Metro Nashville
DISTRICT ENERGY SYSTEM

Operations Monitoring Report
Third Quarter FY08

Prepared by:

THERMAL ENGINEERING GROUP, INC.
P.O. BOX 290 * HENDERSONVILLE, TN 37075

Thermal Engineering Group, Inc.
105 Hazel Path Court, Ste 2
Hendersonville, TN 37075

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I. Executive Summary

A review of the fiscal year 2008 (FY08) Third Quarter performance and contract obligations between Nashville District Energy, LLC (CNDE) and the Metropolitan Government of Nashville and Davidson County (Metro) is presented in this report by Thermal Engineering Group, Inc (TEG). The status of and available funds for all active capital construction and repair and improvement projects are presented.

For the Third Quarter FY08, the chilled water sendout decreased by approximately 11% over the previous Third Quarter (FY07), and the sales decreased by approximately 12%. The number of cooling degree days decreased substantially over the same periods. The peak chilled water demand for the current quarter is 9,800 tons with a cooling load factor for the quarter of approximately 48.2%.

The steam sendout is approximately 2% lower this quarter than the previous Third Quarter, and steam sales are down by approximately 1.9%. There were approximately 12% more heating degree days in the current quarter. Steam system losses were approximately 12% of the sendout which approximated the ratio from the previous Third Quarter. The peak steam demand for the current quarter is 122,531 pounds per hour, which represents a negligible increase from the previous Third Quarter. The heating load factor for the quarter is approximately 54%, which is a decrease of approximately 3.2% from the previous Third Quarter.

The EGF performance continues to surpass the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water and steam plant electric consumptions continue to perform considerably lower than the guaranteed levels. The steam plant fuel efficiency improved approximately 5.3% from the previous Third Quarter. The total water consumption for the steam and chilled water plants has decreased approximately 42% from the previous Third Quarter due to the extensive repairs to the chilled water and condensate return systems.

Work continued on DES Capital Projects during the Third Quarter of FY08. Final modifications to both remaining metering projects (DES 021 & 022) continued during the Third Quarter FY08. There is one FY07 project which remains open (DES 036: 4th Ave Vent Fan). This project has been bid and is currently awaiting award. Two additional FY08 Capital Project designs were completed and bid during the Third Quarter with construction work planned to begin during the Fourth Quarter. Two more FY08 Capital Project designs should be completed during the Fourth Quarter and should be bid during the same quarter. Repair and Improvements to the EDS continue as scheduled.

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II. Energy Distribution System Sales and Performance

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.

A. Chilled Water

1. Sales and Sendout

A comparison for the Third 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. The decrease in sales may be largely attributed to a considerable decrease in the number of cooling degree days for the quarter.

The peak chilled water demand for the current quarter is 9,800 tons occurring during the month of January. The cooling load factor for the current quarter, relative to sendout, is approximately 48% as compared to 41% for the previous Third Quarter.

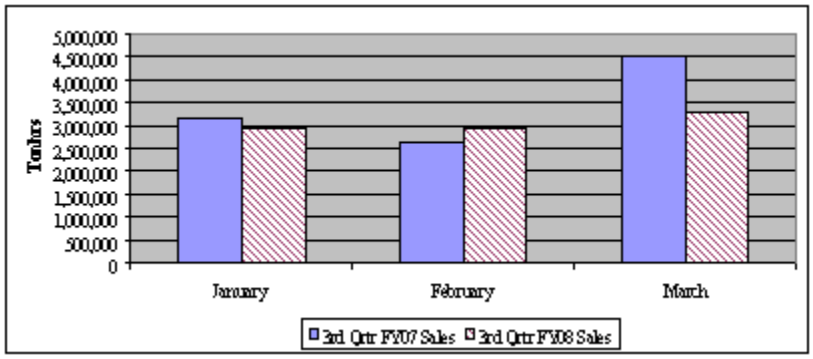

Figure 1. Third Quarter Sales Comparison

Figure 2 shows the chilled water sales, sendout and losses for the 2008 fiscal year to date. 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.

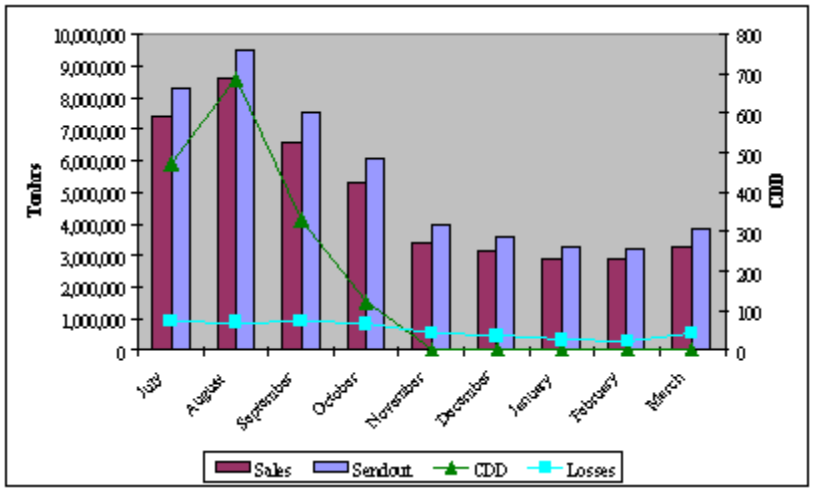

Figure 2. FY08 Chilled Water Sales, Sendout and Losses

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the Third Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales. The energy loss is caused by a combination of the loss in the mass of chilled water and a net heat gain into the chilled water piping. The increase in supply temperature between the EGF and the customers is typically less than 1˚F.

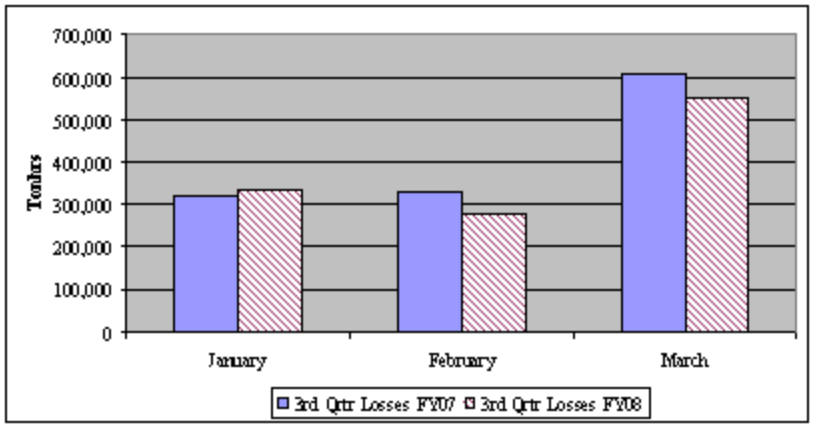

Figure 3. Third Quarter Chilled Water Energy Losses

The mass loss to the EDS is reflected in the amount of city water make-up (MU) to the system. A substantial decrease in the mass loss is noted with a comparison between the Third Quarter data for FY07 and FY08. A decrease of 15% in the amount of city water make-up to the cooling towers is also present in the comparison of Third Quarter data as shown in Figure 4 and is primarily due to a decrease in chilled water sendout.

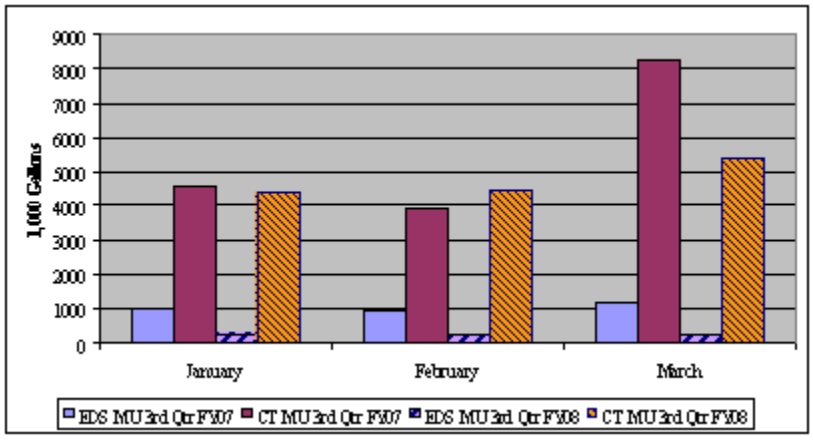

Figure 4. Third Quarter Chiller Plant City Water Make-up

In the operation of a cooling tower, the majority of make-up water required is due to the evaporation of the circulating cooling water. The balance of the make-up is due to the blow down of the tower required by the levels of concentration of particulates and other contaminants entrained in the circulating water. The ratio between the amount of make-up due to evaporation and due to blowdown is referred to as the cycles of concentration. The recorded data for this quarter suggests that the plant operated with an average of 4.9 cycles throughout the quarter. This relatively high level could be indicative of a relatively "clean" condensing water system.

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 fiscal-year-to-date. Under the management of CNDE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

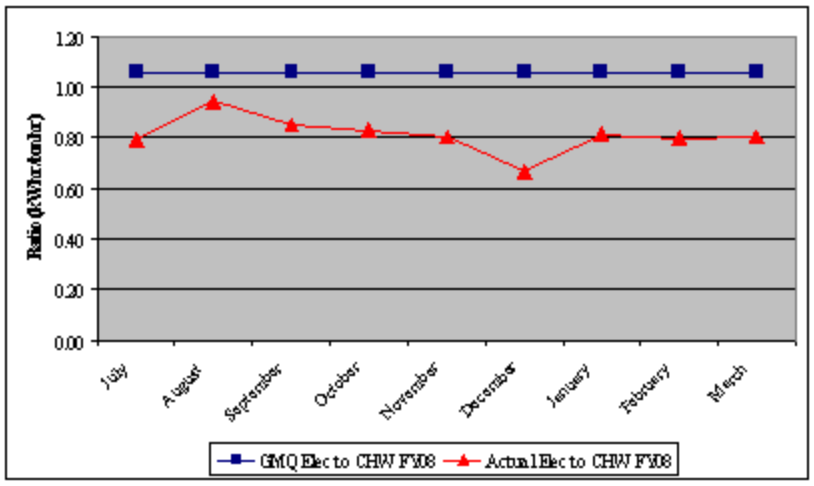

Figure 5. Chilled Water Plant Electric Performance Guarantee Comparison

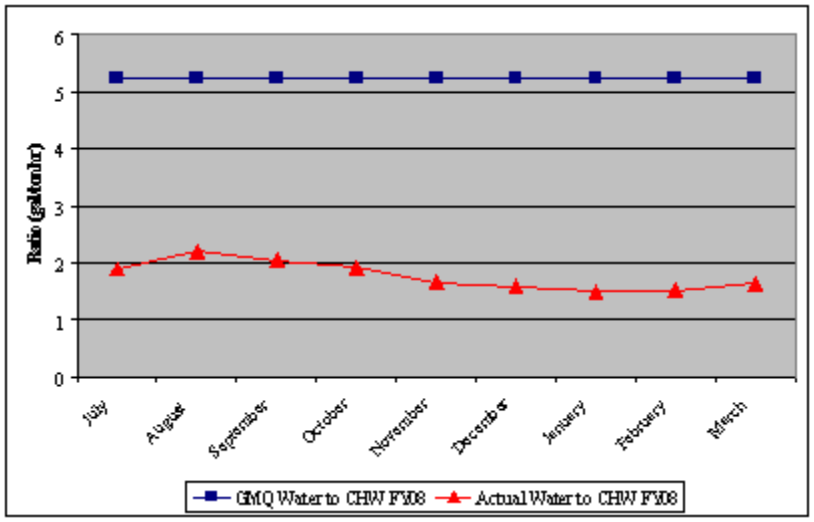

Figure 6. Chilled Water Plant Water Consumption Performance Guarantee Comparison

The chilled water allocation of the electric consumption falls under the GMQ limit of 1.055 kWhr per tonhr for the current quarter. The electric usage for the current quarter increased slightly over the Third Quarter for FY07. Also, the actual chilled water plant water conversion factor is approximately 15% less than in the Third Quarter of FY07.

B. Steam

1. Sales and Sendout

The steam sendout decreased by approximately 2% for the current quarter over the previous Third Quarter (FY07), and the sales decreased by approximately 1.9%. Steam system losses were approximately 12%, which was approximately equal to the previous Third Quarter. There were 12% more heating degree days this quarter. A comparison for the Third Quarter steam sales is shown in Figure 7.

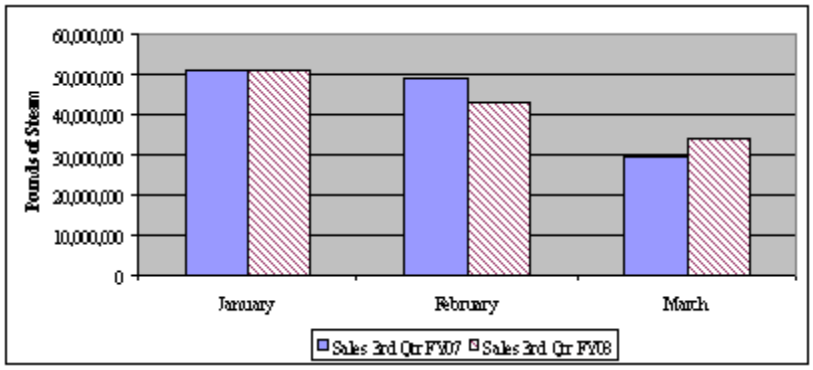

Figure 7. Third Quarter Steam Sales Comparison

Figure 8 shows the steam sales, sendout and losses for the fiscal-year-to-date. 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.

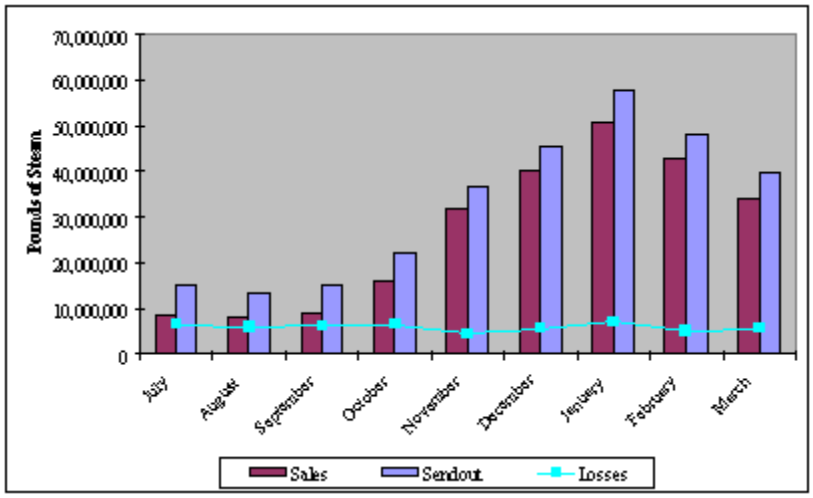

Figure 8. Steam Sales, Sendout and Losses for FY08

The peak steam demand for the current quarter is 122,531 pounds per hour, which was approximately equal to the peak demand for the previous Third Quarter. The heating load factor for the current quarter, relative to sendout, is approximately 54% and reflects an decrease in the heating load factor from the previous Third Quarter of approximately 3.2%.

A decrease in steam sales (1.9%) this quarter is noted with an increase in the number of heating degree days (12%). This phenomenon could be related to an increase in customer conservation programs that have resulted in a decrease in the amount of heating energy consumption.

2. Losses

A comparison of the total steam mass losses in the EDS for the Third 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 3% less than in FY07.

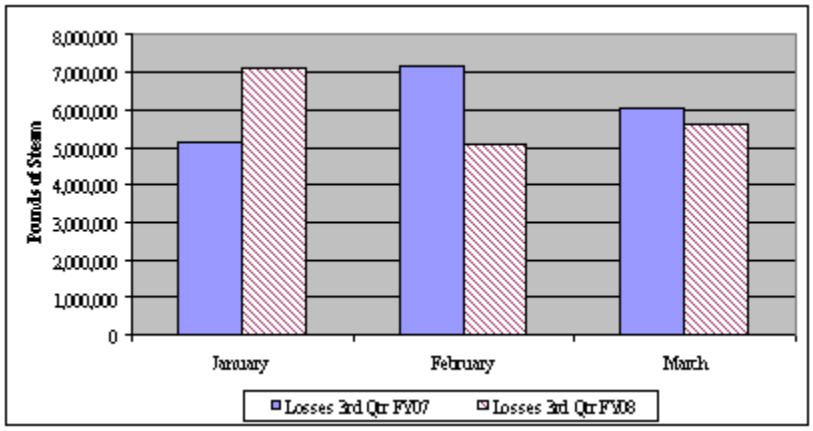

Figure 9. Third Quarter Comparison of the Steam Losses Between the EGF and the Customers

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. A considerable decrease in the mass loss is noted with a comparison between the Third Quarter data for FY07 and FY08 due largely to an increase in the amount of condensate return to the EGF. This data is shown in the comparison of Third Quarter data in Figure 10.

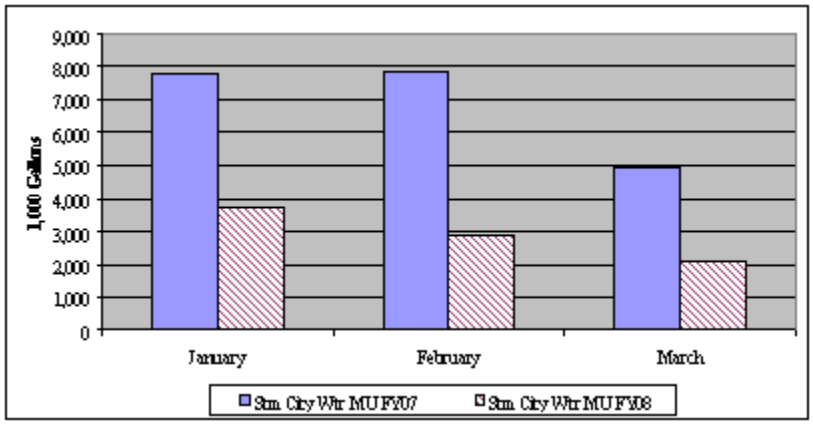

Figure 10. Steam System City Water make-up Comparison

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 CNDE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily except for excursions in the water consumptions throughout the quarter. The fuel consumptions remain below the GMQ for the quarter. The electric usage for the current quarter is approximately 1.3% greater than in the Third Quarter for FY07.

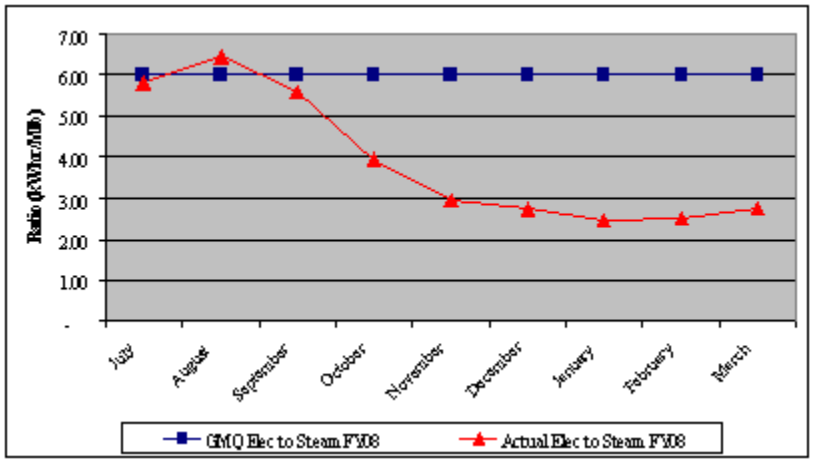

Figure 11. Steam Plant Electric Performance Guarantee Comparison

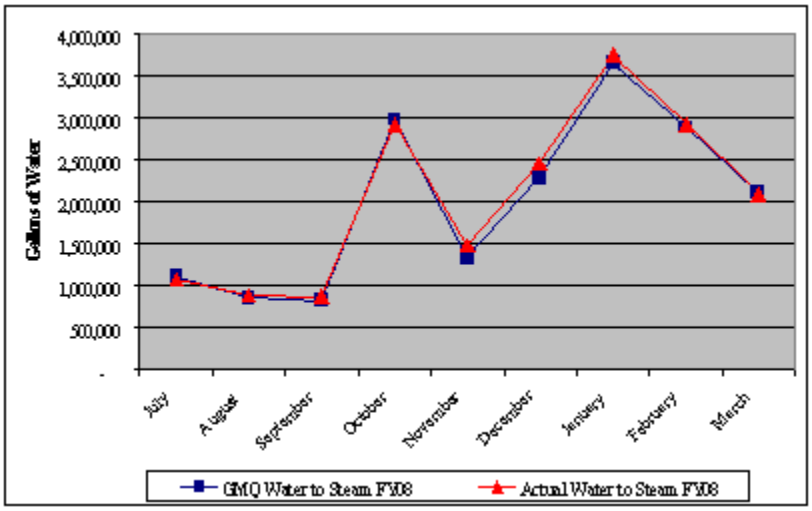

Figure 12. Steam Plant Water Consumption Performance Guarantee Comparison

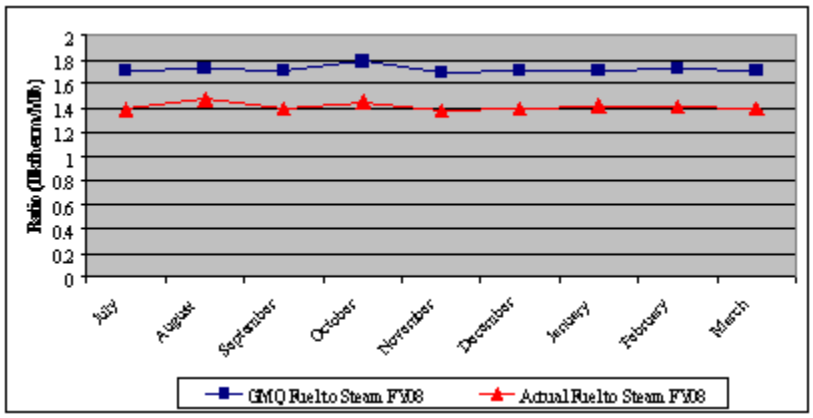

Figure 13. Steam Plant Fuel Consumption Performance Guarantee Comparison

C. Contract Guarantee Performance

The production and sales performance for the EGF and EDS are summarized in Table 1. Additional parameters, such as cooling tower blowdown and peak demands are listed in this table, as well. Table 2 presents the Third Quarter comparison of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. EGF Production and Sales Performance Comparison

	Unit	Third Quarter FY08	Third Quarter FY07	*Percent Difference
	days	91	90	1.11%
Total Electric Use	kWhrs	7,668,016	8,551,139	-10.33%
Chilled Water	kWhrs	7,342,243	8,223,891	-10.72%
Steam	kWhrs	325,773	327,248	-0.45%
Total Water Use	kgal	23,679	40,564	-41.63%
Total Chilled Water	kgal	14,999	19,973	-24.90%
EDS Make-up	kgal	776	3,184	-75.63%
Cooling Towers	kgal	14,223	16,789	-15.28%
Calc CT Evaporation	kgal	11,812	NA	NA
CT Blowdown	kgal	2,411	NA	NA
Calc # Cycles		4.90	NA	NA
Steam	kgal	8,680	20,591	-57.85%
Total Fuel Use	mmBTU	204,236	219,732	-7.05%
Natural Gas	mmBTU	203,610	219,719	-7.33%
Propane	mmBTU	626	13	N/A
Condensate Return	kgal	10,301	3	371698.04%
	lbs	84,010,149	22,596	371698.04%
Avg Temp	°F	171.7	155.0	10.75%
Sendout				
Chilled Water	tonhrs	10,316,300	11,597,300	-11.05%
Steam	lbs	145,454,000	148,275,000	-1.90%
Peak CHW Demand	tons	9,800	13,100	-25.19%
Peak Steam Demand	lb/hr	122,531	122,250	0.23%
CHW LF		48.20%	40.99%	17.60%
Steam LF		54.35%	56.15%	-3.20%
Sales				
Chilled Water	tonhrs	9,149,430	10,344,096	-11.55%
Steam	lbs	127,672,642	129,963,347	-1.76%
Losses				
Chilled Water	tonhrs	1,166,870	1,253,204	-6.89%
Steam	lbs	17,781,358	18,311,653	-2.90%
		12.22%	12.35%	-1.01%
Degree Days				
CDD		5	53	-90.57%
HDD		1,950	1,743	11.88%

*positive percent difference values imply an increase from FY07 to FY08

Table 2. GMQ Calculations and Performance Guarantees

GMQ Calculations	Unit	Thrid Quarter FY08	Thrid Quarter FY07	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	2.55	2.52	1.34%
GMQ Plant Efficiency	Dth/Mlb	1.714	1.781	
Plant Efficiency	Dth/Mlb	1.404	1.482	-5.25%
Actual %CR		57.76%	0.02%	378908.86%
Avg CR Temp	°F	172	155	10.75%
GMQ Water Conversion	gal	8,663,772	20,904,046	
Water Conversion	gal	8,766,800	20,796,910	-57.85%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.802	0.795	0.94%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	1.64	1.93	-15.10%

*positive percent difference values imply an increase from FY07 to FY08

III. EGF Operations

Items relating to the facility operations presented herein are derived from the reports issued by CNDE for the months of January, February and March 2008. Communication between TEG and CNDE continues to be excellent, and CNDE has reported and managed all EGF operations satisfactorily and according to agreement.

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. CNDE reported several disruptions in service during the quarter, but the duration of each was short and had negligible apparent effects on the customers. The reliability issues are summarized in this section.

- The chilled water system pressure dropped on January 3rd due to a leak at the Criminal Justice Center. The drop in system pressure caused the chillers and pumps to trip offline. The equipment was restarted, and the system returned to normal within approximately thirty minutes.
- During the burner tuning on January 22nd, the safety relief valve lifted on Boiler #1 causing the water level in the operating boilers to fall, and the boilers tripped offline.

The boilers were immediately restarted. The system pressure was below 150 psig for approximately one hour.

- Chiller #4 tripped offline due to a failed flow sensor on February 27. The sensor was replaced by Trane on March 3rd. Due to this failure, the supply temperature was above 43˚F for approximately thirty minutes.
- Boiler #1 tripped while testing the burner on propane causing the system pressure to drop below 150 psig for approximately one hour on February 29.
- In the early morning hours of March 7th, a flame scanner failure on Boiler #4 caused the unit to trip offline. Subsequently, Boiler #1 tripped on low water level due to water flow fluctuations. The operators immediately started Boilers #2 and #3. The header pressure was less than 150 psig for approximately one hour.
- During the upgrade of the Siemans Insight Server on March 14, Chillers #4 and #7 tripped offline due to low chilled water flow. The trip was due to the unresponsiveness of the control system in its inability to start an additional chilled water pump. The control problem was corrected immediately after the problem was recognized by Siemans. The chilled water temperature drifted above 43˚F for approximately forty-five minutes.

B. Efficiency

The operation of the EGF satisfied the guaranteed levels for all commodity usage except for the water usage to the steam plant. These values were recorded higher than the allowable level during 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. There were no employees reported to be on light duty and were no reported lost-time accidents during the quarter. Monthly safety meetings were conducted by HazMat, Inc.

D. Personnel

The EGF currently has twenty-six full time employees. There were no personnel changes 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 buildings began this quarter to monitor the concentration and distribution of the steam system chemicals.

- Steam System
  - New quills, flow switch and pump were installed in January to test the injection of sulfite into the city water supply in order to control free chlorine levels. The operation of this new system has led to a substantial decrease in the chlorine levels. The new resin for the softeners was replaced on March 31.
  - The feedwater to the boilers continues to show trace levels of hardness.
  - The effectiveness of the de-aerators was tested in March. The report for this test had not been issued by the time of this quarterly report.
  - The remote testing of the condensate at the customer buildings continues to show high iron levels at the Andrew Jackson building (State steam tunnel).
  - The amount of condensate returned to the EGF continues to increase. This condensate also shows slight increases in the amounts of iron and hardness. If this trend continues, CEPS plans to investigate and test the condensate at the customers' buildings to determine the cause of the increase.
- 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.
  - Eddy current test reports from Trane for Chillers #1, #2 and #5 are complete and no abnormalities were found. No tubes were recommended for plugging. The chiller tubes were cleaned during February.
- Chilled Water System
  - The system control and chemistry continues to be excellent.
  - CEPS reported some azole excursions for the quarter, but the system appeared to be responding to their efforts to control injection by March.

G. Maintenance and EGF Repairs

CNDE continues to report on the numerous 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 annual chiller tube cleaning was completed in February.
- The condenser heads for all nine chillers were cleaned and painted.
- Minor repairs were made on the chemical feed and monitoring system, the condensate return pumps and the boiler instrumentation.
- The cooling tower fan blades on cells 1, 4 and 6 were repaired under warranty by BAC.
- The flame scanner was replaced on Boiler #4 in March.
- Other minor items were presented in the CNDE monthly reports.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on April 8 by Kevin Jacobs, P.E. of TEG. This review involved a tour of the facility with the primary points of interest and concern noted herein.

- The seal on the feedwater pump #2 was observed leaking during the previous walk-through in January. This seal has been repaired.
- The hinges on the gate in the stair way next the EGF conference room were repaired.
- Numerous cracks in the outside concrete walls remain. No additional work has been performed on these cracks. No action is required at this time.
- The re-grading and sloping of the area at the west face of the EGF has not been completed. These repairs could help prevent further settling of the foundation and soil erosion.
- Some noise and vibration was observed at the cooling tower cells 9, 15 and 17. CEPS personnel were notified and planned on investigating the causes of the vibration. At the time of the visit, the chiller plant control system did not indicate that any cooling tower vibration switch was in alarm. The logbook did not indicate a history of vibration alarms. It is believed that the vibration may be due to some loose siding or other non-critical item.

IV. Capital Projects

The Capital Projects discussed in this section are those projects funded through the issuance of bonds by Metro. The status of scheduling of the projects are discussed, and the end of quarter cost status is also presented.

A. Third Quarter FY08 Open Projects

The following projects remained open at the end of the Third Quarter of FY08.

1. DES 021 - Customer Metering (Metro Owned)

The Work relating to this project is completed, and CNDE began operating under the terms of the ARMA on April 1, 2007. Additional work and follow-up was required at the Municipal Auditorium and was completed during this quarter.

2. DES 022 - Customer Metering (Privately Owned)

The Work relating to this project is complete, and CNDE began operating under the terms of the ARMA on April 1, 2007. Additional work was required at the Wildhorse Saloon and Ryman Auditorium. Work at the Sheraton Hotel relating to the control and operation of their de-coupled system continues and is expected to be completed during the Fourth Quarter.

3. 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. A small amount of work was reported for this project during the Third Quarter FY08. This project will remain open.

4. DES041 - Symphony Condensate Repair

The Symphony's condensate is currently being tempered with city water and discharged to the sewer system via Manhole B4. Prior to this condensate being tempered, it was reported to have damaged some sewer piping near Manhole B4 at its discharge point. Based on this situation, TEG completed a preliminary evaluation of the options available for disposal or recovery of the condensate. Based on the recovery of condensate from the Symphony and from the driplegs located in the three manholes along the route, combined with the potential damage which may occur to manhole structures due to the collection of condensate within vaults, a suitable payback exists to install a condensate return line from Manhole B4 to Manhole B. This new line will enable the recovery of the condensate from the Symphony and will also provide a means of recovery of condensate from the planned convention center.

The design of this condensate line is essentially complete awaiting confirmation of the location of a communications conduit in 1st Avenue. TEG will entertain bids in order to confirm construction estimates and pricing. The bid process for a new condensate line should be completed during the Fourth Quarter.

5. DES042 - Regions Bank Condensate Line Repair

Due to a previous failure, the condensate line between Manholes 3 and 4 was isolated, and the condensate from the steam traps in MH 4 was piped into the Regions Bank building where it was drained to the sewer. The condensate line into the Regions Bank has collapsed and is in need of replacement. Economic evaluations were performed regarding the repair of the condensate line between MH 3 and 4 to return the condensate to the EGF, however, a favorable payback does not exist. Hence, the service line to the Regions Bank building must be replaced in order to drain the condensate from the dripleg in MH 4. The design of these modifications were completed and bids were requested during the Second Quarter FY08. Bids were received early in the Third Quarter, but award of the work was delayed due to required clarifications in the proposal documents. Work should begin on this project during the Fourth Quarter.

6. DES044 - MH 5 to MH 9 Condensate Line Replacement

The condensate line between Manholes 5 and 9, located along 5th Avenue between Deaderick and Union Streets, has been isolated due to its poor condition. This segment of condensate line represents a portion of the "main condensate loop" within the downtown distribution system. The replacement of this section of the condensate return system will provide redundancy to enable the return of condensate to the plant from two directions, thus improving the reliability of the system.

As a result of additional research, the scope of this project may need to also include the repair or replacement of portions of the steam piping along this route. Therefore, the design for this project is currently on hold pending re-evaluation of the project's scope.

7. DES045 - MH 6 to MH 23 Condensate Line Replacement and the Sheraton Hotel Condensate Service Line Replacement

Thermographic imaging of the condensate line between Manholes 6 and 23, located along Union Street between 6th and 7th Avenues, indicates that the line has potential leaks. This section of the condensate main receives condensate from one customer, the Hermitage Hotel. With the condensate line between MH 5 and 9 out of service, the condensate return from the 501 Building would also be lost if the section of line between MH 6 and MH 23 were to go out of service. Because the thermographic survey only indicates one or two potential problem spots, in an attempt to avoid the replacement of all 400 feet of piping, design has been completed to perform a repair to a portion of this line. This repair work is currently being bid with pricing expected early in the Fourth Quarter with award and completion during the same quarter. If

it is determined that damage to this line is extensive, then additional design will need to take place and, in all probability, the entire 400 feet will probably need to be replaced.

8. DES046 - Ryman Auditorium Condensate Line

The condensate service line from the Ryman Auditorium to the main return line in 4th Avenue is in very poor condition. Because of the length of this service line, the return on the capital cost replacement is inadequate. Therefore, TEG evaluated the options and alternates for this project during the Third Quarter and the preferred solution is to install a tempering device at the customer to cool the condensate and then dispose of it in the city sewer system. Preliminary design has commenced on this project and will continue once a meeting with the customer to discuss this option takes place.

9. DES047 - State Steam Tunnel Condensate Line Replacement

It was previously reported that approximately 1,000 feet of the condensate line located in the State steam tunnel had been distorted due to expansion joints that are no longer functioning properly and require replacement. Upon further investigation, only approximately 400 feet of piping is actually damaged. Bidding was conducted during the Third Quarter for the replacement of this 400 feet along with the replacement of 8 expansion joints. The work for this project will be awarded in the early part of the Fourth Quarter with completion scheduled for the early part of the First Quarter of FY09.

10. DES048 - Tunnel Lighting & Electrical Upgrades Phase III

The lighting and some of the electrical system located in the Broadway, 4th Avenue and 7th Avenue distribution tunnels was in poor condition and presented a potential safety hazard to maintenance personnel. Therefore, a plan was developed to repair and replace the lighting and some electrical components in three phases over a three year period. The first two phases of this project have been completed and the final phase is budgeted and scheduled to be replaced during this fiscal year. However, the sections of the tunnel system which this third phase addresses has experienced some structural degradation. Therefore, CEPS is currently evaluating the structural aspects of these tunnel sections through a third-party contractor. Once repairs to these tunnel sections are made, this third phase of the lighting and electrical upgrades will proceed.

11. DES049 - Temporary Boiler Connection

Through the City of Nashville's evaluation of emergency planning, it was determined that there is a need to be able to supply heating to the inmates housed in the Metro Criminal Justice Center and Courthouses should the EGF be out of service for any reason. Therefore, this project includes the installation of emergency connections in an existing manhole to allow a temporary boiler to be connected to the distribution system.

The evaluation for the options and alternates for this project was completed during the Third Quarter FY08 and design is underway. This work should be bid early during the Fourth Quarter with the work being completed during the same quarter or the early portion of the First Quarter FY09.

12. DES050 - Manhole & Tunnel Insulation Repair

Insulation in several of the manholes and some portions of the tunnels is in disrepair. Not only does this present a safety hazard to personnel, but it can also cause damage to manhole equipment, components and the manhole structure itself. The required work within these manholes has been prioritized, and a standard insulation specification has been completed. The receipt of bids for the repair and replacement of insulation in the higher priority manholes began during the Third Quarter FY08 with the award of three manholes.

Manhole U has also been addressed under this project. Work at this manhole commenced during the Second Quarter to address high heat and associated pavement damage. The unexpected excavation of piping outside of the manhole was required on this vault in order to remedy these problems. Work involved with this manhole should be completed during the Fourth Quarter FY08.

The Work associated with this project will be ongoing as required.

13. DES051 - Expansion Joint Replacement - 4th Ave Tunnel

It has been determined that this project qualifies as a Repair & Improvement project and not a capital project. Therefore it has been moved to the R & I category.

14. DES052 - Wildhorse Saloon Steam & Condensate Line Replacement

The condensate service line to the Wildhorse Saloon failed during FY07. In addition, CNDE has been monitoring a "hot spot" on the steam service line for several months. After a review of the condition and type of piping system serving this customer, it is anticipated that the steam line may also require replacement in the future. TEG completed the design for these modifications and bids were solicited for this project

during the Second Quarter. Bids will be received early in the Fourth Quarter, however the pricing was prohibitive for the project to move forward as planned. Therefore, as a temporary solution, a tempering tank is currently being designed to cool the condensate in the building and then dispose of the effluent to the sewer system. Meetings with the customer have taken place, and they are receptive to this approach. It is expected that the tempering system design will be bid during the Fourth Quarter with work being completed during the First Quarter FY09.

B. Third Quarter FY 08 Closed Projects

There were no projects closed during the Third Quarter FY08.

C. Capital Projects Budget

The following table summarizes the reported expenditures and remaining balance of the DES capital projects based on reported expenditures at the end of the Third Quarter FY08. Open projects or completed projects that require some additional management are shown. Projects that were closed to date are shown with a gray highlight. The total, historic budget and expenditures of the 2002A Bond are not shown; the values shown only reflect the more recent projects and expenditures with the remaining project balance.

Table 3. Bond Project Budget Summary

	DES Project #	Description	Total Budget	Total Spent to Date	Remaining Balance
2002A Bond Projects					
	DES017	TN Tower Decoupling	$ 1,350,422.00	$ 1,277,926.14	$ 72,495.86
		Interest Earned	$ -	$ (4,772.14)	$ 4,772.14
		Total Closed Projects	$ 2,377,280.59	$ 2,377,280.59	$ -
		Total 2002A Bond	**$ 3,727,702.59**	**$ 3,650,434.59**	**$ 77,268.00**
2005B Bond Projects					
	DES020	Renaissance Decoupling	$ 538,818.00	$ 581,756.91	$ (42,938.91)
	DES004, 021, 022	Customer Metering	$ 1,676,439.40	$ 1,770,162.63	$ (93,723.23)
	DES042	Regions Cond Line Replacement	$ 320,000.00	$ 19,832.89	$ 300,167.11
	DES018	Library Connection	$ 767,151.00	$ 767,149.11	$ 1.89
	DES019	Symphony Connection	$ 2,470,924.00	$ 2,489,765.65	$ (18,841.65)
	DES027	Viridian Connection	$ 1,546,969.00	$ 1,611,435.27	$ (64,466.27)
		Project Development	$ 866,710.03	$ 315,570.26	$ 532,817.61
		Total 2005B Bond	**$ 8,187,011.43**	**$ 7,573,994.89**	**$ 613,016.54**
2007 Bond Projects					
	DES024B	MH 18 to L Steam/Cond	$ 818,206.00	$ 997,287.62	$ (179,081.62)
	DES029	Tn Tower Cond Line	$ 317,031.00	$ 339,029.99	$ (21,998.99)
	DES035	MH 5 ot MH 6 Cond Line	$ 489,688.00	$ 491,402.54	$ (1,714.54)
	DES037	JK Polk Cond Line	$ 413,123.00	$ 456,217.87	$ (43,094.87)
	DES040	Tunnel Lighting Ph II	$ 152,551.00	$ 153,074.50	$ (523.50)
	DES034	State Tunnel Communications	$ 20,500.00	$ 20,509.00	$ (9.00)
	DES038	Wachovia Cond Line	$ 83,016.00	$ 83,016.00	$ -
	DES039	2" State Cond Line	$ 80,233.00	$ 80,233.01	$ (0.01)
		Project Development	$ 484,152.00	$ -	$ 484,152.00
		Total 2007 Bond	**$ 2,858,500.00**	**$ 2,620,770.53**	**$ 237,729.47**
2008 Bond Projects					
	DES044	MH 5 to MH 9 Cond Line	$ 550,000.00	$ 4,830.55	$ 545,169.45
	DES045	MH 6 to MH 23 & Sheraton CND Lines	$ 700,000.00	$ 7,808.18	$ 692,191.82
	DES046	Ryman Auditorium Cond Line	$ 150,000.00	$ 3,107.42	$ 146,892.58
	DES047	State Steam Tunnel	$ 325,000.00	$ 1,674.00	$ 323,326.00
	DES048	Tunnel Lighting & Elec Ph III	$ 90,000.00	$ -	$ 90,000.00
	DES049	Temp Boiler Connection MH 15	$ 93,500.00	$ 486.00	$ 93,014.00
	DES050	MH & Tunnel Insul Repair	$ 100,000.00	$ 3,771.18	$ 96,228.82
		Tunnel & MH Access Mod	$ 220,000.00	$ -	$ 220,000.00
	DES052	Wildhorse Stm & Cond	$ 130,000.00	$ 23,243.53	$ 106,756.47
		Closed Projects Sub-total	$ -	$ -	$ -
		Metro Project Admin	$ -	$ -	$ -
		Project Man, Development, etc	$ 390,000.00	$ -	$ 390,000.00
		Total 2008 Bond	**$ 2,748,500.00**	**$ 486.00**	**$ 2,703,579.14**

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

Several EDS repairs and improvements were made during the Third 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 items listed herein fall outside the scope of the DES Capital Projects. The remaining value

of the R&I budget at the end of the Third Quarter FY08 is $336,744. Table 4 provides a summary of the FY08 expenditures and revenues associated with the R&I budget.

Table 4. FY08 Repair and Improvement Expenditures and Balance

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Fair Market Adjustment	Market Value	Balance
"Market Value" and "Cost Value" as end of FY07						$ 4,207	$ 277,953.63	$ 276,840.02
DES 632 Replace 6" Condensate Expansion Joint	08/15/07		CEPS	$ 16,850.00				
DES 642 MH-B2, B3, B4 and Expansion Joint Replacement	08/27/07		TEG	$ 3,732.91				
DES 661 Manhole B2,B3, B4, Expansion Joint Replacement and 4th Avenue Tunnel Vent for period of 8/5/07 - 9/1/07	09/11/07		TEG	$ 4,667.57				
MH-B2, B3, B4 and Expansion Joint Replacement	10/15/2007	DES- 681	TEG	$ 5,333.39				
Sub-Total First Quarter FY08				$ 30,583.87	$ 60,372.51	$ (390.92)	$ 29,397.72	$ 29,788.64
Manhole B2,B3, B4, and 4th Avenue Tunnel Vent for period of 9/30/07 - 11/3/07	11/17/07	DES- 704	TEG	$ 5,354.85				
Manhole B2,B3, B4, and 4th Avenue Tunnel Vent for period of 11/4/07 - 12/1/07	12/7/2007	DES- 721	TEG	$ 10,298.77				
NDES Emergency Steam Outage 10/20/07	12/21/2007	DES- 737	CEPS	$ 9,110.54				
MWS - Recovery cost for the DES Symphony Project	1/7/2008	DES- 738	MWS	$ 26,578.84				
MH-B2, B3, B4 and 4th Avenue Tunnel Vent	01/08/08	DES- 746	TEG	$ 4,419.32				
Traffic Control: 90 Peabody Street on 12/4/07 - 4.50 Hours to Music City Security	02/26/08	DES- 775	CEPS	$ 180.00				
Sub-Total Second Quarter FY08				$ 55,942.32	$ 60,372.51	$ 175.03	$ 4,605.22	$ 4,430.19
Repairs of damaged pavers at Riverfront Park	01/31/08	DES- 751	MPD	$ 9,497.00				
Repairs to MH-18, MH-K, AA Bench, Gay Street, MH-10, 13, 23 and On-line steam leak repairs	01/28/08	DES- 754	CEPS	$ 3,454.60				
Manhole B2,B3, B4, and 4th Avenue Tunnel Vent for period of 12/30/07 - 2/2/08	02/15/08	DES- 773	TEG	$ 6,102.23				
Manhole B2,B3, B4, and 4th Avenue Tunnel Vent for period of 2/3/08 - 3/1/08 (February 2008)	03/07/08	DES- 791	TEG	$ 4,365.15				
Various Manholes, Renaissance Hotel, Customers Meters, Ryman Auditorium, 7th Avenue Tunnel - various repairs	03/06/08	DES- 796	CEPS	$ 11,268.64				
Sub-Total Third Quarter FY08				$ 34,687.62	$ 60,372.51	$ (1.64)	$ 25,683.35	$ 25,685.00
insert first item fourth quarter this row								
Sub-Total Fourth Quarter FY08				$ -	$ -	$ -	$ -	$ -
FY08 Year to Date				$ 121,213.81	$ 181,117.53	$ (217.53)	$ 337,639.82	$ 336,743.74

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.

- EDS Tunnel and Manhole Inspections: Rock continues to be in need of repair in the ceilings in the tunnels under Broadway and 7th Avenues. The recommendations from the geotechnical consultant received during the Third Quarter are being reviewed. Once complete, the repair work will be prioritized and scheduled for FY09.
- State Tunnel Inspections: CNDE advises the replacement of expansion joints, valves, condensate piping and steam trap assemblies. Some of these items have now been issued for bid from various contractors.
- The determination of the energy consumptions based on monthly bills for a number of customers required reviews of their meter installations. In each case, the meters were determined to be operating properly.
- Several minor repairs were made to some of the systems within the mechanical rooms at some customer's buildings.
- The thermographic review of the EDS revealed an expansion in the "hot spots" near the Citizen's Plaza. Additional inspections of the EDS revealed other new "hot spots" near Manhole B and on Union Street near Capitol Boulevard.
- Other minor items are included in the CNDE monthly reports.

C. Emergencies

CNDE did not report any emergencies with the EDS during the quarter.

D. EDS Walk-through

TEG conducts a quarterly "walk-through" of the energy distribution system in order to help assess the overall condition of the system and also note specific areas that may require maintenance, repair or replacement. CNDE inspects all of the manholes on a monthly basis, and TEG has made arrangements to accompany CNDE during a portion of these manhole inspections once each quarter with the purpose to try and eventually visit all manholes over the course of a year.

Some of the typical items which are noted during these inspections include: the presence of water in the vaults, any type of piping or piping component leaks (such as expansion joints, flanges, valves, traps, etc.), the condition of piping wall penetration seals, condition of insulation, condition of structural components, overall condition of the manhole and any other deficiency or safety related item which requires attention.

The walk-through for the Third Quarter was conducted on April 24, 2008 by Jon Belcher, P.E. of TEG. The following comments and observations are a result of this walkthrough:

- Housekeeping
  - Generally, the manholes which were reviewed were in good order. However, Manhole K has a fair amount of debris and trash present. The remaining manholes visited were reasonably clean.

- Water Infiltration
  - Due to surface and groundwater, several of the manholes require pumping before an inspection can be conducted. This water infiltration is an on-going problem, and it is very difficult to prevent it from occurring. As a result, CNDE pumps out manholes that contain water on a monthly basis. Two of the manholes visited during this quarter had an appreciable amount of water. TEG is going to evaluate the potential installation of steam powered pumps in select manholes to try and prevent the accumulation of large amounts of water.

- Corrosion
  - Due to water infiltration, the structural piping supports, anchors, slides, etc. are oxidizing or rusting. In order to maintain the structural integrity of these piping components, a capital project has been submitted for approval in the 2009 Capital Budget to allow the removal/replacement and painting of the damaged components.

- Manhole A
  - There was an appreciable amount of water in the bottom of this vault. It took approximately 30 to 45 minutes to pump the water out. Based on water stains, it is apparent that water levels within this manhole have been as high as approximately 3 feet. TEG is going to investigate the viability associated with the installation of a steam powered pump to minimize the accumulation of water in this vault.
  - The vault entry consists of two ladders for a portion of the entry length. An extension ladder has been positioned "on top of" ladder rungs which are embedded into the concrete wall of the vault entry. The embedded ladder rungs interfere with the use of the extension ladder rungs and should be removed for safety.
  - The steam piping consists of an"L" configuration with slip type expansion joints at the end of each leg. These joints are rigidly mounted to pipe stanchions which extend to, and are bolted to the floor. In addition, the 90˚ turn has a pipe stanchion which is bolted to the floor along with two kickers at 90˚ to each other which extend horizontally from the elbow to the vault wall. This configuration does not allow the legs of the "L" configuration to expand thermally. Even though stress levels are elevated due to this, because the legs of this "L" configuration are not very long, it is not believed that any

action is required at this time to alter the support configuration. These supports should be monitored during the monthly vault inspections.

The condensate piping configuration allows for thermal growth of the legs of the "L".

- There is some slight corrosion developing on the piping supports. This vault should be included in the 2009 capital project to repair and prevent structural corrosion.
- The trap discharge piping connection to the condensate return pipe is at a 90˚ angle. This may cause erosion to the opposite wall of the condensate pipe at the injection point. This should be monitored during the monthly vault inspections.

- Manhole C
  - This manhole was inaccessible because it was partially covered with construction materials. The manhole is located within the construction zone of the new Metro bus depot. CNDE personnel spoke with a construction superintendent regarding access being maintained to this manhole. The superintendent apologized and promised a better effort to maintain this access.

- Manhole D
  - There was no water present in this manhole.
  - Water hammer was evident in this manhole. There is a trap station in this manhole, however, based on observation of this trap, it is not believed that the water hammer is originating from this trap station. The cause of this water hammer should be investigated.
  - All of the steel structural components in the vault need to be cleaned of all rust and painted to prevent further corrosion. Some corrosion is severe. This vault should be included in the 2009 capital project to repair and prevent structural corrosion.

- Manhole K
  - There was no water present in this manhole.
  - The steel structural components in the vault need to be cleaned of all rust and painted to prevent further corrosion. This vault should be included in the 2009 capital project to repair and prevent structural corrosion.
  - There is an appreciable amount of trash and debris in this vault that needs to be removed.
  - Several sections of the pipe insulation on the steam, condensate and chilled water lines are either absent or in need of repair. This manhole is listed as

"moderate" on the Manhole Insulation priority list developed by Constellation.

- Manhole L
  - There was a small amount of water present in this manhole; it did not require pumping before entry.
  - A small amount of condensate piping insulation is absent. This manhole ranks as "High" on the Manhole Insulation priority list developed by Constellation.
  - The entry ladder is interrupted by an insulated condensate pipe and presents a potential hazard to ingress and egress. The placement of an additional access ladder at the northern manway should be investigated to remedy this situation.
  - The steel structural components in the vault need to be cleaned of all rust and painted to prevent further corrosion. This vault should be included in the 2009 capital project to repair and prevent structural corrosion.

- Manhole M
  - There was an appreciable amount of water in the bottom of this vault. The water was partially pumped out but due to time limitations, not all of the water was removed prior to entry. TEG is going to investigate the viability associated with the installation of a steam powered pump to minimize the accumulation of water in this vault.
  - Access to the vault piping is hampered by the fact that the ladder is located to the east of the two 30" chilled water pipes. In order to access other piping within the vault, personnel are required to climb over/walk on the chilled water pipes. CNDE personnel have suggested installing a platform over the 30" chilled water pipes to enhance the accessibility. TEG concurs with this suggestion.
  - Several sections of the pipe insulation on the steam, condensate and chilled water lines are either absent or in need of repair. This manhole is listed as "high" on the Manhole Insulation priority list developed by Constellation.
  - There is some debris in this manhole; the exact extent of the debris could not be determined due to the presence of water in the manhole. Any debris present should be removed.
  - There is plastic sheeting hanging from the roof of this manhole, apparently remaining from its original construction. This should be removed for two primary reasons: 1) it presents a potential safety hazard to personnel and 2) the condition of the vault ceiling can not be observed during monthly inspections.
  - The link seal on the steam line at the northern wall penetration has been dislodged from the top portion of the pipe. The reason this has occurred is

not clear. There is a slip type expansion joint at this wall penetration and it appears that the piping penetrating the wall might have "lifted up" forcing the link seal from its position. If this has occurred, potential binding of the slip joint is possible. The reason for the dislodging of the link seal needs to be investigated further. The problem with this linkseal was noted by CNDE personnel during its October 2007 manhole inspection.

- Manhole N1
  - There was no water present in this manhole.
  - This manhole only houses chilled water lines which serve the Titans football stadium.
  - There is rebar protruding from the concrete wall at the entry point which presents a hazard to personnel. This rebar should be cut and removed.

- Manhole N2
  - This manhole only houses chilled water lines which serve the Titans football stadium.
  - There is confusion surrounding whether or not this manhole has one or two manways. CNDE personnel present during the walkthrough could not see evidence of a second manway, however CNDE personnel at the EGF contend that there is a second manway. If a second manway exists, it has been covered with dirt by stadium personnel. If this is the case, the stadium personnel need to be contacted and instructed to remove the dirt covering the second manway.
  - There are small portions of insulation absent from the chilled water piping in this manhole. This manhole is not on the Manhole Insulation priority list developed by Constellation and should be added as a "Low " priority.
  - Due to the absence of a second manway, access to TEG personnel was denied.

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.

A. Marketing

- The CNDE Marketing Plan was recieved and approved during the Third Quarter.
- The Ragland Properties along Molloy Street and between 1st and 3rd Avenues is currently being investigated as a potential new customer. This property could represent an additional 150 tons and 1,000 pounds per hour addition to the system.

- CEPS remains in contact with the potential service for the Westin Hotel to be constructed south of Broadway Avenue.

B. Customer Interaction

- Several customers were trained on the use of the DAQ software and the operation of their C-Tech metering panels.
- TEG and CNDE met with personnel from the Municipal Auditorium to discuss their steam use and demand on January 9.
- Meetings were held with personnel from LP Field regarding a reduction in their chilled water demand.
- CNDE met with representatives from Metro Nashville Public Schools on February 12 to discuss the excessive energy consumptions at Hume Fogg.
- The Nashville Convention Center requested that CNDE verify the operation of their temperature control valve on the chilled water system on February 28.
- Other minor issues and customer interactions are noted in the monthly CNDE reports.

VII. Recommendations

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

- As mentioned in previous reports, further investigation is recommended regarding the addition of automated O2-trim to the boilers. This increase in automation may increase the fuel efficiency of the boilers and may have a relatively short return on investment. TEG will begin the investigation of the economic benefit related to this modification during the fiscal year.
- Due to the apparent soil erosion on the west face of the EGF, CNDE should determine if the terrain on the west side of the EGF needs regrading to prevent rainwater from flowing into and under the foundation wall. These repairs could help prevent further settling of the foundation and soil erosion.
- Painting of structural steel within manholes to reduce or eliminate corrosion needs to begin as an ongoing maintenance item.
- Insulation which is either not present or in disrepair within the manholes needs to be addressed through either capital projects which include work within these manholes or through DES 050.
- Potential safety hazards within some of the manholes need to be addressed.
- CNDE should continue to remove any debris present in the manholes as inspections and schedules allow.