



***Metro Nashville***  
***DISTRICT ENERGY SYSTEM***

*DES Advisory Board Meeting*  
*Third Quarter FY24*  
*May 16, 2024*

*Presented by:*  
*MNDES Project Administrator*  
*Thermal Engineering Group, Inc*

# *Agenda*

1. Call to Order
2. Review & Approval of Previous Meeting Minutes
3. Metro Liaison Update
4. Customer Sales
5. Marketing
6. Review of DES Contractor Performance
7. Natural Gas Purchasing Update
8. FY24 Costs to Date and Budget
9. Review of EGF and EDS
10. Capital Projects Review & Status
11. System Operator Update
12. Special Topics
13. Other Board Member Items
14. Adjourn

1. Call to Order
2. Review & Approval of Previous Meeting Minutes
3. Metro Liaison Update

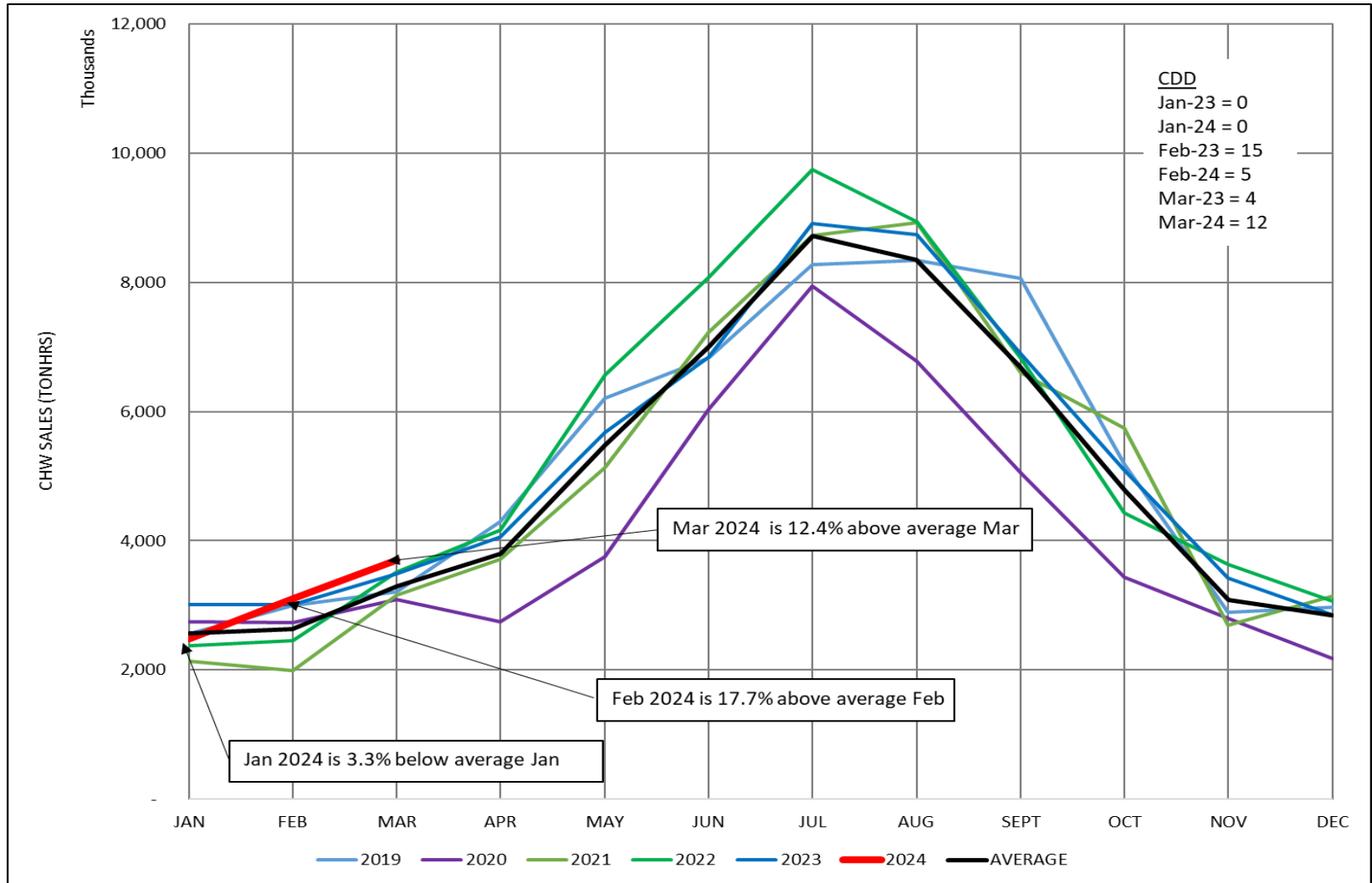
## 4. *Customer Sales*

- ❖ There are 3 customers in arrears more than 30 days
- ❖ Table 4: Customer Cost Comparison for the Previous 12 Months
- ❖ Figure 4A: Historic Chilled Water Sales
- ❖ Figure 4B: Historic Steam Sales

## Summary Table 4: Customer Cost Comparison for the Previous 12 Months

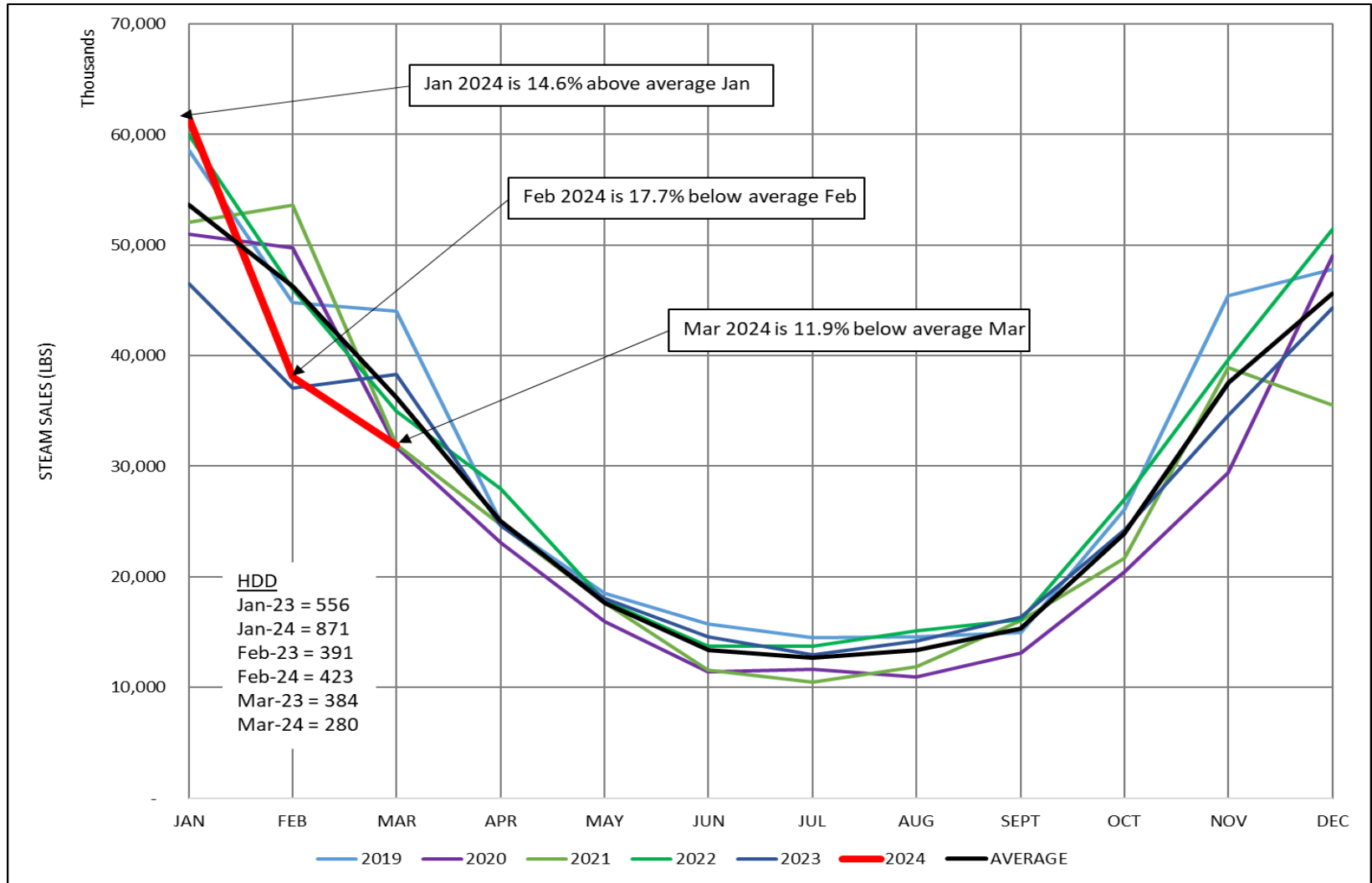
	Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month		
	Apr 2022- Mar 2023	Apr 2023- Mar 2024	% Diff.	Apr 2022- Mar 2023	Apr 2023- Mar 2024	% Diff.
<b>Private</b> Cost	\$ 1,796,226	\$ 1,686,486	-6.11%	\$ 4,627,769	\$ 4,502,232	-2.71%
Usage (lbs or tonhrs)	94,042,066	96,642,016	2.76%	23,625,674	21,988,652	-6.93%
<b>State</b> Cost	\$ 2,307,024	\$ 2,072,589	-10.16%	\$ 3,546,793	\$ 3,505,870	-1.15%
Usage (lbs or tonhrs)	114,254,268	105,619,768	-7.56%	14,445,087	13,264,078	-8.18%
<b>Metro</b> Cost	\$ 2,290,836	\$ 2,045,984	-10.69%	\$ 5,134,396	\$ 5,087,979	-0.90%
Usage (lbs or tonhrs)	136,214,341	133,122,446	-2.27%	26,913,888	26,527,950	-1.43%
<b>Aggregate</b> Cost	\$ 6,394,087	\$ 5,805,060	-9.21%	\$ 13,308,958	\$ 13,096,081	-1.60%
Usage (lbs or tonhrs)	344,510,675	335,384,230	-2.65%	64,984,649	61,780,680	-4.93%
<b>Unit Cost</b>	<b>\$ 18.56</b>	<b>\$ 17.31</b>	<b>-6.7%</b>	<b>\$ 0.205</b>	<b>\$ 0.212</b>	<b>3.50%</b>

# Figure 4A. Historic Chilled Water Sales



Averages include the years 2019, 2020, 2021, 2022, and 2023.

# Figure 4B. Historic Steam Sales



Averages include the years 2019, 2020, 2021, 2022, and 2023.

## 5. *Marketing*

- 8<sup>th</sup> and Demonbreun (Auto Nashville Hotel, LLC)
  - Moved to project DES-217
- Remaining Capacity for Sale (approximate)
  - 1,400 tons of chilled water
  - 35,105 pph of steam
- Potential New Customer Interest
  - ~5,000 tons
  - ~87,000 pph (or equivalent)



## *Marketing (con't)*

- Peabody St Development
  - 1<sup>st</sup> and KVB
    - Development on hold
  - 4<sup>th</sup> and Lea Ave
    - Re-evaluating development; on hold
  - Peabody and Rutledge
    - Development on hold
  - 4<sup>th</sup> and Elm
    - Preliminary design; evaluating options

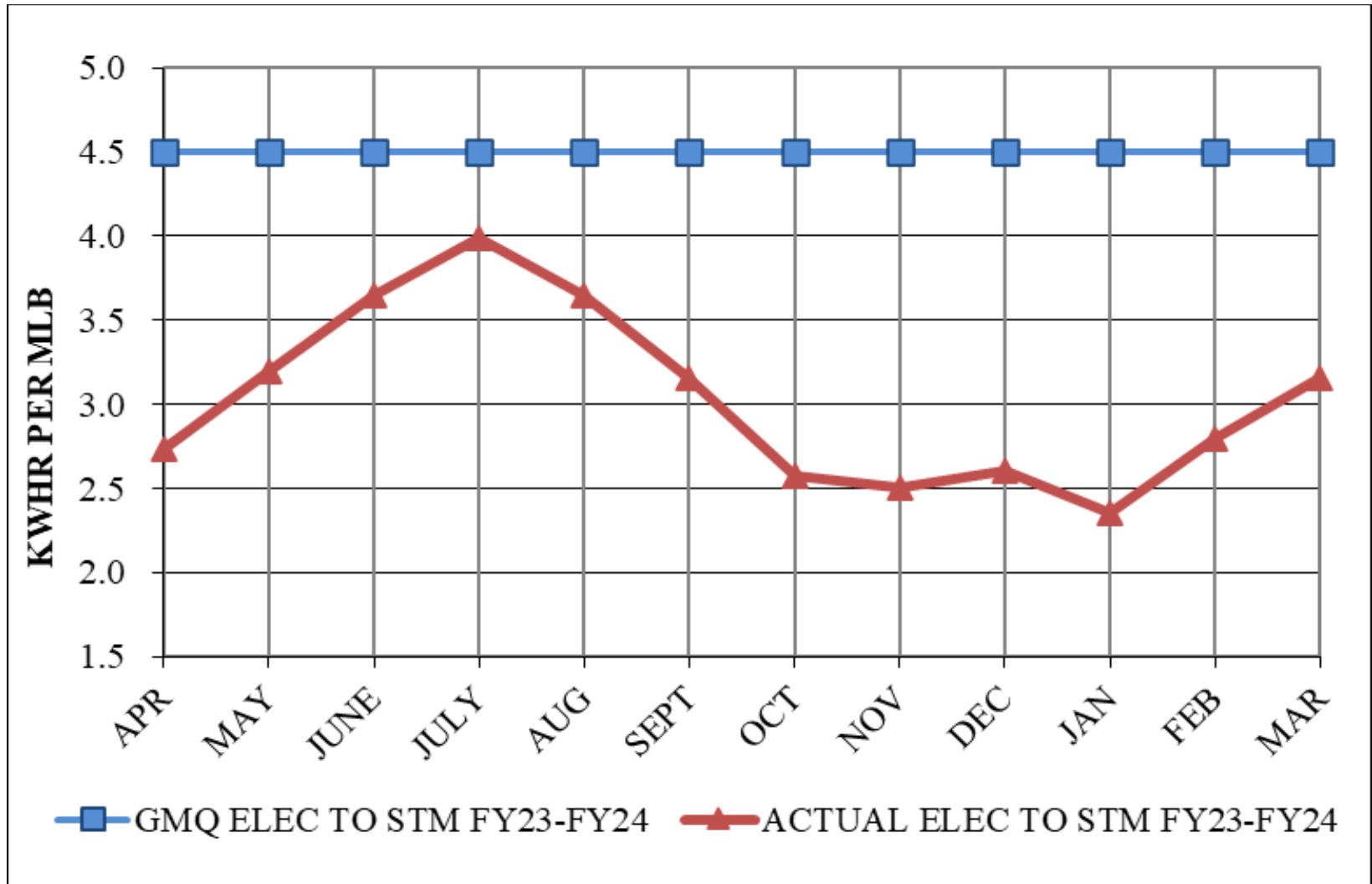
## *Marketing (con't)*

- New Developments North of KVB
  - Printer's and Banker's Alley
    - Development on hold
  - 7<sup>th</sup> and Commerce
    - Development on hold; awaiting executed CSA
  - US Courthouse (Estes Kefauver Bldg)
    - Interested in steam and chilled water to replace old equipment
  - Washington Square
    - Interested in ~375 tons in need of replacing existing chiller
  - 333 Union
    - Small hotel interested in chilled water
  - 805 Demonbreun
    - Large hotel interested in DES service

## *6. Review of DES Contractor Performance*

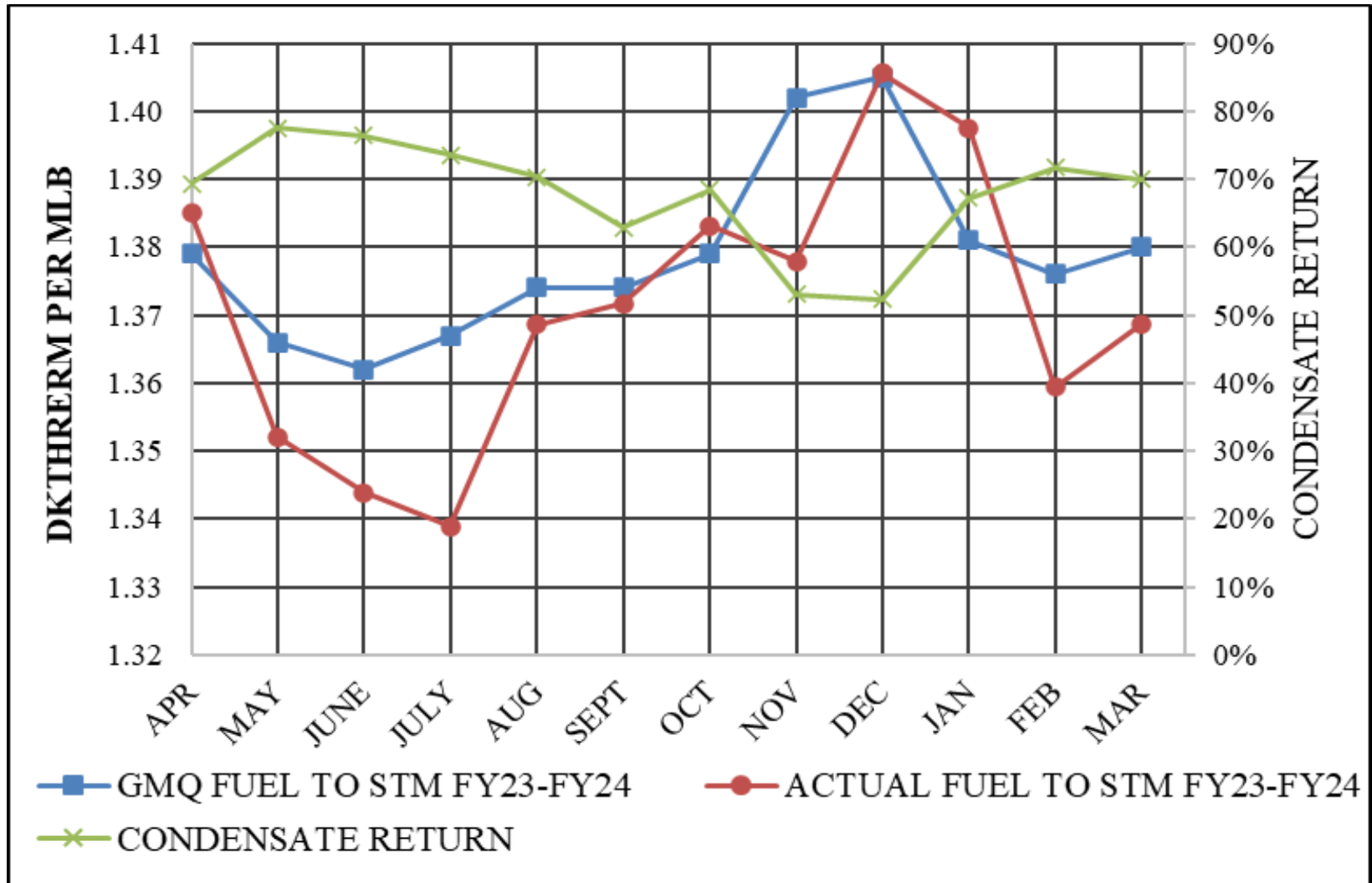
CES has made improvements in FY24 and has met several of the performance metrics for Q3. CES continues to address the system energy usage.

## Performance Measurement FY24: Steam Electric



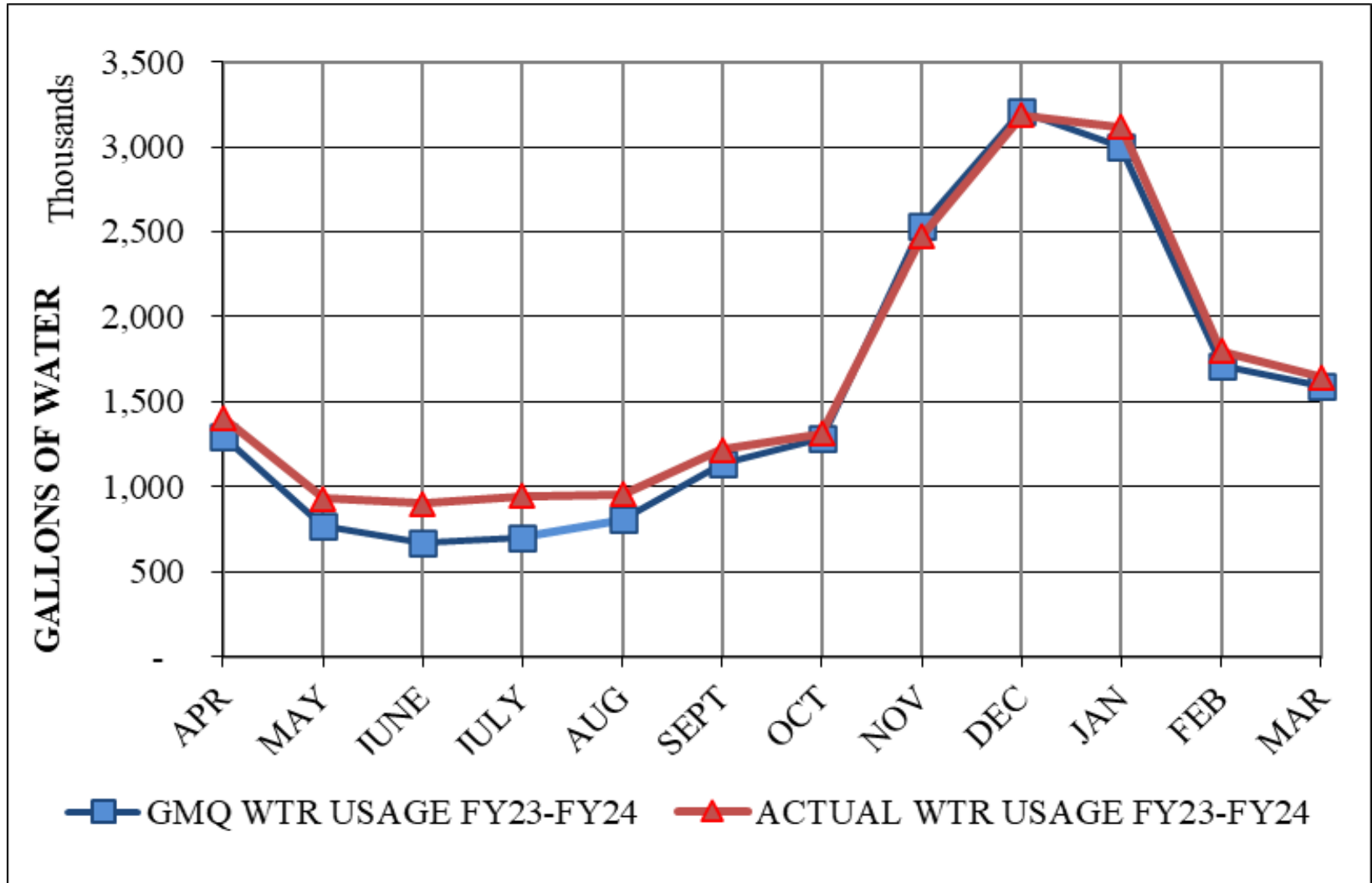
GMQ met in all months shown.

# Performance Measurement FY24: Steam Plant Eff



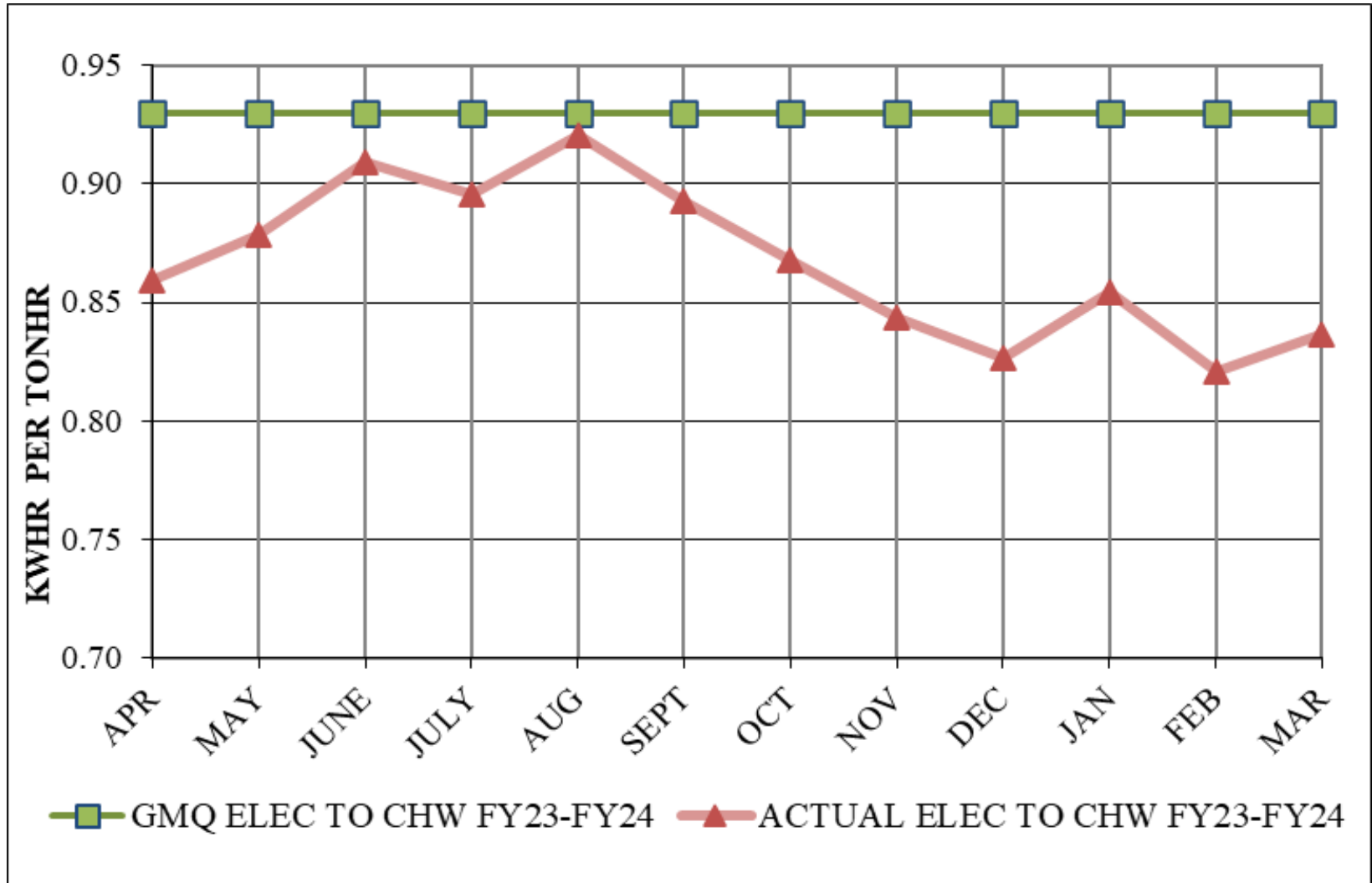
GMQ met May, June, July, Aug, Sept, Nov, Feb, and Mar

# Performance Measurement FY24: Steam Water



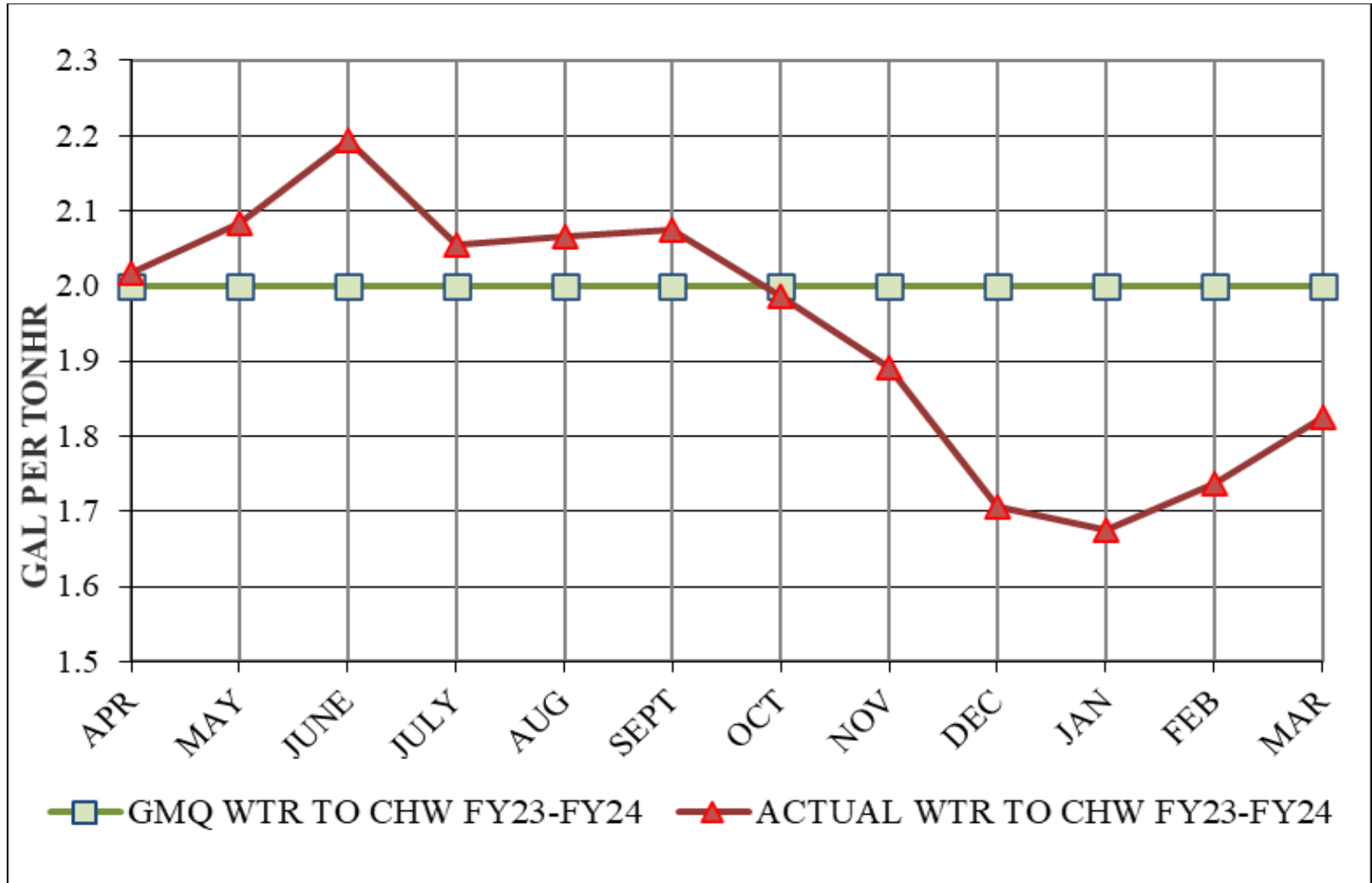
GMQ met in Nov and Dec.

## Performance Measurement FY24: CHW Electric



GMQ met in all months shown.

## Performance Measurement FY24: CHW Water



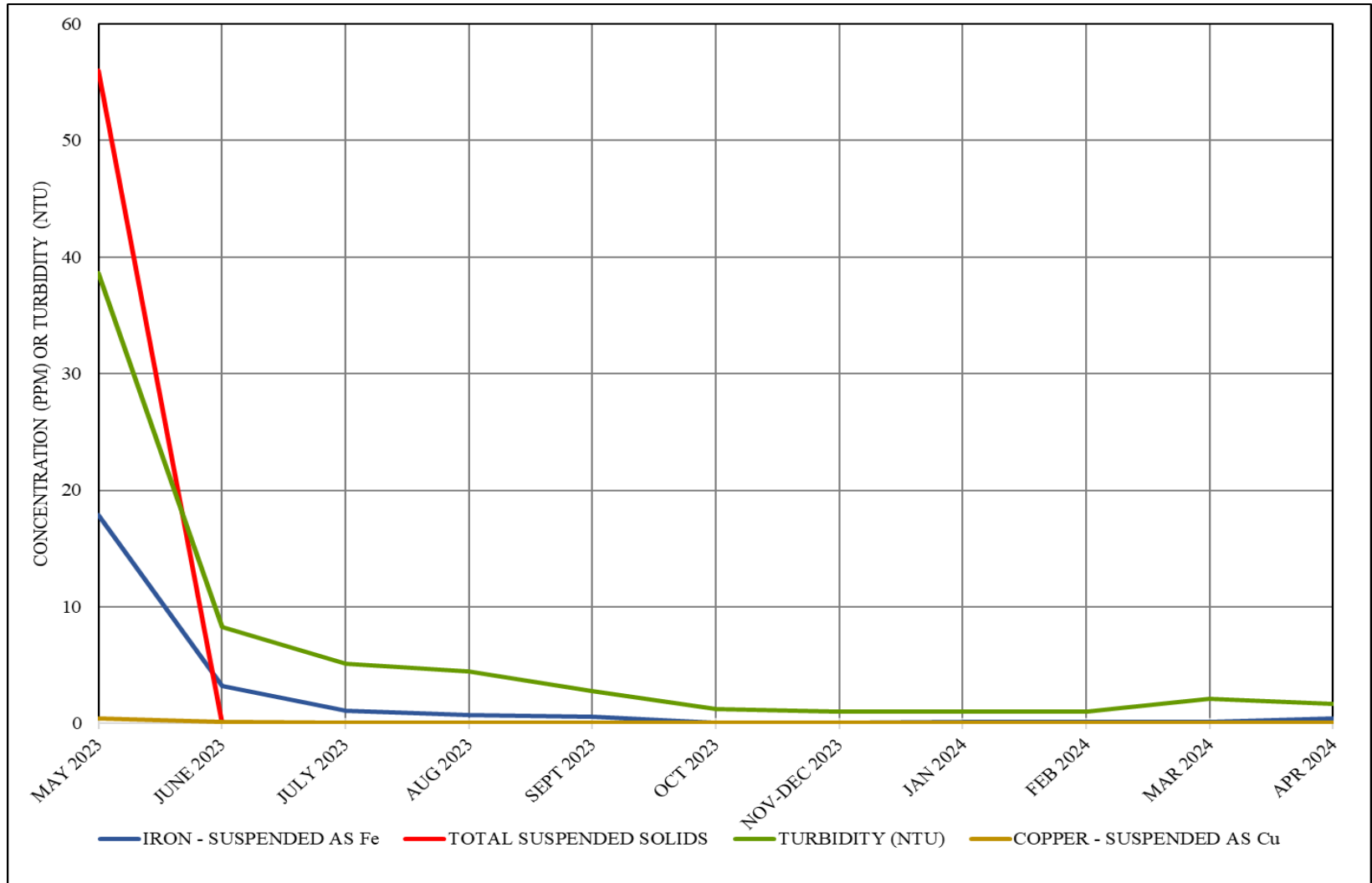
GMQ met Jan, Feb, Mar, Oct, Nov, Dec, Jan, Feb, and Mar.



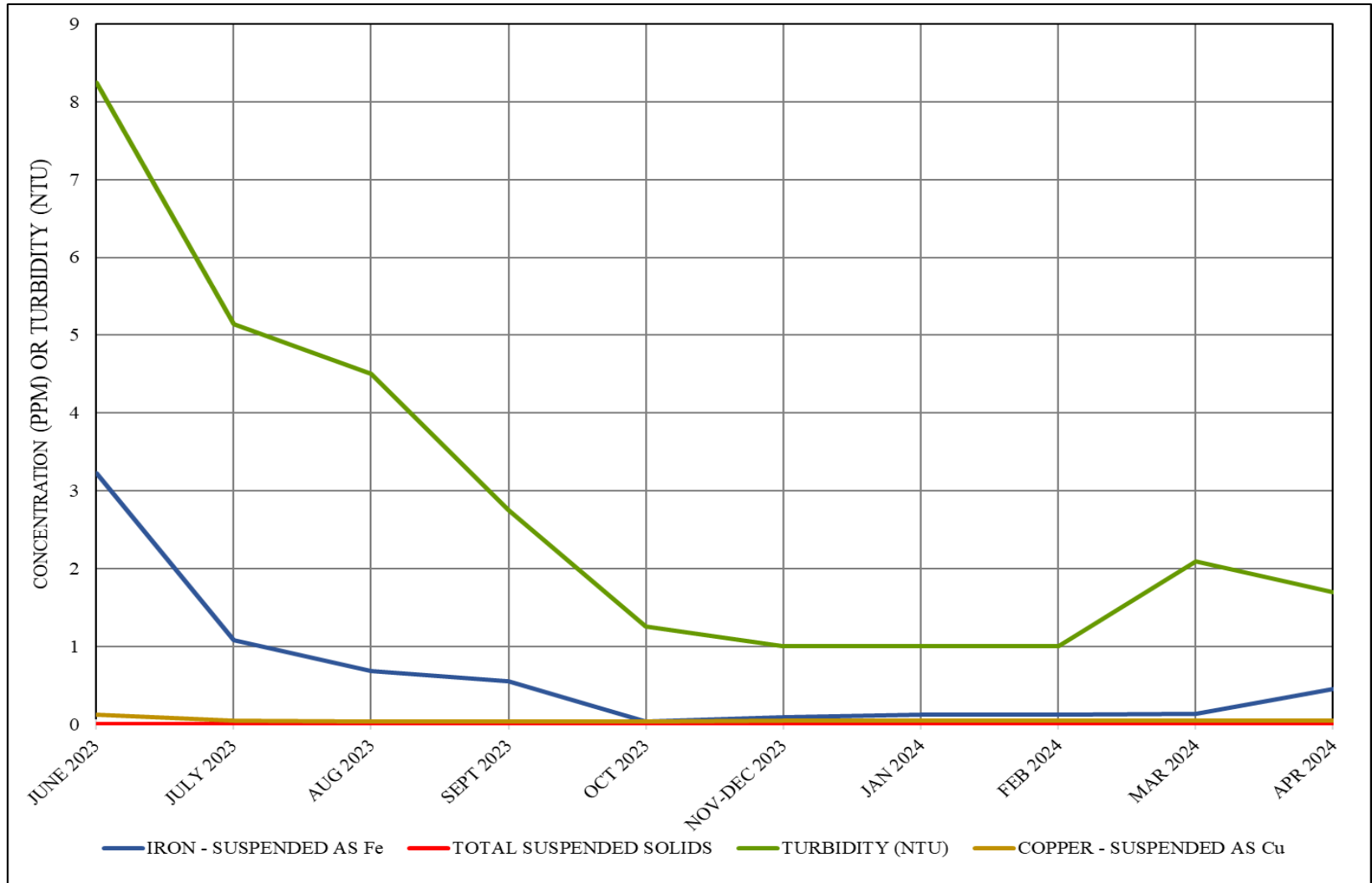
# *Water Treatment*

- ❖ Steam and Condensate
  - ❖ Corrosion
  - ❖ Iron
  - ❖ Hardness
  - ❖ Chlorine/Sulfite
- ❖ Condensing Water
  - ❖ Conductivity
  - ❖ Biologicals
- ❖ Chilled Water
  - ❖ Hardness
  - ❖ Corrosion
  - ❖ EGF and Customer Biologicals Good
  - ❖ Side Stream Filter

# Side Stream Filter Performance



# Side Stream Filter Performance



Slight increase in iron and turbidity in Mar and Apr believed to be due to increase in CHW usage.

## *7. Natural Gas Purchasing*

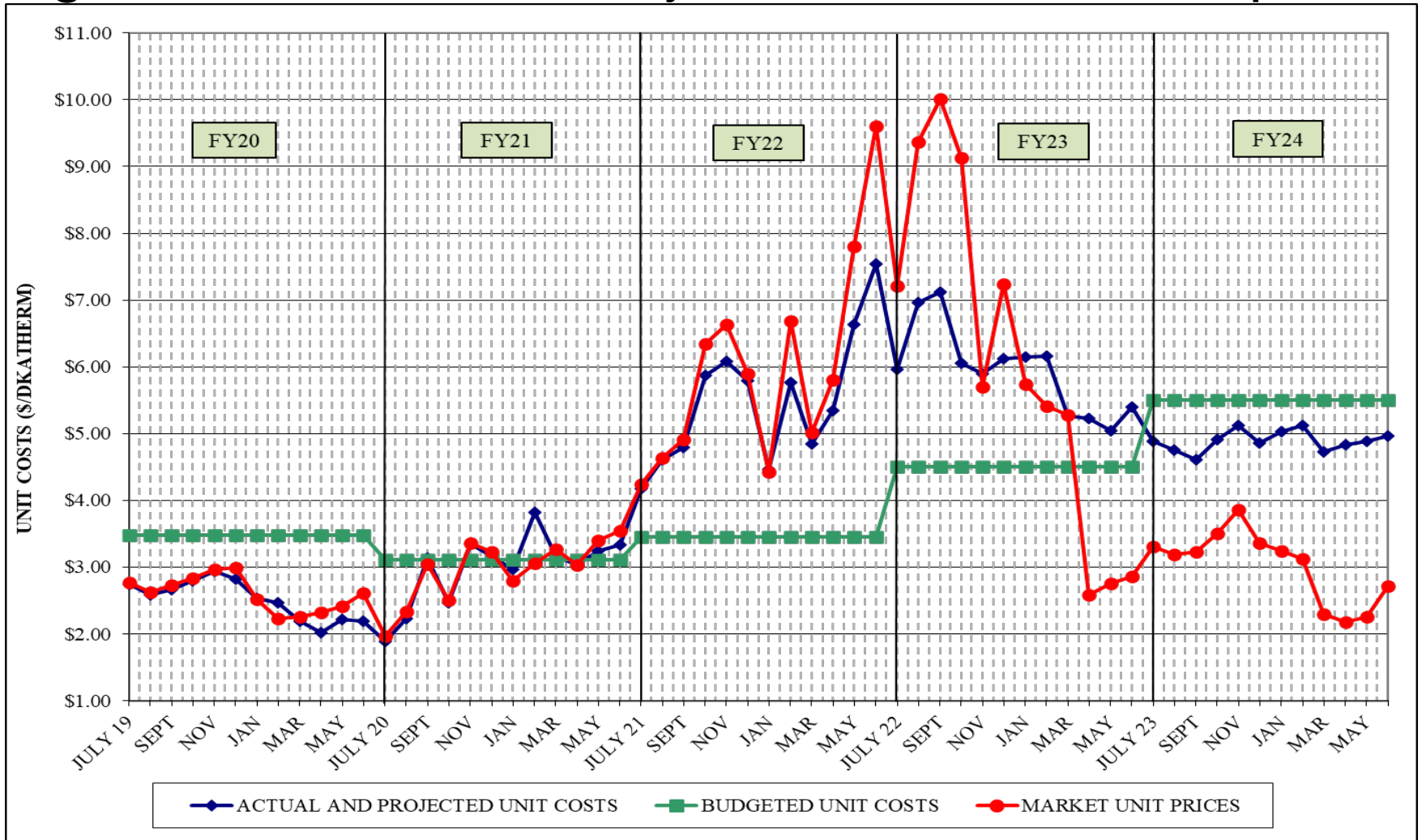
- ❖ Natural Gas Purchasing Review
  - ❖ Table 7: FY24 Gas Spending & Budget Comparison
  - ❖ Figure 7: Actual and Projected Fuel Cost Comparison

## Table 7: FY24 Gas Spending & Budget Comparison

	<b>Actual FY24 To Mar 31</b>	<b>Budget FY24</b>	<b>Percent Difference</b>
Steam Sendout (Mlbs)	320,286	342,643	-6.5%
Fuel Use (Dth) (includes propane)	441,888	491,007	-10.0%
Plant Eff (Dth/Mlb)	1.380	1.433	-3.7%
Total Gas Cost (includes propane)	\$2,174,066	\$3,301,274	-34.1%
Unit Cost of Fuel (\$/Dth)	\$4.920	\$6.525	-24.6%

Excludes consultant fees, FEA, and pre-purchased and stored propane; Includes transportation and actual propane costs and usages. Budget values include price and weather contingencies.

# Figure 7. Actual and Projected Fuel Cost Comparison



Currently hedging 70% of natural gas through FY24 and 40% through FY25; transportation costs included.

## 8. FY24 Costs to Date

Item	FY23 Budget	FY24 Budget	FY24 Actual to date	Percent of FY24 Budget
FOC's	\$ 4,006,800	\$ 4,127,000	\$ 3,095,267	75.00%
Pass Throughs				
Administrative Costs	\$ 932,100	\$ 638,300	\$ 540,658	84.70%
Chemicals	\$ 255,700	\$ 331,200	\$ 208,394	62.92%
R&I Fund Transfers	\$ 303,700	\$ 312,900	\$ 234,675	75.00%
Water/Sewer	\$ 773,400	\$ 1,152,000	\$ 808,539	70.19%
Fuel Base	\$ 2,797,256	\$ 3,422,700	\$ 2,256,072	65.91%
Fuel Contingency	\$ 677,044	\$ 764,200	\$ -	0.00%
Electricity	\$ 6,394,800	\$ 6,476,700	\$ 3,938,431	60.81%
ORF Deposit	\$ 85,800	\$ 188,200	\$ 141,150	75.00%
Debt Service	\$ 4,311,300	\$ 4,774,000	\$ 3,613,237	75.69%
<b>Total Expenses</b>	<b>\$ 20,537,900</b>	<b>\$ 22,187,200</b>	<b>\$ 14,836,423</b>	<b>66.87%</b>
<b>Total Revenues</b>	<b>\$ 20,163,600</b>	<b>\$ 21,802,800</b>	<b>\$ 14,906,004</b>	<b>68.37%</b>
<b>Metro Funding</b>	<b>\$ 374,300</b>	<b>\$ 384,400</b>	<b>\$ 288,300</b>	<b>75.00%</b>

Actual Costs and Revenues to Date include FY23 True-up Items.

## 9. *Review of EGF and EDS*

- Routine maintenance of the EDS is the responsibility of System Operator and is defined within the ARMA. Additional maintenance is directed by the Project Administrator resulting from reviews performed quarterly for tunnels and manholes such that each section and manhole are reviewed annually as defined in the quarterly EDS reports.
  - As identified in one or more EDS quarterly reports, there are several outstanding maintenance items that remain unaddressed.
- 
- Excellent Performance – No Improvement Necessary
  - Satisfactory Performance – Some Improvement Could Be Made
  - Poor Performance – Much Improvement Necessary



# *EGF Walkthrough*

Q3FY24    Q2FY24    Q1FY24    Q2FY23

	Q3FY24	Q2FY24	Q1FY24	Q2FY23
✓ Equipment Maintenance	●	●	●	●
✓ Operations	●	●	●	●
✓ Electrical	●	●	●	●
✓ Housekeeping	●	●	●	●
✓ Building Structure	●	●	●	●
✓ Building Exterior and Grounds	●	●	●	●

# EDS Walkthrough

Q3FY24    Q2FY24    Q1FY24    Q4FY23

✓ Overall Status; Tunnels	● +	● +	●	● -
✓ Overall Status; Vaults	● -	● -	● -	● -
✓ Housekeeping	●	●	●	●
✓ Safety Items	●	●	●	●
✓ Lower Priority/Deferred	● -	● -	● -	
✓ Additional EDS Maintenance Items:				
✓ Piping	● -	● -	● -	● -
✓ Insulation R/R	● -	● -	● -	● -
✓ Water Infiltration	● +	● +	● +	● +
✓ Corrosion	● -	● -	● -	● -

# 10. Capital Expenditure Update

	<b>Spent to End of FY23</b>	<b>FY24 Spending</b>	<b>Balance to Date (04/24/24)</b>
R&I Projects	\$4,644,774	\$339,340	\$199,684
49116-DES Infrastructure Fund	\$5,011,324	\$1,018,950	\$3,343,597
<b>Total</b>	<b>\$9,656,098</b>	<b>\$1,358,290</b>	<b>\$3,543,281</b>

## *Capital Projects Review*

### **Closed or Completed Projects This Quarter**

- DES 196: Exploratory Excav. & Cond. Leak Repair at MH 9
- DES 206: 7<sup>th</sup> Ave Tunnel Fan Replacement
- DES 207: MH N1 Insulation
- DES 208: 2023 Steam Outage
- DES 209: MH B2 Sump Pump Discharge Repair
- DES 212: MH 2 End Can Replacement
- DES 214: Chiller 2 R'newal

## *DES-214: Chiller 2 R'newal*

- Chiller 2 had rotor bar failure October 2023
- Trane proposed a R'newal program to make repairs and provide new 7-Year warranty
- All rotating parts replaced plus new control panel
- CES responsibility is one-third the cost, but Metro agreed to pay two-thirds of cost for complete renewal and new warranty
- Chiller repairs completed and fully operational March 19, 2024



# *Capital Projects Review*

## **Active Capital Projects – General & Marketing**

- DES 163: Peabody Union – working with developer on Guthrie St. impact to DES; demolition of wall began in January.
- DES 192: Peabody St. Developments – survey of routing down Peabody; DES plan for expansion in area with new customers.
- DES 195: DES Parking Area – on hold pending Guthrie St. mods.
- DES 201: East Bank Development – ongoing development and marketing activities related to the East Bank.
- DES 202: 7<sup>th</sup> and Commerce Hotel –building development on hold; intends to use DES CHW and STM.
- DES 203: Printer’s and Banker’s Alley Building – building development on hold; intends to use DES CHW.
- DES 217: DES Service to Auto Nashville Hotel, LLC (8<sup>th</sup> and Demonbreun) – expecting service during construction in late 2025; 1,300 tons chilled water contract capacity with no steam.

## *Capital Projects Review*

### **Active Capital Projects – Corrosion Repair/Prevention**

- DES 211: AA Birch Tunnel and MH D Repairs
  - cleaning and coating of structural steel pipe and platform supports; work anticipated starting 4<sup>th</sup> Qtr FY24.
- DES 218: Manholes B2, B6, B7, B8, B9 and 22B Repairs
  - corrosion clean-up and coating, concrete patching and sealing water infiltration; began during the 3<sup>rd</sup> Qtr; anticipate completion 4<sup>th</sup> Qtr FY24.

# *Capital Projects Review*

## **Active Capital Projects – Repairs/Modifications**

- DES 213: 4<sup>th</sup>, 7<sup>th</sup> & Broadway Tunnel Piping Slide Support Repairs
  - repair and replacement of pipe slides; bidding anticipated in 4<sup>th</sup> Qtr FY24.
- DES 219: 7<sup>th</sup> Ave Tunnel Shotcrete Extension
  - relocation of Metro Library steam and condensate return service piping for tunnel repairs and water infiltration mitigation; bidding anticipated 4<sup>th</sup> Qtr FY24.
- DES 220: MH 20 Condensate Piping Repair and Grating Addition
  - replacement of corroded condensate piping and the installation of grating over shaft to 7<sup>th</sup> Ave Tunnel; anticipate completion in 4<sup>th</sup> Qtr FY24.
- DES 221: War Memorial and Legislative Plaza Renovation
  - State is renovating the two buildings requiring demo of piping and rework of DES meter stations; building offline until late 2024/early 2025.



# *11. System Operator Update*

*By System Operator's General Manager*



*Constellation Energy Solutions, LLC*

## *12. Special Topics*

- Chiller Plant Optimization
  - Companies offer service to audit chiller plant and recommend changes for plant instrumentation, controls, automation, and equipment modifications
- Optimization Goals
  - Improve operational efficiency
  - Reduce CO2 footprint
  - Electrical savings in \$ and kWhr
  - Water savings in \$ and gallons
  - TVA Rebate and utility cost savings
- Alternative is new or replacement equipment
- Cost benefit analysis of options

## *13. Other Board Member Items*

*Operating Management Agreement Development  
(current agreement expires end of FY25)*

*Customer Meeting June 7, 2024, at 11:30 a.m. at  
Downtown Partnership on Commerce St; box lunch  
will be provided*

# 14. *Adjourn*

- *Advisory Board Meeting Schedule*
- FY24 – 4<sup>th</sup> Quarter Meeting – August 15, 2024
- FY25 – 1<sup>st</sup> Quarter Meeting – November 21, 2024
- FY25 – 2<sup>nd</sup> Quarter Meeting – February 20, 2025
- FY25 – 3<sup>rd</sup> Quarter Meeting – May 15, 2025