



Operations Monitoring Report

Fourth Quarter FY16

Prepared by:

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I. Executive Summary

A review of the fiscal year 2016 (FY16) Fourth Quarter performance and contract obligations between Constellation New Energy (CNE) 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 are also presented. For the fiscal year 2016 to date, CNE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the Fourth Quarter FY16, the chilled water sales decreased 2.4% over the previous Fourth Quarter (FY15). The chilled water sendout also decreased 3.2% over the previous Fourth Quarter. However, the system losses were down approximately 18.0%. The Fourth Quarter FY16 saw a marginal increase in cooling degree days (a 2.2% increase). The peak chilled water demand for the current quarter was 18,224 tons, which is 2.0% lower than the previous Fourth Quarter.

For the fiscal year, the chilled water sales increased 2.9% over the previous fiscal (FY15). The chilled water sendout, however, experienced a marginal decrease over the previous fiscal. The system losses were considerably lower (a 45.8% decrease) than in FY15. However, the number of cooling degree days was 6.5% higher than the previous year. FY16 experienced the highest peak demand in the operation of the DES with a recorded load of 19,612 tons, which was approximately 2.4% higher than the peak demand in the previous fiscal.

Steam sendout for the current quarter increased by approximately 11.4% over the previous Fourth Quarter with a 38.1% increase in heating degree days. Likewise, steam sales also increased by approximately 17.5% over the previous Fourth Quarter. Steam system losses, as a percentage of sendout, decreased, and the total losses decreased approximately 6.3% over the previous Fourth Quarter. The peak steam demand for the current quarter was 85,219 pounds per hour, which represents an increase in the Fourth Quarter demand by approximately 26.4%.

For FY16, steam sendout decreased by 12.0% over the previous fiscal year. Likewise, steam sales decreased 14.8% as the number of heating degree days decreased by 27.6%. The steam losses for the year increased 6.5%. The peak steam demand for the year was 14.6% lower than in FY15.

The Energy Generating Facility (EGF) performance continues to surpass the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water plant electric consumption continues to perform lower than the guaranteed levels and has decreased by 3.4% in the Fourth Quarter. The steam plant electric consumption increased over the previous Third Quarter by 3.9%, and the amount of electricity per unit of sales of steam decreased by approximately 11.6%. The total water consumption for the steam and chilled water plants increased 2.7% from the previous Fourth Quarter marked by a 14.8% increase in the EDS make-up for the chilled water system and a 24.7% increase in the steam plant usage.

Annually, the EGF performance satisfied the system performance guarantees in all categories and saw a 3.2% increase in the chiller plant efficiency. Due to some mechanical issues with the boilers during the Second Quarter, the annual boiler plant efficiency decreased by 4.3%.

Work continued on DES Capital and Repair & Improvement Projects during the Fourth Quarter of FY16. Repair and Improvements to the EDS continue as scheduled. Construction was completed on DES123 during the Fourth Quarter FY16 and it is anticipated that it will be closed out during the First Quarter FY17. Confirmation of redline drawing dimensions was received for DES 112, therefore the record drawings were completed and this project was closed during the Fourth Quarter FY16. DES120 Manhole B2 Sump Pump Installation and DES125 Chilled Water Leak Exploratory Excavation on 3rd Avenue were also closed during the Fourth Quarter FY16.

DES127 Manhole 12 Steam Anchor Repair, DES128 Manhole A Sparge Tube Addition, DES129 Manhole 22B Repair, DES130 Manhole B3 Repair and DES131 Wildhorse Saloon Chilled Water Service Modifications were opened during the Third Quarter FY16.

The current fiscal year system operating costs to date are \$19,495,894. This value represents approximately 89.3% of the total budgeted operating cost for FY16. The customer revenues from the sales of steam and chilled water for FY16 (to date) are \$17,658,261 which is approximately 88.2% of the budgeted amount. The difference between the operating costs and customer revenue is the Metro funding amount (MFA), which represents the shortfall in cash flow for the system. The MFA transferred to date for FY16 is \$1,794,000 (100% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices.

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II. Energy Distribution Sales and Performance

A. Chilled Water

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

1. Sales and Sendout

A comparison for the Fourth Quarter chilled water sales is shown in Figure 1. This data reflects a 2.4% decrease in sales for the current quarter over the same quarter of the previous fiscal year.

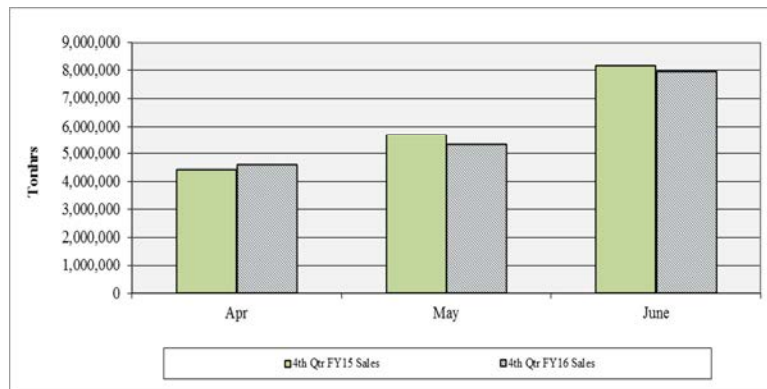


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 18,224 tons, which represents an approximate 2.0% decrease over the previous Fourth Quarter.

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

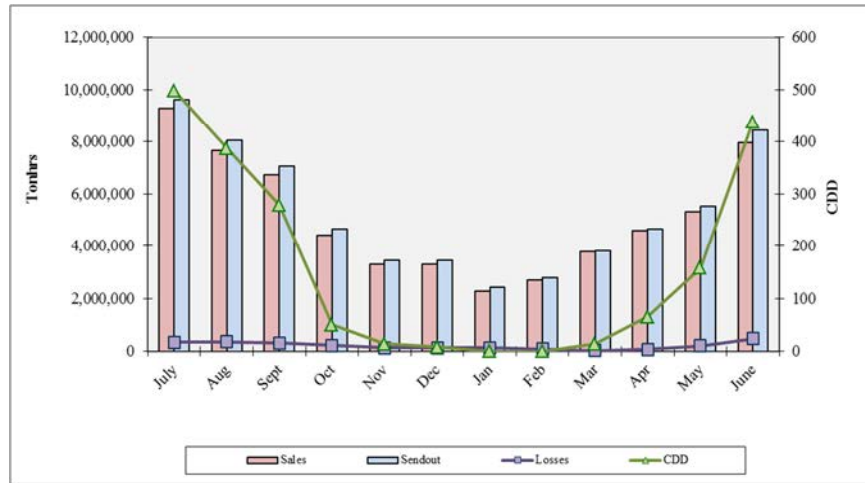


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the Fourth Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales.

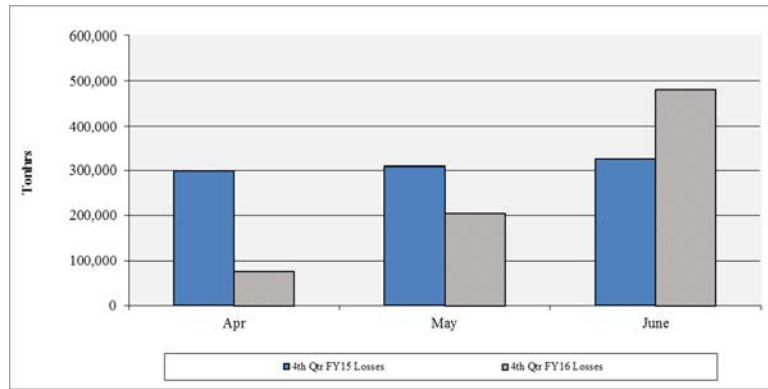


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased by approximately 14.8% over the previous Fourth Quarter. CNE is continuing to investigate the sources of the chilled water leaks that cause the increase in EDS make-up. Recent projects attempting to find the source of leaks anticipated in the buried piping have proven to be unsuccessful so far. The total EDS water usage represents only a small part of the total EGF water usage for the quarter, but the percentage is increasing.

The total energy losses have decreased by approximately 18.0% over the previous Fourth Quarter. The make-up to the cooling towers decreased marginally during the quarter. The number of cycles of concentration in the condensing water

circuit experienced a 5.5% decrease during the current quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

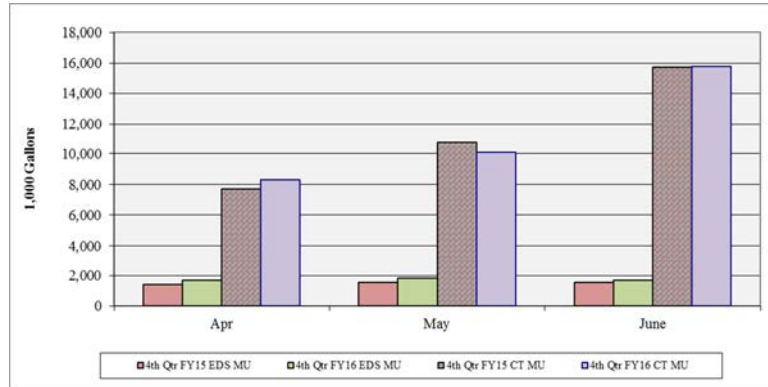


Figure 4. Chilled Water System City Water Usage Comparison

3. Performance

The performance of the chilled water aspect of the EGF is presented by the following two charts, Figures 5 and 6, for the previous twelve months. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

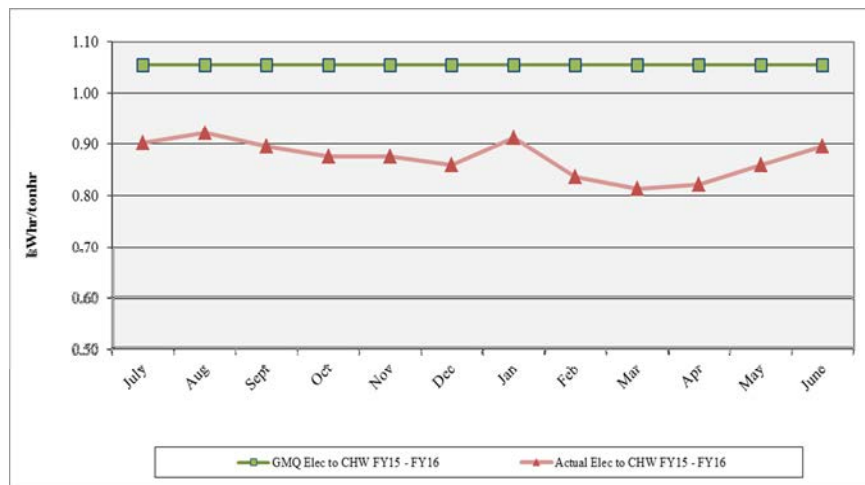


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

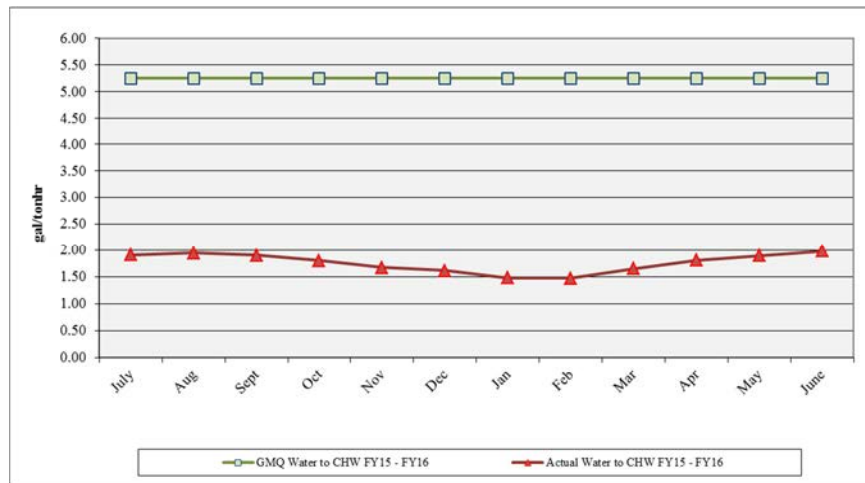


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

The chilled water allocation of the electric consumption falls under the GMQ limit of 1.055 kWhr per tonhr for the current quarter, and no excursion is reported for the current fiscal year. The electric usage per unit of sales decreased approximately 0.99% over the Fourth Quarter for FY15 (Figure 5).

The actual chilled water plant water conversion factor increased approximately 4.2% over the previous Fourth Quarter. However, the total consumption of city water for the chiller plant for the current quarter increased 1.6%.

B. Steam

1. Sales and Sendout

The steam sendout increased by approximately 11.4% over the previous Fourth Quarter (FY15), and the sales also increased by approximately 17.5%. The Quarter experienced a 38.1% increase in the number of heating degree days. The steam system losses decreased 6.2% over the previous Fourth Quarter. A comparison for the Fourth Quarter steam sales is shown in Figure 7.

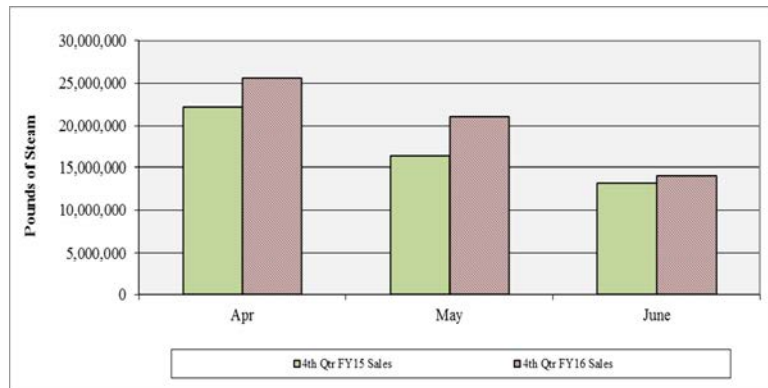


Figure 7. Steam Sales Comparison

The peak steam demand for the current quarter was 85,219 pph, which reflects an approximate 26.4% increase in the peak steam production over the previous Fourth Quarter.

Figure 8 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.

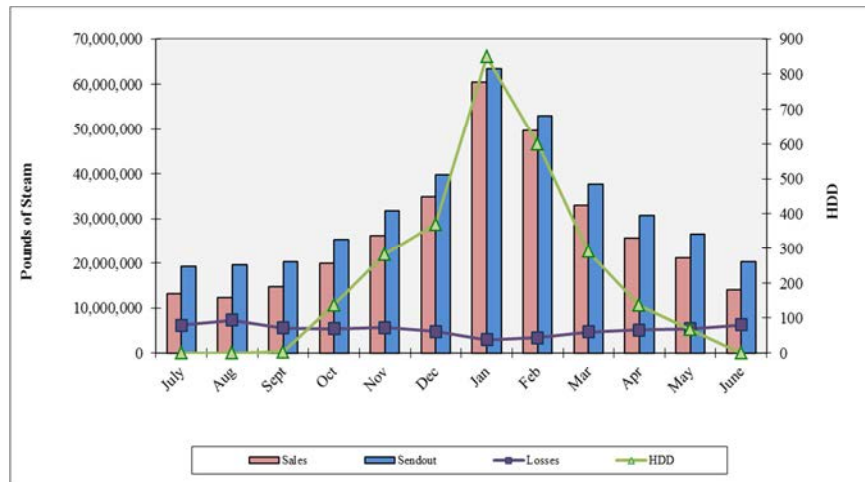


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Fourth Quarter is shown in Figure 9. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing cause of these losses. Whenever steam sales decrease from the previous quarter, the percent of system

losses can be expected to increase since the majority of these losses are based on a near constant heat loss of the system.

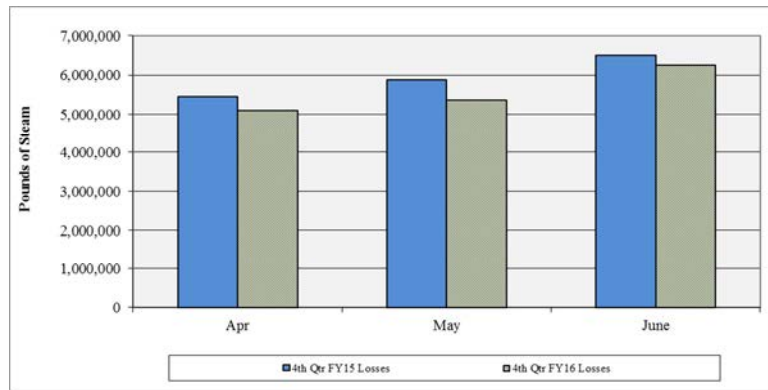


Figure 9. Steam System Losses

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. This data is shown in the comparison of Fourth Quarter data in Figure 10.



Figure 10. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system aspect of the EGF is presented by the following three charts, Figures 11, 12 and 13. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved satisfactorily.

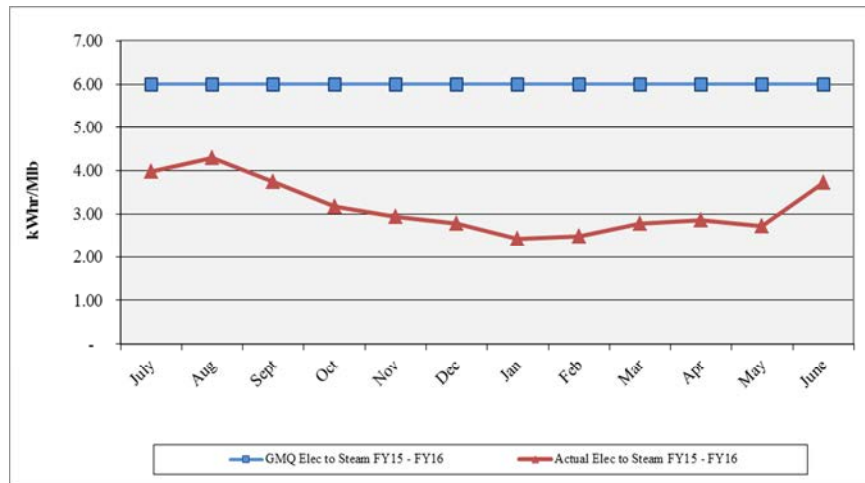


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

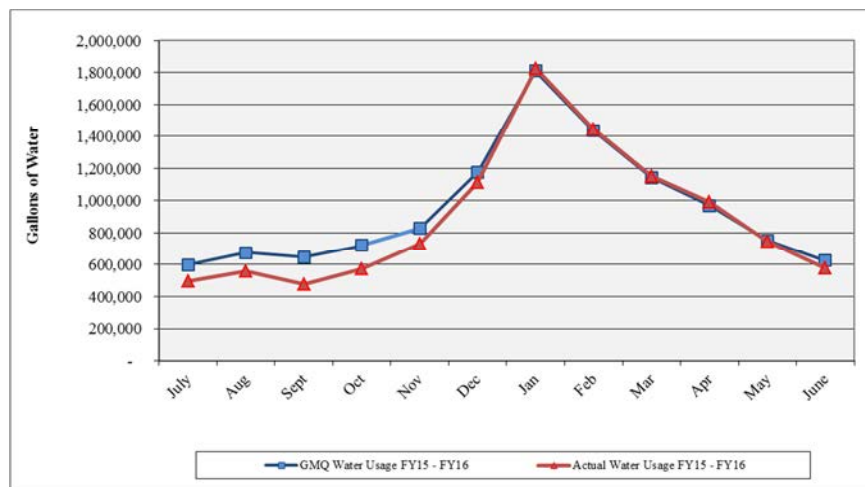


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

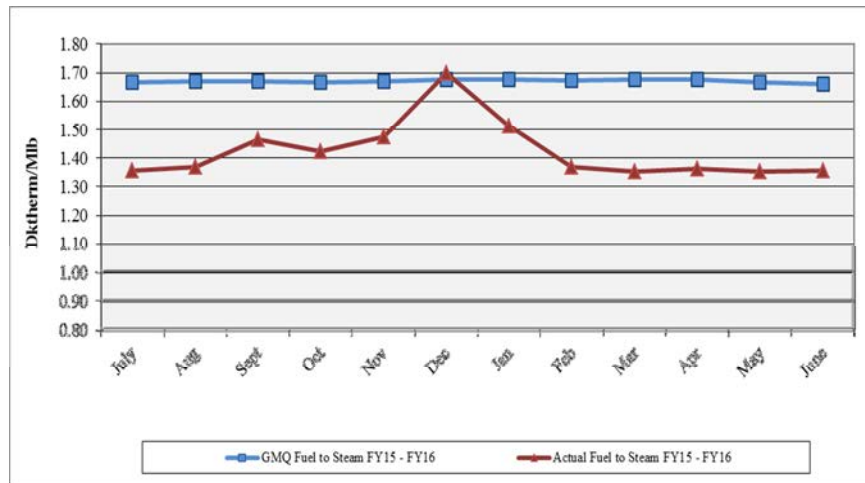


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 3.9% increase in the steam plant electric consumption while experiencing an 11.6% decrease in the electric conversion factor. The water consumption for the steam plant increased 24.7% this quarter as compared to the previous Fourth Quarter. The fuel consumption per unit of steam sales was marginally lower than in the previous Fourth Quarter.

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 Fourth Quarter and annual comparisons of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. Fourth Quarter FY16 and Annual Production, Sales and Consumption Summary

Item	Unit	Fourth Quarter FY16	Fourth Quarter FY15	*Percent Difference	Total Year FY16	Total Year FY15	*Percent Difference
	days	91	91	0.00%	366	365	0.27%
Total Electric Use	kWhrs	15,626,281	16,163,480	-3.32%	54,879,440	55,219,792	-0.62%
Chilled Water	kWhrs	15,443,619	15,987,636	-3.40%	53,939,445	54,142,574	-0.38%
Steam	kWhrs	182,662	175,844	3.88%	939,995	1,077,218	-12.74%
Total Water Use	kgal	41,578	40,505	2.65%	142,784	139,251	2.54%
Total Chilled Water	kgal	39,283	38,665	1.60%	132,200	125,553	5.29%
EDS Make-up	kgal	5,148	4,486	14.76%	20,155	16,458	22.46%
Cooling Towers	kgal	34,135	34,179	-0.13%	112,045	109,095	2.70%
Calc CT Evaporation	kgal	28,034	28,350	-1.11%	93,723	91,042	2.94%
CT Blowdown	kgal	6,101	5,829	4.67%	18,322	18,053	1.49%
Calc # Cycles		4.59	4.86	-5.52%	5.12	5.04	1.43%
Steam	kgal	2,295	1,840	24.73%	10,584	13,698	-22.73%
Total Fuel Use	mmBTU	105,259	94,788	11.05%	557,860	607,463	-8.17%
Natural Gas	mmBTU	105,106	94,428	11.31%	557,609	588,769	-5.29%
Propane	mmBTU	153	360	-57.50%	251	18,694	-98.66%
Condensate Return	kgal	7,470	6,684	11.76%	37,643	41,219	-8.68%
	lbs	60,928,277	54,516,963	11.76%	307,008,817	336,172,718	-8.68%
Avg Temp	°F	183.0	180.0	1.67%	179.9	177.0	1.65%
Sendout							
Chilled Water	tonhrs	18,611,800	19,224,300	-3.19%	63,860,400	64,285,000	-0.66%
Steam	lbs	77,567,000	69,604,000	11.44%	387,718,000	440,426,000	-11.97%
Peak CHW Demand	tons	18,224	18,590	-1.97%	19,612	19,159	2.36%
Peak Steam Demand	lb/hr	85,219	67,406	26.43%	141,813	166,094	-14.62%
CHW LF		46.76%	47.35%	-1.24%	37.07%	38.30%	-3.22%
Steam LF		41.68%	47.28%	-11.85%	31.12%	30.27%	2.82%
Sales							
Chilled Water	tonhrs	17,847,284	18,292,487	-2.43%	61,336,996	59,626,410	2.87%
Steam	lbs	60,865,390	51,783,873	17.54%	325,247,980	381,755,418	-14.80%
Losses							
Chilled Water	tonhrs	764,516	931,813	-17.95%	2,523,404	4,658,590	-45.83%
Steam	lbs	16,701,610	17,820,127	-6.28%	62,470,020	58,670,582	6.48%
		21.53%	25.60%	-15.90%			
Degree Days							
CDD		661	647	2.16%	1,912	1,795	6.52%
HDD		203	147	38.10%	2,736	3,778	-27.58%

*positive percent difference values imply an increase from FY15 to FY16

Table 2. Fourth Quarter FY16 and Annual Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	Fourth Quarter FY16	Fourth Quarter FY15	*Percent Difference	Total Year FY16	Total Year FY15	*Percent Difference
Steam							
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00		6.00	6.00	
Electric Conversion	kWhr/Mlb	3.00	3.40	-11.62%	2.89	2.82	2.42%
GMQ Plant Efficiency	Dth/Mlb	1.667	1.671		1.671	1.678	
Plant Efficiency	Dth/Mlb	1.357	1.362	-0.35%	1.439	1.379	4.32%
Actual %CR		78.55%	78.32%	0.29%	79.18%	76.33%	3.74%
Avg CR Temp	°F	183	180	1.67%	180	177	1.65%
GMQ Water Conversion	gal	2,346,111	2,127,319		11,380,244	14,700,034	
Water Conversion	gal	2,317,950	1,858,400	24.73%	10,689,840	13,834,980	-22.73%
Chilled Water							
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055		1.055	1.055	
Electric Conversion	kWhr/tonhr	0.865	0.874	-0.99%	0.879	0.908	-3.15%
GMQ Water Conversion	gal/tonhr	5.25	5.25		5.25	5.25	
Water Conversion	gal/tonhr	2.20	2.11	4.13%	2.16	2.11	2.36%

*positive percent difference values imply an increase from FY15 to FY16

D. Operating Costs

The fixed operating costs for the DES include the management fee to CNE, debt service payments on the bonds and engineering and administration costs and are charged to the customers relative to their contract demand. 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. The vast majority of the costs incurred for the operation of the DES are passed onto the customers in the form of the demand charges (fixed costs) and energy charges (variable costs). A summary of the total operating costs for the fiscal year to date are shown in Table 3.

The revenues shown 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 paid by Metro. The shortfall exists due to the remaining capacity at the EGF that was included in the original construction and remains unsold and the debt service for bonds to which the customers do not directly contribute.

The system operating costs for FY16 to date are \$19,495,894. This value represents approximately 89.3% of the total budgeted operating cost for FY16 and includes expenses to date that have been invoiced but were not paid at the time of this report. Additional invoices that would be charged to the Fourth Quarter have not been issued or paid at the time of this report. The customer revenues from the sales of steam and chilled water for FY16 are \$17,658,261 which is approximately 88.2% of the budgeted amount. The MFA transferred to date is \$1,794,000 (100% of budget). However, the actual MFA required cannot be accurately calculated due to the outstanding invoices.

Table 3. DES Expenses and Revenues to Date

Item	FY16 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget	
Operating Management Fee								
FOC: Basic	\$ 4,433,800	\$ 1,076,159	\$ 1,076,159	\$ 1,076,159	\$ 1,076,159	\$ 4,304,634	97.09%	
9th Chiller	\$ 41,600	\$ 10,084	\$ 10,084	\$ 10,084	\$ 10,084	\$ 40,335	96.96%	
C/O 6A	\$ 82,000	\$ 19,908	\$ 19,908	\$ 19,908	\$ 19,908	\$ 79,633	97.11%	
C/O 6B	\$ 71,800	\$ 17,429	\$ 17,429	\$ 17,429	\$ 17,429	\$ 69,716	97.10%	
C/O 7	\$ 27,100	\$ 6,566	\$ 6,566	\$ 6,566	\$ 6,566	\$ 26,264	96.91%	
C/O 8	\$ 11,900	\$ 2,873	\$ 2,873	\$ 2,873	\$ 2,873	\$ 11,494	96.59%	
Pass-thru Charges: Chemical Treatment	\$ 139,500	\$ 42,247	\$ 47,778	\$ 44,552	\$ 42,337	\$ 176,914	126.82%	
Insurance	\$ 32,100	\$ 2,675	\$ -	\$ -	\$ 29,716	\$ 32,391	100.91%	
Marketing:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.	
Incentive Payments	\$ 12,800	\$ 3,139	\$ 3,139	\$ 3,139	\$ 3,139	\$ 12,557	98.10%	
FEA: Steam	\$ -	\$ 13,900	\$ 10,873	\$ 32,049	\$ 18,918	\$ 75,741	n.a.	
Chilled Water	\$ -	\$ 144,264	\$ 76,510	\$ 60,336	\$ 113,619	\$ 394,729	n.a.	
Misc: Metro Credit	\$ -	\$ (226,605)	\$ (123,280)	\$ (93,914)	\$ (145,490)	\$ (589,288)	n.a.	
ARFA	\$ -	\$ 15,630	\$ 15,630	\$ 15,630	\$ 15,630	\$ 62,518	n.a.	
Deferral	\$ -	\$ -	\$ (7,016)	\$ (92,385)	\$ (132,538)	\$ (231,939)	n.a.	
Subtotal - Man Fee =	\$ 4,852,600	\$ 1,354,873	\$ 1,279,932	\$ 1,196,339	\$ 1,223,841	\$ 5,054,986	104.17%	
Reimbursed Management Fee + Chem Treatment		\$ 1,354,873	\$ 1,295,351	\$ 1,196,339	\$ 744,417	\$ 4,590,980	0.00%	
Metro Costs								
Pass-thru Charges:								
Engineering	\$ 9,000	\$ 33,421	\$ 9,093	\$ 2,682	\$ (13,197)	\$ 31,998	355.53%	
EDS R&I Transfers	\$ 282,100	\$ 70,525	\$ 70,525	\$ 70,822	\$ 70,525	\$ 282,397	100.11%	
Metro Marketing	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%	
Project Administration	\$ 54,400	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%	
Metro Incremental Cost	\$ 529,600	\$ 145,197	\$ 122,775	\$ 133,734	\$ 151,299	\$ 553,005	104.42%	
Utility Costs:								
Water/Sewer	\$ 745,400	\$ 210,481	\$ 109,117	\$ 82,802	\$ 130,525	\$ 532,925	71.50%	
EDS Water/Sewer	\$ -	\$ 40	\$ 40	\$ 82	\$ 27	\$ 189	n.a.	
EDS Electricity	\$ -	\$ 16,124	\$ 14,163	\$ 11,112	\$ 14,965	\$ 56,363	n.a.	
Electricity	\$ 6,545,700	\$ 2,336,989	\$ 1,018,806	\$ 705,802	\$ 1,412,570	\$ 5,474,167	83.63%	
Natural Gas Consultant	\$ 100,900	\$ 1,893	\$ 2,480	\$ 2,240	\$ 7,640	\$ 14,253	14.13%	
Natural Gas Transport	\$ -	\$ 48,964	\$ 75,416	\$ 98,592	\$ 55,838	\$ 278,810	n.a.	
Natural Gas Fuel	\$ 3,287,100	\$ 269,087	\$ 456,101	\$ 608,950	\$ 268,670	\$ 1,602,808	48.76%	
Propane	\$ -	\$ -	\$ 89,544	\$ -	\$ -	\$ 89,544	n.a.	
Subtotal - Metro Costs =	\$ 11,564,200	\$ 3,132,720	\$ 1,968,060	\$ 1,716,817	\$ 2,098,861	\$ 8,916,458	77.10%	
Subtotal - Operations =		\$ 16,416,800	\$ 4,487,594	\$ 3,247,992	\$ 2,913,157	\$ 3,322,701	\$ 13,971,444	85.10%
Debt Service								
2012 Bonds	\$ 3,479,500	\$ 869,313	\$ 870,075	\$ 870,075	\$ 870,075	\$ 3,479,538	100.00%	
2005 Bonds -Self Funded	\$ 762,200	\$ -	\$ -	\$ 762,175	\$ -	\$ 762,175	100.00%	
2007 Bonds -Self Funded	\$ 204,400	\$ -	\$ -	\$ -	\$ 204,400	\$ 204,400	100.00%	
2008 Bonds -Self Funded	\$ 203,400	\$ -	\$ -	\$ -	\$ 203,400	\$ 203,400	100.00%	
2010 Bonds -Self Funded	\$ 202,400	\$ -	\$ -	\$ -	\$ 202,400	\$ 202,400	100.00%	
MCCC Fund -Self Funded	\$ 714,000	\$ -	\$ 662,100	\$ -	\$ 51,900	\$ 714,000	100.00%	
Interest & Misc Revenue	\$ (156,900)	\$ (6,747)	\$ (12,737)	\$ (6,747)	\$ (15,233)	\$ (41,462)	26.43%	
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.	
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.	
Subtotal - Capital =	\$ 5,409,000	\$ 862,566	\$ 1,519,438	\$ 1,625,503	\$ 1,516,943	\$ 5,524,450	102.13%	
Total =		\$ 21,825,800	\$ 5,350,160	\$ 4,767,430	\$ 4,538,660	\$ 4,839,644	\$ 19,495,894	89.32%
Customer Revenues								
Taxes Collected		\$ 113,667	\$ 84,311	\$ 76,813	\$ 85,755	\$ 360,546	n.a.	
Taxes Paid		\$ 113,666	\$ 84,311	\$ 76,813	\$ 85,755	\$ 360,545	n.a.	
Penalty Revenues/Credits		\$ (38,116)	\$ 7,910	\$ 7,038	\$ 5,998	\$ (17,171)	n.a.	
Energy Revenues Collected		\$ 5,444,128	\$ 4,112,868	\$ 3,864,210	\$ 4,254,226	\$ 17,675,431	n.a.	
Revenues =	\$ 20,031,300	\$ 5,406,013	\$ 4,120,778	\$ 3,871,247	\$ 4,260,224	\$ 17,658,261	88.15%	
Metro Funding Amount =		\$ 1,794,500	\$ (55,853)	\$ 646,652	\$ 667,412	\$ 579,420	\$ 1,837,632	102.40%

The DES serves 28 customers and 41 buildings in downtown Nashville. These customers are divided into three categories: 1) Private customers who privately own their buildings, 2) State of TN owned buildings and 3) Metro owned buildings. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties 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	\$ 3,646,472	18,730,590	\$ 0.1947	\$ 1,373,231	88,005	\$ 15.6040
State Government	\$ 3,339,342	14,385,583	\$ 0.2321	\$ 1,674,108	91,180	\$ 18.3606
Metro Government	\$ 5,545,181	28,221,823	\$ 0.1965	\$ 2,097,097	146,063	\$ 14.3574
New Customers	\$ 3,378,865	17,059,719	\$ 0.1981	\$ 1,096,369	94,106	\$ 11.6503
Total	\$ 12,530,995	61,337,996	\$ 0.2043	\$ 5,144,436	325,248	\$ 15.8170

Total Revenue \$ 17,675,431
 True-up and Adjustments (Net) \$ (17,170)
 Net Revenue \$ 17,658,261

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY16. Communication between TEG and CNE continues to be excellent, and CNE has reported and managed all EGF operations satisfactorily and according to the ARMA with no contract violations.

A. Reliability

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

- On June 15, boiler #4 tripped offline due to low water level. This trip caused the steam pressure to drop to 112 psig and was below 150 psig for 60 minutes. Another feedwater pump was started and the boiler was placed back into service.
- Due to an accidental opening of a blowdown valve on the master pressure controller on boiler #3, the boiler pressure rose and a safety relief valve lifted. The valve would not reseal and the boiler was shut down. The safety relief valve was replaced and a plug was installed in the blowdown valve to prevent a re-occurrence. The steam pressure dropped to a low of 96 psig and was below 150 psig for approximately 60 minutes.
- Excursions and disruptions in operations that have occurred throughout the year are included in the individual Monthly Operational Reports from CNE.

B. Efficiency

The operation of the EGF satisfied the guaranteed levels for all commodity usage during the quarter. There were no significant excursions above the guaranteed levels for the current 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.

Monthly safety meetings were held on Emergency Preparedness, PPE Usage and Chemical Safety.

CNE continues cross-training its maintenance employees to fill in as relief operators.

D. Personnel

The EGF currently has twenty-five full time employees. Of the current number of employees, seventeen were previously employed by Nashville Thermal Transfer Corporation.

E. Training

Staff training for this quarter consisted of the Health and Safety training discussed previously. CNE continues cross training maintenance personnel to perform the tasks of the operators at the EGF in case of emergency or need.

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. Remote testing of the condensate at the AA Birch, Tennessee Tower and the Andrew Jackson also occurs regularly to monitor the concentration and distribution of the steam system chemicals.

- Steam System
 - The condensate return averaged approximately 78.6% of the steam sendout during the quarter which represents a 0.3% increase over the previous Fourth Quarter.
 - Feedwater iron and hardness remained excellent during the quarter.
- Condensing Water System
 - The conductivity of the condensing water continues normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - CNE continues to monitor and test for the presence of bacteria in the system. The continuous dosage of the biocide continues. At this point, the biological growth in the system has decreased.

G. Maintenance and EGF Repairs

CNE continues to report on the numerous routine maintenance and preventive maintenance activities performed on the EGF primary and ancillary equipment. The principle 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.

- The boiler #3 safety relief valve was replaced.
- The fan belts on cooling towers 2, 3, 5, 7 and 10 were adjusted.
- The vacuum breaker on de-aerator #2 was replaced.
- MRG completed the cooling tower fill replacement in towers 2, 3 and 5.
- The oil heater on chiller #5A was replaced.
- The fork lift was replaced and the Genie lift was repaired.
- Trane replaced the supply water temperature sensors on chillers #1 and #8 and replaced the purge suction sensor on chiller #6.
- The soft start controller on CWP #2 was replaced.
- The new hand rails and toe plates on the cooling tower deck were painted.
- The new concrete pad around the water meter boxes was installed.
- Other minor repairs and maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on June 28, 2016, by Kevin Jacobs, P.E. with TEG. This review involved a tour of the facility with the primary points of interest and concern noted herein.

- Some of the housekeeping items noted in the previous walk-through have been repaired or resolved.
- Some of the riser pipes in the cooling towers have been painted, but some repairs remain. CNE has dedicated itself to repaint these riser pipes as the tower basins are repaired and the fill is replaced. They estimate a complete restoration of these components over the next couple of winters.
- The repairs to the water meter boxes along KVB have been made. CNE installed a concrete collar and pad around the boxes and lids. This solution is acceptable.
- Cobwebs have reformed in various places throughout the plant and on motor control center #4 located near the boilers; these should be removed. However, progress has been made in removing some of these cobwebs.
- CNE previously installed “No Trespassing” signs at an area on the western wall of the EGF at the instruction of Metro Police so that they could assist in removing unauthorized people from camping in the area under the trees. The signs have been destroyed and unauthorized people have returned to use the site to camp,

sleep and congregate. Graffiti has also been observed on the western wall of the EGF.

- A number of items that were previously noted as being stored on the mezzanine level near the water treatment area have been removed.
- A safety relief valve on boiler #3 lifted during the quarter and would not reseal. This valve has been replaced by CNE. The boiler was not operated during the interim.

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 statuses of the projects are discussed, and the project cost-to-date and bond balances are also presented.

A. Fourth Quarter FY16 Open Projects

The following projects remained open at the end of the Fourth Quarter FY16.

1. DES033 – Manhole Lid and Ring Replacement/Restoration

This project relates to the repair and replacement of manhole lids and rings whenever Metro Public Works performs Street re-paving. This project will remain open and on-going.

2. DES090 – Manhole & Tunnel Insulation Repair (Revised from DES060)

Work associated with this project will be on-going as required.

3. DES104 –NES Time of Use Rates

CNE has completed the necessary programming changes and the new billing system using the time of use electric rates will be implemented beginning with the July invoices. Final invoicing has been issued and this project will be closed out in the First Quarter FY17.

4. DES111 – DES Combined Heat and Power

I.C. Thomasson and Associates (ICT) began developing the economic analysis of the proposed CHP project in the Second Quarter. Upon review and presentation of their preliminary economic evaluation, Metro believes that this project is not economically viable without a financial contribution from the Flood Protection System. This project is currently on hold.

5. DES119 - Chilled Water System Delta T Issue

The final test for to determine the effectiveness of the Hydroflow device at the Metro Courthouse will be performed during the First Quarter FY17. TEG has continued to monitor the changes in performance of the MCH chilled water system. CNE has continued taking and testing water samples from the building to determine its effectiveness in eliminating bacteria.

6. DES121 – Miscellaneous Manhole Repairs

Miscellaneous repairs are needed inside several manholes. These repairs include the replacement of several entry ladders, the repair/replacement of some insulation and the removal of a steel ceiling which is beginning to fail. This project involves these repairs.

Construction began during the Fourth Quarter FY16 and it is anticipated that it will be completed during the First Quarter FY17.

7. DES122 – Manhole 13 Structural Repairs

Through CNE's monthly manhole inspections, it was noted that the degradation of Manhole 13's structural concrete has worsened. TEG reviewed the condition of the manhole with a registered structural engineer and it was determined that repairs were needed within a 6 to 12 month timeframe.

Engineering and design has begun for the needed repairs however it is not anticipated that construction will begin until late summer, early fall for these repairs.

8. DES123 – John Sevier Building Condensate Return Piping Replacement

The State of Tennessee is demolishing the Central Services Building just east of the Capital Building. It was discovered by State personnel that sometime in the past, the condensate return piping from the John Sevier Building had failed and rather than replacing the piping, the condensate discharge was re-routed to the Central Services Building to be combined with the Central Services condensate before it was pumped to the State Tunnel condensate main. The John Sevier Building's condensate return piping now needs to be replaced to allow for the demolition for the Central Services Building.

Construction was completed during the Fourth Quarter FY16. It is anticipated that this project will be closed during the First Quarter FY17.

9. DES124 - Criminal Justice Center Redevelopment

The design for the demolition of the DES services has been completed and a contractor has been selected. The demolition was initially scheduled for July 2016, but issues involving the relocation of the police and sheriff's department personnel have delayed the building's demolition and the DES-related work. The demolition of the DES services is now anticipated to occur in September 2016.

An economic model of the cost of continuing on DES services after the construction of the new Criminal Justice Center was not pursued. The new building will continue to use DES services.

10. DES126 – Chilled Water Leak Exploratory Excavation on 3rd Avenue

An exploratory excavation was conducted during the quarter along 3rd Avenue and the chilled water leak was not discovered. This project is currently on hold. Final invoicing for this phase of the project has not been issued by CNE.

11. DES127 – Manhole 12 Steam Anchor Repair

During a quarterly manhole review by TEG, it was discovered that the steam piping anchor bolts in this manhole are badly corroded and require replacement. Due to the design of the piping system, this situation does not present any imminent danger as long as the system remains energized.

TEG developed a design to remedy this situation and the repair was bid during the Fourth Quarter FY16. The project will be awarded and the work will take place during the First Quarter of FY17.

12. DES128 – Manhole A Sparge Tube Addition

When in operation, the trap in Manhole A results in steam hammering. Therefore, CNE has isolated this trap. To remedy this, during the Fourth Quarter of FY16, TEG developed a design to install a sparge tube in Manhole A. The design was bid during the Fourth Quarter FY16 and will be awarded and the work will take place during the First Quarter FY17.

13. DES129 – Repair to Manhole 22B

During the quarterly review of the 7th Avenue Tunnel, an appreciable amount of water was noted as draining from Manhole 22B into the tunnel. Further investigation inside Manhole 22B resulted in the discovery that someone had cored two holes, each approximately 3” – 4” in diameter, through the east wall of this manhole. An attempt had been made to patch these holes, but a portion of the

patch had fallen out and groundwater was entering the vault (along with dirt and sand).

Through additional investigation, it was discovered that a directional drilling company, that was research routes for fiber optic cable, had drilled these two holes through the east wall of the manhole. TEG has contacted the responsible party and informed them that MNDES will make the appropriate repairs to the manhole wall and will seek reimbursement from the responsible party.

This repair work was designed, bid and awarded during the Fourth Quarter FY16. The work will take place during the First Quarter FY17.

14. DES130 – Repair to Manhole B3

During TEG's quarterly review of manholes, the CNE maintenance personnel received a call that a directional drilling company believed that it had drilled through DES Manhole B3. Upon investigation, the directional drilling company had indeed drilled through the east wall/east ceiling of Manhole B3. CNE maintenance personnel and a representative of TEG met with the superintendent of the responsible party at the site and exchanged contact information. Since that time, TEG has been in contact with the responsible party and informed them that MNDES will make the appropriate repairs to the manhole and will then seek reimbursement.

This repair work was designed, bid and awarded during the Fourth Quarter FY16. The work will take place during the First Quarter FY17.

15. DES131 – Wildhorse Saloon CHW Service Connections Modifications in MH-K

In attempting to schedule the work for the demolition of DES services at the CJC (DES124), the isolation and shutdown of the Wildhorse Saloon was created scheduling issues for the DES and the building. The DES had previously encountered similar issues with this building, thus to facilitate the shutdown required for DES124, DES131 was created to install a new set of isolation valves on the service lines to the Wildhorse within MH-K. Once these valves and their associated piping are installed, the Wildhorse will be able to be served from the south side of the 30" isolation valves within MH-K, permitting an isolation of the chilled water service along 1st Ave without disrupting the Wildhorse.

The design and bid for this project was completed in the Fourth Quarter. The work is expected to be performed during the First Quarter FY17.

B. Fourth Quarter FY16 Closed Projects

DES112, DES120 and DES125 were closed during the Fourth Quarter FY16.

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 are shown. Total costs for projects that are closed are shown with a gray highlight. Only the funds currently available are shown.

For FY16, a new bond fund, 49116, was established for the DES to fund DES111 and other future projects. Previous payments from the fund 49109 are expected to be transferred to this bond in the Fourth Quarter.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY16 Spending to Date	Total Spent to Date	Remaining Balance
2010 Bond Projects-49109					
DES070	MH 6 to 23 Cond Line	\$ -	\$ -	\$ -	\$ -
DES071	Hermitage Hotel Ser Modifications	\$ -	\$ -	\$ -	\$ -
DES119	DES Delta T Issue	\$ 100,000	\$ 59,226	\$ 59,226	\$ 40,774
DES117	Manhole S5 Modifications	\$ 160,000	\$ 180,161	\$ 180,161	\$ (20,161)
Total Closed Projects		\$ 2,308,661	\$ (69,664)	\$ 2,241,145	\$ 67,517
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 37,254	\$ -	\$ -	\$ 37,254
Total 2010 Bond		\$ 2,605,916	\$ 169,722	\$ 2,480,531	\$ 125,385
Customer Connection Fund-49107					
DES104	Time of Use/ Customer Billing	\$ 30,000	\$ 25,416	\$ 31,769	\$ (1,769)
DES110	Alternative Fuel Source for EGF	\$ 50,000	\$ 25,155	\$ 44,397	\$ 5,603
DES124	CJC Redevelopment	\$ 300,000	\$ 18,059	\$ 18,059	\$ 281,941
DES129	MH 22B Repair	\$ 20,000	\$ 2,188	\$ 2,188	\$ 17,812
DES130	MH B3 Repair	\$ 20,000	\$ 687	\$ 687	\$ 19,313
DES132	Lifeway Service	\$ -	\$ 8,299	\$ 8,299	\$ (8,299)
DES133	NCC Development	\$ -	\$ 7,425	\$ 7,425	\$ (7,425)
Total Closed Projects		\$ 7,233,827	\$ (67,212)	\$ 6,561,869	\$ 671,958
	Metro Project Admin	\$ 80,000	\$ 28,798	\$ 85,743	\$ (5,743)
	Project Man, Development, etc	\$ 775,173	\$ -	\$ -	\$ 775,173
Customer Connection Fund		\$ 8,509,000	\$ 48,813	\$ 6,760,435	\$ 1,748,565
CHP and EDS Repairs-49116					
DES111	DES CHP	\$ 26,000,000	\$ 127,686	\$ 127,686	\$ 25,872,314
Total Closed Projects		\$ -	\$ -	\$ -	\$ -
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ -	\$ -	\$ -	\$ -
CHP and EDS Repairs		\$ 26,000,000	\$ 127,686	\$ 127,686	\$ 25,872,314

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

Several EDS repairs and improvements were made during the Fourth Quarter. The principle 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 budget at the end of the current quarter is \$5,068. Table 6 provides a summary of the FY16 expenditures and revenues to date associated with the R&I budget.

Table 6. Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Net Market Adjustment	Market Value	Balance
Value at end of FY15						\$ -	\$ 46,884.53	\$ 46,884.53
Reimbursement for Symphony Line Damage	7/29/2015	N/A	N/A	\$ (23,197.62)				
Reimbursement for MCC Line Damage	7/29/2015	N/A	N/A	\$ (31,628.93)				
Reimbursement for MCC Line Damage	7/29/2015	N/A	N/A	\$ (22,294.00)				
CNE June R&I	8/13/2015	DES-1938	CNE	\$ 1,820.59				
DES-107 MH A&B Mech	8/6/2015	DES-2038	TEG	\$ 1,366.75				
DES-112 Cordell Hull	8/6/2015	DES-2038	TEG	\$ 1,565.60				
DES-113 Malloy Bridge	8/6/2015	DES-2038	TEG	\$ 85.50				
DES-117 MH S5 Modificaton	8/6/2015	DES-2038	TEG	\$ 4,607.90				
DES-118 2015 Steam Outage	8/6/2015	DES-2038	TEG	\$ 1,039.45				
DES-107 MH A&B Mech Rebuild	9/17/2015	DES-2050	TEG	\$ 3,229.50				
DES-112 Cordell Hull Condensate	9/17/2015	DES-2050	TEG	\$ 3,214.40				
DES-113 Malloy Bridgestone C	9/17/2015	DES-2050	TEG	\$ 213.75				
DES-117 MH S5 Modificaton	9/17/2015	DES-2050	TEG	\$ 2,561.15				
DES-118 2015 Steam Outage	9/17/2015	DES-2050	TEG	\$ 156.20				
DES-107 MH M, B & 2	9/30/2015	DES-2060	CNE	\$ 12,766.11				
CNE July R&I	9/30/2015	DES-2061	CNE	\$ 3,027.55				
DES-118 2015 Steam Outage	9/30/2015	DES-2062	CNE	\$ 7,643.86				
DES-118 2015 Steam Outage	9/30/2015	DES-2063	CNE	\$ 105,923.70				
DES-107 MH M, B & 2	9/30/2015	DES-2064	CNE	\$ 28,360.11				
Sub-Total First Quarter				\$ 100,461.57	\$ 70,524.99	\$ -	\$ (29,936.58)	\$ (29,936.58)
DES-107 MH M, B & 2	10/2/2015	DES-2068	TEG	\$ 1,063.40				
DES-109 Indigo Hotel	10/2/2015	DES-2068	TEG	\$ 117.15				
DES-112 Cordell Hull Condensate	10/2/2015	DES-2068	TEG	\$ 2,152.65				
DES-117 MH S5 Modificaton	10/2/2015	DES-2068	TEG	\$ 7,910.65				
DES-118 2015 Steam Outage	10/2/2015	DES-2068	TEG	\$ 334.60				
DES-107 MH M, B & 2	10/13/2015	DES-2072	TEG	\$ 546.70				
DES-109 Indigo Hotel	10/13/2015	DES-2072	TEG	\$ 312.40				
DES-112 Cordell Hull Condensate	10/13/2015	DES-2072	TEG	\$ 2,310.47				
DES-117 MH S5 Modificaton	10/13/2015	DES-2072	TEG	\$ 8,610.40				
CNE Aug R&I	10/23/2015	DES-2083	CNE	\$ 5,393.98				
DES-107 MH M, B & 2	11/10/2015	DES-2089	TEG	\$ 195.25				
DES-109 Indigo Hotel	11/10/2015	DES-2089	TEG	\$ 117.15				
DES-112 Cordell Hull Condensate	11/10/2015	DES-2089	TEG	\$ 1,169.45				
DES-117 MH S5 Modificaton	11/10/2015	DES-2089	TEG	\$ 7,071.35				
DES-112 Cordell Hull Condensate	11/30/2015	DES-2097	CNE	\$ 36,064.80				
CNE Sept R&I	11/30/2015	DES-2094	CNE	\$ 3,720.98				
CNE Oct R&I	12/18/2015	DES-2109	CNE	\$ 481.25				
DES-112 Cordell Hull Condensate	12/18/2015	DES-2110	TEG	\$ 771.55				
DES-117 MH S5 Modificaton	12/18/2015	DES-2110	TEG	\$ 1,475.95				
Sub-Total Second Quarter				\$ 79,820.13	\$ 70,524.99	\$ -	\$ (9,295.14)	\$ (9,295.14)
DES-112 Cordell Hull Condensate	01/28/16	DES-2226	TEG	\$ 124.55				
DES-117 MH S5 Modificaton	01/28/16	DES-2226	TEG	\$ 1,632.50				
DES-120 MH B Sump Pump	01/28/16	DES-2226	TEG	\$ 1,117.55				
CNE Nov R&I	01/28/16	DES-2225	CNE	\$ 10,302.69				
DES-112 Cordell Hull Condensate	01/29/16	DES-2231	CNE	\$ 48,387.18				
CES EMR15-006 Manhole 18 Emergency 12/15	01/29/16	DES-2229	CNE	\$ 2,045.76				
CNE Dec R&I	03/04/16	DES-2254	CNE	\$ 5,020.53				
DES-117 MH S5 Modificaton	03/04/16	DES-2255	TEG	\$ 332.88				
DES-120 MH B Sump Pump	03/04/16	DES-2255	TEG	\$ 132.75				
DES-121 Misc MH Repairs	03/04/16	DES-2255	TEG	\$ 1,052.05				
DES-122 MH-13	03/04/16	DES-2255	TEG	\$ 424.40				
DES-123 Central Services	03/04/16	DES-2255	TEG	\$ 1,992.30				
DES-112 Cordell Hull Condensate	03/18/16	DES-2261	TEG	\$ 1,054.35				
CNE Jan R&I	03/21/16	DES-2264	CNE	\$ 3,108.90				
Sub-Total Third Quarter				\$ 76,728.39	\$ 70,524.99	\$ -	\$ (6,203.40)	\$ (6,203.40)
DES-121 Misc MH Repairs	4/27/2016	DES-2280	TEG	\$ 1,463.70				
DES-122 MH-13	4/27/2016	DES-2280	TEG	\$ 160.10				
DES-123 Central Services	4/27/2016	DES-2280	TEG	\$ 5,015.63				
CNE Feb R&I	4/27/2016	DES-2277	CNE	\$ 4,115.07				
DES-121 Misc MH Repairs	5/2/2016	DES-2284	TEG	\$ 360.23				
DES-122 MH-13	5/2/2016	DES-2284	TEG	\$ 1,301.10				
DES-123 Central Services	5/2/2016	DES-2284	TEG	\$ 1,000.63				
DES-125 CHW Exploratory 1st Ave	5/2/2016	DES-2284	TEG	\$ 824.65				
DES-126 CHW Exploratory 3rd Ave	5/2/2016	DES-2284	TEG	\$ 320.20				
DES-127 MH13 Steam Anchor Repair	5/2/2016	DES-2284	TEG	\$ 760.48				
DES-128 MHA Sparge Tube	5/2/2016	DES-2284	TEG	\$ 2,081.30				
DES-120 MH B Sump Pump	5/25/2016	DES-2294	CNE	\$ 6,919.23				
DES-125 Exploratory Excavation 1st Ave	5/25/2016	DES-2295	CNE	\$ 6,884.10				
CNE Mar R&I	5/25/2016	DES-2296	CNE	\$ 3,124.79				
DES-112 Cordell Hull Condensate	5/31/2016	DES-2300	TEG	\$ 1,012.04				
DES-117 MH S5 Modificaton	5/31/2016	DES-2300	TEG	\$ 87.65				
DES-121 Misc MH Repairs	5/31/2016	DES-2300	TEG	\$ 40.03				
DES-123 Central Services	5/31/2016	DES-2300	TEG	\$ 200.13				
DES-127 MH13 Steam Anchor Repair	5/31/2016	DES-2300	TEG	\$ 2,168.96				
DES-128 MHA Sparge Tube	5/31/2016	DES-2300	TEG	\$ 848.13				
CNE Apr R&I	7/5/2016	DES-2313	CNE	\$ 718.30				
CNE May R&I	7/25/2016	DES-2324	CNE	\$ 5,938.00				
DES-123 Central Services	7/25/2016	DES-2325	CNE	\$ 17,103.87				
DES-121 Misc MH Repairs	7/26/2016	DES-2326	TEG	\$ 120.08				
DES-123 Central Services	7/26/2016	DES-2326	TEG	\$ 160.10				
DES-127 MH13 Steam Anchor Repair	7/26/2016	DES-2326	TEG	\$ 2,317.41				
DES-128 MHA Sparge Tube	7/26/2016	DES-2326	TEG	\$ 1,860.84				
Sub-Total Fourth Quarter				\$ 66,906.75	\$ 70,524.99	\$ -	\$ 3,618.24	\$ 3,618.24
FY16 Year to Date				\$ 323,916.84	\$ 282,099.96	\$ -	\$ 5,067.65	\$ 5,067.65

B. Preventive Maintenance

Preventive maintenance, tunnel and manhole inspections and reviews of customers' mechanical rooms were performed during the quarter. The principle items for discussion are presented.

1. EDS Manhole Inspections
 - a. Some traps were found not to be functioning properly; CNE is continuing to repair or replace traps in the system.
 - b. Some of the trap-piping strainers do not have blowdown valves installed. These valves need to be installed to permit maintenance personnel to discharge any debris from the trap piping that can cause the traps to fail.
 - c. Structural metal in the vaults and tunnels need to be cleaned and painted or replaced.
 - d. Spalled concrete needs to be repaired in some manholes.
 - e. Some minor insulation repairs are needed in some vaults.
 - f. Mud and debris needs to be removed from some manholes.
2. Other EDS Inspections
 - a. Minor items are included in the CNE monthly reports.

C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walk-through

The Fourth Quarter FY 2016 walkthrough was conducted on June 14 and 15, 2016 by Jon B. Belcher, PE. The manholes that were visited included A, B, B5, K, L, M, N1, N2, S5 and S6. The following comments and observations are a result of this visit:

1. Manhole A
 - a. There was a small amount of water in this manhole which was pumped prior to entry.
 - b. There is a small area of spalled concrete in the ceiling just west of the manway entrance. This is scheduled to be repaired as part of the DES-128 Manhole A Sparge Tube Addition project. This work should be completed during the first quarter of 2017.
 - c. Currently the trap is isolated due to hammering which takes place when the trap "fires". A sparge tube is being installed in this manhole to alleviate this problem under DES-128 Manhole A Sparge Tube Addition project. This work should be completed during the first quarter of 2017.
 - d. There is moderate corrosion present in Manhole D2 on the support members underneath the grating and on the grating. This manhole should be added to the

“MH & Tunnel Structural Corrosion Prevention/Repair” with a “moderate” priority.

2. Manhole B

- a. There was a small amount of water in the floor of both sides of this manhole.
- b. There is some debris in the chilled water side of the manhole which should be removed. This includes some dirt that was probably introduced into the manhole during the West Riverfront Park construction. CNE should address this prior to their next inspection.
- c. The chilled water side of the manhole had a lot of condensation on the ceiling and in some places on the insulated chilled water piping. The day of the review was an extremely humid day, however when DES-107 was completed one of the punchlist items noted condensation on portions of the insulated piping that needed to be addressed. The substantial completion date of DES-107 was July 1, 2015. CNE will want to notify the contractor of the conditions prior to that date in case additional warranty work is needed.

3. Manhole M

- a. There was no water present in this manhole.
- b. The link seal on the steam line penetration at the northern wall has been dislodged from the top portion of the pipe. CNE personnel have tried to re-position this linkseal without success. CNE should continue to monitor the linkseal and report if water infiltration or other complications arise.

4. Manhole L

- a. There was not any appreciable water in this manhole.
- b. There is some corrosion of the structural components in this manhole, especially on the north side of the anchor beam on the west side where a strut penetrates the manhole floor. This vault should be included in the capital project to repair and prevent structural corrosion with a “high” rating.
- c. There is some minor insulation damage that should be repaired.
- d. There are 3 traps in this manhole and none of the strainers ahead of the traps have blowdown valves installed. CNE should add blowdown valves to these strainers as soon as possible.

5. Manhole K

- a. There is some minor insulation damage that should be repaired. This manhole should be put on the insulation repair list with a “minor” rating.
- b. There is some mud in the floor of the manhole. This mud should be cleaned from the manhole. TEG will coordinate this with CNE.
- c. There is some corrosion of the structural components in this manhole. This vault should be included in the capital project to repair and prevent structural corrosion with a “moderate” rating.

- d. The northeast corner of the manhole concrete roof has some cracking around the manway opening. These cracks should be filled with crack filler; TEG will coordinate this with CNE.
 - e. There is some cracking and spalling of the interior southern wall at the steam penetration that has existed for a number of years. However, pictures from this review were compared with pictures from prior manhole reviews - no significant difference was detected.
 - f. The strainer upstream of the steam trap does not have a blowdown valve. CNE should add a blowdown valve to this strainer as soon as possible.
6. Manhole N1
- a. There was no water present in this manhole.
 - b. The CHW branch connections for Nissan Stadium were never insulated in this manhole. Most of the piping in this manhole is ductile iron; however, there are some steel components and the surface condensing is causing some corrosion. Therefore, the non-insulated piping in this manhole should be insulated. TEG will coordinate with CNE to get this accomplished.
7. Manhole N2
- a. There was water present in this manhole.
 - b. The CHW isolation valves and a small portion of the piping in this manhole was never insulated. All of the piping in this manhole is ductile iron, and the surface condensing is causing some slight corrosion. Therefore, the non-insulated piping in this manhole should be insulated. TEG will coordinate with CNE to get this accomplished.
8. Manhole S5
- a. No deficiencies to report.
9. Manhole S6
- a. There was no water in the manhole.
 - b. Insulation is non-existent. Because of the small amount of piping that could be insulated in this manhole, the small size of the manhole and the absence of any valves or equipment that would require maintenance, it is not practical to insulate this piping.
 - c. Because of the lack of serviceable equipment in this manhole, it is not necessary to inspect this manhole on a monthly basis; a yearly inspection is adequate.
 - d. The structural steel in this manhole is corroded. This vault should be included in the capital project to repair and prevent structural corrosion with a “moderate” rating.
10. Manhole B5
- a. The Arma-flex insulation on top of the chilled water isolation valve gearboxes is starting to separate. This insulation should be repaired or replaced. CNE should address this prior to their next inspection.

VI. Customer Relations

This section contains descriptions of the marketing efforts made by the DES Team during the quarter. The topics of interactions, meetings and training seminars with the customers are also discussed. There are currently 28 customers, comprised of 41 different buildings, connected to the EDS. Service to each of these buildings continues to prove satisfactory, and the responsiveness to customer issues is handled by CNE in an excellent and professional manner.

A. Marketing

The DES has placed a temporary hold on active marketing at this time due to the uncertainty of the actual steam and chilled water loads on the MCC and due to the higher than normal system temperature differences that may be related to the chilled water chemistry. TEG will continue to monitor this issue and make recommendations to Metro regarding the availability of any additional capacity.

There have been no additional meetings or discussions with the engineers and developers of the re-development of the “old” Convention Center during the quarter.

The Wells Fargo building is currently under redevelopment as a hotel. This building is anticipated to remain a DES customer.

B. Customer Interaction

The CNE customer service representative (CSR) continues to respond to customer issues as they arise. Much of the communication involves minor problems with the customers’ heating and cooling systems that are unrelated to DES service. Other more significant issues are summarized herein.

- Due to peculiar fluctuations in the EDS chilled water make-up, CNE contacted all of the customers and requested that they check their chilled water systems for leaks and report if they had isolated any coils or piping sections within their buildings.
- CNE and TEG met with personnel from the Metro Library to discuss their operation and ways they can improve their building’s chilled water system performance.
- CNE contacted several customers regarding projects and necessary outages for those projects during the quarter.
- Due to lack of payment, service to the 501 Union Building was terminated in June. Payment was submitted immediately thereafter and service was restored.
- CNE met with personnel from the Municipal Auditorium to discuss safety issues within their mechanical room.
- After being made aware of an apparent electronic interference issue within the control system for the Metro Courthouse, CNE and TEG investigated the cause to determine if the issue was related to the Hydroflow device. Building personnel

and CNE determined that the issue was related to faulty ground wiring within the building's HVAC control circuitry. Building personnel resolved the situation.

- Other minor issues and customer interactions are noted in the monthly CNE reports.

VII. Recommendations

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

- Corroded structural steel within the vaults and tunnels should be cleaned and painted or replaced; TEG will continue to coordinate this effort with CNE.
- Insulation which is absent, or in disrepair, in the vaults should be addressed through either additional capital projects, which include work within these vaults, or through DES090.
- Steam traps which need repair or replacement should be addressed as soon as possible.
- Concrete repairs need to be made in some manholes. TEG will continue to coordinate this effort with CNE.
- Mud and debris needs to be cleaned from some manholes.