



Operations Monitoring Report

First Quarter FY12

Prepared by:

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I. Executive Summary

A review of the fiscal year 2012 (FY12) First Quarter performance and contract obligations between Constellation Energy (CE) 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 2012, CE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the First Quarter FY12, the chilled water sendout decreased by 7.3% over the previous First Quarter (FY11), and the sales decreased by approximately 4.3%. The EDS city water make-up increased by approximately 94% over the previous First Quarter. The First Quarter FY12 saw a decrease in cooling degree days from the previous First Quarter by approximately 10%. The peak chilled water demand for the current quarter was 16,411 tons, which is approximately 2% lower than the previous First Quarter.

An increase in the steam sendout for the current quarter of approximately 17.1% over the previous First Quarter is noted. Likewise, steam sales also increased by approximately 31% over the previous First Quarter. These increases in steam sendout and sales were accompanied by an increase in the number of heating degree days of approximately 357%. Steam system losses were approximately 39% of the sendout, which was lower than in the previous First Quarter (relative to sendout). The peak steam demand for the current quarter was 43,625 pounds per hour, which represents an approximate 15% increase from the previous First Quarter.

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 considerably lower than the guaranteed levels and was slightly lower than the value from the previous First Quarter. The steam plant electric consumption decreased significantly (approximately 20%) over the previous First Quarter. The steam plant fuel efficiency has increased by 2.8% from the previous First Quarter. The total water consumption for the steam and chilled water plants decreased approximately 2% from the previous First Quarter. The chilled water EDS make-up has increased by approximately 94%, indicative of distribution piping leaks. The steam plant make-up also increased by approximately 68% over the previous First Quarter.

Work continued on DES Capital and Repair & Improvement Projects during the First Quarter of FY12. DES067, DES081 and DES086 were closed during the First Quarter. Work began on DES080 during the Quarter. It is anticipated that work will begin on DES076 during the Second Quarter FY12 and that DES083 will be closed out during the same quarter. Construction on DES077 is complete, and the start-up of the new steam and condensate lines are anticipated in October. Repair and Improvements to the EDS continue as scheduled.

The current fiscal year system operating costs to date are \$4,645,685. This value represents approximately 22.4% of the total budgeted operating cost for FY12. The customer revenues from the sales of steam and chilled water for FY12 for the First Quarter are \$4,673,628 which is approximately 25.4% 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 the First Quarter FY12 is \$590,750 (25% of budget). These values include a few invoiced expenses that were not paid at the time of this report but are expected to be paid and charged to FY12.

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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 First Quarter chilled water sales is shown in Figure 1. This data reflects a decrease in sales for the current quarter over the same quarter of the previous fiscal year by 4.3%. A comparison of the two quarters reveals a decrease in the number of cooling degree days by approximately 10%.

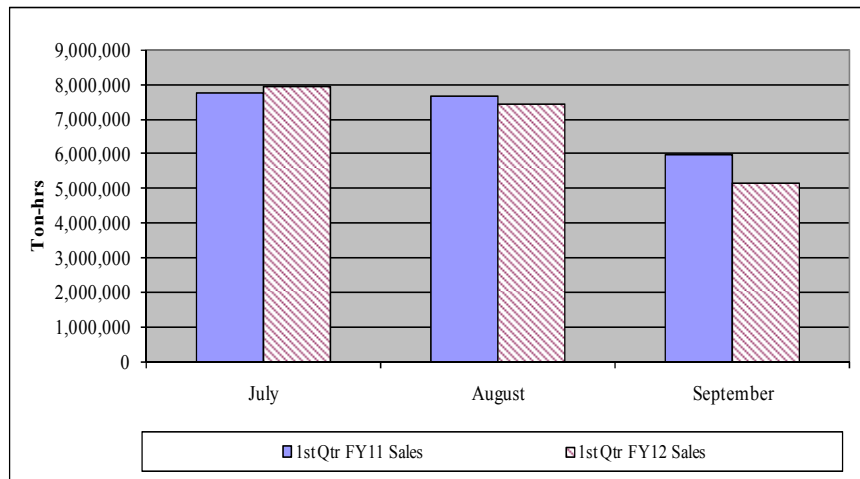


Figure 1. First Quarter FY12 Sales Comparison

The peak chilled water demand for the current quarter is 16,411 tons. This peak demand is approximately 1.7% lower than in the previous First 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.

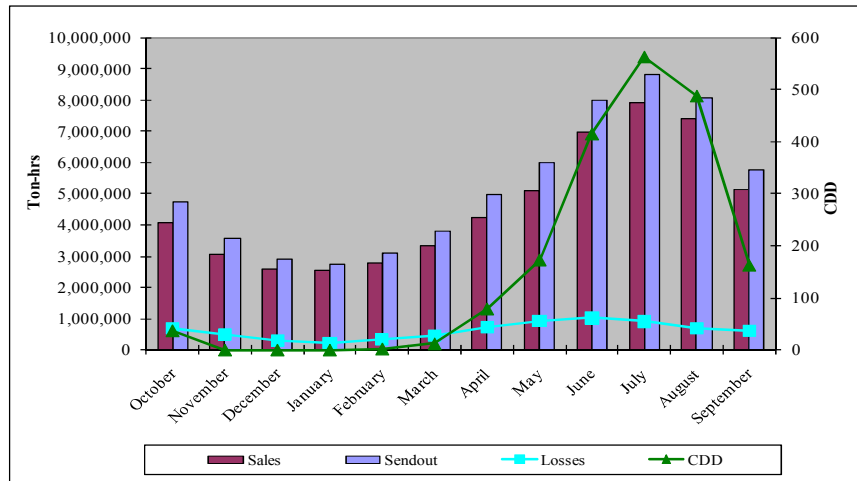


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the First Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales. Due to an apparent error in the reading of the sendout meter at the EGF, the calculation of the energy losses is believed to be errant. The typical increase in the supply temperature between the EGF and the customers is less than 0.5°F. Therefore, the losses cannot be as significant as indicated by this calculation and would be expected to be 3.9% instead of 9.8% of sendout.

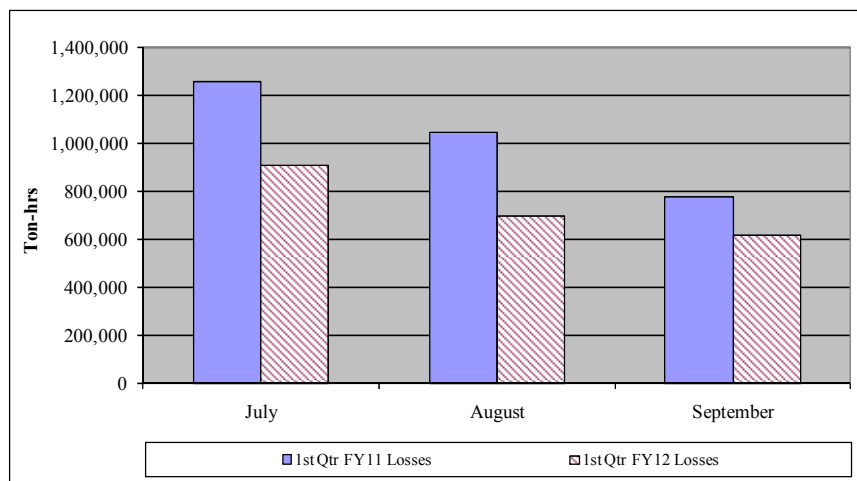


Figure 3. Chilled Water System Loss Comparison for the First Quarter FY12

The EDS make-up increased by approximately 94% over the previous First Quarter due to a leak at MH-D. This increase may be indicative of an additional

leak in the system. However, several known causes for EDS make-up, including filling the in-building system at Citizen’s Plaza, contributed to this increase in make-up. The total energy losses have decreased by approximately 28% over the previous First Quarter. The make-up to the cooling towers decreased by approximately 7.2% due to the decrease in chilled water sales and production and cooling degree days. The number of cycles of concentration in the condensing water circuit experienced a 5.3% increase during the current First. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

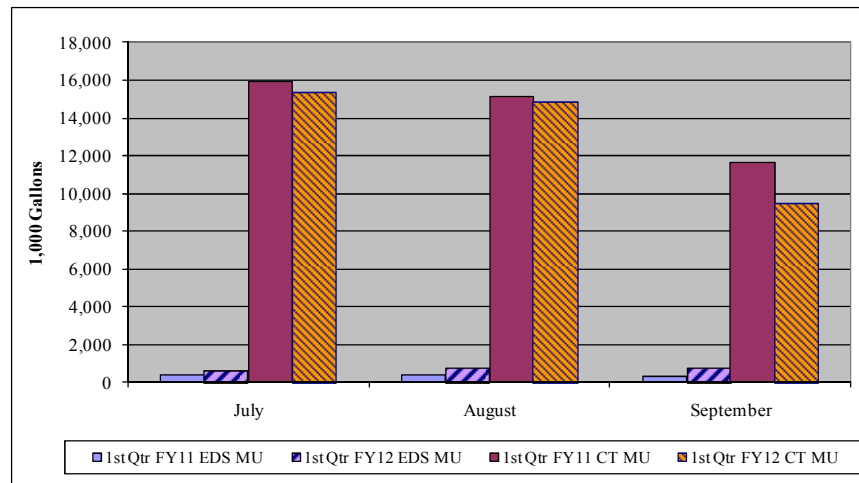


Figure 4. Chilled Water System City Water Usage Comparison

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 CE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

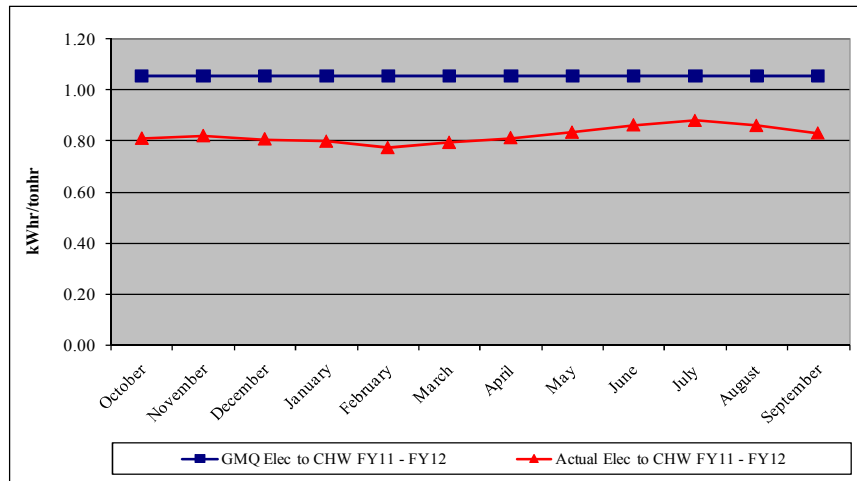


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

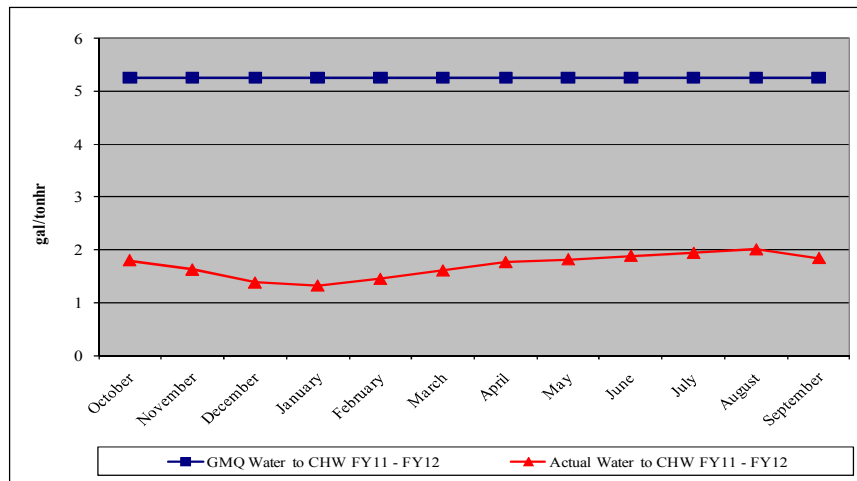


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

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 chiller plant electric usage for the current quarter decreased approximately 5.1% over the First Quarter for FY11 due to a comparable decrease in chilled water sales. The actual electric conversion factor decreased approximately 0.8% in the quarter.

The actual chilled water plant water conversion factor is approximately equal to the value in the previous First Quarter. The total consumption of city water for the chiller plant for the current quarter is approximately 4.6% lower than that for the previous First Quarter.

B. Steam

1. Sales and Sendout

The steam sendout increased by approximately 17.1% over the previous First Quarter (FY11), and the sales increased by approximately 30.6%. The steam system losses have remained approximately the same as in the previous First Quarter. The number of heating degree days has increased by 357% over the previous First Quarter. A comparison for the First Quarter steam sales is shown in Figure 7.

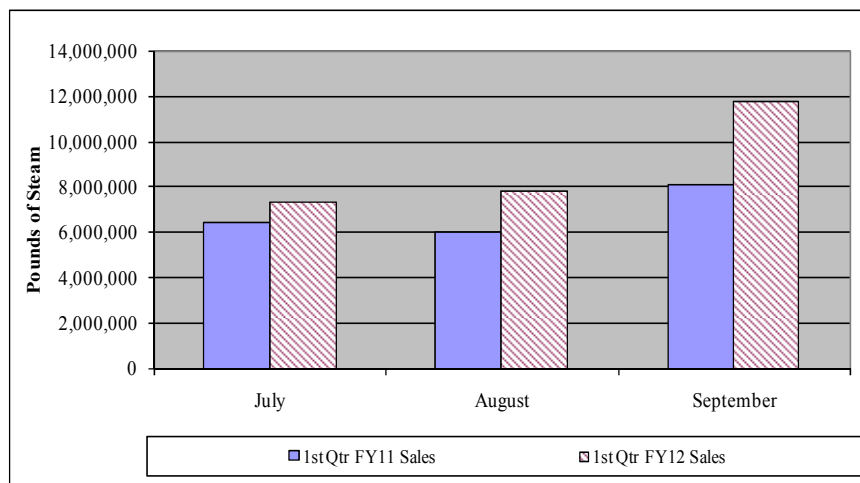


Figure 7. Steam Sales Comparison for the First Quarter FY12

The peak steam demand for the current quarter is 43,625 pph, which reflects an approximate 15% increase in the peak steam production over the previous First 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.

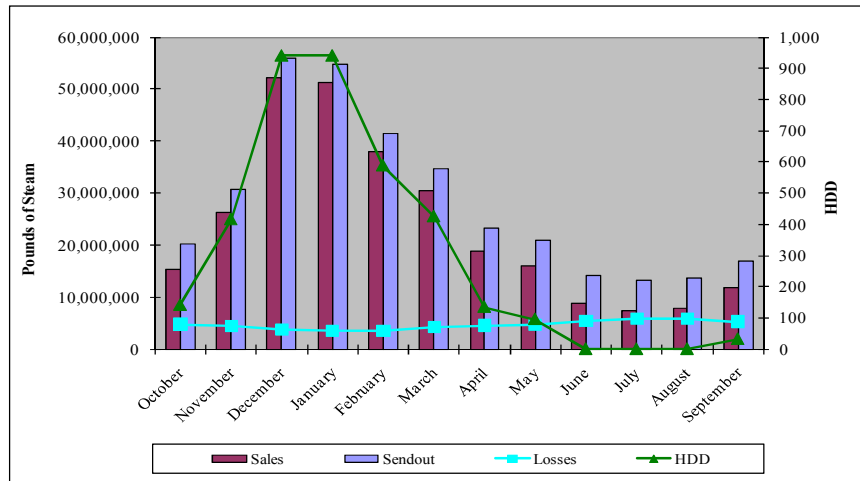


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the First 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. The total losses for the current quarter are approximately the same as in the previous First Quarter.

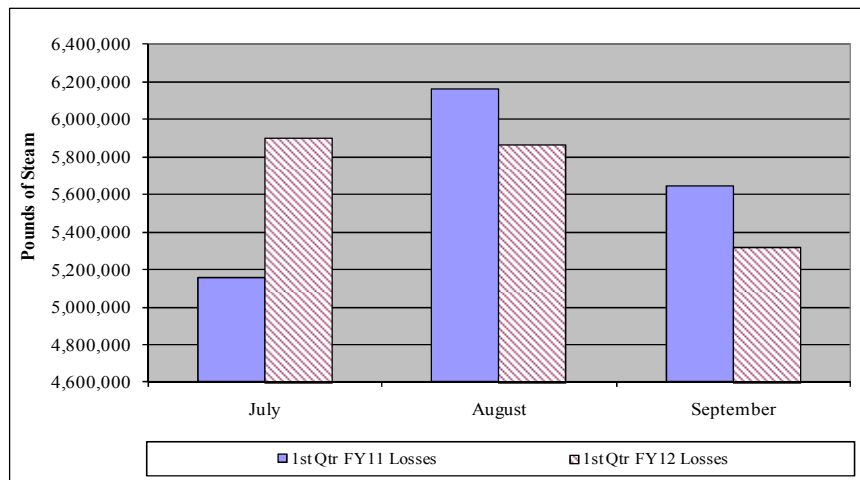


Figure 9. First Quarter FY12 Steam System Losses

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 First Quarter data in Figure 10. Figure 10 depicts an increase in

city water make-up to the steam system of approximately 68% for the current quarter.

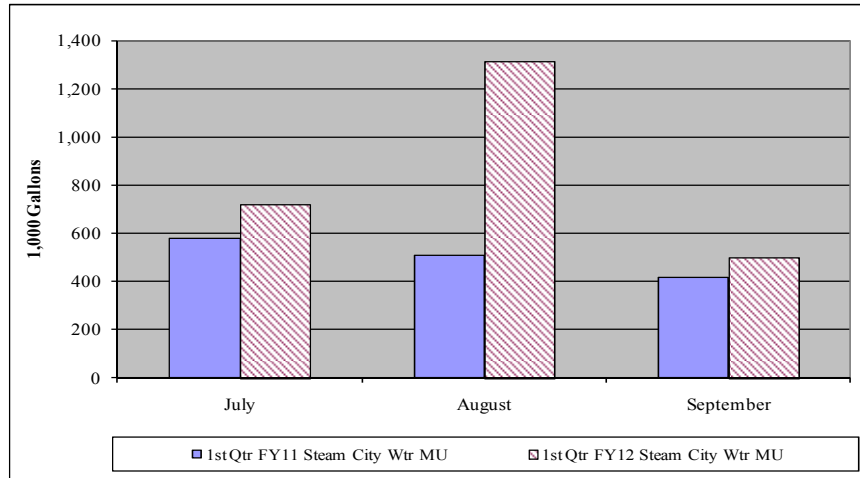


Figure 10. First Quarter FY12 Steam System City Water Make-up Comparison

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 CE, the System Performance Guarantee levels as described in the ARMA are being achieved satisfactorily.

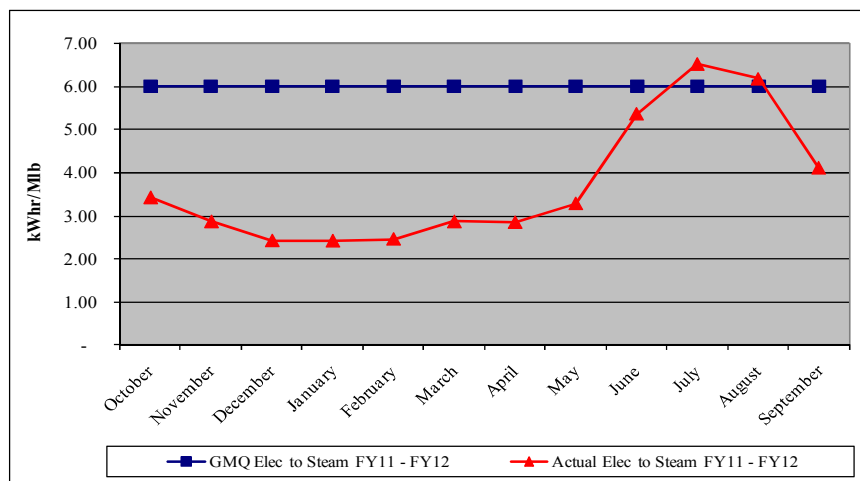


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

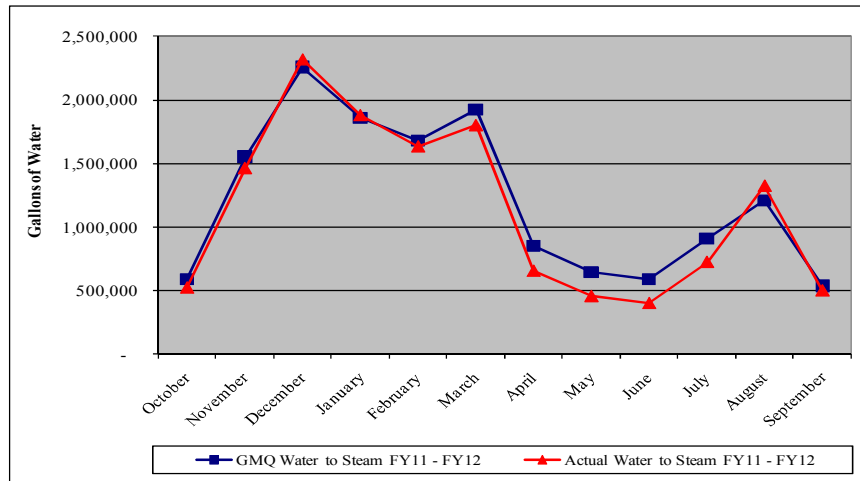


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

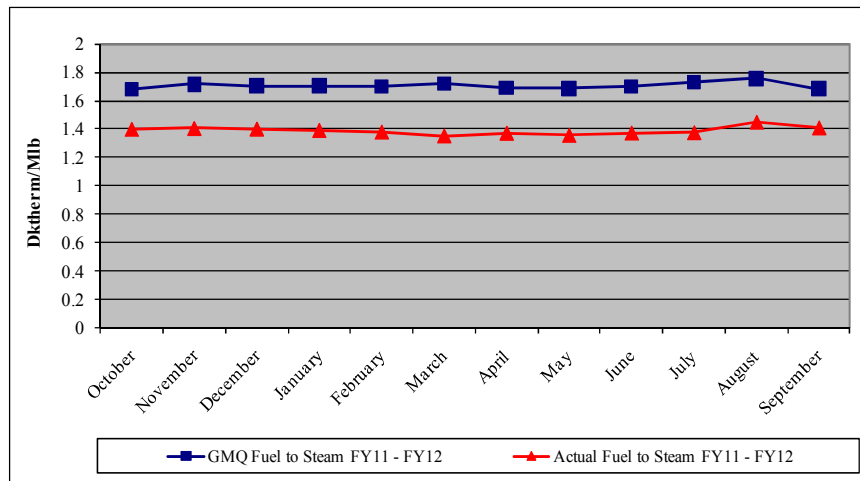


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 5.7% increase in the steam plant electric consumption while experiencing a 19.8% decrease in the electric conversion factor. The water consumption for the steam plant increased 68% this quarter as compared to the previous First Quarter. The fuel consumption per unit of steam sales is relatively constant throughout the year and when compared to the historic data. The boiler plant fuel efficiency increased 2.8% for the current 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 First Quarter

comparison of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. First Quarter FY12 Production, Sales and Consumption Summary

Item	Unit	First Quarter FY12	First Quarter FY11	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	17,747,178	18,685,728	-5.02%
Chilled Water	kWhrs	17,603,053	18,548,153	-5.10%
Steam	kWhrs	144,125	137,575	4.76%
Total Water Use	kgal	44,352	45,358	-2.22%
Total Chilled Water	kgal	41,828	43,855	-4.62%
EDS Make-up	kgal	2,192	1,128	94.33%
Cooling Towers	kgal	39,636	42,727	-7.23%
Calc CT Evaporation	kgal	34,138	36,533	-6.56%
CT Blowdown	kgal	5,498	6,194	-11.24%
Calc # Cycles		6.21	5.90	5.27%
Steam	kgal	2,524	1,503	67.93%
Total Fuel Use	mmBTU	62,017	51,505	20.41%
Natural Gas	mmBTU	62,017	51,505	20.41%
Propane	mmBTU	0	0	n.a.
Condensate Return	kgal	3,071	2,847	7.88%
	lbs	25,049,878	23,220,521	7.88%
Avg Temp	°F	173.0	179.3	-3.53%
Sendout				
Chilled Water	tonhrs	22,673,200	24,456,900	-7.29%
Steam	lbs	43,937,000	37,522,000	17.10%
Peak CHW Demand	tons	16,411	16,700	-1.73%
Peak Steam Demand	lb/hr	43,625	37,938	14.99%
CHW LF		62.57%	66.33%	-5.66%
Steam LF		45.61%	44.79%	1.83%
Sales				
Chilled Water	tonhrs	20,459,896	21,386,379	-4.33%
Steam	lbs	26,855,788	20,560,619	30.62%
Losses				
Chilled Water	tonhrs	2,213,304	3,070,521	-27.92%
Steam	lbs	17,081,212	16,961,381	0.71%
		38.88%	45.20%	-14.00%
Degree Days				
CDD		1,214	1,344	-9.67%
HDD		32	7	357.14%

*positive percent difference values imply an increase from FY11 to FY12

Table 2. First Quarter FY12 Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	First Quarter FY12	First Quarter FY11	* Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	5.37	6.69	-19.80%
GMQ Plant Efficiency	Dth/Mlb	1.724	1.707	
Plant Efficiency	Dth/Mlb	1.411	1.373	2.83%
Actual %CR		57.01%	61.89%	-7.87%
Avg CR Temp	°F	173	179	-3.53%
GMQ Water Conversion	gal	2,663,142	2,016,553	
Water Conversion	gal	2,549,240	1,518,030	67.93%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.860	0.867	-0.80%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.04	2.05	-0.30%

*positive percent difference values imply an increase from FY11 to FY12

D. Operating Costs

The operating costs for the DES include the management fee to CE, debt service payments on the bonds and engineering and administration costs. 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, in part, due to the remaining capacity at the EGF that was included in the original construction and remains unsold. This capacity is available for potential future customers.

The system operating costs for FY12 to date are \$4,645,685. This value represents approximately 22.4% of the total budgeted operating cost for FY12 and include expenses to date that have been invoiced but were not paid at the time of this report. Additional invoices are that would be charged to the First 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 FY12 are \$4,673,685 which is approximately 25.4% of the budgeted amount. The MFA

transferred to date for the First Quarter FY12 is \$590,750 (25% of budget). However, the actual MFA required cannot be calculated due to the outstanding invoices.

Table 3. DES Expenses and Revenues to Date

Item		FY12 Budget	First Quarter Expenses	% of Budget
Operating Management Fee				
FOC: Basic		\$ 4,123,000	\$ 1,017,034.26	24.67%
9th Chiller		\$ 38,300	\$ 9,529.74	24.88%
C/O 6A		\$ 75,600	\$ 18,814.74	24.89%
C/O 6B		\$ 66,200	\$ 16,471.41	24.88%
Pass-thru Charges: Chemical Treatment		\$ 186,600	\$ 17,018.05	9.12%
Insurance		\$ 28,500	\$ -	0.00%
Marketing: CES Sales Activity		\$ -	\$ -	n.a.
Incentive Payments		\$ -	\$ -	n.a.
FEA: Steam		\$ -	\$ 12,506.87	n.a.
Chilled Water		\$ -	\$ 151,805.21	n.a.
Misc: Metro Credit		\$ -	\$ (183,311.41)	n.a.
ARFA		\$ -	\$ 14,770.83	n.a.
Deferral		\$ -	\$ -	n.a.
Subtotal - Man Fee =		\$ 4,518,200	\$ 1,074,640	23.78%
Reimbursed Management Fee + Chem Treatment			\$ 428,753.46	0.00%
Metro Costs				
Pass-thru Charges: Engineering		\$ 27,000	\$ 10,398.14	38.51%
EDS R&I Transfers		\$ 254,500	\$ 63,624.99	25.00%
Metro Marketing		\$ 15,500	\$ -	0.00%
Project Administration		\$ 30,700	\$ -	0.00%
Metro Incremental Cost		\$ 488,600	\$ 123,322.42	26.50%
Utility Costs: Water/Sewer		\$ 597,700	\$ 167,065.58	27.95%
EDS Water/Sewer		\$ -	\$ 13.34	n.a.
EDS Electricity		\$ -	\$ 16,245.83	n.a.
Electricity		\$ 5,192,900	\$ 1,956,010.36	37.67%
Natural Gas Consultant		\$ 92,700	\$ 4,357.50	4.70%
Natural Gas Transport		\$ -	\$ 34,677.26	n.a.
Natural Gas Fuel		\$ 3,846,600	\$ 282,156.22	7.34%
Propane		\$ -	\$ -	n.a.
Subtotal - Metro Costs =		\$ 10,546,200	\$ 2,657,872	25.26%
Subtotal - Operations =		\$ 15,064,400	\$ 3,732,511	24.82%
Debt Service				
2002 Bonds		\$ 4,377,100	\$ 926,092.32	21.16%
2005 Bonds		\$ 306,200	\$ -	0.00%
2007 Bonds		\$ 227,800	\$ -	0.00%
2008 Bonds		\$ 220,500	\$ -	0.00%
2010 Bonds		\$ 682,100	\$ -	0.00%
Interest Revenue		\$ (110,000)	\$ (12,918.75)	11.74%
MIP		\$ -	\$ -	n.a.
Oper. Reserve Fund		\$ -	\$ -	n.a.
Subtotal - Capital =		\$ 5,703,700	\$ 913,174	16.01%
Total =		\$ 20,768,100	\$ 4,645,685	22.40%
Customer Revenues				
Taxes Collected			\$ 95,295.87	n.a.
Taxes Paid			\$ 91,791.58	n.a.
Penalty Revenues			\$ 9,312.86	n.a.
Energy Revenues Collected			\$ 4,660,810.82	n.a.
Revenues =		\$ 18,405,100	\$ 4,673,627.97	25.39%
Metro Funding Amount =		\$ 2,363,000	\$ (27,943)	-0.92%

The DES serves 26 customers and 40 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	\$ 1,386,482	7,958,441	\$ 0.1742	\$ 304,915	8,150	\$ 37.4134
State Government	\$ 1,117,553	6,019,567	\$ 0.1857	\$ 392,958	8,835	\$ 44.4797
Metro Government	\$ 1,089,291	6,481,888	\$ 0.1681	\$ 369,612	9,871	\$ 37.4428
New Customers	\$ 480,815	2,850,369	\$ 0.1687	\$ 50,805	1,506	\$ 33.7391
Total	\$ 3,593,326	20,459,896	\$ 0.1756	\$ 1,067,485	26,856	\$ 39.7488

Total Revenue	\$ 4,660,811
True-up and Adjustments	\$ 12,817
Net Revenue	\$ 4,673,628

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CE for FY12. Communication between TEG and CE continues to be excellent, and CE 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.

- An excursion occurred in the chilled water system during the cooling tower testing in July. As the condensing water flow rate was being throttled to achieve a specific flow rate, several chillers tripped offline but restarted immediately.
- Other minor occurrences of higher than normal chilled water supply temperatures are included in the Monthly Operational Reports from CE.

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 First

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 Blood-borne Pathogens, CPR and First Aid Training and Confined Space Entry Training.

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. CE filled a previously open position for Stationary Engineer (SE-2) during the quarter.

E. Training

Staff training for this quarter consisted of the Health and Safety training discussed previously.

F. Water Treatment

The water treatment program consists of regular testing and monitoring of the water chemistry in the steam, chilled water and condensing water systems. Chemicals are added to control the water hardness, chlorine levels and biologicals. 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 steam and condensate system had excellent chemistry for most of the quarter.
 - High hardness levels in the condensate return for July and August required placing the condensate to drain for most of the period. Condensate return levels returned to normal (78% return) during September.
- Condensing Water System
 - The conductivity of the condensing water continues to be normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - The control of the system chemistry continues to be excellent.

G. Maintenance and EGF Repairs

CE 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 cooling tower suction strainers and balancing boxes were periodically cleaned during the quarter due to insects.
- The chilled water line above the women's restroom was repaired in July.
- The boiler O2 analyzers were calibrated during the quarter for all of the boilers.
- Other minor repairs and maintenance were made during the quarter and are listed in the monthly reports issued by CE.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on September 27, 2011, 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.

- Numerous housekeeping items were observed as needing attention. These include:
 - Light fixture lenses are being stored on the cooling tower deck;
 - Cob webs have returned and are abundant throughout the plant and on the equipment;
 - Desks, empty boxes and ceiling tiles are being stored in the electric room;
 - A light fixture is in need of repair on the chiller plant operating floor;
 - Wheel marks, scuffs and dirt are scattered throughout the EGF lobby and hallway;
 - Standing water was present on the chiller plant operating floor and around the chilled water pumps;
- The wooden platform that was constructed in order to make repairs on the expansion tank bladder should be removed by CE personnel. This item has been noted in several of the previous walk-throughs.
- No work has been completed to date on the building wall cracks and spalling. New cracks have appeared in the concrete on the west face of the EGF.

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. First Quarter FY12 Open Projects

The following projects remained open at the end of the First Quarter FY12.

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.

2. DES048 – Tunnel Lighting & Electrical Upgrades Phase III

The first two phases of this project have been completed. The final phase had been postponed pending the completion of the Tunnel Rock Rehabilitation Project (DES067). DES067 was completed during the Fourth Quarter FY11, therefore this final phase of the tunnel lighting and electrical upgrades was bid during the First Quarter of FY12 and the award and work is anticipated to begin during the second quarter FY12.

3. DES060 – Manhole & Tunnel Insulation Repair (Revised from DES050 for FY10)

The project number for this work has been updated to DES090. The Broadway, 4th Avenue and 7th Avenue Tunnel insulation that needs to be installed or repaired was bid during the First Quarter FY12. This work will be awarded and completed during the Second Quarter FY12. Work associated with this project will be ongoing as required.

4. DES061B – Manhole 3 and 4 Structural Repairs

Work began and was substantially completed for the structural repairs for Manholes 3 and 4 during the Fourth Quarter FY11. Piping insulation was completed during the First Quarter FY12 with the exception of the insulation blankets for the expansion joints. These items still have not been delivered. Once delivered, these will be installed and the job can be closed out. It is anticipated that this will occur during the Second Quarter FY12.

5. DES076 – Manhole S4A Rehabilitation

The State has completed the installation of a secondary fiber optic line to replace the fiber optics within this manhole. This project was bid during the Fourth Quarter FY11; however, there was only one bidder and the pricing was higher than expected. Therefore, this job was re-bid during the First Quarter FY12. The pricing was lower during this second bid, but it was still higher than anticipated.

The State is scheduled to review the costs and give its approval during the early portion of the Second Quarter FY12. Upon approval, this project will be released for construction. With favorable weather conditions, it is anticipated that this project will require 6 to 8 weeks to complete.

6. DES077 – Music City Center Service Connection

Work on the direct-buried piping and distribution system was completed during the quarter. Although a few punchlist items remain, a certificate of substantial completion is anticipated in the Second Quarter FY12. Start-up of the new steam and condensate lines is scheduled to occur on October 2, 2011.

Additional aspects of this project include the MCCC metering station, the cooling tower testing and the modification of the EGF chilled water pumps. The work on the MCCC metering station is subject to the schedule of the internal construction of the building. This aspect of the project is expected to be completed prior to the need of chilled water service in April 2012.

The components for the chilled water pumps and the new motors have been ordered and submittals have been approved. The new motors and pump parts are expected to be installed during the Second Quarter FY12.

The cooling tower testing at the EGF was completed in July 2011. A report was issued by McHale Performance on August 16, 2011. This report indicated that the existing cooling towers were capable of operating at only 91% of the design capacity, implying that a minimum of 17 cooling tower cells is required to reject the heat from the eight (8) chillers operating with a capacity of 20,800 tons.

7. DES080 – Misc. Manhole & Tunnel Safety Repairs

As a result of the ongoing review of the manholes and tunnels, some safety items have been noted that require attention. This project was established to address these items.

This project was bid and awarded during the First Quarter FY12. It is anticipated that this work will begin and be completed during the Second Quarter FY12.

8. DES081 – Flood Related Repairs

Repairs were completed during the First Quarter FY12 on portions of the lighting and electrical systems that were damaged during the May 2, 2010 flood in the Broadway and 4th Avenue Tunnels, and this project is now closed out.

9. DES083 – Manhole 13 Leak Repair

Punchlist items were completed on this project during the First Quarter FY12 and this project should be closed during the Second Quarter FY12.

10. DES086 – Manhole 12 Roof Replacement

Cost substantiation was approved and this project was closed out during the First Quarter FY12.

11. DES088 – Andrew Jackson Steam Tunnel PRV Control

A review of the PRV installation between TEG, CE and a prospective contractor occurred during the quarter. The bid for this work is expected in the early part of the Second Quarter FY12 with work being performed as soon as possible.

12. DES091 – Thermal Storage and NES Time of Use Rates

The evaluation of the feasibility of thermal storage is on-going.

13. DES092 – Sheraton Chilled Water Pumps

The contractor for this project has been selected and equipment is on-order. The work is anticipated to be completed during the Second Quarter FY12.

14. D ES093 – Manhole 6 Repair and Structural Rehabilitation

The traps in Manhole 6 were not functioning and there is a condensate leak in this manhole which has existed for some time. In addition, the structural steel in this manhole needs cleaning and painting. Due to the immediate need for the replacement of the traps, this project was undertaken to address the additional items which need to be repaired. Work will begin and be completed on this project during the Second Quarter FY 12.

15. DES 094 – Molloy Street Exploratory Dig

As a result of the monthly thermographic surveys, a new “hot spot” appeared just east of Manhole B2. In addition, the vent and drain of the underground steam line is emitting steam, indicating that there is a breach in the steam line’s conduit system. Due to this, this exploratory dig is being undertaken to locate and repair any breaches in the steam piping system.

B. First Quarter FY12 Closed Projects

The following projects were closed during the First Quarter FY12: DES067; DES081 and DES086.

C. Capital Projects Budget

The following table summarizes the costs and remaining balance of the DES capital projects based on reported expenditures at the end of the FY12. 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.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY12 Spending to Date	Total Spent to Date	Remaining Balance
2005B Bond Projects					
DES-061	Tunnel Steel Corrosion	\$ 250,000.00	\$ 4,718.14	\$ 68,862.09	\$ 181,137.91
Total Closed Projects		\$ 7,320,301	\$ -	\$ 7,759,672	\$ (439,371)
	Project Development	\$ 616,199	\$ -	\$ 293,328	\$ 300,944
Total 2005B Bond		\$ 8,186,500	\$ 4,718	\$ 8,143,789	\$ 42,711
2010 Bond Projects					
DES067	Tunnel Rock Repair	\$ 1,076,354	\$ 35,512	\$ 1,097,604	\$ (21,250)
DES070	MH 6 to 23 Cond Line	\$ 250,000	\$ -	\$ 527	\$ 249,473
DES071	Hermitage Hotel Ser Modifications	\$ 125,000	\$ -	\$ 1,119	\$ 123,881
DES072	Sheraton Stm & Cond Line	\$ 250,000	\$ 4,563	\$ 5,364	\$ 244,636
DES076	MH S4A Rehabilitation	\$ 50,000	\$ 3,827	\$ 17,321	\$ 32,679
DES088	AJ/State Tunnel Steam PRV Air Control	\$ 25,000	\$ 267	\$ 267	\$ 24,733
DES091	NES Time of Use Electric Rate	\$ 50,000	\$ 14,076	\$ 44,452	\$ 5,548
DES092	Sheraton CHW Pumps	\$ 56,750	\$ 1,465	\$ 1,632	\$ 55,118
Total Closed Projects		\$ 495,000	\$ 33	\$ 349,191	\$ 145,809
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 31,896	\$ -	\$ -	\$ 31,896
Total 2010 Bond		\$ 2,410,000	\$ 59,744	\$ 1,521,394	\$ 888,606
MCCC Construction Fund					
DES077	Music City Convention Center Design/Const	\$ 325,900	\$ 19,261	\$ 311,454	\$ 14,446
DES077	MH-B4 Valve Replacement	\$ 8,000	\$ -	\$ 7,119	\$ 881
DES077	MCCC Metering	\$ 121,870	\$ -	\$ -	\$ 121,870
DES077	EGF Cooling Tower Testing	\$ 47,884	\$ -	\$ -	\$ 47,884
DES077	EGF Chilled Water Pumps	\$ 598,672	\$ -	\$ -	\$ 598,672
DES077	Bell/Clark Construction Fund	\$ 4,697,860	\$ 362,406	\$ 3,919,442	\$ 778,418
	Metro Project Admin	\$ -	\$ -	\$ -	\$ -
	Project Man, Development, etc	\$ 2,699,814	\$ -	\$ -	\$ 2,699,814
Total MCCC Construction Fund		\$ 8,500,000	\$ 381,667	\$ 4,238,015	\$ 4,261,985

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

Several EDS repairs and improvements were made during the First 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 \$503,215. Table 6 provides a summary of the FY11 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 FY11						\$ -	\$ 403,653.04	\$ 403,653.04
DES Repair And Improvements, for billing period of (7/3/11 - 7/30/11)	8/8/2011	DES-1384	TEG	\$ 6,452.15				
ADJUSTMENT FROM 2010 BOND	7/31/2011	N/A	N/A	\$ (89,912.00)				
ADJUSTMENT FROM 2010 BOND	7/31/2011	N/A	N/A	\$ (35,478.66)				
DES Repair And Improvements, for July 2011	8/9/2011	N/A	CE	\$ 1,282.76				
TEG August Invoice	9/13/2011	N/A	TEG	\$ 4,246.12				
CE; DES Proj;DES-086 MH	9/16/2011	N/A	CE	\$ 66,589.48				
CE; 401 Union bldg Strm	9/16/2011	N/A	CE	\$ 6,924.45				
CE;DES CES Mgmt Fees July	9/16/2011	N/A	CE	\$ 2,100.39				
DES R&I 8/28-10/1/11	10/6/2011	N/A	TEG	\$ 1,858.63				
			Sub-Total First Quarter	\$ (35,936.68)	\$ 63,624.99	\$ -	\$ 99,561.67	\$ 99,561.67
			Sub-Total Second Quarter	\$ -	\$ -	\$ -	\$ -	\$ -
			Sub-Total Third Quarter	\$ -	\$ -	\$ -	\$ -	\$ -
			Sub-Total Fourth Quarter	\$ -	\$ -	\$ -	\$ -	\$ -
			FY12 Year to Date	\$ (35,936.68)	\$ 63,624.99	\$ -	\$503,214.71	\$ 503,214.71

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. A more detailed review of the condition of the EDS is presented in sub-section D of this report, "EDS Walk-through."

1. EDS Tunnel and Manhole Inspections
 - a. MH-B2 continues to require frequent pumping due to the infiltration of water.
 - b. New aluminum grating was installed at the access/ventilation shaft at MH-23 during August.
 - c. Minor repairs were made during the quarter.
2. State Tunnel Inspections
 - a. CE continues to monitor some steam and condensate leaks within the tunnel.
 - b. The tunnel radio system is continues to be non-operational. State personnel have been notified.
 - c. Other minor repairs were made during the quarter.

3. Other EDS Inspections
 - a. The monthly thermographic analyses revealed a new hot spot on Molloy St north of XO Communications and near MH-B2.
 - b. Other minor items are included in the CE monthly reports.

C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walk-through

The primary EDS walkthrough was conducted on September 21, 23 and 27, 2011, by Jon Belcher, PE with TEG. The structures visited included Manholes 1, 2, 3, 4, 5, 6, 9, 10, 11, 13, 18A, D and Manhole D Sump. The following comments and observations are a result of these visits.

1. Manhole 1
 - a. There was no water in this manhole.
 - b. There is some spalling of the concrete walls and ceiling; these areas have worsened since the last review approximately 1 year ago. TEG is developing a methodology for this vault to be repaired under the annual R&I budget.
 - c. Some of the anchor bolts which hold the access ladder to the wall are loose or absent. This presents a potential safety hazard and these anchor bolts need to be repaired or replaced as soon as possible. In addition, the lower portion of the ladder is badly corroded and should be replaced, or if easier, the entire ladder should be replaced.
 - d. Portions of the existing structural steel that was cleaned and painted approximately 1 year ago require some touch-up.
 - e. The branch steam piping which once served Washington Square includes a flanged gate valve. This valve's flange has numerous injection points indicating that the flange has leaked in the past. During the next system shut-down, this valve should be replaced and installed with a welded cap to avoid a potential emergency shut down in the future.
2. Manhole 2
 - a. There was a large amount of water present in this manhole, and it required pumping before entry.
 - b. The manhole was extremely hot. The asphalt surrounding the two manways is soft and depressed due to the high heat and traffic loads. It was discovered upon entry that the groundwater accumulation in the manhole had been deep enough to contact the

steam piping and cause boiling of the groundwater. This is one reason that this manhole remains so hot. TEG is investigating a method to try and prevent the infiltration of groundwater into the manhole. The soft asphalt surrounding the manways should be monitored.

- c. The structural steel in this manhole was replaced and then cleaned and painted approximately 1 year ago. Because of the high heat and boiling groundwater, much of this paint is now damaged and needs to be cleaned and re-painted. TEG is investigating high temperature, submersible paints/coatings to be used in this application.
- d. There is a small leak on the steam expansion joint in this manhole. This leak should be monitored and repaired as soon as possible.
- e. There is some debris in this manhole which should be removed.
- f. There are areas of the walls and roof where concrete has fallen off due to spalling. These areas have worsened since the last quarterly inspection one year ago. TEG is working on a methodology to make repairs to this concrete.
- g. There is an appreciable amount of mud in the manhole floor which should be removed.
- h. The entry ladder has experienced some severe corrosion and probably will be unsafe to use within the next year. This ladder should be replaced.
- i. The slip joint insulation blankets have deteriorated and will probably require replacement within the next year; the insulation blankets' condition should be monitored.

3. Manhole 3

- a. There was water present in this manhole, and it required pumping before entry.
- b. The main steam valve is leaking; the source of this leak should be investigated, and the leak should be repaired.
- c. The steam trap was not functioning; after tapping on the strainer upstream of the trap, the trap began to function. The strainers upstream of steam traps should be blown down on a regular basis to remove any accumulated scale or deposits which could cause plugging.

4. Manhole 4

- a. There was water present in this manhole, and it required pumping before entry.
- b. There are still some outstanding punchlist items that need to be addressed from DES061B. This includes the installation of some insulation blankets and grouting.

5. Manhole 5
 - a. There was water present in this manhole, and it required pumping before entry.
 - b. The bottom of the entry ladder is corroded badly. The bottom section of the ladder can be removed without adversely impacting ingress or regress, and its removal would slow the mitigation of rust and corrosion on the ladder. The bottom rung and associated side-rails of the ladder should be removed.

6. Manhole 6
 - a. There was water present in this manhole, and it required pumping before entry.
 - b. The steel structural components in the manhole need to be cleaned of all rust and painted to prevent further corrosion. Some portions of the vertical C channel components probably will require re-reinforcement. The entry ladder is badly corroded and should be replaced. This manhole is a “High” priority on the “MH & Tunnel Structural Corrosion Prevention/Repair” project list and a contract for this work should be let within the next month or two.
 - c. There is a leak at a condensate piping flange connection between the steel piping in the manhole and the ductile piping penetrating the north manhole wall that should be repaired.
 - d. There is some spalling of the manhole’s concrete wall. TEG is developing a methodology for this to be repaired under the annual R&I budget.
 - e. The two steam traps are not functioning; these traps need to be repaired or replaced.
 - f. The trap piping becomes submerged due to the infiltration of ground and surface water. Due to the repeated presence of this water, the valves in the trap piping are in very poor condition and two of the valves’ hand-wheels have corroded and fallen off; two other trap piping valves are leaking. The trap piping needs to be replaced along with the installation of new traps and valves. The trap piping needs to be re-configured to have the traps higher in the manhole to prevent them from being submerged when groundwater enters the manhole.
 - g. The condensate piping includes an isolation valve which is badly corroded; this valve should be replaced at the earliest opportunity.
 - h. There is some damaged and missing piping insulation; this insulation should be repaired or replaced when the trap piping is repaired.

7. Manhole 9
 - a. The manhole is in good condition.

- b. The paint on the base plates of some of the piping supports has begun to flake off. These places should be cleaned, prepped and re-painted.
 - c. The trap in this manhole was “blowing through”. This trap should be replaced as soon as possible.
 - d. There has been some water seepage around the linkseals for the water line which passes through this manhole. The linkseals should be adjusted as required to eliminate this seepage.
8. Manhole 10
- a. There was some water present in this manhole, and it required pumping before entry.
 - b. The steel structural components in the manhole need to be cleaned of all rust and painted to prevent further corrosion. This manhole is a “Moderate” priority on the “MH & Tunnel Structural Corrosion Prevention/Repair” project list.
 - c. The concrete in the manhole is in very poor condition; there is cracking and spalling of the existing concrete which requires immediate attention. TEG is developing a methodology for this item to be repaired under the annual R&I budget.
 - d. Provisions have been made to install an electric sump pump in this manhole using power from St. Mary’s Church. TEG will pursue this option by talking with St. Mary’s Church.
9. Manhole 11
- a. There was a small amount of water in this manhole which required pumping before entry.
 - b. The trap in this manhole was “blowing through”. This trap should be repaired or replaced.
 - c. The entry ladder consists of individual ladder rungs embedded into the concrete walls. This type of ladder rung can fail without warning and could result in personal injury. These rungs should be removed from the walls and a new ladder installed.
10. Manhole 13
- a. There was water present in this manhole, and it required pumping before entry.
 - b. There is a small condensate leak at a flanged joint that should be repaired. The flanges should be removed and replaced with a piping spool piece to eliminate the flanges.
 - c. The insulation at the very bottom of the dripleg is damaged due to groundwater infiltration. This insulation should be repaired.
 - d. The teflon pads on the kicker slide plates have fallen out of place. During the next shut-down of this section of piping, these pads

- should be re-positioned and a method devised to keep them in their proper position.
- e. The bottom of the entry ladder has begun to corrode; this should be monitored and repaired/replaced when necessary.
 - f. There are several locations where concrete has spalled from the ceiling and concrete beams in the manhole and should be repaired as soon as possible. TEG is developing a methodology for this to be repaired under the annual R&I budget.
11. Manhole 18A
- a. There was water present in the manhole and was pumped prior to entry.
 - b. There is some very minor corrosion on the structural metal components in this manhole. This corrosion should be wire brushed, cleaned and painted to prevent its propagation.
12. Manhole D
- a. There was water present in the manhole and was pumped prior to entry.
 - b. All of the steel structural components in the manhole need to be cleaned of all rust and painted to prevent further corrosion. Some corrosion is severe. This manhole is a “High” priority on the “MH & Tunnel Structural Corrosion Prevention/Repair” project list and a contract for this work should be let within the next month or two.
 - c. There is some minor concrete spalling within this manhole. These areas should be repaired to prevent any further deterioration. TEG is developing a methodology for this to be repaired under the annual R&I budget.
 - d. There is some minor piping insulation damage in this manhole. There is no immediate need to make repairs at this time.
 - e. Water hammer has been reported in prior manhole review reports for this manhole. Water hammer is still present in the manhole and appears to coincide with the discharge of the trap station in the manhole. The trap should be checked to make sure it is functioning properly. If it is functioning properly, a sparge station may need to be added to this manhole in order to reduce or eliminate this hammering.
13. Manhole D Sump
- a. The platform used to service the sump pump is nonexistent and the existing ladder is severely corroded. A new platform and ladder has been designed and a contract has been awarded for their installation.

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 26 customers, comprised of 40 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 CE in an excellent and professional manner.

A. Marketing

TEG and Metro DES continue to monitor and remain involved with the progress associated with the development of the new Music City Convention Center (MCCC). Construction on the direct-buried distribution system expansion for this project, which began in the First Quarter FY11, is now completed.

DES has been in contact with two additional entities requesting information on connecting to the system. These potential customers are proposed hotels to be located on Molloy St. TEG has been in communication with these entities to address both technical and economic concerns they have.

B. Customer Interaction

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

- Several customers reported issues with either their in-building heating or cooling systems. These issues were addressed by the CE customer service representative (CSR). In most cases, the issues related to failed customer equipment or the improper control of the building system.
- CE informed the building personnel at Tennessee Tower that their steam safety relief valve was lifting in July. Building personnel indicated they would address this issue.
- The Renaissance Office Tower installed new VFD's on their circulation pumps during July. The CE CSR assisted the contractor and the building personnel in re-starting the pumps.
- A meeting was held between the Schermerhorn Symphony, TEG, CE and the Symphony's engineer (IC Thomasson) to discuss the operation of the building's chilled water system.
- Other minor issues and customer interactions are noted in the monthly CE reports.

VII. Recommendations

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

- The repair of the cracks in the west wall of the EGF and the repair of the flashing in this area, as noted in previous reports, should be addressed. No work has been performed on this topic to date.
- Chilled water customer should be notified not to use DES chilled water to re-fill their buildings after draining.
- Safety items noted in the EDS Walk-through are being addressed under the current project DES080.
- Steam traps noted as not functioning should be repaired or replaced as soon as possible.
- Leaks noted in the EDS walk through should be repaired.
- Structural components requiring cleaning and painting noted in the EDS walk through should be addressed.
- Insulation which is absent, or in disrepair, in the manholes should be addressed through either additional capital projects, which include work within these manholes, or through DES090.