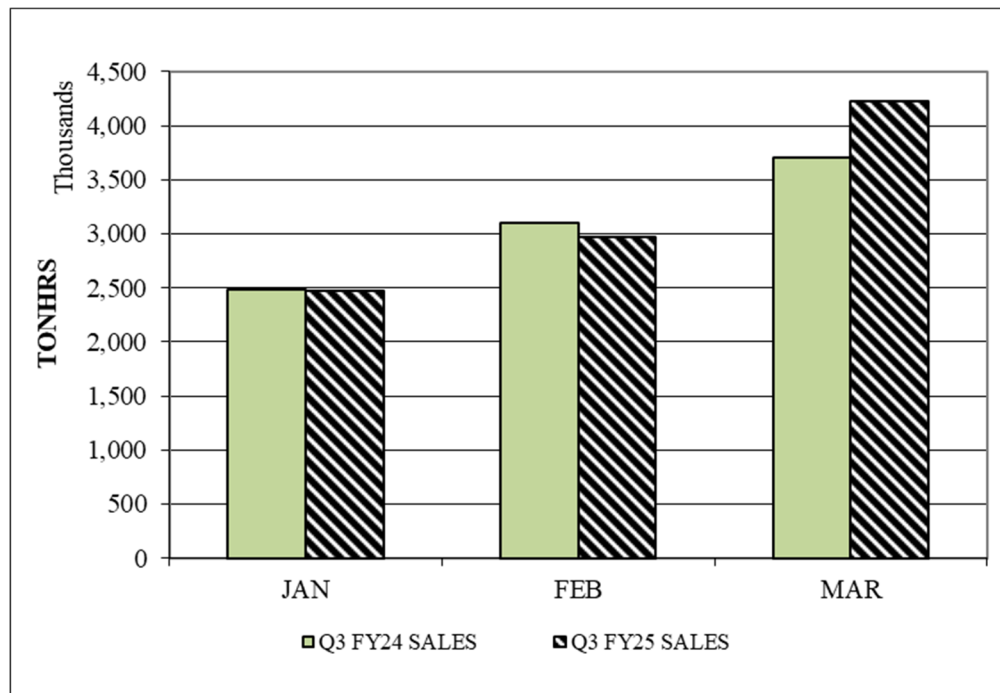


Figure 1. Chilled Water Sales Comparison

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses in this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS.

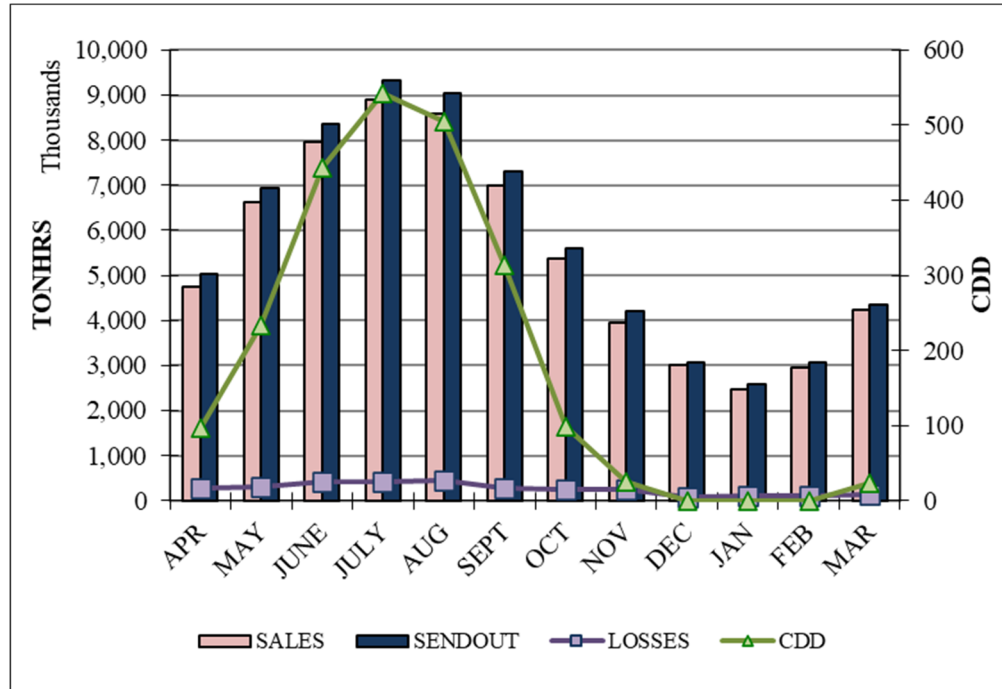


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total chilled water energy losses in the EDS for the Third 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 and the customer meters. The losses decreased 38.8% over the previous Third Quarter.

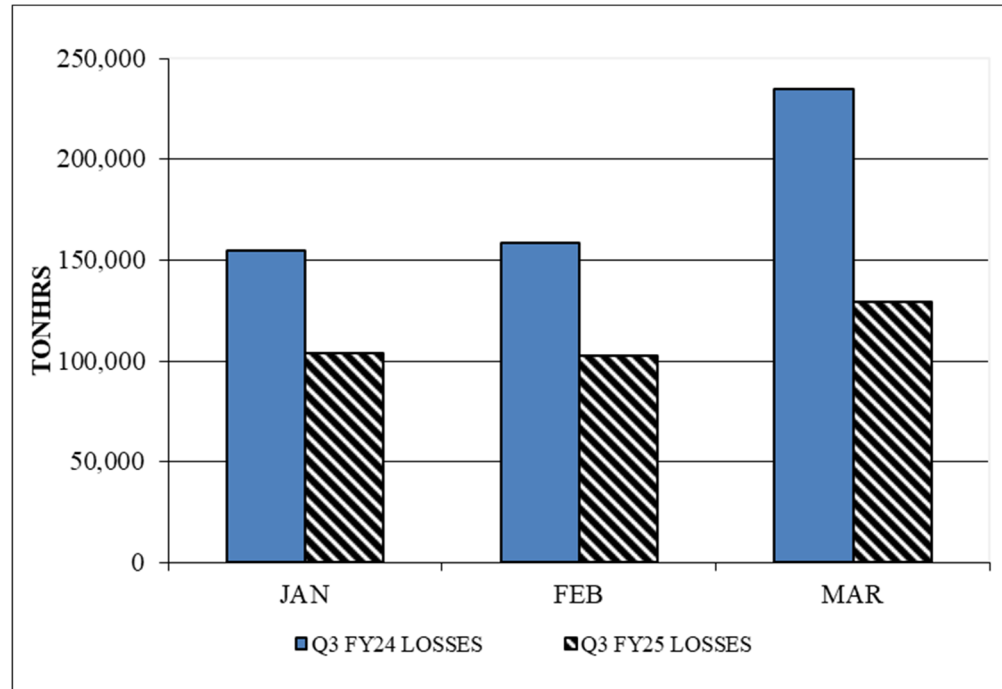


Figure 3. Chilled Water System Loss Comparison

The EDS make-up decreased 34.1% over the previous Third Quarter. 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. Occasionally, the make-up flow rate goes to zero suggesting a customer may be adding water to the system. However, the make-up to EDS remains relatively low as of the end of the Third Quarter.

The make-up to the cooling towers increased 1.5% over the previous Third Quarter. The water usage in the cooling towers is typically proportional to the production of chilled water and should vary with chilled water sales. Since the chilled water sales increased over the previous quarter, the amount of heat rejection through evaporation in the cooling towers would be expected to increase. The total chiller plant water use remained approximately the same as in the previous Third Quarter. The overall city water make-up comparison for the chilled water system Third Quarter is shown in Figure 4.

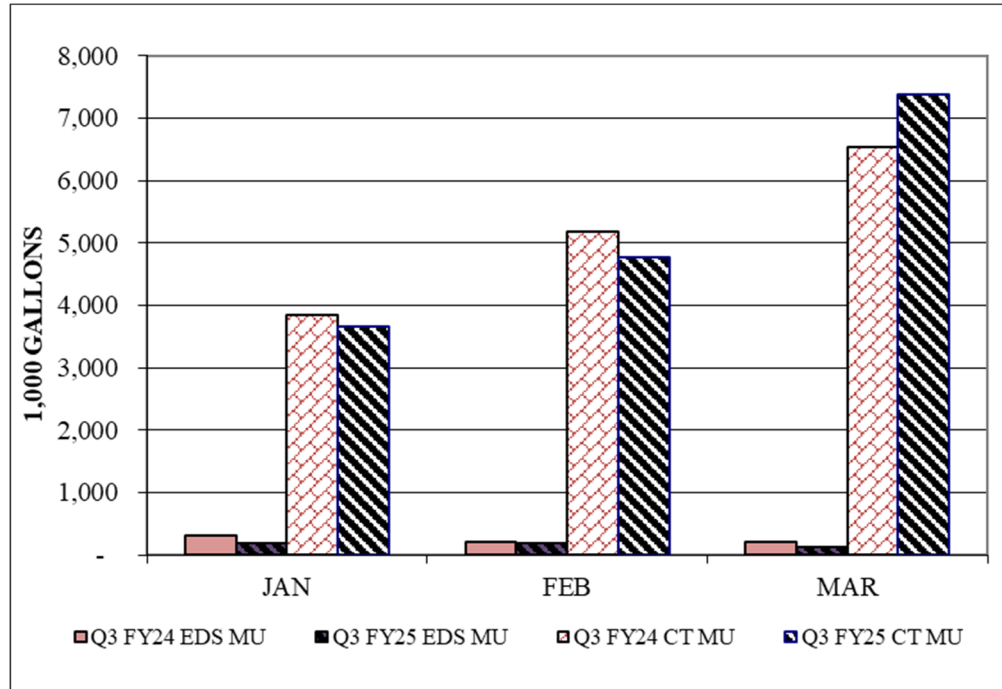


Figure 4. Chilled Water System City Water Usage Comparison

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 may prove 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 quarters with the expectation of reducing the water usage and improving their performance relative to the chilled water-water guarantee. A comparison of the Third Quarter values between FY24 and FY25 are shown in Figure 5.

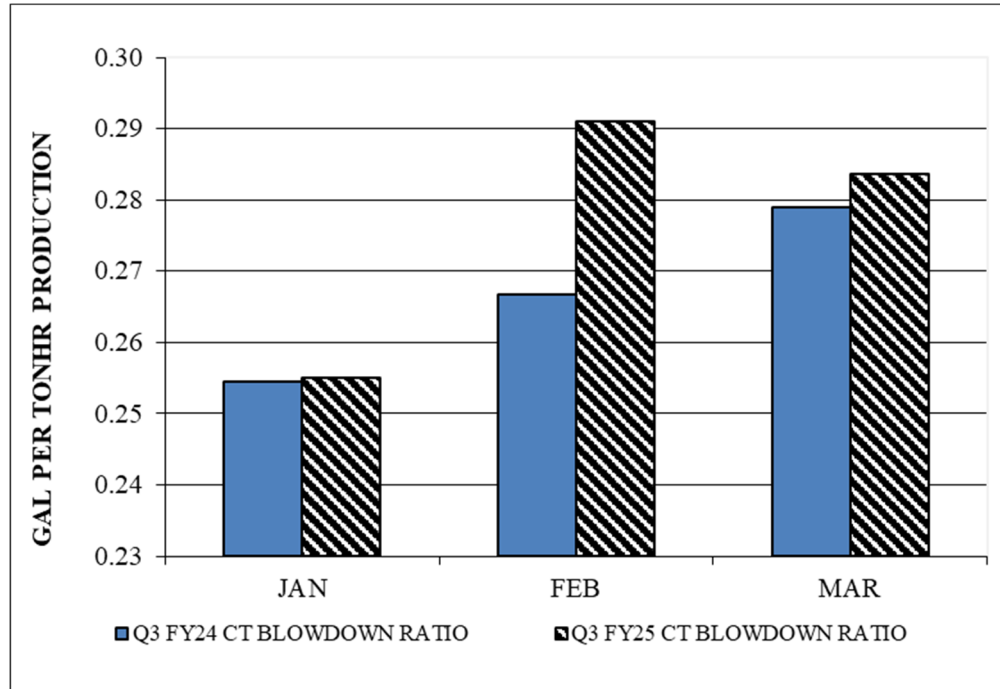


Figure 5. Cooling Tower Blowdown Ratio Comparison

When a comparison is made between the Third Quarter FY25 and FY24, the average cooling tower blowdown ratio increased 3.8%. This value corresponds to meeting the chilled water-water performance guarantee for each month during the quarter. 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. Based on the data review in recent months, a blowdown ratio of 0.27 to 0.28 gallon per tonhr appears to result in improvement performance.

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 remained approximately the same as in the previous Third Quarter indicating a consistent efficiency. DEAO and TEG continue to monitor the improvements created by DEAO’s operational changes.

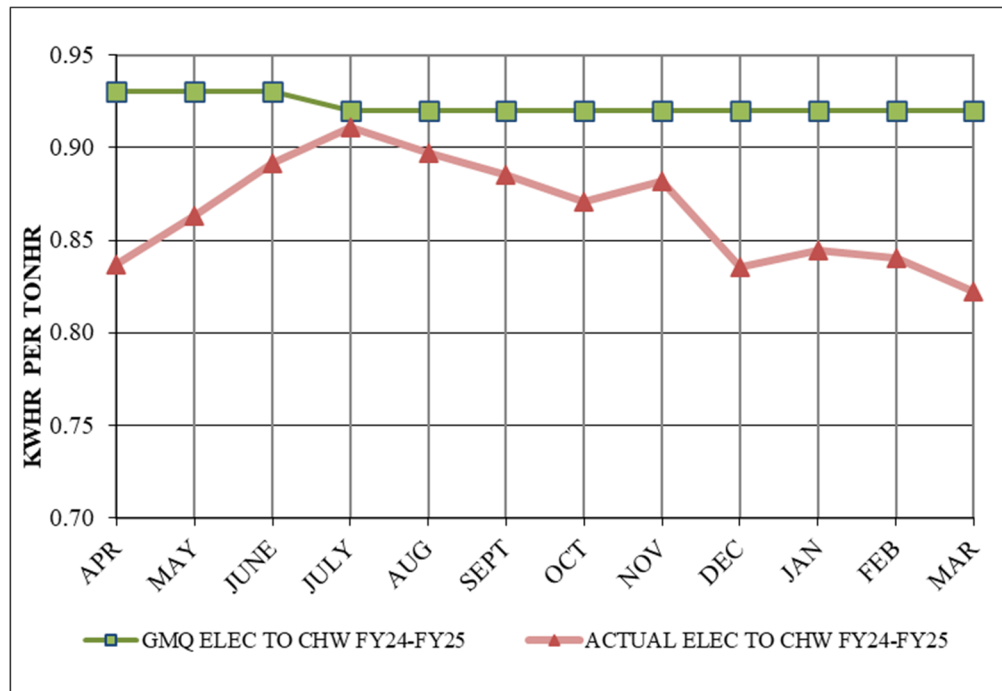


Figure 6. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

The total consumption of city water for the chiller plant for the current quarter remained approximately the same as in the previous Third Quarter. The EDS make-up decreased 34.1%, but the cooling tower blowdown increased 5.5%. The side stream filter backwash decreased 74.4% indicating cleaner chilled water. DEAO met the new chilled water-water performance metric each month during the quarter. Figure 7 shows the metric for the previous twelve months. The calculation for the “actual” water metric for months prior to July 2024 uses the methodology from Amendment 2. The FY25 data uses the Amendment 3 methodology. 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.

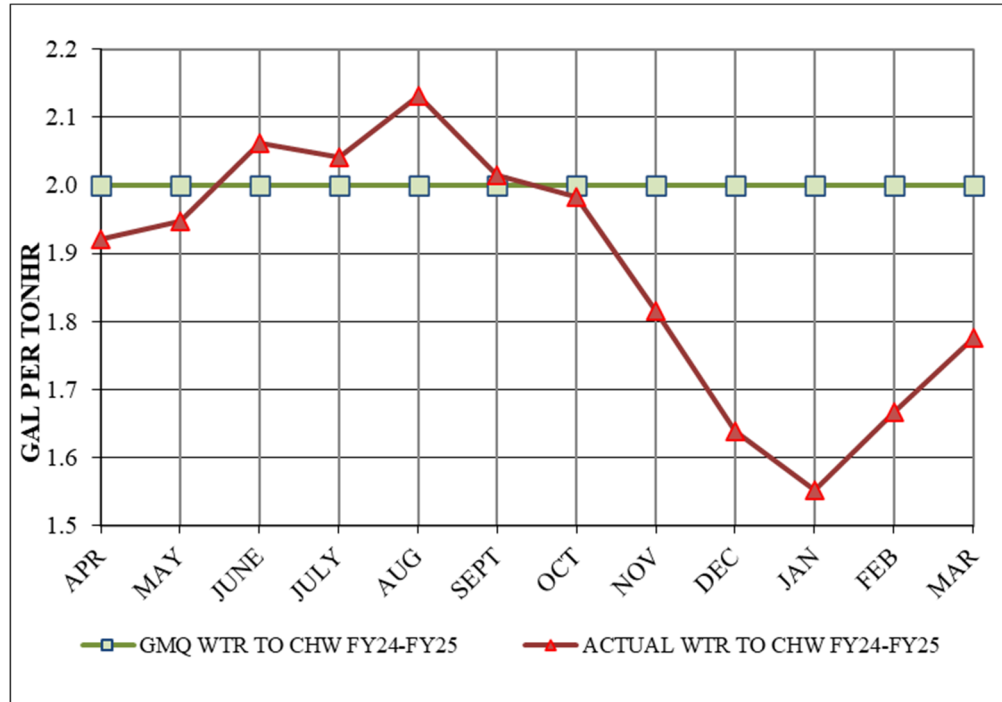


Figure 7. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

B. Steam

1. Sales and Sendout

The steam sendout increased 8.2% over the previous Third Quarter (FY24), and the sales increased 11.1%. The number of heating degree days increased 35.0% over the previous Third Quarter. The steam system losses decreased 18.3%. The relative amount of condensate return decreased 13.2%; multiple condensate leaks were found and repaired during the quarter resulting in the decrease in the relative amount of condensate returned to the EGF. The peak steam demand for the current quarter is 130,675 pph, which reflects a 10.3% decrease in the peak steam production over the previous Third Quarter. A lower peak steam demand with a higher volume of sales suggests a more consistent load occurring over the quarter relative to the Third Quarter FY24. A comparison for the Third Quarter steam sales is shown in Figure 8.

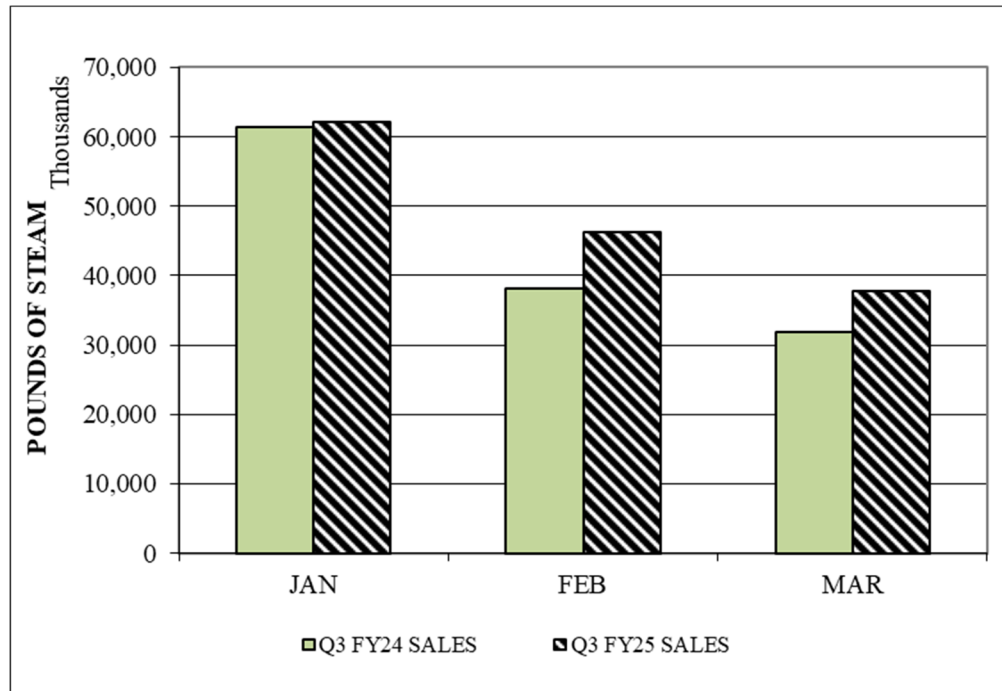


Figure 8. Steam Sales Comparison

Figure 9 shows the steam sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in pounds per month between the recorded sendout and sales values and represent the total mass loss in the EDS between the EGF and the customer meters.

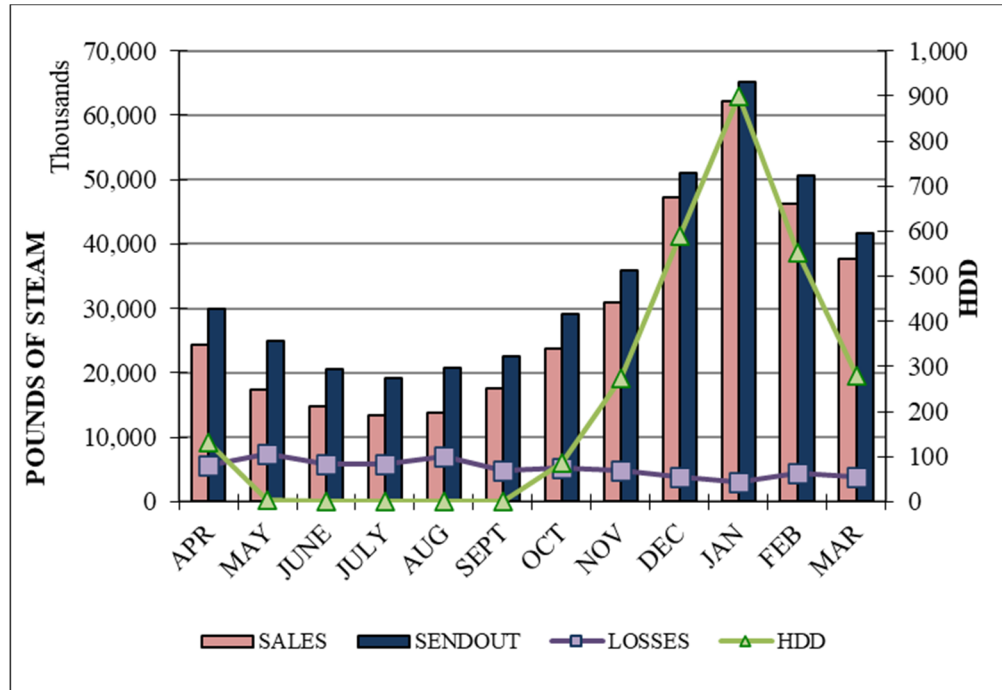


Figure 9. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Third Quarter is shown in Figure 10. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing cause of these losses.

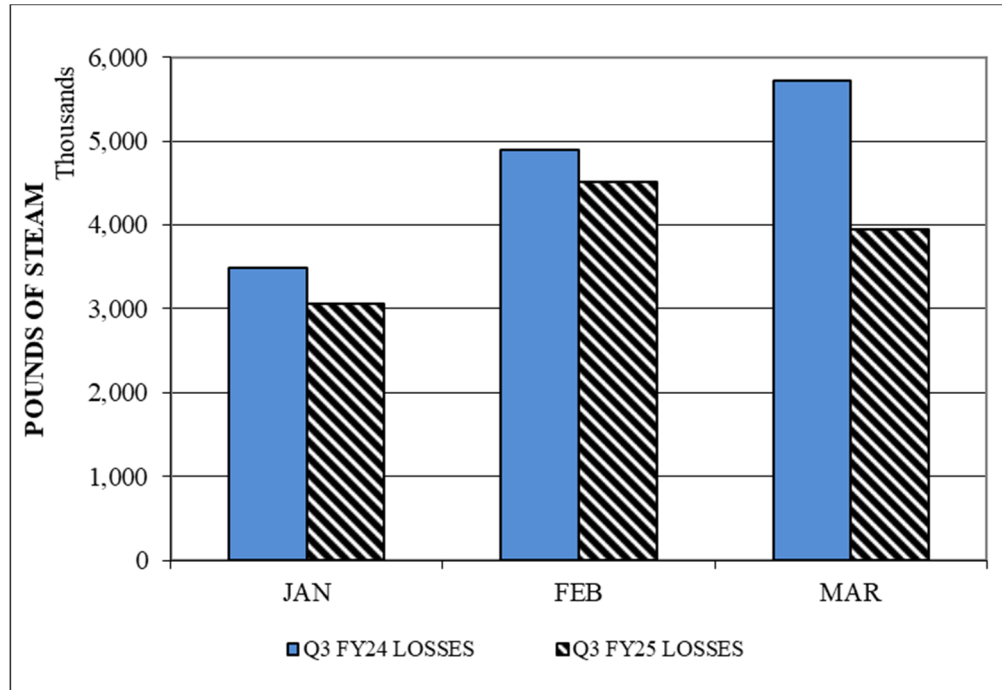


Figure 10. Steam System Losses

The amount of city water make-up (MU) to the steam system consists of the loss in mass between the EGF and the customers, in the condensate return from the customers to the EGF and losses at the EGF. The amount of make-up to the steam system increased 19.3% over the Third Quarter FY24. Multiple condensate leaks were found and repaired during the quarter. These leaks resulted in an increase in the make-up water to the steam system. Make-up to the system is anticipated to be less in the Fourth Quarter since the leak repairs have or will be made by the end of April. The corresponding data for steam system make-up is shown in the comparison of Third Quarter data in Figure 11.

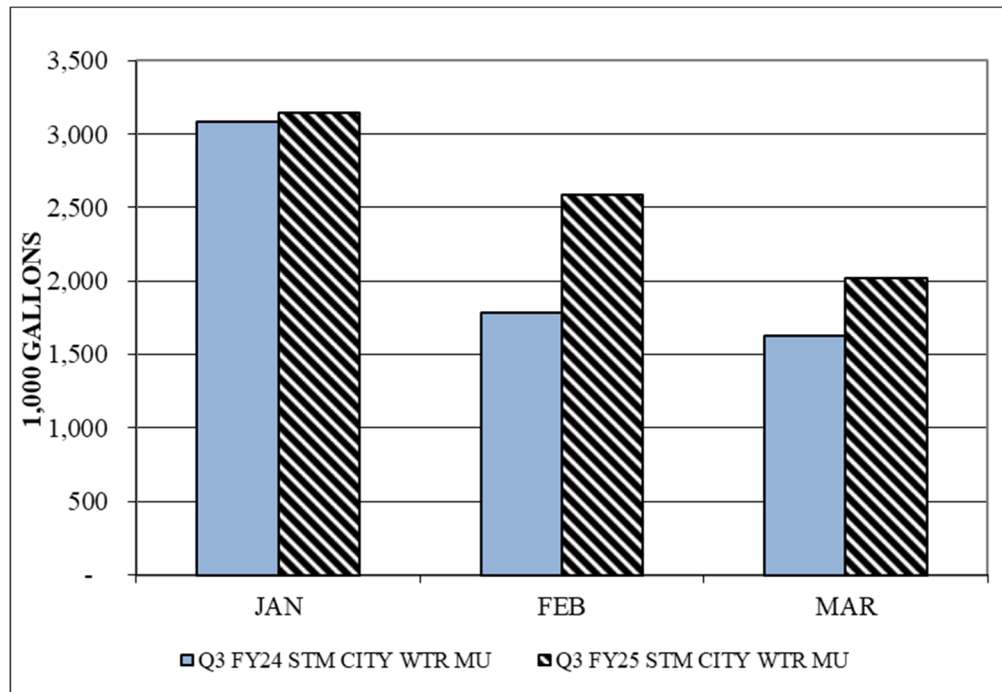


Figure 11. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system of the EGF is presented in the following three charts, Figures 12, 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 met each month of the quarter. The steam plant electric consumption for the current quarter was 6.9% higher in FY25 than in FY24. The steam-electric metric decreased 6.9% over the previous Third Quarter. The monthly steam-electric conversion factors, along with the guaranteed values, are shown in Figure 12.

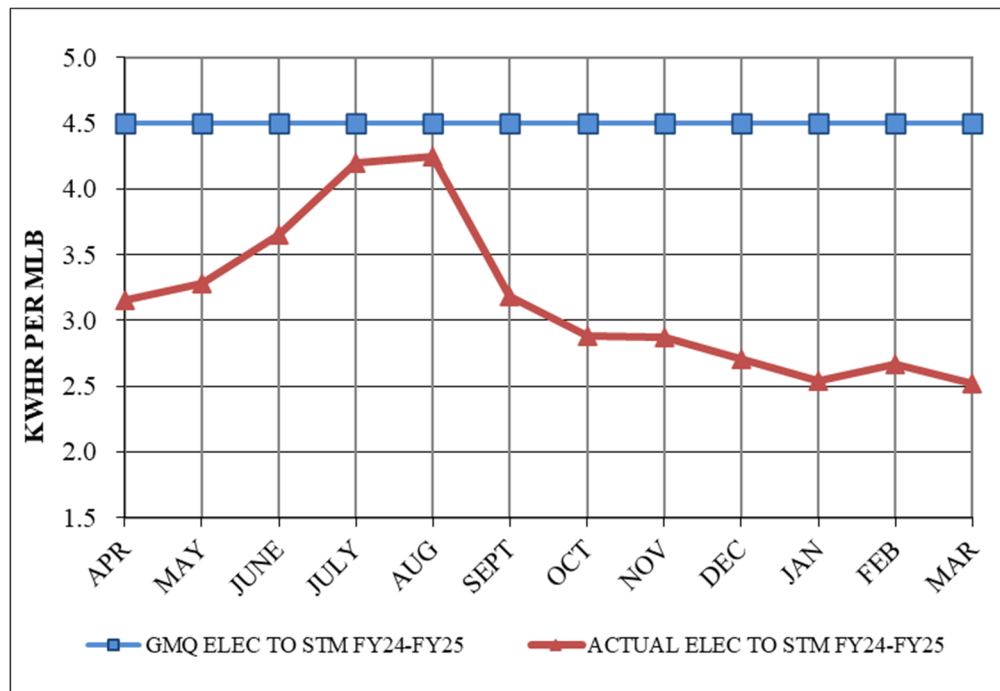


Figure 12. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

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.

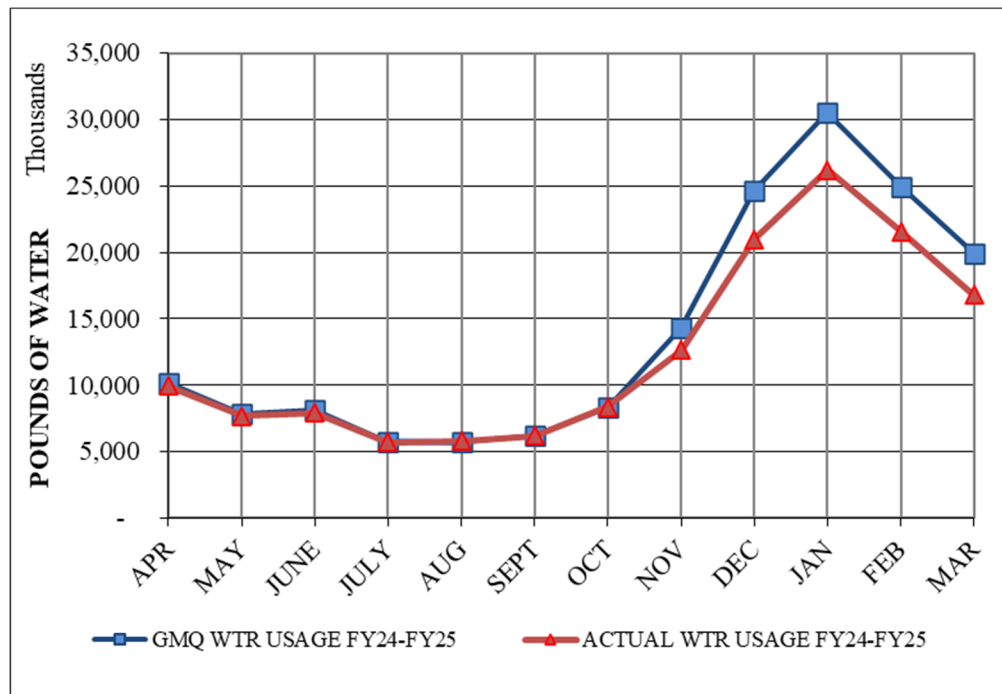


Figure 13A. Steam Plant Water Performance Guarantee for the Previous Twelve Months Using a Mass Comparison

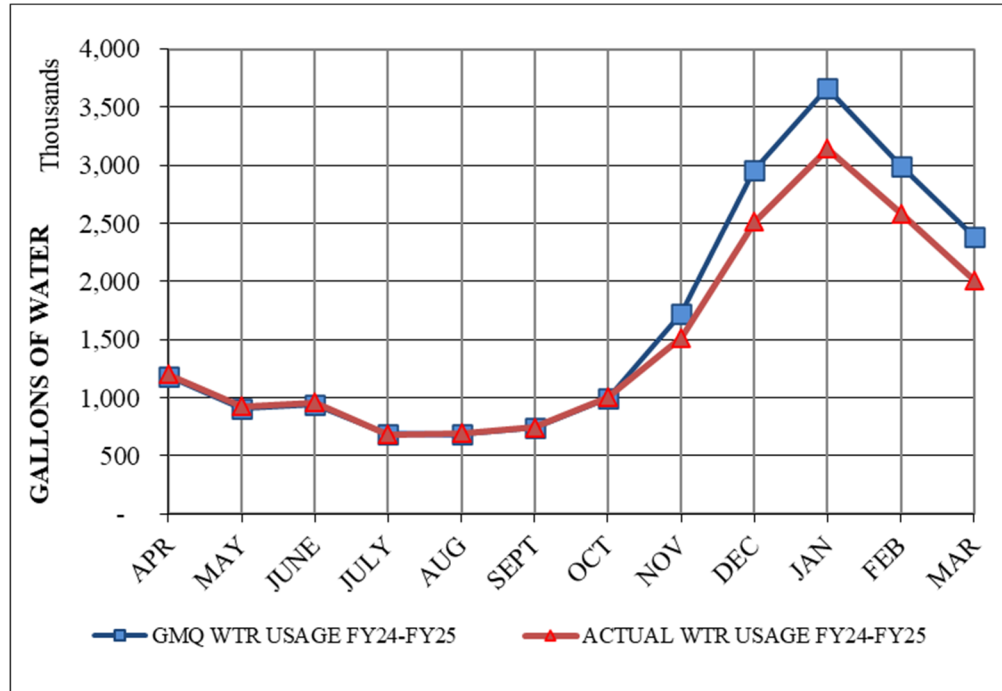


Figure 13B. Steam Plant Water Performance Guarantee for the Previous Twelve Months Using a Volumetric Comparison

For the Third Quarter, the boiler plant water usage increased 19.3%. This increase resulted in an 18.1% increase in the steam-water metric with the volumetric comparison methodology from Amendment 2 and a 19.3% increase with the density correction formulation similar to Amendment 3. Using the Amendment 3 methodology, the metric was met each month during the quarter. Please note the performance metric is based on the actual amount of condensate return each month resulting in a variation in the GMQ value.

The steam-fuel metric did not change in Amendment 3; however, the relative amount of condensate return is reported using the mass flow values determined by the density corrected values used in the steam-water metric. The actual steam-fuel metric was met each month during the Third Quarter. The fuel consumption per unit of steam sendout increased marginally over the previous Third Quarter. 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 shows the performance of the conversion factors for the previous twelve months.

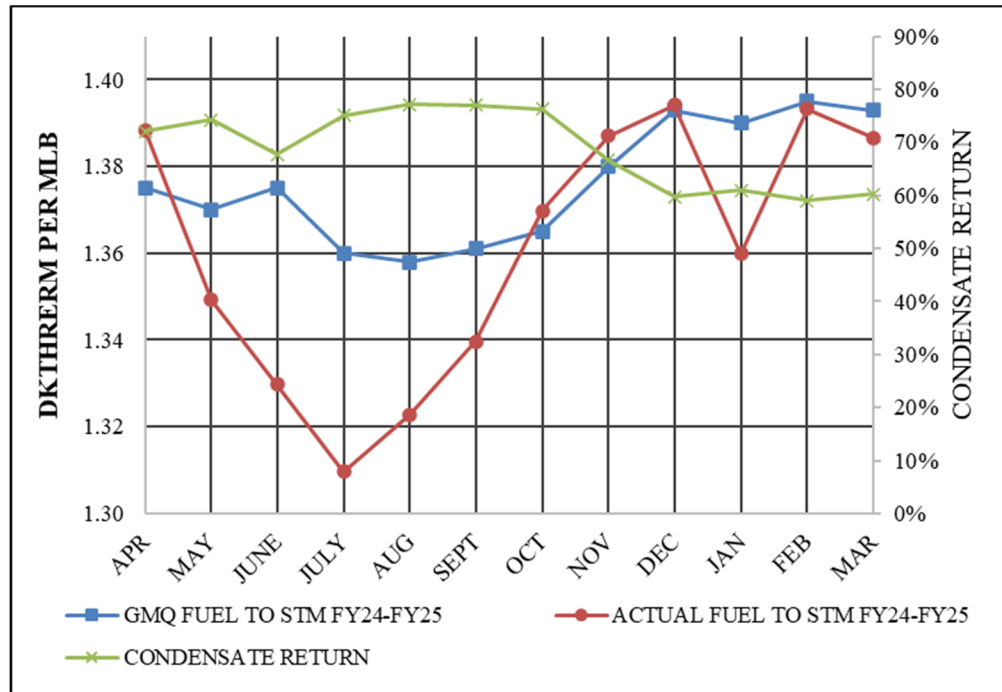


Figure 14. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

C. Contract Guarantee Performance

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

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

| Item | Unit | Third Quarter FY25 | Third Quarter FY24 | *Percent Difference |
|-------------------------------------|------------|-----------------------|-----------------------|------------------------|
| | days | 90 | 91 | -1.10% |
| Total Electric Use | kWhrs | 8,436,031 | 8,118,538 | 3.91% |
| Chilled Water | kWhrs | 8,059,720 | 7,766,657 | 3.77% |
| Steam | kWhrs | 376,311 | 351,881 | 6.94% |
| Total Water Use | kgal | 24,043 | 22,815 | 5.38% |
| Total Chilled Water | kgal | 16,300 | 16,323 | -0.14% |
| EDS Make-up | kgal | 494 | 749 | -34.05% |
| Cooling Towers | kgal | 15,806 | 15,574 | 1.49% |
| Calc CT Evaporation | kgal | 13,020 | 12,933 | 0.67% |
| CT Blowdown | kgal | 2,786 | 2,641 | 5.50% |
| Calc # Cycles | | 4.67 | 4.90 | -4.58% |
| Sidestream Filter Backwash | gal | 9,085 | 35,420 | -74.35% |
| Steam | kgal | 7,743 | 6,492 | 19.27% |
| Total Fuel Use | mmBTU | 217,004 | 200,664 | 8.14% |
| Natural Gas | mmBTU | 216,963 | 199,861 | 8.56% |
| Propane | mmBTU | 41 | 803 | -94.87% |
| Condensate Return | kgal | 11,674 | 12,356 | -5.52% |
| | lbs | 94,716,397 | 100,774,596 | -6.01% |
| Avg Temp | °F | 175.0 | 175.0 | 0.00% |
| Sendout | | | | |
| Chilled Water | tonhrs | 10,002,700 | 9,838,600 | 1.67% |
| Steam | lbs | 157,516,000 | 145,528,000 | 8.24% |
| Peak CHW Demand | tons | 12,488 | 10,996 | 13.57% |
| Peak Steam Demand | lb/hr | 130,675 | 145,600 | -10.25% |
| CHW LF | | 37.08% | 40.97% | -9.48% |
| Steam LF | | 55.81% | 45.76% | 21.94% |
| Sales | | | | |
| Chilled Water | tonhrs | 9,667,048 | 9,290,081 | 4.06% |
| Steam | lbs | 145,993,437 | 131,428,062 | 11.08% |
| Losses | | | | |
| Chilled Water | tonhrs | 335,652 | 548,519 | -38.81% |
| Steam | lbs | 11,522,563 | 14,099,938 | -18.28% |
| | | 7.32% | 9.69% | -24.50% |
| Degree Days | | | | |
| CDD | | 23 | 17 | 35.29% |
| HDD | | 1,732 | 1,283 | 35.00% |
| Cooling Tower Blowdown Ratio | | | | |
| Cooling Tower Blowdown | gal | 2,786,000 | 2,640,656 | 5.50% |
| Chilled Water Production | tonhrs | 10,002,700 | 9,838,600 | 1.67% |
| Ratio | gal/tonhrs | 0.279 | 0.268 | 3.77% |

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

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

| GMQ Calculations | Unit | Third Quarter FY25 | Third Quarter FY24 | *Percent Difference |
|----------------------|------------|--------------------|--------------------|---------------------|
| Steam | | | | |
| GMQ Elec Conversion | kWhr/Mlb | 4.50 | 4.50 | |
| Electric Conversion | kWhr/Mlb | 2.58 | 2.77 | -6.89% |
| GMQ Plant Efficiency | Dth/Mlb | 1.393 | 1.379 | |
| Plant Efficiency | Dth/Mlb | 1.380 | 1.379 | 0.07% |
| Actual %CR | | 60.13% | 69.25% | -13.16% |
| Avg CR Temp | °F | 175 | 175 | 0.00% |
| GMQ Water Conversion | gal | 9,033,748 | 6,310,368 | |
| Water Conversion | gal | 7,743,030 | 6,556,920 | 18.09% |
| GMQ Water Conversion | lbs | 75,359,524 | 54,346,359 | |
| Water Conversion | lbs | 64,592,356 | 54,156,264 | 19.27% |
| Chilled Water | | | | |
| GMQ Elec Conversion | kWhr/tonhr | 0.920 | 0.930 | |
| Electric Conversion | kWhr/tonhr | 0.836 | 0.836 | -0.01% |
| GMQ Water Conversion | gal/tonhr | 2.00 | 2.00 | |
| Water Conversion | gal/tonhr | 1.66 | 1.75 | -4.64% |

*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. A summary of the total operating costs for the fiscal year-to-date is shown in Table 3.

The revenues shown in Tables 3 and 4 reflect the charges to the customers for their respective steam and chilled water service. The difference between the total costs and revenues from the customers is the shortfall that must be covered by Metro. The shortfall exists due to the remaining unsold capacity at the EGF and the debt service for bonds to which the customers do not directly contribute.

The current fiscal year operating costs to date are \$15,243,607. This value represents approximately 67.7% of the total budgeted operating cost for FY25. The total system revenues from the sales of steam and chilled water for FY25 are \$15,009,021 (67.9% of budgeted amount) which includes the annual true-up amount for FY24 (\$128,967.46) and other miscellaneous revenue sources. Metro has reported the Metro Funding Amount (MFA) transfers of \$288,750 (75.0% 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.

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 | \$ - | \$ 3,188,125 | 75.00% |
| 9th Chiller | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| C/O 6A | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| C/O 6B | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| C/O 7 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| C/O 8 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| Pass-thru Charges: | | | | | | | |
| Chemical Treatment | \$ 379,300 | \$ 83,309 | \$ 73,247 | \$ 84,518 | \$ - | \$ 241,074 | 63.56% |
| 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 | \$ - | \$ 17,104 | 20.10% |
| Chilled Water | \$ 138,700 | \$ 5,068 | \$ 18,301 | \$ 24,603 | \$ - | \$ 47,973 | 34.59% |
| Misc: | | | | | | | |
| Metro Credit | \$ - | \$ (435,450) | \$ (229,025) | \$ (187,401) | \$ - | \$ (851,876) | n.a. |
| ARFA | \$ 66,900 | \$ 16,714 | \$ 16,714 | \$ 16,714 | \$ - | \$ 50,141 | 74.95% |
| Deferral | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| Subtotal - Man Fee = | \$ 4,959,800 | \$ 1,170,606 | \$ 1,174,019 | \$ 1,199,792 | \$ - | \$ 3,544,417 | 71.46% |
| Reimbursed Management Fee + Chem Treatment | | \$ 1,155,132 | \$ 1,158,545 | \$ 398,209 | \$ - | \$ 2,711,886 | 0.00% |
| Metro Costs | | | | | | | |
| Pass-thru Charges: | | | | | | | |
| Engineering | \$ 99,500 | \$ 22,128 | \$ 16,440 | \$ 25,597 | \$ - | \$ 64,165 | 64.49% |
| EDS R&I Transfers | \$ 322,200 | \$ 80,550 | \$ 80,550 | \$ 80,550 | \$ 26,850 | \$ 268,500 | 83.33% |
| Metro Marketing | \$ 74,400 | \$ 15,124 | \$ 17,837 | \$ 8,603 | \$ - | \$ 41,563 | 55.86% |
| Project Administration | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| Metro Incremental Cost | \$ 539,600 | \$ 137,834 | \$ 117,896 | \$ 125,780 | \$ 13,525 | \$ 395,035 | 73.21% |
| Utility Costs: | | | | | | | |
| Water/Sewer | \$ 1,165,600 | \$ 414,723 | \$ 209,189 | \$ 171,364 | \$ - | \$ 795,276 | 68.23% |
| EDS Water/Sewer | \$ - | \$ 50 | \$ 100 | \$ 50 | \$ - | \$ 200 | n.a. |
| EDS Electricity | \$ 82,200 | \$ 20,935 | \$ 20,021 | \$ 16,120 | \$ - | \$ 57,076 | 69.44% |
| Electricity | \$ 6,572,600 | \$ 2,012,996 | \$ 1,102,904 | \$ 900,169 | \$ - | \$ 4,016,069 | 61.10% |
| Natural Gas Consultant | \$ 17,800 | \$ 4,320 | \$ 4,680 | \$ 4,590 | \$ - | \$ 13,590 | 76.35% |
| Natural Gas Transport | \$ - | \$ 70,450 | \$ 117,098 | \$ 159,598 | \$ - | \$ 347,147 | n.a. |
| Natural Gas Fuel | \$ 3,145,800 | \$ 239,415 | \$ 536,570 | \$ 771,906 | \$ - | \$ 1,547,891 | 49.21% |
| Propane | \$ 141,400 | \$ - | \$ 102,574 | \$ - | \$ - | \$ 102,574 | 72.54% |
| Subtotal - Metro Costs = | \$ 12,161,100 | \$ 3,018,523 | \$ 2,325,860 | \$ 2,264,327 | \$ 40,375 | \$ 7,649,086 | 62.90% |
| Subtotal - Operations = | \$ 17,120,900 | \$ 4,189,129 | \$ 3,499,879 | \$ 3,464,119 | \$ 40,375 | \$ 11,193,503 | 65.38% |
| Debt Service | | | | | | | |
| 2012A Bonds | \$ 3,435,800 | \$ 858,950 | \$ 881,234 | \$ 847,795 | \$ - | \$ 2,587,980 | 75.32% |
| 2005B Bonds | \$ 732,600 | \$ 183,150 | \$ 183,150 | \$ 183,150 | \$ - | \$ 549,450 | 75.00% |
| Series 2018 | \$ 117,200 | \$ 29,300 | \$ 29,300 | \$ 29,300 | \$ - | \$ 87,900 | 75.00% |
| Series 2015C | \$ 71,500 | \$ 17,875 | \$ 17,875 | \$ 17,875 | \$ - | \$ 53,625 | 75.00% |
| Series 2017 | \$ 41,800 | \$ 10,450 | \$ 10,450 | \$ 10,450 | \$ - | \$ 31,350 | 75.00% |
| Series 2013A | \$ 673,000 | \$ 168,250 | \$ 168,250 | \$ 168,250 | \$ - | \$ 504,750 | 75.00% |
| Series 2021C | \$ 122,000 | \$ 30,500 | \$ 30,500 | \$ 30,500 | \$ - | \$ 91,500 | 75.00% |
| Series 2022A | \$ 149,400 | \$ 37,350 | \$ 37,350 | \$ 37,350 | \$ - | \$ 112,050 | 75.00% |
| Series 2022B | \$ 26,300 | \$ 6,575 | \$ 6,575 | \$ 6,575 | \$ - | \$ 19,725 | 75.00% |
| FY25 Addition | \$ 15,700 | \$ 3,925 | \$ 3,925 | \$ 3,925 | \$ - | \$ 11,775 | 75.00% |
| MIP | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| Oper. Reserve Fund | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | n.a. |
| Subtotal - Capital = | \$ 5,385,300 | \$ 1,346,325 | \$ 1,368,609 | \$ 1,335,170 | \$ - | \$ 4,050,105 | 75.21% |
| Total = | \$ 22,506,200 | \$ 5,535,454 | \$ 4,868,488 | \$ 4,799,289 | \$ 40,375 | \$ 15,243,607 | 67.73% |
| Customer Revenues | | | | | | | |
| Taxes Collected | | \$ 123,869 | \$ 100,888 | \$ 101,034 | \$ - | \$ 325,791 | n.a. |
| Taxes Paid | | \$ 123,869 | \$ 100,888 | \$ 101,035 | \$ - | \$ 325,792 | n.a. |
| Interest & Misc Revenue | \$ 490,900 | \$ 155,035 | \$ 161,517 | \$ 141,701 | \$ - | \$ 458,253 | 93.35% |
| Penalty Revenues/Credits | \$ - | \$ 130,974 | \$ 1,061 | \$ 5,381 | \$ - | \$ 137,415 | n.a. |
| Energy Revenues Collected | \$ 21,630,300 | \$ 5,282,366 | \$ 4,537,900 | \$ 4,593,087 | \$ - | \$ 14,413,354 | 66.64% |
| Revenues = | \$ 22,121,200 | \$ 5,568,375 | \$ 4,700,478 | \$ 4,740,168 | \$ - | \$ 15,009,021 | 67.85% |
| Metro Funding Amount = | \$ 385,000 | \$ (32,920) | \$ 168,010 | \$ 59,122 | \$ 40,375 | \$ 234,586 | 60.93% |

The DES serves 22 customers and 43 buildings in downtown Nashville (including the Auto Nashville Hotel). These customers are divided into three categories: 1) Privately-owned buildings, 2) State of TN-owned buildings and 3) Metro-owned buildings. The New Customers listed in Table 4 are non-Initial System private customers. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties, the charges for the 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 | \$ 3,412,111 | 16,183,155 | \$ 0.2108 | \$ 1,264,448 | 81,738 | \$ 15.4695 |
| State Government | \$ 2,678,832 | 9,880,027 | \$ 0.2711 | \$ 1,544,357 | 92,375 | \$ 16.7184 |
| Metro Government | \$ 3,950,844 | 20,390,745 | \$ 0.1938 | \$ 1,562,763 | 118,923 | \$ 13.1410 |
| New Customers | \$ 2,512,220 | 11,828,674 | \$ 0.2124 | \$ 1,061,648 | 85,295 | \$ 12.4467 |
| Total | \$ 10,041,786 | 46,453,927 | \$ 0.2162 | \$ 4,371,568 | 293,036 | \$ 14.9182 |

Total Revenue \$ 14,413,354
 True-up and Adjustments (Net) \$ 595,667
 Net Revenue \$ 15,009,021

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 and DEAO discussed at length the need to address the operational or maintenance issues causing such trips during the First Quarter. As a result of apparent operational changes, the number of any thirty-minute periods where the steam sendout pressure was less than 150 psig and where the chilled water sendout temperature exceeded 43.3°F during the quarter has greatly decreased.

However, 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.

B. Efficiency

The operation of the EGF satisfied all of the performance guarantees each month during the quarter. A more detailed discussion of the contract guarantee performance was presented previously in this report.

C. Environment, Health, and Safety

No environmental violations were reported during the quarter.

DEAO has implemented and requires regular attendance of online and in-person safety courses for their employees. For the Third Quarter, the courses included: Electrical Safety, Proper PPE and Right Tools for the Job, and Emergency Preparedness.

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. DEAO hired a replacement electrician in February after the retirement of their previous electrician. 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 condensate return averaged approximately 60.1% of the steam sendout during the quarter, which represents a 13.2% decrease over the previous Third Quarter.
 - 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 algae previously noted within the cooling tower basins was removed during the cooling tower cleaning which occurred during the Third Quarter.
 - The cooling tower blowdown increased 5.5% over the previous Third Quarter. This increase resulted in an average decrease in the cycles of concentration in the cooling towers of 4.6%.
 - DEAO began monitoring and tracking the ratio of the cooling tower blowdown to the chilled water production. The average value for the quarter increased 3.8% over the previous Third Quarter. Since the chilled water-water guarantee was met each month during the quarter, operating with a cooling tower blowdown ratio around 0.26 to 0.28 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 15 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.

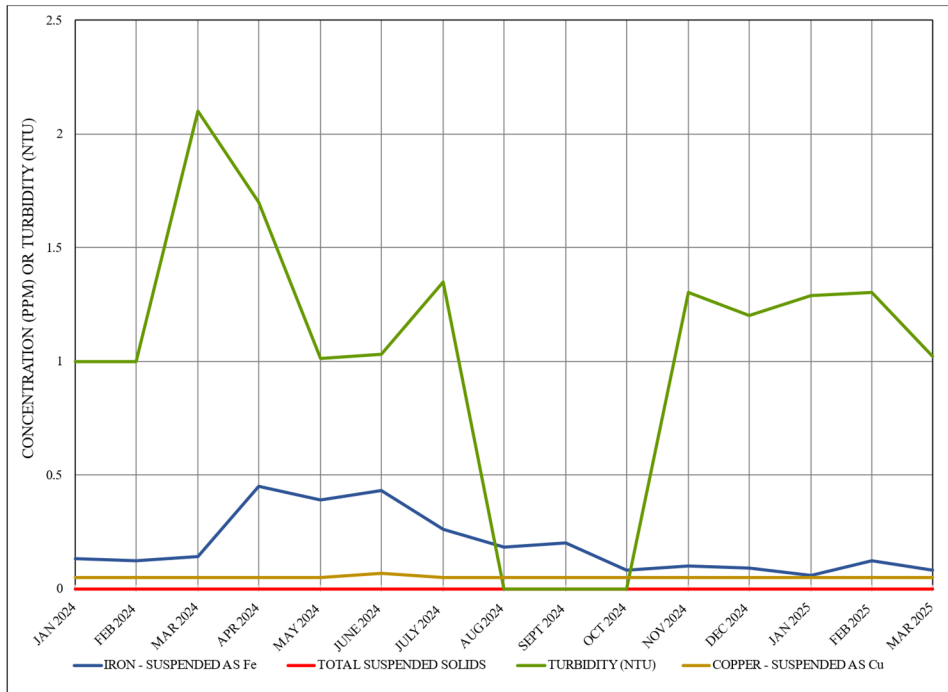


Figure 15. Chilled Water Composition Downstream of Side Stream Filter

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. In addition, Optimum Energy questioned the appropriateness of the block fill used to replace the original hanging fill in the cooling towers in their report, “Energy Site Analysis” provided as part of the project DES224. Therefore, TEG retained McHale and Associates, Inc. to perform a visual inspection of the cooling towers to assess the condition and maintenance of the towers and provide recommendations for the maintenance and repair as well as potential improvements for the cooling tower performance. McHale also indicated that the block fill may have an impact on the performance of the cooling towers and recommended the cooling tower manufacturer and the block fill manufacturer both be consulted. Additional information on McHale’s report is included in the Capital Projects section of this report.

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

- The cooling towers were cleaned by a third party as part of DEAO's annual PMs subsequent to McHale's inspection and prior to the issuance of their report;
- Performed onsite motor testing;
- Winterized the EGF;
- Replaced the fill in cooling tower 6 (concurrent with McHale's inspection);
- Repaired oil pump relay and leak check on chiller 8B;
- Repaired and replaced some insulation;
- Repaired chilled water pump packing glands;
- Other repairs, maintenance and preventative maintenance were made during the quarter and are listed in the monthly reports issued by DEAO.

H. EGF Walkthrough

The EGF Walkthrough was conducted on March 25, 2025, by Kevin L. Jacobs, P.E. Based on the review of the EGF, the following comments and observations are presented. The following items were observed during this Walkthrough which require attention.

- The louvers and portions of the fill at cooling towers 1, 6 and 15 appear to have been damaged. **Towers 5 and 15 have been repaired. The louvers on the east side of cooling tower 1 have been replaced. More work is required on the balance of cooling tower 1 and all of cooling tower 6. This item has been reported for several years; no other work has been performed as of January 2025.---All of the fill in cooling tower 6 was replaced during the Third Quarter. Repairs to the fill for cooling tower 1 have not been made. This item will be replaced with the following in future reports:**
 - Damage to the inboard side of the 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.**
 - Water was previously noted as leaking from or around a roof drain or sanitary vent onto the main operating floor near boiler 3 and water was found pooling on the
-

floor next to the switchgear panel. DEAO addressed the leak, cleaned up the area on the floor, and made repairs prior to the First Quarter Walkthrough. However, as noted in the First Quarter Walkthrough report, the hood over motor control center 3 had rusted or was stained by the rust and leaking water and needed to be cleaned. DEAO cleaned and painted the hood over the motor control center prior to the Second Quarter Walkthrough, but some rust stains remain on the wall next to the motor control center. DEAO needs to clean these rust stains. **–DEAO has made the necessary repairs and cleaned the areas. This item will be removed from future reports.**

- 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 FY24 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 FY25. DEAO needs to repair the insulation to the control valve. This insulation was not repaired as of the Second Quarter Walkthrough FY25. **--- The valve was insulated during the Third Quarter FY25, but the adjoining isolation and bypass valves had not been insulated DEAO needs to address the insulation of these valves to prevent condensation and reduce the occurrence of further corrosion.**
- Although DEAO reported they had cleaned the cooling towers in the spring of 2024, the salt and/or calcium build-up on the louvers to several cooling towers was noted in the Fourth Quarter FY24 Walkthrough. These towers were the east sides of 11, 12, 13, 14, and 15, and the west side of 8. DEAO reported during First Quarter FY25 Walkthrough that they were in the process of cleaning the towers. The buildup noted in the Fourth Quarter FY24 Walkthrough report and the First Quarter FY25 Walkthrough reports is still noticeably present. DEAO needs to clean the cooling towers. **---The cooling towers were cleaned during the quarter. This item will be removed from future reports.**
- In the First Quarter FY25 Walkthrough report, the isolation steam valve for boiler 3 was reported to have been leaking steam. The valve was not leaking during the Second Quarter Walkthrough; however, the drum vent/pressure tap line was leaking steam from the threads on the upper valve. Water also appears to have collected at the open end of the pipe. **--- DEAO appears to have addressed this issue. This item will be removed from future reports..**
- Algae was observed at the bottom of each of the cooling tower basins (i.e., for each tower) during the First and Second Quarter FY25 Walkthroughs. In addition, silt, dirt, etc. was present in each of the basins. The accumulation of silt, dirt, etc. was noticeably worse during the Second Quarter FY25 Walkthrough. DEAO needs to address the presence of algae in the basins and complete the cleaning of the cooling towers. **---The cooling towers were cleaned during the quarter. This item will be removed from future reports.**

- 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. This item was reported in the First Quarter FY25 Walkthrough report and has not been addressed. The insulation on the chilled water piping at the pumps also appears damaged and stained and should be repaired. --- **No additional work appears to have been done during the Third Quarter. DEAO needs to address these issues.**
 - The label plaque for cooling tower 12 is broken and missing. The plaque for cooling tower 6 is broken but still held in place. These items were reported in the First Quarter FY25 Walkthrough report and have not been addressed.---**DEAO has replaced these plaques. This item will be removed from future reports.**
 - Water was pooling around several of the chillers and the chilled water pumps. This item was noted in the Fourth Quarter FY24 Walkthrough report. **Although the pooling of water around the pumps and chillers was not present during the Second Quarter FY25 Walkthrough, DEAO has not addressed cleaning the pump frames and drip pans at the chilled and condensing water pumps and their drainpipes. Debris, dirt, sludge, etc. has collected on many of the frames and drip pans. The drainpipes should also be cleaned to ensure the draining water flows into the floor drains.**
 - The insulation on the condensate and feedwater lines south of boiler 4 needs to be repaired in several locations. The insulation on the steam line west of boiler 4 also needs to be repaired. The hangers on these pipes need to be adjusted and tightened if necessary. **DEAO needs to address these issues.**
 - 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 needs to clean the hot water basin for cooling tower 11, including removing and debris present, and inspect the other hot water basins for similar mud and debris and clean if necessary. It may also be prudent to inspect and clean the chiller condensers.**
 - 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 needs to respond to the scheduling noted in the March 18, 2025, memo from TEG.**
 - Water was pooling around several of the chillers and the chilled water pumps. This item was noted in the Fourth Quarter FY24 Walkthrough report. **Although the pooling of water around the pumps and chillers was not present during the Second Quarter FY25 Walkthrough, DEAO has not addressed cleaning the pump frames and drip pans at the chilled and condensing water pumps and their drainpipes. Debris, dirt, sludge, etc., has collected on many of the frames and drip pans. --- No work appears to have been done prior to the Third Quarter FY25 Walkthrough. The drainpipes should also be cleaned to ensure the draining water flows into the floor drains.**
-

- **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 not been provided. These calibration reports need to be saved to the Metro drive so they can be backed-up.**
- **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. Very few items have been updated over the previous few quarters which may not be indicative of the maintenance performed by DEAO.**
- Other action items previously noted to be addressed by DEAO may have been completed. (See also the “Quarterly EGF Walkthrough Report,” dated March 26, 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. Third 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.

Peabody Union’s contractor (Turner) installed the new fencing on the EGF site during the quarter. TEG reviewed the installation and provided a punch list of incomplete or unacceptable items to Turner and AR Coleman on February 27. As of the end of the Third Quarter, none of the punch list items had not been completed.

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

2. DES192 – Peabody Street Development

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

3. DES195 – DES Parking Area

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

4. DES201 – East Bank Development

There were no other activities for this project during the quarter.

5. DES202 – 7th and Commerce Hotel

The developer for the new hotel has reported their project is progressing with financing and 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. These slides and guides need to be replaced to restore the low resistance to the expansion and contraction movements as originally designed. 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. TEG has modeled these supports to determine the resulting forces on the supports based on varying friction factors. The design documents for these support modifications were completed during the Fourth Quarter FY24. Due to other project schedules, the bidding of this work has been delayed and should take place during CY2025.

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. Once completed, this survey will provide crucial information in developing the design and route from the existing DES piping to the building. The survey completion is anticipated in the Fourth Quarter FY25 with the design of the service commencing soon thereafter.

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

There is an area approximately 100 feet in length within the 7th Ave Tunnel which has experienced water infiltration for several years due to a city water leak. Metro Water Services has investigated the area but has been unsuccessful in identifying the leak location.

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

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

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 is impeded by the steam and condensate return service piping to the Metro Library. Upon evaluation of the options, the relocation of the piping to facilitate the shotcrete work will be the most cost-effective solution. In addition, the relocation of the piping eliminates obstructions in the tunnel pathway and improves this safety aspect.

TEG prepared drawings and specifications for the relocation of this service piping and this 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 during December 2024.

This project is in close-out.

10. DES221 – War Memorial Service Modifications

The building's contractor (Comfort Group Mechanical) continued with the construction and installation of the DES instrumentation for the War Memorial Auditorium and Legislative Plaza. TEG and DEAO met onsite with the contractor several times during the quarter and remained in contact answering questions. All of the DES instruments were installed during the quarter and startup of the chilled water service to the War Memorial is anticipated in May. This project will remain open for the duration of the renovations and as long as DES may be required to participate.

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 are corroded and require 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 TEG has followed up with 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 will have 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 has installed a temporary power source for the sump pumps to be diverted. This temporary equipment has been installed.

The new replacement electrical enclosure/controller had an extended delivery time and was delivered during the Third Quarter FY25. This work is scheduled to begin early in the Fourth Quarter FY25.

13. DES224 – EGF Optimization

After investigating the options and through consultation with Metro, TEG retained the services of Optimum Energy to evaluate the EGF chiller plant with the goal of evaluating alternatives to improve the efficiency of the plant resulting in potential energy savings. A preliminary draft report was issued by Optimum Energy during the quarter and discussed with TEG. An official draft report was issued during the Second Quarter FY24. A presentation was provided on January 16, 2025. The final report was issued to Metro on March 13, 2025. This project is closed.

14. DES225 – 1st and Molloy Hot Spot Investigation

The paving repair for this project was completed during the Third Quarter FY25.

This project is now closed.

15. DES226 – State PRV Replacement

The replacement pneumatic actuated valve arrived during the Second Quarter FY25. Installation is anticipated during the Fourth Quarter.

16. 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 is corroded and in need of 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.

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.

17. 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 during the spring or summer of 2025.

This project will remain open until Manhole B2’s dripleg is modified.

18. 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 Quarter FY25. This work is on-going, and it is anticipated that most of the insulation needs in the remaining manholes will be completed during the Fourth Quarter 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.

19. 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 only have one manway and dirt floors. Because each manhole only has one manway, if maintenance personnel need to access either manhole, ventilation ducting must be introduced through this manway which can be a safety hazard. In addition, the elevated ambient temperature of the steam manhole heightens the safety risk. Additionally, the steam service valve is not operational and needs replacement.

In March, TEG and DEAO reviewed the Hermitage Hotel in-building piping, valving, and instrumentation to determine the availability of valves to isolate services to the Hermitage Hotel. It was determined that even though valving exists, the valves and the DES metering instrumentation are not accessible. Recently, the Hermitage Hotel added equipment to their mechanical area, making the area extremely congested. Therefore, TEG issued a letter to the hotel on March 13 detailing the issues related to the inaccessibility of the valves and to the DES instrumentation. TEG is waiting on the hotel's response to address the various piping, conduit, and equipment installed in their most recent renovations prohibiting ready operation of the valves.

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.

Once a response is received from the Hermitage Hotel, this project's full scope will be determined.

20. 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.

To reduce the potential impact of this relocation, the steam piping work will be executed in late summer and the chilled water work will be executed in the fall. In addition, the tie-in of both relocations will occur over weekends.

TEG received bids for this work during the Third Quarter FY25 and forwarded a bid comparison to the State, with a recommendation for review. TEG is awaiting a response from the State.

21. DES232 - 4th Avenue Tunnel Water Infiltration Remediation

With the replacement of the 4th and Church's building condensate return piping (DES227), a portion of the vertical shaft of Manhole 16 has exposed a wall section which did not receive shotcrete because of the location of the removed piping. This "void" also exposes some reinforcing material that is subject to 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 in close-out, awaiting an invoice from DEAO.

22. DES233 – Manhole 12 to Manhole 15 Hotspot Investigation

The water intrusion into Manhole 15 increased dramatically during the Second Quarter FY25, and the water's temperature was elevated. 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 is expected to be completed during the Fourth Quarter FY25.

23. DES234 – Manhole 9 and Manhole 18 Repairs

The work in Manhole 9 was completed during the Second Quarter FY25. The work in Manhole 18 was completed during the Third Quarter FY25. This project is in close out.

24. 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"

pipng 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.

It is anticipated that this project will be closed during the Fourth Quarter FY25.

25. 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 and anticipating bidding the work during the Fourth Quarter FY25 with the work executed during the summer of 2025.

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

A major chilled water leak occurred early in April 2025. The leak has been repaired. However, because this occurrence is outside the window of the Third Quarter FY25, additional details will be included in next quarter’s report.

27. 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. In addition, Optimum Energy questioned the appropriateness of the block fill used to replace the original hanging fill in the cooling towers in their report, “Energy Site Analysis” provided as part of the project DES224. Therefore, TEG retained McHale and Associates, Inc. to perform a visual inspection of the cooling towers to assess the condition and maintenance of the towers and provide recommendations for the maintenance and repair as well as potential improvements for the cooling tower performance. McHale also indicated that the block fill may have an impact on the performance of the cooling towers and recommended the cooling tower manufacturer and the block fill manufacturer both be consulted.

McHale’s report to TEG and Metro dated March 6, 2025, includes the following list of recommendations. As stated previously, DEAO has cleaned the cooling towers and completed the replacement of the cooling tower fill for tower 6; however, the fill was replaced with the same block-type fill as the other cooling towers. The engineering study and testing of the towers included as

recommendations (below) are being considered by Metro and would not necessarily be the responsibility of DEAO. See McHale and Associates, Inc. Nashville District Energy Inspection Report dated March 6, 2025, for additional information. TEG, Metro, and DEAO have scheduled a meeting in April to discuss the findings and recommendations within the report.

1. A major cleaning plan should be implemented. [The cleaning of all the cooling towers is recommended.]
2. Repairs should be made based on the inspection findings. [The findings are detailed within the report.]
3. An evaluation of the circulating water chemistry should be undertaken in accordance with the published industry standards for water treatment in cooling towers.
4. A regular cooling tower maintenance schedule should be instituted. [Recommendations for the schedule are included within the report.]
5. The Local BAC representative should be consulted for technical support.
6. More details on the performance of the fill should be obtained from Evapco. [Evapco is the manufacturer of the block-type fill installed in all the towers.]
7. Consider having engineering studies performed to aid in operational planning.
8. Test the thermal performance and air flow of the cooling towers.

B. Third Quarter FY25 Closed Projects

DES224 and 225 were closed during the Third Quarter.

Although some follow-up action is necessary for DEAO relative the McHale and Associates cooling tower report, no additional work or reporting for McHale is anticipated.

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 5. 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 | \$ 10,036 | \$ 109,488 | \$ 909,314 |
| 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 | \$ 530 | \$ 29,058 | \$ 1,600,942 |
| 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 | \$ 9,109 | \$ 15,636 | \$ 3,063,364 |
| 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 | \$ 115,991 | \$ 149,822 | \$ 241,778 |
| DES220 | MH20 Cond Repair & Grating | \$ 51,700 | \$ 12,489 | \$ 20,663 | \$ 31,037 |
| DES221 | WM/LP Service Modifications | \$ 160,000 | \$ 35,547 | \$ 53,918 | \$ 106,082 |
| DES222 | EDS Tagging Program | \$ 44,000 | \$ 4,512 | \$ 31,718 | \$ 12,282 |
| DES223 | MH-18 Electrical Repair | \$ 121,000 | \$ 2,597 | \$ 5,962 | \$ 115,038 |
| DES224 | EGF Optimization Evaluation | \$ 120,000 | \$ 101,393 | \$ 104,002 | \$ 15,998 |
| DES225 | 1st Ave and Molloy Hot Spot | \$ 330,000 | \$ 277,363 | \$ 277,363 | \$ 52,637 |
| DES226 | State PRV Replacement | \$ 110,000 | \$ 33,271 | \$ 33,271 | \$ 76,729 |
| DES227 | MH-16 CND Line | \$ 55,000 | \$ 13,778 | \$ 13,778 | \$ 41,222 |
| DES228 | MH-B2 & B3 Dripleg Mod | \$ 82,500 | \$ 6,012 | \$ 6,012 | \$ 76,488 |
| DES229 | MH Insulation Repair | \$ 75,000 | \$ 2,784 | \$ 2,784 | \$ 72,216 |
| DES230 | MH 6A Evaluation | \$ 404,000 | \$ 8,294 | \$ 8,294 | \$ 395,706 |
| DES231 | TN Tower Service Relocation | \$ 510,000 | \$ 53,862 | \$ 53,862 | \$ 456,139 |
| DES232 | 4th Ave Shotcrete Repairs | \$ 100,000 | \$ 84,328 | \$ 84,328 | \$ 15,672 |
| DES233 | MH12 to MH15 Hot Spot | \$ 110,000 | \$ 12,195 | \$ 12,195 | \$ 97,805 |
| DES234 | MH9 & 18 Repair | \$ 28,000 | \$ 1,674 | \$ 1,674 | \$ 26,326 |
| DES235 | Condensate Leak at CJC | \$ 185,000 | \$ 154,514 | \$ 154,514 | \$ 30,486 |
| Total Closed Projects | | \$ 5,144,600 | \$ - | \$ 5,144,600 | \$ - |
| Metro Project Admin | | \$ - | \$ - | \$ - | \$ - |
| Project Man, Development, etc | | \$ 9,368,898 | \$ - | \$ - | \$ 9,368,898 |
| Fund Total | | \$ 26,000,000 | \$ 1,023,173 | \$ 7,484,933 | \$ 18,515,067 |

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

Several EDS repairs and improvements were made during the Third Quarter. The principal items for discussion are presented in the following sections.

A. Repairs and Improvements

Several repairs were made to the EDS and at customer buildings during the quarter. The remaining value of the R&I account to date is \$59,560. Table 6 provides a summary of the FY25 expenditures and revenues to date associated with the R&I budget.

Table 6. 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 | 02/18/25 | - | DEAO | \$ 1,369.91 | | |
| DES-228 MH B2 and B3 Drip Legs | 02/18/25 | - | DEAO | \$ 11,907.25 | | |
| DES-234 MH-18 and 9 Enecon | 02/18/25 | - | DEAO | \$ 15,320.76 | | |
| DES-235 CJC Area Condensate Repairs | 02/18/25 | - | DEAO | \$ 2,853.67 | | |
| DES-223 MH18 Electrical Project | 02/18/25 | - | DEAO | \$ 4,967.89 | | |
| DEAO Jan 2025 R&I | 02/18/25 | - | DEAO | \$ 8,693.36 | | |
| Interest | 02/03/25 | - | - | \$ 893.77 | | |
| Interest | 02/03/25 | - | - | \$ (893.77) | | |
| DES-234 MH-18 and 9 Enecon | 03/17/25 | - | DEAO | \$ 15,320.76 | | |
| DES-222 EDS Tagging Program | 03/17/25 | - | DEAO | \$ 708.75 | | |
| DEAO Feb 2025 R&I | 03/20/25 | - | DEAO | \$ 5,832.31 | | |
| Interest | 03/03/25 | - | - | \$ 867.78 | | |
| Interest | 03/03/25 | - | - | \$ (867.78) | | |
| Modifications | 04/21/25 | - | DEAO | \$ 436.71 | | |
| DES-235 CJC Area Condensate Repairs | 04/21/25 | - | DEAO | \$ 8,608.98 | | |
| DES-219 7th Ave Tunnel Repairs | 04/21/25 | - | DEAO | \$ 67,500.00 | | |
| DES-231 TN Tower Service Relocation | 04/21/25 | - | DEAO | \$ 22,406.18 | | |
| DEAO Mar 2025 R&I | 04/21/25 | - | DEAO | \$ 15,382.95 | | |
| | | | | | | |
| | | | | | | |
| Sub-Total Third Quarter | | | | \$ 181,309.48 | \$ 80,550.00 | \$ 59,560.13 |
| | | | | | | |
| Sub-Total Fourth Quarter | | | | \$ - | \$ - | \$ 59,560.13 |
| FY25 Year to Date | | | | \$ 259,613.40 | \$ 241,650.00 | \$ 59,560.13 |

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.

C. Emergencies

There were no emergencies during the quarter.

D. EDS Walkthrough

This quarter's walkthrough was conducted on March 3 and 4, 2025 by Jon B. Belcher, PE of TEG. The manholes that were visited include Manholes A, B, B1, B1A, G, K, L, M, N1, N2, S4A, S5, S6, 18A and the chilled water piping suspended underneath the Woodland Street Bridge. The following comments and observations are a result of these visits.

Many 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 manhole quarterly report identifying seven (7) high or critical items that need to be addressed by DEAO, two (2) of which have been reported multiple times.

1. Manhole A
 - a. There was a lot of water present in this manhole, and it required pumping prior to entry.
 - b. When asked, DEAO maintenance personnel stated that the central plant has not experienced hammering in the condensate receiver/piping in quite a while. DEAO was instructed to notify TEG if the hammering recurs.
 - c. The northern steam wall penetration link seal is starting to “back out” of the wall penetration. DEAO should attempt to re-position this link seal, however prior attempts to do this in other manholes have not been successful. If unsuccessful, DEAO should monitor this link seal and notify TEG of additional movement.
 - d. DEAO should continue to monitor the ceiling patches covering the rebar chair feet. The “feet” are starting to “show through” the patches indicating that moisture and corrosion may be progressing. DEAO should notify TEG of any noticeable changes.

 2. Manhole B
 - a. There was a small amount of water in the floor of both sides of this manhole.
 - b. The link seals at the southern and northern steam and condensate return wall penetrations are starting to become dislodged; the northern seal is more advanced. CES should attempt to push the links back in place and tighten them. However, from prior experience with similar situations, the link seal will not go back in place without the mud, dirt, etc. from the annular space being removed so that the link-seal can be inserted into the annular space. It is possible that the link seal cannot be positioned back in place. In this instance, the annular space may need to be packed with hydraulic cement or another material to keep the wall penetration sealed. **This item appeared in the last four years’ reports.**
 - c. The end can of the steam penetration at the western wall on the chilled water side of the manhole was repaired with hydraulic cement by Enecon over two years ago. Water is infiltrating at this point, but it is only a consistent drip - which has not changed substantially since the last report. DEAO should continue to monitor this penetration and report any changes to TEG. TEG has included this section of piping in its “Comprehensive Repair and Replacement Plan.”

 3. Manhole B1
 - a. This is a sump pump manhole located in 1st Avenue South to the west of Manhole B. It was constructed to reduce/control the amount of groundwater entering Manhole B.
 - b. No deficiencies noted.

 4. Manhole B1A
 - a. This is a newly constructed manhole located in the sidewalk in the northwest corner of the 1st Ave North and Molloy intersection. It houses a
-

- sump pump to control the amount of groundwater accumulating in this area of the EDS.
- b. DEAO maintenance personnel noted that the pump will run constantly for long periods of time after a rain event. The question was posed whether a larger pump is needed. Since the review, TEG investigated the available Weil pumps in this pump line (sump pumps that can tolerate elevated temperatures) and the installed pump is the largest available. TEG will continue to research solutions to this potential problem.
 - c. The water level in the manhole was high and the pump was not running. The pump was manually engaged to lower the water level. DEAO should lower the float positions to reduce the level of the standing water. The Weil recommended sump pump settings result in no more than 10 starts per hour and a minimum run time of 1-1/2 minutes.
 - d. Several of the concrete form ties remain in place and present a potential safety hazard for maintenance personnel. These ties should be cut flush with the manhole interior wall surface as soon as possible..
5. Manhole G
- a. This is an abandoned manhole located in a grass median near the intersection of 1st Avenue North and Union Street. It is reviewed to ensure its structural integrity is not compromised.
 - b. Due to NES construction, this manhole was not accessible for review, therefore this manhole will be added to the next quarterly review.
6. Manhole K
- a. There was a small amount of mud and water in this manhole. It did not require pumping prior to entry. After DEAO discovered that surface water was entering the manhole through the concrete roof seams, TEG directed DEAO to caulk these seams and the amount of infiltration has been substantially reduced. DEAO should continue to monitor the water infiltration and caulk openings as needed.
 - b. There are some hairline cracks in the concrete patching of the southern manhole wall. DEAO should monitor these cracks and notify TEG of any significant changes.
 - c. There was a small amount of moisture at the 6 o'clock position of the eastern Wildhorse Saloon chilled water service line wall penetration. It is not known if this is due to groundwater infiltration or a failure of insulation sealing. DEAO should monitor this moisture and report any significant changes to TEG immediately.
 - d. There was a small amount of moisture at the 6 o'clock position of the eastern Wildhorse Saloon chilled water service line wall penetration. It is not known if this is due to groundwater infiltration or a failure of insulation sealing. DEAO should monitor this moisture and report any significant changes to TEG immediately.
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7. Manhole L
 - a. There was no water in this manhole.
 - b. The west end of the horizontal anchor beam has some coating flaking/cracking on the top of the northern flange. Please have Enecon re-visit this manhole as soon as possible and make this repair.
 - c. The insulation jacketing end cap on the steam piping exiting the manhole to the north is has come loose and is hanging from the piping – it is in disrepair. This manhole is included in DES229 Miscellaneous Manhole Insulation Repairs and should be repaired soon.
 - d. As needed, remove mud and debris from the “trough” area.

 8. Manhole M
 - a. There was water present in this manhole and required pumping prior to entry. This is the first time water has been present in this manhole in several years. This accumulation might be the result of a steam trap leak discovered during this review (see below). DEAO should monitor the water accumulation in this manhole and report its findings to TEG.
 - b. The trap in this manhole was leaking appreciably. DEAO contacted a contractor and scheduled to replace this trap two days after this review.
 - c. The link seal on the steam line penetration at the northern wall has dislodged from the top portion of the pipe. DEAO personnel have tried to re-position this link-seal without success. DEAO should remove the link-seal and then remove the dirt, mud, gravel, etc. from the annular space and try to re-install the link-seal and tighten it. (A similar situation exists in Manhole B, therefore DEAO should attempt this at one location to determine if it can be done successfully before attempting numerous locations.) It is possible that a link seal cannot be positioned back in place. In this instance, the annular space may need to be packed with hydraulic cement or another material to keep the wall penetration sealed. **This item appeared in the last four years’ reports.**

 9. Manhole N1
 - a. There was a small puddle in the floor of this manhole, but not enough to require pumping.
 - b. The CHW piping in this manhole was recently insulated. To prevent condensation on the ceiling of the manhole, the ceiling was also insulated. There was a small area in the northeastern corner of the ceiling that had condensation. DEAO should monitor the ceiling and report the occurrences of condensation to TEG. Additional insulation may be warranted.

 10. Manhole N2
 - a. This manhole is located on the Nissan Stadium campus.
 - b. Due to a low oxygen level reading, the manhole could not be entered. This has occurred during prior reviews. In the future, DEAO should bring a
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canister fan with them to review this manhole to provide ventilation to alleviate the low oxygen level.

- c. TEG reviewed the manhole interior from the surface.
- d. The chilled water bypass piping and isolation valves in this manhole were never insulated. The surface condensation ("sweating") is causing some corrosion to occur, therefore, the uninsulated piping in this manhole needs to be insulated. However, the new stadium will not be on the DES system and once the new stadium is opened, the piping in this manhole may be blind flanged which will require insulation work. Therefore, the uninsulated piping in this manhole should be insulated once any piping work related to the closure of the existing Nissan Stadium is completed.

11. Manhole S4A

- a. There was a small amount of water present in this manhole, but it did not require pumping prior to entering.
- b. There are hairline cracks in the walls of this manhole. DEAO should monitor these cracks and report any significant changes to TEG.
- c. There is some minor flaking/spalling of the concrete walls in this manhole. DEAO should monitor this spalling and notify TEG of any significant changes.

12. Manhole S5

- a. There was a small amount of water in this manhole. There is a sump pump in this manhole which was used to remove most of the accumulated water.
- b. There are some cracks in the manhole interior wall surfaces. DEAO should monitor these cracks and report any degradation to TEG.
- c. There is some minor insulation jacket damage in this manhole. This should be repaired the next time insulation work is done in this manhole.

13. Manhole S6

- a. No deficiencies noted.
- b. DEAO should continue to monitor the structure, anchor, and piping.

14. Manhole 18A

- a. The slip joint insulation blankets are deteriorating. This manhole is included in DES229 Miscellaneous Manhole Insulation Repairs which includes the replacement of these blankets.
- b. One, or both trap root valves need replacement. This repair will be made during the upcoming steam outage to complete the work included in DES228.
- c. Some of the structural steel base plates have some minor corrosion. This corrosion should be cleaned and the area painted with cold galvanizing paint as soon as possible.

15. Woodland St Bridge Chilled Water Piping
 - a. The homeless had accessed the area underneath the western end of the bridge again. The support post for the entry gate is failing and is very loose. Not wanting to cause additional damage to the fence/gate structure, the area was not accessed.
 - b. The missing section of an angle siderail on the north side of the grated walkway underneath the bridge has been repaired. This handrail section was visible from outside the entry area. On the eastern riverbank, the chilled water piping drops vertically into the ground. This piping has a galvanized conduit protecting the pipe insulation. This galvanized conduit is badly corroded in several places and needs repair. TEG will ask DEAO to assign a project number for this repair.
 - c. The aluminum insulation jacketing on the west riverbank is damaged in several locations. It appears that the damage is from vandalism. This damage should be repaired. (See item d. below).
 - d. On the eastern riverbank, the chilled water piping drops vertically into the ground. This piping has a galvanized conduit protecting the pipe insulation. This galvanized conduit is badly corroded in several places and needs repair. TEG will ask DEAO to assign a project number for this repair.

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 reach out and investigate potential developments along the Peabody St corridor and 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 to 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.

Metro Water Services (MWS) participates on the East Bank 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. Activities are tracked under project DES201.

B. Customer Interaction

DEAO's customer service representative (CSR) had regular communications with the DES customers which often entailed discussions of a technical nature and scheduling outages. 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.

- Due to issues with the pressure control valve in the Andrew Jackson building. The steam to the State loop was interrupted prompting DEAO to investigate and reset the air compressor. The valve, controls and air compressor are the responsibility of DES. Long term repairs to this valve are included in the project DES226.
- A short-term outage for three steam customers along the Mollo and Demonbreun St corridors due to a leak in MH-B3. The customers were notified, and the repairs were made. Service was restored within one hour.
- A condensate leak was found on 3rd Avenue North near the Downtown Detention Center (formerly the Criminal Justice Center). The line was isolated, and the effected customers were asked to send their inbuilding condensate to drain on January 13. Due to the extent of the damage, service was not completely restored until March 18. Work for this project was included under DES235.
- DEAO's CSR and the Bridgestone Arena's maintenance personnel reviewed the building's condensate pumps for proper operation after DEAO was notified the pumps were not functioning properly. DEAO determined the condensate return did not contain hardness which would indicate a leaking steam to hot water heat exchanger. Additional testing in February suggested a failed check valve on the pumps. Repairs were made by the building in March.
- A chilled water leak was found at the Andrew Jackson building on a portion of the piping falling within DES responsibility. The insulation was tested and determined to contain asbestos which was remediated by Frost Environmental Services. A chilled water shutdown of the area (several customers were impacted) was scheduled for March 15. Although the leak was repaired, additional repairs could not be made since the isolation valves within the distribution system could not stop the flow of chilled water sufficiently to complete all other necessary repairs. An additional shutdown will have to be scheduled to complete all the work originally intended.

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 Third Quarter FY25 EGF and EDS operations, the following recommendations are made.

- 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 continue to address the cooling tower repairs and other maintenance items noted in the EGF Walkthrough reports and as included in the McHale and Associates Inspection Report of the cooling towers. Underperforming cooling towers cause a decreased chiller efficiency resulting in unnecessary CO2 emissions and electric usage. Some of these issues could potentially be addressed with additional repairs and maintenance to the towers.
- DEAO needs to address the maintenance of the distribution valves and identify which valves need repair or replacement. In TEG's opinion, too often valves are known to insufficiently isolate portions of the distribution system only when they are needed most. This issue often causes Metro additional expense and requires additional customers to be shut down when they would not otherwise need to be had the valves held.
- 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 manholes.