Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD

Final Project Report

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DISCLAIMER

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ABSTRACT

This report presents the results of a multi-year test program conducted as part of Cooperative Agreement DE-FC26-06NT42779, “Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD.” The objective of this program was to determine the level of mercury removal achievable using sorbent injection for a plant firing Texas lignite fuel and equipped with an ESP and wet FGD. The project was primarily funded by the U.S. DOE National Energy Technology Laboratory. EPRI, NRG Texas, Luminant (formerly TXU), and AEP were project co-funders. URS Group was the prime contractor, and Apogee Scientific and ADA-ES were subcontractors.

The host site for this program was NRG Texas’ Limestone Electric Generating Station (LMS) Units 1 and 2, located in Jewett, Texas. The plant fires a blend of Texas lignite and Powder River Basin (PRB) coal. Full-scale tests were conducted to evaluate the mercury removal performance of powdered sorbents injected into the flue gas upstream of the ESP (traditional configuration), upstream of the air preheater, and/or between electric fields within the ESP (Toxecon™ II configuration).

Phases I through III of the test program, conducted on Unit 1 in 2006-2007, consisted of three short-term parametric test phases followed by a 60-day continuous operation test. Selected mercury sorbents were injected to treat one quarter of the flue gas (e.g., approximately 225 MW equivalence) produced by Limestone Unit 1. Six sorbents and three injection configurations were evaluated and results were used to select the best combination of sorbent (Norit Americas’ DARCO Hg-LH at 2 lb/Macf) and injection location (upstream of the ESP) for a two-month performance evaluation. A mercury removal rate of 50-70% was targeted for the long-term test. During this continuous-injection test, mercury removal performance and variability were evaluated as the plant operated under normal conditions. Additional evaluations were made to determine any balance-of-plant impacts of the mercury control process, including those associated with ESP performance and fly ash reuse properties.

Upon analysis of the project results, the project team identified several areas of interest for further study. Follow-on testing was conducted on Unit 2 in 2009 with the entire unit treated with injected sorbent so that mercury removal across the FGD could be measured and so that other low-ash impact technologies could be evaluated. Three approaches to minimizing ash impacts were tested: (1) injection of “low ash impact” sorbents, (2) alterations to the injection configuration, and (3) injection of calcium bromide in conjunction with sorbent. These conditions were tested with the goal of identifying the conditions that result in the highest mercury removal while maintaining the sorbent injection at a rate that preserves the beneficial use of ash.

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Acfm	Actual cubic feet per minute (flue gas flow)
ACI	Activated carbon injection
AEA	Air entrainment admixture
Ag	Silver
AH	Air heater
App K	Appendix K (sorbent tube) sampling
As	Arsenic
ASTM	American Society for Testing and Materials
Au	Gold
Ba	Barium
BAC	Bromine (treated) activated carbon
Be	Berillium
BH	Baghouse
BL	Baseline
Br	Bromide
Br_2	Bromine
Btu	British thermal unit
$CaBr_2$	Calcium bromide
Cd	Cadmium
CEM	Continuous emission monitor
CFD	Computational fluid dynamic (modeling)
Cl	Chloride
Cl_2	Chlorine
CO	Carbon monoxide
Co	Cobalt
CO_2	Carbon dioxide
CO_3	Carbonate
Cr	Chromium
Cu	Copper
CVAAS	Cold vapor atomic absorption spectrometer
DOE	U.S. Department of Energy
dP	Pressure drop
dNm^3	Dry normal cubic meters
dscf	Dry standard cubic feet (gas flow)
Dscm	Dry standard cubic meters (gas flow)
Dv50	Median particle size (for volumetric psd)
Dv90	Particle size below which 90% of population lies
EDTA	Ethylenediaminetetraacetic acid
EPA	U.S. Environmental Protection Agency
ESP	Electrostatic precipitator
°C	Degrees Celsius
°F	Degrees Fahrenheit
FGD	Flue gas desulfurization
FOB	Freight on board

gpm	Gallons per minute
H_2O	Water
HBr	Hydrogen bromide
HCl	Hydrochloric acid
Hg	Mercury
Hg^0	Elemental mercury
Hg^T	Total mercury
Hr	Hour
HX	Hydrogen halide
IGS	Inertial gas separation (sampling filter)
KCl	Potassium chloride
Kg	Kilogram
KW	Kilowatt
Kwh	Kilowatt hour
Lb	Pound
Lb/MM Btu	Pounds per million Btu
Lb/TBtu	Pounds per trillion Btu
LMS	NRG Texas Limestone Station
LOI	Loss on ignition
Lpm	Liters per minute
M	Molar (moles/liter)
m^2/cc	Square meters per cubic centimeter
M5	EPA Method 5
M17	EPA Method 17
M26A	EPA Method 26A
M29	EPA Method 29
Macf	Million actual cubic feet (of flue gas)
Mg	Magnesium
mg	Milligrams
MMBtu	Million Btu
Mn	Manganese
MW	Mega-Watt (boiler load)
Na	Sodium
NC	Not calculable (as pertaining to analytical data)
ND	Non-detect
NETL	U.S. DOE National Energy Technology Laboratory
Ni	Nickel
Nm^3	Normal cubic meters (gas flow)
NOx	Nitrogen oxides
NSPS	New source performance standard
O_2	Oxygen
OH	Ontario Hydro Method
ORP	Oxidation-reduction potential
Oz	Ounce
Pb	Lead
PC	Portland cement

PM	Particulate matter
ppb	Part per billion
ppm	Parts per million
PRB	Powder River Basin
PSD	Particle size distribution
psi	Pounds per square inch
psig	Pound-force per square inch gauge
PTFE	Polytetrafluoroethylene polymer
QA/QC	Quality assurance/quality control
R^2	Coefficient of determination
RPD	Relative percent deviation
rpm	revolutions per minute
RSD	Relative standard deviation
S	Sulfur
SAI	Strength activity index
Sb	Antimony
SCA	Specific collection area (for ESP)
SCEM	Semi-continuous (mercury) emission monitor
Scfm	Standard cubic feet per minute (gas flow)
SDA	Spray dryer absorber
Se	Selenium
Slpm	Standard liters per minute
SO_2	Sulfur dioxide
SO_3	Sulfite
SO_4	Sulfate
Spm	(ESP) Sparks per minute
SSA	Specific surface area
Tl	Thallium
Tris	Tris-hyroxymethylaminomethane
TxL	Texas lignite
µg	Microgram
µm	Micrometer
U1	LMS Unit 1
U2	LMS Unit 2
UV	Ultra-violet
V	Vanadium
FGD	Wet flue gas desulfurization
WPS	Wet particulate scrubber
Wt %	Weight percent
X_2	Diatomic halide
XFM	X-ray Filter method
XRF	X-ray fluorescence
Zn	Zinc

EXECUTIVE SUMMARY

A multi-phase test program was conducted as part of Cooperative Agreement DE-FC26-06NT42779, “Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD,” to evaluate the performance of different sorbent injection options for removing mercury from a power plant firing Texas lignite. The project was primarily funded by the U.S. DOE National Energy Technology Laboratory and co-funding was provided by EPRI, NRG Texas, Luminant (formerly TXU), and AEP. URS Group was the prime contractor, and Apogee Scientific and ADA-ES were subcontractors.

The host site for this program was NRG Texas’ Limestone Electric Generating Station (LMS) Units 1 and 2, located in Jewett, Texas. The 900-MW units typically fire a 70/30 wt% blend of Texas lignite/Powder River Basin coal, and are equipped with cold-side ESPs and limestone forced oxidation FGD systems. The units generate high quality, low LOI fly ash that is used for cement replacement in concrete production. Measurements made during the test program indicated less than 5% native mercury removal by the fly ash. Baseline mercury concentrations at the ESP outlet averaged 20 $\mu g/dNm^3$ and ranged from 15 – 25 $\mu g/dNm^3$. Mercury oxidation at the ESP outlet averaged 50%, but varied between 25 – 75%. With ~15% of the flue gas bypassing the FGD, the overall system mercury removal averaged 22%, with FGD outlet concentrations ranging from 12 – 19 $\mu g/dNm^3$. The data suggest there were intermittent mercury re-emissions from the FGD system.

The objective of this project was to achieve 50 – 70% system mercury removal with sorbent injection while maintaining fly ash integrity for use in concrete. Activated carbon (AC) sorbent particles present in fly ash can competitively adsorb air-entraining admixtures (AEAs) added to concrete for air entrainment and stabilization. This competition results in a larger volume of AEA being needed, and more significantly to ready-mix concrete manufacturers, it results in variability in the amount of AEA needed. The following technologies were tested to enhance system mercury removal while reducing AC contamination of the fly ash: use of alternate sorbents; changes to the injection system and configuration; and, co-application of calcium bromide to the coal. Mercury removal was primarily characterized with mercury semi-continuous emission monitors (SCEMs); sorbent traps, Ontario Hydro, and other measurements were also used and indicated a wide variability in mercury removal, but generally validated the SCEM observations.

Mercury removal objectives were met by most of the process configurations and conditions evaluated. At 0.5 lb/Macf Darco Hg-LH, an overall system removal of 50% was achieved with fly ash integrity preserved. With 1 – 2 lb/Macf Darco Hg-LH injection, system mercury removals (air heater inlet to stack, with 15% flue gas bypass) of 60 – 70% were achieved but ash integrity may have been compromised. The combination of bromide addition to the coal and sorbent injection increased system mercury removals to 75 – 85%. Increasing the fraction of PRB in the fuel blend to 45% while injecting sorbent at 1 – 2 lb/Macf also resulted in increasing system mercury removal to greater than 75%. Additional removal would be expected by eliminating the FGD bypass and possibly by controlling FGD re-emissions.

Brominated activated carbons and low-ash impact sorbents from Norit Americas, Calgon Carbon, Sorbent Technologies, and BASF were evaluated. Carbon-based sorbents were able to achieve system mercury removals within the targeted 50 – 70% range. For a given injection rate, all low-ash impact sorbents achieved lower mercury removal than their standard brominated counterparts; however, fly ash containing these low-ash-impact sorbents demonstrated better fly ash reuse properties and should be investigated further. Finely ground Darco Hg-LH did not perform better than the respective unground material, due possibly to particle agglomeration within the sorbent transfer lines. A non-carbon sorbent from BASF did not achieve greater than 50% mercury removal, even at elevated injection rates.

ESP mercury removal during a two-month test, with Darco Hg-LH injected at 2 lb/Macf, ranged from 30 to 97% and averaged 82%. Mercury oxidation averaged 80% at the ESP outlet suggesting system removals should be higher when including the downstream wet FGD system. Because of the duct configuration and only ¼ of total flue gas was treated with AC, it was not possible to measure FGD mercury removal during the long-term test. Fly ash quality during the test was diminished but was deemed just within acceptable specifications for use in concrete; however, it may be difficult to maintain ash consistency sufficient for the concrete market.

Several sorbent injection configurations were evaluated in this program. Although each was able to achieve established program removal objectives, none offered a clear advantage over the others. AC injection upstream of the air heater did not improve mercury removal as compared to injection upstream of the ESP. EPRI's Toxecon™ II process, as implemented, could not achieve >60% mercury removal across the ESP. Staging injection such that a small amount of AC was injected upstream of the ESP housing the Toxecon™ II system, did not offer any improvement in mercury removal over other injection configurations. Alternate lance designs for both the duct injection and Toxecon™ II systems did not result in increased mercury removal.

The lowest stack mercury concentration achieved was 2.8 $\mu g/dNm^3$ with 280 ppm Br to the dry coal and 1.6 lb/Macf finely ground Darco Hg-LH. The combination of bromide addition and sorbent injection achieved the lowest stack Hg concentration of all technologies tested at LMS Unit 2. However, the required sorbent injection rate of 1.6 lb/Macf finely ground Darco Hg-LH is high enough to potentially jeopardize the beneficial use of ash, and the required bromide injection rate could adversely impact the scrubber system. Without changes in scrubber blowdown rates, high bromide addition rates will cause the steady-state FGD Br level to increase, which may possibly lead to corrosion problems in alloy-based scrubbers.

Although test results showed that the program objectives could be achieved using a number of process configurations, sorbents, and AC addition rates, they also indicated that higher mercury removals at LMS would be challenging to achieve and maintain. None of the technologies tested on Unit 2 were demonstrated to achieve 90% system mercury removal. For both baseline and for all sorbents evaluated, mercury oxidation and removal performance was extremely variable over time, between units, and across the ducts tested, suggesting one of the many challenges for mercury removal in Texas lignite-derived flue gas.

1.0 INTRODUCTION

A multi-phase sorbent injection test program was conducted under Cooperative Agreement DE-FC26-06NT42779, “Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD,” during 2006-2007 and 2009. The objective of this project was to evaluate full-scale sorbent injection for mercury control at a power plant firing Texas lignite and equipped with a cold-side electrostatic precipitator (ESP) followed by a wet flue-gas desulfurization unit (wet FGD). The project was funded by the U.S. DOE National Energy Technology Laboratory under this Cooperative Agreement. EPRI, NRG Texas, Luminant (formerly TXU), and AEP were project co-funders. URS Group was the prime contractor, and Apogee Scientific and ADA-ES were subcontractors. This report presents a comprehensive summary of the results obtained during this test program.

NRG Texas provided co-funding and technical input to this project and provided Limestone Electric Generating Station (LMS) as a host site for testing. Limestone Station, located in Jewett, Texas, consists of two tangentially-fired units that are each approximately 900 MW in size. Units 1 and 2 fire an approximate 70/30 by weight blend of Texas lignite (TxL) and Powder River Basin (PRB) coal and are equipped with cold-side ESPs and limestone FGD systems. Fly ash and gypsum produced at the LMS are marketed for reuse. Testing was performed on Unit 1 during 2006-2007 (Parametric Phases I, II, III, and Long-Term Testing) and on Unit 2 during 2009 (Parametric Phase IV).

Previous studies have shown that the mercury-removal effectiveness of sorbent injection processes is dependent upon the sorbent type, flue gas characteristics and the air pollution control devices installed. For example, untreated activated carbon has provided limited mercury removal (50-60%) in chloride-deficient flue gases, while halogen-treated activated carbons have achieved more than 90% mercury reduction in these same gases. Because TxL coal has low but variable chloride content, and the corresponding flue gas mercury speciation is highly variable (25% to 75% elemental mercury in vapor phase), halogenated carbons may provide enhanced mercury removal over untreated carbons. In this program both standard and halogenated carbons were tested.

Fly ash produced at plants burning TxL coal may be suitable for sale to the concrete industry. However, carbon injected upstream of an ESP partitions to the fly ash and potentially compromises its integrity for use as a cement replacement in concrete. The carbon sorbent in the fly ash competitively adsorbs the air-entraining admixtures (AEAs) that are added to concrete for air entrainment and stabilization. This competition results in a larger volume of AEA being needed, and more significantly to ready-mix concrete manufacturers, it results in variability in the amount of AEA needed. It has been generally assumed that if standard ACI is employed, the resulting fly ash will not be suitable for cement/concrete applications. This poses a liability to the plant due to the loss of environmental benefits of re-use and the loss of the beneficial use of ash and extra disposal cost. Therefore, it is desired to design a sorbent injection process that preserves fly ash integrity. Three approaches are possible: (1) inject a “low ash impact” sorbent, (2) inject an activated carbon sorbent into the process after a majority of the ash has been collected using EPRI’s Toxecon™ II process, or (3) inject a small amount of carbon upstream of the ESP such that the resulting carbon concentration in the ash does not affect beneficial re-use or can be "neutralized" with a chemical treatment. All three approaches were evaluated in this program.

During Phases I-III (2006-2007), full-scale sorbent injection tests were performed at NRG's LMS Unit 1 to evaluate mercury removal across the cold-side ESP. Three short-term parametric test phases were followed by a 60-day long-term test. Sorbent was injected to treat one quarter of the Unit 1 flue gas. In the first phase of parametric tests, several sorbents were injected upstream of the ESP. The sorbents were selected based on cost, availability, and previous test results. A standard activated carbon, bromine-treated carbons, and a low-ash impact sorbent were included in the test program. Based on the initial parametric results (Phase I) Norit America's DARCO Hg and DARCO Hg-LH were selected for additional testing in which the Toxecon™ II injection process and staged injection were evaluated (Phases II & III).

The best combination of sorbent and injection location were then selected for a two-month evaluation of performance and variability. A mercury removal rate of 50-70% was targeted for the long-term test. The continuous injection test provided insight to the long-term performance and variability of this process, as well as any effects on plant operations or ash byproduct composition.

Upon analysis of the Phase I-III project results, the project team identified several areas of interest for further study. These areas included: 1) demonstration of lower sorbent injection rates to achieve the targeted mercury removal rate, and 2) evaluating the effect of lower injection rates for improving the viability of the fly ash for sale as a cement replacement. Phase IV follow-on testing was conducted in 2009 with the entire unit treated with sorbent so that mercury removal across the FGD could be measured and so that other low-ash impact technologies could be evaluated. Three approaches to minimizing ash impacts were tested: (1) injection of "low ash impact" sorbents, (2) alterations to the injection configuration, and (3) addition of calcium bromide to the coal in conjunction with sorbent injection to the flue gas. These conditions were tested with the goal of identifying process conditions that result in the highest mercury removal while preserving the beneficial use of fly ash. It was also of interest to investigate how mercury removal changed when the fuel blend ratio was modified.

The remainder of this report is divided into four sections: Experimental Procedures; Results and Discussion – Phases I – III and Long-Term Tests (2006-2007); Results and Discussion – Phase IV (2009); Conclusions and Recommendations.

2.0 EXPERIMENTAL METHODS

This section describes the technical approach and work plan for the LMS ACI evaluation program. The project was composed of four parametric phases and one 60-day, long-term test.

Phase I of the parametric test program involved evaluating the injection of several mercury sorbents, including a standard activated carbon, bromine-treated carbons, and an alternative sorbent designed for minimized impact on fly ash reuse. The sorbent injection rate was varied for each sorbent in an attempt to achieve 50-90% mercury removal. For this test phase, the sorbent injection lances were installed upstream of the Unit 1 ESP.

Following the initial phase of parametric testing, additional tests were conducted during which two sorbents were selected, based on Phase I results, and evaluated using several process configurations. These Phase II and III tests were conducted over two two-week periods and evaluated sorbent injection using three process configurations: (1) upstream of the ESP, (2) in between ESP fields (Toxecon™ II), and (3) staged injection. The latter configuration involved co-injection of sorbent(s) both upstream of the ESP and via the Toxecon™ II system. This effort was conducted after a planned unit outage during which the Toxecon™ II system was installed.

After completion of the Phase II & III parametric tests, a two-month long-term test was conducted. An optimal combination of sorbent (Norit DARCO Hg-LH) and injection location (upstream of the ESP) were chosen from the results of the parametric testing to use for the long-term test; the objective was to achieve 50-70% mercury removal. An optimum injection rate (2 lb/Macf) was based on a combination of mercury removal performance and economic factors. Mercury removal and ash byproduct composition were monitored throughout the long-term test in order to evaluate process variability and to determine any effects of carbon injection on plant operations or performance.

Upon analysis of the results obtained during Phases I-III, the project team identified several areas of interest for further study as part of a no-cost extension for Phase IV parametric testing. Phase IV tests were conducted in the second and third quarters of 2009. Unlike the previous phases which were conducted on Unit 1, Phase IV tests were performed on Unit 2. These tests evaluated a wide range of ACI process conditions in an effort to investigate some of the areas of interest identified during the long-term test. Sorbent injection was carried out at two different locations including the air heater inlet of the entire unit and upstream of the ESP. In addition, tests evaluated two types of injection lances, several sorbents at a variety of injection rates, and calcium bromide addition in combination with ACI. Additional funding was provided by EPRI to perform trace metals and in-situ carbon particle size distribution measurements during the Phase IV program. Calgon Carbon Corporation provided funding to screen the performance of additional proprietary sorbents at the conclusion of the DOE-funded program; results from these tests are presented in this report.

2.1 Host Site Description

NRG's Limestone Electric Generating Station (LMS) Units 1 and 2 served as the host site for this test program. Both units typically fire a blend by weight of 70% Texas lignite and 30% PRB and are rated at approximately 900 MW. Each unit is equipped with two air heaters, four ESPs, and five scrubber modules. Figure 2-1 shows the basic LMS unit configuration and Table 2-1 summarizes the basic design parameters for Units 1 and 2. Figure 2-2 shows the Unit 1 ESP ductwork along with the injection and sampling locations. Testing for the first three phases of parametric testing and the 60-day continuous test was conducted across the Unit 1A ESP. Testing for the fourth phase of parametric testing was conducted across the entireity of Unit 2, with limited testing across the Unit 2C ESP. Figure 2-3 shows the Unit 2 ESP ductwork along with the injection and sampling locations.

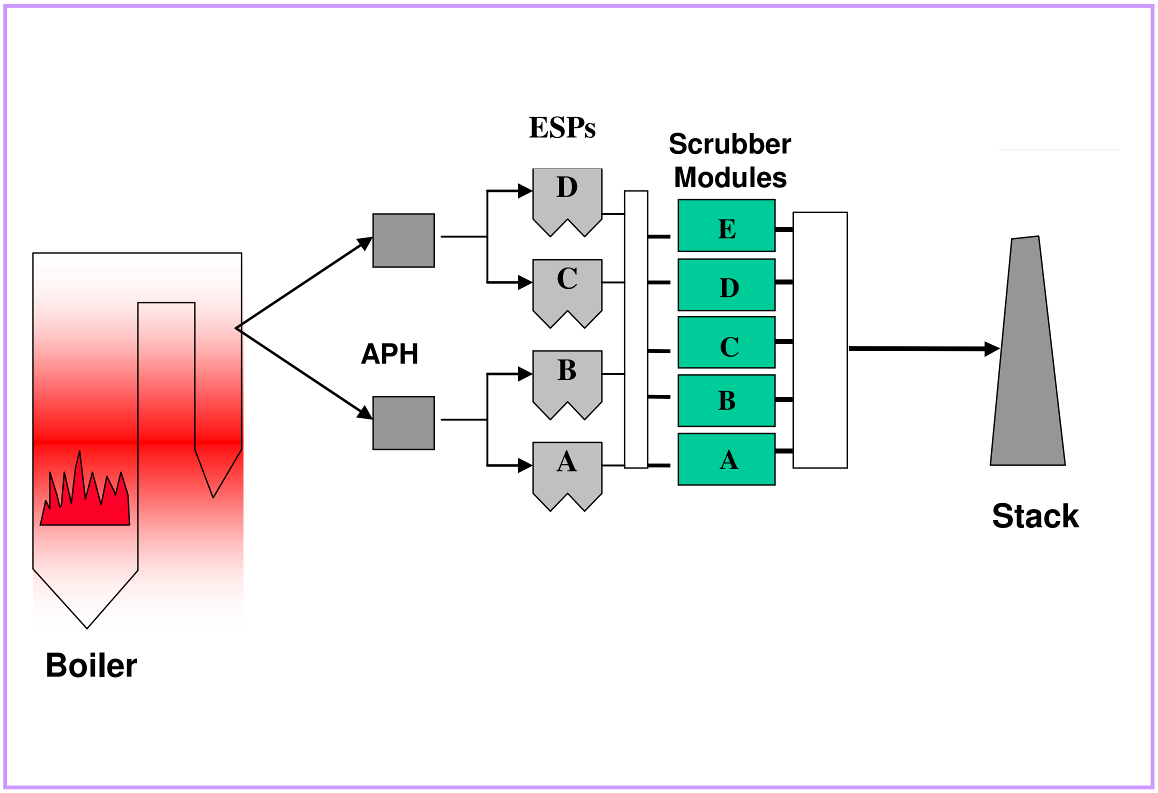


Figure 2-1. General Unit Configuration for the NRG LMS Plant

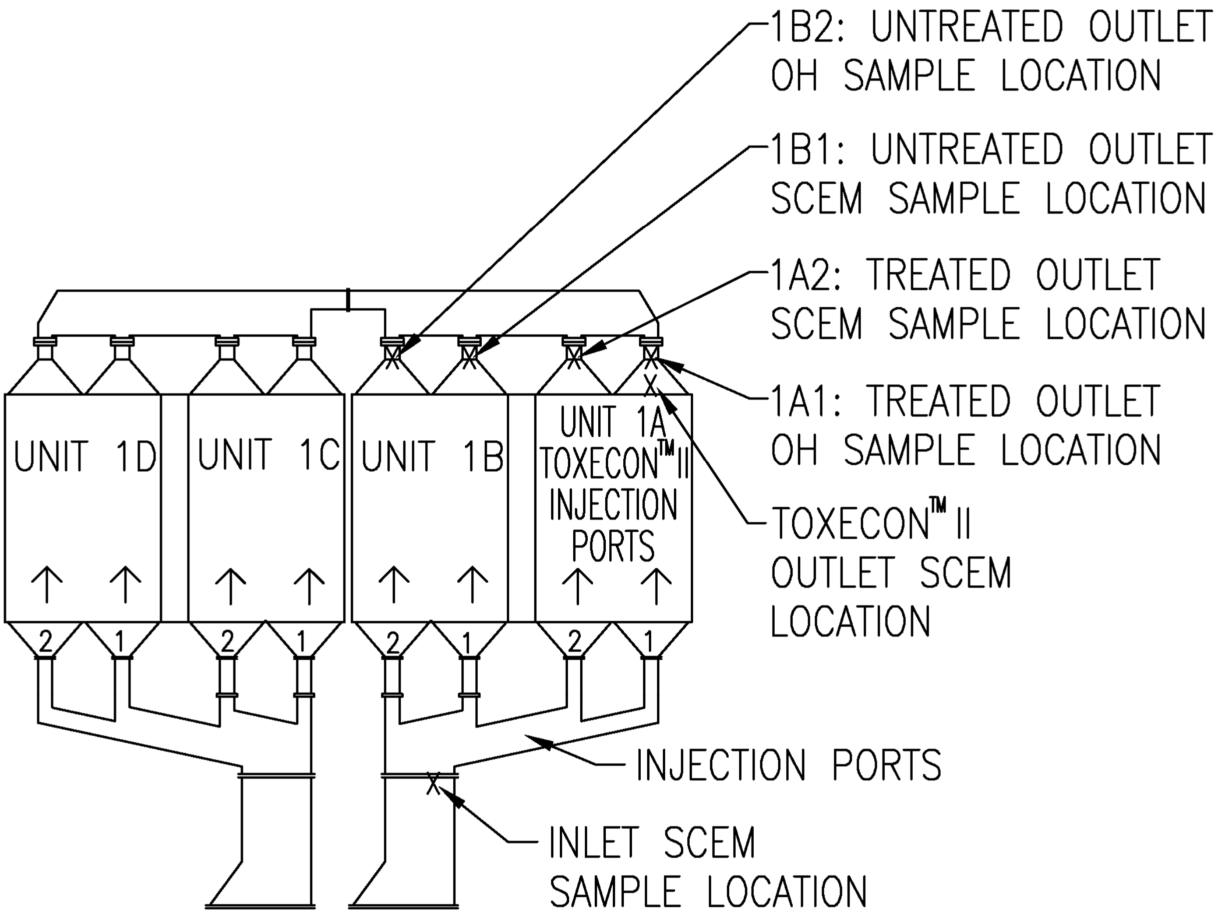


Figure 2-2. LMS Unit 1 ESP Duct Configuration and Sampling Locations

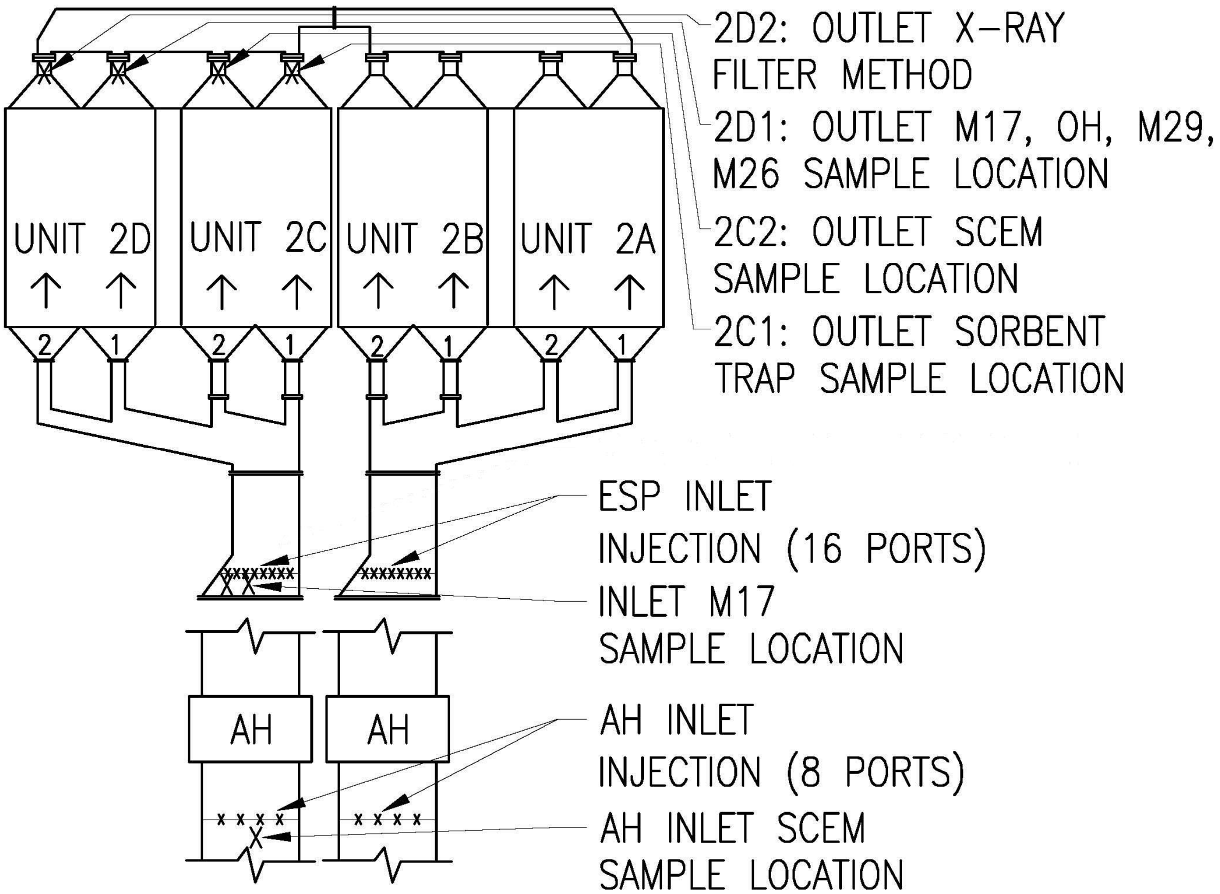


Figure 2-3. LMS Unit 2 ESP Duct Configuration and Sampling Locations

Table 2-1. Limestone Electric Generating Station Unit 1 and Unit 2 Design Parameters

	Limestone Electric Generating Station Unit 1	
Boiler		
Type	Tangentially-fired, pulverized coal furnace	
Nameplate (MW)	890 (U1) / 913 (U2)	
Coal		
Type	**Texas Lignite**	**PRB**
Weight Fraction in Coal Feed	0.7	0.3
Ash (wt%, dry)	15-25%	7-11%
Sulfur (wt%, dry)	0.8-1.2%	0.5-0.7%
Mercury (mg/kg, dry)	0.15-0.25 ppm	0.08-0.13 ppm
Chloride (mg/kg, dry)	35-70 ppm	20-40 ppm
ESP		
Type	Cold-side	
ESP Manufacturer	Lodge-Cottrell	
ESP Conditioning	None	
Specific Collection Area (ft^2/1000 acfm)	452	
Plate Spacing (in)	11	
Plate Height (ft)	44’-6”	
Electrical Fields	7	
ESP Inlet Temperature (°F)	290-330	
NO_X Controls	Low-NO_X Burners	
SO_2 Controls	Wet FGD; limestone forced oxidation (as of Jan. 2009); inhibited oxidation with elemental sulfur emulsion (prior to Jan. 2009)	

2.2 Mercury Sorbent Selection

Several types of mercury sorbents were tested on Unit 1 during the first three phases of testing, including a standard activated carbon, brominated carbons, and low ash-impact sorbents. Table 2-2 lists the sorbents selected for screening tests conducted with the injection lances configured upstream of the ESP. Evaluated sorbents included Norit America’s DARCO Hg as the standard activated carbon and four brominated activated carbons: Norit America’s DARCO Hg-LH, Sorbent Technology’s B-PAC and C-PAC, and Calgon Carbon’s Flue PAC MC Plus. The selected sorbents had been previously demonstrated in several full-scale carbon injection tests.

Norit Americas was chosen as a sorbent vendor because of its proximity (158 miles) to the LMS plant. The large volumes of carbon that will be needed for this plant will likely make transportation costs a contributing factor when selecting a sorbent vendor, should LMS decide to employ sorbent injection as its mercury control technology. Sorbent Technology’s B-PAC and Calgon Carbon’s Flue PAC MC Plus were chosen for testing as competitive sorbents; however, these sorbents would need either a lower cost or higher reactivity to be more cost effective than Norit Americas’ sorbents for this plant.

Several vendors were approached for a low ash impact sorbent, including BASF and Amended Silicates. The MS200 sorbent from BASF and C-PAC carbon from Sorbent Technologies were evaluated as low ash impact sorbents. Amended Silicates was not able to produce sufficient quantities of its sorbent for the test program.

During Phase IV, three of the sorbents tested during 2006-2007 and several additional types of sorbents were tested on Unit 2. The three sorbents selected from the first three phases of testing were Norit America's DARCO Hg and DARCO Hg-LH carbons and Sorbent Technology's C-PAC carbon. The additional carbons tested during Phase IV are listed in Table 2-3 and included Norit America's Finely Ground Darco Hg-LH and Darco Hg-LH EXP224 sorbents, Calgon Carbon's Flue PAC CF Plus and CF Plus Ultra sorbents, as well as several other proprietary sorbents from Calgon Carbon.

Table 2-2. Sorbents Selected for Evaluation at LMS Unit 1

Sorbent Name	Manufacturer	Manufacturing Location	Sorbent Description	d_{50} (µm)
DARCO Hg	Norit Americas	Marshall, TX	Texas lignite derived activated carbon	19
DARCO Hg-LH	Norit Americas	Marshall, TX	Texas lignite derived activated carbon, brominated	19
B-PAC	Sorbent Technologies	Twinsburg, OH	Activated carbon, brominated	20
C-PAC	Sorbent Technologies	Twinsburg, OH	Activated carbon treated with bromine and passivated to be low-ash impact	20
Flue PAC MC Plus	Calgon Carbon	Pittsburgh, PA	Activated carbon, treated with bromine	unknown
MS200	BASF	Gordon, GA and Attapulgus, GA	Enhanced molecular sieve material	15-20

Table 2-3. Sorbents Selected for Evaluation at LMS Unit 2

Sorbent Name	Manufacturer	Manufacturing Location	Sorbent Description	d_{50} (µm)
DARCO Hg	Norit Americas	Marshall, TX	Texas lignite derived activated carbon	19
DARCO Hg-LH	Norit Americas	Marshall, TX	Texas lignite derived activated carbon, brominated	19
Darco Hg-LH EXP 224	Norit Americas	Marshall, TX	Texas lignite derived activated carbon, brominated and designed to be low-ash impact	
Darco Hg-LH Finely Ground	Norit Americas	Marshall, TX	Darco Hg-LH that underwent second milling to finer particle size	6
C-PAC	Albemarle (formlerly Sorbent Technologies)	Twinsburg, OH	Activated carbon, ,brominated and designed to be low-ash impact	20
Flue PAC CF Plus	Calgon Carbon	Pittsburgh, PA	Activated carbon treated with bromine	16
Flue PAC CF Plus Ultra	Calgon Carbon	Pittsburgh, PA	Activated carbon treated with bromine and designed to be low-ash impact	16
A	Calgon Carbon	Pittsburgh, PA	Activated carbon designed for sulfur tolerance	
A2, CANG-2, CNAHF-1, CN6, CN30, THB	Calgon Carbon	Pittsburgh, PA	Activated carbons of various sizes and chemical treatments	various

2.3 Design and Installation of the Sorbent Injection System

The sorbent injection system was designed and installed upstream of the ESP by Apogee Scientific. Apogee also designed, installed, and operated the sorbent feeding system. The Toxecon™ II injection grid was designed by ADA-ES. ADA-ES provided oversight of the on-site installation. URS Group contracted the required subcontractors to assist with this installation.

Sorbent Feeding System

For the short-term parametric tests, a portable sorbent injection system was installed to service both the Unit 1 and Unit 2 inlet and Unit 1 mid-ESP injection points. This portable dry injection system pneumatically conveyed a predetermined and adjustable amount of powdered activated carbon (PAC) from 900-lb bulk bags into the flue gas stream via flexible hoses that led to a distribution manifold feeding multiple sorbent injection lances. PAC was metered using a volumetric feeder into a pneumatic eductor, where the air supplied from the regenerative blower provided the motive force needed to transport the carbon to the final injection locations. The system could deliver between 15 – 2000 lb/hr of activated carbon. For the long-term tests, sorbent was delivered in bulk pneumatic trucks and loaded into a bulk-storage truck, which was equipped with a bin vent bag filter. The same screwfeeder/blower system from the parametric tests was used in the long-term tests.

Injection Lances - Upstream of the ESP (Unit 1 Tests in 2006-2007)

For sorbent injection upstream of the ESP, injection lances were inserted vertically into eight of the ten existing four-inch ports on the ESP 1A inlet duct. The two centermost ports were not used because of an internal obstruction to flue gas flow. The duct was 20-feet wide by 11.75-feet deep at the injection location. A flexible pneumatic conveying hose carried the sorbent from the injection system on the ground level, which was approximately 80 feet below the duct. A steel pipe manifold divided the flow via smaller diameter flex lines to each of the eight lances. Each leg of the manifold was designed to have approximately the same pressure drop; however, there was no mechanism by which to monitor or control air/carbon flow distribution between lances. The lances were fabricated from steel pipe and consisted of paired holes or nozzle openings at 1-foot intervals along the length to provide for uniform distribution of the sorbent across the duct.

Injection Lances - Upstream of the Air Heater, ESP (Unit 2 Tests in 2009)

For sorbent injection upstream of the air heater, the lances were inserted into the eight existing sample ports on the AH inlet ducts. After operating for two weeks at this injection location, the injection system was moved to downstream of the AH, and a total of sixteen lances were installed in the ducts upstream of the four Unit 2 ESPs. During sorbent injection across ¼ of the unit, the lances were left in the same location but only the four lances upstream of the Unit 2C ESP continued to inject sorbent. A flexible pneumatic conveying hose carried the sorbent from the injection system located at ground level, which was approximately 80 feet below the flue gas duct. A steel pipe manifold divided the sorbent-containing stream via smaller diameter flex lines to each of the injection lances. Each leg of the manifold was designed to have approximately the same pressure drop; however, there was no mechanism by which to monitor or control air/carbon flow distribution between lances.

For most of this test program, a “traditional” simple pipe lance design was used to deliver powdered activated carbon to the flue gas duct. The traditional lance design consisted of paired holes at 1-foot intervals along the length of the lance. The traditional lance was used for all tests performed in 2006-2007 (with exception of Toxecon II), for injection upstream of the AH in 2009, and for selected injection tests upstream of the ESP in 2009.

To improve sorbent dispersion and utilization, URS has developed a proprietary design for carbon injection lances. In the 2009 test program, alternate lances employing this design replaced four of the traditional lances upstream of the Unit 2C ESP for selected injection tests. The dispersion lances were designed to increase gas turbulence and recirculation downstream of the lance and to distribute carbon particles more evenly along the length of the lance. Figures 2-4 and 2-5 provide modeled carbon particle trajectories for both lance types. These figures illustrate the improved distribution of carbon particles through the duct that is expected to be achieved with the distribution lances. This test program represents the first time this lance design has been tested in a flue gas application.

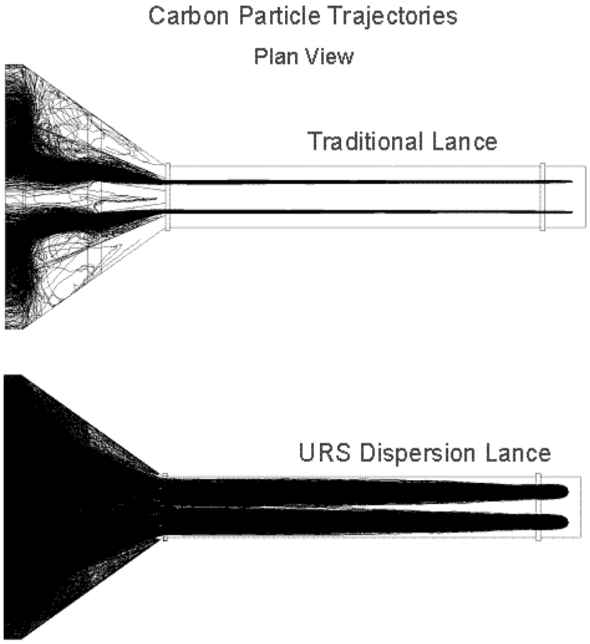


Figure 2-4. Plan View Particle Trajectory Comparison – Traditional vs. Dispersion Lances

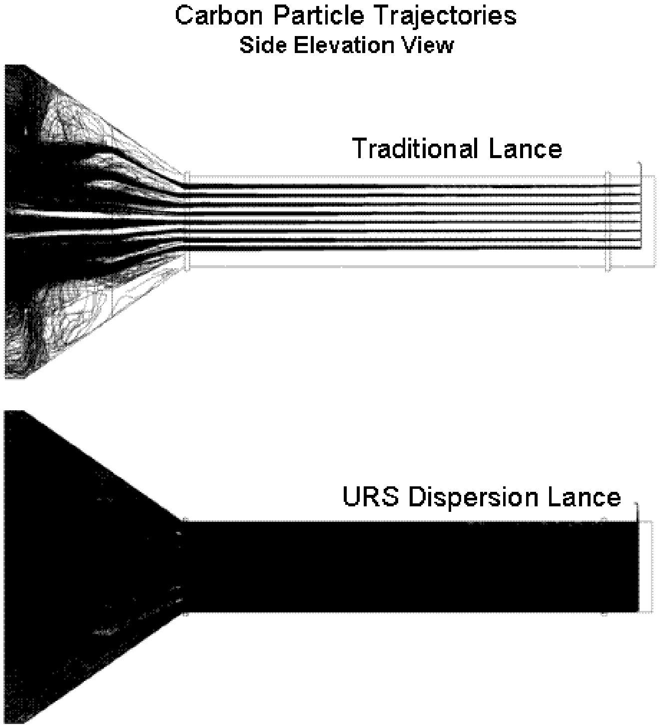


Figure 2-5. Side Elevation View Particle Trajectory Comparison – Traditional vs. Dispersion Lances

Toxecon™ II Injection System

EPRI's Toxecon™ II involves the injection of dry sorbent between the middle fields of an ESP, thus allowing for the untreated ash in the front fields to be segregated from the treated sorbent/ash mixture (pending a re-design of the ash handling system). Toxecon™ II therefore maintains the integrity of the bulk (>90%) of the fly ash, which is an advantage to plants such as LMS that market their fly ash as a beneficial cement replacement in concrete.

Prior to this test program, the Toxecon™ II system had been tested in short-term tests at Great River Energy's Coal Creek Station and at Entergy's 842 MW Independence Steam Electric Station (ISES) Unit 2. The Coal Creek tests were a quick proof-of-concept demonstration funded by EPRI. The ISES tests were used to develop the technology to improve sorbent utilization and mercury removal. The ISES tests have been conducted since 2005 as short-term tests lasting several hours to several weeks. Independence fires Powder River Basin (PRB) coal and is configured with a cold-side ESP for particulate control (SCA 542 ft^2/1,000 acfm). Funding for ISES Toxecon™ II testing was provided by DOE-NETL through contract DE-FC26-05NT42307, Entergy, EPRI, and ADA-ES. The primary contractor for Toxecon™ II testing at Independence was ADA-ES, which also provided the engineering for the Toxecon™ II system at LMS. The lessons learned from the ISES test program were applied to the Toxecon™ II lance design used for LMS and are now summarized.

Ensuring proper sorbent distribution is critical for effective mercury control. Good sorbent distribution is more challenging with Toxecon™ II than injection upstream of the ESP for three primary reasons:

- The flue gas velocity within the ESP is typically 3 to 4 ft/sec compared to 40 to 50 ft/sec upstream of the ESP. The velocity is reduced by increasing the cross sectional area in the direction of flow within the ESP. The increased cross sectional area requires a much larger sorbent injection grid and poses a greater challenge for proper sorbent distribution.
- The penetration of the sorbent from the lance into the gas is affected by the velocity in the ESP. Consequently, varying boiler load can significantly impact the sorbent distribution.
- The distance between the injection lances and the downstream collection field is limited to nominally 3 ft.

ADA-ES evaluated three lance designs at ISES. Each modified lance design was based on field testing experience with the lances and from extensive modeling efforts by ADA-ES (physical modeling of lance designs), NELS Consulting Services (physical modeling of ESP and injection grid), and Reaction Engineering International (computational fluid dynamics modeling).
From these combined modeling efforts, ADA-ES developed a beta tool to evaluate the potential of the grid design to capture vapor phase mercury. This tool is an evaluation of the potential sorbent coverage of the flue gas stream as it enters the downstream collector plates. It can also include a variable to estimate the impact of residence time on performance. Due to the limited test data available, this tool was in preliminary development status at the time of lance design.

The first phase of testing at ISES was performed with a series of single multi-nozzle lances that spanned the entire height of the ESP (Design #1). Mercury removal was limited to 80% at injection rates as high as 10 lb/Macf. Higher mercury removal had been achieved when injecting upstream of the ESP. CFD modeling by Reaction Engineering and physical modeling by ADA-ES indicated that the original single lance design resulted in a significant fraction of the sorbent exiting each lance through the nozzle furthest from the blower (>50% according to the CFD model, >35% according to the physical model). The CFD model also indicated that roughly twice as much sorbent was exiting the nozzles furthest from the manifold as compared to the other three lances in the grid.

A second lance design (Design #2) was developed wherein each single 40-foot lance was replaced by three lance sections each feeding 1/3 of the cross section (upper, middle, and lower) to minimize the top-to-bottom bias of the original lance design. Each lance section was configured with 8 nozzles at orientations determined through modeling to optimize distribution when compared to adjacent lances. The nozzles were placed at 4 elevations along the length of each lance section. In addition, rather than feeding an entire grid section through a single penthouse penetration, multiple penetrations were installed to allow more uniform side-to-side sorbent distribution. The penetrations were designed with guides spanning the height of the ESP to allow installation and removal of the lances while the ESP was in service.

The second lance design was tested at ISES in February/March 2007. The mercury removal achieved by Design #2 increased to 89% and this removal was sustained at high and low operating loads. However, lance sections became plugged with carbon after a few days of operation. A third lance design was tested at ISES in May 2007 that was designed to provide better maintenance properties than Design #2. The mercury removal achieved by Design #3 was significantly affected by unit load, with only 78% mercury removal at high load and 92% mercury removal at low load. While the mercury removal performance of the lances decreased, Design #3 did correct some of the operating and maintenance concerns associated with Design #2.

The LMS Toxecon™ II lance design was completed in February 2007 so that the lances could be fabricated in time for a March 2007 installation. The timing of the design/installation of the LMS lances coincided with the testing of the Design #2 lances at ISES; therefore, the lance design used at LMS was very similar to the lance Design #2 (i.e. eight three-section lances). The LMS lance design was further modified to allow lance blowback to clear any carbon pluggage. The Toxecon™ II injection system at LMS included the following design features:

1. The Toxecon™ II lances were installed to treat one-third of the ESP 1A box, which is one-twelfth of the flue gas flow. Eight lance bundles were installed.
2. The injection grid was installed at the downstream end of the fourth field, injecting in front of the fifth field, in between fields 1A4EF and 1A5EF.
3. The grid design included the capability to insert and retract the injection lances with the unit on line. For safety reasons, the fields immediately upstream and downstream of the grid were out of service during retraction.

4. The guide system for the grid lances was attached to the walkway at the bottom end of the plates, at a mid-support bar, and at the top of the box. The ports penetrated the ESP roof between the two trailing edge plate rapper hammer supports (Figure 2-6).
5. The distribution manifold was in the ESP penthouse, thus distributing the sorbent and transport air outside of the ESP box.
6. The lances were installed in between every fourth ESP plate.
7. The fourth field was de-energized during operation of the injection system.
8. The design assumed that the flue gas distribution through the ESP was essentially uniform across the plane of the plate trailing edges.

Figure 2-6. Toxecon™ II Lances Installed - View from ESP Roof

The ~50% mercury removal achieved by the Design #2 lances at LMS was significantly lower than the mercury removal achieved by these lances at ISES and lower than the physical model predictions. The internal ESP clearances at LMS prevented an optimal placement of the lances, limiting the ability of the lances to achieve optimized sorbent distribution. The pluggage problems encountered with the Design #2 lances at ISES were not encountered at LMS and the blowback system was not needed. The pluggage issues at ISES were only clearly discernible during extended continuous injection periods and may not have been evident during the parametric testing at LMS [1].

In May 2007, lance Design #3 was evaluated at LMS. The mercury removal performance did not improve with this new lance design, likely due to the already limited distribution potential of the lance design.

The results from the testing at ISES indicated that under certain operating conditions, the plant experienced particulate emissions spikes associated with last field plate rapping when operating at reduced ESP power levels and with non-brominated PAC. Based on changing the ESP power levels at ISES, it appears that operating at increased power levels for the last field minimized or eliminated these particulate spikes. It also appeared that both the particulate monitors and the opacity monitors respond differently to ash and to carbon particles, giving perhaps a significantly higher reading for the PAC/ash mixture than for a similar amount of straight ash.

At ISES, the last field rapping frequency was increased to 1 rap/hour. At LMS the last fields of the ESPs are rapped once per week and opacity spikes are observed during this rapping. Because of the infrequent rap cycle and the already observed opacity spike, rapping frequency was not changed for Toxecon™ II operation at LMS.

2.4 Calcium Bromide Addition System

During select parts of the Phase IV test program, calcium bromide was added to the coal to evaluate the ability of bromide to enhance the mercury removal achieved by sorbent injection. The LMS Unit 2 furnace is a split tangential furnace with ten coal feeders; each coal feeder services all eight burners on a single furnace level. Feeder A serves the lowest level of the furnace, followed by B, C, D, etc., moving up the furnace.

For this program, calcium bromide was added to two feeders (i.e., bromide was added to two levels of the furnace). From 7/9/09 through 7/15/09, the A and C feeders were used; from 7/16/09 through 7/20/09, the A and D feeders were used. The feeder location was changed due to operational problems with feeder C; these problems were unrelated to the bromide test. No modeling of the furnace was performed, so the effect of changing feeder location is uknown; however, little change is expected as the feeder location only changed by one level in the furnace.

The bromide was added as a 52 wt% solution of calcium bromide. An electronic metering pump delivered calcium bromide from 260-gallon totes through plastic tubing to a fitting on top of the coal feeder. Each feeder had a dedicated tote and pump. The liquid exited the fitting and fell on the coal as it neared the end of the weigh belt and fell into the pulverizer. The coal and bromide solution mixed in the pulverizer and then traveled through the fuel pipes to the furnace. Pump flow rates were checked with a daily calibration, and bromide feed rates were confirmed by monitoring the depletion rate of the bromide totes.

2.5 Flue Gas and Process Sampling Methods

An integral part of this test program was the collection and analysis of flue gas, coal, and process byproduct samples. Project engineers developed a chain-of-custody procedure and coordinated with plant personnel to ensure coal, fly ash, and FGD solid/liquid samples were collected and tracked properly. A quality assurance and control plan was adopted, as provided in Appendix A.

Flue Gas Sampling

Flue gas mercury concentrations (total and elemental mercury) were measured at the ESP inlet and ESP outlet using EPRI semi-continuous mercury analyzers, provided and operated by Apogee Scientific and URS Group. Four other flue gas mercury measurement methods were used at various points in this test program: Sorbent traps, Ontario Hydro (OH), EPA Method 29

(M29), and a novel X-ray Filter Method (XFM) developed by Cooper Enviornmental Services (CES). Sorbent trap measurements of total mercury concentration were made at the ESP outlet and stack during Phase IV testing. Ontario Hydro measurements of speciated mercury concentrations were conducted during baseline tests, the long-term injection test, and Phase IV. Also during Phase IV, EPA Method 29 and XFM were used to determine flue gas metals concentrations (including Hg) before and after the FGD scrubber.

Flue gas halogen concentrations (HCl, HBr, Br_2, Cl_2) were measured using EPA Method 26 during Parametric Phases I–III and the long-term test; no Method 26 measurements were performed during PHase IV. EPA Method 17 traverses were performed at the ESP inlet and outlet to monitor for particulate and sorbent breakthrough. Additional particulate measurements were made at the ESP outlet using EPA Method 5 (M5). An opacity montitor was used at the ESP outlet to determine the effect of carbon injection on opacity. Each of these methods is described in more detail below.

EPRI SCEM - Flue gas vapor-phase mercury analyses were made using mercury semi-continuous emission monitors (Hg SCEMs) depicted in Figure 2-7. At each testing location, a sample of the flue gas was extracted at a single point from the duct, drawn through an inertial gas separation filter to remove particulate matter, and returned to the duct. A secondary sample stream was pulled across the filter and then directed through the mercury analyzer at a rate of approximately 1-2 L/min, thus providing near real-time feedback during the various test conditions.

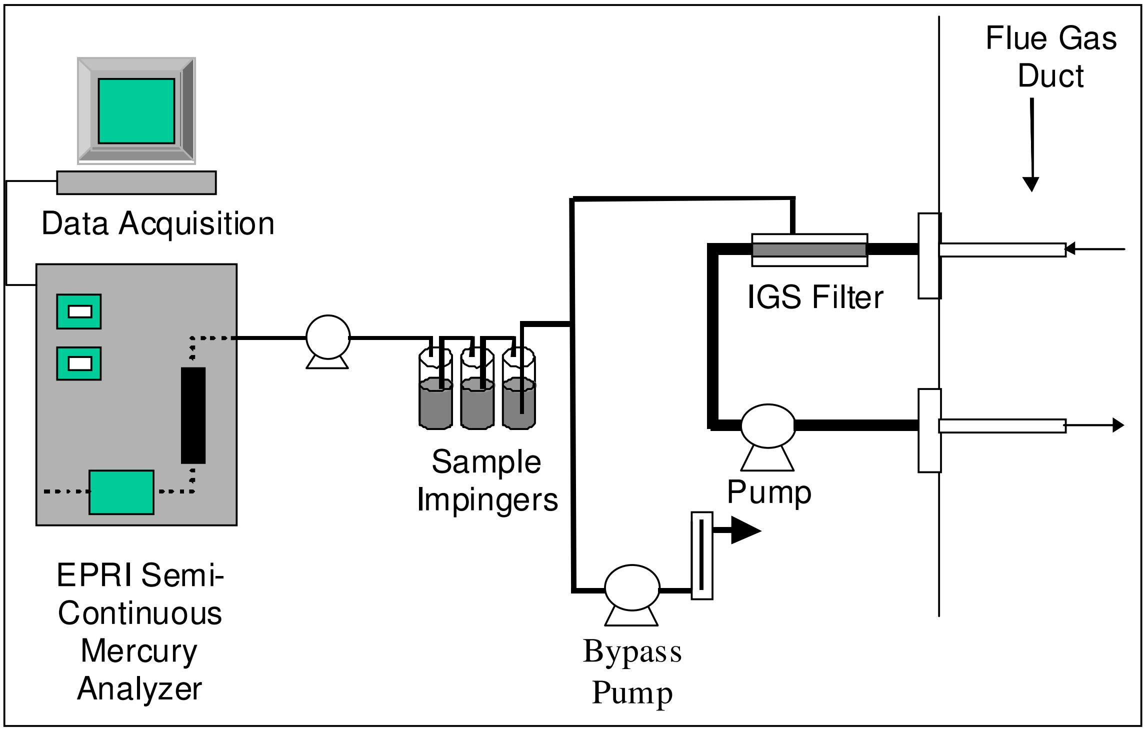


Figure 2-7. Semi-Continuous Mercury Analyzer

The analyzer consists of a cold vapor atomic absorption spectrometer (CVAAS) coupled with a gold amalgamation system (Au-CVAAS). Since the Au-CVAAS measures mercury by using the distinct lines of the UV absorption characteristics of elemental mercury, the non-elemental fraction is converted to elemental mercury prior to analysis using a chilled reduction solution of acidified stannous chloride. Several impingers containing alkaline solutions are placed downstream of the reducing impingers to remove acidic components from the flue gas; elemental mercury is quantitatively transferred through these impingers.

Gas exiting the impingers flows through a gold amalgamation column where the mercury in the gas is adsorbed (<60° C). After adsorbing mercury onto the gold for a fixed period of time (typically one to five minutes, depending on the mercury concentration in the gas), the mercury concentrated on the gold is thermally desorbed (>400° C) in air, and sent as a concentrated mercury stream to a CVAAS for analysis. Therefore, the total flue gas mercury concentration is measured semi-continuously with a one to five-minute sample time followed by a 2-minute analytical period.

To measure elemental mercury only, an impinger containing either 1M potassium chloride (KCl) or 1M Tris hydroxymethyl(aminomethane) (Tris) and EDTA is placed upstream of the alkaline solution impingers to capture oxidized mercury. Oxidized forms of mercury are subsequently captured and maintained in the KCl or Tris impingers while elemental mercury passes through to the gold amalgamation system. Comparison of “total” and “elemental” mercury measurements yields the extent of mercury oxidation in the flue gas. A detailed discussion on the methodology for calculating vapor-phase mercury concentration from the SCEMS data is provided in Appendix B.

When bromide is added to the furnace, highly reactive bromine is produced in the flue gas and the possibility exists for a negative bias in the measurement of flue gas mercury concentrations by SCEMs. This bias has been observed by several measurements groups, including URS Group, with various SCEMs at various power plants. This bias was observed in this test program at LMS with SCEMs at the AH inlet and ESP outlet; therefore, alternate measurement methods such as sorbent traps were used to quantify total flue gas mercury concentrations. Bromine is effectively removed by the FGD, so FGD outlet measurements are typically not subject to the bias. At LMS, where 15% of the flue gas bypasses the FGD, some bromide will be present in the stack flue gas; it is unknown if this level of bromide was sufficient to bias the Tekran CEMS at the stack. In the discussion of the mercury removal results during bromide addition, flue gas mercury concentrations are presented from the following methods: sorbent traps, M29, and XFM.

Sorbent Trap Method - In the sorbent trap method, a measured volume of flue gas is pulled through a sorbent trap over a set period of time. Flue gas mercury adsorbs to the sorbent material during the sample period. The sorbent is then digested in the laboratory and analyzed for total mercury content. Dividing the mass of mercury collected on the sorbent trap by the amount of flue gas sampled provides an average flue gas mercury concentration over the sample time period.

This method provides a total vapor phase mercury concentration; it does not speciate the mercury. Sorbent trap measurements were collected on most days during the 2009 Unit 2 test program. Measurements were collected at the ESP outlet and at the stack. Each day of sorbent trap collection consisted of two runs at each location. The oxygen concentration was measured once during each sorbent trap run to correct the measured mercury concentration to 3% O_2.

While the sorbent trap probe is capable of making dual sorbent trap measurements, only one sorbent trap was used at a time. Dual traps are specified for compliance purposes; as this project was experimental and past experience has indicated very good agreement between the two simultaneous traps, the second trap was not used in this test program. Method blanks were performed over the course of the test program. Both two-bed traps and three-bed, pre-spiked traps, were used for this test program.

It is not anticipated that the sorbent trap method would be subject to bromine-induced measurement bias when measuring total mercury concentration; however, no experimental study has been conducted to explicitly verify this assumption.

Ontario Hydro - Flue gas mercury measurements were made by the Ontario Hydro method (ASTM D 6784-02) during both the long-term test program on Unit 1 and Phase IV parametric testing on Unit 2. The Ontario Hydro method is a manual isokinetic wet chemistry method that obtains speciated flue gas mercury data. The method applies to the determination of elemental, oxidized, particle-bound, and total mercury emissions from coal-fired power plants. ASTM 6784-02 provides a full description of the equipment and procedures associated with the Ontario Hydro method.

During the long-term Unit 1 test program in 2007, the Ontario Hydro method was conducted at the treated ESP outlet and the untreated ESP outlet. The untreated ESP outlet served as the “uncontrolled” Ontario Hydro measurements for the unit. Ontario Hydro samples were not obtained at the ESP inlet, as previous Ontario Hydro tests at plants firing Texas Lignite have shown an appreciable bias in measured mercury oxidation and mercury concentration due to the reactivity of ash collected on the Method 5 filter (i.e., configured upstream of the Ontario Hydro collection impingers).

During the 2009 Unit 2 test program, Ontario Hydro sampling was conducted at the treated ESP outlet only; there were no untreated ESP ducts as the entire unit was treated with mercury controls. OH measurements were made on outlet duct 2D1, and each run consisted of a three port traverse of that duct.

Flue Gas Trace Metals - Flue gas samples were collected using EPA Method 29 [1] (Determination of Metals Emissions from Stationary Sources) and the Cooper XFM method. The methods were conducted simultaneously at both the ESP outlet and the stack. At each location, triplicate runs of each method were performed on one baseline day, on one day of sorbent injection only, and on one day of calcium bromide and sorbent injection. The measurements were collected to measure the concentration of metals in the flue gas before and after the FGD scrubber.

EPA Method 29 was conducted as a single-point, isokinetic measurement. Method 29 consists of a quartz filter to capture particulate matter followed by an impinger train as shown in Figure 2-8. The impinger train contains a knock-out impinger, two acidic hydrogen peroxide impingers, an empty impinger, and two impingers containing an acidified potassium permanganate solution.

The first three impingers are combined and analyzed for all metals, including mercury. The empty impinger rinse and the two permanganate impingers are analyzed solely for mercury.

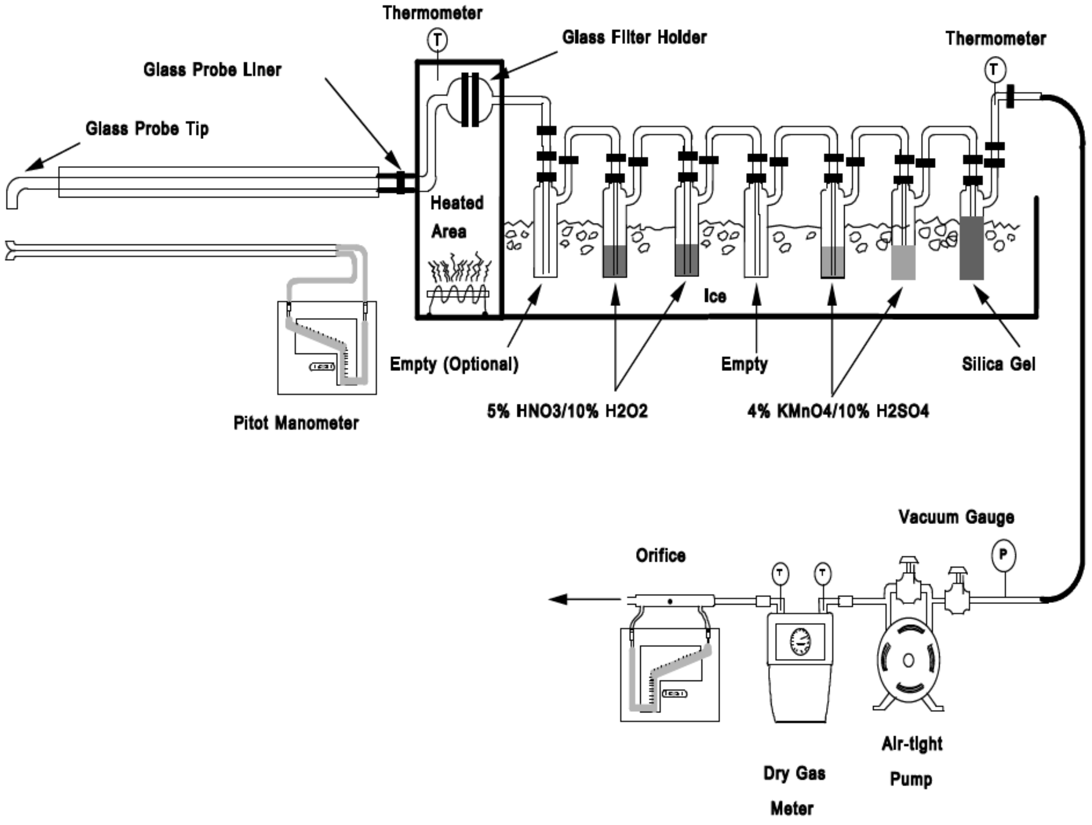


Figure 2-8. Diagram of EPA Method 29 Impinger Train

All sample preparation was carried out in accordance with EPA Method 29; the only deviation from the method was the addition of hydroxylamine sulfate to the permanganate impingers to ensure that no precipitate was present. Samples were analyzed for trace metal concentrations by CONSOL Energy using ICP-OES or ICP-MS (equivalent to EPA 200.7 and 200.8 respectively). Mercury analyses were carried out via CVAA. Continuing calibration verification (CCV) and quality control samples, such as duplicate and spiked samples, were performed periodically during the analyses; reported values were bracketed by CCVs within the range of 82-118% recovery.

The Cooper XFM method, developed by CES, is an alternative sampling and analysis method for determining the concentrations of particulate and vapor phase metals in flue gas. The method has been validated for use on a hazardous waste incinerator using EPA Method 301.[2] The X-ray based filter method has the potential to be a more efficient approach to trace-metals measurements as compared to the wet impinger-based Method 29. This program evaluated how an adaptation of the XFM method performed relative to Method 29 when sampling at a coal-fired power plant. Other adaptations of the XFM solid sorbent technology include the possible use of in-stack isokinetic sampling cassettes.[3]

For this study a large volume (approximately 750 Lpm) of stack gas was withdrawn from a single point using a heated velocity pressure probe (see Figure 2-9). A subsample (approximately 50 Lpm) of the stack gas in the probe was then drawn into the XFM extraction assembly using an eductor. Finally, about 1 Lpm of stack gas was drawn from the extraction assembly, diluted approximately 1:1 with clean dry air and passed through a filter cassette.

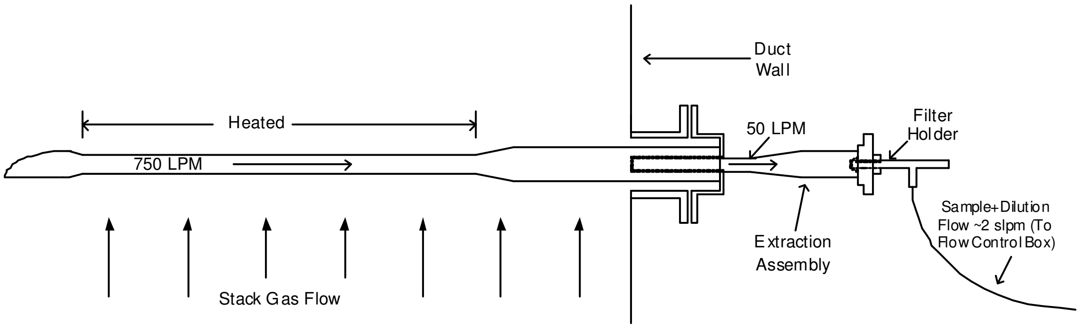


Figure 2-9. XFM Sampling Assembly

The filter cassette consisted of two filters: the first was a PTFE filter which removed the particulate from the gas stream and the second was a reactive filter which removed vapor phase metals from the gas stream, including vapor phase mercury and arsenic. After passing through the filter cassette the sampled flue gas traveled through a series of impingers submerged in ice to remove entrained water, through a carbon trap to remove acid vapors and was then measured using a mass flow meter. A filter cassette with three filters (PTFE filter, reactive filter, and treated reactive filter) enabled determination of mercury speciation.

Both the dilution flow and the total flow (stack gas flow plus dilution flow) were measured and totalized over each sampling period which lasted from 30 minutes to 1 hour. Following sampling, the filter cassette was removed from the filter holder, stored in a petri dish and sent to the laboratory for metals analysis by X-ray fluorescence. Each element has a characteristic wavelength that it emits as it returns to ground state after excitation due to the absorption of radiation; the intensity of this emission is measured and used to determine analyte concentration. The total concentration of each analyte was determined by dividing the XRF determined mass by the sample volume as follows:

$$C^i = \frac{M^i_{PTFE} + M^i_r}{V_t - V_d}$$

where:

C^i = Concentration of the ith element in flue gas (µg/dscm)

M^i_{PTFE} = XRF measured mass of the ith element on the PTFE filter (µg)

M^i_r = XRF measured mass of the ith element on the reactive filter (µg)

V_t = Total volume (dscm)

V_d = Dilution volume (dscm)

For every nine filters analyzed, CES analyzed a quality control standard to verify the XRF calibration stability. All of these QC standards were within 98-107% recovery.

Method 26A - Flue gas samples were collected using EPA Method 26A ["Determination of Hydrogen Halide (HX) and Halogen (X_2) Emissions from Stationary Sources"] during baseline and long-term testing conditions. These measurements were made to characterize the baseline flue gas halogen (HCl/Cl_2 and HBr/Br_2) concentrations and determine if bromine species volatilized from the chemically impregnated carbons after being injected into the flue gas. These measurements were only collected during testing on Unit 1. No Method 26A measurements were collected during the Unit 2 testing.

In Method 26A, hydrogen halides are solubilized in an acidic solution, while the halogens pass through to be captured in an alkaline solution. Method 26A has not been validated for flue gas measurements below 20 ppm halide; furthermore, a negative bias has been demonstrated for the quantification of halogen (X_2) present, with a corresponding positive bias for the quantification of the respective hydrogen halide [2]. In the presence of certain flue gas components (SO_2, O_2, NO_x), a significant fraction of the halogen (X_2) is captured in the acidic solution. While this bias affects the halogen speciation data, it does not affect the measurement of total halogen ($HX + X_2$) in the flue gas. Therefore, data will be reported as total halogen concentration, expressed in HCl or HBr equivalents.

Method 17 and Method 5 **-** Particulate matter measurements were made using EPA Methods 5 and 17 during the Unit 1 and Unit 2 tests. Method 17 uses an in-duct filter to collect particulate matter, while Method 5 uses a heated filter external to the duct. During the Unit 1 testing, the Method 17 measurements were conducted as a traverse of one duct exiting the ESP 1A outlet (representing 1/2 the treated ESP, or 1/8 of the entire unit). The other duct exiting the ESP 1A was not traversed, as the mercury SCEM was located in that duct. During the Unit 2 testing, Method 17 measurements were collected at both the inlet and the outlet of the 2D duct of the ESP. At the ESP outlet, traverses of both the upper and lower halves of duct 2D1 were performed on each testing day. Here, each of the sample ports were traversed at points across either the upper or lower half of the duct for a given sampling period. At the ESP inlet, measurements were collected from both the 2D1 and 2D2 ducts each day. Filters were weighed at a subcontracted laboratory (Severn Trent Laboratories).

Particulate measurements at the ESP inlet were performed at four existing (4-inch) sampling ports. Each inlet sampling event lasted 25 minutes and was conducted using one of the available ports, as illustrated in Figure 2-10. Each port was traversed in the following manner: the first sample point was located 1 foot into the duct with each subsequent point spaced 2 feet apart.

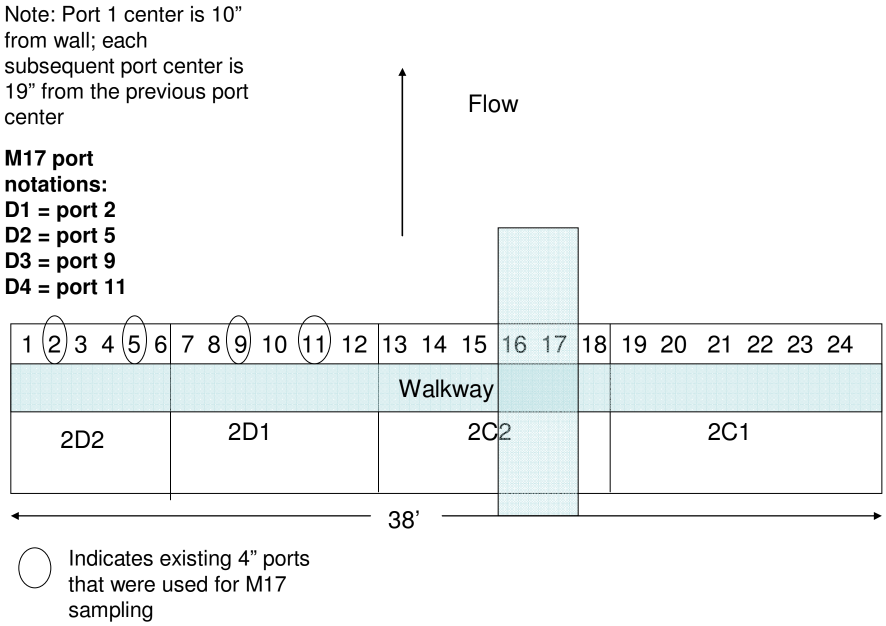


Figure 2-10. ESP Inlet Port Locations for Method 17 Measurements

The ESP outlet was traversed using three different sampling ports (Figure 2-11) to obtain particulate measurements. The outlet duct measurements were divided into top and bottom half traverses, as illustrated in Figure 2-12, to determine the level of particulate matter stratification across the duct, if any. Because outlet sampling times varied, the averages of outlet particulate concentration measurements for a given test condition were time-weighted.

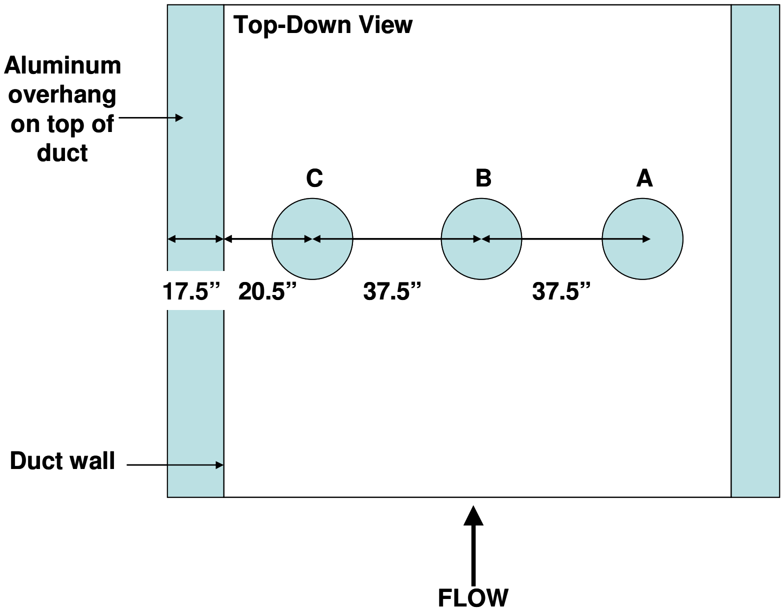
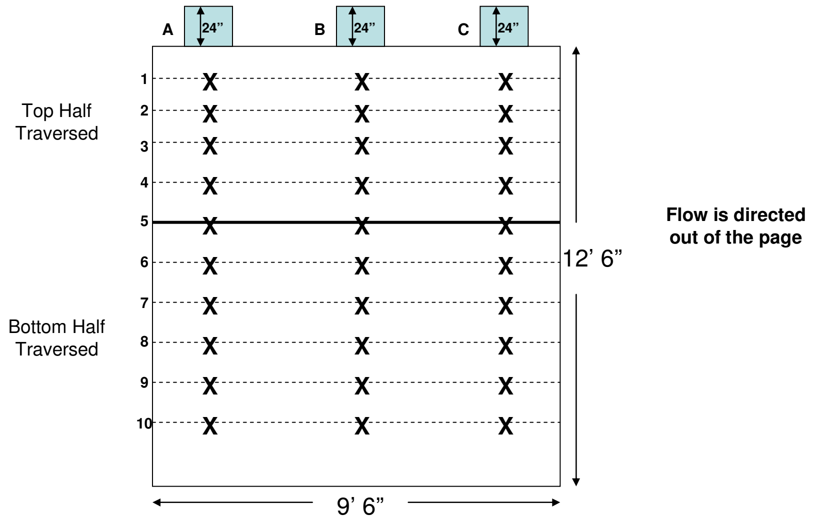


Figure 2-11. ESP Outlet Sampling Ports for Method 17 Measurements (Top-Down View)



Note: ESPO duct was traversed using ports A through C. Top half consisted of measurements from 1' to 5' into the deep at one foot intervals. Bottom half consisted of measurements from 6' to 10' deep at one foot intervals.

Figure 2-12. ESP Outlet Sampling Grid for Method 17 Measurements (Side Elevation)

Opacity Monitor - Each LMS ESP outlet duct is equipped with a Dynatron 1100M opacity monitor. Monitor data were hand-recorded during the parametric tests, but were electronically recorded for the long-term test. During Unit 1 testing in 2006-2007, the data from an untreated duct were compared with that for the treated duct to determine if there were any changes in opacity due to injection of activated carbon.

Coal and Byproduct Samples

Coal - Samples of both the Texas lignite and PRB coals fired at LMS were obtained each day during parametric testing and several times a week during long-term testing. During the 2006 – 2007 Phase I-III tests, coal samples were taken from the coal feeder weigh belts on Unit 1. Due to a change in the coal handling system resulting in a mixture of lignite/PRB coal on the weigh belts during the 2009 Phase IV tests, samples were collected as the coals were loaded onto the belt in the coal yard. The delay between coal loading and coal firing was approximately 8 hours. Coal mercury, trace metals, chloride, bromide, and ultimate/proximate parameters were determined by a subcontracted laboratory (Consol).

Fly Ash - Fly ash samples were collected directly from the ESP hoppers. Figure 2-13 shows the layout of the collectors for the Unit 1A ESP, and Figure 2-14 shows the layout of the Unit 2 ESP hoppers. During parametric tests, ash samples were obtained at the end of each test period. During the long-term injection test on Unit 1, fly ash samples were gathered once per day. During the Unit 2 test program, fly ash samples were collected on most test days. Fly ash samples were analyzed in URS' Austin laboratories for loss-on-ignition (LOI), mercury content, and foam index. The details for the URS foam index testing procedure are included in Appendix I. Fly ash mercury concentrations were determined by URS using ASTM 3684 digestion and CVAAS analysis. Mercury concentrations are reported as µg/g on a dry basis. The fly ash samples (and associated leachates) were analyzed for non-mercury trace metals concentration by a subcontracted laboratory (Consol). The fly ash samples were also analyzed by Headwaters Inc. to determine the ash's potential for use as a cement replacement in concrete. These tests included foam index, air entrainment requirements, and concrete strength. The foam index testing procedure used by Headwaters Inc. is included in Appendix I.

The leaching protocol used was the Synthetic Precipitation Leaching Procedure (SPLP). This leaching procedure, also known as EPA Method 1312, uses an acidified, aqueous leaching solution of pH 4.2 for samples collected east of the Mississippi River and pH 5.0 for samples collected west of the Mississippi River. This difference reflects the higher acidity of rainwater east of the Mississippi River. A mixture of nitric and sulfuric acid is used to adjust the pH of the water for this leaching procedure. The test duration is 18 hours and the test uses a 20:1 liquid-to-solid ratio and a turn rate of 30 rpm.

FGD System Samples - All FGD absorber slurry samples were collected from the recycle pump loop of the wet FGD system. Since the Unit 1 long-term test program was concerned with mercury removal across the ESP, only limited scrubber samples were obtained. During the Unit 1 long-term test program, the scrubber operated in an inhibited oxidation mode using the addition of elemental sulfur emulsion. Since only one-fourth of the unit's flue gas was treated with activated carbon and both treated and untreated flue gas combined in a common header prior to the scrubber system, it was impossible to obtain FGD absorber slurry samples representative of a unit treated with activated carbon. However, scrubber samples were obtained during baseline and long-term injection testing to monitor for signs of activated carbon breaking through the ESP and into the scrubber slurry.

The Unit 2 scrubber was converted to a forced oxidation mode in January 2009. During the 2009 Unit 2 test program, scrubber samples were collected on five test days: baseline, full unit Darco Hg-LH injection at the air preheater outlet and ESP inlet locations, and bromide boiler injection test conditions. These samples were analyzed for mercury and trace metals content in both the solid and liquid phase of each sample.

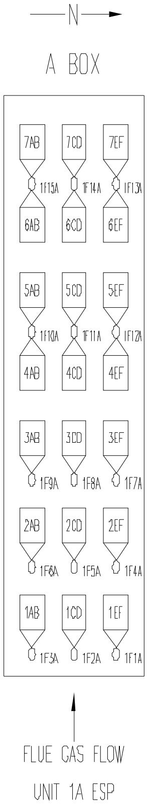


Figure 2-13. ESP 1A Hopper Configuration

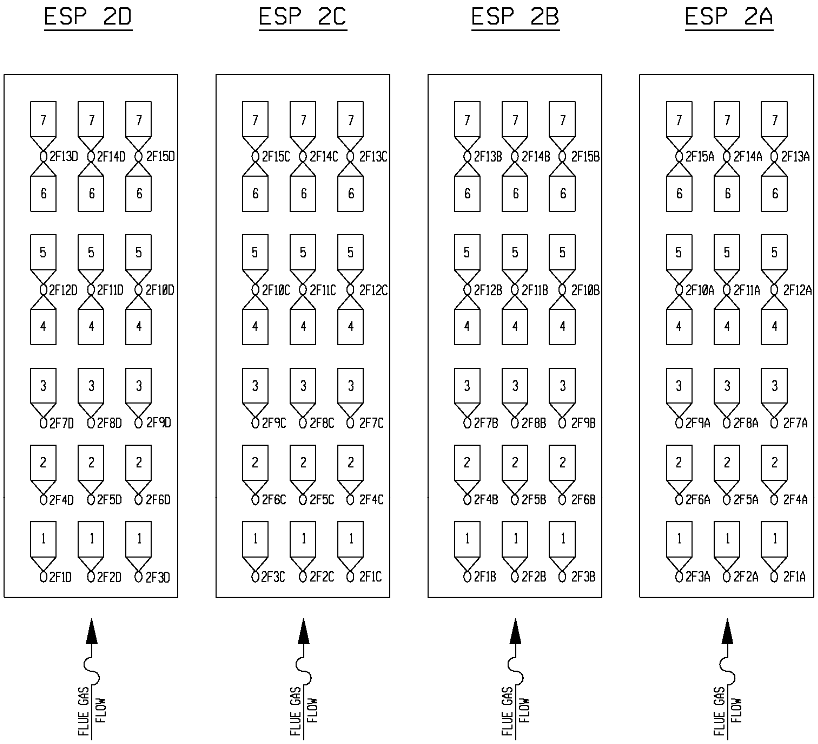


Figure 2-14. Unit 2 ESP Hopper Configuration

2.5 Parametric Testing Sample Matrix (Phases I-III, 2006-2007)

In the first phase of parametric testing, several sorbents were injected upstream of the ESP and evaluated for mercury control performance. Testing occurred over a two-week period. Each sorbent was tested at up to four different injection rates with each rate evaluated for up to four hours. Baseline characterization was scheduled during overnight periods to monitor the unit's return to baseline conditions after stopping carbon injection. Sorbents evaluated in Phase I parametric testing in December 2006 included Norit America's DARCO Hg (activated carbon) and DARCO Hg-LH (brominated carbon), Sorbent Technologies' B-PAC (brominated carbon), and Calgon Carbon's Flue PAC MC Plus (brominated carbon). It was originally planned to test a low ash impact sorbent (from BASF) during this test period; however, the vendor was unable to deliver the sorbent in time for the testing. This low ash impact sorbent was therefore evaluated just prior to the Phase II parametric tests.

The schedule for tests executed during Phase I of the parametric test program is provided in Table 2-4. For the carbon injection tests, SCEM mercury data collected after the flue gas mercury concentrations reached steady-state were analyzed and averaged.

Table 2-4. Executed Test Schedule – Parametric Testing, Phase I

Start Time (CT)	End Time (CT)	Injection Activity	Injection Rate* (lb/Macf)
12/3/2006 9:30	12/3/2006 12:07	Baseline	0
12/3/2006 12:14	12/3/2006 15:47	DARCO Hg-LH	1.1
12/3/2006 16:10	12/3/2006 19:13	DARCO Hg-LH	2.9
12/4/2006 8:34	12/4/2006 9:50	Baseline	0
12/4/2006 9:45	12/4/2006 13:40	DARCO Hg-LH	0.5
12/4/2006 13:40	12/4/2006 17:15	DARCO Hg-LH	2.5
12/4/2006 17:15	12/4/2006 19:40	DARCO Hg-LH	5.1
12/4/2006 19:45	12/4/2006 22:10	DARCO Hg-LH	1.7
12/5/2006 8:27	12/5/2006 9:17	Baseline	0
12/5/2006 9:15	12/5/2006 12:02	B-PAC	0.5
12/5/2006 12:02	12/5/2006 15:15	B-PAC	1.3
12/5/2006 15:15	12/5/2006 18:35	B-PAC	3.3
12/5/2006 18:35	12/5/2006 20:24	B-PAC	1.9
12/6/2006 8:15	12/6/2006 9:56	Baseline	0
12/6/2006 9:56	12/6/2006 12:23	DARCO Hg	3.4
12/6/2006 12:23	12/6/2006 16:36	DARCO Hg	8.2
12/6/2006 16:36	12/6/2006 19:12	DARCO Hg	5.6
12/7/2006 9:18	12/7/2006 9:55	Baseline	0
12/7/2006 9:55	12/7/2006 12:24	DARCO Hg	0.4
12/7/2006 12:24	12/7/2006 15:05	DARCO Hg	1.5
12/7/2006 15:05	12/7/2006 18:05	DARCO Hg	1.7
12/7/2006 18:05	12/7/2006 20:00	DARCO Hg	8.9
12/8/2006 8:00	12/8/2006 9:57	Baseline	0
12/8/2006 9:57	12/8/2006 12:10	Flue PAC MC Plus	0.5
12/8/2006 12:10	12/8/2006 15:02	Flue PAC MC Plus	1.9
12/8/2006 15:02	12/8/2006 17:38	Flue PAC MC Plus	5.8
12/9/2006 8:45	12/9/2006 9:47	Baseline	0
12/9/2006 9:47	12/10/2006 10:50	DARCO Hg	0.6
12/10/2006 10:50	12/10/2006 13:02	DARCO Hg	1.1

* Injection rates based on treating ¼ of Unit 1 flue gas (770,000 acfm).

Table 2-5 displays the testing schedule for Phase II of the parametric testing, which was conducted in late April and early May 2007. In the Phase II tests, several promising low ash impact sorbents and injection configurations were tested. The BASF MS200 and C-PAC sorbents were tested as low ash impact sorbents. The Toxecon™ II and staged injection configurations were tested using the DARCO Hg sorbent as possible low ash impact sorbent injection configurations.

Table 2-5. Test Schedule – Parametric Testing, Phase II

Start Time (CT)	End Time (CT)	Injection Activity	Injection Rate* (lb/Macf)
4/20/2007 9:38	4/21/2007 7:12	Baseline	0
4/21/2007 7:13	4/21/2007 8:55	Baseline	0
4/21/2007 8:55	4/21/2007 14:30	BASF MS200	6
4/21/2007 14:30	4/21/2007 18:10	BASF MS200	8
4/22/2007 9:28	4/22/2007 13:36	BASF MS200	10
4/22/2007 13:36	4/22/2007 17:43	BASF MS200	12
4/22/2007 17:43	4/22/2007 18:18	BASF MS200	20
4/22/2007 21:30	4/22/2007 8:50	Baseline	0
4/23/2007 10:00	4/23/2007 14:35	C-PAC	0.5
4/23/2007 14:35	4/23/2007 19:07	C-PAC	1.5
4/23/2007 22:00	4/24/2007 10:00	Baseline	0
4/24/2007 10:07	4/24/2007 14:04	DARCO Hg	1
4/24/2007 14:04	4/24/2007 18:49	DARCO Hg	2
4/25/2007 9:00	4/25/2007 11:30	Baseline	0
4/25/2007 11:03	4/25/2007 14:24	Calgon HGR-LH	1
4/25/2007 14:24	4/25/2007 18:21	Calgon HGR-LH	2
4/26/2007 10:00	4/26/2007 10:30	Baseline	0
4/26/2007 10:33	4/26/2007 13:03	DARCO Hg-LH	1
4/26/2007 17:44	4/26/2007 18:20	DARCO Hg-LH	2
4/27/2007 10:19	4/28/2007 0:00	Baseline	0
4/28/2007 0:01	4/28/2007 23:59	Baseline	0
4/29/2007 0:01	4/29/2007 17:30	Baseline	0
4/30/2007 0:01	4/30/2007 10:00	Baseline	0
4/30/2007 10:11	4/30/2007 14:58	Toxecon™ II DARCO Hg	2
4/30/2007 14:58	4/30/2007 19:34	Toxecon™ II DARCO Hg	5
5/1/2007 0:01	5/1/2007 9:30	Baseline	0
5/1/2007 12:26	5/1/2007 15:05	Toxecon™ II DARCO Hg	5
5/1/2007 18:00	5/2/2007 7:26	Baseline	0
5/2/2007 11:15	5/2/2007 14:29	DARCO Hg	2
5/2/2007 14:31	5/2/2007 18:10	DARCO Hg	3
5/2/2007 18:11	5/2/2007 22:15	Baseline	0
5/3/2007 12:00	5/3/2007 13:02	BASF MS200	8
5/4/2007 12:14	5/4/2007 18:48	B-PAC	1

* Injection rates based on treating ¼ of Unit 1 flue gas (770,000 acfm).

A third phase of parametric testing was conducted to investigate an alternate design for the Toxecon™ II lances. Table 2-6 shows the schedule for the Phase III parametric testing.

Table 2-6. Executed Test Schedule – Parametric Testing, Phase III

Start Time (CT)	End Time (CT)	Injection Activity	Injection Rate* (lb/Macf)
5/22/2007 19:01	5/23/2007 10:42	Baseline	0
5/23/2007 11:45	5/23/2007 13:30	Toxecon™ II DARCO Hg	2.0
5/23/2007 13:30	5/23/2007 18:40	Toxecon™ II DARCO Hg	6.0
5/23/2007 18:40	5/24/2007 5:00	Baseline	0
5/24/2007 8:50	5/24/2007 9:30	Baseline	0
5/24/2007 10:05	5/24/2007 13:30	Toxecon™ II DARCO Hg	3.0
5/24/2007 13:35	5/24/2007 16:05	Staged Injection DARCO Hg	0.5/3.0
5/24/2007 16:05	5/24/2007 17:40	Staged Injection DARCO Hg	0.5/5.0
5/24/2007 21:00	5/25/2007 7:00	Baseline	0
5/25/2007 8:30	5/25/2007 12:45	Baseline	0
5/25/2007 12:45	5/25/2007 17:10	Toxecon™ II DARCO Hg-LH	5.0
5/25/2007 22:00	5/26/2007 9:30	Baseline	0
5/26/2007 9:31	5/26/2007 10:45	Baseline	0
5/26/2007 10:45	5/26/2007 11:30	DARCO Hg-LH w/o forced air	0.5
5/26/2007 11:30	5/26/2007 12:10	DARCO Hg-LH w/ forced air	0.5
5/26/2007 12:10	5/26/2007 14:55	DARCO Hg-LH w/ forced air	0.7
5/26/2007 15:00	5/26/2007 15:25	DARCO Hg-LH w/ forced air	1.0
5/26/2007 15:25	5/26/2007 16:20	DARCO Hg-LH w/o forced air	1.0
5/26/2007 16:25	5/26/2007 18:10	Staged Injection DARCO Hg-LH	1.0/5.0

*Injection rates based on treating ¼ of Unit 1 flue gas (770,000 acfm).

Table 2-7 lists the flue gas parameters measured during the parametric tests. Flue gas mercury concentrations were measured continuously with two mercury SCEMs. The first SCEM measured mercury at the ESP inlet; the second SCEM alternated between measuring speciated mercury at the ESP 1A2 outlet (treated duct) and ESP 1B1 outlet (untreated duct).

Prior to installing the mercury analyzer extraction probes, a duct velocity traverse was conducted during full-load conditions to determine profiles for identifying appropriate sampling locations and for modeling sorbent distribution in the duct. During baseline and each parametric carbon injection test condition, ESP outlet flue gas particulate concentrations were measured with a Method 17 traverse of one half of ESP 1A.

Table 2-7. Flue Gas Sampling Matrix for 2006-2007 Parametric Tests

Location	Sample Method	Parameter(s)	Frequency Per Test Condition
ESP 1A Inlet	M2	Velocity Profile	Once prior to installation of SCEM and injection lances
	SCEM	Speciated Hg	Continuous
ESP 1A Outlet	M2	Velocity Profile	Once prior to installation of SCEM
	SCEM	Speciated Hg	Continuous
	M17	Particulate Loading, traverse of ½ ESP 1A	Once per test condition
	Dynatron 1100M Opacity Monitor	Opacity	Hand recorded (2-5 times per day)
ESP 1B Outlet	SCEM	Total Hg	Limited

Solid process samples were collected with the help of plant personnel. Table 2-8 shows the process sampling schedule during the short-term parametric testing. Coal and ash samples were taken daily; however, not all collected samples were analyzed.

Table 2-8. Solid Process Samples Collected for 2006-2007 Parametric Tests

Sample	Sample Frequency	Sample Size	Responsible Party for Collection	Parameters for Analysis
Coal – Feeder Weigh Belt	Once per day	One gallon size bag of each coal type	LMS	Hg, Halogens, Ultimate/Proximate
Fly Ash – Unit 1 ESP A	Once per test condition	One quart size sample per hopper	URS	Hg, LOI, Concrete Testing

Sorbent injection test conditions were not maintained long enough in the parametric tests to obtain representative fly ash samples; therefore, simulated ash/carbon mixtures were made in the laboratory and underwent concrete testing as shown in Table 2-9. Previous testing by URS and EPRI has shown that representative samples, for the evaluation of fly ash reuse properties, can be prepared from actual fly ash mixed with known amounts of activated carbon.

Table 2-9. Sampling Plan for Concrete Testing for 2006-2007 Parametric Tests

Test Parameters	Samples Tested
AEA Demand	Baseline, Simulated Ash + Sorbent
Slump	Baseline, Simulated Ash + Sorbent
Air % Pressure	Baseline, Simulated Ash + Sorbent
7 day compressive strength	Baseline, Simulated Ash + Sorbent
28 day compressive strength	Baseline, Simulated Ash + Sorbent

2.6 Long-Term Testing Sample Matrix

The best overall combination of sorbent type and injection feed location (factoring in mercury removal efficiency, sorbent cost, fly ash reuse properties and any short-term balance-of-plant impacts such as ESP particulate collection efficiency) was selected for a 60-day continuous injection evaluation.

Based on the parametric test results, the project team decided to conduct the 60-day test with Norit's DARCO Hg-LH injected upstream of the ESP at 2 lb/Macf. While the non-brominated DARCO Hg performed nearly as well as the DARCO Hg-LH and was available at a lower cost, it was not selected for the long-term test. A brominated sorbent was selected because the plant sometimes fires 100% PRB coal, and a brominated sorbent was needed to overcome the low halogen content of the PRB coal. In addition, a brominated sorbent was expected to be less sensitive to higher flue gas temperatures, which would be encountered during the summer test months. Norit's DARCO Hg-LH sorbent was selected over Sorbent Technologies B-PAC because it had the overall lower cost, when factoring in transportation of the sorbent. In addition, B-PAC did not perform as well as DARCO Hg-LH in simulated concrete foam index tests. Both brominated sorbents performed similarly in terms of mercury removal during the test program and were available at the same F.O.B. cost.

The Toxecon™ II and staged injection configurations were not selected for the long-term test, as neither configuration was able to consistently achieve the mercury removal target (> 50%) for this project. Furthermore, the risk of particulate matter breaking through the ESP was higher with Toxecon™ II. Therefore, the project team elected to inject sorbent upstream of the ESP.

The injection rate of 2 lb/Macf was chosen because the parametric tests showed that the mercury removal target of at least 50% could be achieved at this rate. Concrete testing results (foam index, air entrainment, and compressive strength) for simulated ash/carbon mixtures for this injection rate indicated that the ash might still be marketable to the concrete industry. Higher injection rates were not considered as they would pose a higher risk of the ash not being marketable. Lower injection rates were not considered as they would pose the risk of not meeting the project's mercury removal target.

Flue gas and byproduct mercury concentrations were monitored throughout the long-term test along with plant operating data to evaluate mercury removal performance variability and any balance-of-plant impacts that occurred. During the long-term test, the plant typically fired a 70/30 mixture of Texas lignite and PRB coals. However, for four short periods (less than 2 days each) the unit fired 100% PRB coal when Texas lignite was not available. Table 2-10 summarizes the coal firing schedule during the long-term test.

Table 2-10. Coal Schedule for Unit 1 Long-Term Test

Coal Fired	Start	End
70/30 TxL/PRB	6/19/07 19:00	6/26/07 23:00
100% PRB	6/27/07 4:00	6/28/07 15:00
70/30 TxL/PRB	6/28/07 19:00	7/2/07 20:00
100% PRB	7/4/07 1:00	7/5/07 4:00
70/30 TxL/PRB	7/5/07 13:00	7/5/07 21:00
100% PRB	7/5/07 23:00	7/7/07 6:00
70/30 TxL/PRB	7/7/07 10:00	7/13/07 2:00
Unit outage	7/13/07 7:25	7/18/07 11:45
70/30 TxL/PRB	7/18/07 14:00	8/2/07 12:00
100% PRB	8/2/07 17:00	8/3/07 9:00
70/30 TxL/PRB	8/3/07 14:00	8/22/07 17:00

Table 2-11 provides a summary of the flue gas samples collected during the long-term baseline and sorbent injection test periods. Ontario Hydro measurements were conducted at the ESP outlet at baseline conditions and at the beginning, middle, and end of the long-term test. Table 2-12 provides the Ontario Hydro sample schedule. Two mercury SCEMs were operated continuously throughout the test period; one at the ESP inlet (e.g., upstream of sorbent injection), and one at the ESP outlet. Method 26 measurements were made at the treated and untreated ESP outlets to determine how much bromine volatilized from the DARCO Hg-LH sorbent. Particulate loading was measured at the ESP inlet and outlet as a Method 5 train in conjunction with Ontario Hydro and Method 26A. Method 17 measurements were conducted three times during the long term test at the ESP outlet. For OH, M5, M26A, and M17, only one-half of the 1A and 1B ESPs was traversed due to port availability. SCEM probes were installed in ports on the other half of each ESP.

Table 2-11. Sample Collection and Analyses for Unit 1 Long-Term Tests

Location	Sample Method	Parameter(s)	Frequency [a]	
			Baseline	Injection
ESP 1A Inlet	SCEM	Speciated Hg	Continuous	Continuous
ESP 1A1 Outlet (Treated ESP)	Ontario Hydro	Speciated Hg, Particulate Loading	1 set of three runs	3 sets of three runs
	M26A	HCl/Cl_2, Particulate Loading		Once
	M17	Particulate Loading		3 sets of six runs
	Dynatron 1100M	Opacity	Continuous	Continuous
ESP 1A2 Outlet (Treated ESP)	SCEM	Speciated Hg	Continuous	Continuous
ESP 1B1 Outlet (Untreated ESP)	SCEM	Speciated Hg	Continuous	Continuous
ESP 1B2 Outlet (Untreated ESP)	Ontario Hydro	Speciated Hg, Particulate Loading	1 set of three runs	3 sets of three runs
	M26A	HCl/Cl_2, Particulate Loading		Once
	Dynatron 1100M	Opacity	Continuous	Continuous
ESP 1C Outlet (Untreated ESP)	Dynatron 1100M	Opacity	Continuous	Continuous
ESP 1D Outlet (Untreated ESP)	Dynatron 1100M	Opacity	Continuous	Continuous

[a] Frequency during the baseline and the 8-week long-term injection test periods.

Table 2-12. OH Sample Schedule for Unit 1 Long-Term Tests

	Untreated Duct		Treated Duct	
	Date	Start & Stop Times	Date	Start & Stop Times
Baseline (Trip 1)				
Run 1	20-Jun-07	10:10-12:24	20-Jun-07	10:10-12:25
Run 2	20-Jun-07	13:50-16:04	20-Jun-07	13:50-16:00
Run 3	21-Jun-07	11:01-15:29	21-Jun-07	11:01-15:32
Injection Round 1 (Trip 2)				
Run 1	10-Jul-07	12:10-14:27	10-Jul-07	12:10-14:24
Run 2	10-Jul-07	15:20-17:35	10-Jul-07	15:20-17:23
Run 3	11-Jul-07	09:32-11:45	11-Jul-07	9:32-11:43
Injection Round 2 (Trip 3)				
Run 1	31-Jul-07	10:00-12:45	31-Jul-07	10:00-12:11
Run 2	31-Jul-07	14:01-16:09	31-Jul-07	14:01-16:13
Run 3	1-Aug-07	09:20-11:32	1-Aug-07	09:23-11:36
Injection Round 3 (Trip 4)				
Run 1	14-Aug-07	11:30-13:40	14-Aug-07	11:30-13:45
Run 2	14-Aug-07	15:00-17:10	14-Aug-07	15:00-17:10
Run 3	15-Aug-07	09:30-11:35	15-Aug-07	09:30-11:38

Table 2-13 shows the process sampling frequency during the continuous injection tests. Coal samples were obtained a few times per week, ash samples were taken daily, and FGD samples were collected once per week. As part of this program, samples were obtained for DOE NETL's byproduct testing program.

Table 2-13. Process Sample Schedule for Unit 1 Long-Term Injection Test

Sample	Frequency	Sample Size	Responsible Party	Parameters for Analysis
Coal – Unit 1	3 times per week	One gallon size bag of each coal type	LMS	Hg, Halogens, Ultimate/ Proximate
Fly Ash – Unit 1A ESP	Once per day	One pint per hopper in first fields	URS	Hg, LOI
Fly Ash – Unit 1A ESP	Once per week	Two 5-gallon buckets in first field	URS	Concrete Testing
Fly Ash – Unit 1A ESP	Collected at baseline, one month and two month marks	Three 5-gallon buckets	URS	DOE Byproduct Testing
Fly Ash – Unit 1A ESP	Once per week	One pint per hopper in all fields	URS	Hg, LOI, Concrete Testing
Fly Ash – Unit 1B ESP	Once per week	One pint per hopper in first field	URS	Hg, LOI, Concrete Testing
FGD Sample –Unit 1A	Once per week	One 500-mL sample	URS	Visual determination of carbon breakthrough, Hg and FGD Analyses

Ash samples collected during baseline and long-term testing were subjected to various characterization tests to determine the suitability of the ash for use in concrete production. Foam index and LOI tests were performed by URS, strength activity tests were performed by UNDEERC, and Headwaters Inc. performed the tests listed in Table 2-14.

Table 2-14. Fly Ash Sampling Plan for Concrete Testing for Unit 1 Long-Term Test

Tests Performed by Headwaters	Method(s) Used
AEA Demand (Foam Index Testing)	ASTM C 618
% Carbon	LOI & total carbon by LECO
Particle Size	325 mesh & Horiba
Compressive Strength on Mortar Cubes	ASTM C 109
Compressive Strength on Concrete Cylinders	ASTM C 39

2.8 Parametric Phase IV Scope of Work and Plan

The fourth and final round of parametric testing was performed at LMS Unit 2 over seven weeks. Table 2-15 shows the executed test schedule for Phase IV. This test program was designed to evaluate several sorbents and injection configurations. Flue gas mercury measurements were made at the AH inlet, ESP outlet and stack. The entire unit (all four ESPs) was treated during the first several weeks of the test program, thus allowing for measurement of mercury removal across the combined ESP/FGD system. During the remainder of the test program, only one ESP (one quarter of Unit 2) was treated; an alternate lance configuration and several experimental sorbents were tested during this period.

Several tests were conducted with Norit Americas' DARCO Hg and DARCO Hg-LH to allow for comparisons to previous LMS test data. In addition, three different ash compatible sorbents and several proprietary sorbents, provided by Calgon Carbon, were evaluated.

Sorbent injection was tested for several days while the unit fired an alternate fuel blend consisting of 55/45 (percent by mass) TxL/PRB coals. The unit typically fires a 70/30 TxL/PRB blend.

In conjunction with this test program, EPRI and NRG funded tests to evaluate the impact of calcium bromide injection to the furnace on the fate of mercury across the LMS gas path. These tests were conducted in cooperation with Alstom, who owns the North American license for the technology. Tests were conducted with bromide injection alone and in conjunction with activated carbon injection.

The LMS scrubbers recently underwent a conversion from inhibited oxidation to forced oxidation operation. Baseline mercury removal across the FGD was evaluated under both FGD chemistries; however, the parametric sorbent injection program was conducted with the unit operating at steady-state forced oxidation chemistry.

During this test program, the FGD scrubber was operated with some of the flue gas bypassing the FGD system. The fraction of gas bypassing the scrubber was calculated using plant data according to the following equation:

$$BypassFraction = \frac{SO_2, out - (0.15 \times SO_2, in)}{(0.85 \times SO_2, in)}$$

Here, SO_2, in and SO_2, out are the flue gas SO_2 concentrations at the scrubber inlet and outlet (post re-introduction of bypassed gas to the stack flue gas), respectively. The scrubber bypass flow at LMS was not measured. The equation thus uses known inlet and outlet SO_2 values and the scrubber removal efficiency to estimate the fraction of flue gas bypassing the FGD system. This equation assumes an average SO_2 removal of 85% across the wet FGD scrubber. This was determined, through system performance tests, to be an average removal obtained across the FGD absorbers when operating at the conditions employed during the ACI testing period.

With some flue gas bypassing the FGD, the actual mercury removal achieved by LMS Unit 2 was lower than what would be possible if all the flue gas was scrubbed. Theoretical total and elemental mercury concentrations at the stack, *assuming no gas bypass, no re-emissions, and 95% removal of oxidized Hg*, were calculated using the bypass fraction and the ESP outlet concentrations. Where appropriate, theoretical mercury removal at the stack was then calculated using these theoretical stack mercury concentrations and measured ESP outlet concentrations.

Table 2-15. Test Schedule – Parametric Testing, Phase IV

Date (2009)	Day #	Day of Week	Activity	Fuel Blend (TxL/PRB)	Injection Location	Sorbent	Sorbent Injection Rates (lb/Macf)	SCEM AH Inlet (1)/ ESP Outlet (2) / Stack (3)	ESP Ash Hopper Samples C/D	Silo Ash Sample	App K ESP Outlet(1)/ Stack(2)	M17 ESP Inlet	M17 ESP Outlet*	M29 ESP Outlet(1)/ Stack(2)	FGD Samples	OH ESP Outlet
						χ			Δ	◊	σ			τ	∇	ψ
8-Jun	1	M	Travel/Setup									VT at AH Inlet				
9-Jun	2	T	Setup									VT at ESP Out				
10-Jun	3	W	Setup									X	X			
11-Jun	4	Th	Baseline	70/30			0	1/2/3	C	X	1/2	X	X			
12-Jun	5	F	Baseline	70/30			0	1/2/3	C	X	1/2				Z	3
13-Jun	6	Sa	Continuous Injection	70/30	AH	Darco Hg-LH	2	1/2/3	C,D		1/2		X			
14-Jun	7	Su		70/30	AH	Darco Hg-LH	2	1/2/3	C,D	X	1/2		X			
15-Jun	8	M		70/30	AH	Darco Hg-LH	.5	1/2/3	C,D		1/2		X			
16-Jun	9	T		70/30	AH	Darco Hg-LH	.5	1/2/3	C,D	X	1/2	X	X			
17-Jun	10	W		70/30	AH	Darco Hg-LH	1	1/2/3	C,D		1/2	X	X			
18-Jun	11	Th		70/30	AH	Darco Hg-LH	1	1/2/3	C	X	1/2				Z	3
19-Jun	12	F	No Testing													
20-Jun	13	Sa	No Testing													
21-Jun	14	Su	Baseline	70/30	AH		0	1/2/3			1/2					
22-Jun	15	M	Concrete Compatible Parametric	70/30	AH	Sorbtech C-PAC	1	1/2/3	C		1/2					
23-Jun	16	T		70/30	AH	Calgon FLUEPAC CF Plus	1	1/2/3	C		1/2					
24-Jun	17	W		70/30	AH	Norit Hg-LH EXP224	1	1/2/3	C		1/2					

Date (2009)	Day #	Day of Week	Activity	Fuel Blend (TxL/PRB)	Injection Location	Sorbent	Sorbent Injection Rates (lb/Macf)	SCEM AH Inlet $^{(1)}$/ ESP Outlet $^{(2)}$ / Stack $^{(3)}$	ESP Ash Hopper Samples C/D	Silo Ash Sample	App K ESP Outlet$^{(1)}$/ Stack$^{(2)}$	M17 ESP Inlet	M17 ESP Outlet*	M29 ESP Outlet$^{(1)}$/ Stack$^{(2)}$	FGD Samples	OH ESP Outlet
						χ			Δ	◊	σ			τ	∇	ψ
25-Jun	18	Th	Calgon Funded; Concrete Compatible Parametric	70/30	AH	Calgon CF Plus Ultra (2 bags); Darco Hg-LH (1 bag)	1	1/2/3			none					
26-Jun	19	F	Alternate Fuel Blend	30/70	AH	Baseline	0	1/2/3	C		1/2					
27-Jun	20	Sa	Alt Fuel; Continuous ACI	30/70	AH	Darco Hg-LH	1	1/2/3	C		1/2					
28-Jun	21	Su		30/70	AH	Darco Hg-LH	2	1/2/3	C		1/2					
6/29/09 - 7/6/09	22 - 29	M-M	No Testing				0									
7-Jul	30	T	Baseline; move lances to ESP	70/30			0	1/2/3								
8-Jul	31	W	Parametric ACI	70/30	ESP	Darco Hg	0.5/1/ 2	1/2/3			1/2					
9-Jul	32	Th	Begin Continuous Br to Coal	70/30	ESP		0	1/2/3	C		1/2					2
10-Jul	33	F	Br to Coal +ACI	70/30	ESP	Darco Hg	0.5	1/2/3	C		1/2					2
11-Jul	34	Sa	Br to Coal + ACI	70/30	ESP	Darco Hg	0.5	1/2/3	C		1/2					2
12-Jul	35	Su	Br to Coal + ACI	70/30	ESP	Darco Hg	0.5	1/2/3	C		1/2			1/2 + Cooper	Z	
13-Jul	36	M	Baseline	70/30			0	1/2/3			1/2	Mal. Travel		1/2 + Cooper	Z	
14-Jul	37	T	Upstream ESP Injection	70/30	ESP	Darco Hg-LH	2	1/2/3	C		1/2	Mal. Setup		1/2 + Cooper	Z	
15-Jul	38	W	Upstream ESP Injection	70/30	ESP	Darco Hg-LH	Varying rates 0.5-2	1/2/3	C	X	1/2	Mal. Test				
16-Jul	39	Th	Br to Coal + ACI	70/30	ESP	Darco Hg-LH Finely Ground	0.5/2/1	1/2/3			1/2	Mal. Test				
17-Jul	40	F	Move lances for 1/4 unit tests; test	70/30	ESP	Norit Darco HgLH	1	1/2/3				Mal . Travel				
18-Jul	41	Sa	1/4 unit test	70/30	ESP	Norit Darco HgLH	0.5/1/2	1/2/3								

Date (2009)	Day #	Day of Week	Activity	Fuel Blend (TxL/PRB)	Injection Location	Sorbent	Sorbent Injection Rates (lb/Macf)	SCEM AH Inlet $^{(1)}$/ ESP Outlet $^{(2)}$ / Stack $^{(3)}$	ESP Ash Hopper Samples C/D	Silo Ash Sample	App K ESP Outlet$^{(1)}$/ Stack$^{(2)}$	M17 ESP Inlet	M17 ESP Outlet*	M29 ESP Outlet$^{(1)}$/ Stack$^{(2)}$	FGD Samples	OH ESP Outlet
						χ			Δ	◊	σ			τ	∇	ψ
19-Jul	42	Su	Calgon Funded Test1	70/30	ESP	Calgon A2, A	1	1/2/3								
20-Jul	43	M	Br to Coal + Install Enhanced Distribution (ED) lances	70/30	ESP	None	0	1/2/3								
21-Jul	44	T	Test ED lances	70/30	ESP	Norit Darco HgLH	1/2/6	1/2/3			1					
22-Jul	45	W	Test ED lances	70/30	ESP	Norit Darco HgLH	1	1/2/3			1					
23-Jul	46	Th	Test ED lances	70/30	ESP	Norit Darco HgLH	1	1/2/3			1					
24-Jul	47	F	Calgon Test2	70/30	ESP	Calgon		1/2/3								
25-Jul	48	Sa	Calgon Test3	70/30	ESP	Calgon		1/2/3								
26-Jul	49	Su	Calgon Test4	70/30	ESP	Calgon		1/2/3								
27-Jul	50	M	Calgon Test5	70/30	ESP	Calgon		1/2/3								
28-Jul	51	T	Calgon Test6	70/30	ESP	Calgon		1/2/3			1/2					
29-Jul	52	W	Calgon Test7	70/30	ESP	Calgon		1/2/3			1/2					
30-Jul	53	Th	Calgon Test8	70/30	ESP	Calgon		1/2/3			1/2					
31-Jul	54	F	Teardown													
1-Aug	55	Sa	Teardown/Travel													

Notes:

χ Sample of each sorbent lot will be collected by Apogee.

Δ C – ESP C: 5-gal 2F2C; quart 2F11C, quart 2F14C
D – ESP D: quart 2F1D, 2F2D, 2F3D, 2F11D, 2F14D

Silo ash samples will be collected by Headwaters. Headwaters will collect an amount sufficient for their analysis plus a 5 gallon bucket for URS testing.

σ Each day of sorbent trap collection consists of two runs at indicated location. Single point measurements. Runs at each location will alternate between two-bed traps and third-bed spiked traps. ESP outlet sorbent trap will be conducted in duct 2C1.

* Method 17 runs will be 3.5 hours long; two runs per day; first run will be for upper half traverse of duct; second run will be for lower half traverse of duct, conducted in ESP outlet duct 2D1; Inlet ports sampled should correspond to the 2D ESP (sample 2D1 ports with 1 filter, then 2D2 ports with another filter; kep alternating for duration of M17 outlet run)

τ M29 will be conducted in ESP outlet duct 2D1 and at the stack (single point or traverse?)

Ψ 2-3 runs per day of OH at ESP outlet, three port traverse of ESP outlet duct 2D1

Z - DF, Hg, Trace Metals, wt% at the Absorber Blowdown, pH, ORP (Field Blank per sampler)

Mal = Malvern PSD analyzer system

Table 2-16 displays the sorbent injection schedule for Phase IV of this test program, and Table 2-17 displays the bromide addition test schedule.

Table 2-16. Sorbent Injection Schedule – Parametric Testing, Phase IV

Start Time (CT)	End Time (CT)	Injection Activity	Injection Location	Injection Rate* (lb/Macf)
6/9/2009 0:00	6/13/2009 10:00	Baseline	--	0
6/13/2009 10:00	6/15/2009 2:30	DARCO Hg-LH	AH	1.89
6/15/2009 2:30	6/17/2009 0:00	DARCO Hg-LH	AH	0.48
6/17/2009 0:00	6/18/2009 22:05	DARCO Hg-LH	AH	0.99
6/18/2009 22:05	6/22/2009 10:58	Baseline	--	0
6/22/2009 10:58	6/22/2009 22:15	Sorbtech C-PAC	AH	0.96
6/22/2009 22:15	6/23/2009 10:25	Baseline	--	0
6/23/2009 10:25	6/23/2009 20:00	Calgon CF Plus	AH	0.95
6/23/2009 20:00	6/24/2009 9:50	Baseline	--	0
6/24/2009 9:50	6/24/2009 19:10	Norit EXP224	AH	0.95
6/24/2009 19:10	6/25/2009 13:58	Baseline	--	0
6/25/2009 13:58	6/25/2009 18:20	CF Plus Ultra	AH	0.98
6/25/2009 18:20	6/25/2009 18:25	Baseline	--	0
6/25/2009 18:25	6/25/2009 22:55	DARCO Hg-LH	AH	0.91
6/25/2009 22:55	6/27/2009 11:27	Baseline	--	0
6/27/2009 11:27	6/28/2009 9:30	DARCO Hg-LH	AH	1.00
6/28/2009 9:30	6/28/2009 17:00	DARCO Hg-LH	AH	1.83
6/28/2009 17:00	7/8/2009 10:50	Baseline	--	0
7/8/2009 10:50	7/8/2009 14:55	DARCO Hg	ESP (Full)	0.47
7/8/2009 14:55	7/8/2009 15:50	DARCO Hg-LH	ESP (Full)	0.98
7/8/2009 15:50	7/8/2009 17:20	DARCO Hg-LH	ESP (Full)	1.84
7/8/2009 17:20	7/10/2009 12:10	Baseline	--	0
7/10/2009 12:10	7/10/2009 18:30	DARCO Hg	ESP (Full)	0.47
7/10/2009 18:30	7/11/2009 13:15	Baseline	--	0
7/11/2009 13:15	7/11/2009 17:35	DARCO Hg	ESP (Full)	0.61
7/11/2009 17:35	7/12/2009 6:15	Baseline	--	0
7/12/2009 6:15	7/12/2009 16:55	DARCO Hg	ESP (Full)	0.48
7/12/2009 16:55	7/14/2009 6:30	Baseline	--	0
7/14/2009 6:30	7/14/2009 15:20	DARCO Hg-LH	ESP (Full)	1.89
7/14/2009 15:20	7/15/2009 9:25	Baseline	--	0
7/15/2009 9:25	7/15/2009 13:00	DARCO Hg-LH	ESP (Full)	0.48
7/15/2009 13:00	7/15/2009 13:30	DARCO Hg-LH	ESP (Full)	0.69
7/15/2009 13:30	7/15/2009 14:00	DARCO Hg-LH	ESP (Full)	0.95
7/15/2009 14:00	7/15/2009 14:30	DARCO Hg-LH	ESP (Full)	1.17
7/15/2009 14:30	7/15/2009 15:00	DARCO Hg-LH	ESP (Full)	1.39
7/15/2009 15:00	7/15/2009 15:30	DARCO Hg-LH	ESP (Full)	1.51
7/15/2009 15:30	7/15/2009 16:00	DARCO Hg-LH	ESP (Full)	1.73
7/15/2009 16:00	7/16/2009 9:00	Baseline	--	0
7/16/2009 9:00	7/16/2009 13:00	Darco Hg-LH Fine	ESP (Full)	0.46
7/16/2009 13:00	7/16/2009 14:15	Darco Hg-LH Fine	ESP (Full)	1.64
7/16/2009 14:15	7/16/2009 20:30	Darco Hg-LH Fine	ESP (Full)	0.91
7/16/2009 20:30	7/17/2009 10:05	Baseline	--	0
7/17/2009 10:05	7/17/2009 18:10	DARCO Hg-LH	ESP (1/4)	0.98
7/17/2009 18:10	7/18/2009 9:00	Baseline	--	0
7/18/2009 9:00	7/18/2009 13:00	DARCO Hg-LH	ESP (1/4)	0.44
7/18/2009 13:00	7/18/2009 15:30	DARCO Hg-LH	ESP (1/4)	0.98
7/18/2009 15:30	7/18/2009 18:30	DARCO Hg-LH	ESP (1/4)	1.85
7/18/2009 18:30	7/19/2009 9:30	Baseline	--	0

Start Time (CT)	End Time (CT)	Injection Activity	Injection Location	Injection Rate* (lb/Macf)
7/19/2009 9:30	7/19/2009 13:30	Calgon A2	ESP (1/4)	0.96
7/19/2009 13:30	7/19/2009 14:10	Baseline	--	0
7/19/2009 14:10	7/19/2009 18:00	Calgon A	ESP (1/4)	0.88
7/19/2009 18:00	7/21/2009 10:47	Baseline	--	0
7/21/2009 10:47	7/21/2009 13:23	DARCO Hg-LH	ESP (1/4)	0.95
7/21/2009 13:23	7/21/2009 16:00	DARCO Hg-LH	ESP (1/4)	1.85
7/21/2009 16:00	7/21/2009 18:50	DARCO Hg-LH	ESP (1/4)	5.49
7/21/2009 18:50	7/22/2009 10:17	Baseline	--	0
7/22/2009 10:17	7/22/2009 17:25	DARCO Hg-LH	ESP (1/4)	1.06
7/22/2009 17:25	7/23/2009 10:40	Baseline	--	0
7/23/2009 10:40	7/23/2009 20:20	DARCO Hg-LH	ESP (1/4)	1.01
7/23/2009 20:20	7/24/2009 9:18	Baseline	--	0
7/24/2009 9:18	7/24/2009 11:15	CANG-2	ESP (1/4)	1.14
7/24/2009 11:15	7/24/2009 12:55	CANG-2	ESP (1/4)	1.82
7/24/2009 12:55	7/24/2009 13:50	CANG-2	ESP (1/4)	3.49
7/24/2009 13:50	7/24/2009 14:40	Baseline	--	0
7/24/2009 14:40	7/24/2009 16:03	CNAHF-1	ESP (1/4)	1.93
7/24/2009 16:03	7/24/2009 17:20	CNAHF-1	ESP (1/4)	4.00
7/24/2009 17:20	7/25/2009 10:50	Baseline	--	0
7/25/2009 10:50	7/25/2009 12:14	CNAHF-1	ESP (1/4)	1.60
7/25/2009 12:14	7/25/2009 13:50	CNAHF-1	ESP (1/4)	4.06
7/25/2009 13:50	7/25/2009 14:36	Baseline	--	0
7/25/2009 14:36	7/25/2009 15:55	CANG-2	ESP (1/4)	1.66
7/25/2009 15:55	7/25/2009 17:20	CANG-2	ESP (1/4)	4.13
7/25/2009 17:20	7/25/2009 17:52	Baseline	--	0
7/25/2009 17:52	7/25/2009 18:30	DARCO Hg-LH	ESP (1/4)	1.80
7/25/2009 18:30	7/25/2009 22:25	DARCO Hg-LH	ESP (1/4)	3.85
7/25/2009 22:25	7/26/2009 10:35	Baseline	--	0
7/26/2009 10:35	7/26/2009 12:30	Calgon A2	ESP (1/4)	2.41
7/26/2009 12:30	7/26/2009 14:30	Calgon A2	ESP (1/4)	2.93
7/26/2009 14:30	7/26/2009 14:49	Baseline	--	0
7/26/2009 14:49	7/26/2009 16:50	Calgon A	ESP (1/4)	1.73
7/26/2009 16:50	7/26/2009 17:47	Baseline	--	0
7/26/2009 17:47	7/26/2009 19:15	Calgon CN6	ESP (1/4)	1.87
7/26/2009 19:15	7/27/2009 11:57	Baseline	--	0
7/27/2009 11:57	7/27/2009 13:15	Calgon CN30	ESP (1/4)	1.76
7/27/2009 13:15	7/27/2009 13:40	Baseline	--	0
7/27/2009 13:40	7/27/2009 15:25	Calgon CN6	ESP (1/4)	1.59
7/27/2009 15:25	7/27/2009 19:05	Baseline	--	0
7/27/2009 19:05	7/27/2009 22:00	Calgon THB	ESP (1/4)	2.10
7/27/2009 22:00	7/28/2009 10:00	Baseline	--	0
7/28/2009 10:00	7/28/2009 11:15	Calgon A2	ESP (1/4)	0.90
7/28/2009 11:15	7/28/2009 13:10	Calgon A2	ESP (1/4)	2.06
7/28/2009 13:10	7/28/2009 14:00	Baseline	--	0
7/28/2009 14:00	7/28/2009 15:10	Calgon A	ESP (1/4)	1.89
7/28/2009 15:10	7/28/2009 16:00	Baseline	--	0
7/28/2009 16:00	7/28/2009 17:10	Calgon A	ESP (1/4)	0.90
7/28/2009 17:10	7/28/2009 17:20	Baseline	--	0
7/28/2009 17:20	7/28/2009 18:45	Calgon A	ESP (1/4)	1.83
7/28/2009 18:45	7/28/2009 19:45	Baseline	--	0
7/28/2009 19:45	7/28/2009 20:50	Calgon CF Plus	ESP (1/4)	2.00
7/28/2009 20:50	7/29/2009 8:35	Baseline	--	0
7/29/2009 8:35	7/29/2009 10:45	Calgon CF Plus	ESP (1/4)	0.48
7/29/2009 10:45	7/29/2009 11:45	Baseline	--	0

Start Time (CT)	End Time (CT)	Injection Activity	Injection Location	Injection Rate* (lb/Macf)
7/29/2009 11:45	7/29/2009 13:00	Calgon CF	ESP (1/4)	0.99
7/29/2009 13:00	7/29/2009 13:45	Baseline	--	0
7/29/2009 13:45	7/29/2009 15:15	Calgon N	ESP (1/4)	0.96
7/29/2009 15:15	7/29/2009 15:40	Calgon N	ESP (1/4)	0.95
7/29/2009 15:40	7/29/2009 17:00	Baseline	--	0
7/29/2009 17:00	7/29/2009 17:45	Calgon CAN	ESP (1/4)	0.95
7/29/2009 17:45	7/29/2009 18:30	Baseline	--	0
7/29/2009 18:30	7/29/2009 19:45	Calgon CNA-HF	ESP (1/4)	0.98
7/29/2009 19:45	7/29/2009 20:00	Baseline	--	0
7/29/2009 20:00	7/29/2009 22:00	Calgon NB	ESP (1/4)	0.91
7/29/2009 22:00	7/30/2009 9:23	Baseline	--	0
7/30/2009 9:23	7/30/2009 11:00	Calgon A	ESP (1/4)	1.55

* Injection rates based on treating all of Unit 2 flue gas if the location is AH or ESP(Full) and ¼ of Unit 2 flue gas if the location is ESP(1/4).

Table 2-17. Bromide Addition Schedule – Parametric Testing, Phase IV

Start Time (CT)	End Time (CT)	Addition Rate (ppm Br to coal, dry)
7/9/2009 0:00	7/9/2009 11:05	0
7/9/2009 11:05	7/9/2009 13:30	172
7/9/2009 13:30	7/9/2009 13:40	0
7/9/2009 13:40	7/9/2009 18:24	172
7/9/2009 18:24	7/10/2009 7:33	85
7/10/2009 7:33	7/10/2009 17:01	97
7/10/2009 17:01	7/11/2009 7:15	176
7/11/2009 7:15	7/11/2009 17:40	164
7/11/2009 17:40	7/11/2009 18:45	78
7/11/2009 18:45	7/12/2009 3:00	57
7/12/2009 3:00	7/12/2009 6:30	112
7/12/2009 6:30	7/12/2009 16:00	122
7/12/2009 16:00	7/16/2009 11:00	0
7/16/2009 11:00	7/16/2009 16:00	280
7/16/2009 16:00	7/16/2009 17:00	173
7/16/2009 17:00	7/20/2009 9:52	0
7/20/2009 9:52	7/20/2009 17:01	182

Tables 2-18 through 2-21 present the start and stop times for the OH, M29, M17, and the sorbent trap measurements, respectively.

Table 2-18. OH Sample Schedule for Unit 2 Parametric Tests, Phase IV

Conditions	Date	Start & Stop Times
Baseline		
Run 1	12-Jun-09	9:42 – 12:04
Run 2	12-Jun-09	12:40 – 14:50
Run 3	12-Jun-09	15:16 – 17:27
AH Injection – Darco Hg-LH		
Run 1	18-Jun-09	10:04 – 12:15
Run 2	18-Jun-09	13:28 – 15:47
Run 3	18-Jun-09	16:22 – 18:32
ESP Injection – $CaBr_2$		
Run 1	9-Jul-09	12:21 – 14:38
Run 2	9-Jul-09	15:57 – 17:40
ESP Injection – Darco Hg and $CaBr_2$		
Run 1	10-Jul-09	9:13 – 11:13
Run 2	10-Jul-09	14:30 – 16:15
ESP Injection – Darco Hg and $CaBr_2$		
Run 1	11-Jul-09	9:34 – 11:19
Run 2	11-Jul-09	14:09 – 16:09

Table 2-19. M29 Sample Schedule for Unit 2 Parametric Tests, Phase IV (XFM Runs Conducted during Same Time Periods)

	ESP Outlet		Stack	
	Date	Start & Stop Times	Date	Start & Stop Times
Br + ACI (122 ppm Br to coal, dry basis; 0.48 lb/Macf Darco Hg)				
Run 1	12-Jul-09	8:01-10:01	12-Jul-09	8:02-10:02
Run 2	12-Jul-09	10:45-12:45	12-Jul-09	10:45-12:45
Run 3	12-Jul-09	13:35-15:35	12-Jul-09	13:37-15:37
Baseline				
Run 1	13-Jul-09	7:44-9:44	13-Jul-09	7:45-9:45
Run 2	13-Jul-09	10:32-12:32	13-Jul-09	10:33-12:33
Run 3	13-Jul-09	13:04-15:04	13-Jul-09	13:04-15:04
ACI (1.89 lb/Macf Darco Hg-LH)				
Run 1	14-Jul-09	7:30-9:30	14-Jul-09	7:30-9:30
Run 2	14-Jul-09	10:05-12:05	14-Jul-09	10:06-12:06
Run 3	14-Jul-09	13:27-15:27	14-Jul-09	13:27-15:27

Table 2-20. M17 Sample Schedule for Phase IV Parametric Tests

Condition	Injection Rate (lbs/MMacf)	Date	Condition Time
Baseline	N/A	6/10/2009	9:08-17:44
	N/A	6/11/2009	8:43-16:25
ACI	1.89	6/13/2009	10:50-17:00
	1.89	6/14/2009	7:40-15:21
	1.89	6/15/2009	8:05-16:19
	0.48	6/16/2009	9:01-18:00
	0.99	6/17/2009	8:30-17:00

Table 2-21. Sorbent Trap Sample Schedule for Phase IV Parametric Tests

ESP Outlet			Stack		
Date (in 2009)	Start Time	Stop Time	Date (in 2009)	Start Time	Stop Time
6/11	9:16	17:16	6/11	9:16	17:16
6/11	17:42	1:43	6/11	17:31	1:31
6/12	8:55	16:55	6/12	8:10	16:04
6/12	17:24	1:24	6/12	16:22	00:22
6/13	10:52	16:53	6/13	11:39	17:47
6/13	17:21	1:22	6/13	18:00	2:00
6/14	7:57	15:07	6/14	8:57	16:01
6/14	15:25	23:26	6/14	16:20	00:20
6/15	8:53	16:53	6/15	10:21	16:30
6/15	18:00	2:01	6/15	17:23	1:24
6/16	7:53	15:54	6/16	9:12	17:13
6/16	17:58	22:58	6/16	19:01	0:02
6/17	7:52	15:45	6/17	9:17	17:17
6/17	16:15	0:15	6/17	18:06	2:07
6/18	7:53	15:54	6/18	8:55	16:55
6/21	8:42	16:42	6/21	9:48	17:48
6/21	17:31	1:31	6/21	18:52	2:53
6/22	11:57	14:57	6/22	11:56	14:56
6/22	15:44	19:44	6/22	15:44	19:42
6/23	11:15	15:15	6/23	11:15	15:15
6/23	15:59	19:59	6/23	15:57	19:57
6/24	10:42	13:42	6/24	10:40	13:40
6/24	14:18	16:18	6/24	14:13	15:43
6/26	9:42	12:42	6/26	9:30	13:00
6/26	13:58	18:58	6/26	13:52	18:53
6/27	11:58	16:29	6/27	12:00	16:30
6/27	17:11	20:11	6/27	16:57	19:57
6/28	9:59	12:59	6/28	10:00	13:00
6/28	13:24	15:54	6/28	13:21	15:51
7/8	11:30	14:30	7/8	11:25	14:25
7/8	16:15	17:09	7/8	16:15	17:10
7/9	11:55	14:55	7/9	11:55	14:55

ESP Outlet			Stack		
Date (in 2009)	**Start Time**	**Stop Time**	**Date (in 2009)**	**Start Time**	**Stop Time**
7/10	8:49	11:49	7/10	8:30	11:30
7/10	14:20	16:40	7/10	14:20	16:56
7/11	9:10	11:35	7/11	9:10	12:10
7/11	14:00	16:03	7/11	14:00	16:09
7/12	8:14	11:15	7/12	8:23	11:23
7/12	12:56	15:36	7/12	12:30	15:30
7/13	7:55	10:55	7/13	7:51	10:51
			7/13	12:53	15:53
7/14	7:37	10:37	7/14	7:35	10:36
7/14	13:33	16:34	7/14	13:30	16:31
7/15	9:48	12:48	7/15	9:47	12:47
7/15	13:26	16:24	7/15	13:25	16:22
7/16	9:50	12:50	7/16	9:48	12:48
7/16	13:18	16:18	7/16	13:18	16:18
7/21	11:29	13:09			
7/21	14:10	15:49			
7/22	10:54	12:36			
7/22	13:15	14:53			
7/22	15:31	17:09			
7/23	11:23	12:58			
7/23	13:40	15:14			
7/23	15:58	17:33			

2.7 Plant Data Collection

The project team coordinated with plant personnel to retrieve the necessary historical plant operating data files. Process data collected by the plant and by the project team for Unit 1 are summarized in Table 2-22. Process data collected from Unit 2 were similar, with the exception of the ESP operational parameters. The plant system that saved the ESP operational parameters malfunctioned and the data were lost. Since Phase IV tests on Unit 2 did not include long-term test conditions, the ESP operational data would have been of limited value in evaluating the impacts of sorbent injection on ESP operations.

A table of plant data collected for all parametric and long-term testing is provided in Appendix C.

Table 2-22. Process Data Collected at Limestone Unit 1 and Unit 2

Parameter	**Sample/Signal/Test**
Coal	Coal feed rate (ton/hr) Fraction of PRB and TxL fed by weight
Unit operation	Boiler load (Gross MW) Heat Rate (Gross Btu/kwh) Boiler steam flow, temperature, and pressure Furnace O_2
Flue Gas Temperatures	Air heater inlet, air heater outlet, ESP outlet
ESP Operation (for ESPs A, B, C, D) (for Unit 1 only)	ESP power, current, voltage by field Sparking and arcing data Opacity
Stack data	NO_x (CEM) SO_2 (CEM) CO_2 CO Opacity Flow rate

3.0 RESULTS AND DISCUSSION - PHASES I-III AND LONG-TERM TEST (2006–2007)

This section presents results from Unit 1 parametric tests Phases I-III and the long-term test conducted in 2006 – 2007. Chapter 4 will present the 2009 test results, in a series of parametric tests was conducted on Unit 2. In 2009 the entire unit was treated with ACI so that mercury removal across the FGD could be measured. The 2009 results showed lower mercury removal across the ESP than the 2006-2007 results; a comparison of the two sets of data is provided in Chapter 5.

Phase I parametric testing was completed in December 2006. During this phase, several different sorbents were injected upstream of the Limestone Unit 1A ESP and evaluated for mercury removal performance. The effect of carbon injection on particulate emissions was also evaluated. As part of this testing, a velocity traverse was conducted at each sample location, coal and ash samples were collected, and baseline mercury removal performance was characterized across the Unit 1A ESP.

Phase II parametric testing was conducted in April 2007. During this phase potential "ash-friendly" sorbents and process configurations were evaluated. Norit America's DARCO Hg and DARCO Hg-LH sorbents were injected in three configurations: upstream of the ESP, Toxecon™ II, and staged injection. Phase III parametric tests were conducted in May 2007 with a revised Toxecon™ II lance design. For both phases II and III, mercury removal performance and ESP operation and performance were evaluated.

The 60-day long-term injection test was started on June 22, 2007 and ran until August 21, 2007. Long-term testing was conducted with Norit's DARCO Hg-LH carbon injected upstream of the ESP at 2 lb/Macf. In addition to evaluating mercury removal and ESP performance, fly ash was routinely sampled and analyzed for concrete properties.

The discussion of the 2006 – 2007 test results in this chapter is organized into the following sections:

- Unit operation;
- Baseline mercury measurements;
- Parametric sorbent injection mercury removal results;
- Long-term sorbent injection mercury removal results;
- Long-term sorbent injection mercury oxidation results;
- Effects of sorbent injection on ESP operation;
- Coal and ash mercury characterization;
- Concrete testing results;
- Flue gas halogen measurements;
- FGD measurements;
- Economic analysis.

3.1 Unit Operation

Unit Load

Table 3-1 shows Unit 1 boiler load information for each test phase. The minimum and average values shown include process fluctuations and minor upsets, but data collected during unit outages were not included in the calculations. The average unit loads during Phases I and II and the long-term test were very similar, ranging from 869 – 882 MW. The average load during Phase III was slightly lower (823 MW). There were several hour-long process upsets during Phases II and III, specifically on May 3 and May 4, and May 22-24. During these upsets, the load decreased to values ranging from 400-600 MW for periods of approximately 2-3 hours.

Boiler load during the long-term injection test is plotted along with sorbent injection rate in Figure 3-1. During normal operation within the test period, the unit load was relatively stable and averaged 875 MW. Three short-term unplanned outages occurred during the test; these occurred on July 2, July 13-16, and briefly on July 17. The unit operated at a lower load of 800 MW from July 18-22.

Tables 3-2 and 3-3 show ESP inlet duct temperatures for each phase of ACI testing. Figure 3-2 plots ESP inlet temperature during long term testing. ESP inlet temperatures were typically between 280°F and 340°F throughout all phases of testing. Temperatures during long term testing were higher on average than during the other phases of testing. This can be attributed to the increased ambient temperatures and slightly higher load encountered during the summer months. The treated (U1A) and untreated (U1B) ESPs displayed similar temperature profiles, with the U1A ESP operating about 7°F higher than U1B ESP. The flue gas temperature fluctuated daily throughout the testing period. The pattern of flue gas temperature fluctuations correlated with ambient temperature and changes in unit load. In Section 3.4, an analysis is conducted to determine how these changes in flue gas temperature affected the mercury removal performance of the activated carbon.

Table 3-1. Gross Load for Unit 1 during ACI Testing

Test Type	Date Start	Date Stop	Boiler Load Minimum (MW)	Boiler Load Maximum (MW)	Boiler Load Average (MW)
Phase I	11/28/06	12/11/06	784	899	882
Phase II	04/26/07	05/04/07	583	901	869
Phase III	05/22/07	05/26/07	494	900	823
Long Term	06/19/07	08/22/07	280	907	875

Table 3-2. U1A Treated ESP Inlet Temperature during ACI Testing

Test Type	Date Start	Date Stop	ESP A Inlet Temperature Minimum (°F)	ESP A Inlet Temperature Maximum (°F)	ESP A Inlet Temperature Average (°F)
Phase I	11/28/06	12/11/06	242	308	288
Phase II	04/26/07	05/04/07	280	319	300
Phase III	05/22/07	05/26/07	287	318	302
Long Term	06/19/07[1]	08/22/07[1]	217	341	310

Table 3-3. Inlet Temperature of Untreated U1B ESP during ACI Testing

Test Type	Date Start	Date Stop	ESP B Inlet Temperature Minimum (°F)	ESP B Inlet Temperature Max (°F)	ESP B Inlet Temperature Average (°F)
Phase I	11/28/06	12/11/06	n/a	n/a	n/a
Phase II	04/26/07	05/04/07	247	315	296
Phase III	05/22/07	05/26/07	246	310	295
Long Term	06/19/07[1]	08/22/07[1]	262	332	303

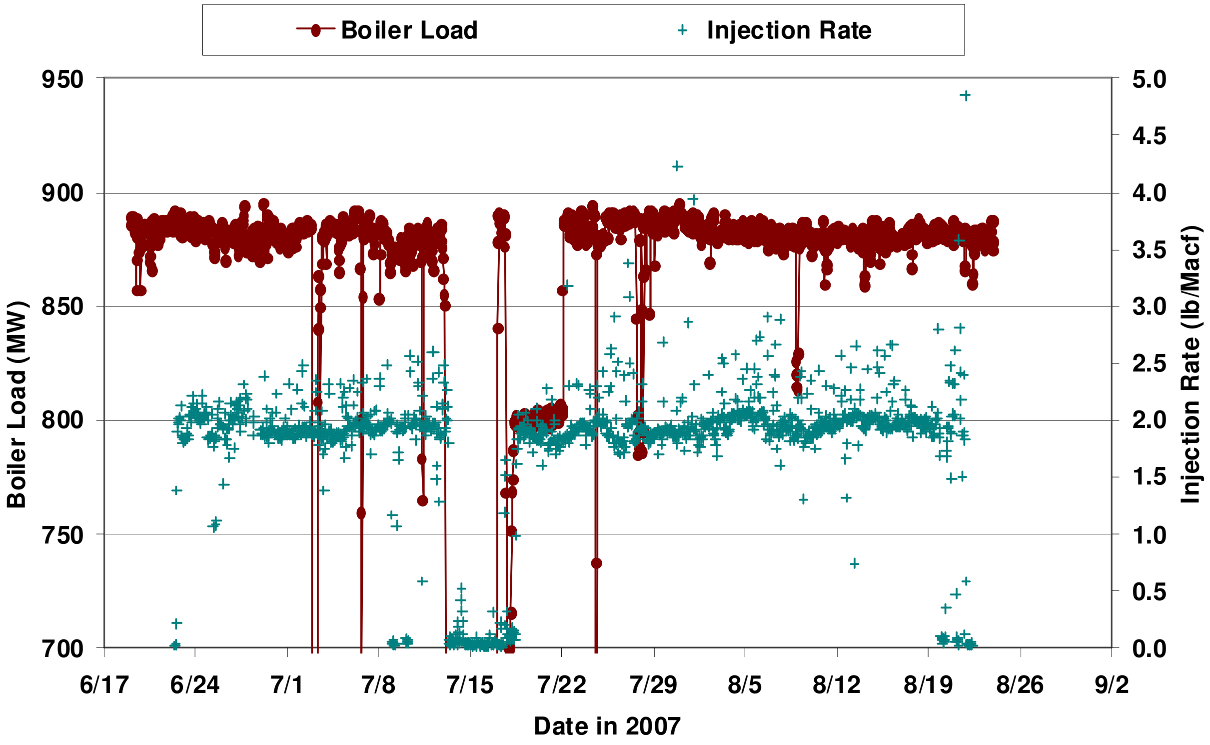


Figure 3-1. Boiler Load and Injection Rate during Long-Term Injection Tests

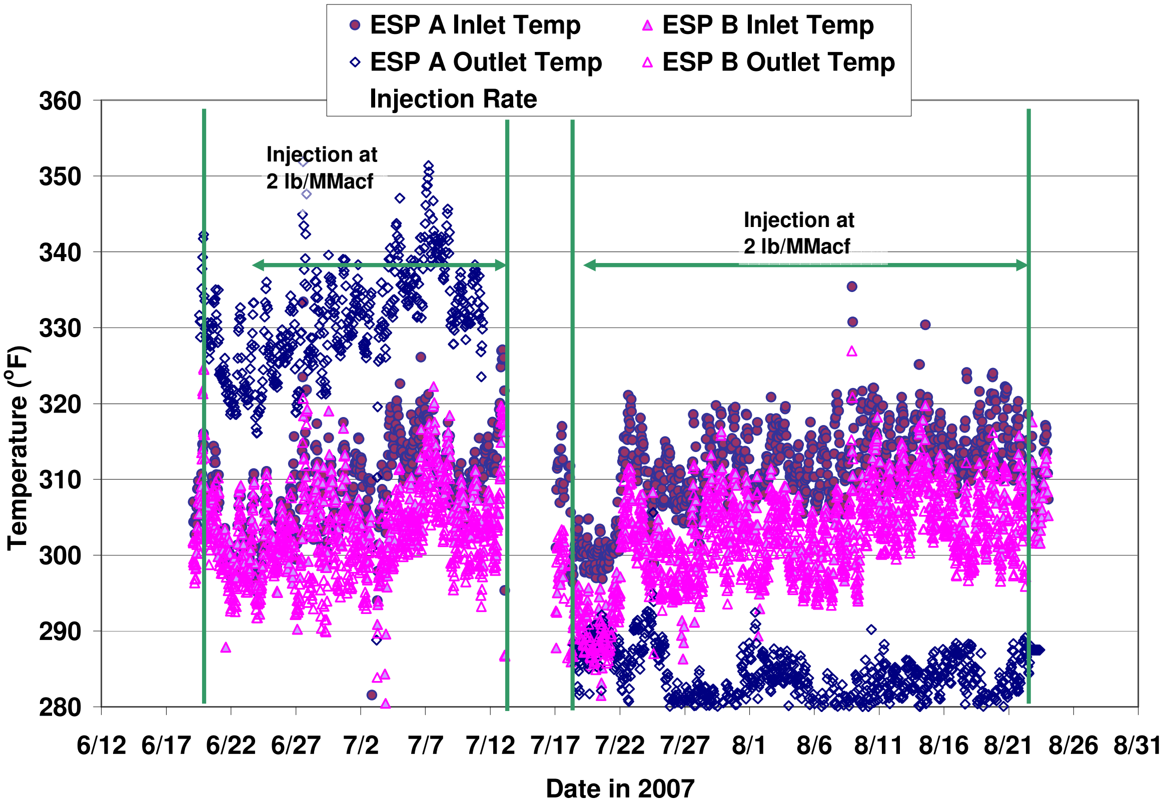


Figure 3-2. ESP Inlet Temperature during Long-Term Injection Test

Velocity Traverse Measurements at Duct Sampling and Injection Locations

Velocity traverses were conducted at the following flue gas duct locations: ESP inlet at the SCEM ports, ESP inlet at the carbon injection lance location, ESP outlet locations 1A1 and 1A2 (treated duct) and 1B1 and 1B2 (untreated duct), and the Toxecon II injection and measurement ports. Refer to Figure 2-2 for a drawing of the duct configuration and locations for these ports. Test results are listed in Appendix D. Velocity traverse measurements were conducted at each of the sampling ports in order to determine appropriate sampling probe placement in areas of average duct flue gas flow. Velocity traverses were conducted at injection locations to select the ports used for carbon injection lance installation. There were nine available ports at the carbon injection location. Flue gas velocity measured at the middle port (port E) was low due to a duct obstruction; therefore, a carbon injection lance was not placed in this middle port. Injection lances were placed in the other eight available ports.

The flow rates and temperatures measured at each ESP inlet location during the baseline period are summarized in Table 3-4. The flue gas flow rate measured at the ESP inlet ports used for mercury measurements was approximately 1.75 x 10^6 acfm. This represented the flow rate for the 1A and 1B ducts, or half of the total unit flow. At the ESP inlet ports used for the carbon injection lances, the measured flow rate was approximately 0.79 x 10^6 acfm. This represented the flow entering only the 1A ESP, and was approximately half the flow rate in the 1A/1B combined duct.

Table 3-4. Baseline Volumetric Flow Rates Measured at ESP Inlet (Load = 880 MW)

Measurement Location	Flow Rate (acfm)	Temperature (°F)	Oxygen (%)	Moisture (vol %)
ESP 1A/1B Inlet (Hg Measurement Ports)	1,747,605	316	5.0	15
ESP 1A Inlet (Carbon Injection Ports)	787,774	325	5.0	13

3.2 Baseline Mercury Measurements

Baseline Mercury Measurements – SCEM

Several days of baseline measurements were made with SCEM analyzers prior to each phase of parametric testing and the long-term test. During the baseline periods, flue gas mercury concentrations were measured at the following locations: ESP 1A/1B inlet, ESP 1A2 outlet (treated ESP outlet), ESP 1B1 outlet (untreated ESP outlet), and special ports installed on the ESP 1A1 outlet for Toxecon™ II testing (Toxecon™ II outlet). The ducts are referred to as treated and untreated outlets even when discussing baseline results when no carbon was injected into the system.

Baseline flue gas mercury concentrations were measured with SCEMs prior to the first parametric test, from 9:30 December 1, 2006 through 12:00 December 3, 2006. Figure 3-3 plots the inlet and outlet total and elemental mercury concentrations measured during this period. The inlet total vapor phase mercury concentration ranged from 13 to 37 µg/dNm^3 at 3% O_2, with an average of 25 µg/dNm^3. The outlet total vapor phase mercury concentration ranged from 13 to 30 µg/dNm^3, with an average of 19 µg/dNm^3. The average baseline removal of vapor-phase mercury across the ESP was 26%. The unit fluctuated between periods of 10% mercury removal to periods with up to 36% mercury removal. The mercury concentrations in the treated and untreated outlet ducts were equivalent to each other during December testing. Approximately 21% of the ESP inlet vapor-phase mercury was present as oxidized mercury, and 24% of the ESP outlet vapor-phase mercury was present as oxidized mercury. Only a small amount of mercury oxidation occurred across the ESP.

Baseline measurements were also made during the overnight periods between the daily parametric sorbent injection tests. The purpose of these measurements was to verify that the unit had returned to baseline operation prior to starting injection tests each day. Similar behavior was noted between these overnight baseline periods and the initial baseline measurement days. Thus, these measurments showed that upon ending a given ACI parametric test at the end of a day the system returned to normal (baseline) conditions overnight prior to starting the next test.

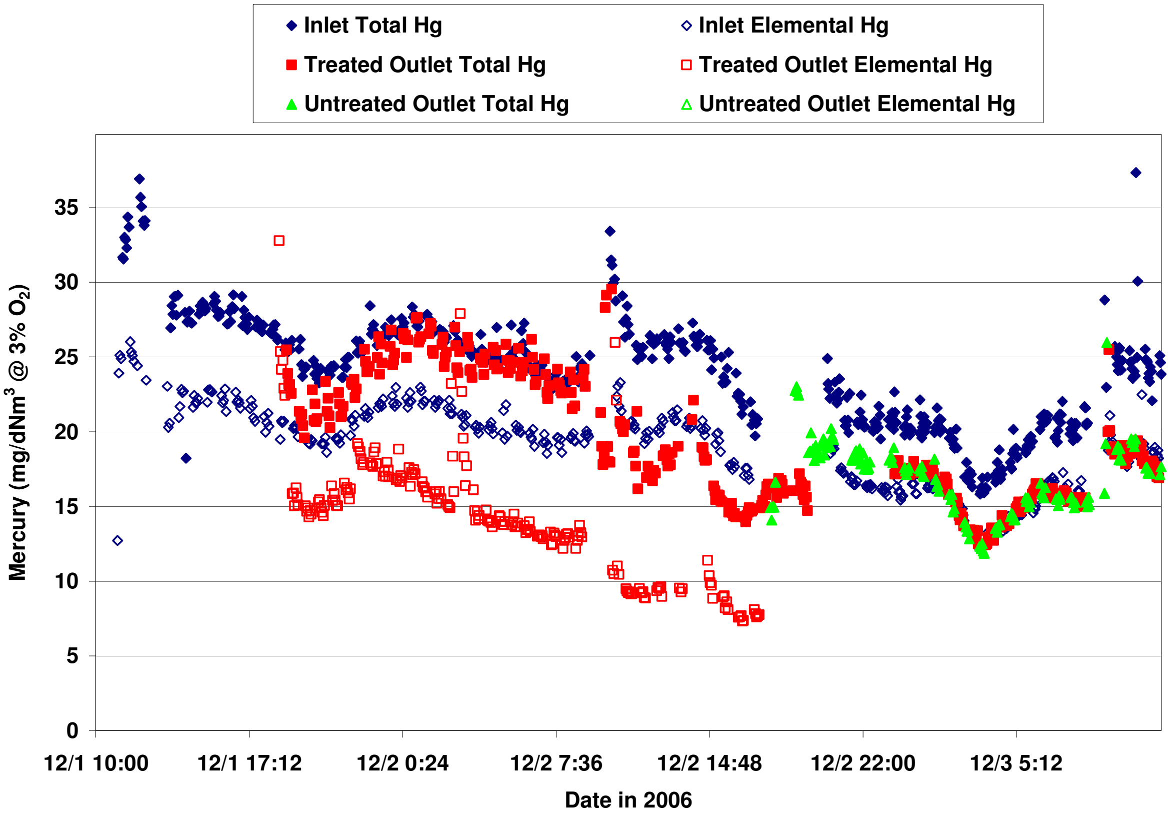


Figure 3-3. Baseline Mercury Measurements Prior to Phase I Parametric Tests

Baseline flue gas mercury concentrations were measured with SCEMs from 10:00 April 19, 2007 through 12:00 April 21, 2007, prior to the Phase II parametric tests. Figure 3-4 plots the inlet and outlet total and elemental mercury concentrations measured during this period. The inlet total vapor phase mercury concentration ranged from 20 to 34 µg/dNm^3 at 3% O_2, with an average of 28 µg/dNm^3. The outlet total vapor phase mercury concentration at the treated outlet ranged from 13 to 23 µg/dNm^3, with an average of 18 µg/dNm^3, and the untreated outlet mercury concentration ranged from 19 to 23 µg/dNm^3 with an average of 21 µg/dNm^3. There was good correlation between the treated and untreated outlet baseline mercury concentration. The average baseline removal of vapor-phase mercury across the ESP was 34% prior to the Phase II parametric tests. Approximately 31% of the ESP inlet vapor-phase mercury was present as oxidized mercury, and 35% of the ESP outlet vapor-phase mercury was present as oxidized mercury.

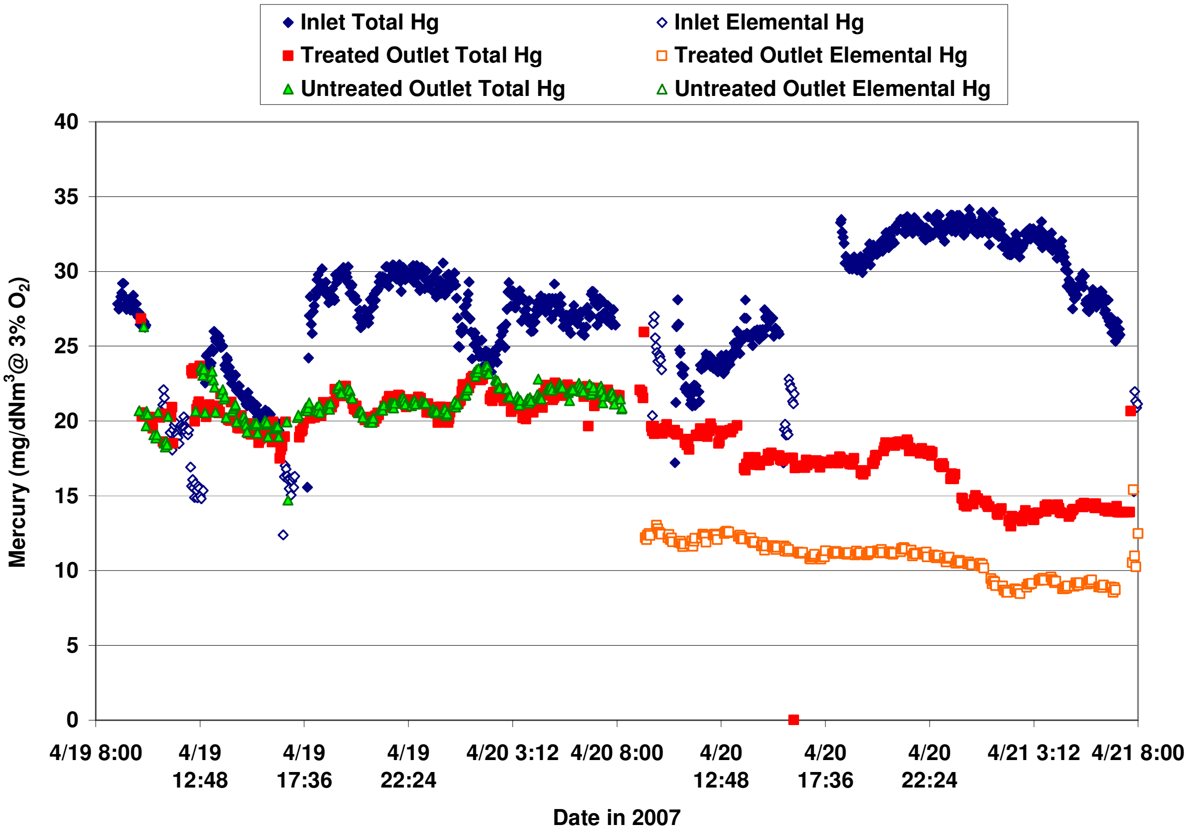


Figure 3-4. Baseline Mercury Measurements Prior to Phase II Parametric Tests

Additional baseline mercury measurements were made between 9:00 on May 22, 2007 through 7:00 May 21, 2007 8:00. Figure 3-5 plots the inlet and outlet total and elemental mercury concentrations measured during this time period. The inlet total vapor phase mercury concentration ranged from 18 to 25 µg/dNm^3 at 3% O_2, with an average of 22 µg/dNm^3. The outlet total vapor phase mercury concentration at the Toxecon™ II outlet ranged from 15 to 29 µg/dNm^3, with an average of 20 µg/dNm^3, and the untreated outlet mercury concentration ranged from 13 to 29 µg/dNm^3 with an average of 20 µg/dNm^3. The average baseline removal of vapor-phase mercury measured at the Toxecon™ II ports was 8%. Approximately 29% of the ESP inlet vapor-phase mercury was present as oxidized mercury, and 73% of the baseline mercury at the Toxecon™ II outlet ports was present as oxidized mercury during this period. Mercury oxidation was greater at the outlet during Phase III than during previous measurement periods.

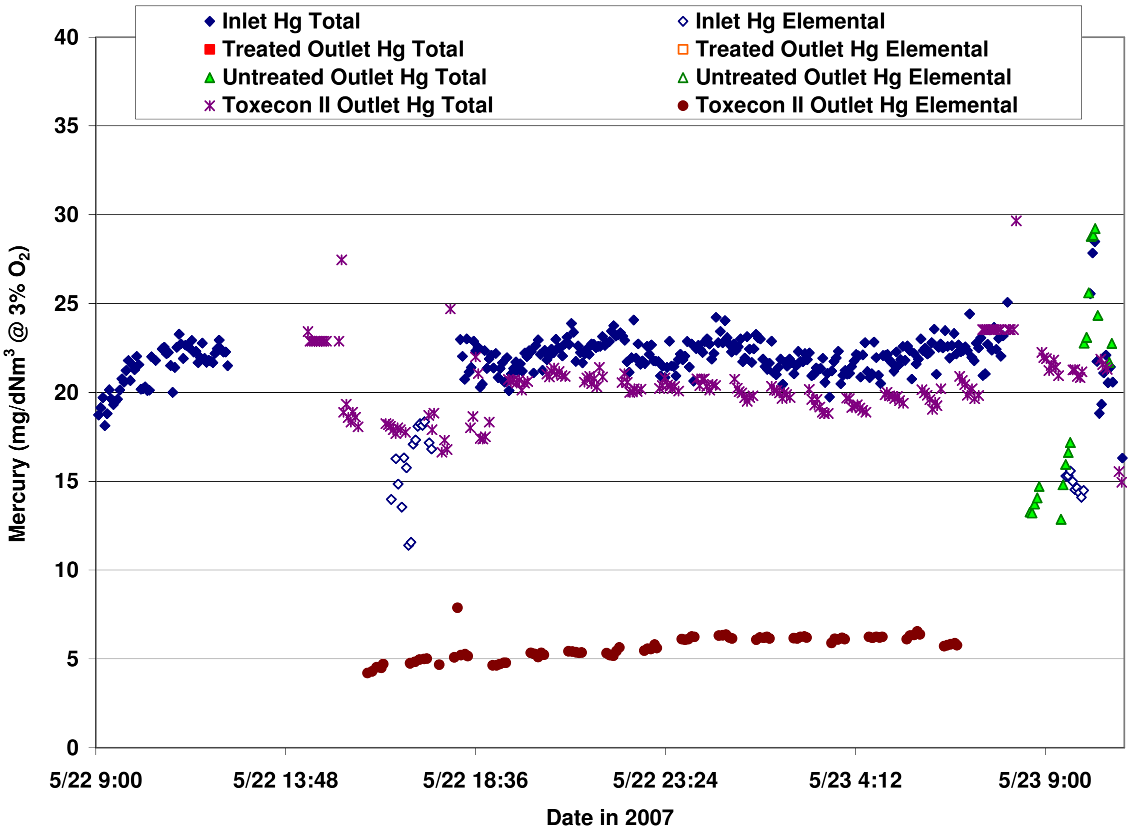


Figure 3-5. Baseline Mercury Measurements Prior to Phase III Parametric Tests

Baseline measurements were made prior to the long-term test from June 19, 2007 17:00 through June 22, 2007 13:00. Flue gas mercury concentrations were measured at the following locations: ESP 1A/1B inlet, ESP 1A2 outlet (treated ESP outlet), and ESP 1B1 outlet (untreated ESP outlet). Figure 3-6 plots the total and elemental mercury concentrations measured at the ESP inlet and outlet locations. Inlet total vapor phase mercury concentrations ranged from 16 to 29 $\mu g/dNm^3$ at 3% O_2, with an average of 22 $\mu g/dNm^3$. The treated outlet total vapor phase mercury concentration ranged from 18 to 33 $\mu g/dNm^3$, with an average of 22 $\mu g/dNm^3$. The untreated outlet mercury concentration was somewhat higher than the inlet concentration, averaging around 25 $\mu g/dNm^3$. During the baseline measurement period prior to the long-term injection test, the average removal of vapor-phase mercury across the ESP was 7%. Approximately 24% of the ESP inlet vapor-phase mercury was present as oxidized mercury, and 61% of the ESP outlet vapor-phase mercury was present in an oxidized form.

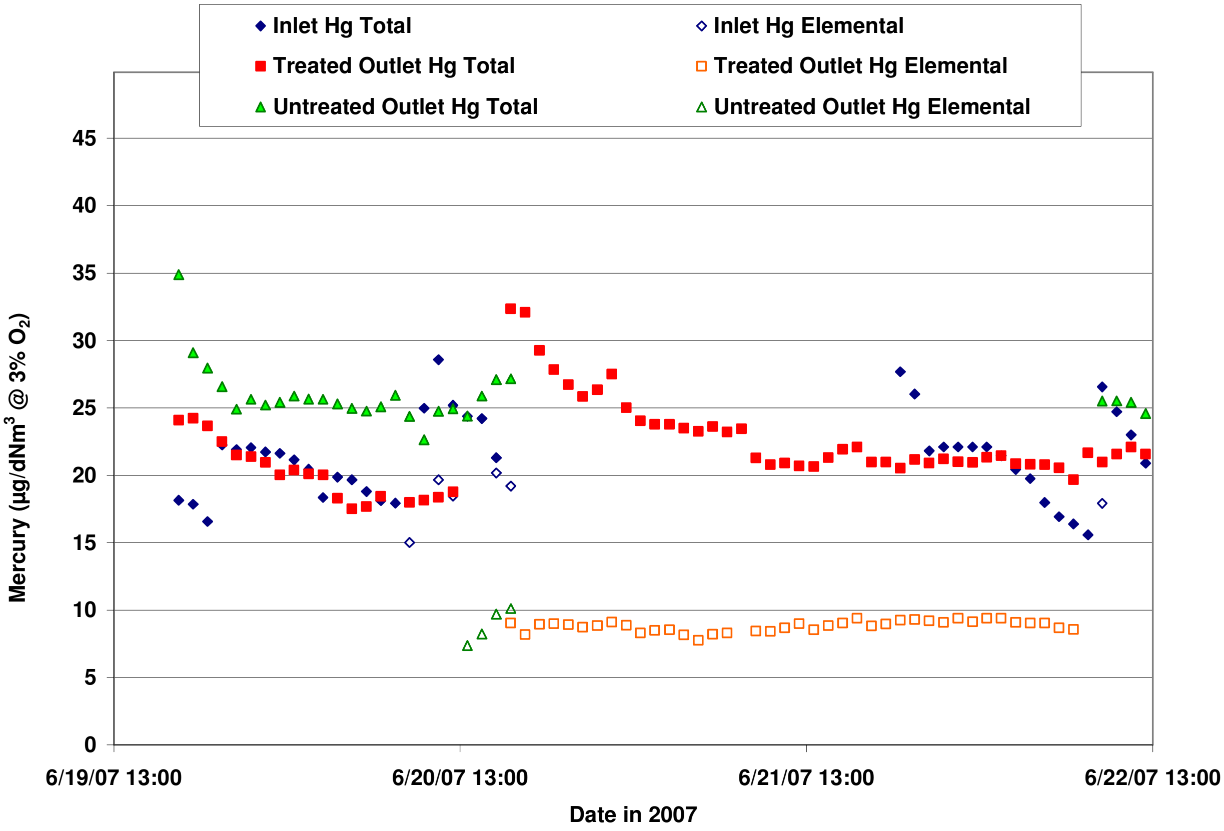


Figure 3-6. Baseline Hourly-Averaged Mercury Measurements Prior to Long-Term Injection Test

Baseline Mercury Measurements – OH Characterization

Ontario Hydro (OH) measurement results obtained during the baseline tests are summarized in Table 3-5. OH measures three phases of mercury: particulate, oxidized and elemental. Previous experiences with OH measurements conducted at the ESP inlet (i.e., flue gas with high ash loading) of a TxL fired unit have shown a positive bias for particulate and oxidized forms of mercury. The reason for this bias is believed to be the relatively high reactivity of the fly ash when it forms a filter cake. Therefore, OH measurements at LMS were conducted only at the ESP outlet, where little particulate matter is present. Mercury concentrations were compared between the untreated ESP outlet and treated ESP outlet ducts.

The average baseline total vapor-phase mercury concentrations measured by OH were 24.1 and 26.1 μg/dNm^3 at 3% O_2 for the untreated and treated outlet ducts, respectively. Approximately 50% of the flue gas mercury was present as oxidized mercury. There was no detectable particulate phase mercury.

While on average the total vapor phase mercury concentrations at the treated and untreated outlet ducts were within 2 μg/dNm^3, the differences in measured concentrations between the ducts for each individual run were as high as 6 μg/dNm^3. For two of the runs, the treated duct mercury concentration was higher by 6 µg/dNm^3, while for the other run the untreated duct mercury concentration was higher.

The variability in mercury concentrations between the treated and untreated ESPs, as measured by OH, is similar to the variability measured by the SCEMs over the previous several months of testing. On average, the mercury concentrations measured at the outlet of the two ESPs was very similar; however, there were periods when one of the ESP outlet ducts experienced mercury concentrations several µg/dNm^3 units higher than the other ESP.

A comparison of OH and SCEM total and elemental mercury measurements over the baseline period is provided in Table 3-6. The two methods were in good agreement at the untreated outlet duct (4% difference). At the treated outlet duct, the SCEM measurements were approximately 30% lower than the OH measurements. It should be noted that the OH and SCEM measurements in Table 3-6 were conducted in four different ducts. The treated ESP outlet is comprised of two ducts: one duct was used to make SCEM measurements, while the other was used to make OH measurements. A similar measurement arrangement was used for the untreated ESP outlet duct. Just as ±30% differences were observed between the treated and untreated outlet ducts for the OH measurements, similar variations could be expected between the OH and SCEM for the two ducts at the treated ESP outlet. These results suggest that mercury concentration gradients may exist across the flue gas ducts tested.

Table 3-5. Baseline OH Results at ESP Outlet

Date	Time	Duct Sampled	Total Hg (gas phase + particulate) µg/dNm^3	Hg_p, µg/dNm^3	Hg^{2+}, µg/dNm^3	Hg^0, µg/dNm^3	% of Total Hg as Oxidized Hg	% Hg Removal (Treated vs. Untreated)
20-Jun-07	10:10-12:24	Untreated	22.7	<0.03	11.5	11.2	51%	
20-Jun-07	10:10-12:25	Treated	28.8	0.09	15.6	13.1	54%	-27%
20-Jun-07	13:50-16:04	Untreated	28.6	<0.08	17.5	11.1	61%	
20-Jun-07	13:50-16:00	Treated	22.9	<0.08	8.9	14.0	39%	20%
21-Jun-07	11:01-15:29	Untreated	20.9	<0.05	9.8	11.1	47%	
21-Jun-07	11:01-15:32	Treated	26.5	<0.05	14.3	12.2	54%	-27%
	Average	Untreated	24.1	<0.05	12.9	11.1	53%	
	Average	Treated	26.1	<0.07	12.9	13.1	49%	-8%

Table 3-6. Comparison of OH to SCEM Baseline Mercury Measurements

Date	Time	Location	OH Total Hg, µg/dNm^3	SCEM Total Hg, µg/dNm^3	% Difference* in Total Hg	OH Elemental Hg, µg/dNm^3	SCEM Elemental Hg, µg/dNm^3
20-Jun-07	10:10-12:24	Untreated	22.7	24.14	-6%	11.2	--
20-Jun-07	10:10-12:25	Treated	28.8	18.51	44%	13.1	--
20-Jun-07	13:50-16:04	Untreated	30.1	26.57	12%	11.1	9.4
20-Jun-07	13:50-16:00	Treated	22.9	--	--	14.0	--
21-Jun-07	11:01-15:29	Untreated	20.9	--	--	11.1	--
21-Jun-07	11:01-15:32	Treated	26.5	21.11	23%	12.2	8.9
	Average**	Untreated	26.4	25.36	4%	11.1	9.4
		Treated	27.7	19.81	33%	12.2	8.9

*% Difference calculated as (OH Total Hg – SCEM Total Hg)/(Average of SCEM and OH Total Hg)*100

** Average does not include runs where SCEM data were not available.

-- No data available

Baseline Mercury Measurements – Fly Ash

For the two-day period in which baseline OH measurements were conducted, the fly ash mercury concentration in the treated ESP was less than 0.03 ppm, indicating that less than 2% of the mercury entering with the coal was removed by the fly ash. These results generally agreed with the SCEM measurements over the same time period, which indicated 7% vapor-phase mercury removal between the ESP inlet and outlet ducts. The fly ash mercury data are tabulated in Section 3.4 under the subheading “Mercury Measurements during Long-Term Sorbent Injection - Fly Ash Results”.

Baseline Mercury Measurements – Summary

From the baseline tests conducted in conjunction with the parametric and long term test periods, the following observations were made:

- Baseline total vapor phase mercury concentrations at the ESP inlet ranged from 13 to 40 µg/dNm^3 at 3% O_2, and averaged approximately 22 µg/dNm^3;
- The total vapor phase mercury concentration at the treated ESP outlet ranged from 12 to 32 µg/dNm^3, and averaged 20 µg/dNm^3 during baseline periods;
- The untreated ESP outlet total vapor phase mercury concentration ranged from 13 to 29 µg/dNm^3, with an average of 22 µg/dNm^3;
- Total mercury concentrations at the treated and untreated outlet ports typically corresponded well with each other; however, there were periods when ±30% difference was observed;

- Flue gas mercury concentrations as measured by SCEM and OH at the ESP outlet agreed well with each other;
- The average native removal of vapor-phase mercury across the ESP, as measured by the SCEMs, varied between 8 and 33% during baseline measurement periods; the variability in measured removal may be a function of the variability in the flue gas mercury profile at the ESP outlet;
- Fly ash mercury concentrations measured during baseline periods indicated that the native removal of vapor-phase mercury across the ESP was less than 10%; and
- Baseline vapor-phase mercury speciation measurements showed that 21 to 29% of the mercury at the ESP inlet was present in an oxidized form and that 25 to 73% of the mercury present at the ESP outlet was oxidized. Flue gas mercury oxidation measurements by SCEM and OH methods agreed well with each other.

3.3 Parametric Sorbent Injection Tests – Mercury Removal Results

During the sorbent injection tests at LMS, flue gas mercury concentrations were measured at the following four locations: ESP 1A/1B inlet, ESP 1A2 outlet (treated ESP outlet), ESP 1B1outlet (untreated ESP outlet), and special ports installed on the ESP 1A1 outlet for Toxecon™ II testing (Toxecon™ II outlet). Table 3-7 shows average mercury concentrations measured when injecting sorbent upstream of the ESP and Table 3-8 shows mercury concentrations measured in the tests employing the Toxecon™ II and staged injection configurations.

Mercury removal at the outlet of the treated ESP was calculated for each test run using the following equation:

$$\%\ \text{Mercury Reduction at ESP outlet} = [1 - Hg_{\text{ESP 1A, out}} / Hg_{\text{ESP 1B, out}}] * 100$$

where,

$Hg_{\text{ESP 1A, out}}$ = the total vapor phase mercury concentration at the treated ESP 1A outlet
$Hg_{\text{ESP 1B, out}}$ = the total vapor phase mercury concentration at the untreated ESP 1B outlet.

This calculation represents the percent mercury reduction achieved at the outlet of the treated ESP relative to that for the untreated ESP (i.e., ‘baseline’ condition).

Vapor-phase mercury removal across the treated ESP was calculated as:

$$\%\ \text{Mercury Removal across ESP} = [\ 1 - Hg_{\text{ESP 1A, out}} / Hg_{\text{ESP 1A/B, in}}] * 100$$

where,

$Hg_{\text{ESP 1A/B, in}}$ = the total vapor phase mercury concentration at the ESP 1A/1B inlet.

Tables 3-9 and 3-10 summarize the mercury reduction observed at the ESP outlet and across the ESP for injection upstream of the ESP and for Toxecon™ II injection, respectively. A detailed summary of the parametric tests conducted for each sorbent injection configuration is provided below.

Table 3-7. Average Mercury Concentrations Measured during Parametric Tests with Sorbent Injection Upstream of ESP

Sorbent Type	**Date of Test**	**Injection Rate** (lb/Macf)	**Vapor Phase Mercury Concentration** (µg/dNm^3 at 3% O_2)			
			ESP Inlet (Hg^{Total})	**ESP Inlet** (Hg^0)	**Treated Outlet** (Hg^{Total})	**Untreated Outlet** (Hg^{Total})
DARCO Hg-LH	12/03/06	1.1	24.9	19.5	5.9	18.1
DARCO Hg-LH	12/03/06	2.9	21.7	17.0	1.4	15.9
DARCO Hg-LH	12/04/06	0.5	28.7	19.4	9.2	19.0
DARCO Hg-LH	12/04/06	2.5	23.6	17.8	1.9	11.8
DARCO Hg-LH	12/04/06	5.1	24.4	17.9	0.7	20.9
DARCO Hg-LH	12/04/06	1.7	24.6	18.1	2.1	20.2
B-PAC	12/05/06	0.5	21.3	17.0	9.1	18.8
B-PAC	12/05/06	1.3	20.5	16.8	4.6	18.3
B-PAC	12/05/06	3.3	20.0	16.2	1.7	18.2
B-PAC	12/05/06	1.9	19.8	15.6	2.7	17.4
DARCO Hg	12/06/06	3.4	28.1	20.2	3.3	22.2
DARCO Hg	12/06/06	8.2	27.0	19.9	1.6	19.9
DARCO Hg	12/06/06	5.6	26.3	18.7	1.9	20.0
DARCO Hg	12/07/06	0.4	20.5	16.0	7.5	16.4
DARCO Hg	12/07/06	1.5	21.8	16.2	5.5	NA
DARCO Hg	12/07/06	1.7	22.0	15.1	3.4	NA
DARCO Hg	12/07/06	8.9	21.7	15.5	1.2	16.3
Flue PAC MC Plus	12/08/06	0.5	28.2	17.2	14.9	18.3
Flue PAC MC Plus	12/08/06	1.9	26.7	17.7	9.6	18.6
Flue PAC MC Plus	12/08/06	5.8	24.9	16.0	3.2	17.2
DARCO Hg	12/09/06	0.6	21.4	14.8	9.8	19.0
BASF MS200	04/21/07	6.0	24.5	21.8	12.4	NA
BASF MS200	04/21/07	8.0	29.1	21.2	8.9	20.6
BASF MS200	04/22/07	10.0	22.4	NA	11.1	16.5
BASF MS200	04/22/07	12.0	22.9	19.9	10.6	16.9
C-PAC	04/23/07	0.5	27.0	NA	8.3	NA
C-PAC	04/23/07	1.5	25.9	NA	4.6	17.0
DARCO Hg	04/24/07	1.0	27.5	19.3	7.4	16.7
DARCO Hg	04/24/07	2.0	31.5	20.8	4.8	NA
Flue PAC MC Plus #2	04/25/07	1.0	NA	NA	11.9	17.4
Flue PAC MC Plus #2	04/25/07	2.0	17.2	NA	8.6	17.6
DARCO Hg-LH	04/26/07	1.0	20.7	13.3	9.3	20.9
DARCO Hg-LH	04/26/07	2.0	19.2	NA	5.6	NA
DARCO Hg	05/02/07	5.0	24.4	14.6	NA	23.3
DARCO Hg	05/02/07	2.0	24.0	NA	8.8	20.3
DARCO Hg	05/02/07	3.0	20.4	6.4	6.1	24.8
BASF MS200	05/03/07	8.0	NA	NA	2.9	7.8
B-PAC	05/04/07	1.0	NA	NA	4.5	NA
DARCO Hg-LH w/o forced air	05/26/07	0.5	27.6	NA	22.6	15.3
DARCO Hg-LH w/ forced air	05/26/07	0.5	31.1	NA	19.9	15.9
DARCO Hg-LH w/ forced air	05/26/07	0.7	28.6	NA	21.3	16.1
DARCO Hg-LH w/ forced air	05/26/07	1.0	28.9	NA	22.2	15.4
DARCO Hg-LH w/o forced air	05/26/07	1.0	28.6	NA	20.7	15.0

Table 3-8. Average Mercury Concentrations Measured during Toxecon™ II & Staged Injection Tests (Phases II & III)

Sorbent Type	Date of Test	Injection Rate (lb/Macf)	Vapor Phase Mercury Concentration (µg/dNm^3 at 3% O$_2$)			
			ESP Inlet (Hg^{Total})	**ESP Inlet** (Hg^0)	**Untreated Outlet** (Hg^{Total})	**ESP 1A Toxecon™ II Outlet** (Hg^{Total})
Toxecon™ II DARCO Hg	04/30/07	2.0	26.8	20.0	25.0	13.2
Toxecon™ II DARCO Hg	04/30/07	5.0	33.2	NA	25.0	10.7
Toxecon™ II DARCO Hg	05/01/07	5.0	24.8	NA	23.6	14.3
Toxecon™ II DARCO Hg	05/23/07	2.0	26.4	14.1	24.1	13.2
Toxecon™ II DARCO Hg	05/23/07	6.0	22.2	11.9	22.0	9.0
Toxecon™ II DARCO Hg	05/24/07	3.0	21.6	NA	23.0	14.0
Staged Injection DARCO Hg	05/24/07	0.5/3.0*	22.1	NA	22.8	9.3
Staged Injection DARCO Hg	05/24/07	0.5/5.0*	NA	NA	21.8	7.5
Toxecon™ II DARCO Hg-LH	05/25/07	5.0	10.0	8.5	9.7	3.8
Staged Injection DARCO Hg-LH	05/26/07	1.0/5.0*	25.0	15.0	20.9	9.5

* For staged injection, first value indicates injection rate upstream of ESP; second value indicates injection rate mid-stream of ESP (Toxecon™ II injection rate).

Table 3-9. Percent Mercury Reduction and ESP Removal for Parametric Tests with Sorbent Injection Upstream of ESP

Sorbent Type	Date of Test	Injection Rate (lb/Macf)	% Mercury Reduction at ESP Outlet	% Mercury Removal across ESP
DARCO Hg-LH	12/03/06	1.1	68	76
DARCO Hg-LH	12/03/06	2.9	91	94
DARCO Hg-LH	12/04/06	0.5	51	68
DARCO Hg-LH	12/04/06	2.5	84	92
DARCO Hg-LH	12/04/06	5.1	97	97
DARCO Hg-LH	12/04/06	1.7	90	92
B-PAC	12/05/06	0.5	52	57
B-PAC	12/05/06	1.3	75	78
B-PAC	12/05/06	3.3	91	91
B-PAC	12/05/06	1.9	85	87
DARCO Hg	12/06/06	3.4	85	88
DARCO Hg	12/06/06	8.2	92	94
DARCO Hg	12/06/06	5.6	90	93
DARCO Hg	12/07/06	0.4	54	64
DARCO Hg	12/07/06	1.5	67	75
DARCO Hg	12/07/06	1.7	79	84
DARCO Hg	12/07/06	8.9	93	94
Flue PAC MC Plus	12/08/06	0.5	19	47
Flue PAC MC Plus	12/08/06	1.9	48	64
Flue PAC MC Plus	12/08/06	5.8	82	87
DARCO Hg	12/09/06	0.6	49	54
BASF MS200	04/21/07	6.0	40	49
BASF MS200	04/21/07	8.0	57	70
BASF MS200	04/22/07	10.0	33	51
BASF MS200	04/22/07	12.0	37	54
C-PAC	04/23/07	0.5	52	69
C-PAC	04/23/07	1.5	73	82
DARCO Hg	04/24/07	1.0	56	73
DARCO Hg	04/24/07	2.0	71	84
Calgon HGR-LH	04/25/07	1.0	31	31
Calgon HGR-LH	04/25/07	2.0	51	50
DARCO Hg-LH	04/26/07	1.0	55	55
DARCO Hg-LH	04/26/07	2.0	73	71
DARCO Hg	05/02/07	5.0	NA	43
DARCO Hg	05/02/07	2.0	57	63
DARCO Hg	05/02/07	3.0	75	70
BASF MS200	05/03/07	8.0	63	NA
B-PAC	05/04/07	1.0	NA	NA
DARCO Hg-LH w/o forced air	05/26/07	0.5	33	45
DARCO Hg-LH w/ forced air	05/26/07	0.5	20	49
DARCO Hg-LH w/ forced air	05/26/07	0.7	24	44
DARCO Hg-LH w/ forced air	05/26/07	1.0	31	47
DARCO Hg-LH w/o forced air	05/26/07	1.0	27	47

Table 3-10. Percent Mercury Reductions and Removals for Toxecon™ II & Staged Injection Tests (Phase II & III)

Sorbent Type	Date of Testing	Injection Rate (lb/Macf)	% Mercury Reduction at ESP Outlet	% Mercury Removal across ESP
Toxecon™ II DARCO Hg	4/30/2007	2.0	49	63
Toxecon™ II DARCO Hg	4/30/2007	5.0	58	69
Toxecon™ II DARCO Hg	5/1/2007	5.0	39	42
Toxecon™ II DARCO Hg	5/23/2007	2.0	45	50
Toxecon™ II DARCO Hg	5/23/2007	6.0	59	60
Toxecon™ II DARCO Hg	5/24/2007	3.0	39	35
Staged DARCO Hg	5/24/2007	0.5/3.0*	59	58
Staged DARCO Hg	5/24/2007	0.5/5.0*	65	NA
Toxecon™ II DARCO Hg-LH	5/25/2007	5.0	61	62
Staged DARCO Hg-LH	5/26/2007	1.0/5.0*	55	62

*For staged injection, first value indicates injection rate upstream of ESP; second value indicates injection rate mid-stream of ESP (Toxecon™ II injection rate).

Parametric Results for Sorbent Injection Upstream of ESP

Parametric tests were performed to evaluate sorbent injection upstream of the ESP. Three separate test periods were conducted over a six-month period. Each mercury sorbent was tested at several injection rates to develop a mercury removal performance curve.

Figure 3-7 shows the results for all sorbents injected upstream of the LMS ESP. Data points in the plot represent two- to four-hour averaged SCEM data. The plot shows how vapor-phase mercury removal across the ESP varied with sorbent injection rate. Removal across the ESP was calculated by comparing the treated ESP outlet mercury concentration to the ESP inlet mercury concentration. In Figure 3-7, baseline removal is represented by the points that fall along the y-axis (i.e. an injection rate of 0 lb/Macf). Baseline mercury removal across the ESP varied from 5% to 50% over the parametric test program.

Because the baseline mercury removal varied so greatly over the program, the data are also presented in terms of the percent reduction of mercury at the ESP outlet (Figure 3-8). The data for this evaluation was obtained by simultaneously measuring flue gas mercury downstream of a sorbent-treated and an untreated ESP module. The percent reduction was calculated by comparing the treated ESP outlet mercury concentration to the untreated ESP outlet mercury concentration. Since any changes to the baseline removal occurring during the tests would be expected to impact both ESPs, this comparison allows for the impact of the just the injected sorbent to be determined. The calculation of percent reduction thus indicates the amount of mercury removal the sorbent achieves beyond the baseline removal.

From Figure 3-8, it is readily noted that several DARCO Hg and DARCO Hg-LH datum points did not fall on the generally established curve. One cluster of these points occurred on a single day when the LMS unit was undergoing a fuel transition from PRB (exclusively) to a PRB/TxL blend. It is unclear why the sorbents demonstrated poorer performance during this isolated period. Excluding this period, three of the brominated sorbents (DARCO Hg-LH, B-PAC, and C-PAC) performed very similarly with results indicating that 90% reduction of mercury was attainable at injection rates of 2 -3 lb/Macf; results from 2009 tests indicated lower removal, as will be discussed in Chapter 4. The similar performance of the fly ash compatible C-PAC to the non-passivated brominated carbons suggests that higher levels of mercury removal may be attained at acceptable injection rates (for fly ash reuse) with this sorbent. The mercury removal performance curve of the fourth tested brominated sorbent (Flue PAC MC Plus) fell significantly below the others. Flue PAC MC Plus was tested at two different times during the six-month program and on days when the other brominated sorbents were performing better. The performance of the non-carbon BASF MS200 sorbent was limited to 50% reduction in mercury at the ESP outlet.

The non-halogenated activated carbon (DARCO Hg) performed nearly as well as its brominated counterpart, DARCO Hg-LH, on a percent reduction of mercury basis (Figure 3-8). Previous comparisons of these two sorbents in low-chloride flue gases have been made on units firing 100% PRB. Results of these previous tests showed that the DARCO Hg sorbent had significant limitations in the extent of mercury removal achieved as compared to the DARCO Hg-LH. For example, at Great River Energy's Stanton Station Unit 1, the DARCO Hg was limited to approximately 50% removal, even at the highest injection rates, while the DARCO Hg-LH achieved greater than 90% removal [3]. While Texas lignite is considered a low chloride coal (50-100 ppm), it does have higher chloride content than PRB coal (20-60 ppm). This modest increase in chloride may be sufficient to enable the DARCO Hg to achieve higher levels of mercury removal in a 70/30 TxL/PRB blended gas than in a PRB gas.

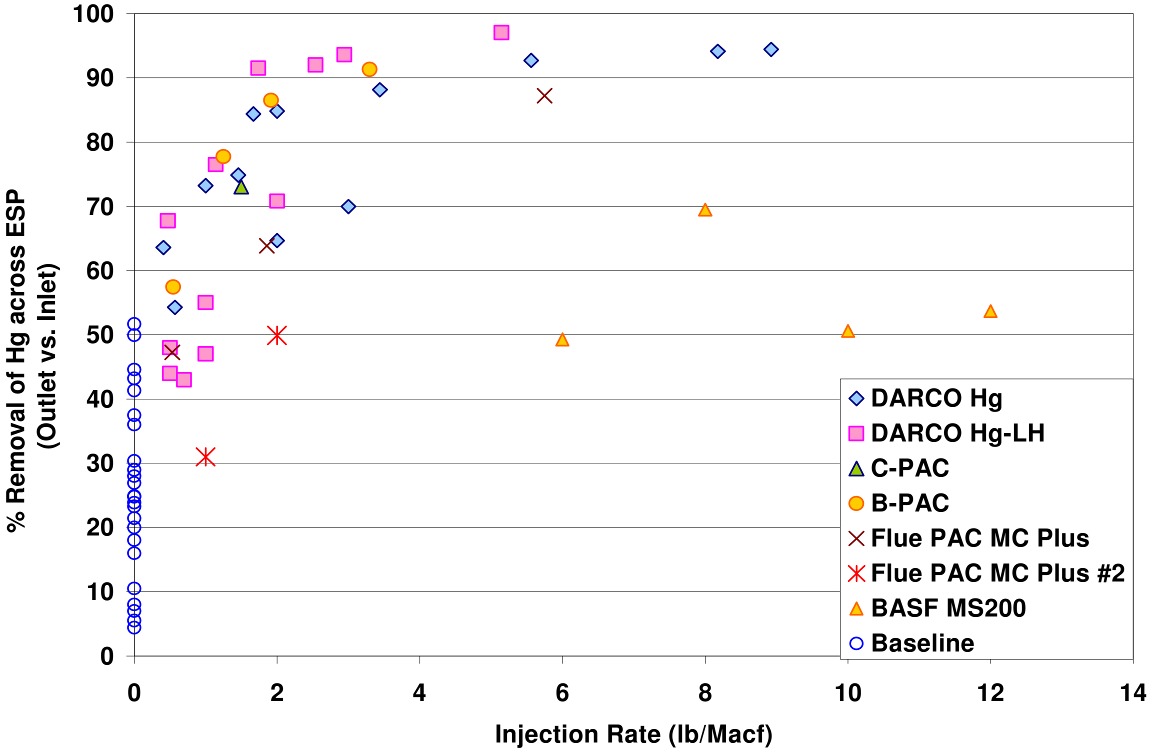


Figure 3-7. Mercury Removal across the LMS ESP (Injection Upstream of ESP)

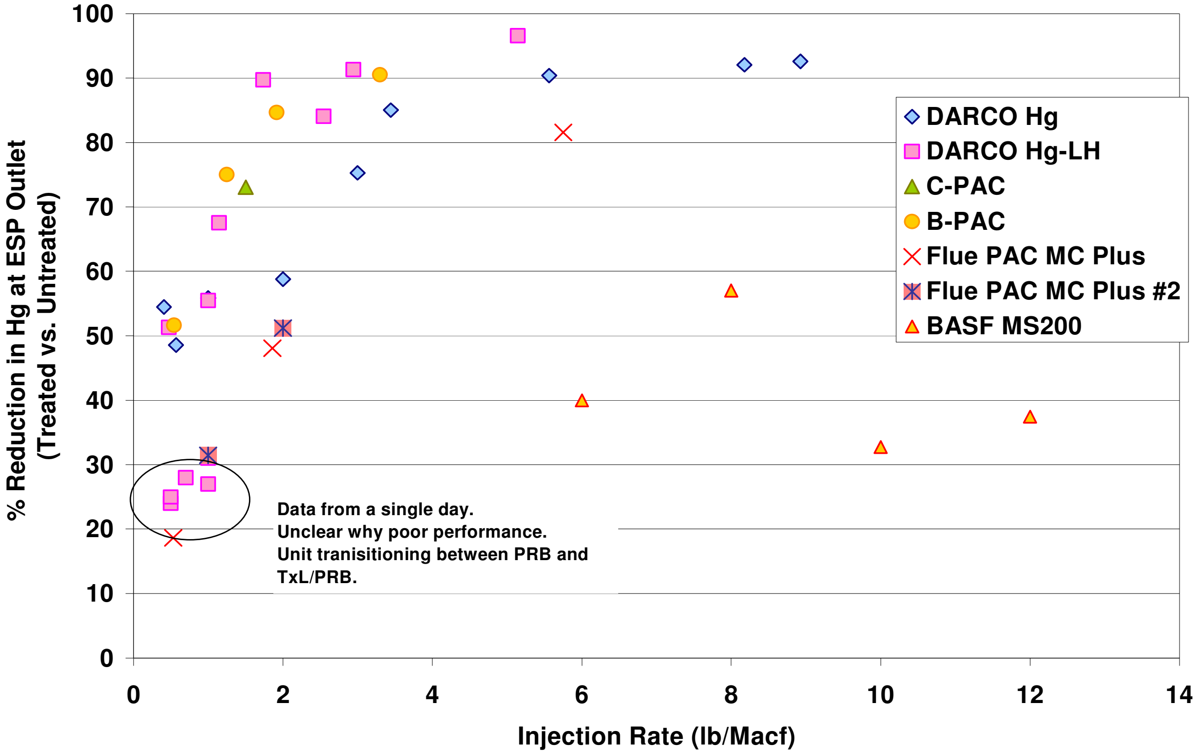


Figure 3-8. Reduction in Mercury Concentration at the ESP Outlet (Injection Upstream of ESP)

Table 3-11 summarizes the injection rates estimated for each sorbent to achieve 70% mercury reduction at the ESP outlet. These rates were interpolated from logarithmic fits to the data shown in Figure 3-8. Parametric test results indicate that the DARCO Hg, DARCO Hg-LH, and B-PAC would require between 1.0 and 2.0 lb/Macf of injected sorbent to achieve 70% mercury reduction. Results indicated that 70% removal would not be achievable with the non-carbon MS200 sorbent.

Table 3-11. Sorbent Injection Rate Needed to Achieve 70% Mercury Reduction at ESP Outlet

Sorbent	Injection Rate (lb/Macf) Needed to Achieve 70% Hg Reduction at ESP Outlet
DARCO Hg-LH	1.3 / 1.8*
B-PAC	1.1
DARCO Hg	2.0
Calgon Flue PAC MC Plus	3.9
C-PAC	1.5
BASF MS200	NA**

* 1.2 lb/Macf injection rate when excluding data from 5/26/07 showing unusually poor performance; 1.8 lb/Macf injection rate is predicted when including these data

** NA - 70% reduction was not achievable

Parametric Test Results with Toxecon™ II and Staged Injection Configurations

A series of tests was conducted to evaluate mercury removal with a Toxecon™ II sorbent injection configuration at LMS. Tests included exclusive use of the Toxecon™ II system as well as the combined use of Toxecon II with sorbent injection upstream of the ESP (i.e., staged injection). The objective of the tests was to determine if high levels of mercury removal could be achieved across the ESP while maintaining low activated carbon in the bulk of the fly ash.

Based on the results from the previous parametric tests conducted upstream of the ESP, Norit Americas' DARCO Hg and DARCO Hg-LH sorbents were selected for testing in the Toxecon™ II and staged injection configurations. These sorbents were selected because they were among the highest performing sorbents and because of the proximity of the Norit Americas' manufacturing center to the LMS plant (i.e., lower transportation costs than the other evaluated sorbents).

Figure 3-9 shows the mercury reduction results for these two sorbents with the various sorbent injection configurations evaluated. Toxecon™ II (injection mid-stream of the ESP) was tested during two different weeks in this program. The original tests were performed in April 2007. Despite the lances providing poor theoretical cross-sectional coverage of carbon across the ESP (~20% area coverage predicted), mercury reductions up to 60% were measured at the ESP outlet. A Toxecon™ II lance re-design was implemented and tested in May 2007; the system was modified in an attempt to improve carbon distribution within the ESP. Subsequent results obtained in May 2007 were similar to the April 2007 results, indicating no improvement in mercury removal performance. The volume and pressure of the air delivered to the Toxecon™ II lances were varied during the tests, but no associated improvements in mercury removal performance were observed.

A series of tests was conducted with staged injection, in which a small amount of carbon was injected upstream of the ESP, with the bulk of the carbon injected in the Toxecon™ II lances. This configuration did not provide any improvements in mercury removal over the Toxecon™ II-only arrangement. Analysis of the results suggests that the injection upstream of the ESP was not performing as well as in previous tests (see circled points in lower left corner of Figure 3-9, indicating data collected during same test week with injection upstream of ESP only).

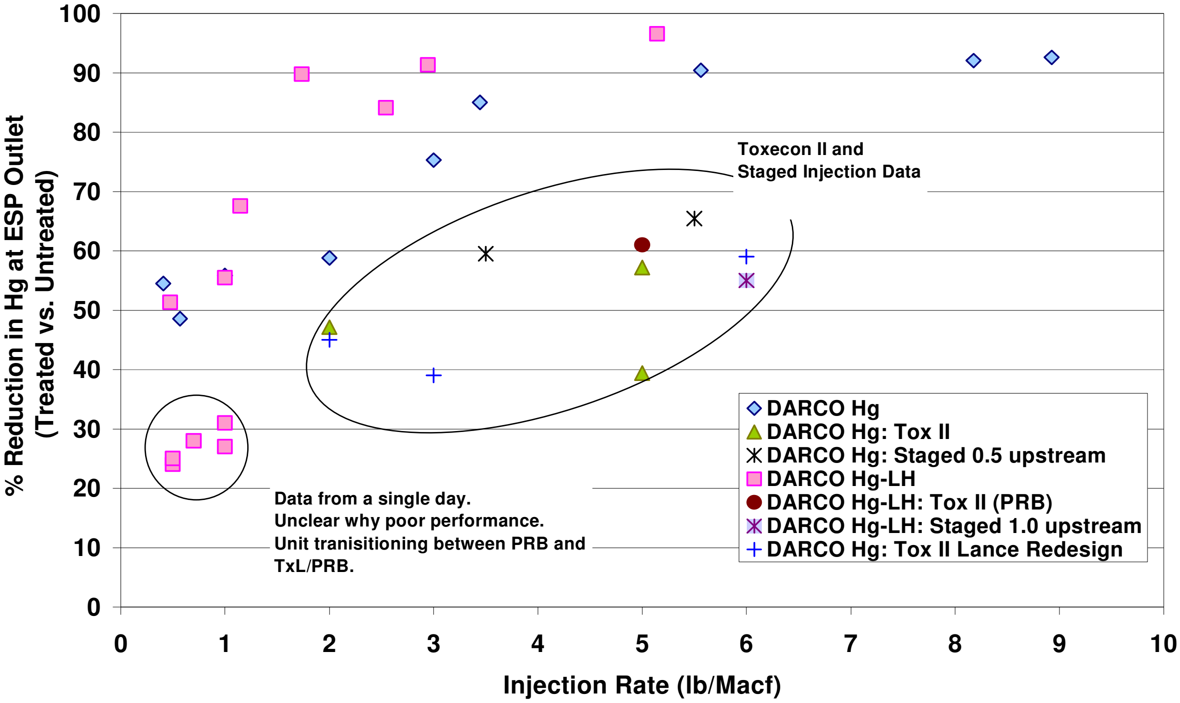


Figure 3-9. Effect of Injection Location on the Reduction of Mercury at the ESP Outlet

3.4 Long-Term Sorbent Injection – Mercury Removal Results

Based on the results from parametric tests conducted upstream of the ESP, Norit Americas' DARCO Hg-LH sorbent was selected for the sixty-day continuous mercury control evaluation. This sorbent was selected because it was among the highest performing sorbents and because of the proximity of the Norit Americas' manufacturing center to the power plant. DARCO Hg-LH was selected over DARCO Hg because the unit occasionally burns 100% PRB coal, in which case the DARCO Hg-LH is more effective than the DARCO Hg. Toxecon™ II and staged injection did not consistently achieve the test program's targeted mercury removal; therefore, carbon was injected upstream of the ESP for the long term tests. An injection rate of 2 lb/Macf was selected based on parametric results indicating that this rate should meet the program target mercury removal while still preserving the beneficial use of ash.

Table 3-12 presents a timeline for the sixty-day DARCO Hg-LH injection test. Sorbent injection commenced on June 22, 2007 at 1:00 PM and continued for 60 days at an average rate of 2.0 lb/Macf. As presented in the table, the unit occasionally burned 100% PRB during the test period. Sorbent injection was maintained for most of the test duration, but was lost for several brief periods (Table 3-12); data for these periods were excluded from data averaging.

Table 3-12. Long-Term Sorbent Injection Test Schedule

Periods	Start	End
Baseline	6/19/07 19:00	6/22/07 12:00
Typical[‡]	6/22/07 15:00	6/26/07 23:00
High PRB[†]	6/27/07 4:00	6/27/07 0:00
Lost injection – EXCLUDE[*]	6/27/07 12:40	6/27/07 17:20
High PRB	6/27/07 18:00	6/27/07 23:00
Lost injection - EXCLUDE	6/27/07 23:10	6/28/07 8:55
High PRB	6/28/07 9:00	6/28/07 15:00
Lost injection - EXCLUDE	6/28/07 15:05	6/28/07 18:15
Typical	6/28/07 19:00	7/2/07 20:00
High PRB	7/4/07 1:00	7/5/07 4:00
Lost injection - EXCLUDE	7/5/07 10:45	7/5/07 12:40
Typical	7/5/07 13:00	7/5/07 21:00
High PRB	7/5/07 23:00	7/7/07 6:00
Typical	7/7/07 10:00	7/8/07 22:00
Lost injection - EXCLUDE	7/8/07 22:50	7/9/07 7:30
Typical	7/9/07 8:00	7/10/07 0:00
Lost injection - EXCLUDE	7/10/07 0:35	7/10/07 9:00
Typical	7/10/07 10:00	7/13/07 2:00
Unit outage (Forced)	7/13/07 7:25	7/18/07 11:45
Typical	7/18/07 14:00	8/2/07 12:00
High PRB	8/2/07 17:00	8/3/07 9:00
Typical	8/3/07 14:00	8/13/07 7:00
Lost injection - EXCLUDE	8/13/07 7:55	8/13/07 9:45
Typical	8/13/07 10:00	8/19/07 18:00
Lost injection - EXCLUDE	8/19/07 18:10	8/20/07 7:45
Typical	8/20/07 8:00	8/20/07 17:00
Lost injection - EXCLUDE	8/20/07 17:35	8/20/07 19:00
Typical	8/20/07 19:00	8/21/07 0:00
Lost injection - EXCLUDE	8/21/07 0:50	8/21/07 7:30
Typical	8/21/07 8:00	8/21/07 15:00
Return to Baseline	8/21/07 22:00	

[‡] Typical = data from time periods when unit fired typical mix of 70% Lignite and 30% PRB
[†] High PRB = data from time periods when unit fired greater than 95% PRB coal
* EXCLUDE = data from this period not included in average of long-term results

Mercury Measurements During Long-Term Sorbent Injection – SCEM Results

Flue gas mercury concentrations during the long-term sorbent injection test were measured by SCEMs at the following locations: ESP 1A/1B inlet, ESP 1A2 outlet (treated ESP outlet), and ESP 1B1 outlet (untreated ESP outlet). Typically the plant fired a mixture of 70% lignite and 30% PRB; however, occasionally over the 60-day evaluation period the plant fired 100% PRB. Because mercury removal and speciation can vary based on the coal type, results are reported separately for each coal type (i.e., PRB only or TxL/PRB blend) in Tables 3-13 through 3-16.

Tables 3-13 and 3-14 summarize the average total and elemental mercury concentrations measured for each coal type. Table 3-15 shows percent oxidized mercury in the flue gas at the different measurement locations, and Table 3-16 summarizes the percent mercury reduction at the ESP outlet and percent mercury removal measured across the ESP. Figure 3-10 plots total and elemental mercury concentrations measured throughout the two-month period. Figure 3-11 plots the hourly-averaged mercury removal over the long-term test; results indicated that mercury removal varied from 30 to 97% during the test.

When firing the typical 70/30 TxL/PRB fuel mix, the daily Unit 1 inlet total vapor phase mercury concentration ranged from 18.0 to 30.5 µg/dNm^3 at 3% O_2, with an average of 25.4 µg/dNm^3. The treated outlet total vapor phase mercury concentration ranged from 1.4 to 10.8 µg/dNm^3, with an average of 4.9 µg/dNm^3. The average daily removal of vapor-phase mercury across the treated ESP was 81%. In comparison, the daily average removal of vapor-phase mercury across the untreated ESP was 26%. On average, 37% of the ESP inlet, 81% of the treated ESP outlet, and 49% of the untreated ESP outlet vapor-phase mercury was present as oxidized mercury. These values represent daily averages; more variability was observed in hourly data over the two-month period.

While firing 100% PRB, the hourly inlet total vapor phase mercury concentration ranged from 8.0 to 19.3 µg/dNm^3 at 3% O_2, with an average of 11.7 µg/dNm^3. The hourly treated outlet total vapor phase mercury concentration ranged from 0.3 to 3.6 µg/dNm^3, with an average of 1.0 µg/dNm^3. Hourly elemental mercury concentration measurements were not available. The hourly average removal of vapor-phase mercury across the treated ESP was 93%. In comparison, the hourly average removal of vapor-phase mercury across the untreated ESP was 27%. Approximately 35% of the ESP inlet vapor-phase mercury was present as oxidized mercury.

Figure 3-12 compares the average mercury removal achieved over the two-month injection test to the parametric test results for the Darco Hg-LH sorbent. At 2 lb/Macf, three different parametric tests resulted in mercury removals ranging between 70% and 95%. The average removal of 82% achieved over the two-month period falls within the performance predicted by the parametric tests.

Figure 3-13 plots daily-averaged mercury removal across the ESP versus the daily-averaged operating temperature of the ESP. As shown by the low R^2 value, there was no correlation between mercury removal and ESP operating temperature.

Table 3-13. Average Total Mercury Concentrations (μg/Nm^3 at 3% O_2) during Long-Term Injection Test

	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	High PRB	High PRB	High PRB
	Average	Daily Average Maximum	Daily Average Minimum	Average	Hourly Maximum	Hourly Minimum
Inlet	25.4	30.5	18.0	11.7	19.3	8.0
Treated Outlet	4.9	10.8	1.4	1.0	3.6	0.3
Untreated Outlet	18.5	25.0	14.8	9.0	18.7	5.0

Table 3-14. Average Elemental Mercury Concentrations (μg/Nm^3 at 3% O_2) during Long-Term Injection Test

	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	High PRB	High PRB	High PRB
	Average	Daily Average Maximum	Daily Average Minimum	Average	Hourly Maximum	Hourly Minimum
Inlet	15.2	21.5	4.9	8.6	15.7	5.3
Treated Outlet	0.9	1.3	0.3	no data	no data	no data
Untreated Outlet	9.0	12.4	3.4	3.4	4.4	2.5

Table 3-15. Average Flue Gas Mercury Oxidation Measured during Long-Term Injection

	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	High PRB	High PRB	High PRB
	Average	Daily Average Maximum	Daily Average Minimum	Average	Hourly Maximum	Hourly Minimum
Inlet	37%	75%	13%	35%	57%	0%
Treated Outlet	81%	93%	54%	n/a	n/a	n/a
Untreated Outlet	49%	82%	35%	54%	73%	30%

Table 3-16. Mercury Removals Measured during Long-Term Injection Test

	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	Typical 70/30 TxL/PRB	High PRB	High PRB	High PRB
	Average	Daily Average Maximum	Daily Aerage Minimum	Average	Hourly Maximum	Hourly Minimum
Untreated Outlet vs. Inlet (Native Removal)	26%	51%	0%	27%	49%	0%
Treated Outlet vs .Inlet (% Removal)	81%	95%	58%	93%	97%	86%
Treated Outlet vs. Untreated Outlet (% Reduction)	73%	92%	57%	89%	95%	78%

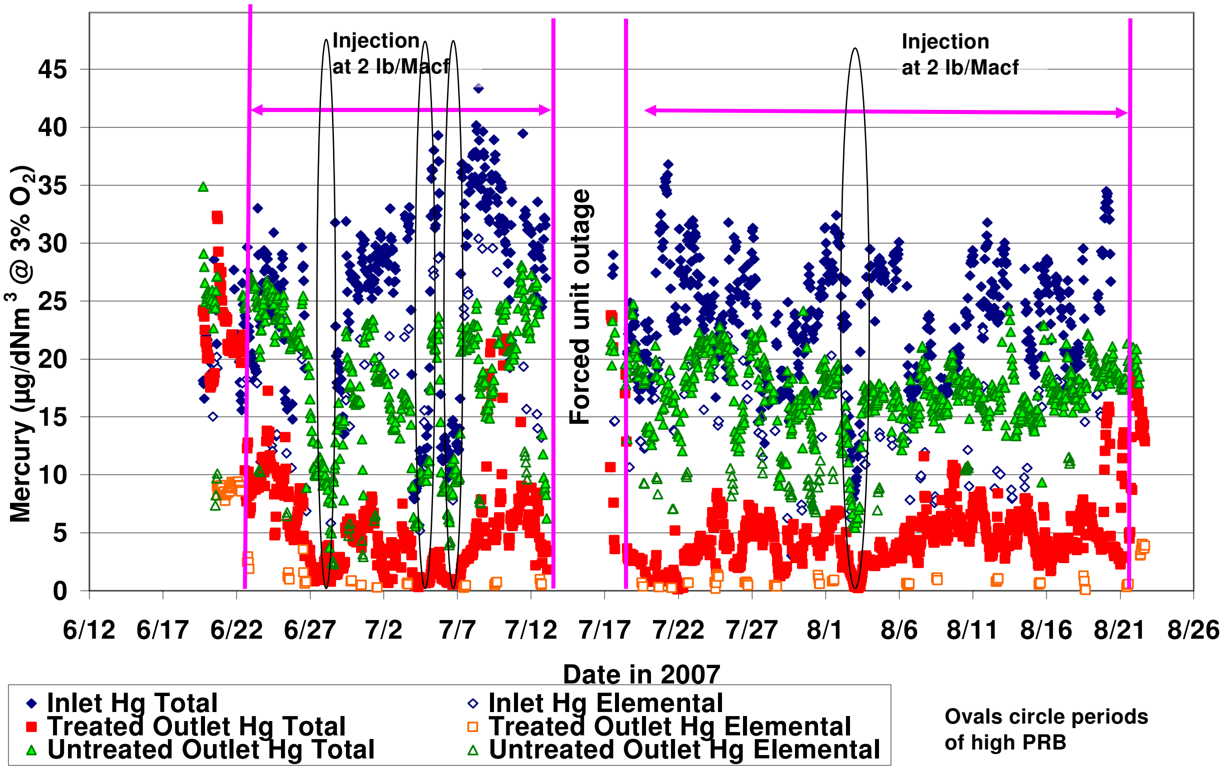


Figure 3-10. Total and Elemental Mercury Concentrations Measured during Long-Term Injection Test

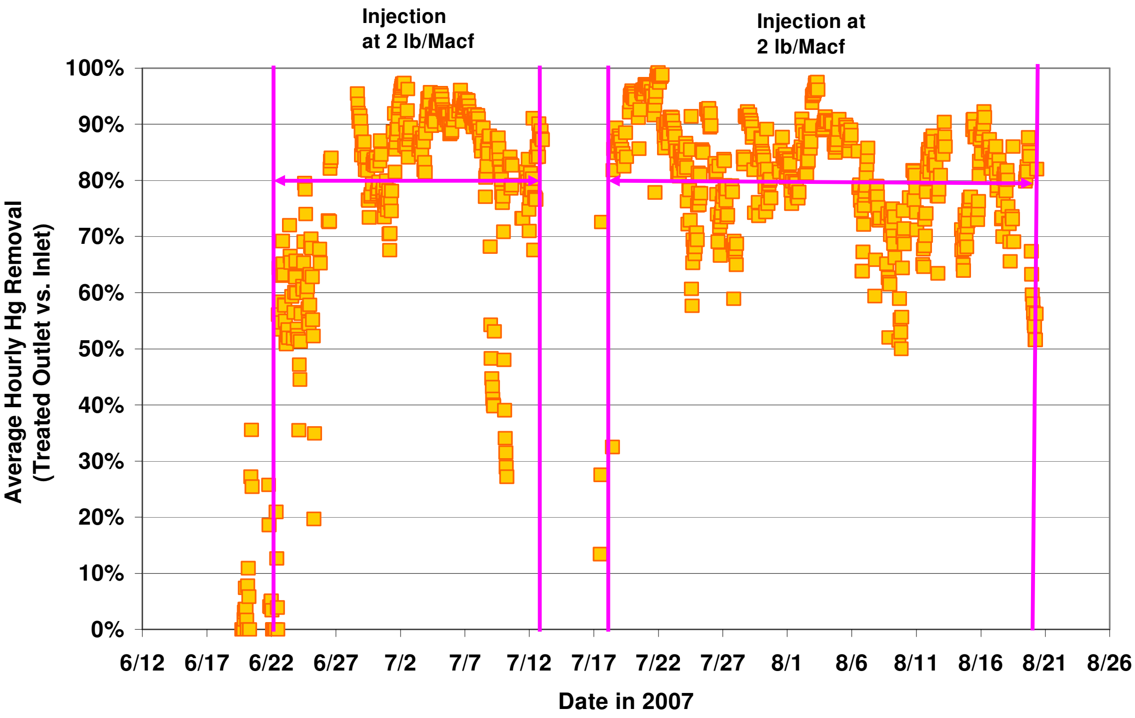


Figure 3-11. Hourly-Averaged Mercury Removal across ESP during Long-Term Injection

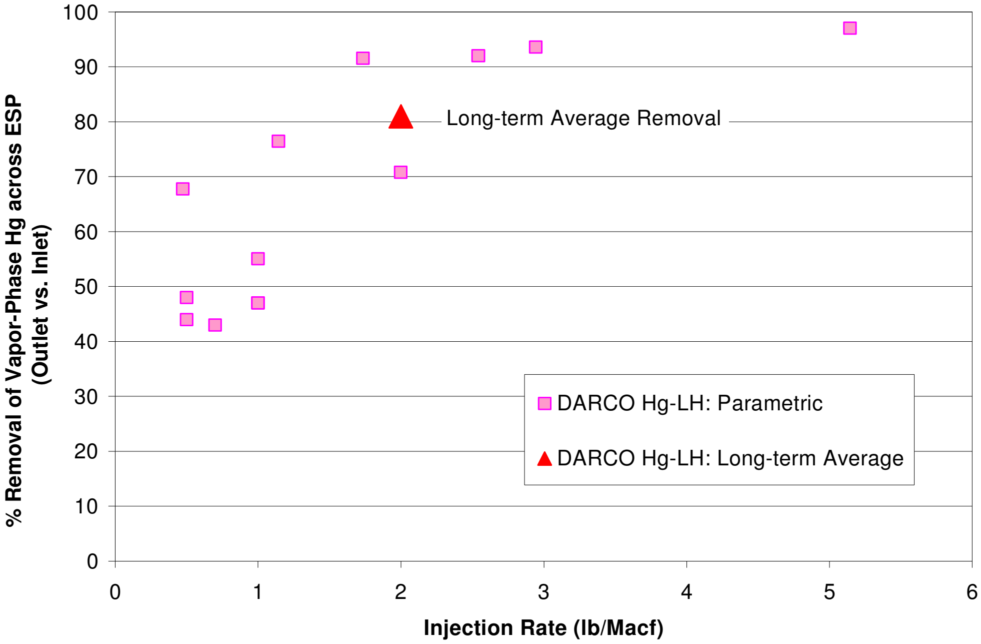


Figure 3-12. Mercury Removal Comparison bewteen Long-Term and Parametric Tests, as Measured by SCEMs

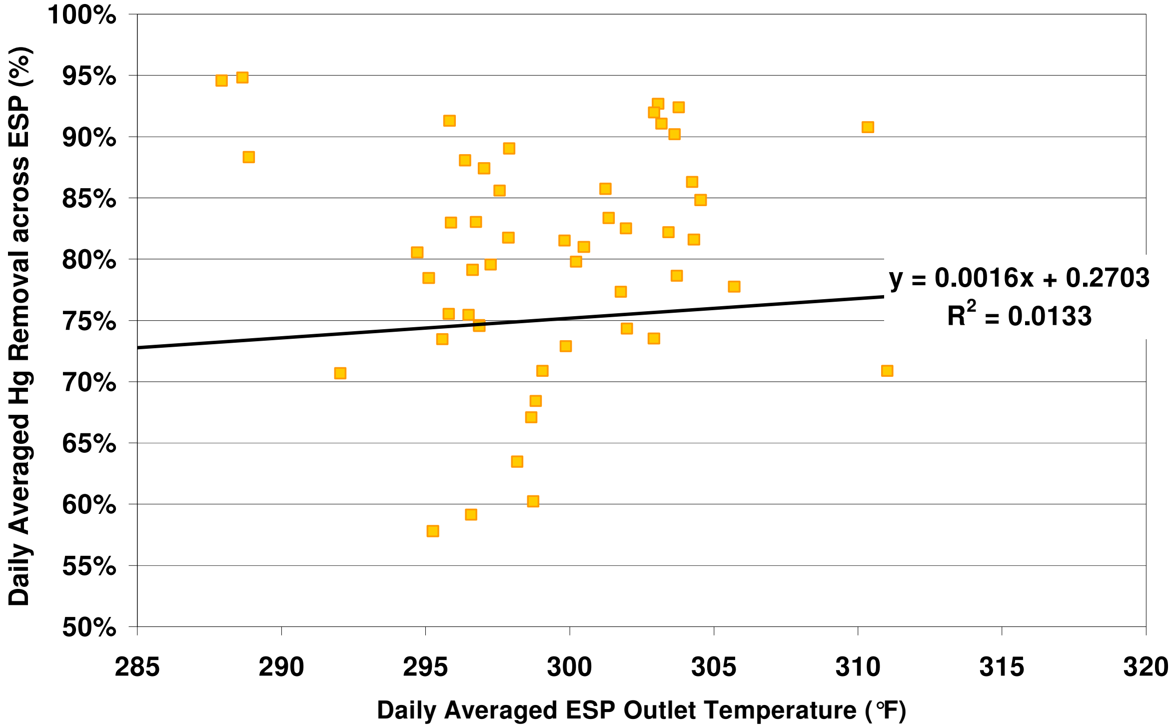


Figure 3-13. Comparison of Daily-Averaged Mercury Removal and ESP Temperature

Mercury Measurements During Long Term Sorbent Injection – Ontario Hydro Results

OH measurements were conducted at three different times during the two-month continuous injection test and are summarized in Table 3-17. OH measurements were made at the treated and untreated ESP outlet ducts.

The average OH total gas phase mercury concentration at the untreated outlet was 32.8 µg/dNm^3 at 3% O_2. The OH total gas phase mercury concentration at the treated outlet ranged from 9 to 22 µg/dNm^3 at 3% O_2 and averaged 16 µg/dNm^3 at 3% O_2. The percent mercury reduction at the ESP outlet averaged 51%, and ranged from 27% to 71% over the nine OH runs that were conducted. Mercury removal across the ESP was calculated by comparing the treated ESP outlet OH data to the ESP inlet SCEM data (Table 3-18). Mercury removal across the ESP ranged from 0% to 63%, and averaged 40%.

On average, the flue gas mercury at the untreated outlet duct was 54% oxidized, while at the treated outlet duct it was 77% oxidized. Treated outlet duct elemental mercury concentrations ranged from 2.1 to 5.3 µg/dNm^3, and averaged 3.3 µg/dNm^3. These results indicate that the injection of activated carbon resulted in increased oxidation of mercury in the flue gas.

OH results are compared to SCEM results in Table 3-19. The OH mercury concentration measurements were higher than the SCEM measurements at both the treated and untreated outlet ducts. However, both OH and SCEM showed significant oxidation of mercury due to the injection of activated carbon.

Table 3-17. OH Results for Long-Term Injection Test

Date	Time	Location	Total Hg (gas phase + particulate) μg/dNm^3	Hg$_p$, μg/dNm^3	Hg^{2+}, μg/dNm^3	Hg^0, μg/dNm^3	Oxidized % of Total Hg	% Hg Removal Untreated vs. Treated
10-Jul-07	12:10-14:27	Untreated	35.5	<0.03	21.2	14.3	60%	
10-Jul-07	12:10-14:24	Treated	15.0	0.08	10.9	4.0	73%	58%
10-Jul-07	15:20-17:35	Untreated	38.7	<0.04	22.8	15.9	59%	
10-Jul-07	15:20-17:23	Treated	20.0	<0.05	14.7	5.3	73%	48%
11-Jul-07	09:32-11:45	Untreated	41.7	<0.04	25.5	16.2	61%	
11-Jul-07	09:32-11:43	Treated	18.5	<0.07	14.0	4.5	76%	56%
31-Jul-07	10:00-12:45	Untreated	30.8	<0.04	16.1	14.7	52%	
31-Jul-07	10:00-12:11	Treated	9.8	0.14	7.4	2.2	77%	69%
31-Jul-07	14:01-16:09	Untreated	31.8	<0.04	17.0	14.9	53%	
31-Jul-07	14:01-16:13	Treated	9.3	<0.06	7.3	2.1	78%	71%
1-Aug-07	09:20-11:32	Untreated	26.5	<0.04	12.4	14.1	47%	
1-Aug-07	09:23-11:36	Treated	17.0	<0.07	14.3	2.8	84%	36%
14-Aug-07	11:30-13:40	Untreated	33.4	<0.01	16.8	16.6	50%	
14-Aug-07	11:30-13:45	Treated	21.9	<0.01	17.3	4.6	79%	34%
14-Aug-07	15:00-17:10	Untreated	30.6	<0.01	15.1	15.5	49%	
14-Aug-07	15:00-17:10	Treated	22.4	<0.01	17.3	5.1	77%	27%
15-Aug-07	09:30-11:35	Untreated	26.5	<0.01	14.8	11.7	56%	
15-Aug-07	09:30-11:38	Treated	10.8	<0.01	7.9	2.9	73%	59%
	Average	Untreated	32.8	<0.03	16.2	13.4	54%	
	Average	Treated	16.1	<0.05	11.1	3.3	77%	51%

Table 3-18. Calculation of Mercury Removal across the ESP Based on OH Outlet Concentrations

Date	Time	ESP Inlet Hg (SCEM) µg/dNm^3	Treated ESP Outlet Hg (OH) µg/dNm^3	% Hg Removal across ESP
10-Jul-07	12:10-14:27	26.5	14.9	44%
10-Jul-07	15:20-17:35	32.9	20.0	39%
11-Jul-07	09:32-11:45	n/a	18.5	n/a
31-Jul-07	10:00-12:45	23.5	9.6	59%
31-Jul-07	14:01-16:09	25.6	9.3	63%
1-Aug-07	09:20-11:32	27.8	17.0	39%
14-Aug-07	11:30-13:40	25.9	21.9	15%
14-Aug-07	15:00-17:10	21.6	22.4	0%
15-Aug-07	09:30-11:35	26.8	10.8	60%
	Average			40%

Table 3-19. Comparison of OH and SCEM Mercury Measurements during Long-Term Test

			OH Outlet		SCEM Outlet		OH	SCEM
Date	Time	ESP Outlet Location	Vapor-phase Total Hg, μg/dNm^3	% Ox	Vapor-phase Total Hg, μg/dNm^3	% Ox	% Removal Untreated vs. Treated	% Removal Untreated vs. Treated
10-Jul-07	12:10-14:27	Untreated	35.5	60%	20.9	-		
10-Jul-07	12:10-14:24	Treated	15.0	73%	4.5	-	58%	79%
10-Jul-07	15:20-17:35	Untreated	38.7	59%	20.9	-		
10-Jul-07	15:20-1723	Treated	20.0	73%	6.0	-	48%	71%
11-Jul-07	09:32-11:45	Untreated	41.7	61%	27.0	-		
11-Jul-07	09:32-11:43	Treated	18.5	76%	8.4	-	56%	69%
31-Jul-07	10:00-12:45	Untreated	30.8	52%	16.1	-		
31-Jul-07	10:00-12:11	Treated	9.8	77%	4.0	58%	68%	75%
31-Jul-07	14:01-16:09	Untreated	31.8	53%	19.5	42%		
31-Jul-07	14:01-16:13	Treated	9.3	78%	3.2	-	71%	83%
1-Aug-07	09:20-11:32	Untreated	26.5	47%	17.7	-		
1-Aug-07	09:23-11:36	Treated	17.1	84%	6.0	84%	36%	66%
14-Aug-07	11:30-13:40	Untreated	33.4	50%	16.5	-		
14-Aug-07	11:30-13:45	Treated	21.9	79%	7.7	-	34%	54%
14-Aug-07	15:00-17:10	Untreated	30.6	49%	16.4	-		
14-Aug-07	15:00-17:10	Treated	22.4	77%	7.7	-	27%	53%
15-Aug-07	09:30-11:35	Untreated	26.5	56%	15.2	-		
15-Aug-07	09:30-11:38	Treated	10.8	73%	2.4	72%	59%	84%
	Average	Untreated	32.8	54%	18.9	42%		
		Treated	15.8	77%	5.2	71%	51%	70%

Mercury Measurements During Long-Term Sorbent Injection – Fly Ash Results

Fly ash from the first field of the ESP was obtained daily and samples from every other day were analyzed for mercury content. Because it was more difficult to collect, ash from the back fields of the ESP was sampled and analyzed on a weekly basis. Results from the daily analyses of the first-field ash are summarized in Appendix E. The weekly analyses of all fields are summarized in Table 3-20. As expected, carbon injection resulted in a large increase in the fly ash mercury content. The mercury concentration of the first-field ash increased from 0.04 ppm at baseline conditions to an average of 0.75 ppm during carbon injection. Most hopper 3A samples after July 4th were not used in averages presented in this section due to economizer ash carry-over contamination. During the long-term injection test, fly ash mercury concentration was even higher for the back fields of the ESP. The second field ash mercury concentration averaged 1.9 ppm, and the third field ash mercury concentration averaged 3.2 ppm. The combined fourth and fifth field fly ash had an average mercury concentration of 3.7 ppm, while the last field averaged just under 2.0 ppm. Higher ash mercury content in the back field of the ESP was expected, based on previous experience, and is believed to be related to the higher carbon content (on a mass percent basis) and smaller particle size (i.e., higher specific surface area) of the ash captured there.

Fly ash mercury concentrations were compared to the inlet SCEM data to calculate the mercury removal across the ESP. This calculation was performed for each of the thirty days in which the first-field ash mercury concentration was analyzed. Because the back fields were only analyzed once per week and the results were fairly consistent over the course of the test program, test average mercury concentrations for the second through seventh fields were used in the calculation. Detailed calculations of the amount of mercury captured in the fly ash and exiting with the flue gas are provided in Appendix F. Daily averaged mercury removal, as calculated from the ash and inlet SCEM data, ranged from 44% to 100%, with an overall average of 66%.

Table 3-20. Average Fly Ash Mercury Concentration Measured Across the Treated ESP

Condition	Date of Sample	Time of Sample	Ash Hg Content (ppm)				
			Field				
			1	2	3	4&5	6&7
Baseline	6/22/2007*	11:30	0.04	0.03	0.03	0.92	0.78
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007*	13:00	0.78	1.59	2.99	3.59	
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007±	14:10	0.68	1.82	3.12	3.82	1.95
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007±	12:12	1.02	2.49	3.74	3.34	1.88
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007±	15:10	0.58	1.78	3.66	3.89	2.73
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007±	15:30	0.76	2.16	3.22	3.89	1.31
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007±	13:00	0.66	1.66	2.75		
LT Average			**0.75**	**1.91**	**3.25**	**3.71**	**1.96**
LT Std Dev			**0.15**	**0.34**	**0.39**	**0.24**	**0.58**

*Hg content of the ash is reported as an average of hoppers 1A, 2A, and 3A for each field

± Hg content of the ash is reported as an average of hoppers 1A and 2A for each field. Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007.

Discussion of Mercury Removal During the Long-Term Injection Test

Three different measurement methods were used to calculate the mercury removal achieved by activated carbon injection during the long-term test: SCEM measurements, OH measurements, and fly ash mercury analysis. Mercury removal was calculated by comparing the mercury measured by each method to SCEM inlet mercury measurements made during the same time period. The calculation of mercury removal based on the inlet SCEM data is predicated on the assumption that inlet SCEM data are accurate. A comparison of inlet SCEM data to coal mercury data collected over the two month period indicated agreement within 10%, thus suggesting that the assumption is valid.

Figure 3-14 compares the results obtained from these three calculation methods. The data points indicate the calculated mercury removal for each day. Removal is calculated for a discrete time period in the day corresponding to the period when fly ash was sampled; it is not the average of the entire 24-hour period. Dashed lines in the plot indicate the average removals over the course of the two-month injection test. For all methods, there was a wide scatter in the measured mercury removal over the test period. Mercury removal, as determined solely from SCEM measurements, ranged from 64% to 99%, and averaged 82%. The use of fly ash mercury data predicted lower mercury removal, averaging 66%; however, the ash data also indicated a wider range of mercury removal from 44% to 100%.

The OH data indicated an average of 40% mercury removal. This average was obtained from nine two-hour runs that were made over the two-month injection test; thus, the OH data are not representative of the entire two-month test program. For the OH data collected the sixth week of the long-term test, there is good agreement with the removal calculated from the ash mercury concentration. Two of the three OH runs collected during the eighth week of the long-term test indicated significantly lower mercury removals than did the fly ash or SCEM data. These data indicated only 0-15% removal, which does not agree with any of the other OH, ash, or SCEM data collected over the two month period. However, an analysis of these runs does not indicate any quality control problems. When excluding these two runs, the average mercury removal predicted by the OH method increases to 50%, which is still lower than the removal measured by the fly ash or the SCEMs.

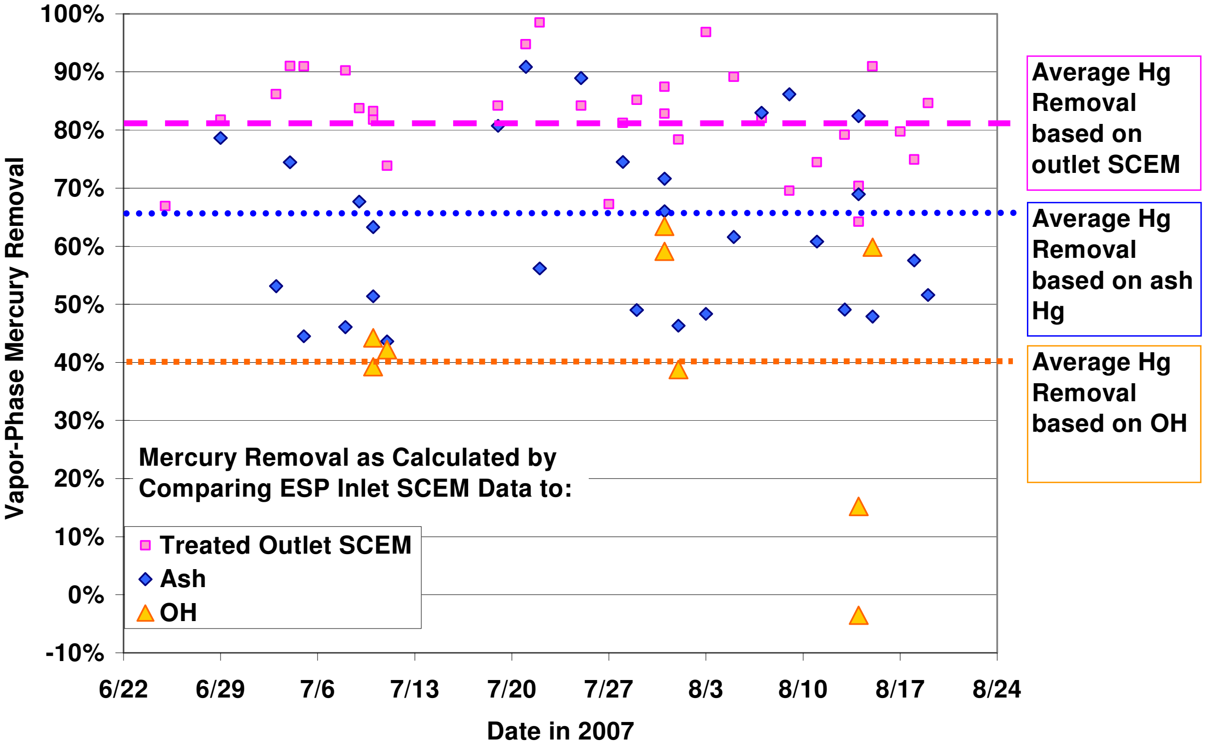


Figure 3-14. Comparison of Mercury Removals Calculated from SCEM, Ash, and OH Data

Results from this comparison show a large discrepancy between the mercury removals calculated from the SCEM, OH, and fly ash data evaluation. A review of the QA/QC data associated with the SCEM, OH, and fly ash measurements does not identify any problems that could have led to the discrepancy between the methods. The SCEM probe at the ESP outlet was changed three times during the course of the long-term test; no changes in measured mercury concentrations were observed with the new probes (Appendix G). All analytical parameters associated with the OH and fly ash characterization procedures passed stringent QC criteria (Appendix A).

The discrepancy between the data may result from differences in the sample collection techniques for the methods. SCEM data were collected at a single point in one of the two treated ESP outlet ducts whereas the OH data were collected as a traverse of the other treated ESP outlet duct. While the SCEM probe was located at a point with average flow for the duct, it is possible that the selected point corresponded to a location in the duct with higher than average carbon contact and, thus, mercury removal. Although care was taken to achieve good sorbent distribution across the flue gas duct, the actual extent of the (duct) coverage attained is not known. Computational flow dynamic (CFD) modeling would be required to more accurately evaluate this.

3.5 Mercury Oxidation during Sorbent Injection

The long-term injection test was used to evaluate the effectiveness of injecting 2 lb/Macf of DARCO Hg-LH to achieve mercury removal and oxidation. Appreciable levels of both would be expected to result in high overall removal across the unit configured with an ESP and wet FGD system. Mercury removal across the ESP was discussed in the previous section. Figure 3-15 shows the measured flue gas mercury oxidation at the inlet and the treated and untreated ESP outlet ducts, based on SCEM data. Tables 3-14 and 3-15 list the average elemental mercury concentrations and percent oxidation measured by SCEM, respectively. The mercury oxidation at each location varied greatly over the course of the two-month injection test.

As discussed in the previous section, the SCEM and OH measurements did not agree well for the prediction of mercury removal during the sorbent injection test. Despite the general disagreement in total mercury concentrations, both methods indicated that activated carbon resulted in significant oxidation of flue gas mercury. OH measurements showed an average mercury oxidation of 54% at the untreated ESP outlet and 77% at the treated ESP outlet. SCEM measurements showed an average mercury oxidation of 49% at the untreated ESP outlet and 81% mercury oxidation at the treated ESP outlet.

Limestone Unit 1 is equipped with an FGD scrubber that can remove oxidized mercury at high efficiency, so these results suggest that the overall system mercury removal from a sorbent injection process would be higher than the removal measured at the ESP outlet. The results also suggest that it might be possible to optimize the sorbent injection process to maximize overall removal across the ESP-FGD system. Thus, a lower sorbent injection rate might be used for the Limestone units than for other units that are not equipped with FGD scrubbers.

Table 3-21 lists the results of theoretical calculations of overall system (ESP + FGD) removal for the long-term test. These calculations assume that the FGD scrubber removes 95% of oxidized mercury present in the flue gas and that there are no mercury re-emissions. Two sets of calculations were made: (1) based on SCEM outlet measurements, and, (2) based on OH outlet measurements. For both sets of calculations, the overall system removal was based on an average ESP inlet mercury concentration of 25.4 µg/dNm^3, as measured by the SCEM.

Using the SCEM data, the average mercury removal across the ESP was 81%, which would result in an ESP outlet mercury concentration of 4.8 µg/dNm^3. The average mercury oxidation at the ESP outlet was 81%; therefore 0.9 µg/dNm^3 would be present as elemental mercury and 3.9 µg/dNm^3 would be present as oxidized mercury. Assuming 95% net removal of oxidized mercury across the FGD scrubber and 100% transmission of elemental mercury, the FGD outlet mercury concentration would be 0.9 + 0.05*3.9 = 1.1 µg/dNm^3. The overall system removal would thus be greater than 90%.

Using the OH data, the average mercury removal across the ESP was 40%, which would result in an ESP outlet mercury concentration of 15.2 µg/dNm^3. The average mercury oxidation at the ESP outlet was 77%; therefore 3.5 µg/dNm^3 would be present as elemental mercury and 11.7 µg/dNm^3 would be present as oxidized mercury. Using the same assumptions for FGD mercury removal, the FGD outlet mercury concentration would be 3.5 + 0.05*11.7 = 4.1 µg/dNm^3. The overall system removal would then be 84%.

To verify these theoretical calculations, in 2009 flue gas mercury measurements were made across the entire LMS unit including the FGD during ACI. The 2009 results indicated lower levels of mercury removal than the 90+% mercury removal predicted from the theoretical calculations using the 2007 SCEM data. As will be discussed in Chapter 4, with injection of Darco Hg-LH at 1.89 lb/Macf, mercury removals across the system were 65% and 79% on two different days; if no flue gas bypassed the FGD and there were no re-emissions, as was assumed in the theoretical calculations with the 2007 data, mercury removals would increase to 70% and 84%, for those two days. These 2009 measurements indicate wide variability in mercury removal performance of the LMS system and the potential for lower removal than the 2007 OH theoretical prediction of 84% removal.

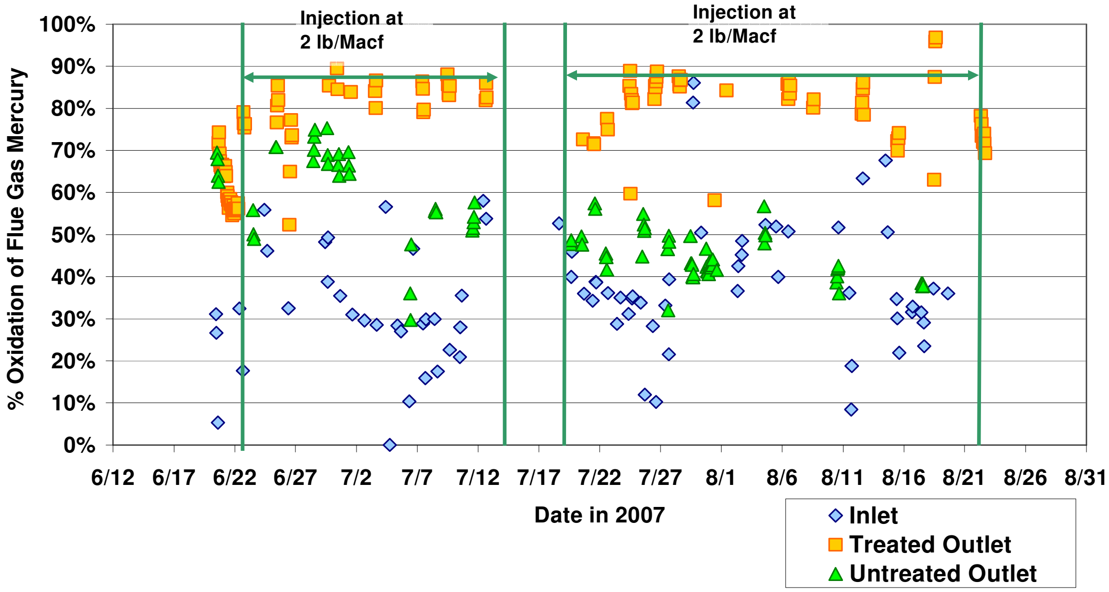


Figure 3-15. Percent Mercury Oxidation Measured at Each Sample Location during Long-Term Test

Table 3-21. Theoretical Predictions of Mercury Removal by ESP + FGD

	Calculations Based on SCEM Outlet Data	**Calculations Based on OH Outlet Data**
Inlet Hg by SCEM ($\mu g/dNm^3$)	25.4	25.4
Removal Across ESP	81%	40%
Predicted ESP Outlet Total Hg ($\mu g/dNm^3$)	4.8	15.2
Oxidation at ESP Outlet	81%	77%
Predicted Outlet Hg^0/Hg^{2+} ($\mu g/dNm^3$)	0.9 / 3.9	3.5 / 11.7
Assumed Net Removal of Hg^{2+} Across FGD	95%	95%
Assumed Removal of Hg^0 Across FGD	0%	0%
Predicted FGD Outlet Total Hg ($\mu g/dNm^3$)	1.1	4.1
Predicted Overall System (ESP+FGD) Hg Removal	> 90%	84%

3.6 Analysis of Coal and Fly Ash

In addition to flue gas mercury measurements, coal and fly ash samples were obtained and characterized so that a mercury mass balance across the Unit 2 gas path could be performed. PRB and TxL coals were fired over the course of testing at LMS; most tests involved a 70/30 blend of TxL and PRB, respectively. Both coal types were collected and analyzed separately, as presented in Appendix H. Average coal analysis results for each coal type are summarized in Tables 3-22 and 3-23 for each phase of testing. No coal samples from Phase III were analyzed.

For TxL coal, the mercury concentration averaged 0.22 ppmd and the chloride concentration averaged 59 ppm during the long-term test. PRB coal the mercury concentrations averaged 0.10 ppmd and chloride concentrations averaged 22 ppm during the long-term test. There was significant sample to sample variation in the chloride concentration for both coal types. Bromide concentrations were generally higher for the TxL coal than for the PRB coal; however, the average bromide concentration for both coals during the long-term test was less than 1.0 ppm.

Table 3-22. Summary of TxL Coal Analysis Results

	December 2006 Phase I Parametric Testing Texas Lignite		April 2007 Phase II Parametric Testing Texas Lignite		June-August 2007 Long-Term Testing Texas Lignite	
Parameter, Unit	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.
Mercury, ppm (dry)	0.186	0.043	0.175	0.045	0.216	0.086
Chloride, ppm (dry)	33	14	42	8	59	65
Bromide, ppm (dry)	9.8	0.5	5.8	0.0	1.0	0.0
Fluoride, ppm (dry)	58	22	83	9	n/a	
Dry Basis						
% Moisture	31.9	0.7	32.7	0.4	32.5	3.1
% Ash	18.3	3.3	20.3	5.5	21.0	3.1
Carbon, wt%	60.1	4.1	n/a		58.1	3.1
Hydrogen, wt%	4.25	0.26	n/a		4.96	0.21
Nitrogen, wt%	0.87	0.01	n/a		0.84	0.05
Sulfur, wt%	0.88	0.17	0.86	0.10	1.25	0.89
Oxygen, wt%	15.2	0.9	n/a		13.8	0.8
Heating Value, Btu/lb	10645	435	9979	695	10007	540
Calculated Parameters (from average values above)						
F_d, dscf/10^6 Btu, 0% O_2	9565		n/a		10133	
Sulfur, wt% (as recieved)	0.60		0.58		0.84	
Heating value, Btu/lb (as received)	7248		6721		6754	
Hg, lb/Tbtu	25.6		n/a		32.0	

n/a - value not determined

Table 3-23. Summary of PRB Coal Analysis Results

	December 2006 Phase I Parametric Testing PRB		April 2007 Phase II Parametric Testing PRB		June-August 2007 Long-Term Testing PRB	
Parameter, Unit	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.
Mercury, ppm (dry)	0.121	0.020	0.143	0.033	0.095	0.024
Chloride, ppm (dry)	16	6	25	18	22	31
Bromide, ppm (dry)	< 1	0.0	4.8	0.2	<1.0	0.0
Fluoride, ppm (dry)	67	5	61	25	n/a	
Dry Basis						
% Moisture	30.4	0.7	31.7	0.3	32.8	4.3
% Ash	8.1	1.4	10.5	0.0	8.1	1.2
Carbon, wt%	68.5	0.8	n/a		68.4	0.9
Hydrogen, wt%	4.47	0.04	n/a		5.40	0.29
Nitrogen, wt%	0.75	0.05	n/a		0.74	0.04
Sulfur, wt%	0.55	0.18	0.57	0.01	0.56	0.06
Oxygen, wt%	17.6	0.7	n/a		16.7	0.5
Heating Value, Btu/lb	11784	165	11285	23	11643	400
Calculated Parameters (from average values above)						
F_d, dscf/10^6 Btu, 0% O_2	9617		n/a		10237	
Sulfur, wt% (wet)	0.38		0.39		0.38	
Heating value, Btu/lb (as received)	8200		7710		7822	
Hg, lb/Tbtu	14.8		n/a		12.2	

n/a - value not determined

Fly ash samples were collected during baseline operation, parametric testing, and the long-term injection test. Because parametric tests were too short in duration to obtain representative ash samples, the results from these analyses are not reported. This section presents the results from the analysis of baseline ESP 1A ash, fly ash from the untreated ESP 1B (sampled weekly), and ash collected from the treated ESP 1A during long-term sorbent injection. Daily first-field fly ash samples from ESP 1A were collected during the long-term injection test, while back-field ash samples were obtained on a weekly basis (due to difficulty in obtaining samples). After July 4, 2007, all hopper 3A samples from ESP 1A were contaminated by economizer ash that carried over into the hoppers during the injection test period. The results from the daily analyses of the first field ash are summarized in Appendix E. Hopper 3A (ESP 1A) data are recorded in the appendix, but were not used to tabulate average field measurements after July 4, 2007 because of contamination from economizer ash.

Figure 3-16 compares the first-field fly ash mercury concentrations for the treated and untreated ESPs. The untreated ash mercury concentration was consistently below 0.1 ppm, indicating less than 10% mercury removal (from the flue gas) by the fly ash across the ESP. The first-field treated ash concentration from the long-term test ranged from 0.4 to 1.0 ppm, with an average of 0.66 ppm. The fly ash mercury concentration was even higher for the back fields of the ESP; the second- and third-field ash mercury concentrations averaged 1.91 ppm and 3.25 ppm, respectively (Table 3-20). As discussed previously and tabulated in Appendix F, the fly ash mercury concentrations indicated ESP removals between 44 and 100%, with an average of 66%, during the long-term sorbent injection test.

Loss on ignition (LOI) tests are used to determine the amount of unburned carbon in the fly ash. From a concrete standpoint, ash containing little LOI is most desirable since finely divided materials, such as carbon, have been known to reduce the entrained air content of concrete. Table 3-24 documents ash LOI content in all fields during long-term injection. The first field LOI content increased for sorbent injection as compared to baseline. Back fields were enriched in carbon for both baseline and sorbent injection. Figure 3-17 shows fly ash Hg concentration versus fly ash LOI. There is a distinct trend of Hg content increasing as LOI content increased.

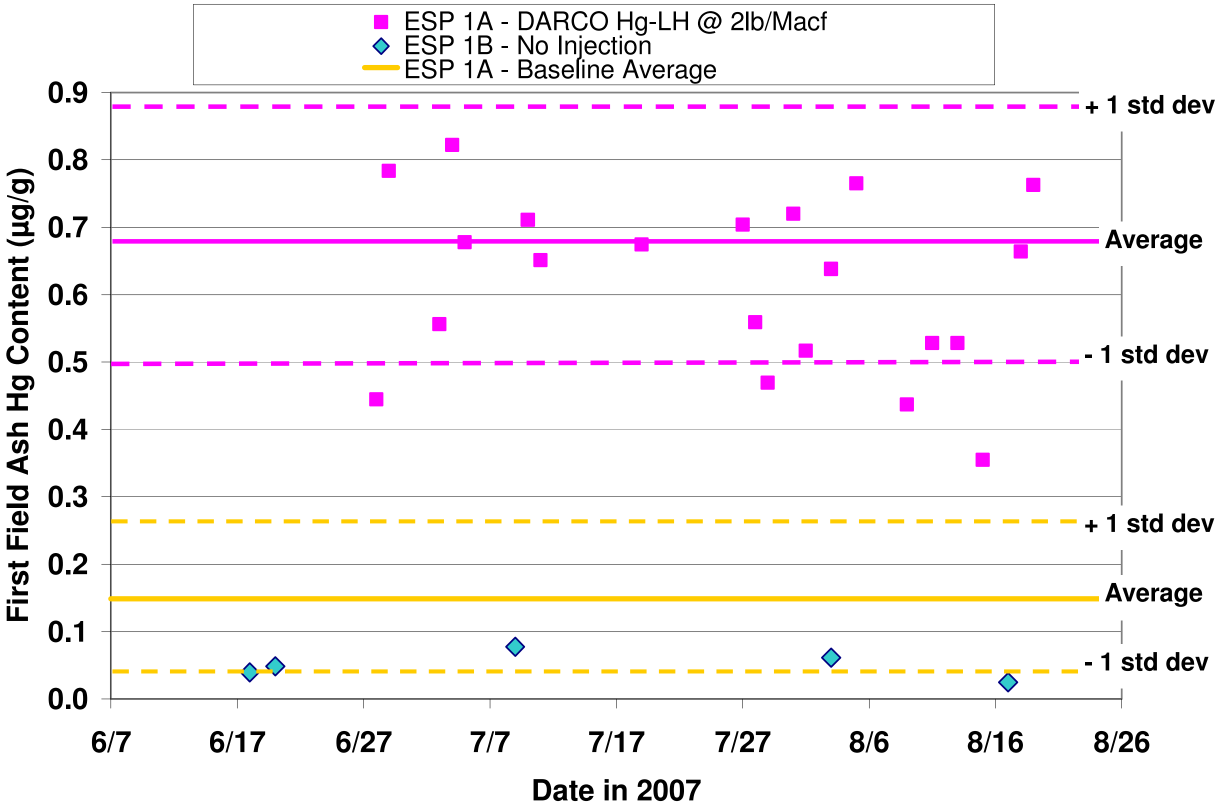


Figure 3-16. First-Field Fly Ash Hg during Long-Term Sorbent Injection – Comparison of Treated and Untreated ESPs

Table 3-24. Fly Ash LOI Concentrations during Long-Term Sorbent Injection – All Fields

Condition	**Date of Sample**	**Time of Sample**	**Fly Ash LOI Content (%)**				
			Field				
			1	**2**	**3**	**4&5**	**6&7**
Average of all Baseline Data			**0.13**				**1.03**
Baseline	6/22/2007*	11:30	0.03	0.16	0.31	1.36	2.58
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007*	13:00	n/a	0.54	0.71	0.81	n/a
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007±	14:10	0.61	1.07	1.27	1.36	1.63
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007±	12:12	0.54	0.79	1.15	1.40	1.76
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007±	15:30	0.64	0.93	0.74	0.87	1.36
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007±	15:10	0.39	0.63	0.86	1.44	2.15
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007±	13:00	0.40	0.63	0.89	1.00	1.39
LT Average			**0.52**	**0.77**	**0.94**	**1.15**	**1.66**
LT St Dev			**0.12**	**0.20**	**0.23**	**0.28**	**0.32**

*LOI content of the ash are reported as an average of hoppers 1A, 2A, and 3A for each field

± LOI content of the ash are reported as an average of hoppers 1A and 2A for each field. Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007.

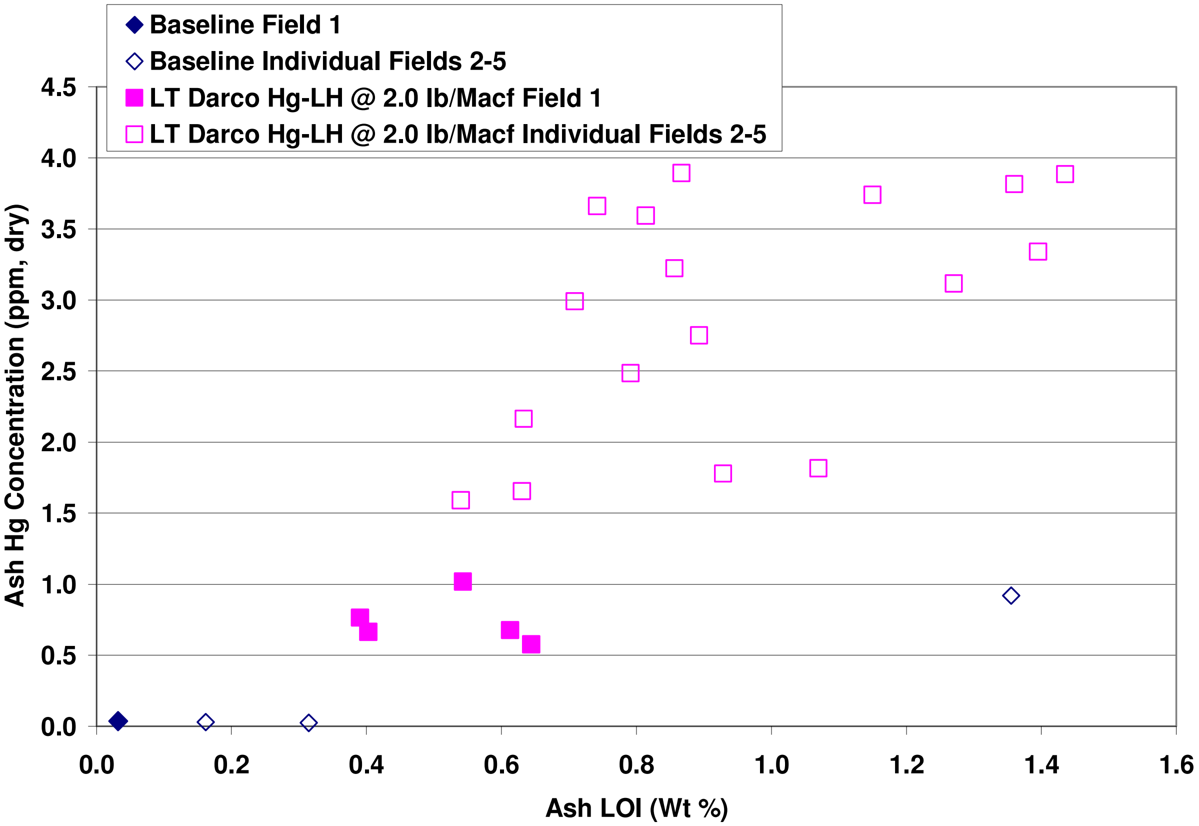


Figure 3-17. Ash Hg Concentration vs. Ash LOI for all Fields, Baseline and Long-Term ACI

3.7 Effects of Sorbent Injection on ESP Operation

The injection of activated carbon can have an effect on ESP operation. ESP electrical data and opacity data were gathered during baseline, parametric, and long term testing with a data logger starting on April 26 and ending on September 19, 2007. Due to several data storage problems, data from May 27 until July 31 were lost. The lost data were from the baseline testing period just prior to the long-term test and approximately the first half of the 60-day sorbent injection test. ESP electrical data included sparking, power use, and current for each field. Opacity monitors were located at the outlet of each ESP module and were not compliance monitors; the latter were located downstream of the FGD units. As such, the ESP outlet opacity was used only to determine relative trends. Data from the FGD outlet opacity monitors were not analyzed, as only one-fourth of the gas exiting the FGD units was treated with activated carbon.

Due to the brevity of each parametric test, no accurate conclusions could be drawn about the effect of different sorbents or respective injection rates on ESP performance. As such, the analysis presented in this report was confined to pre-test baseline, long-term test, and post-test baseline data.

Figure 3-18 shows pre-test baseline opacity for ESPs 1A and 1D. ESP 1A is the ACI-treated ESP, and ESP 1D is an untreated ESP. The baseline opacity data from ESP 1D (more than ESPs

1B and 1C) trended similarly to ESP 1A, so it was used as the control basis for analysis of the effect of carbon injection on opacity.

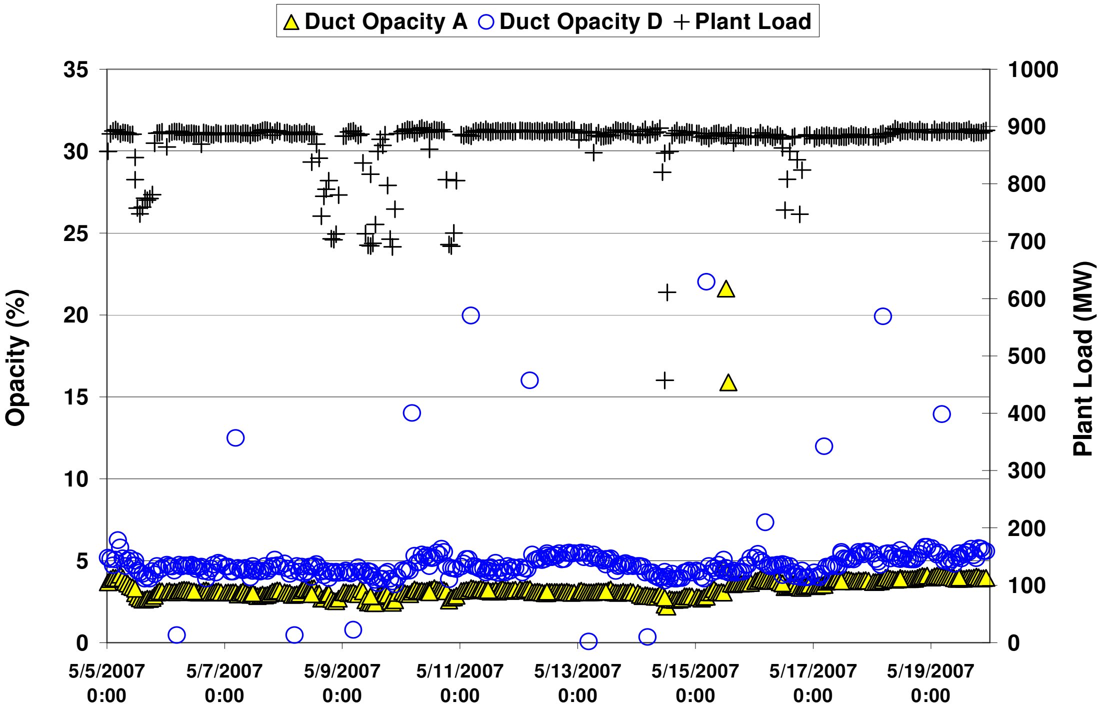


Figure 3-18. Pre-Test Baseline Opacity

Figure 3-19 shows duct opacity for ESP 1A and ESP 1D during the long-term test and during post-test baseline operation. ESPs 1A and 1D showed similar behavior during carbon injection and non-carbon injection test periods, indicating that carbon injection had no impact on the opacity measured at the ESP outlet. Table 3-25 shows the average opacity during all three phases for ESPs 1A and 1D. For both ESPs, the opacity increased slightly during the sorbent injection period and then increased even further during the post-test baseline period.

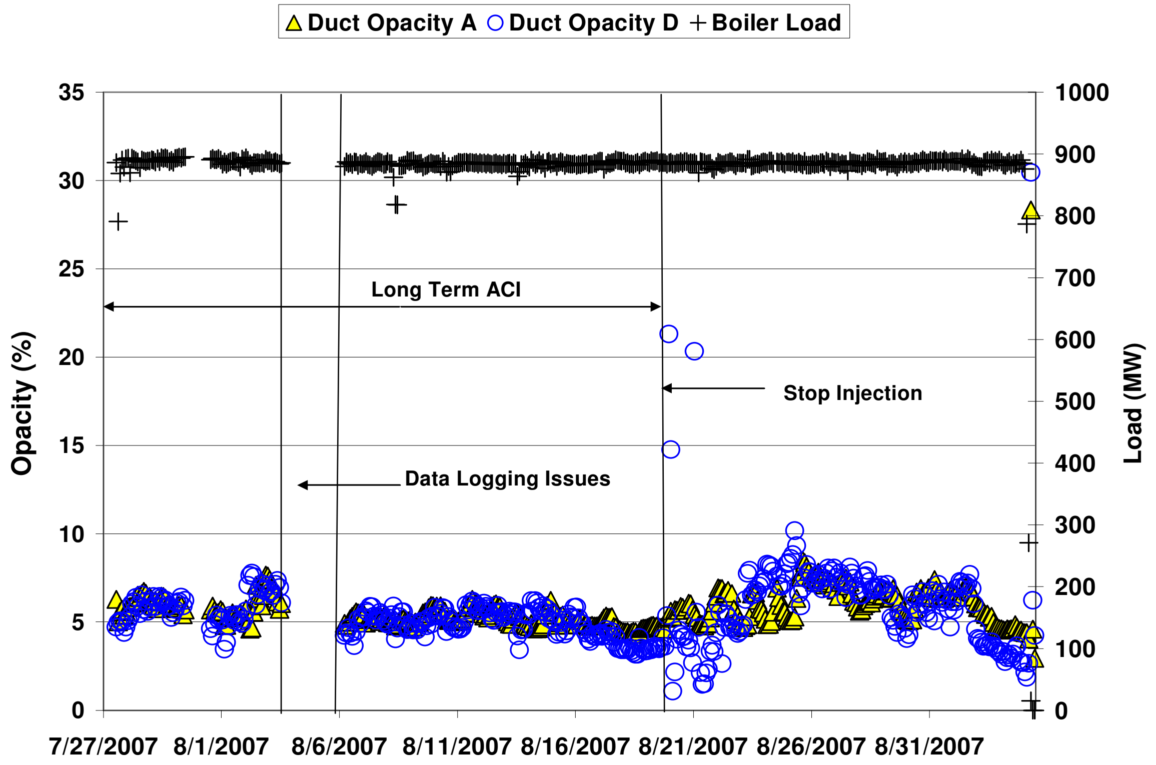


Figure 3-19. Opacity during Long-Term Test and Post-Test Baseline Operation

Table 3-25. Comparison of Average Opacity for Treated and Untreated ESPs

Testing Phase	Average Opacity ESP 1A (Treated)	Average Opacity ESP 1D (Untreated)
Pre-Test Baseline	5.3%	4.8%
Long Term ACI	5.4%	5.2%
Post-Test Baseline	6.3%	6.5%

Analysis of the ESP electrical data was more complicated than the opacity data analysis due mainly to the size of the LMS ESP. The ESP has 84 separate measurement points with 21 in each ESP (1A through 1D) broken up into 3 rows (AB, CD, and EF), with 7 fields each. Figures 3-20 through 3-22 show that the behavior from location to location was quite erratic. Some locations, like A1AB and A1EF, experienced high sparking rates (>30 spm) throughout the test period with only occasional temporary reductions in sparking observed (Figure 3-20). Locations such as A1CD and A3CD experienced relatively lower spark rates (<10 spm) for most of the test period (Figure 3-21). Other locations, such as A2AB and D2AB, showed essentially no sparking for the duration of the testing (Figure 3-22). For all of these fields, there was no discernible difference in sparking rates between sorbent injection and non-injection test periods. The ESP electrical data was too complex to undergo a mathematical analysis to evaluate the effect of ACI on ESP performance.

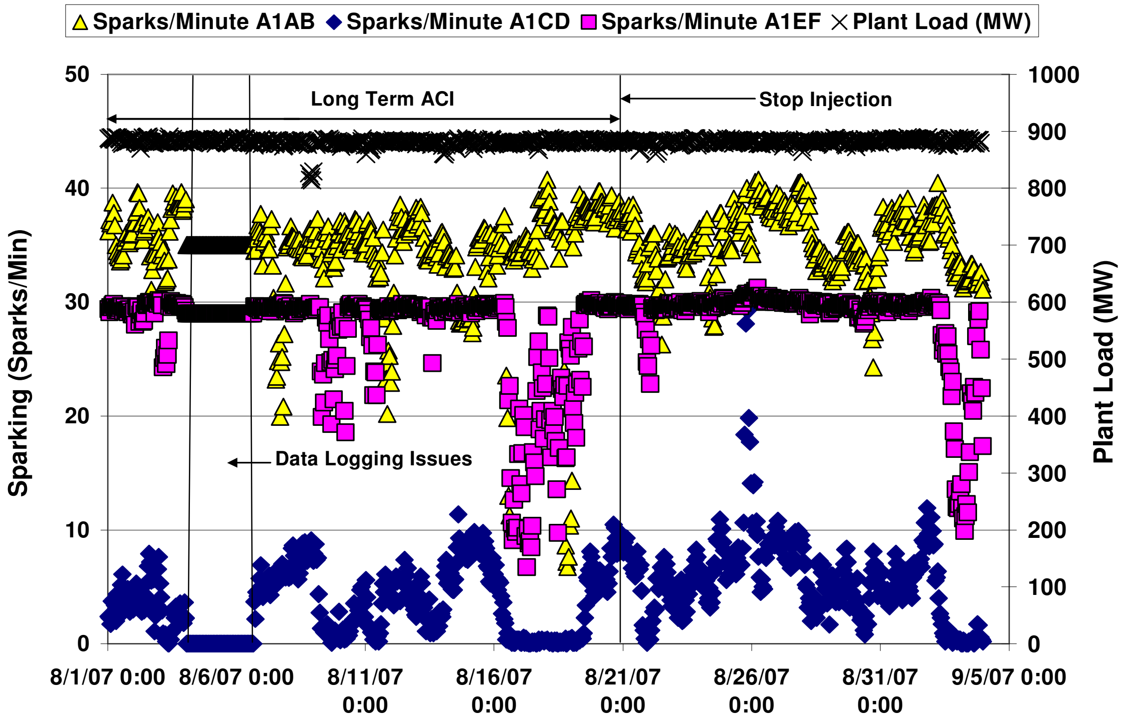


Figure 3-20. ESP A Field 1 Spark Rates during Long-Term and Post-Test Baseline Periods

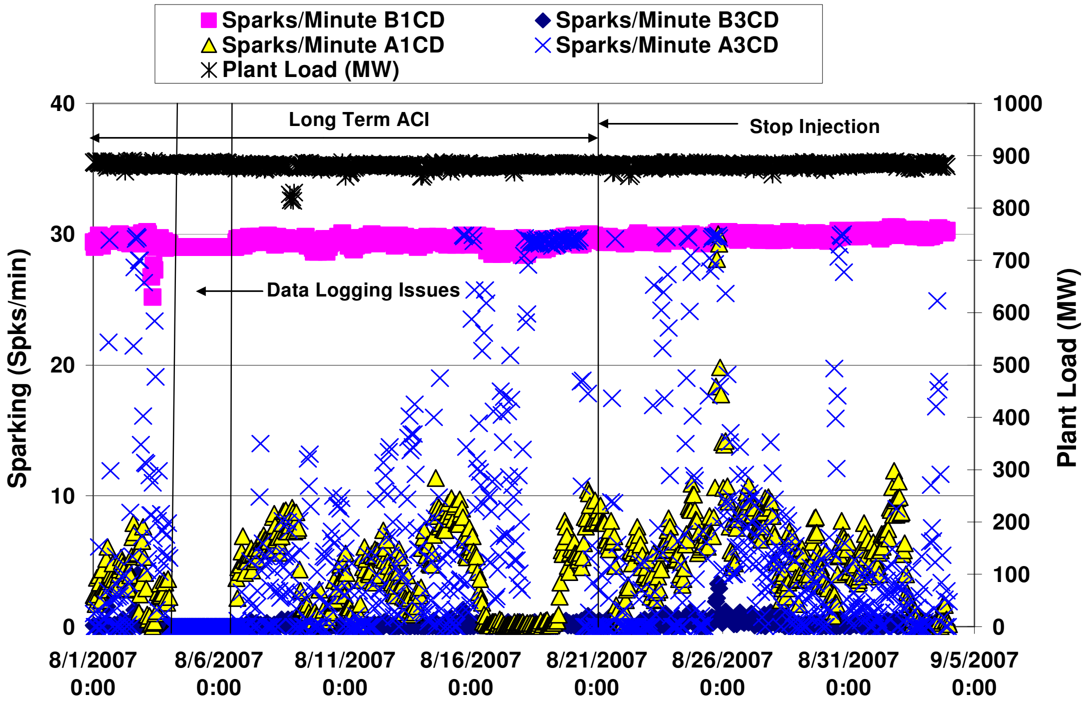


Figure 3-21. ESP 1A and ESP 1B Spark Rates during Long-Term and Baseline Testing

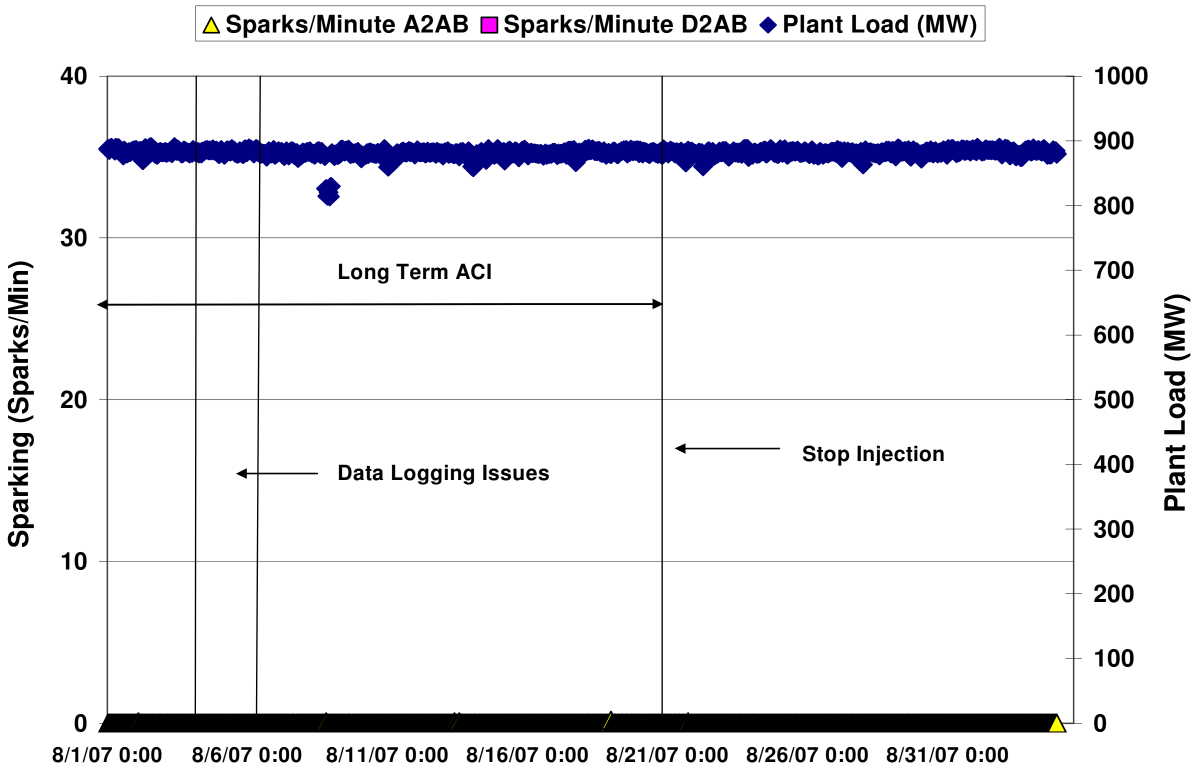


Figure 3-22. ESP 1A and ESP 1D Spark Rates during Long-Term and Baseline Testing

3.8 ESP Outlet Particulate Matter Measurement Results

Baseline particulate concentration measurements were made using EPA Method 17 at the ESP inlet ports that served both the 1A and 1B ESPs and at the ESP outlet duct 1A1. All particulate measurement values are presented in milligrain/dscf at 7% O_2 and 10^{-3} lb/MMBtu for the ease of the reader. The inlet baseline Method 17 results are summarized in Table 3-26. The inlet particulate loading averaged 6,775 milligrain/dscf. During baseline operation and all sorbent injection periods, measured ESP outlet particulate concentrations were below the NSPS 78(d)(a) standard of 0.03 lb/MMBtu.

Table 3-26. Baseline Particulate Loading Measurements at ESP Inlet

Run #	**Date**	**Start Time**	**End Time**	**Inlet Particulate Loading** (milligrain/dscf at 7% O_2)	**Inlet Particulate Loading** (10^{-3} lb/MMBtu)
1	11/30/06	10:32	12:57	8140	17910
2	11/30/06	14:22	15:20	5410	11900
Average				**6775**	**14900**

Tables 3-27 and 3-28 summarize the baseline Method 17 and Method 5 particulate loading results, respectively, at the treated outlet of duct 1A1. The baseline outlet particulate loading measurements averaged 4.03 milligrain/dscf for Method 17 and 4.27 milligrain/dscf for Method 5. Results from these two methods should not be directly compared to each other because they use different particulate collection techniques.

Table 3-27. Baseline Particulate Loading Measurements at Treated Outlet Duct 1A1 (Method 17)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
12/1/2006	9:48	11:47	2.74	6.03
12/1/2006	12:20	14:21	2.10	4.62
12/1/2006	14:42	16:41	2.17	4.77
12/2/2006	8:23	10:23	3.93	8.65
12/2/2006	11:03	13:00	4.28	9.42
12/2/2006	13:39	15:35	3.94	8.67
4/20/2007	13:38	15:45	7.06	15.53
4/26/2007	7:49	9:28	5.70	12.54
6/19/2007	9:40	11:50	5.55	12.21
6/19/2007	12:15	14:22	3.92	8.63
6/19/2007	15:00	17:15	2.97	6.52
Average			**4.03**	**8.87**
Std Dev			**1.56**	**3.48**

Table 3-28. Baseline Particulate Loading Measurements at Treated Outlet Duct 1A1 (Method 5)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
6/20/2007	10:10	12:25	4.05	12.21
6/20/2007	13:50	16:00	4.72	8.63
6/21/2007	11:01	15:32	4.05	6.52
Average			**4.27**	**9.12**

The average baseline particulate loading (as measured by Method 17) was 1.44 milligrain/dscf for the Toxecon™ II ports (Table 3-29). The Toxecon™ II particulate measurements cannot be compared to the measurements at the treated outlet duct 1A1 in Table 3-27. The Toxecon™ II ports were not an ideal location because they were located in the widest part of the duct where the flue gas velocity was very low. However, these measurements can be used to identify differences in behavior between periods of sorbent injection and no injection. During Toxecon™ II injection, the ESP outlet particulate loading did not increase; however, the Method 17 filters darkened considerably (Figure 3-23) as compared to filters collected when injecting carbon upstream of the ESP. This indicated that Toxecon™ II resulted in increased penetration of carbon through the ESP.

Table 3-29. Baseline Particulate Loading Measurements at Toxecon™ II Outlet Duct 1A1 (Method 17)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
5/22/2007	13:50	15:36	1.01	2.22
5/23/2007	8:15	10:01	2.16	4.75
5/24/2007	8:10	9:52	1.26	2.77
5/25/2007	8:29	10:11	1.33	2.93
Average			**1.44**	**3.17**

Figure 3-23. Photograph Comparing Method 17 Filters Collected during Toxecon™ II and Injection Upstream of the ESP

Method 17 results from parametric test periods are presented in Table 3-30 and Figure 3-24. The Method 17 measurements ranged from 2.1 to 7.1 milligrain/dscf at 7% O_2. Confidence intervals of 95% confidence were created for baseline data. While particulate loadings during several short-term carbon injection tests were higher than during baseline, there was significant variability in the data. The parametric measurements indicated that outlet particulate values did not trend with sorbent injection rate or sorbent type.

ESP outlet particulate concentrations were measured during long-term injection testing using both Method 17 and Method 5 procedures. Results from the two methods can not be compared directly because they use different filter collection mechanisms. However, the conclusions drawn from the two methods can be compared to determine if there is corroboration.

Method 17 results from the long-term test are presented in Table 3-31 and Figure 3-25. Baseline particulate measurements at the treated ESP outlet averaged 4.0 milligrain/dscf at 7% O_2, with data ranging from 2.1 to 7.1 milligrain/dscf at 7% O_2 (Table 3-26). During the long-term test, Method 17 measurements showed increased ESP outlet particulate concentrations, averaging 6.1 milligrain/dscf at 7% O_2, with measurements ranging from 2.4 to 11.0 milligrain/dscf at 7% O_2. Approximately half of the M17 measurements obtained during the long-term test were higher than the range observed during baseline operation. The variability in baseline particulate loadings (which ranged by a factor of three) makes it difficult to ascertain whether the outlier points (for particulate concentration) obtained during the sorbent injection period were due to carbon injection or normal variability for the ESP. To further compare baseline and long-term sorbent injection measurements, 95% confidence intervals were created around the average baseline and long-term injection particulate measurements. Although there is significant variability with both sets of measurements, and there is slight overlap in both sets of confidence intervals, there appears to be an increase in particulate concentration due to sorbent injection. In Figure 3-26, Method 17 data from Darco Hg-LH injection upstream of the ESP are plotted versus operating temperature. There was no discernible impact of temperature on particulate emissions.

Method 5 results from the long-term test are presented in Table 3-32 and Figure 3-27. Baseline Method 5 measurements averaged 4.3 milligrain/dscf at 7% O_2, with a range of 4.0 to 4.7 over three measurements (Table 3-29). Method 5 measurements collected during long-term sorbent injection averaged 7.7 milligrain/dscf at 7% O_2, with measurements ranging from 4.9 to 11.6 milligrain/dscf. Method 5 results corroborate the Method 17 results, showing an increase in particulate loading during sorbent injection.

Fewer baseline Method 5 measurements were obtained as compared to Method 17 measurements, so the natural variability in the ESP outlet particulate loading was not adequately assessed by Method 5. However, several sets of M5 particulate loading measurements were made on the untreated outlet duct (Table 3-33). A comparison of measured particulate loadings for the treated and untreated ESPs is plotted in Figure 3-27. Baseline M5 measurements were made on 6/20/07 and 6/21/07. The treated outlet duct particulate emissions averaged 4.3 milligrain/dscf, and the untreated outlet duct averaged 2.1 milligram/dscf during baseline operation. The untreated ESP 1B thus showed lower particulate emissions than the treated ESP 1A. Furthermore, during the two month injection test, the untreated ESP 1B particulate emissions remained very steady averaging 2.3 milligrain/dscf. In contrast, the treated ESP 1A particulate emissions were 1.5 to 2.5 times greater during long-term sorbent injection than during baseline operation. While this analysis implies that the increase in particulate loading during long-term sorbent injection may have been due to the activated carbon, it is unknown if the untreated ESP 1B has a more steady baseline particulate emissions profile than the treated ESP 1A.

Figure 3-28 shows a photograph of the Method 17 filters collected during baseline and during carbon injection test periods. While measurement uncertainty makes it difficult to conclude whether carbon injection resulted in increased particulate emissions, the darkening of the sample filters collected during carbon injection provides visual evidence of carbon penetrating the ESP.

Table 3-30. Method 17 Results from Parametric Sorbent Injection Testing

Sorbent	**Injection Rate** (lb/Macf)	**Date**	**Start Time**	**End Time**	**Outlet Particulate Loading** (milligrain/dscf at 7% O_2)	**Outlet Particulate Loading** (10^{-3} lb/MMBtu)
B-PAC	0.5	12/5/2006	953	1147	10.60	23.32
B-PAC	1.3	12/5/2006	1302	1456	6.02	13.24
B-PAC	3.3	12/5/2006	1605	1759	5.64	12.41
BASF MS200	6	4/21/2007	10:46	12:28	6.36	13.99
BASF MS200	6	4/21/2007	12:48	14:33	7.17	15.77
BASF MS200	8	4/21/2007	14:45	16:25	7.32	16.10
BASF MS200	10	4/22/2007	9:38	11:20	7.02	15.44
BASF MS200	12	4/22/2007	15:50	17:35	7.63	16.79
C-PAC	0.5	4/23/2007	10:05	11:45	8.28	18.21
C-PAC	1.5	4/23/2007	13:55	15:37	18.20	40.04
DARCO Hg	0.4	12/7/2006	1012	1206	13.20	29.04
DARCO Hg	0.6	12/9/2006	10:19	12:12	5.30	11.66
DARCO Hg	0.6	12/9/2006	12:39	14:32	4.72	10.38
DARCO Hg	0.6	12/9/2006	15:04	16:57	9.07	19.95
DARCO Hg	1	4/24/2007	10:16	11:57	7.66	16.85
DARCO Hg	1	4/24/2007	12:14	13:55	6.44	14.17
DARCO Hg	2	4/24/2007	16:14	17:19	8.87	19.51
DARCO Hg	1.7	12/7/2006	15:25	17:18	10.10	22.22
DARCO Hg	3.4	12/6/2006	10:15	12:09	8.32	18.30
DARCO Hg	5.6	12/6/2006	16:50	18:45	8.82	19.40
DARCO Hg	8.2	12/6/2006	13:15	15:11	9.24	20.33
Flue PAC MC Plus	0.5	12/8/2006	1016	1210	4.35	9.57
Flue PAC MC Plus	1.9	12/8/2006	1245	1440	5.47	12.03
Flue PAC MC Plus	5.8	12/8/2006	1533	1727	4.72	10.38
Flue PAC MC Plus #2	1	4/25/2007	1113	1430	7.47	16.43
Flue PAC MC Plus #2	2	4/25/2007	1317	1635	10.90	23.98
DARCO Hg-LH	0.5	12/4/2006	1001	1157	10.60	23.32
DARCO Hg-LH	1	4/26/2007	10:46	12:26	7.36	16.19
DARCO Hg-LH	1.1	12/3/2006	13:03	14:57	2.51	5.52
DARCO Hg-LH	2	4/26/2007	13:22	15:02	9.35	20.57
DARCO Hg-LH	2	4/26/2007	15:26	17:06	6.42	14.12
DARCO Hg-LH	2.5	12/4/2006	14:00	15:56	4.98	10.96
DARCO Hg-LH	2.9	12/3/2006	16:40	18:34	5.20	11.44
DARCO Hg-LH	5.1	12/4/2006	17:27	19:21	7.48	16.46

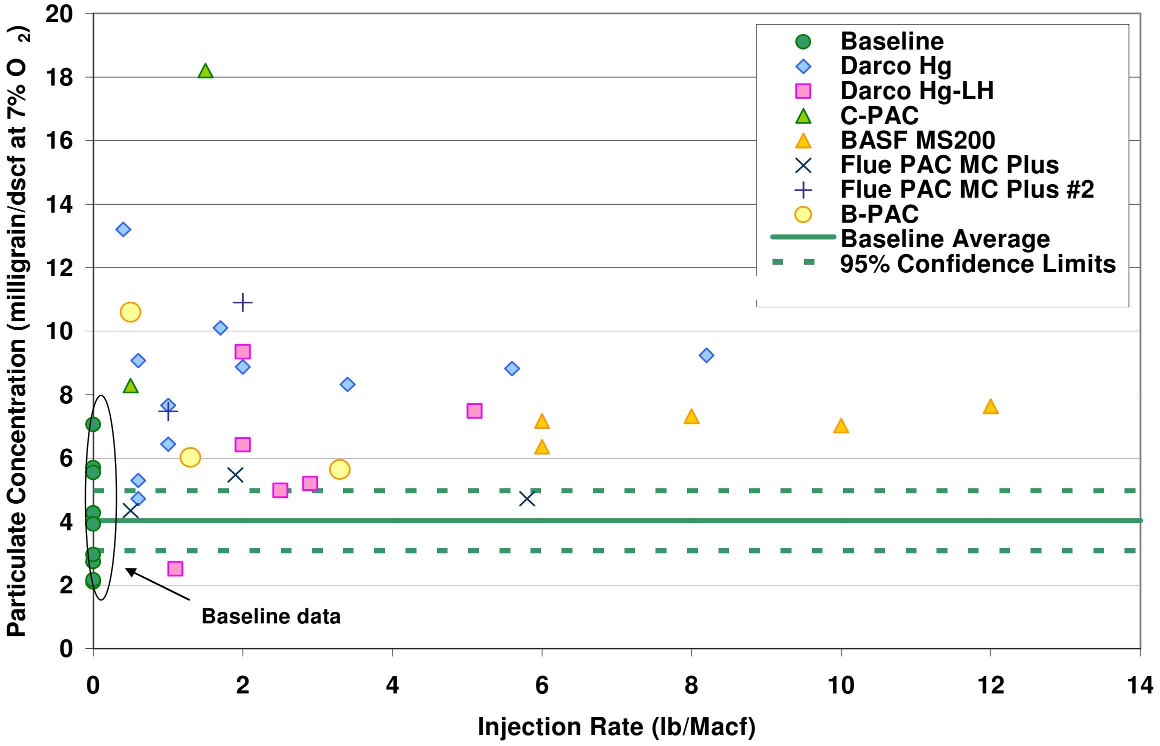


Figure 3-24. Method 17 Results for ESP 1A Outlet from Parametric I, II, and III Testing

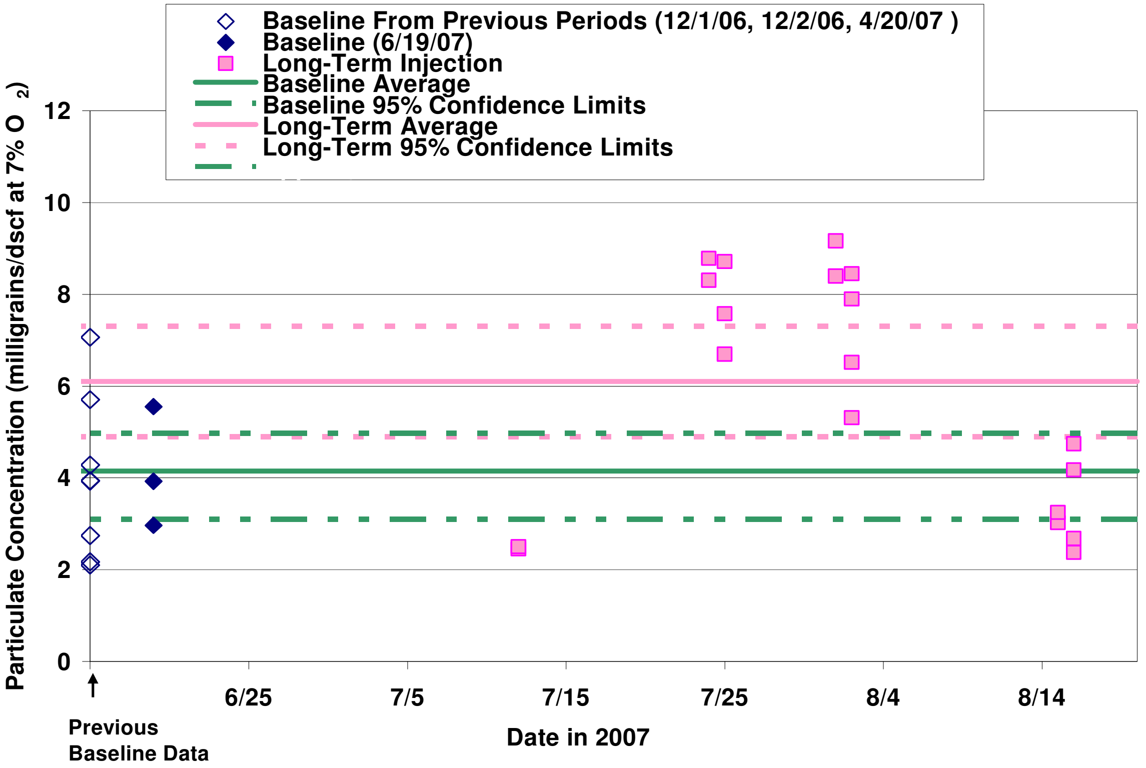


Figure 3-25. Method 17 Results for ESP 1A Outlet during Long-Term Injection Test

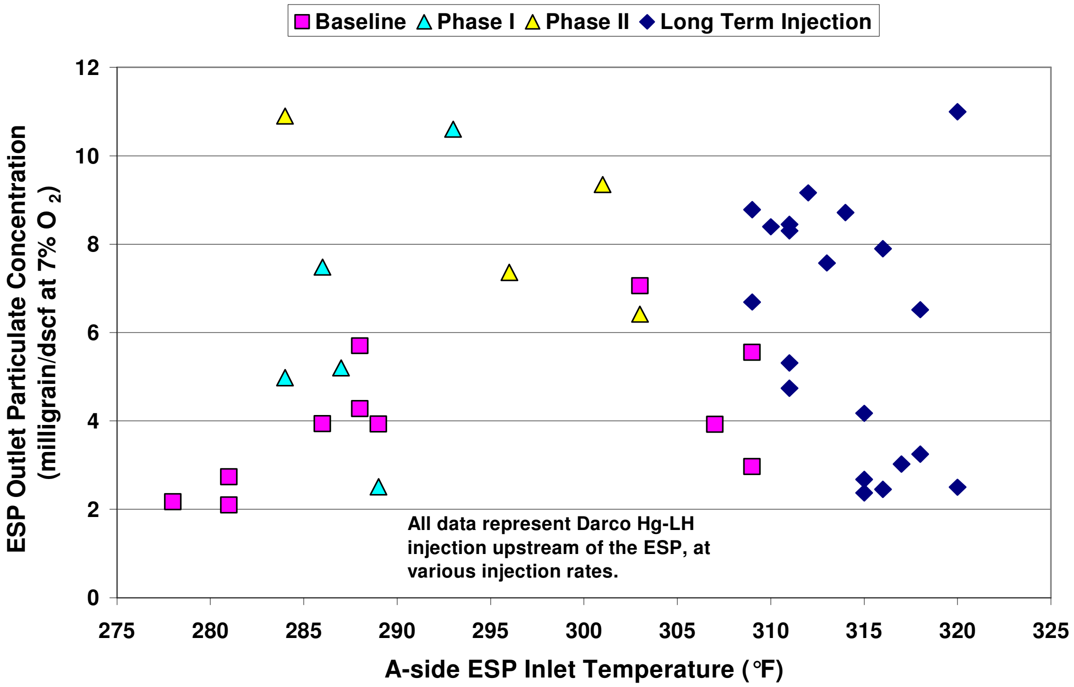


Figure 3-26. Impact of Temperature on ESP 1A Particulate Emissions for All Test Phases Involving Darco Hg-LH Injection

Table 3-31. Method 17 Results from Long-Term Sorbent Injection Tests on Treated ESP 1A

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Average Baseline			**4.03**	**8.87**
Std Dev			**1.56**	**3.48**
7/12/2007	12:37	14:41	2.45	5.40
7/12/2007	14:54	16:58	2.50	5.50
7/24/2007	14:37	16:54	8.78	19.32
7/24/2007	17:07	19:11	11.00	24.19
7/24/2007	19:25	21:29	8.30	18.26
7/25/2007	8:26	10:28	6.69	14.72
7/25/2007	10:40	12:44	8.71	19.17
7/25/2007	12:53	14:57	7.58	16.67
8/1/2007	13:27	15:38	9.16	20.16
8/1/2007	16:13	18:18	8.40	18.47
8/2/2007	8:03	10:11	8.45	18.59
8/2/2007	10:19	12:27	5.31	11.69
8/2/2007	12:40	14:47	6.51	14.33
8/2/2007	14:57	17:02	7.90	17.38
8/15/2007	13:14	15:18	3.03	6.65
8/15/2007	15:32	17:38	3.25	7.15
8/16/2007	8:57	11:02	2.37	5.22
8/16/2007	11:12	13:18	2.68	5.89
8/16/2007	13:28	15:35	4.17	9.18
8/16/2007	15:46	17:51	4.74	10.43
Long Term Average			**6.10**	**13.42**
St Dev			**2.76**	**6.07**

Table 3-32. Method 5 Results from Long-Term Sorbent Injection Tests on Treated ESP 1A

Date	Start Time	End Time	**Outlet Particulate Loading** (milligrain/dscf at 7% O_2)	**Outlet Particulate Loading** (10^{-3} lb/MMBtu)
Average Baseline			**4.27**	**9.40**
St Dev			**0.38**	**0.84**
7/10/2007	12:10	14:24	7.85	17.27
7/10/2007	15:20	17:33	8.11	17.85
7/11/2007	9:32	11:43	6.76	14.88
7/11/2007	12:51	15:02	5.76	12.67
7/11/2007	16:05	18:15	6.18	13.60
7/12/2007	8:40	10:50	4.90	10.79
7/31/2007	10:00	12:11	11.65	25.64
7/31/2007	14:01	16:13	10.92	24.02
7/30/2007	9:23	11:36	10.25	22.55
8/14/2007	11:30	13:45	5.98	13.16
8/14/2007	15:00	17:10	6.56	14.44
8/15/2007	9:30	11:38	7.78	17.12
Long Term Average			**7.73**	**17.00**
Std Dev			**2.17**	**4.77**

Table 3-33. Method 5 Results during Long-Term Test for Untreated ESP 1B

Date	**Start Time**	**End Time**	**Outlet Particulate Loading** (milligrain/dscf at 7% O_2)	**Outlet Particulate Loading** (10^{-3} lb/MMBtu)
06/20/07	10:10	12:24	1.22	2.69
06/20/07	13:50	16:04	2.56	5.62
06/21/07	11:01	15:29	2.46	5.42
Baseline Average			**2.08**	**4.58**
St. Dev.			**0.75**	**1.64**
07/10/07	12:10	14:27	2.69	5.91
07/10/07	15:20	17:35	2.41	5.31
07/11/07	09:32	11:45	2.84	6.26
07/11/07	12:51	15:03	2.33	5.12
07/11/07	16:05	18:17	2.36	5.19
07/12/07	08:40	10:49	2.01	4.43
07/31/07	10:00	12:45	2.13	4.68
07/31/07	14:01	16:09	4.07	8.95
08/01/07	09:20	11:32	1.92	4.23
08/14/07	11:30	13:40	1.78	3.92
08/14/07	15:00	17:10	1.76	3.86
08/15/07	09:30	11:35	1.58	3.48
Long Term Average			**2.32**	**5.11**
St. Dev.			**0.67**	**1.47**

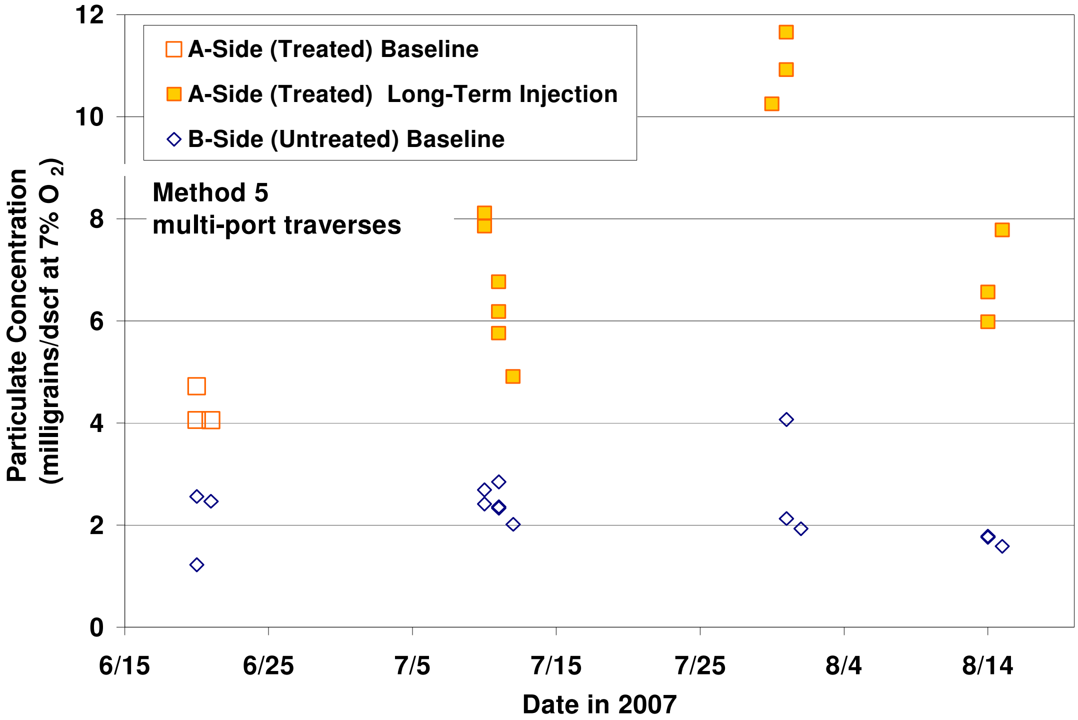


Figure 3-27. Method 5 Results for ESPs 1A (Treated) and 1B (Untreated) during Long-Term Injection Test

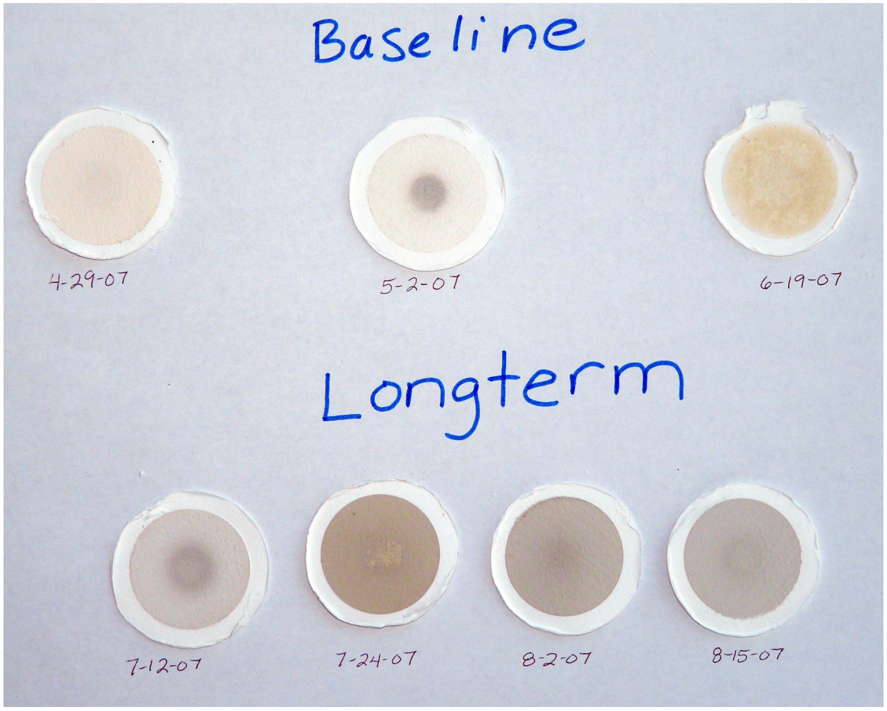


Figure 3-28. Darkening of M5 Particulate Filters during Carbon Injection

3.9 Effects of Sorbent Injection on Fly Ash Concrete Properties

One objective of this test program was to determine the effect of ACI on fly ash quality as it relates to reuse as a cement replacement for concrete production. Fly ash samples collected during parametric sorbent injection tests were analyzed to establish how the presence of sorbent material affected the quality of concrete prepared from the fly ash. Based on the results obtained from the parametric tests, the sorbent and injection rate for the long-term test were chosen to maximize mercury removal while maintaining acceptable fly ash quality. During the long-term test, fly ash samples were collected weekly and subjected to concrete testing. To determine if carbon-containing fly ash might be acceptable for concrete manufacturing, the following properties were examined:

- Air Entraining Agent (AEA) demand;
- LOI and total carbon content;
- 325 mesh and average particle size;
- Compressive Strength;
- Slump;
- Air pressure; and
- Strength Activity Index (SAI).

Throughout the testing, four laboratories (URS, Headwaters Inc., EERC, and LMS) performed various parts of the aforementioned analyses. Some of the measured parameters are very specific to the operator of the measurement technique, so each laboratory's results are presented individually in the following paragraphs.

Initial Screen Fly Ash and Concrete Results

Foam Index Testing on Simulated Ash/Carbon Mixtures

Carbon in ash is problematic for concrete because of its impact on air entrainment in concrete. The natural air content of concrete is about 2%; however an air content of 6% is generally required to prevent cracking during cold weather. Air entrainment in concrete is achieved by using surfactants called Air Entraining Agents (AEAs) to stabilize a well distributed air void system in the concrete. Carbon in fly ash has a strong tendency to adsorb these surfactants, thus making it more difficult to entrain air in concrete. Ash with elevated carbon content requires additional AEA (i.e. higher AEA demand) to create the necessary spacing between ash pores. While low AEA demand is desired, ashes with higher AEA demand may be acceptable for manufacturing so long as the demand is consistent over time. The foam index test is a rapid method used to determine the amount of AEA needed during concrete mixing. The foam index test is a titration with a subjective endpoint, so there is significant variability in results obtained by different operators. In addition, the use of different air entraining agents, laboratory equipment, drop size variability, technique, and use of non-standard methods create further confusion when comparing data between laboratories. For this report, each laboratory's results are presented individually and are not compared to each other.

Figure 3-29 provides URS foam index results for several simulated carbon/ash mixtures. These samples were created by mixing an appropriate amount of B-PAC, C-PAC, DARCO Hg, or DARCO Hg-LH carbon to baseline fly ash collected at LMS on 12/2/2006 from the first row of hoppers on ESP 1A. Baseline ash (containing no added carbon) required three drops of AEA in the foam index titration. Samples of DARCO Hg-LH and C-PAC simulating 0.5 lb/Macf also required only three drops of AEA. This carbon concentration (in the fly ash) appeared to have no affect on the foam index properties of the ash. As the simulated sorbent injection rate increased, more drops of AEA were required. B-PAC carbon displayed the steepest response curve, while C-PAC had the shallowest response curve; this indicates improved ash properties with the passivated ‘concrete compatible’ sorbent. At 2 lb/Macf, C-PAC required 5 drops AEA while DARCO Hg-LH needed 6 drops to reach the titration endpoint. Parametric test results indicated that this injection rate was appropriate for meeting the targeted mercury removal (50-70%) objective of the program. Because the DARCO Hg-LH AEA dose/response curve was deemed potentially acceptable by Headwaters, and the sorbent was available at a lower cost than C-PAC, it was selected for evaluation in the long-term test.

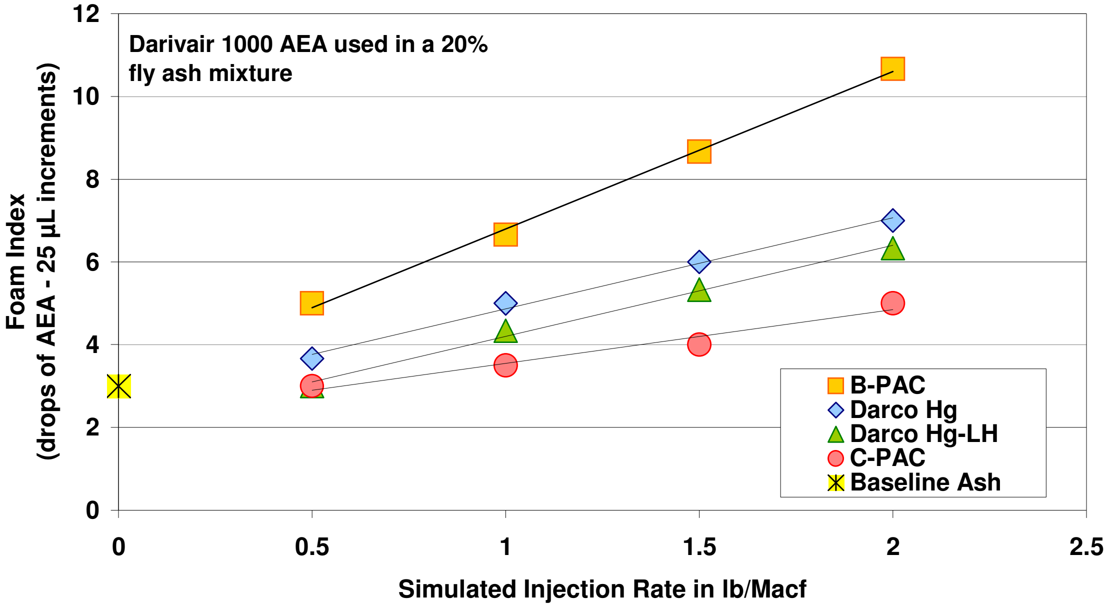


Figure 3-29. URS Foam Index Results for Simulated Carbon/Ash Mixtures

Laboratory Generated Concrete Samples from Simulated Ash/Carbon Mixtures

Prior to the long-term injection test, concrete tests were performed with simulated carbon-ash mixtures. Samples were prepared simulating injection rates of 1.0 lb/Macf and 2.0 lb/Macf DARCO Hg-LH. These were prepared by mixing appropriate amounts of DARCO Hg-LH sorbent with baseline LMS fly ash. The samples were subjected to foam index and concrete characterization tests by Headwaters. The concrete tests determined the unconfined compressive strength of samples made with aggregates, chemical admixtures, sand, ash and water.

Table 3-34 provides the results of the 1.0 and 2.0 lb/Macf DARCO Hg-LH fly ash simulation tests. The sample simulating 2.0 lb/Macf showed a doubling in AEA requirement as compared to the baseline fly ash. The same relative effect of carbon on AEA demand was seen in the URS results, described above. Concrete was made using the amount of AEA indicated in Table 3-34. Actual air levels entrained in the prepared concrete was measured to ensure that air content was both stable and met the targeted content of 5-7%. Results showed that the air content of the samples decreased slightly with increasing carbon content, but remained within the targeted range.

Slump is the measure of workability of the concrete. Headwaters targets a value between 5–7 inches for concrete prepared with LMS ash. Test results showed that both simulated samples met this criterion. Fly ash usually behaves as a natural water reducing agent. All fly ash mixtures reduced the water/cement ratio from 0.57 to 0.52, and at the same time produced the same slump (6-inches). Excess water tends to lower strength development.

Compressive strength results for the two simulated ash/carbon samples were higher than for the control sample. The target for the control sample typically depends on the application desired for the concrete. Although it may seem desirable to increase the strength of the concrete, as can result from increasing the LOI content of the ash, the increased strength is undesirable if it causes the concrete to fail a freeze/thaw analysis. The freeze/thaw analysis simulates the temperature swings concrete can be exposed to that could cause the concrete to crack and fail. This failure can occur if the concrete becomes too dense (does not have enough voids) because of the addition of high LOI ash [4]. No freeze/thaw analyses were performed during this program.

Table 3-34. Headwaters Concrete Testing Results for Simulated Carbon/Ash Mixtures

Test Parameter	Units	Passing Criteria	Control with Portland Cement (no ash)	Baseline Ash 1F2A (4/19/07)	Simulated* 1.0 lb/Macf DARCO Hg-LH	Simulated* 2.0 lb/Macf DARCO Hg-LH
AEA	oz/cwt	Steady and low	0.22	0.22	0.35	0.46
Air Pressure	%	5 – 7	6.5	6.3	6.0	5.8
Slump .25 inch	inches	5 – 7	6	6	6	6
Water to Cement Ratio	none	Similar to Control	0.57	0.52	0.52	0.52
7-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	2777	3054	2934	3193
28-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	3344	3958	3862	4013

* The simulated ashes were made by combining baseline ash from 1F2A on 4/19/07 with the appropriate amount of DARCO Hg-LH to produce the designated injection conditions.

Table 3-35 shows the results of mortar tests performed by EERC. SAI testing was performed using an LMS fly ash sample collected on 12/9/06 when 0.6 lb/Macf DARCO was injected for a 24-hour period, and on a sample containing baseline fly ash collected on 12/1/06 and mixed with DARCO Hg-LH to yield a simulated 2.0 lb/Macf ash. SAI tests or mortar cube tests use only sand, cement, water and ash. SAI is an indicator of how the fly ash performs in a simulated matrix relative to a control based on a vendor's specifications. The SAI is calculated by dividing the compressive strength of a given sample made with fly ash by the compressive strength of the control, which does not contain fly ash. Meeting the minimum 7 day or 28 day strength activity index of 75% indicates compliance with ASTM C618; ASTM C618 is a specification that covers coal fly ash and raw or calcined natural pozzolan for use in concrete. The maximum allowed water requirement is 105%. In all LMS ash samples tested, the SAI and water requirements were shown to be acceptable.

Table 3-35. EERC Concrete Results for Simulated Carbon/Ash Mixtures

Test Parameter	Passing Criteria*	Baseline (12/1/07)	12/9/07 0.6 lb/Macf DARCO (24-hr test)	Simulated 2.0 lb/Macf DARCO Hg-LH
7-Day Strength Activity Index (%)	> 75	71	83	79
28-Day Strength Activity Index (%)	> 75	82	88	87
Water Requirement (%)	< 105	95	95	95

* Passing criteria based on ASTM C 618 specifications.

Fly ash and Concrete Results during Long-Term Test

Concrete Results from Day 3 of Injection

Although the results for simulated carbon-fly ash samples indicated that 1-2 lb/Macf activated carbon injection rates at LMS should be acceptable for subsequent fly ash reuse, actual field samples provide a more accurate indicator of fly ash fitness since certain air entraining agents might be more sensitive to carbon exposed to flue gas. Three days into the long-term injection test, first-field fly ash samples were obtained and analyzed by Headwaters for concrete testing. The purpose of this screening test was to confirm that the chosen sorbent injection rate (for the long-term test) was suitable for generating fly ash that was concrete compatible. Concrete was prepared from fly ash collected from each of the three rows of the first field. Results of the concrete tests are shown in Table 3-36. AEA, slump, water content, air pressure, and compressive strength were all determined to be satisfactory. Thus, the long-term test was continued at the 2 lb/Macf injection rate. Results from the long-term test samples (Table 3-36) were very similar to results obtained from the simulated carbon/ash mixtures (Table 3-34), thereby validating the simulation tests as a viable screening method.

Table 3-36. Headwaters Concrete Results for Baseline and Day 3 (of Long-Term Test) Fly Ash

Test Parameter	Units	Passing Criteria	Control with Portland Cement (no ash)	Hopper 1F1A 1st Field, 1st Row		Hopper 1F2A 1st Field, 2nd Row		Hopper 1F3A 1st Field, 3rd Row	
Date				Baseline 6/22/07	Injection Day 3 6/25/07	Baseline 6/22/07	Injection Day 3 6/25/07	Baseline 6/22/07	Injection Day 3 6/25/07
AEA	oz/cwt	Steady and low	0.21	0.22	0.46	0.20	0.40	0.20	0.43
Slump .25 inch	%	5 – 7	5.5	5.8	6.0	6.0	5.5	5.5	6.0
Air Pressure	%	5 – 7	6.2	6.8	6.0	6.6	5.5	6.4	5.5
Water to Cement Ratio	none	Similar to Control	0.56	0.51	0.53	0.51	0.53	0.51	0.52
7-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	2966	2825	2994	2932	3271	2932	2847
28-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	4222	4072	3905	4405	4827	4049	4355

Foam Index Testing

Headwaters performed on site foam index testing on fly ash samples collected weekly during the long-term test (Appendix I). Figure 3-30 shows results for these tests. Each datum point is the average of all three hoppers in the first field for either the untreated ESP 1B (hoppers 1B, 2B and 3B), or the treated ESP 1A (hoppers 1A, 2A, and 3A). A line is drawn to indicate the overall average foam index result for each duct, as well as one standard deviation difference. The overall average does not include days where only PRB coal was fired. Results showed that the untreated duct produced more steady foam index results, and demanded less AEA than the treated duct. The higher variability observed with fly ash collected from the treated ESP may be related to possible variability with the sorbent injection delivery, sorbent duct coverage, or that associated with obtaining representative samples of fly ash-carbon mixtures.

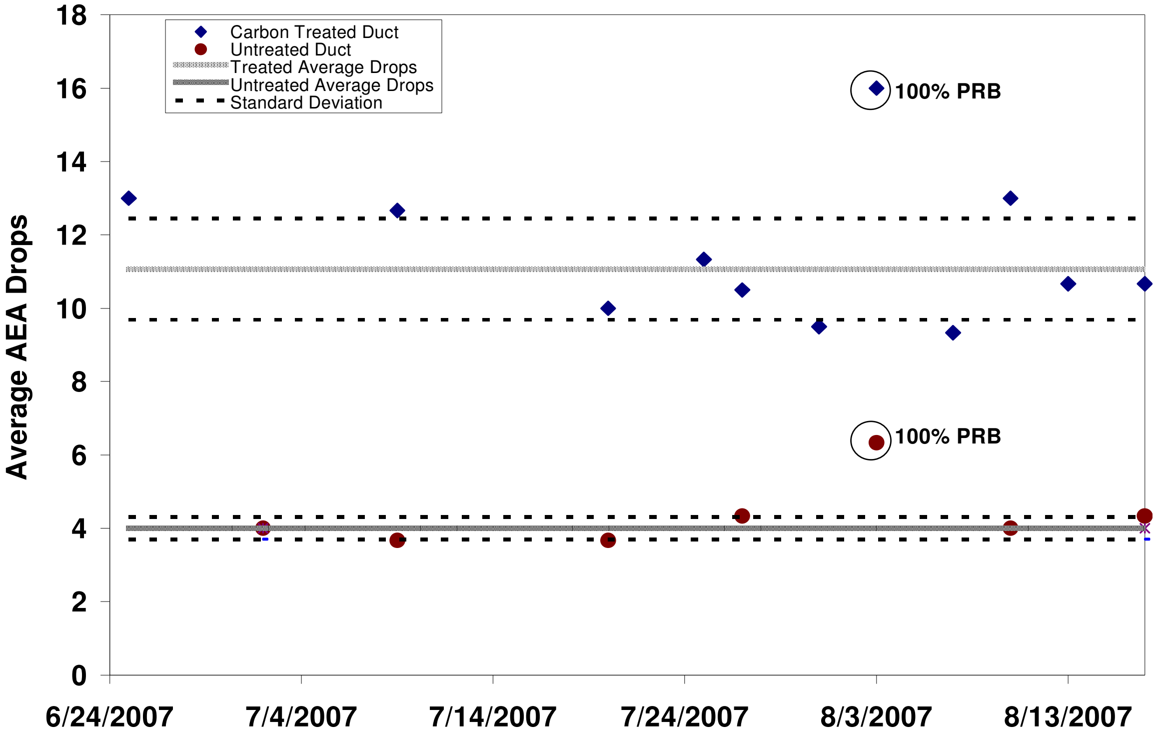


Figure 3-30. Fly Ash Foam Index Results for Samples Collected during the Long-Term Test

Most of the ash and concrete analyses for this program were performed on samples collected from the first field of the ESP since 90% of the fly ash is typically collected there. However, fly ash from all ESP fields would be incorporated into concrete, so it is important to evaluate the back-field ash characteristics as well. Because so little ash is captured in these backfields, limited samples were available. Table 3-37 lists foam index data for ash collected from the back-field hoppers of ESP 1A. Results for the baseline fly ash collected on June 22nd showed higher foam index properties from fields 4 and 5 hopper 1A, and fields 6 and 7 hoppers 1A and 2A. It is believed that this was likely due to residual carbon from Toxecon™ II testing that occurred in prior weeks. These hoppers are cleared approximately once per week, so it could take several weeks to fully clear the injected carbon from the backfields. Because only the fields downstream of the Toxecon™ II location showed increased foam index results, it is believed that residual carbon from Toxecon™ II caused the high results.

Table 3-37. LMS Foam Index* from All Fields of ESP 1A (Treated ESP)

Date	Field 1			Field 2			Field 3			Fields 4&5			Fields 6&7		
	1A	2A	3A	1A	2A	3A	1A	2A	3A	1A	2A	3A	1A	2A	3A
Baseline															
6/22/2007	5	5	4	4	5	5	5	6	6	31	6	6	32	30	7
Long Term															
6/25/2007	12	12	14	10	11	18	NA	8	20	NA	10	NA	NA	NA	21
8/2/2007	NA	NA	NA	19	15	15	17	19	14	15	22	24	27	36	30

* Foam Index units are in drops of AEA.

LOI and Carbon by LECO

Headwaters conducted on site LOI testing (Appendix I) during the test program. Figure 3-31 displays the overall average LOI result for both treated and untreated ducts, as well as the calculated standard deviation of the collective measurements. Each datum point represents the average from all three hoppers in the first field. The average does not include days where only PRB coal was fired. The treated duct produced higher and more variable LOI results than the untreated duct. According to ASTM C 618 the maximum LOI should not exceed 6.0% for a Class C ash; however, concrete manufacturers may set an even lower limit. Samples collected from both ducts were well below the LOI requirements for a Class C fly ash.

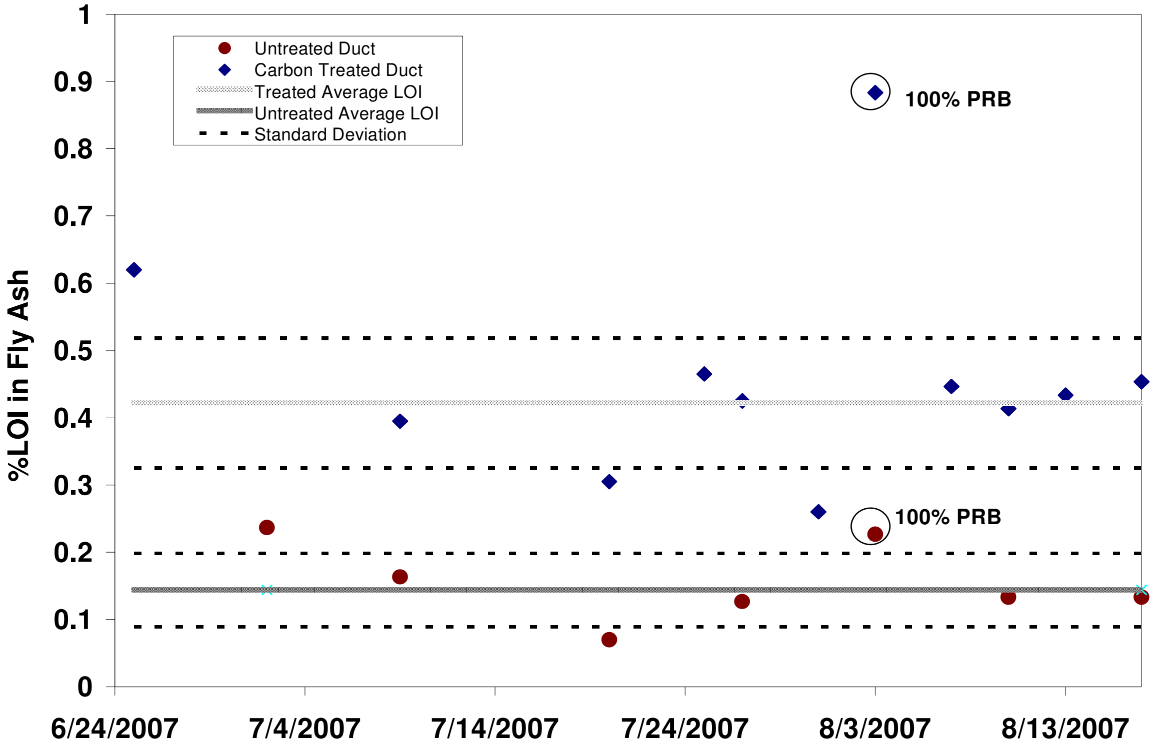


Figure 3-31. First-Field Fly Ash LOI during the Long-Term Test (LMS Laboratory)

LOI measures loss of *any* weight (net weight loss) upon ignition. Not only will unburned carbon become incinerated, but sulfur compounds present in the ash can be released as well. For these reasons, an alternative method is often used to produce unburned carbon results. More accurate carbon results can be obtained using an instrument such as LECO. LECO heats a sample and oxidizes carbon in the ash to carbon dioxide, which is then measured by an infrared detector providing increased speed and accuracy, and lower detection limits. LOI measurements determine a net weight loss of a sample whereas LECO measures only the carbon content (Table 3-38); therefore, LOI measurements tend to be higher than those determined by LECO.

Table 3-38. Carbon by LECO as Measured by Headwaters Laboratory

Date	Hopper 1F1A 1st Field, 1st Row (% Carbon)	Hopper 1F2A 1st Field, 2nd Row (% Carbon)	Hopper 1F3A 1st Field, 3rd Row (% Carbon)
7/9/07	0.32	0.32	0.14
7/20/07	0.30	0.38	-
7/25/07	0.47	0.47	0.29
8/3/07	0.91	0.81	0.70
8/7/07	-	0.31	-
8/10/07	0.30	-	-
8/13/07	0.26	0.38	0.53
8/17/07	0.33	0.35	0.23
8/21/07	0.26	0.32	0.10

- Data not available

Particle Size Characterization

Concrete consists of air, Portland cement, gravel, sand, and water. The reactive constituents of Portland cement (PC) are lime and silica. PC is an expensive material, so concrete manufacturers replace up to 20% PC with fly ash and receive a beneficial effect on concrete properties. Fly ash particles are smaller than those in PC allowing them to flow and fill voids more easily. When water and PC are mixed, two products are created: (1) a durable binder that glues concrete aggregates together and (2) free lime. Free lime reacts with the fly ash replacement creating a more desirable binder.

The reactivity of the fly ash with lime in a concrete matrix increases with smaller fly ash particle size. Finer sized particles have higher surface areas and create a higher probability of contact between the lime and fly ash. LMS performed on-site particle size characterization of selected fly ash samples using both a sieving method and analysis using a Horiba particle size analyzer (for median particle size). A 325-mesh sieve test was conducted in which the coarser ash particles are retained on the mesh while the finer particles pass through it. A 325-mesh sieve corresponds to a particle size of 45μm. Results of the 325-mesh sieve test are reported as the percent of ash material retained on the sieve, with higher values indicated larger particle size. Fineness, or the amount of material retained when wet-sieved on a 325-mesh screen, is a physical requirement used for defining a suitable Class C fly ash. This number should not exceed 34% according to ASTM C 618.

Figure 3-32 shows the overall 325-mesh sieve results for the treated and untreated ducts. Each B-side datum point represents the average of all three hoppers in the first field. For the A-side, only hoppers 1A and 2A data points were included. Due to the coarseness of the material coming from the 3A hopper, it appears as though ash from the economizer was carrying over into it. Headwaters indicated that this phenomenon has been seen before in this hopper and is not a result of carbon injection. Therefore, none of the ash from the first field 3A hopper was used in the concrete simulations, nor was it included in the data presented in Figure 3-32. Table 3-39 shows how the 3A hopper particles were more coarse (i.e. higher 325-mesh) than the 1A and 2A hoppers.

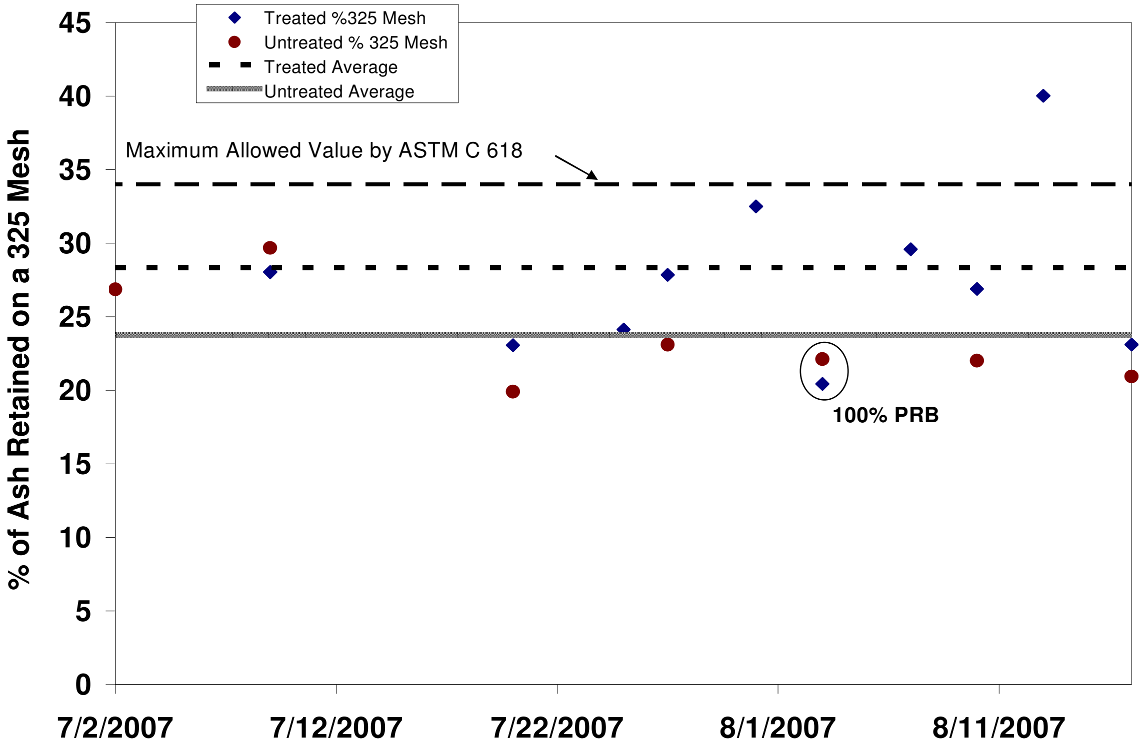


Figure 3-32. Average Results for 325-Mesh Characterization of First-Field Ash during the Long-Term Test

Table 3-39. 325 Mesh Results for Each First-Field Hopper of the Treated ESP

Date	Hopper 1F1A 1st Field, 1st Row (% Retained on a 325 mesh)	Hopper 1F2A 1st Field, 2nd Row (% Retained on a 325 mesh)	Hopper 1F3A 1st Field, 3rd Row (% Retained on a 325 mesh)
7/9/2007	29.9	26.2	83.7
7/20/2007	27.0	19.1	-
7/25/2007	23.8	24.5	52.9
7/27/2007	29.3	26.4	-
7/31/2007	34.3	30.7	-
8/3/2007	20.9	19.9	33.0
8/7/2007	32.8	26.4	36.8
8/10/2007	27.0	26.8	42.7
8/13/2007	43.8	37.4	38.9
8/17/2007	21.5	24.7	48.1

-Data not available.

The Horiba particle size instrument uses laser diffraction, and provides much more accurate information than a 325-mesh sieve measurement. The Horiba particle size measurements (Table 3-40) obtained for hopper 3A were significantly higher than those for hoppers 1A and 2A, again providing evidence that the hopper was tainted by economizer ash. It is unclear why particle sizes of all three fields on 8/13/07 are nearly triple the typical value of ~15 µm.

Table 3-40. Median Fly Ash Particle Size as Measured by the Horiba Analyzer

Date	Hopper 1F1A 1st Field, 1st Row	Hopper 1F2A 1st Field, 2nd Row	Hopper 1F3A 1st Field, 3rd Row
	Particle Size (µm)	Particle Size (µm)	Particle Size (µm)
7/9/07	19.5	17.1	96.4
7/20/07	18.4	13.1	-
7/25/07	14.4	15.5	46.6
8/3/07	16.1	15.0	25.1
8/7/07	-	18.4	-
8/10/07	19.5	-	-
8/13/07	47.6	40.1	42.1
8/17/07	14.2	14.7	43.9
8/21/07	17.6	16.7	35.5

- Data not available

Additional Compressive Strength Results

Concrete test results presented previously in this report were for fly ash samples collected from the first field of the ESP. In reality, ash from all ESP fields is combined in a silo (where stratification often occurs) and then transported to a truck (where mixing occurs) and shipped to the concrete manufacturer. Because ash fineness changes from field to field, silo samples will have different characteristics than first-field fly ash. During ACI testing, fly ash from the treated ESP was transferred to a non-marketing silo where it was mixed with economizer ash. This silo ash was not appropriate for concrete testing (due to the inclusion of economizer ash). Therefore, in order to obtain an ash sample representative of that captured across the entire Unit 1 ESP, Headwaters combined individual samples from multiple fields to simulate the fineness of untreated bulk fly ash.

A blended ash sample was made to mimic fly ash that would be transported for reuse. This was accomplished by using the best possible combination of individual hopper samples, given the limited number and quantity available. To prepare a representative ash sample, first field samples from hoppers 1A and 2A collected on 7/9/07 were blended in a 50:50 ratio. As stated previously, ash from hopper 1F3A was not used due to its unusual coarseness. The 50:50 first-field blend was then mixed 80:20 with finer ash from field 3F3A (collected on 8/2/07) to produce a sample that simulated the fineness of the final marketed fly ash sample (i.e., “truck sample”). This final blend was tested for foam index, slump, air pressure, and compressive strength by Headwaters.

The multiple-field blend showed higher compressive strength than individual first-field samples (Table 3-41). Truck samples of untreated ash (i.e., not containing activated carbon) and multiple field treated ash behaved similarly except in AEA demand. Injection of activated carbon thus appeared to have no adverse impact on fly ash quality.

Table 3-41. Headwaters Concrete Using Ash from Long-Term Injection

Test Parameter	Units	Passing Criteria	Control with Portland Cement (no ash)	Untreated Ash Truck Sample	Multi-Field Blend*
Date			10/30/07	6/26/07	7/9/07 & 8/2/07
AEA	oz/cwt	Steady and low	0.16	0.19	0.32
Slump .25 inch	inches	5 – 7	5.5	6.0	6.0
Air Pressure (%)	%	5 – 7	6.0	5.8	5.5
Water to Cement Ratio	none	Similar to Control	0.52	0.51	0.51
7-Day Average**	Psi of unconfined compressive strength	Similar to Control	4016	3713	3663
%RSD			3.2	1.2	3.2
28-Day Average**	Psi of unconfined compressive strength	Similar to Control	5989	5561	5328
%RSD			2.8	3.7	1.7

* Blended sample made by mixing 50:50 first field samples from hoppers 1A and 2A collected on 7/9/07. Ash from hopper 1F3A on 7/9/07 was not used due to its coarseness. This 50:50 blend was then mixed 80:20 with Field 3F3A from 8/2/07 to give a final blend of hoppers used to prepare concrete mixes. No first field ash from 8/2/07 was used because plant went to all PRB before it could be collected.

** Reported average of three individual cylinders. See Appendix I for the individual cylinder results.

3.10 Flue Gas Halogen Measurements

Flue gas halogen concentrations were measured to determine the potential for bromide compounds, impregnated on the DARCO Hg-LH sorbent, to volatilize after being injected into the duct. Flue gas samples were collected using EPA Method 26A (isokinetic, full traverse measurements), which is a standard method used to determine hydrogen halide and halogen emissions from stationary sources. Samples were collected simultaneously on the injection side (A) of the ESP and the non-injection side (B).

As discussed in previous sections, a bias exists in determining the speciation of the halogen and hydrogen halide at low concentrations in coal-derived flue gas. The halogen concentration can be biased low, resulting in the hydrogen halide concentration being biased high. However, the total concentration of halogen and hydrogen halide concentration is still accurate. In Table 3-42, the halogen (Br_2/Cl_2) data are presented along with the hydrogen halide (HBr/HCl) data. In all cases, the halogen concentrations are near or below the detection limit. Because of the sampling bias, there may indeed have been Br_2 and Cl_2 present in the flue gas, but it was detected only in the hydrogen halide impinger.

As presented in Table 3-42, chloride was detected in both the injection and non-injection sides at concentrations between 4.1 and 6.2 ppmvd @ 3%O_2. Flue gas bromide concentrations averaged 0.50 ppmvd at 3% O_2 in the treated duct, and 0.09 ppmvd in the untreated duct. This result indicates bromine is volatizing from the impregnated sorbent. It is expected that the volatilized bromide would be removed across the FGD scrubber.

Table 3-42. Method 26A Results during Long-Term Testing

Location	Run	Date	Time	Cl_2 (ppmvd @ 3% O_2)	HCl (ppmvd @ 3% O_2)	Br_2 (ppmvd @ 3% O_2)	HBr (ppmvd @ 3% O_2)
Untreated Side	1	7/11/07	12:51-15:03	<0.002	6.23	<0.001	0.09
Untreated Side	2	7/11/07	16:05-18:17	0.003	6.20	<0.001	0.08
Untreated Side	3	7/12/07	08:40-10:49	<0.002	4.18	<0.001	0.09
Treated Side	1	7/11/07	12:51-15:02	<0.002	5.87	<0.001	0.54
Treated Side	2	7/11/07	16:05-18:15	0.003	6.13	<0.001	0.48
Treated Side	3	7/12/07	08:40-10:50	<0.003	4.12	<0.001	0.47

3.11 FGD System Measurements

Flue gas desulfurization absorber slurry solid and liquid samples were collected during baseline and long-term tests and analyzed. Measured concentrations of various analytes for solids and liquids are presented in Tables 3-43 and 3-44, respectively. The FGD liquor Br concentration would be expected to increase due to an increase in flue gas Br concentration during injection of the brominated Darco Hg-LH carbon. However, only ¼ of Unit 1 was treated for the long-term test and the treated and untreated gas mix prior to the FGD. Therefore, the concentrations presented in Tables 3-43 and 3-44 do not reflect the FGD concentrations that would be achieved at steady-state had all of Unit 1 been treated with ACI.

Table 3-43. FGD Solids Analysis from Long-Term Test

Description	Module A Solids	Module A Solids	Module A Solids	Module A Solids	Module A Solids	Module A Solids	Module A Solids	Module A Solids
Date	6/18/2007	6/20/2007	6/25/2007	7/4/2007	7/10/2007	7/22/2007	7/30/2007	8/3/2007
Time	17:15	15:00	16:40	11:15	15:00	12:20	14:15	15:50
pH	5.48	5.48	5.50	5.54	5.49	5.47	5.25	5.16
Temperature	57.3	52.5	60	59.2	60.3	59.4	56.3	57
Ca, mg/g	303	303	302	293	297	298	287	299
Mg, mg/g	<0.2	0.3	0.3	<0.2	<0.2	<0.2	<0.2	<0.2
SO_3, mg/g	512.8	482.8	496.4	435.6	427.4	487.0	471.4	438.5
SO_4, mg/g	89	128	111	171	177	111	112	171
CO_3, mg/g	3	7	3	2	4	2	2	3
Inerts, wt%	0.96	1.12	0.88	0.84	0.76	0.88	1.08	1.04
Solids, wt%	7.90	12.42	13.41	10.42	9.19	6.06	13.46	11.90
Oxidation, %	12.6	18.1	15.8	24.7	25.7	16.0	16.5	24.5
Utilization, %	98.5	98.0	98.7	99.2	98.3	98.7	99.1	98.5

Table 3-44. FGD Liquid Analysis from Long-Term Test

Description	Module A Liquids	Module A Liquids	Module A Liquids	Module A Liquids	Module A Liquids	Module A Liquids	Module A Liquids	Module A Liquids
Date	6/18/2007	6/20/2007	6/25/2007	7/4/2007	7/10/2007	7/22/2007	7/30/2007	8/3/2007
Time	17:15	15:00	16:40	11:15	15:00	12:20	14:15	15:50
Ca, mg/L	1127	1303	1270	1188	1179	1186	1184	1195
Mg, mg/L	1774	2686	2297	2578	2351	2205	3641	3888
Na, mg/L	2937	4364	3726	4361	4124	3722	5895	6388
Cl, mg/L	5265	7928	6710	7756	7096	6462	10888	11909
Br, mg/L	63	96	89	109	104	94	161	181
CO_3, mg/L	<12	<12	<12	<12	<12	23	27	17
SO_3, mg/L	1328	1861	1335	1417	1382	1350	1688	2080
SO_4, mg/L	5953	7157	7738	7167	6765	6015	9201	9448

3.12 Economic Analysis

Activated Carbon Injection Process Economics

Results obtained during Phases I-III were used to conduct a preliminary cost analysis for the use of sorbent injection to control mercury at a power plant similar in nature to LMS. The objective of this analysis was to verify the feasibility of sorbent injection technology at LMS and to help establish testing priorities for Phase IV. This section describes the assumptions used and results obtained for the interim economic analysis. The economic analysis was repeated after the conclusion of the Phase IV parametric tests in 2009 and those results are reported in Chapter 4. Data from sorbent injection indicated better performance for mercury removal and ash properties in 2007 than in 2009, with no clear reason for the change in performance. In light of the poorer performance achieved in 2009, the results presented in this section based on the 2007 results represent an optimistic estimation of the costs of sorbent injection for a plant similar in configuration to LMS.

Capital and operating costs associated with various targeted mercury control levels were developed for sorbent injection implemented at a hypothetical 500-MW electric generating station firing primarily Texas Lignite. The assumed configuration for this hypothetical plant was similar to LMS in that it fired a 70/30 blend of Texas Lignite/PRB and was equipped with both a large-SCA ESP for particulate control and an FGD system for SO_2 control. The FGD system was assumed to operate in a limestone inhibited oxidation mode and did not produce a salable gypsum byproduct. The activated carbon injection lances were assumed to be installed upstream of the ESP.

Plant characteristics for the model plant are summarized in Table 3-45. Average TxL and PRB coal compositions from the Phase III two-month injection test at LMS were used to calculate an average coal mercury input of 639 lb/yr and ESP inlet mercury concentration of 26 $\mu g/dNm^3$ at 3% O_2. Baseline mercury removal across the ESP was assumed to be 10%.

Table 3-45. Process Parameters for Hypothetical Plant in Economic Analysis

Parameter	Value
Coal Type	70/30 TxL/PRB blend
Particulate Control	Large-SCA ESP
SO_2 Control	Wet Limestone FGD, Inhibited Oxidation (Sulfur Emulsion)
Net Unit Load	500 MW
Net Heat Rate	9800 Btu/kwh
Unit Capacity Factor	0.85
Flue Gas Temperature at ESP Inlet	310°F
Flue Gas Flow Rate at ESP Inlet	1.9×10^6 acfm
Baseline Vapor Phase Hg Concentration at ESP Inlet	26 $\mu g/dNm^3$ at 3% O_2
Baseline Hg Removal across ESP	10%
Baseline Vapor Phase Hg Concentration at ESP Outlet	23 $\mu g/dNm^3$ at 3% O_2

The economic analyses included the estimation of costs for achieving targeted mercury reductions of 50%, 70%, and 90% at the ESP outlet. The annual cost associated with a carbon injection system was composed of the following components:

- ***Sorbent cost*** – This is the yearly cost of the sorbent. For this analysis, the chosen sorbent was Norit Americas' DARCO Hg-LH, available at $1.00/lb F.O.B as of 3/31/08. The delivery cost of the sorbent from Norit's plant in Marshall, Texas was assumed to be $0.02125/lb. The DARCO Hg-LH sorbent performance curve generated during Phase I-III parametric tests was used to estimate the sorbent injection rates needed to achieve 50%, 70%, and 90% mercury reduction at the ESP outlet. In the 2009 tests, there was difficulty consistently achieving even 50% reduction at the ESP outlet. Therefore, this economic analysis is repeated in Chapter 4 with the 2009 data.

  Other brominated sorbents were not chosen for this analysis because either (1) they were less effective for mercury capture or (2) had to be shipped from considerably farther distances without providing increased mercury removal performance or decreased sorbent cost. Only sorbent types that met the program mercury removal performance target were considered. From the laboratory simulations performed as part of this test program, the potentially ash friendly C-PAC sorbent did not offer any substantive advantage over Darco Hg-LH for maintaining fly ash quality. Like Darco Hg-LH, the C-PAC caused an increase in AEA demand, albeit a somewhat smaller increase.

- ***Ash mitigation cost*** – This is the cost associated with treatment of the ash to make it viable for use by the concrete industry. Several different ash mitigation scenarios were considered.
  - In the case of 50% mercury reduction at the ESP, the injection rate needed was only 0.5 lb/Macf. Based on the data gathered from 2007, ash containing this amount of carbon can be marketed directly to the concrete industry without the use of any ash mitigation techniques. Although ash quality was more diminished in 2009 than 2007, data gathered in 2009 indicated that ash at 0.5 lb/Macf carbon injection was viable as-is for use by concrete industry (see Chapter 4).

  - For the case of 70% mercury reduction, an injection rate of 1.2 lb/Macf was needed. In this case, the 2007 results indicate the ash is viable to sell for concrete; however, more AEA will be needed at the concrete manufacturer resulting in a lower cost procured for the ash. Depending on variations in unit operation, it is possible that some truckloads of ash may not pass the ash marketer's criteria for carbon content and may need to be landfilled (at a cost of $22.6/ton for lost sales and landfilling). The frequency of rejection was assumed to be 5% for a required 50% mercury removal and 10% for higher removal levels.
  - For the case of 90% mercury reduction at the ESP outlet, Phase I-III test results indicated that an injection rate of 3.2 lb/Macf would be needed. The AEA demand was estimated to be triple the demand of the untreated ash and thus unacceptable to sell as-is to concrete manufacturers. For this case, it was assumed that a proprietary surfactant would be applied to the fly ash at the power plant. The cost to apply this surfactant was assumed to be $10/ton of fly ash, based on capital and operating costs estimated by Headwaters.
  - The cost of $22.6/ton for lost ash sales and land filling assumes that the ash can be landfilled locally. A landfill has a finite volume; once filled, ash will need to be trucked to a location farther away, which will significantly increase landfill costs.
- ***Operating and maintenance cost*** – Labor is required to monitor the operation of the sorbent injection system, coordinate sorbent shipments, and provide routine maintenance. It was assumed that over the course of one year, an average of one hour per day would be needed, at a loaded labor rate of $50/hr. A spare parts budget of $5,000/yr was allocated. The capital cost estimate already included a spare feeder.
- ***Amortized capital cost*** – This is the cost associated with installation of the carbon injection system. The economic life of the equipment was assumed to be 15 years at an interest rate of 8%, for a capital recovery factor of 0.12.

Table 3-46 shows the estimated annual cost to achieve 50%, 70% and 90% mercury reduction at the ESP outlet, based on the 2007 data. Figures 3-33 and 3-34 illustrate the nature of the annual costs for a plant where fly ash sales are maintained and lost, respectively. For each case the annual cost is broken down into its contributing components: sorbent cost, amortized capital cost, and fly ash related costs. For the case where fly ash sales are maintained, costs for mitigating the byproduct are included. For the case where fly ash sales are lost, costs associated with lost revenues and byproduct landfilling are included. Costs for operations and maintenance are not presented in the Figures as they are too small (~$25,000) to appear. The results presented here are "first-year" costs with the sorbent costs presented in current U.S. dollars while capital costs are amortized over fifteen years.

To achieve 50% mercury reduction at the ESP outlet, the annual cost was estimated to be $1.2M assuming that fly ash integrity is maintained. To achieve 70% mercury reduction, the annual cost increased to $3.3M. The cost associated with ash mitigation (i.e., increased AEA usage and disposal of 10% of fly ash) contributed 50% of the annual cost. At 90% mercury reduction at the ESP outlet, the annual cost increased to $6.4M. Again, sorbent costs and ash mitigation costs contributed nearly equally to the annual cost.

If the mercury control implementation results in the inability to preserve the fly ash quality, all of the ash would need to be landfilled; this case is shown at the bottom of Table 3-46 and in Figure 3-34. In this case, the cost for 50% mercury reduction increases from $1.2M (with ash sales) to $6.6M; the respective cost for 90% mercury reduction increases from $6.4M to $9.0M.

Table 3-46. Annual Cost Breakdown for Sorbent Injection Implemented Upstream of the ESP, Based on 2007 Data

Case Name		50% Hg Reduction; Sell Fly Ash	70% Hg Reduction; Sell Fly Ash	90% Hg Reduction; Sell Fly Ash
Targeted % Hg Reduction at ESP Outlet		50%	70%	90%
Injection Location		Upstream of ESP	Upstream of ESP	Upstream of ESP
Sorbent		Darco Hg-LH	Darco Hg-LH	Darco Hg-LH
ACI Injection rate	lb/Macf	0.5	1.3	3.2
ACI Injection rate at full load	lb/hr	59	148	373
ACI Injection	lb/yr	439,443	1,104,521	2,776,165
Foam Index Result (drops; BL = 3 drops)		3	5	9
Ash Disposal Plan		Sell all ash	Sell all ash, extra AEA needed	Sell all ash, surfactant used
Rejection Rate of Fly Ash	%	5%	10%	10%
Total Annual Cost: Carbon+Capital+Ash Mitigation	**$/yr**	**$1,237,401**	**$3,254,465**	**$6,435,039**
Annual carbon cost (including shipping)	$/yr	$448,781	$1,127,992	$2,835,159
Operating and Maintenance	$/yr	$23,200	$23,200	$23,200
Amortized Capital Cost For ACI System	$/yr	$480,000	$480,000	$480,000
Ash Mitigation Cost	$/yr	$285,420	$1,623,273	$3,096,680
AEA Cost	$/yr	$0	$1,052,433	$0
Surfactant Cost	$/yr	$0	$0	$2,525,840
Lost Ash Sales + Landfill Cost	$/yr	$285,420	$570,840	$570,840

Table 3-47 calculates the cost of the ACI process in units of $/lb mercury removed.

Table 3-47. Cost of Implementing ACI for Mercury Control, in Terms of $/lb Hg Removed, Based on 2007 Data

Targeted % Hg Reduction at ESP Outlet	**%**	**50%**	**70%**	**90%**
Hg removed by ACI across ESP	lb/yr	288	403	518
$/lb Hg removed by ACI (ESP only)	**$/lb**	**$4,300**	**$8,078**	**$12,423**

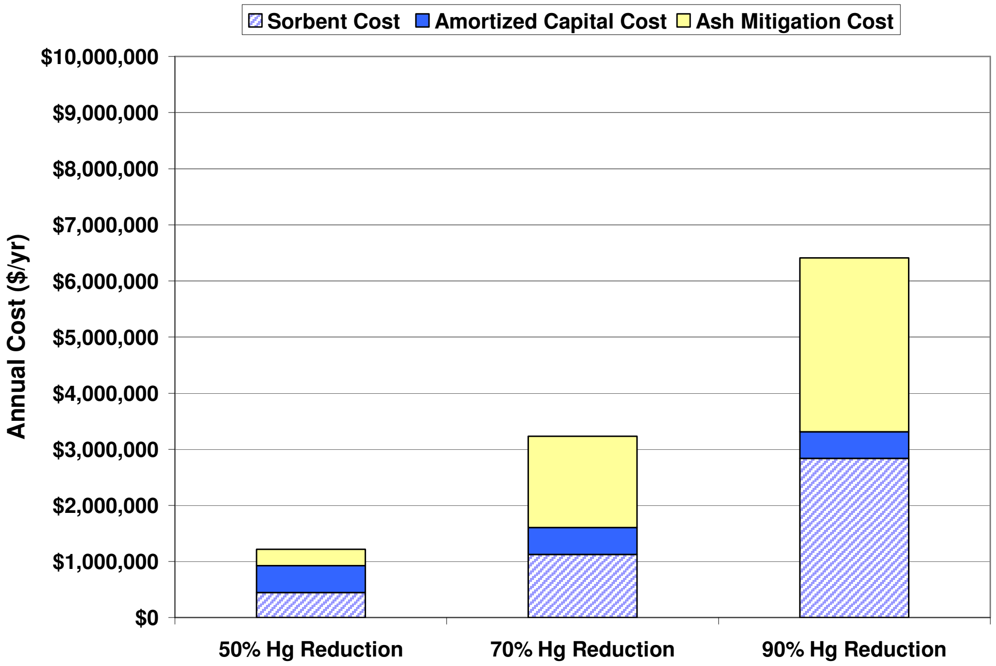


Figure 3-33. Total Annual Cost of ACI for Three Different Levels of Mercury Removal at ESP Outlet While Maintaining Fly Ash Sales

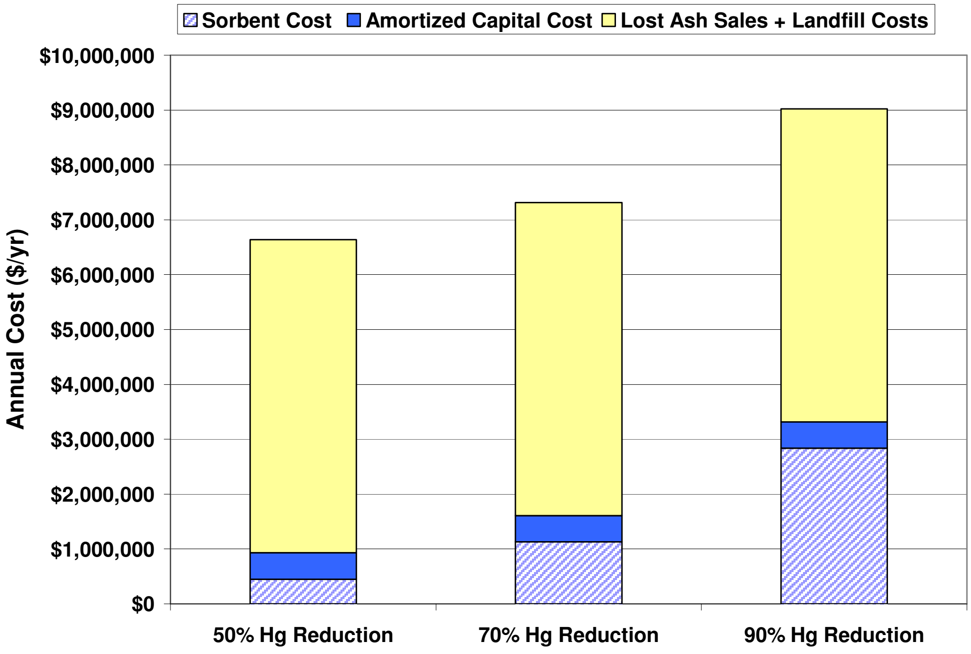


Figure 3-34. Total Annual Cost of ACI for Three Different Levels of Mercury Removal at ESP Outlet with the Loss of Fly Ash Sales

Phase I-III testing at LMS showed that ACI resulted in mercury removal across the ESP and increased mercury oxidation at the ESP outlet. Both OH and SCEM data indicated that baseline mercury oxidation at the ESP outlet was approximately 50% while during the long-term injection of 2 lb/Macf of activated carbon, the average mercury oxidation at the ESP outlet was 81%. Short-term parametric tests conducted several months earlier at LMS indicated that similarly high levels of mercury oxidation were obtained with only 0.5 lb/Macf. Oxidized mercury in the flue gas at this location would be expected to be removed across the wet FGD system. Thus, the process economics described above, which only consider mercury removal across up to the ESP outlet, would improve when considering FGD mercury removal. See Section 3.5 for a discussion of theoretical calculations of oxidized mercury removal across the FGD.

In 2009 flue gas mercury measurements were made across the entire LMS unit including the FGD during ACI. The 2009 results indicated lower levels of mercury removal than the 90+% mercury removal predicted from the theoretical calculations using the 2007 SCEM data. Therefore, economic analysis of ACI for the combined ESP/FGD system was performed for only the 2009 data (see Chapter 4), since the 2007 data were based on theoretical calculations of removal across the FGD, rather than measurements.

4.0 RESULTS AND DISCUSSION – PHASE IV (2009)

This section presents the results from Phase IV parametric testing conducted on Unit 2 in 2009. Three approaches to minimizing ash impacts of ACI were tested: (1) injection of “low ash impact” sorbents, (2) alterations to the injection configuration and injection lance design, and (3) injection of calcium bromide in conjunction with sorbent injection. The primary goal was to identify the conditions that result in the highest mercury removal across the AH/ESP/FGD system while maintaining the sorbent injection at a rate that has minimal impact on fly ash properties and potential for beneficial use.

The discussion of the test results is organized into the following sections:

- Unit operation;
- Baseline - flue gas mercury measurements;
- Parametric testing - flue gas mercury measurements;
- Effects of sorbent injection on concrete properties;
- Characterization of coal, fly ash and FGD absorber slurry;
- Trace metals measurements;
- In-line particle size measurements of sorbents;
- ESP outlet particulate emissions.

Testing in 2006-2007 at LMS demonstrated spatial variability of mercury concentration within each duct and between ducts at the ESP outlet. This made it difficult to accurately quantify the effectiveness of mercury controls for the entire system. Therefore, for the 2009 test program, the entire unit was treated so that stack mercury concentrations could be used to characterize performance. The flue gas at the stack should be better mixed after passing through the FGD scrubber.

In the 2009 program, several flue gas mercury measurement methods were used to better characterize the spatial variability of mercury measurements at the ESP outlet. SCEM measurements at the ESP outlet were made in the 2C2 duct, sorbent trap measurements were made in the 2C1 duct, limited OH and Method 29 measurements were made in the 2D1 duct, and limited XFM measurements were made in the 2D2 duct. The SCEM, sorbent trap, M29 and XFM methods each measured mercury concentrations at a single point in their respective ducts, allowing for an evaluation of concentration changes over time at a single point. Each OH method measurement consisted of a three-port, multi-point traverse, providing an indication of average mercury concentration within the duct.

Because the SCEM method measured semi-continuously and operated at all three sampling locations throughout the test program, including overnight periods, it was the primary source of data used to characterize system performance. Data from the other methods used at the ESP outlet and stack are presented to show the range of mercury concentrations and removal percentages obtained at different locations downstream of the same ESP rather than to verify the

SCEM results. In the case of the bromide addition tests, SCEMs operating upstream of the FGD system have historically demonstrated a low bias as has the OH method. Therefore in this instance, sorbent trap data were used as the primary characterization of system performance.

All mercury and trace metals data presented in this chapter are in units of µg/dNm^3 at 3% O_2, except as explicitly noted in text and figures. Concentrations listed as µg/dNm^3 should be assumed to be at 3% O_2, unless stated otherwise.

4.1 Unit Operation

Table 4-1 shows Unit 2 boiler load for each phase of the Phase IV parametric test periods. The minimum and average values shown include process dips and minor upsets, but do not include overnight periods during which no sorbent testing was conducted. For the Phase IV test program Unit 2 operated near its maximum load rating of 913 MW. Average air heater outlet duct temperatures for the Phase IV program were within ±4°F of the average temperature (310°F) of the 2007 long-term injection test (Table 4-2).

Detailed data for all process parameters for Unit 2 are provided in Appendix J

Table 4-1. Gross Load during Phase IV Sorbent Injection Tests

Test Block	Date Start	Date Stop	Boiler Load Minimum (MW)	Boiler Load Maximum (MW)	Boiler Load Average (MW)
AH Injection – Full Unit	06/13/09	06/28/09	715	921	894
ESP Injection – Full Unit	07/8/09	07/16/09	771	917	895
ESP Injection – ¼ Unit	07/18/09	07/30/09	845	919	906

Table 4-2. Flue Gas Temperatures during Phase IV Sorbent Injection Tests

Test Type	Unit/AH*	Date Start	Date Stop	AH Outlet Temperature Minimum (°F)	AH Outlet Temperature Maximum (°F)	AH Outlet Temperature Average (°F)
Phase I	1-A	11/28/06	12/11/06	242	308	288
Phase II	1-A	04/26/07	05/04/07	280	319	300
Phase III	1-A	05/22/07	05/26/07	287	318	302
Long Term	1-A	06/19/07[1]	08/22/07[1]	217	341	310
AH Injection – Full Unit	2-B	06/13/09	06/28/09	287	334	314
ESP Injection – Full Unit	2-B	07/8/09	07/16/09	285	322	308
ESP Injection – ¼ Unit	2-B	07/18/09	07/30/09	291	319	307

*AH outlet duct 1-A feeds ESP 1-A and ESP 1-B. AH outlet duct 2-B feeds ESP 2-C and ESP 2-D.

Velocity traverses were conducted at the following flue gas duct locations: ESP inlet at 2D1, ESP outlet at 2D1, ESP outlet at 2C1, and the stack. Refer to Figure 2-3 for a drawing of the duct configuration and locations for these ports. At full load, flue gas temperatures ranged from 329-346°F at the ESP inlet 2D1 and 323-341°F at ESP outlet 2D1. Velocity traverse results are listed in Appendix D along with the velocity traverse results from previous test phases.

4.2 Baseline - Flue Gas Mercury Measurements

Baseline flue gas mercury concentrations were measured prior to the start of the Phase IV parametric tests, from 8:00 on June 11, 2009 through 10:00 on June 13, 2009. Additional complete days of baseline measurements were made on June 21, July 7, and July 13. During these baseline periods and throughout this test program, mercury concentrations were measured at the AH inlet using a SCEM and at both the ESP outlet and stack using SCEM, sorbent traps, Method 29, and XFM. In addition, OH measurements were performed at the ESP outlet on one baseline day.

Baseline Mercury Measurements – SCEM

Table 4-3 presents the average total and elemental mercury concentrations as measured by SCEM at all three locations on each baseline testing day. The AH inlet total vapor phase mercury concentration ranged from 15 to 27 $\mu g/dNm^3$ at 3% O_2 throughout baseline testing. The ESP outlet total vapor phase mercury concentration ranged from 15 to 25 $\mu g/dNm^3$. The stack total vapor phase mercury concentration ranged from 10 to 16 $\mu g/dNm^3$.

Based on the average data for each baseline day, less than 15% of the AH inlet vapor-phase mercury was present as oxidized mercury, while 40 – 50% of the ESP outlet vapor-phase mercury was oxidized, indicating that a significant amount of mercury oxidation occurred across the AH/ESP. The average baseline removal of vapor-phase mercury across the AH/ESP, calculated for each baseline day, ranged from -16 to 20%. The average baseline removal across the combined AH/ESP/FGD system ranged from 14% to 45% based on SCEM measurements at the stack. The average percentage of flue gas bypassing the FGD system was approximately 15% during the baseline test period. The FGD outlet elemental and oxidized mercury concentrations were estimated based on the bypass percentage, ESP outlet and stack mercury concentrations. The percent of ESP outlet oxidized mercury re-emitted from the FGD during baseline ranged from -25% to 17%.

Baseline measurements were also made during the overnight periods between daily parametric sorbent injection tests. The purpose of these measurements was to verify that the unit had returned to baseline operation prior to starting the injection tests for each day. Data from these overnight periods are not presented in Table 4-3 because the Unit 2 load was often unsteady during these overnight periods; however, they are presented in the daily SCEM data plots in Appendix K.

Table 4-3. Baseline, Phase IV: SCEM Measurements and Removals

Condition Start Time	Condition End Time	Avg. AH Inlet Hg Concentration (μg/dNm^3)			Avg. ESP Outlet Hg Concentration (μg/dNm^3)			% Removal Across AH/ESP	Avg. Measured Stack Hg Concentration (μg/dNm^3)	% Removal Across System (AH vs. Stack)	FGD Bypass %
		Total Hg	Elem. Hg	% Oxid.	Total Hg	Elem. Hg	% Oxid.		Total Hg		
6/11/09 8:00	6/11/09 20:00	21.7	20.3	6%	17.3	8.3	52%	20%	12.2	44%	14%
6/12/09 8:00	6/12/09 20:00	21.6	19.4	10%	19.1	10.4	46%	12%	16.2	25%	13%
6/21/09 8:00	6/21/09 21:00	16.8	14.8	12%	19.5	11.4	42%	-16%	14.4	14%	15%
7/7/09 8:00	7/7/09 20:00	18.0	17.5	3%	20.5	10.6	48%	-14%	14.1	22%	15%
7/13/09 8:00	7/13/09 20:00	24.6	21.2	14%	22.7	8.3	64%	8%	13.5	45%	15%

Baseline Mercury Measurements - Alternate Methods

Table 4-4 summarizes the mercury concentrations measured by OH at the ESP outlet during a single baseline test day. The mercury oxidation percentages measured at the ESP outlet using both SCEMs and OH were similar, nearly 50%. The average baseline total vapor-phase mercury concentration measured by OH was 31 µg/dNm^3 at 3% O_2 which was 40-60% higher than the total mercury measurements obtained with SCEMs at both the AH inlet and ESP outlet 2C2. This degree of duct-to-duct variability in total mercury concentration, but consistency in mercury oxidation, was also observed with OH and SCEM measurements on Unit 1 in 2007.

Table 4-4. Baseline, Phase IV: OH vs. SCEM Measurements at the ESP Outlet

ACI Rate (lb/Macf)	Br Injection rate (ppm in coal)	Date in 2009	Averaging Period		AH Inlet SCEM	ESP Outlet 2D1 OH			ESP Outlet 2C2 SCEM		
			Start Time	End Time	Total Hg (µg/Nm^3)	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid
BL	BL	6/12	9:42	12:04	23.2	29.7	14.97	50	19.6	10.2	48
BL	BL	6/12	12:40	14:50	23.0	31.8	16.74	47	18.7	10.5	44
BL	BL	6/12	15:16	17:27	21.4	30.5	15.73	48	19.8	10.3	48

In addition to SCEM and OH, mercury measurements at the ESP outlet were made with sorbent traps in duct 2C1, XFM in duct 2D2, and Method 29 in duct 2D1, as presented in Table 4-5. SCEM concentrations ranged from 15 – 22 µg/dNm^3, sorbent traps ranged from 20 – 25 µg/dNm^3, Method 29 ranged from 18 – 34 µg/dNm^3, XFM ranged from 25 – 27 µg/dNm^3, and OH ranged from 30 – 32 µg/dNm^3.

Table 4-5 presents the average mercury concentrations and standard deviation for the measurements made during each time period, as well as an overall average and standard deviation for all data collected during baseline operation. The AH inlet concentration averaged 20.2 µg/dNm^3 and the ESP outlet averaged 21.7 µg/dNm^3. The overall standard deviation was 20% of the average value. Tests conducted in 2006-2007 (Phases I-III and Long-Term) also showed appreciable variability from one duct location to another even when measured with the same sampling method, as discussed in Section 3.2 Baseline Hg Measurements.

Total mercury removal across the AH/ESP was calculated in two ways. First, it was calculated using both the SCEM data at the AH inlet and the SCEM data at the ESP outlet. Second, it was calculated using the SCEM data at the AH inlet and the average mercury concentration measurement (of all methods for which data were available) at the ESP outlet. The SCEM data from ESP outlet duct 2C2 indicated an average mercury removal of 5% across the AH/ESP, while the average of all ESP outlet data indicated -8% mercury removal across the AH/ESP.

Table 4-5. Baseline, Phase IV: Mercury Concentrations and Removals Measured at ESP Outlet

BASELINE 70/30 TxL/PRB				AH Inlet	Hg Measurement Method ESP Outlet Duct #							% Removal Across AH/ESP^2	
Test Condition	Date in 2009	Averaging Period		SCEM	OH 2D1	ST 2C1	XFM 2D2	M29 2D1	SCEM 2C2	AVG^1	STD DEV^1	SCEM	AVG
		Start	End	Total Hg (µg/dNm^3 at 3% O_2)									
Baseline	11-Jun	9:16	17:16	21.8	--	21.8	--	--	--	21.8	--	--	0%
Baseline	11-Jun	17:42	1:43	20.3	--	20.3	--	--	15.5	17.9	3.4	24%	12%
Baseline	12-Jun	8:55	16:55	22.7	30.7	22.5	--	--	19.2	24.1	5.9	15%	-6%
Baseline	12-Jun	17:24	1:24	18.4	--	25.4	--	--	18.4	21.9	4.9	0%	-19%
Baseline	21-Jun	8:42	16:42	16.4	--	22.7	--	--	19.4	21.1	2.3	-18%	-28%
Baseline	21-Jun	17:31	1:31	18.2	--	23.5	--	--	18.7	21.1	3.4	-3%	-16%
Baseline	13-Jul	7:55	10:55	23.0	--	24.4	27.0	18.2	21.6	22.8	3.8	6%	1%
Baseline	13-Jul	10:32	12:32	24.3	--	--	25.6	27.0	19.9	24.2	3.8	18%	1%
Baseline	13-Jul	13:04	15:04	25.7	--	--	24.5	33.7	21.6	26.6	6.3	16%	-4%
Baseline AVERAGE				20.2	30.7	22.8	25.9	25.1	18.7	21.7	4.1	5%	-8%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at ESP outlet.

[2] Mercury removals calculated by comparing the AH inlet SCEM data to (a) ESP outlet SCEM and (b) average ESP outlet Hg concentratio

Table 4-6 presents mercury concentrations measured at the stack by the various methods, along with averages, standard deviations, and percent removals. Stack SCEM mercury concentrations ranged from 12 – 16 µg/dNm^3, sorbent traps ranged from 15 – 19 µg/dNm^3, Method 29 ranged from 14 – 21 µg/dNm^3, and XFM ranged from 17 – 18 µg/dNm^3. The time-weighted average of all baseline mercury concentration data at the stack was 15.5 µg/dNm^3. Stack mercury measurements were somewhat less variable than the ESP outlet measurements; the overall standard deviation was 15% of the average value. The trends in data variability at the stack were similar to those observed at the ESP outlet, with the SCEMs measuring the lowest concentrations, Method 29 providing the widest range of results, XFM showing the tightest range of concentrations, and sorbent trap mercury concentrations falling in the middle of all measured values.

The total mercury removal across the Unit 2 gas path (i.e., AH inlet vs. stack) was calculated with both the stack SCEM data and the average stack data. The SCEM data indicated an average 28% system mercury removal, while the average of all stack data indicated 22% system mercury removal.

Table 4-6. Baseline, Phase IV: Mercury Concentrations and Removals Measured at Stack

BASELINE 70/30 TxL/PRB				AH Inlet	Hg Measurement Method used at Stack						% Removal (AH Inlet vs. Stack)[2]	
Test Condition	Date in 2009	Averaging Period Start	Averaging Period End	SCEM	Sorbent Traps	XFM	M29	SCEM	AVG[1]	STD DEV[1]	SCEM	AVG
				Total Hg (µg/dNm^3 at 3% O_2)								
Baseline	11-Jun	9:16	17:16	21.8	15.2	--	--	12.0	13.6	2.3	45%	38%
Baseline	11-Jun	17:31	1:31	20.3	14.7	--	--	11.9	13.3	2.0	41%	34%
Baseline	12-Jun	8:10	16:04	22.7	18.2	--	--	16.2	17.2	1.4	29%	24%
Baseline	12-Jun	16:22	0:22	18.4	19.3	--	--	16.0	17.7	2.3	13%	4%
Baseline	21-Jun	9:48	17:48	16.4	15.1	--	--	14.5	14.8	0.4	12%	10%
Baseline	21-Jun	18:52	2:53	18.2	17.0	--	--	15.0	16.0	1.4	18%	12%
Baseline	13-Jul	7:45	9:45	22.3	17.1	18.4	15.5	13.2	16.1	2.2	41%	28%
Baseline	13-Jul	10:33	12:33	24.3	--	17.3	14.2	13.1	14.9	2.2	46%	39%
Baseline	13-Jul	13:04	15:04	25.7	16.9	18.0	21.4	12.6	17.2	3.6	51%	33%
Baseline AVERAGE				20.1	16.6	17.9	17.0	14.1	15.5	1.8	28%	22%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at stack.

[2] Hg removals calculated by comparing the AH inlet SCEM data to (a) stack SCEM and (b) average stack Hg concentration.

Baseline Mercury Measurements – Summary

Throughout the Phase IV baseline testing, the following observations were made:

- Baseline SCEM measurements of AH inlet total vapor phase mercury concentrations ranged from 15 to 27 µg/dNm^3 at 3% O_2, with an average of 20 µg/dNm^3. AH inlet vapor-phase mercury was present as 3 to 14% oxidized mercury during baseline testing.
- ESP outlet total vapor phase mercury concentrations measured ranged from 15 to 32 µg/dNm^3, and averaged approximately 22 µg/dNm^3. Flue gas mercury concentration results showed appreciable variability based on the ducts sampled and measurement methods used. SCEM data were at the low end of the measurements obtained and sorbent trap data fell in the middle of the measured range.
- While total Hg concentrations in ducts 2C2 and 2D1 were significantly different (as measured by SCEM and OH, respectively), the baseline mercury oxidation measured in both locations were very similar during the OH test periods, ranging from 40 to 50%.
- The stack total vapor phase mercury concentration ranged from 12 to 18 µg/dNm^3. XFM and Method 29 data were typically higher than the SCEM and sorbent trap measurements.
- The average baseline removal of vapor-phase mercury across the AH/ESP was -8% and the average AH/ESP/FGD system removal was 22%, with an average of 13 – 15% of the flue gas bypassing the scrubber.

4.3 Parametric Sorbent Injection Mercury Removal

ACI Upstream of the AH

Tests were conducted in Phase IV to evaluate the mercury removal performance of Darco Hg-LH and four low-ash impact sorbents injected upstream of the AH. Previous testing at LMS evaluated sorbent injection upstream of the ESP. In Phase IV, the injection location was moved upstream of the AH in an attempt to improve mercury removal by providing additional mixing and duct residence time. During ACI at the AH inlet, flue gas mercury concentrations were measured with SCEMs at the AH inlet, ESP outlet, and stack and with sorbent traps at the ESP outlet and stack. ACI tests were conducted with the normal fuel blend (70/30 TxL/PRB) and an alternate fuel blend (55/45 TxL/PRB).

Normal Fuel Blend (70/30 TxL/PRB)

ACI upstream of the AH was tested while Unit 2 fired its normal fuel blend of 70/30 TxL/PRB. Four low-ash impact carbons were tested at a single injection rate with each test lasting three to nine hours; Darco Hg-LH was tested at three injection rates, each lasting ~ 48 hours.

Table 4-7 shows average SCEM mercury concentrations measured during each sorbent injection test. Each datum point in Table 4-7 represents the calculated average removal once steady-state ESP outlet concentrations were achieved for each test. While the Darco Hg-LH tests lasted ~48 hours, the datum points in Table 4-7 represent averages during day-time operation (generally the 12 hour period between 8 am and 8 pm). Measurements collected overnight were excluded from these averages because of fluctuations in unit load during these periods.

Tables 4-8 and 4-9 compare the SCEM measurements to OH and sorbent trap measurements for the ESP outlet and stack, respectively. Figure 4-1 compares the calculated mercury removals using the sorbent trap and SCEM data across the AH/ESP and across the system. While the removals calculated from the two measurement methods did not agree (as evidenced by data not falling along 1:1 line), there was a consistent correlation, indicating that both measurement methods show the same trends in mercury removal, if not the same values. Almost all datum points fell below the 1:1 line, indicating that mercury removal measured by the sorbent trap measurements was lower than that measured by the SCEM. The sorbent trap and SCEM removals were in closer agreement and were correlated more predictably at the stack than at the ESP outlet.

Table 4-7. ACI Upstream of AH: SCEM Measurements and Mercury Removals

				Avg. AH Inlet Hg Concentrations (µg/dNm^3)			Avg. ESP Outlet Hg Concentrations (µg/dNm^3)				Avg. Stack Hg Concentrations (µg/dNm^3)		
Condition Start Time	Condition End Time	Sorbent Type	Injection Rate (lb/Macf)	Total Hg	Elem. Hg	% Oxid.	Total Hg	Elem. Hg	% Oxid.	% Removal Across AH/ESP	Total Hg	% Removal Across System (AH Inlet vs. Stack)	FGD Bypass %
6/13/09 11:45	6/13/09 20:00	Darco Hg-LH	1.89	18.4	18.9	-3%	11.2	3.6	68%	39%	6.5	65%	13%
6/14/09 8:00	6/14/09 20:00	Darco Hg-LH	1.89	23.1	22.0	5%	12.6	3.6	71%	45%	4.8	79%	11%
6/15/09 8:00	6/15/09 20:00	Darco Hg-LH	0.48	21.6	20.3	6%	15.9	5.0	69%	26%	8.1	62%	10%
6/16/09 8:00	6/16/09 20:00	Darco Hg-LH	0.48	16.5	15.1	8%	12.8	4.3	66%	22%	6.5	61%	11%
6/17/09 3:00	6/17/09 20:00	Darco Hg-LH	0.99	18.5	17.7	4%	8.6	4.7	45%	54%	5.0	73%	13%
6/18/09 8:00	6/18/09 20:00	Darco Hg-LH	0.99	15.7	16.8	-7%	12.7	5.4	58%	19%	6.1	61%	14%
6/22/09 13:00	6/22/09 21:30	C-PAC	0.96	17.7	15.8	11%	10.4	6.0	42%	42%	8.0	55%	12%
6/23/09 13:30	6/23/09 19:30	CF Plus	0.95	23.7	17.3	27%	7.0	2.3	67%	70%	4.9	79%	15%
6/24/09 12:00	6/24/09 19:00	EXP224	0.95	17.0	17.7	-4%	15.3	6.1	60%	10%	6.7	61%	12%
6/25/09 15:00	6/25/09 18:00	CF Plus Ultra	0.98	18.1	18.0	0%	7.8	3.4	57%	57%	6.4	64%	12%
6/27/09 12:30	6/27/09 23:00	Darco Hg-LH*	1.00	14.9	13.2	11%	6.1	3.9	37%	59%	3.7	75%	12%
6/28/09 8:30	6/28/09 16:00	Darco Hg-LH*	1.83	17.2	15.8	8%	4.8	2.8	42%	72%	3.1	82%	9%

*These measurements were collected during combustion of the alternate 30/70 TxL/PRB fuel blend.

Table 4-8. ACI Upstream of the AH: Mercury Concentrations and Removals Measured at ESP Outlet

AH Inlet ACI 70/30 TxL/PRB					AH Inlet	Hg Measurement Method used at ESP Outlet					% Removal Across AH/ESP[2]		
ACI Rate	Carbon Injected	Date in 2009	Averaging Period		SCEM	OH	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]	Sorbent Traps	SCEM	AVG
(lb/Macf)			Start	End	Total Hg ($\mu g/dNm^3$ at 3% O_2)								
0.48	Darco Hg-LH	15-Jun	8:53	16:53	22.6	--	23.1	16.8	20.0	4.5	-2%	26%	12%
0.48	Darco Hg-LH	15-Jun	18:00	2:01	20.1	--	20.1	12.6	16.4	5.3	0%	37%	19%
0.48	Darco Hg-LH	16-Jun	7:53	15:54	17.7	--	15.5	11.9	13.7	2.5	12%	33%	23%
0.48	Darco Hg-LH	16-Jun	17:58	22:58	15.1	--	17.7	13.5	15.6	3.0	-17%	11%	-3%
0.99	Darco Hg-LH	17-Jun	7:52	15:45	19.3	--	12.6	8.3	10.5	3.0	35%	57%	46%
0.99	Darco Hg-LH	17-Jun	16:15	0:15	15.7	--	12.6	7.5	10.1	3.6	20%	52%	36%
0.99	Darco Hg-LH	18-Jun	7:53	15:54	14.9	9.8	15.8	12.7	12.8	3.0	-6%	15%	14%
0.99	Darco Hg-LH	18-Jun	16:22	18:32	17.3	7.1	--	12.3	9.7	3.7	#N/A	29%	44%
1.89	Darco Hg-LH	13-Jun	10:52	16:53	17.2	--	14.8	10.2	12.5	3.3	14%	41%	27%
1.89	Darco Hg-LH	13-Jun	17:21	1:22	21.5	--	13.4	11.4	12.4	1.4	38%	47%	42%
1.89	Darco Hg-LH	14-Jun	7:57	15:07	24.5	--	12.5	10.7	11.6	1.3	49%	56%	53%
1.89	Darco Hg-LH	14-Jun	15:25	23:26	21.0	--	--	12.9	12.9	--	#N/A	39%	39%
0.96	C-PAC	22-Jun	11:57	14:57	16.4	--	13.9	10.5	12.2	2.4	15%	36%	26%
0.96	C-PAC	22-Jun	15:44	19:44	17.5	--	14.9	10.3	12.6	3.3	15%	41%	28%
0.95	CF Plus	23-Jun	11:15	15:15	25.5	--	8.7	7.9	8.3	0.6	66%	69%	67%
0.95	CF Plus	23-Jun	15:59	19:59	21.4	--	10.1	7.1	8.6	2.1	53%	67%	60%
0.95	EXP224	24-Jun	10:42	13:42	18.9	--	13.8	18.4	16.1	3.3	27%	3%	15%
0.95	EXP224	24-Jun	14:18	16:18	14.9	--	11.9	12.1	12.0	0.1	20%	19%	19%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at ESP outlet.

[2] Hg removal calculated by comparing the AH Inlet SCEM data to (a) ESP outlet sorbent traps, (b) ESP outlet SCEM , (c) all ESP outlet measurements.

Table 4-9. ACI Upstream of AH: Mercury Concentrations and Removals Measured at Stack

AH Inlet ACI 70/30 TxL/PRB					AH Inlet	Hg Measurement Method used at Stack				% Removal (AH Inlet vs. Stack)[2]		
ACI Rate	Carbon Injected	Date	Averaging Period		SCEM	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]	Sorbent Traps	SCEM	AVG
(lb/Macf)			Start	End	Total Hg (µg/dNm^3 at 3% O_2)							
0.48	Darco Hg-LH	15-Jun	10:21	16:30	22.8	9.6	8.1	8.9	1.1	58%	65%	61%
0.48	Darco Hg-LH	15-Jun	17:23	1:24	19.9	10.0	8.4	9.2	1.1	50%	58%	54%
0.48	Darco Hg-LH	16-Jun	9:12	17:13	17.1	7.9	6.5	7.2	1.0	54%	62%	58%
0.48	Darco Hg-LH	16-Jun	19:01	0:02	15.0	8.0	6.9	7.5	0.8	47%	54%	50%
0.99	Darco Hg-LH	17-Jun	9:17	17:17	19.1	6.6	5.1	5.9	1.1	65%	73%	69%
0.99	Darco Hg-LH	17-Jun	18:06	2:07	15.3	5.5	4.9	5.2	0.4	64%	68%	66%
0.99	Darco Hg-LH	18-Jun	8:55	16:55	14.3	7.7	6.0	6.9	1.2	46%	58%	52%
1.89	Darco Hg-LH	13-Jun	11:39	17:47	17.2	8.0	6.5	7.3	1.1	53%	62%	58%
1.89	Darco Hg-LH	13-Jun	18:00	2:00	21.5	7.4	6.1	6.8	0.9	66%	72%	69%
1.89	Darco Hg-LH	14-Jun	8:57	16:01	24.4	5.5	4.6	5.1	0.6	78%	81%	79%
1.89	Darco Hg-LH	14-Jun	16:20	0:20	20.5	7.1	5.4	6.3	1.2	66%	74%	70%
0.96	C-PAC	22-Jun	11:56	14:56	16.4	8.9	7.8	8.4	0.8	46%	52%	49%
0.96	C-PAC	22-Jun	15:44	19:42	17.5	8.1	8.1	8.1	0.0	54%	54%	54%
0.95	CF Plus	23-Jun	11:15	15:15	25.5	6.0	5.3	5.7	0.5	76%	79%	78%
0.95	CF Plus	23-Jun	15:57	19:57	21.5	6.2	4.8	5.5	1.0	71%	78%	74%
0.95	EXP224	24-Jun	10:40	13:40	18.9	9.2	7.9	8.6	0.9	51%	58%	55%
0.95	EXP224	24-Jun	14:13	15:43	14.3	8.4	6.8	7.6	1.1	41%	52%	47%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at stack.

[2] Hg removals calculated by comparing AH Inlet SCEM data to (a) stack Sorbent Traps, (b) stack SCEM, (c) average stack Hg concentration

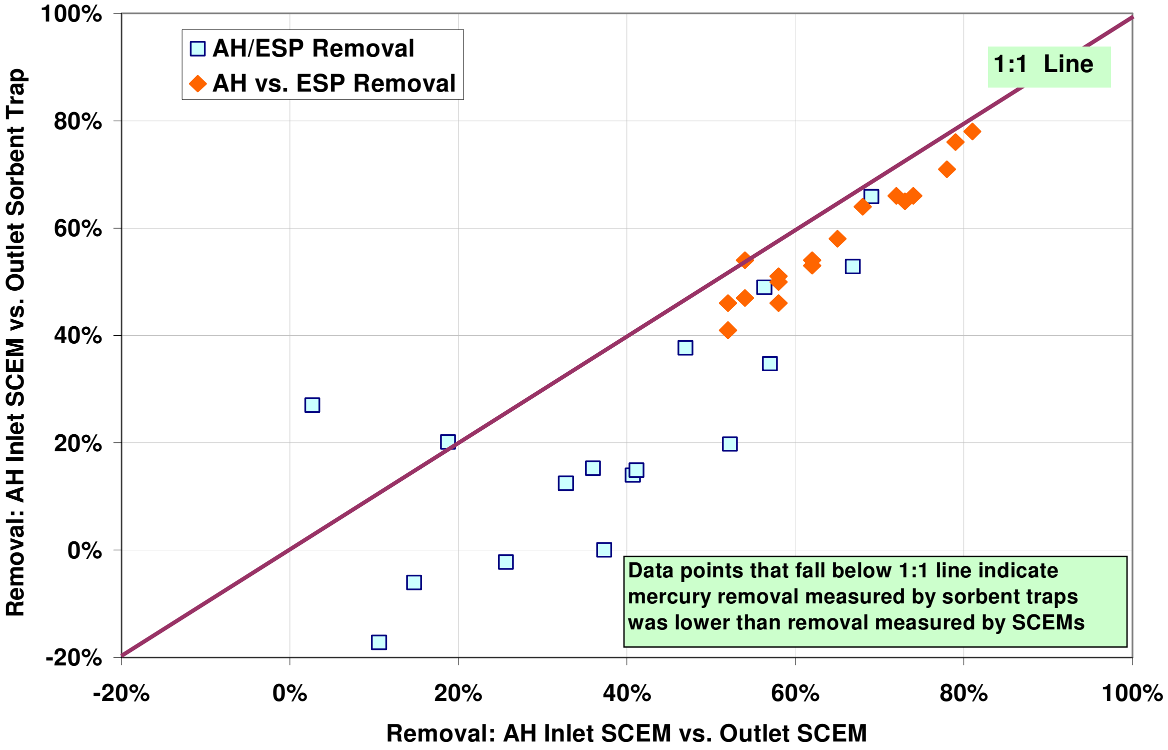


Figure 4-1. ACI Upstream of AH: Mercury Removal Percentages as Measured by SCEM and Sorbent Traps at the ESP Outlet and Stack

Figure 4-2 shows the calculated mercury removals across the AH/ESP vs. injection rate based on sorbent trap and SCEM data for Darco Hg-LH injection upstream of the AH. Both the SCEM and sorbent trap data indicate increasing mercury removal with injection rate and indicate a possible plateau in mercury removal between 1.0 and 2.0 lb/Macf. Both measurement methods indicate a maximum achieved mercury removal of ~55% (albeit at different injection rates), and data from both methods indicate a wide variation in measured mercury removal at each injection rate. Higher mercury removal was achieved with this sorbent on Unit 1 in 2007, when 70% mercury reduction was achieved at an injection rate of 1.8 lb/Macf.

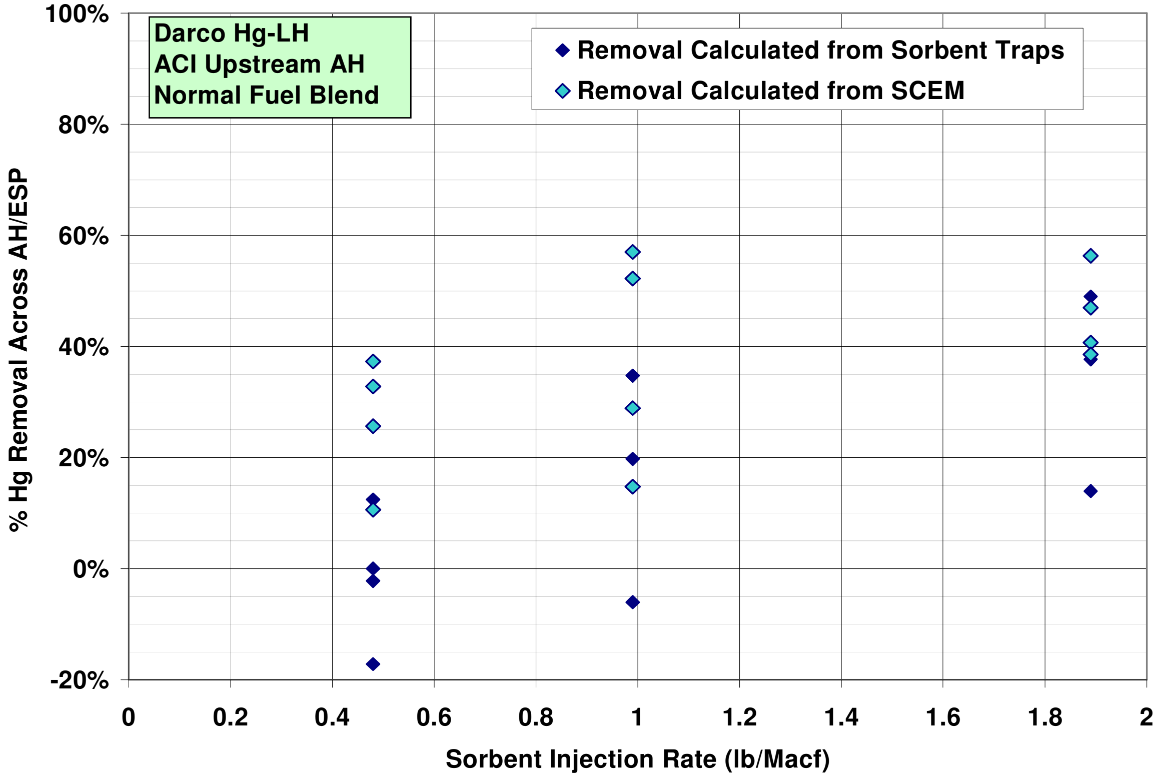


Figure 4-2. ACI Upstream of AH: Comparison of Mercury Removals across AH/ESP for Darco Hg-LH, Based on Sorbent Trap and SCEM Data

Figure 4-3 compares the mercury removal (based on SCEM data) across the AH/ESP of the low ash impact sorbents to Darco Hg-LH. Each datum point in the plot represents a daily test average. Removals based on sorbent trap data are provided in Table 4-8. The low ash impact carbons were only tested for one day each at a rate of 1.0 lb/Macf, so there are not sufficient data to determine if these sorbents would have experienced the same degree of performance variability in performance as Darco Hg-LH. Both sorbent trap and SCEM data indicated that CF Plus achieved the highest mercury removal (68% by SCEM, 60% by sorbent trap) across the AH/ESP for all sorbents tested. CF Plus Ultra achieved lower removal (57%) than CF Plus. Both sorbent trap and SCEM data indicated that and EXP-224 achieved the lowest mercury removal across the AH/ESP of the sorbents tested, ranging from 10% to 41%. The passivation of the carbons to make them concrete friendly appears to have led to a decrease in mercury removal performance for EXP-224 and CF Plus Ultra, as compared to their standard counterpart sorbents (Darco Hg-LH and CF Plus). In non-TxL flue gas both C-PAC [8] and EXP 224 have been demonstrated to perform nearly as well as their non-ash compatible counterparts.

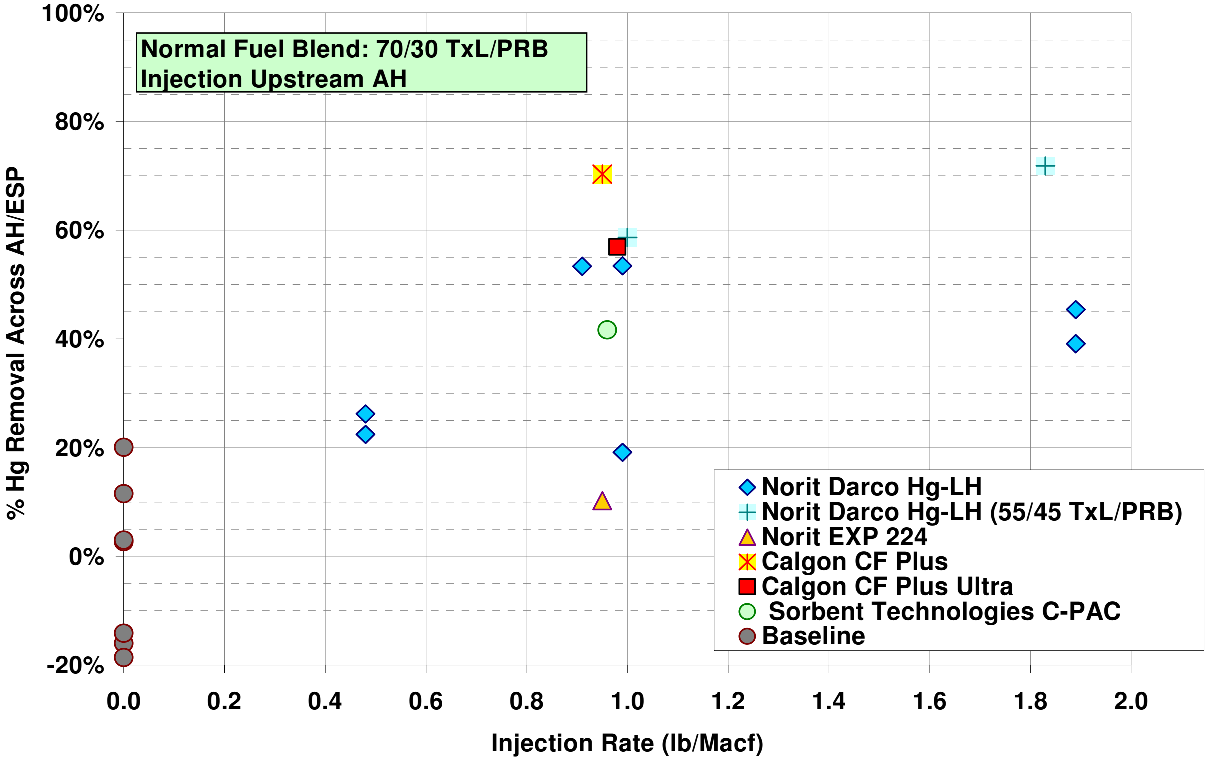


Figure 4-3. ACI Upstream of AH: Mercury Removal across AH/ESP, Based on SCEM Data

During baseline testing, flue gas mercury oxidation at the ESP outlet was typically 40-50%, as measured by SCEM. During injection of the Darco Hg-LH sorbent, mercury oxidation at the ESP outlet increased, ranging from 44 – 70%, but typically 60 – 70%. The mercury oxidation achieved by the Darco Hg -LH sorbent was independent of injection rate; an injection rate of 0.5 lb/Macf Darco Hg-LH was sufficient to increase ESP outlet mercury oxidation to 69%. During injection of the ash-compatible sorbents, mercury oxidation at the ESP outlet was higher than baseline but lower than during injection of Darco Hg-LH. Mercury oxidation measurements were also made by OH during one test day of Darco Hg-LH at 1.0 lb/Macf (Table 4-10). Despite the variability in total Hg concentration measured by OH, both OH and SCEM measurements indicated the ESP outlet elemental concentration was consistently ~5 µg/dNm^3 throughout the test day. Mercury oxidation at the ESP outlet was lower on Unit 2 in 2009 than on Unit 1 in 2007 (when it ranged from 70 – 80%); this decrease in oxidation may be due to differences in operation of the two units or just the natural variability associated with Texas Lignite.

Table 4-10. OH vs. SCEM Results at ESP Outlet (Darco Hg-LH Injected Upstream of the AH at ~1 lb/Macf)

ACI Rate (lb/Macf)	Date in 2009	Averaging Period		AH Inlet	ESP Outlet Duct 2D1 OH Results			ESP Outlet Duct 2C2 SCEM Results			% Removal Across AH/ESP[1]	
		Start Time	End Time	Total Hg (µg/Nm^3)	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid	OH	SCEM
1.0	6/18	10:04	12:15	14.9	13.6	4.4	68	11.8	5.0	57	8%	21%
1.0	6/18	13:28	15:47	16.1[2]	5.9	4.6	22	13.6	5.5	59	63%	16%
1.0	6/18	16:22	18:32	17.3	7.1	5.9	17	12.3	--	--	59%	29%

[1] Mercury removal calculated by comparing the AH inlet SCEM data to each measurement method at the ESP outlet.

[2] AH inlet Hg SCEM failed quality control check after this second OH run; therefore, reported average of run 1 and run 3 data (16.1) rather than measured value (12.8).

Mercury removal across the entire system, calculated as AH inlet vs. stack SCEM Hg concentration, is plotted in Figure 4-4. Approximately 15% of the flue gas bypassed the FGD during the test period. The increase in mercury oxidation at the ESP outlet due to sorbent injection resulted in increased mercury removal across the FGD. Baseline removal across the entire system ranged from 20% – 56%. Calgon's CF Plus sorbent achieved the highest removal (70 – 80%) of the sorbents tested at ~1 lb/Macf. Darco Hg-LH achieved a similar level of removal when injected at 2 lb/Macf, but only 50 –70% removal at 1 lb/Macf. EXP-224 and C-PAC achieved the lowest system removals of the sorbent tested, ranging from 40 – 60%. These are both passivated carbons designed to be concrete friendly (insuffient data from LMS exist to confirm this would be case in long-term operation), so there may be some benefit to their use despite the lower mercury removal. Analysis of both stack sorbent trap data (tabulated in Table 4-9) resulted in similar conclusions about the relative performance of the sorbents and level of mercury removal achieved.

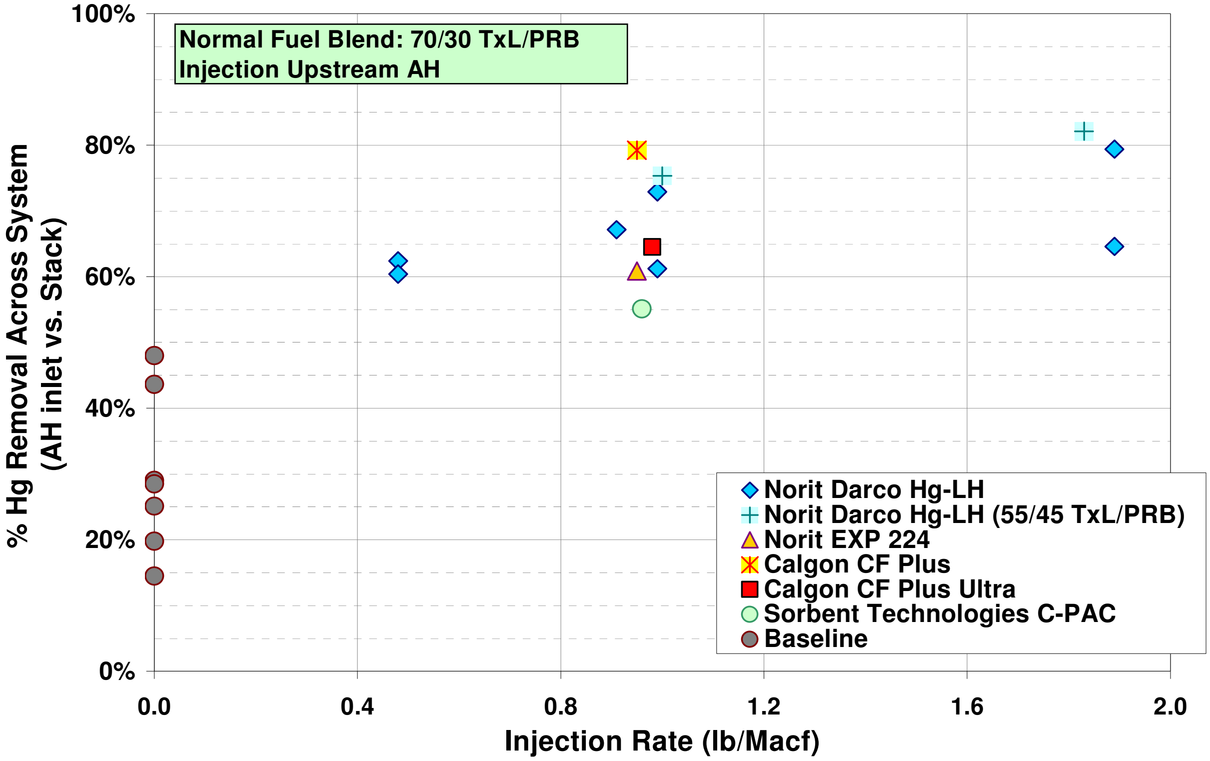


Figure 4-4. ACI Upstream of AH: Mercury Removal across System, Based on SCEM Data

Alternative Fuel Blend

During the last three days of sorbent injection upstream of the AH, an alternative fuel blend of 55% Texas lignite and 45% PRB was combusted. One day of baseline data was collected on 6/26/09, and Darco Hg-LH sorbent was tested at two rates to evaluate the fuel blend impact on mercury removal performance. Each injection rate was tested for only one day, so variability in sorbent Hg removal performance could not be quantified.

Tables 4-11 and 4-12 present the mercury concentration and removal data from the alternate fuel testing at the ESP outlet and stack, respectively. For baseline and sorbent injection periods, the sorbent trap and SCEM data agreed very well at both the ESP outlet and stack. Mercury removals for the alternate blend were included previously in Figures 4-3 and 4-4.

Table 4-11. Alternate Fuel Blend, ACI Upstream of AH: Mercury Concentrations and Removals Measured at ESP Outlet

AH Inlet ACI 55/45 TxL/PRB					AH Inlet	Hg Measurement Method used at ESP Outlet				% Removal Across AH/ESP[2]		
ACI Rate	Carbon	Date in	Averaging Period		SCEM	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]	Sorbent Traps	SCEM	AVG
(lb/Macf)	Injected	2009	Start	End	Total Hg ($\mu g/dNm^3$ at 3% O_2)							
0	None	26-Jun	9:42	12:42	15.9	24.6	18.4	21.5	4.4	-55%	-16%	-35%
0	None	26-Jun	13:58	18:58	16.3	23.3	19.7	21.5	2.5	-43%	-21%	-32%
1.00	Darco Hg-LH	27-Jun	11:58	16:29	16.2	6.3	5.4	5.9	0.6	61%	67%	64%
1.00	Darco Hg-LH	27-Jun	17:11	20:11	15.2	6.4	6.5	6.5	0.1	58%	57%	58%
1.83	Darco Hg-LH	28-Jun	9:59	12:59	17.5	4.0	4.5	4.3	0.4	77%	74%	76%
1.83	Darco Hg-LH	28-Jun	13:24	15:54	16.6	5.8	4.9	5.4	0.6	65%	70%	68%

[1] Averages and standard deviations calculated for sorbent trap and SCEM data at ESP outlet.

[2] Hg removal calculated by comparing the AH Inlet SCEM data to (a) ESP outlet sorbent traps, (b) ESP outlet SCEM , (c) all ESP outlet measuremer

Table 4-12. Alternate Fuel Blend, ACI Upstream of AH: Mercury Concentrations and Removals Measured at Stack

AH Inlet ACI 55/45 TxL/PRB					AH Inlet	Hg Measurement Method used at Stack				% Removal (AH Inlet vs. Stack)[2]		
ACI Rate	Carbon		Averaging Period		SCEM	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]	Sorbent Traps	SCEM	AVG
(lb/Macf)	Injected	Date	Start	End	Total Hg ($\mu g/dNm^3$ at 3% O_2)							
0	None	26-Jun	9:30	13:00	16.2	16.7	13.3	15.0	2.4	-3%	18%	7%
0	None	26-Jun	13:52	18:53	16.3	16.2	13.0	14.6	2.3	1%	20%	10%
1.00	Darco Hg-LH	27-Jun	12:00	16:30	16.2	4.1	3.7	3.9	0.3	75%	77%	76%
1.00	Darco Hg-LH	27-Jun	16:57	19:57	15.4	3.4	3.7	3.6	0.2	78%	76%	77%
1.83	Darco Hg-LH	28-Jun	10:00	13:00	17.5	3.3	3.0	3.2	0.2	81%	83%	82%
1.83	Darco Hg-LH	28-Jun	13:21	15:51	16.6	2.9	2.8	2.9	0.1	83%	83%	83%

[1] Average and standard deviations calculated for sorbent trap and SCEM data at stack.

[2] Hg removals calculated by comparing AH Inlet SCEM data to (a) stack Sorbent Traps, (b) stack SCEM, (c) average stack Hg concentration

Baseline data collected during combustion of the alternative fuel blend indicates that air heater inlet flue gas mercury concentrations are similar or slightly lower than air heater inlet concentrations measured during the normal fuel blend. This result is not surprising as the alternate blend has an average mercury concentration of 0.24 ppm, dry, while the normal fuel blend has an average mercury concentration of 0.27 ppm, dry.

Mercury oxidation at the ESP outlet was ~50%, which was also similar to that observed at that location during normal fuel combustion. No mercury removal was measured across the AH/ESP and mercury removal across the AH/ESP/FGD system was ~20%; again, these results are similar to the results from combustion of the normal fuel blend.

During sorbent injection, higher mercury removals were achieved across the AH/ESP and across the system when the fraction of PRB in the fuel increased from 30% to 45%. At ~1 lb/Macf Darco Hg-LH, mercury removal across the AH/ESP increased from ~40% to 57 – 67%, and system removal increased from 65% to 77%. ESP outlet mercury concentrations decreased when firing the alternate fuel blend (12 vs. 6 $\mu g/dNm^3$); likewise, stack mercury concentration decreased from ~ 6.0 to 3.7 $\mu g/dNm^3$. At ~1.8 lb/Macf Darco Hg-LH, system mercury removal with the alternate fuel blend increased from 69% to 83% and the stack mercury concentration decreased from 6.4 to 3.0 µg/dNm^3.

ACI Upstream of the ESP – Full Unit

At the conclusion of injection tests upstream of the AH (with eight lances), the sorbent injection lances were moved downstream of the AH. A total of sixteen traditional style lances were installed upstream of the four ESPs on Unit 2. Table 4-13 presents the SCEM results for test periods when sorbent was injected upstream of the ESP; only test periods of 2 hours or longer are included in the table. Tables 4-14 and 4-15 compare the SCEM measurements to XFM, M29, and sorbent traps for the ESP outlet and stack, respectively. At the ESP outlet, the standard deviation averaged 20% of the average value for each time period; at the stack, the overall standard deviation averaged 10% of the average value for each time period. There was good agreement in the calculated system removals based on stack SCEM and average stack Hg data.

Table 4-13. Average Mercury Concentrations Measured during Parametric Sorbent Injection Upstream of ESP (Full Unit) – Phase IV

Condition Start Time	Condition End Time	Sorbent	Injection Rate (lb/Macf)	Avg. AH Inlet Hg Concentrations (µg/dNm^3)			Avg. ESP Outlet Hg Concentrations (µg/dNm^3)			% Removal Across AH/ESP	Avg. Measured Stack Hg Concentrations (µg/dNm^3)	% Removal Across System	FGD Bypass %
				Total Hg	Elem. Hg	% Oxid.	Total Hg	Elem. Hg	% Oxid.		Total Hg		
7/8/09 12:00	7/8/09 14:45	Darco Hg	0.5	18.6	17.5	6%	17.2	10.3	40%	8%	9.5	49%	15%
7/14/09 6:30	7/14/09 15:20	Darco Hg-LH	1.9	24.9	22.4	10%	20.3	8.0	61%	18%	7.7	69%	16%
7/15/09 9:25	7/15/09 13:00	Darco Hg-LH	0.5	24.5	21.9	11%	12.5	5.7	55%	49%	9.3	62%	11%
7/16/09 17:45	7/16/09 20:00	Darco Hg-LH Finely Ground	0.9	24.5	21.8	11%	13.9	6.9	50%	43%	5.2	79%	13%

Table 4-14. ACI Upstream of the ESP: Mercury Concentrations and Removals Measured at ESP Outlet

Full Unit ESP Inlet ACI 70/30 TxL/PRB					AH Inlet	Hg Measurement Method ESP Outlet Duct #						% Removal Across AH/ESP[2]	
ACI Rate (lb/Macf)	Carbon Injected	Date	Averaging Period		SCEM	XFM 2D2	M29 2D1	Sorbent Traps 2C1	SCEM 2C2	AVG[1]	STD DEV[1]	SCEM	AVG
			Start	End	Total Hg (µg/dNm^3 at 3% O$_2$)								
0.47	Darco Hg	8-Jul	11:30	14:30	18.8	--	--	20.7	17.1	18.9	2.5	9%	-1%
0.91	Darco Hg-LH Finely Ground	16-Jul	17:45	20:00	24.5	--	--	--	13.9	--	--	43%	--
0.48	Darco Hg-LH	15-Jul	9:48	12:48	24.7	--	--	15.8	12.5	14.2	2.3	49%	43%
1.84	Darco Hg-LH	8-Jul	16:15	17:09	16.7	--	--	9.0	12.7	10.9	2.6	24%	35%
1.89	Darco Hg-LH	14-Jul	7:30	9:30	25.8	17.4	15.7	16.1	13.4	15.7	1.7	48%	39%
1.89	Darco Hg-LH	14-Jul	10:05	12:05	24.6	11.0	11.7	--	17.3	13.3	3.5	30%	46%
1.89	Darco Hg-LH	14-Jul	13:27	15:27	24.5	12.6	15.7	13.5	24.0	16.5	5.2	2%	33%
0.95, 1.17, 1.38, 1.51, 1.73	Darco Hg-LH	15-Jul	13:26	16:24	27.4	--	--	15.7	12.9	14.3	2.0	53%	48%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at ESP outlet.

[2] Mercury removals calculated by comparing the AH inlet SCEM data to (a) ESP outlet SCEM and (b) average ESP outlet Hg concentration.

Table 4-15. ACI Upstream of the ESP: Mercury Concentrations and Removals Measured at Stack

					AH Inlet	Hg Measurement Method used at Stack						% Removal (AH Inlet vs. Stack)[2]	
ACI Rate	Carbon Injected		Averaging Period		SCEM	XFM	M29	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]	SCEM	AVG
(lb/Macf)		Date	Start	End	Total Hg (µg/dNm^3 at 3% O_2)								
0.47	Darco Hg	8-Jul	11:25	14:25	18.8	--	--	12.2	9.8	11.0	1.7	48%	41%
0.91	Darco Hg-LH Finely Ground	16-Jul	17:45	20:00	24.5	--	--	--	5.2	--	--	79%	--
0.48	Darco Hg-LH	15-Jul	9:47	12:47	24.7	--	--	9.9	9.2	9.6	0.5	63%	61%
1.84	Darco Hg-LH	8-Jul	16:15	17:10	16.7	--	--	6.5	4.8	5.7	1.2	71%	66%
1.89	Darco Hg-LH	14-Jul	7:35	9:30	25.5	11.0	9.6	9.1	8.9	9.7	0.9	65%	62%
1.89	Darco Hg-LH	14-Jul	10:06	12:06	24.6	9.4	7.1		6.6	7.7	1.5	73%	69%
1.89	Darco Hg-LH	14-Jul	13:30	16:31	25.1	9.2	8.7	8.3	6.5	8.2	1.2	74%	67%
0.95, 1.17, 1.38, 1.51, 1.73	Darco Hg-LH	15-Jul	13:25	16:22	27.4	--	--	8.8	7.8	8.3	0.7	72%	70%

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at stack.

[2] Mercury removals calculated by comparing the AH inlet SCEM data to (a) stack SCEM and (b) average stack Hg concentration.

Figure 4-5 shows mercury removal across the AH/ESP for injection upstream of the ESP for the various sorbents tested. Only the Darco Hg-LH sorbent was tested both upstream of the ESP and upstream of the AH. At 1.9 lb/Macf, comparable Hg removal was observed for the ESP and AH injection locations; at 0.5 lb/Macf, mercury removal improved when injecting upstream of the ESP. Due to port constraints, there were only eight lances used upstream of the AH, compared to 16 lances upstream of ESP. Any gains in residence time from injecting upstream of the AH may have been offset by decreased lateral sorbent distribution due to the reduced number of lances. Alternatively, mercury removal performance at LMS may have been reaction-limited rather than mass transfer-limited, in which case improvements to sorbent distribution would not have resulted in increased mercury removal.

Mercury removal by finely ground Darco Hg-LH was comparable to the standard Darco Hg-LH. As will be discussed in Section 4.8 the Darco Hg-LH finely ground carbon particles agglomerated when transported through the conveying lines; the agglomeration worsened as injection rate increased. At the injection rate of 0.5 lb/Macf shown in Figure 4-5, the average particle size was 13 µm, which was larger than the 6 µm particle size of the as-received finely ground carbon but less than the 20 µm average particle size of the standard Darco Hg-LH.

Mercury removal by Darco Hg at 0.5 lb/Macf was only 10%, as compared to 49% by Darco Hg-LH. In contrast, the Unit 1 tests in 2007 showed that Darco Hg performed nearly as well as Darco Hg-LH for mercury removal across the AH/ESP.

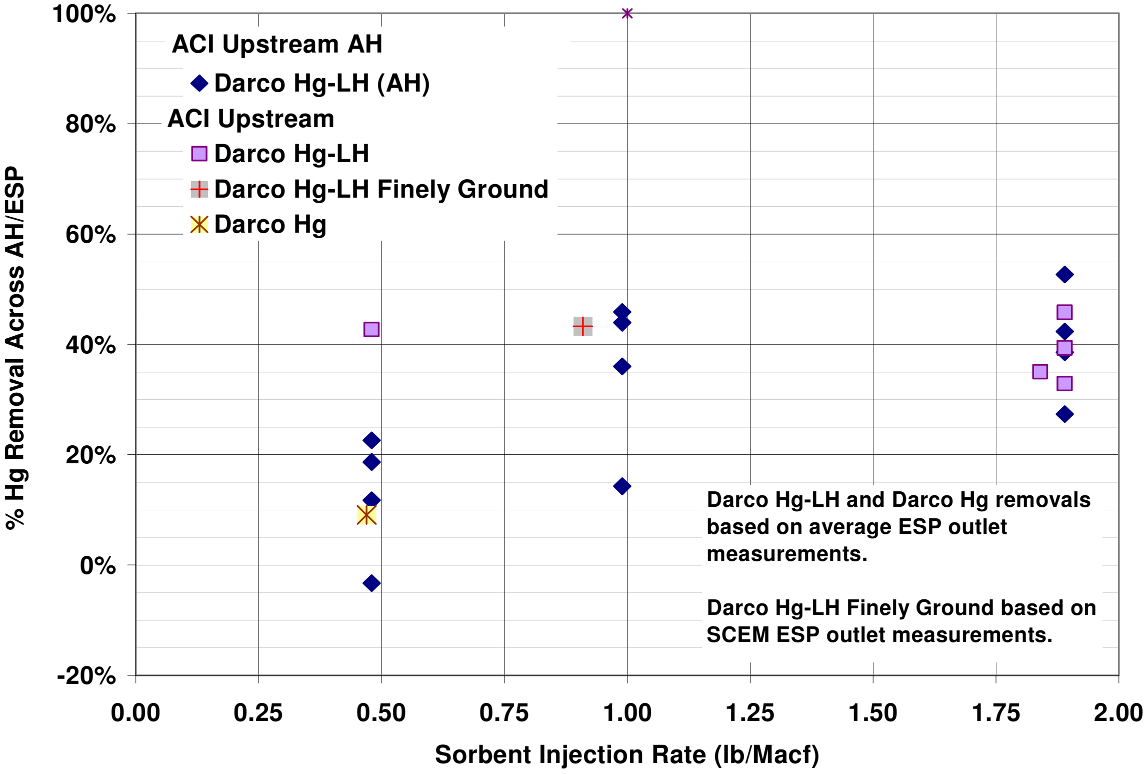


Figure 4-5. ACI Upstream of ESP, Phase IV: Mercury Removal across AH/ESP

During injection upstream of the ESP, the mercury oxidation percentages at the ESP outlet during the two injection tests conducted with Darco Hg-LH sorbent were 55 and 61%. These oxidation percentages were comparable to the oxidation achieved with this same sorbent during injection upstream of the AH, indicating that the injection location did not have an impact on mercury oxidation at the ESP outlet. The mercury oxidation percentage achieved with Darco Hg sorbent was 40%, which was no more than the low end of the oxidation percentages observed during baseline testing, and the oxidation achieved with the finely ground Darco Hg-LH sorbent was 50%, which was lower than the oxidation percentages observed during injection of the standard size Darco Hg-LH sorbent. Mercury oxidation data for Darco Hg and finely ground Darco Hg-LH represent only one day of testing for each sorbent.

Mercury removal across the system (AH inlet vs. stack) is presented in Figure 4-6 for ACI upstream of the ESP. Only Darco Hg-LH was tested both upstream of the ESP and upstream of the AH; mercury removal across the system was similar for both injection locations, averaging ~55% at 0.5 lb/Macf and ~65% at 1.9 lb/Macf. The highest system removal (79%) during sorbent injection upstream of the ESP was achieved with finely ground Darco Hg-LH at 0.9lb/Macf.

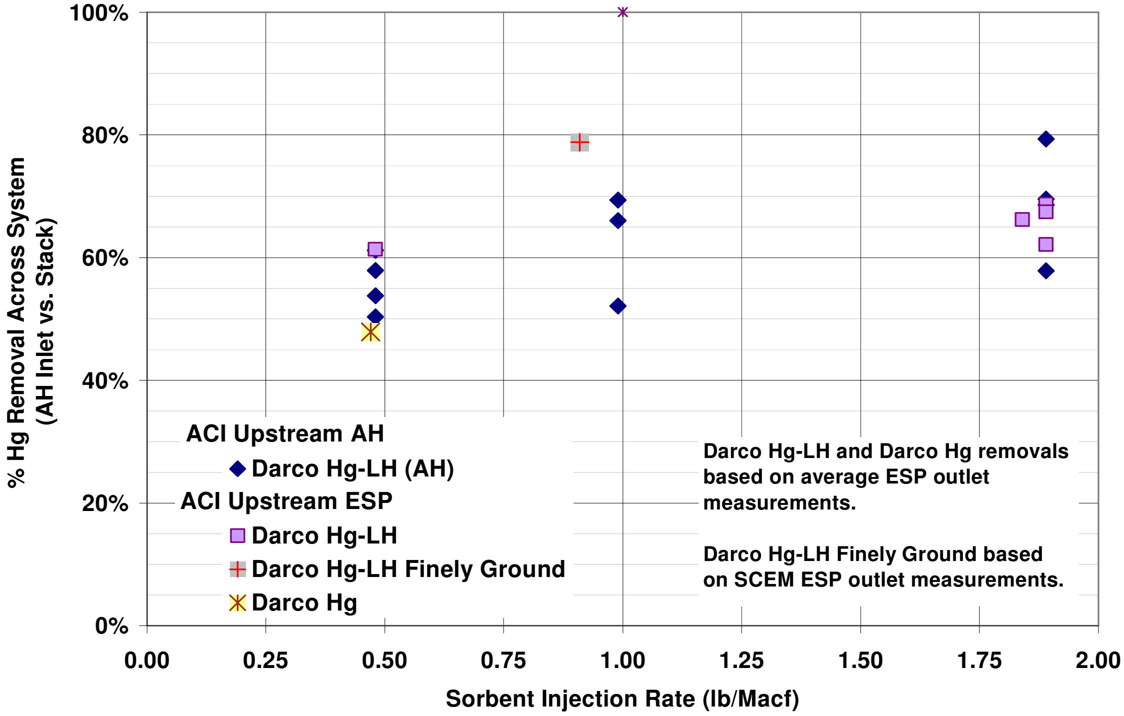


Figure 4-6. ACI Upstream of ESP, Phase IV: Mercury Removal across System

Calcium Bromide Addition to Coal

In conjunction with sorbent injection testing, calcium bromide was added to the coal to determine if there were synergistic effects of the two technologies for mercury removal. The presence of bromine in the flue gas biased low the SCEM mercury measurements made upstream of the FGD. Historically, SCEM measurements at an FGD outlet location have been more reliable because the FGD removes bromide from the flue gas. However, at LMS 15% of the flue gas bypassed the FGD so some bromide was present in the stack gas; it is unknown if this level of bromide was sufficient to bias low the mercury SCEMs measurements. Because none of the measurement methods are validated for flue gas containing bromide, all measurements were averaged to characterize mercury removal for each test condition. However, during bromide addition, the SCEM measurements at the stack were even lower than the other measurements methods as compared to non-bromide conditions.

Table 4-16 summarizes the average stack mercury concentrations for each test condition involving bromide and/or sorbent injection. Tables 4-17 and 4-18 summarize the ESP outlet and stack mercury concentrations measured by the various methods.

Table 4-16. Average Stack Mercury Concentrations during Coal Bromide Addition and Sorbent Injection Upstream of ESP – Phase IV

	Stack Hg Concentration (µg/dNm^3 at 3% O_2)			
Bromide Addition Rate **ppm Br to Coal, dry basis**	**Bromide Only (No Sorbent)**	**Bromide + 0.5 lb/Macf Darco Hg**	**Bromide + 0.5 lb/Macf Darco Hg-LH Fine**	**Bromide + 1.6 lb/Macf Darco Hg-LH Fine**
0	13 – 18	11.0	5.2	
97	9.8	5.9		
122				
164 / 172	11.8 / 6.7	5.7		
280			6.1	2.6

Referring to Table 4-16, at baseline (no bromide, no sorbent), stack mercury concentrations ranged from 13 – 18 µg/dNm^3 at 3% O_2. When bromide was added to the coal at rates ranging from 97 to 172 ppm, dry, the stack SCEM mercury concentration decreased to 4 – 7 µg/dNm^3; whereas, the sorbent trap measurements indicated stack mercury concentrations ranging from 9 – 17 µg/dNm^3. For the application of bromide only, the SCEMs show a benefit for mercury removal while the sorbent traps show perhaps a modest benefit.

The combination of 0.5 lb/Macf Darco Hg carbon and 97 ppm Br resulted in stack mercury concentrations decreasing to 5.9 µg/dNm^3, as compared to 11.0 µg/dNm^3 with sorbent alone. Further increases in the bromide adition rate did not result in lower stack Hg concentrations. The SCEMs, sorbent traps, and Method 29 measurements all confirm the benefit of employing bromide addition in addition to sorbent injection.

Table 4-17. Bromide Addition: Mercury Concentrations Measured at ESP Outlet

Bromide Addition to Furnace 70/30 TxL/PRB						Hg Measurement Method ESP Outlet Duct #					
ACI Rate		Br Injection Rate (ppm in coal)		Averaging Period		OH 2D1	XFM 2D2	M29 2D1	Sorbent Traps 2C1	AVG[1]	STD DEV[1]
(lb/Macf)	Carbon Injected		Date	Start	End	Total Hg (µg/dNm^3 at 3% O_2)					
0	None	97	10-Jul	8:49	11:49	10.3	--	--	19.9	15.1	6.8
0	None	164	11-Jul	9:10	11:35	25.2	--	--	27.2	26.2	1.4
0	None	172	9-Jul	11:55	14:55	26.8	--	--	19.6	23.2	5.1
0.47	Darco Hg	97	10-Jul	14:20	16:40	8.8	--	--	9.1	9.0	0.2
0.48	Darco Hg	122	12-Jul	8:01	10:01	--	12.6	14.8	12.0	13.1	1.5
0.48	Darco Hg	122	12-Jul	10:45	12:45	--	12.7	14.1	--	13.4	1.0
0.48	Darco Hg	122	12-Jul	13:35	15:35	--	11.5	13.3	12.4	12.4	0.9
0.61	Darco Hg	164	11-Jul	14:00	16:03	7.3	--	--	9.2	8.3	1.3
0.46	Darco Hg-LH Finely Ground	0, 280	16-Jul	9:50	12:50	--	--	--	12.8	--	--
1.64, 0.91	Darco Hg-LH Finely Ground	280, 173	16-Jul	13:18	16:18	--	--	--	8.3	--	--

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at ESP outlet.

Table 4-18. Bromide Addition: Mercury Concentrations Measured at Stack

Bromide Addition to Furnace 70/30 TxL/PRB						Hg Measurement Method used at Stack					
ACI Rate (lb/Macf)	Carbon Injected	Br Injection Rate (ppm in coal)	Date	Averaging Period		XFM	M29	Sorbent Traps	SCEM	AVG[1]	STD DEV[1]
				Start	End	Total Hg (µg/dNm^3 at 3% O_2)					
0	None	97	10-Jul	8:30	11:30	--	--	13.3	6.2	9.8	5.0
0	None	164	11-Jul	9:10	12:10	--	--	17.4	6.1	11.8	8.0
0	None	172	9-Jul	11:55	14:55	--	--	8.9	4.4	6.7	3.2
0.47	Darco Hg	97	10-Jul	14:20	16:56	--	--	8.0	3.8	5.9	3.0
0.48	Darco Hg	122	12-Jul	7:30	9:30	12.6	9.6	7.5	4.2	8.5	3.5
0.48	Darco Hg	122	12-Jul	10:06	12:06	11.2	7.2	--	4.1	7.5	3.6
0.48	Darco Hg	122	12-Jul	13:27	15:27	8.0	8.7	9.8	4.2	7.7	2.4
0.61	Darco Hg	164	11-Jul	14:00	16:09	--	--	7.5	3.8	5.7	2.6
0.46	Darco Hg-LH Finely Ground	0, 280	16-Jul	9:48	12:48	--	--	6.7	5.5	6.1	0.8
1.64, 0.91	Darco Hg-LH Finely Ground	280, 173	16-Jul	13:18	16:18	--	--	3.0	2.2	2.6	0.6

[1] Average and standard deviations calculated for all measurement methods for which mercury concentration data available at stack.

The lowest stack mercury concentration achieved was 2.6 µg/dNm^3 with 280 ppm Br and 1.6 lb/Macf finely ground Darco Hg-LH, with very good agreement between the sorbent trap and SCEM measurements. The combination of bromide addition and sorbent injection achieved the lowest stack Hg concentration of all technologies tested at LMS Unit 2. However, the required sorbent injection rate of 1.6 lb/Macf finely ground Darco Hg-LH is high enough to potentially jeopardize ash sales, and the required bromide injection rate could adversely impact the scrubber system. Without changes in scrubber blowdown rates, high bromide addition rates will cause the steady-state FGD Br level to increase, which may lead to corrosion problems in alloy-based scrubbers.

Four OH runs were performed during bromide addition (no sorbent injection), at rates of 97, 164, 171, and 171 ppm Br to coal. The ESP outlet OH results for these tests were erratic, with measured mercury concentrations of 10, 25, 27, and 5 µg/Nm^3, respectively. Results for these OH tests are shown in Table 4-19. At LMS, with its very low LOI ash, little to no mercury removal would be expected across the ESP when adding bromide to the coal. The sorbent trap results support this supposition, with ESP outlet mercury concentrations ranging from 20 – 28 µg/dNm^3 durng bromide-only addiiton. The ash mercury concentrations during bromide addition tests were not significantly higher than during sorbent addition tests. Therefore, it is likely the OH method experienced an intermittent low bias in the measurement of total mercury concentration when bromide was present in the flue gas.

As stated previously, the SCEM experiences negative biases when measuring flue gas containing bromide; however, the elemental mercury concentrations measured by OH and SCEM at the ESP outlet agreed well for five of six runs, indicating between 2.0 and 4.0 µg/dNm^3. Total mercury concentrations agreed well for three of the six runs.

Table 4-19. OH Results from Bromide Addition Tests

ACI Rate (lb/Macf)	Br Injection rate (ppm in coal)	Date in 2009	Averaging Period		ESP Outlet 2D1 Ontario Hydro Results			ESP Outlet 2C2 SCEM Results*		
			Start Time	End Time	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid	Total Hg (µg/Nm^3)	Elem. Hg (µg/Nm^3)	% Oxid
0	97	7/10	9:13	11:13	10.3	3.8	63	11.2	2.9	74
0.47	97	7/10	14:30	16:15	8.8	2.6	70	7.0	2.2	69
0	164	7/11	9:34	11:19	25.2	3.6	86	13.9	2.3	83
0.61	164	7/11	14:09	16:09	7.3	2.0	72	8.0	--	--
0	171	7/9	12:21	14:38	26.8	2.6	90	8.6	2.0	77
0	171	7/9	15:57	17:40	4.8	2.4	51	8.0	0.6	93

*SCEM total Hg concentrations at ESP outlet known to be biased low due to bromide bias.

ACI Upstream of the ESP – ¼ Unit

For the final two weeks of the test program, sorbent injection was limited to ¼ of Unit 2 (specifically, Unit 2C ESP). Because only part of the unit was treated during this portion of the test program, mercury concentrations measured at the stack were not representative of the test condition and could not be included in the mercury removal analysis. Two types of lances were used in this final part of the test program: the traditional lances used previously during this test program, and dispersion lances. The dispersion lances were designed to improve the distribution of sorbent in the duct and increase the contact between flue gas mercury and the sorbent. For the ¼ unit testing, four lances were used for the traditional setup and then replaced with four dispersion lances. The remaining twelve traditional lances (servicing 2A, 2B, and 2D ESPs) were taken out of service.

Table 4-20 presents average mercury concentrations measured at the AH inlet and the ESP outlet during each sorbent injection test involving Darco Hg-LH, Calgon A, and Calgon A2 sorbents. These sorbents were injected with both types of lances during the Unit 2C ESP injection testing and formed the basis for evaluating the performance of the dispersion lances.

Table 4-20. Average Mercury Concentrations Measured during Traditional vs. Dispersion Lance Testing (Injection Upstream of ¼ of the Unit 2 ESP)

Start Time	End Time	Sorbent	Lance Type	Injection Rate (lb/Macf)	Avg. AH Inlet Hg Concentrations (µg/dNm^3)			Avg. ESP Outlet Hg Concentrations (µg/dNm^3)			% Removal Across AH/ESP
					Total Hg	Elem. Hg	% Oxid.	Total Hg	Elem. Hg	% Oxid.	
7/17/09 10:05	7/17/09 18:10	Darco Hg-LH	Traditional	0.98	21.5	17.4	19%	12.3	7.4	39%	43%
7/18/09 9:00	7/18/09 13:00	Darco Hg-LH	Traditional	0.44	19.2	16.8	12%	14.5	6.2	57%	24%
7/18/09 13:00	7/18/09 15:30	Darco Hg-LH	Traditional	0.98	21.3	16.3	24%	13.2	6.6	50%	38%
7/18/09 15:30	7/18/09 18:30	Darco Hg-LH	Traditional	1.85	21.5	17.2	20%	14.6	--	--	32%
7/19/09 10:30	7/19/09 12:50	Calgon A2	Traditional	1	19.8	16.8	15%	11.6	5.6	52%	41%
7/19/09 15:00	7/19/09 17:10	Calgon A	Traditional	1	20.4	17.7	13%	11.7	5.8	51%	42%
7/21/09 10:47	7/21/09 13:23	Darco Hg-LH	Dispersion	0.95	21.7	20.5	5%	11.0	5.3	52%	49%
7/21/09 13:23	7/21/09 16:00	Darco Hg-LH	Dispersion	1.85	22.4	21.8	3%	9.1	4.6	49%	59%
7/22/09 10:17	7/22/09 17:25	Darco Hg-LH	Dispersion	1.06	22.9	21.7	5%	17.6	8.1	54%	23%
7/23/09 10:40	7/23/09 17:40	Darco Hg-LH	Dispersion (Low Pressure)	1.01	19.6	14.1	28%	14.2	8.4	41%	28%
7/23/09 17:40	7/23/09 20:20	Darco Hg-LH	Dispersion (High Pressure)	1.01	20.0	14.5	28%	11.5	6.5	44%	43%
7/28/09 10:09	7/28/09 11:19	Calgon A2	Dispersion	1	19.9	18.5	7%	12.9	4.8	63%	35%
7/28/09 16:22	7/28/09 17:13	Calgon A	Dispersion	1	18.8	17.8	5%	7.7	3.2	59%	65%

Figure 4-7 shows mercury removal results versus sorbent injection rate for the three sorbents injected with both lance types. There was no consistent trend in performance associated with using the dispersion lances instead of the traditional lances. All three of the sorbents included in the figure were injected at ~1 lb/Macf. For the Calgon A sorbent, the dispersion lances achieved higher removal (59%) than the traditional lances (42%). For the Calgon A2 sorbent, the traditional lances achieved similar removal (41%) to the dispersion lances (35%). For the Darco Hg-LH sorbent, the dispersion lances achieved higher removal than the traditional lances during some test periods and lower removal during others. The variability in performance between the lances was similar to the run-to-run variability at a single test condition. Mercury removal performance at LMS may have been reaction-limited rather than mass transfer-limited, in which case improvements to sorbent distribution would not have resulted in increased mercury removal.

During initial evaluation of the dispersion lances, mercury measurements were made traversing different locations at the ESP outlet using the sorbent trap method. Sorbent trap tests run on July 21st and 22nd were performed in three ports per run, half an hour per port. The ports were labeled A, B, and C and were located BLANK. For sorbent trap tests conducted on July 23rd each test was run in one port, run 1 was A, run 2 B, and run 3 C. For each test on the 23rd three different duct depths were tested for 30 minutes for each run; the depths were six feet, four feet, and two feet. Sampling locations for each sorbent trap test are shown in Table 4-21. Results for the sorbent trap testing are provided in Table 4-22.

The mercury concentrations measured with the SCEM and with the sorbent traps trended together throughout this part of the test program. The removal percentages across the AH/ESP calculated using each set of data were similar, although the removal indicated by the SCEM measurements was generally higher than the removal indicated by the sorbent trap measurements.

At the conclusion of this test program, the dispersion lances were removed from the duct and inspected. This inspection revealed that some plugging occurred during injection. On one of the four dispersion lances, half of the nozzles were completely plugged and the inlet plenum was 80% plugged with sorbent. Another lance had one plugged nozzle, and the inlet plenum on a third lance was 60% plugged with debris and sorbent. Since the inspection occurred at the end of the test program, it is unknown how much of an effect the plugging had on the distribution of carbon in the duct and the resulting perceived performance of the dispersion lances.

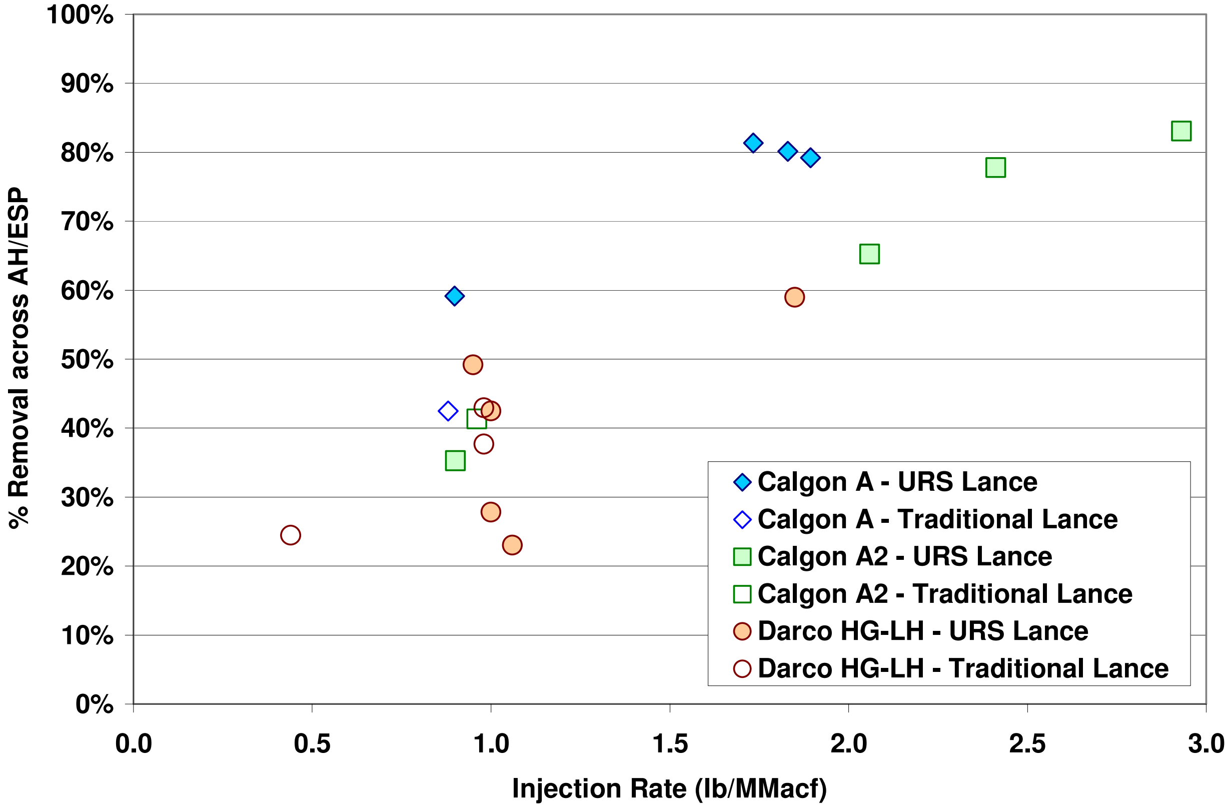


Figure 4-7. Mercury Removal across AH/ESP, Traditional Lances vs. Dispersion Lances (Injection of Upstream of Unit 2C ESP).

Because there was no obvious difference in mercury removals achieved for the traditional and dispersion lances, the dispersion lances were left in place for the remainder of the test program in which several proprietary Calgon sorbents were injected at varying rates to evaluate mercury removal performance.

Figure 4-8 presents the mercury removal percentages across the AH/ESP for all of the Calgon carbons injected with the dispersion lances during this program. Several of the injection tests lasted less than one hour. Only the data collected after the ESP outlet concentrations steadied were included in the averages in Figure 4-8, resulting in averaging periods as short as 22 minutes. Of the carbons tested, Calgon A carbon achieved the highest removal (80%) at the lowest injection rate (~1.8 lb/Macf). Only the Calgon A carbon, which was designed for sulfur tolerance, performed consistently better than Darco Hg-LH.

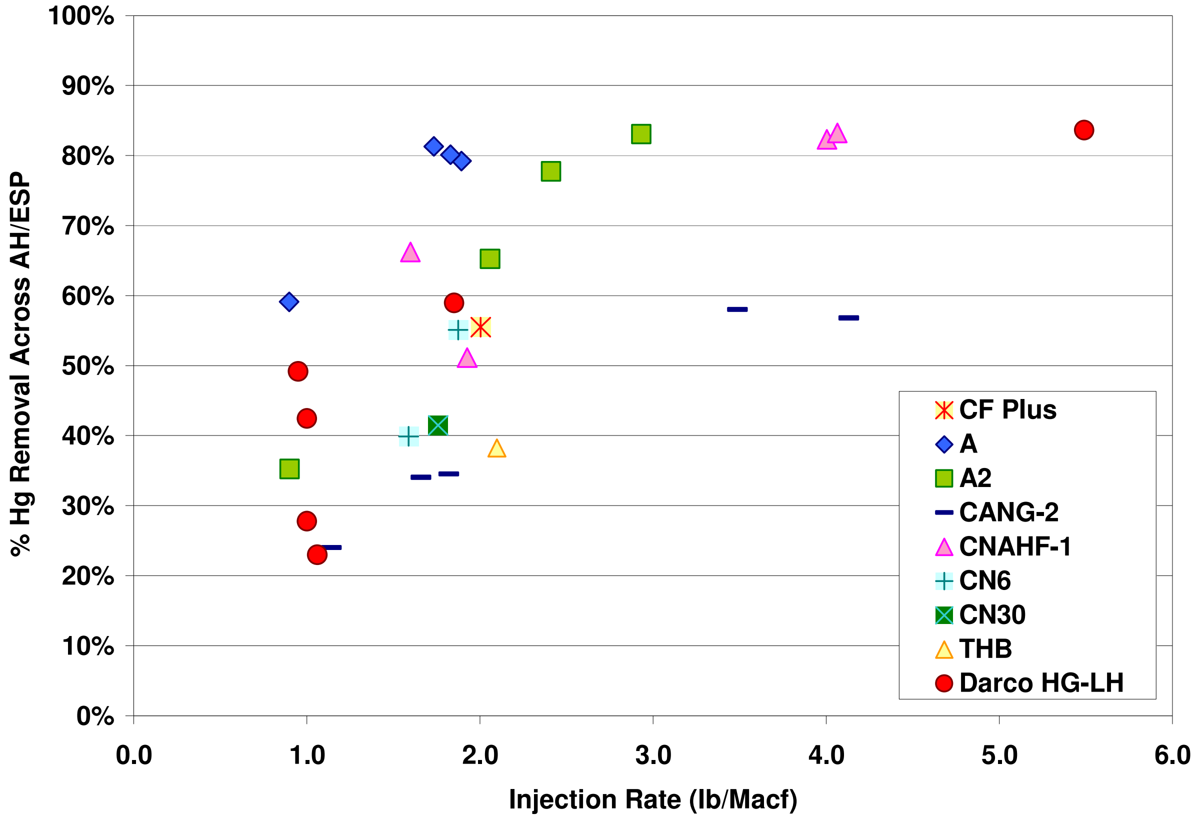


Figure 4-8. Mercury Removal across AH/ESP for Calgon Sorbents Injected with the Dispersion Lances (Injection of Upstream of Unit 2C ESP)

Table 4-21. Duct Location for Sorbent Trap Traverse Testing

ACI Rate (lb/Macf)	Carbon Injected	Date in 2009	Start Time	End Time	Duct Location	Duct Depth (ft)
0.95	Darco Hg-LH	7/21	11:29	13:09	A,B,C	6
1.85	Darco Hg-LH	7/21	14:10	15:49	A,B,C	6
1.06	Darco Hg-LH	7/22	10:54	12:36	A,B,C	6
1.06	Darco Hg-LH	7/22	13:15	14:53	A,B,C	6
1.06	Darco Hg-LH	7/22	15:31	17:09	A,B,C	6
1.01	Darco Hg-LH	7/23	11:23	12:58	A	2,4,6
1.01	Darco Hg-LH	7/23	13:40	15:14	B	2,4,6
1.01	Darco Hg-LH	7/23	15:58	17:33	C	2,4,6

Table 4-22. Dispersion Lances: Sorbent Trap and SCEM Results at ESP Outlet

ACI Rate (lb/Macf)	Carbon Injected	Date in 2009	AveragingPeriod		AH Inlet Total Hg (µg/dNm^3 at 3% O_2)	Sorbent Trap Traverse Location[1]	ESP Outlet - Sorbent Traps	ESP Outlet - SCEM	% RemovalAcross AH/ESP[2]	
			Start Time	EndTime			Total Hg (µg/dNm3 at 3% O_2)	Total Hg (µg/dNm^3 at 3% O_2)	Sorbent Trap	SCEM
0.95	Darco Hg-LH	7/21	11:29	13:09	21.9	Bottom	12.9	10.6	41%	52%
1.85	Darco Hg-LH	7/21	14:10	15:49	22.6	Bottom	8.8	9	61%	60%
1.06	Darco Hg-LH	7/22	10:54	12:36	24.1	Bottom	15.8	17.4	34%	28%
1.06	Darco Hg-LH	7/22	13:15	14:53	23.3	Middle	18.4	17.8	21%	23%
1.06	Darco Hg-LH	7/22	15:31	17:09	19.7	Top	19.6	17.6	1%	10%
1.01	Darco Hg-LH	7/23	11:23	12:58	21.2	North	17.9	14.7	16%	31%
1.01	Darco Hg-LH	7/23	13:40	15:14	19	Center	15.3	14.3	19%	25%
1.01	Darco Hg-LH	7/23	15:58	17:33	18.6	South	16.8	12.7	10%	32%

[1] Bottom indicates that all three ports in duct were traversed at 6' depth; middle indicates that all three ports were traversed at 4' depth; top indicates that all three ports in duct were traversed at 2' depth; north indicates north-most port traversed at three depths (2',4',6'); center indicates center-most port traversed at three depths; south indicates south-most port traversed at three depths.

[2] Mercury removal calculated by comparing the AH Inlet SCEM data to each measurement method at the ESP outlet.

4.4 Effects of Sorbent Injection on Concrete Properties

An objective of this test program was to determine the effect of ACI on fly ash quality. Refer to Section 3.9 for a general explanation of the effect of ACI on replacement of cement with fly ash in concrete mixtures.

Fly ash samples were collected during parametric sorbent injection tests and analyzed to determine how sorbent content impacted the fly ash properties applicable to its use as a cement replacement in concrete. Concrete tests conducted on samples from the 2006-2007 tests at LMS indicated that a carbon injection rate of 2 lb/Macf Darco Hg-LH was marginally acceptable for maintaining fly ash integrity for use as a cement replacement. During Phase IV testing, carbon injection rates ranged from 0.5 lb/Macf to 2.0 lb/Macf. Two types of sorbents were were evaluated, including brominated sorbents and ash compatible sorbents (some of which were also brominated).

The Phase IV test results showed that a carbon injection rate of 2 lb/Macf may be too high to sell fly ash for cement replacement due to its significant effects on the air entraining properties of the resulting concrete mixture. Phase IV tests also showed that ash compatible sorbents had no impact on the air entrainment properties of a concrete mixture at injection rates of up to 1 lb/Macf, whereas injection of brominated carbon at rates as low as 0.5 lb/Macf significantly affected concrete air content. Higher injection rates of ash compatible sorbents were not tested.

Headwaters, Inc. evaluated the following fly ash properties of samples obtained from either first field hopper 2F2C or from the top of the silo used to store fly ash collected from the ESP:

- Foam index;
- LOI and carbon analysis; and
- Particle size analysis.

A series of concrete mixtures were made with 25% of the cement replaced by fly ash samples obtained from first field hopper 2F2C. The following properties of the concrete were compared to a control sample prepared with no fly ash:

- Air pressure;
- Air entraining agent (AEA) demand;
- Slump;
- Compressive strength; and
- Petrographic analyses on hardened concrete.

Obtaining a representative sample of fly ash for testing is difficult. The fly ash that is used to make concrete has been somewhat mixed by the various handling processes that take it from the ESP through storage silos to the truck that conveys it offsite. In contrast, fly ash from the storage silo is more stratified because the ESP is evacuated one field at a time. Fly ash sampled from the top of the silo may be from a front field or a back field of the ESP. Because the back field ash at Limestone is richer in carbon conent and finer in particle size than the front field, silo samples obtained after a back field has been evacuated tend to have high foam index titration results. The ideal fly ash sampling scheme is to collect individual hopper samples from each field of the ESP and then mix them in proportion to the amount of ash collected by the hopper. During this program, only the first and fourth fields of the U2 ESP were equipped with sampling valves; most days, little to no ash could be obtained from the fourth field. Therefore, individual hopper samples are presented for the first field only. The first field of the ESP collects 94% of the fly ash.

During Phase IV tests, samples were gathered almost daily from the top of the silo by Headwaters LMS staff and from hopper 2F2C by URS staff. Headwaters analyzed selected silo and hopper samples for foam index, LOI, carbon, and particle size (Tables 4-23 and 4-24). Concrete samples made with selected hopper samples were characterized for air pressure, slump, water/cement ratio, and compressive strength. The results in Table 4-25 are for concrete mixtures made at a fixed dose of AEA (4.5 g of Micro Air additive), while the results in Table 4-26 are for samples where the AEA dose was modified to obtain a target percentage of air in the concrete mixture (5-7% air).

Table 4-23. Silo Fly Ash Characterization Results

Date/Time	Carbon Type	Injection Rate (lb/Macf)	Foam Index (Drops)	Carbon by Leco (%)	LOI (%)	Mean Particle Size (μm)
6/11/09 13:30	None	N/A	4	0.08	0.06	22.7
6/15/09 08:10	Darco Hg LH	0.48*	23	0.33	0.44	10.2
6/15/09 16:00	Darco Hg LH	0.48	14	0.18	0.20	30.8
6/16/09 14:30	Darco Hg LH	0.48	12	0.14	0.14	27.0
6/13/09 16:40	Darco Hg LH	1.89	3	0.07	0.07	15.0
6/14/09 16:40	Darco Hg LH	1.89	20	0.28	0.35	10.9

* Silo sample taken after only six hours at 0.48 lb/Macf injection rate. Previous injection rate had been 1.89 lb/Macf. Silo sample likely biased high by presence of ash from the higher injection rate.

Table 4-24. Hopper Fly Ash Sample Characterization Results (Hopper 2F2C)

Date/Time	Carbon Type	Injection Rate (lb/Macf)	Foam Index (Drops)	Carbon by Leco (%)	LOI (%)	Mean Particle Size (µm)
6/11/09 17:54	None	N/A	5	0.08	0.06	11.9
6/12/09 17:00	None	N/A	5	0.07	0.09	11.0
6/16/2009 15:40	Darco Hg LH	0.48	9	0.14	0.20	12.0
6/18/2009 16:00	Darco Hg LH	0.99	8	0.18	0.21	12.2
6/28/2009 8:20	Darco Hg LH	1.00	8	0.20	0.24	12.5
6/28/2009 15:00	Darco Hg LH	1.83	10	0.24	0.22	11.9
6/14/2009 16:10	Darco Hg LH	1.89	16	0.29	0.31	10.7
6/23/09 16:10	CF Plus	0.95	4	0.08	0.07	15.5
6/24/09 16:00	EXP224	0.95	4	0.11	0.13	11.9
6/22/09 16:30	CPAC	0.96	4	0.17	0.17	11.7

Foam Index

Foam index is the primary test used to determine whether fly ash from LMS can be sold for cement replacement applications. Headwaters prefers that the foam index remain below 10 drops, but will sometimes accept foam index results that are several drops higher. Foam index results for silo ash samples obtained during the first several days of injection testing (6/14/09 at 16:40 and 6/15/09 at 08:10) exceeded Headwater's established limit for fly ash cement replacement. The 6/14/09 sample was taken after two days of injection at 1.89 lb/Macf Darco Hg-LH. The foam index of 16 for this sample was on the outer limits of acceptability for sale of the LMS fly ash as a cement replacement product. The silo ash sample from the same time period had a higher foam index of 20, likely due to inclusion of carbon-rich fly ash captured in the back fields of the ESP.

The injection rate was decreased to 0.48 lb/Macf on 6/15/09 at 02:30. The next silo sample was taken six hours later and had a foam index of 23, which was higher than expected and is most likely due to the carryover of ash from the 1.89 lb/Macf test. Subsequent silo samples taken at 0.48 lb/Macf had foam indices between 12 – 14, which was just within Headwater's criterion for acceptability.

Based on foam index results from the first three days of ACI tests, no Unit 2 fly ash was marketed for concrete use when an injection rate greater than 0.5 lb/Macf Darco Hg-LH was used during the Phase IV test program. Ash for injection rates of 0.5 lb/Macf and lower of Darco Hg-LH was deemed acceptable to market to the concrete industry.

Table 4-25. Phase IV ACI Tests, Hopper Samples - Headwaters Concrete Results with Constant AEA Dosage

Test Parameter	Units	Passing Criteria	Control with Portland Cement (no ash)	Baseline Fly Ash 06/11/09 & 6/12/09	Darco Hg LH 0.48 lb/Macf 06/16/09	Darco Hg LH 0.99 lb/Macf 06/18/09	Darco Hg LH 1.0 lb/Macf 06/28/09	Darco Hg LH 1.89 lb/Macf 06/14/09	Darco Hg LH 1.83 lb/Macf 06/28/09	C-PAC 0.96 lb/Macf 06/22/09	CF Plus 0.95 lb/Macf 06/23/09	EXP224 0.95 lb/Macf 06/24/09
AEA	oz/cwt	Steady and low	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Air Pressure	%	5 – 7	6.2	7.2/6.2	2.6	3.8	3.7	2.2	3.4	6.4	7.2	7.2
Slump .25 inch	Inches	5 – 7	6	6.5/6.25	6	6.5	6.5	6	5.75	6	6.25	6.25
Water to Cement Ratio	None	Similar to Control	0.53	0.48/0.51	0.53	0.53	0.52	0.55	0.51	0.50	0.49	0.49
7-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	3978	3482/3332	3874	3565	3798	3180	3702	3565	3158	3324
28-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	5551	4963/5035	5706	5484	5374	5117	5469	5527	4733	4886

Table 4-26. Phase IV ACI Tests, Hopper Samples - Headwaters AEA Demand Test Concrete Results

Test Parameter	Units	Passing Criteria	Control with Portland Cement (no ash)	Darco Hg-LH 1.0 lb/Macf 06/18/09	Darco Hg-LH 1.0 lb/Macf 06/28/09	Darco Hg-LH 1.9 lb/Macf 06/14/09
AEA	oz/cwt	Steady and low	0.12	0.16	0.19	0.32
Air Pressure	%	5 – 7	6.2	5.3	5.5	6.3
Slump .25 inch	inches	5 – 7	6	6.25	6.25	6.00
Water to Cement Ratio	none	Similar to Control	0.53	0.53	0.53	0.53
28-Day Compressive Strength	Psi of unconfined compressive strength	Similar to Control	5076	5535	5995	5080

LOI and Carbon Characterization

Carbon and LOI content were measured for silo and ESP hopper ash samples collected during from Phase IV tests; results of these analyses were shown in Tables 4-23 and 4-24, respectively. A strong linear correlation existed between the carbon and LOI results (Figure 4-9), with LOI levels on average 25% higher than the measured values for carbon content. LOI measurements determine a net weight loss of a sample whereas the LECO carbon analysis measures only the carbon content of the ash. Therefore, LOI measurements tend to be higher than the LECO carbon measurements.

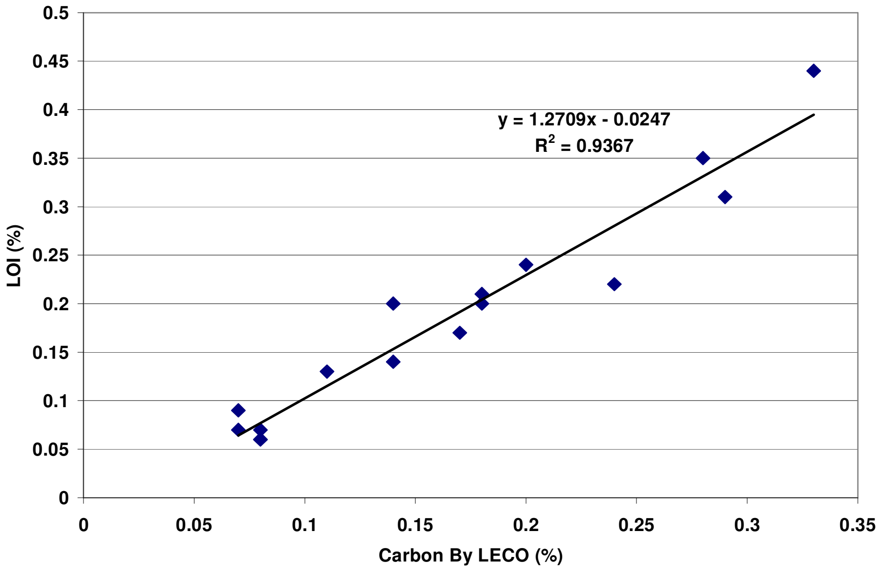


Figure 4-9. LOI versus Carbon Content for Phase IV Ash Samples

Table 4-27 compares the measured carbon content of the fly ash to a theoretical carbon content based on the assumptions that 100% of the injected activated carbon was captured across the ESP and 85% of the coal ash reported as fly ash. The ash content was calculated for each day's coal blend percentage, using test-average ash contents of the PRB and TxL coals. For days where both hopper and silo data were available, there was excellent agreement between these samples. Figure 4-10 shows how the theoretical carbon content compared with the measured carbon content of the silo and hopper fly ash samples for various injection rates. Good agreement was observed for ash samples obtained when activated carbon was injected at a rate of 0.5 lb/Macf; however, at higher injection rates both hopper and silo samples had carbon contents lower than the predicted values. This suggests that (1) these samples were not good representations of the actual carbon injection rates employed, and/or (2) the assumptions (such as average ash content) used to calculate the theoretical carbon content were not accurate for these sample periods.

Table 4-27. Carbon Content in First Field (2F2C) Fly Ash Samples (Theoretical vs. Measured)

Date	Carbon Type	Injection Rate (lb/Macf)	Theoretical Carbon Content of Fly Ash (%)	Hopper Fly Ash Sample Measured Carbon Content* (%)	Silo Fly Ash Sample Measured Carbon Content* (%)
6/11/09	None	N/A		0.08	0.08
6/12/09	None	N/A		0.07	-
6/13/09	Darco Hg LH	1.89	0.37	-	0.07
6/14/09	Darco Hg LH	1.89	0.38	0.29	0.28
6/15/09	Darco Hg LH	0.48	0.15	-	0.33/0.18
6/16/09	Darco Hg LH	0.48	0.16	0.14	0.14
6/18/09	Darco Hg LH	0.99	0.25	0.18	-
6/22/09	C-PAC	0.96	0.24	0.17	-
6/23/09	EXP224	0.95	0.24	0.08	-
6/24/09	CF Plus	0.95	0.28	0.11	-
6/28/09	Darco Hg LH	1.0	0.26	0.20	-
6/28/09	Darco Hg LH	1.83	0.42	0.24	-

*measured by the LECO method

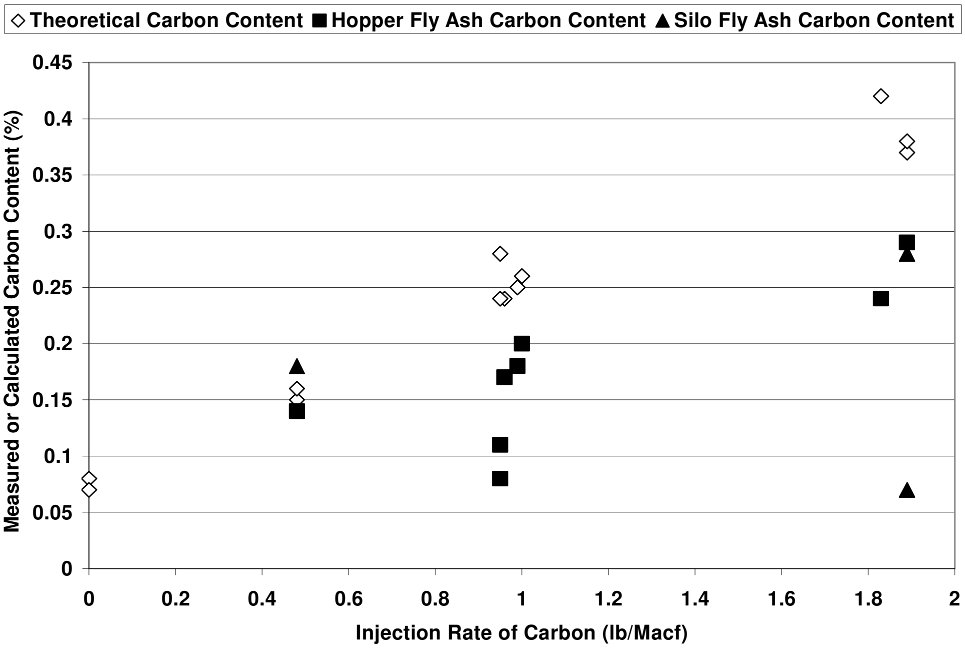


Figure 4-10. Theoretical vs. Measured Carbon Content for Phase IV Fly Ash Samples

Foam Index

Table 4-28 shows foam index results for simulated ash/carbon mixtures, while Figure 4-11 plots foam index for both hopper and silo fly ash samples taken during Phase IV parametric testing. The foam index increased with increased addition rate of Darco Hg-LH. In contrast, the foam index of the ash containing the ash-compatible carbons (EXP 224, CF Plus, CF Plus Ultra, C-PAC) had a much slower rate of increase, indicating that these carbons offer an advantage over standard brominated carbons for preserving fly ash integrity. However, the ash-compatible carbons had lower mercury removals than their standard counterparts, so higher injection rates would be required for these sorbents to achieve a specific mercury removal target. The highest foam index results were seen for the Norit Finely Ground Darco Hg, even higher than the Darco Hg-LH. This is likely due to a combination of two reasons; non-brominated carbons have a slightly higher foam index than their brominated counter parts, and as a finely ground carbon it has a larger surface area for the same mass of carbon than the non-ground carbons.

Table 4-28. Foam Index Results for Simulated Fly Ash

Carbon	Drops AEA Required at Simulated Injection Rate				
	0.0 (lb/Macf)	0.5 (lb/Macf)	1.0 (lb/Macf)	2.0 (lb/Macf)	3.0 (lb/Macf)
EXP 224	3	3	3	4	7
Darco Hg-LH	3	6	7	8	9
Norit Finely Ground Darco Hg	3	6	7	10	14
CF Plus	3	3	3	4	5
CF Plus Ultra	3	3	3		4
C-PAC	3	3	3	4	6

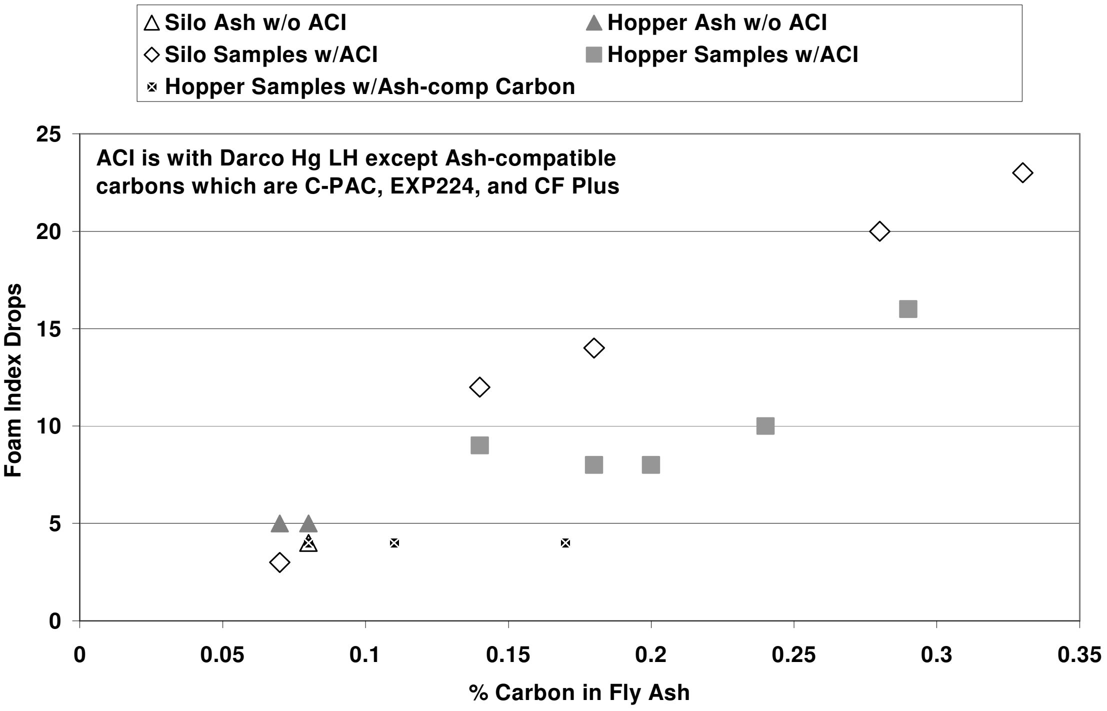


Figure 4-11. Foam Index Results versus Carbon Content for Phase IV Ash Samples

Particle Size Analysis

Headwaters measured the median particle size of selected fly ash samples using a Horiba analyzer. There are no ASTM guidelines on median particle size of a fly ash sample for reuse as a cement replacement additive. As a guideline for fly ash particle size ASTM C618 does specify the acceptable range for percent retained on a 325 mesh sieve, but these tests were not conducted for the Phase IV tests.

Median particle size for Unit 2 hopper ash samples from the Phase IV tests ranged from 10.7 to 15.5 µm, which was lower than the Unit 1 typical median hopper ash particle size range of 13.1 to 19.5 µm. However, the median particle size of the Unit 2 silo ash samples ranged from 10.2 to 30.8 µm providing evidence for the existence of larger particles than what were present in the hopper samples. There were no silo ash samples obtained from Unit 1 tests since the injected activated carbon treated only one-quarter of the Unit 1 flue gas.

Air Content of Concrete Mixture

Table 4-25 shows the measured air content for concrete mixtures made at a fixed dose of AEA (4.5 g of Micro Air additive). The air content of the control concrete made with no fly ash was 6.2%. Concrete made with the baseline fly ash samples (6/11/09 and 6/12/09; no ACI) had air contents of 7.2% and 6.2%, respectively. An injection rate as low as 0.48 lb/Macf lowered the air pressure to 2.6%, which was below the minimum acceptable value of 5%. All of the concrete mixtures made with fly ash containing 1.0 lb/Macf ash-compatible sorbent had air contents in the acceptable range of 5% – 7%. Due to time constraints, tests of the ash-compatible carbons were limited to a single day at 1.0 lb/Macf. Based on these air entrainment results, further testing of the ash-compatible carbons at higher injection rates and for longer time periods is warranted.

The results in Table 4-26 are for samples where the AEA dose was modified to obtain a target percentage of air in the concrete mixture (5-7% air). With additional AEA it is possible to make acceptable concrete mixtures from fly ash containing Darco Hg LH carbon that meet the required air content specifications. An injection rate of 1 lb/Macf required an AEA dose 30-60% higher than the control concrete; an injection rate of 1.89 required an AEA does 166% greater than the control. In practice the higher AEA demand may not be acceptable beause it would likely be more unpredictable.

Slump/Water to Cement Ratio/Compressive Strength

Table 4-25 and 4-26 show results for slump, water-to-cement ratio, and compressive strength for the various concrete mixtures made with fly ash. All parameters were within the acceptable ranges for all samples.

Petrographic Analyses

In addition to freeze thaw testing, air void spacing is another commonly accepted test parameter to determine freeze thaw resistance. Petrographic analysis by ASTM C457 gives the air void spacing in cured concrete samples. ASTM C457 states that the air void spacing should be 0.004 to 0.008 inches to adequately protect against freeze thaw damage. Petrographic analyses were performed on concrete cylinders formed with hopper fly ash samples obtained from injection rates of 1.89, 0.99, and 1.0 lb/Macf Darco Hg-LH. All three samples met ASTM standards for void spacing values of 0.004, 0.005, and 0.005 inches, respectively. Complete petrographic analysis reults are in Appendix I.

4.5 Characterization of Coal, Fly Ash, and FGD Absorber Slurry

During Phase IV parametric tests several liquid and solid process streams were characterized including fly ash, coal, and FGD absorber solids and liquids. Coal samples were analyzed for ultimate and proximate composition. Tables 4-29 and 4-30 show the coal compositions for the TXL and PRB coals, respectively. Compared to PRB, the TXL coal had larger sample to sample variability in composition, as evidenced by the larger standard deviations for most coal properties. As shown in Figure 4-12, the TxL coal had significantly higher mercury content than the PRB coal (0.34 vs. 0.12 ppm, dry). Concentrations for other trace metals are presented in Section 4.6 which covers various trace metals measurements made at LMS during this test program.

Fly ash was tested for mercury content and LOI content. Table 4-31 shows ash mercury content for the different test conditions by field and a collection weighted average of the fields. The collection weighted average is based on plant data showing 94% of fly ash was collected in first field and 0.4% was collected in Fields 4&5. As expected, mercury content of the fly ash increased with activated carbon injection. Table 4-32 shows ash LOI for the different test conditions by field and a collection weighted average of the fields. Ash LOI increased during ACI, and in general was higher in Fields 4&5 and 6&7 than in Field 1.

FGD absorber solids and liquors were analyzed. Solids analyses are presented in Table 4-33 and liquor analyses are presented in Table 4-34. As expected, liquor bromide concentration increased by a factor of two during bromide injection compared to baseline. This heightened bromide concentration persisted during ACI the following two days due to the residence time of the liquor in the FGD system. The liquor bromide concentration of 500 ppm was lower than the estimated value of ~100,000 ppm that would have been achieved if the bromide addition tests had lasted long enough for the FGD to achieve steady state operation. This estimated FGD Br concentration is based on the fact that bromide addition rate was approximately five times greater than Cl concentration of coal, and the FGD baseline Cl level is ~20,000 ppm.

Table 4-29. Summary of TxL Coal Analyses Results, Phase IV

Coal Type: TxL													
Date	6/12/2009	6/15/2009	6/18/2009	6/25/2009	6/28/2009	7/10/2009	7/12/2009	7/13/2009	7/14/2009	7/16/2009	7/18/2009	**Average**	Std Dev
Time	13:45	6:25	8:20	16:00	8:25	8:45	8:55	7:30	8:30	7:00	8:30		
% Total Moisture	33.2	27.89	28.32	15.43	30.54	33.35	31.08	30.69	29.45	31.49	32.61	**29.62**	5.23
Dry Basis:													
Heating Value Btu/lb	10847	6910	8151	10641	8683	10641	9035	10075	7996	9716	10911	**9670**	1129
% Carbon	63.83		48.58			62.71						**58.37**	8.50
% Hydrogen	4.52		3.34			4.27						**4.04**	0.62
% Nitrogen	0.97		0.7			0.97						**0.88**	0.16
% Sulfur	1.3	1.2	1.9	1.8	1.1	1.0	0.8	0.9	1.1	2.0	1.5	**1.3**	0.4
% Ash	13.9	41.7	33.4	17.1	29.1	14.9	26.3	19.8	35.2	23.3	15.0	**22.8**	7.9
% Oxygen	15.5		12.0			16.1						**14.6**	2.2
Cl (ppm)	50	25	32	31	39	35	80			39	38	**41**	16
Br (ppm)	<1	<1	<1	9.6	10	<1	10.6			<1	<1	**4**	
Hg (µg/g)	0.189	0.168	0.420	0.709	0.200	0.286	0.250	0.350	0.323	0.585	0.250	**0.339**	0.171

Table 4-30. Summary of PRB Coal Analyses Results, Phase IV

Coal Type: PRB													
Date	6/12/2009	6/15/2009	6/18/2009	6/25/2009	6/28/2009	7/10/2009	7/12/2009	7/13/2009	7/14/2009	7/16/2009	7/18/2009	**Average**	Std Dev
Time	13:50	6:20	8:25	15:55	8:15	8:40	8:59	7:30	8:30	7:00	8:30		
% Total Moisture	32.47	31.48	31.55	11.49	30.78	29.78	30.57	29.91	31.85	30.87	31.95	**29.12**	6.26
Dry Basis:													
Heating Value Btu/lb	11642	11611	11548	11725	11538	11857	11773	11741	11788	11792	11778	**11718**	107
% Carbon	68.46		67.13			68.7						**68.10**	0.85
% Hydrogen	4.64		4.54			4.72						**4.63**	0.09
% Nitrogen	0.83		0.73			0.75						**0.77**	0.05
% Sulfur	0.8	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.6	**0.5**	0.1
% Ash	8.5	8.4	9.2	7.5	8.3	7.1	6.8	7.3	5.7	7.4	7.0	**7.5**	1.0
% Oxygen	16.9		17.9			18.2						**17.7**	0.7
Cl (ppm)	24	24	15	17	19	13	13			20	15	**17**	4
Br (ppm)	<1	<1	<1	<1	<1	<1	<1			<1	<1	**<1**	
Hg (µg/g)	0.174	0.151	0.129	0.261		0.092	0.063	0.104	0.071	0.070	0.087	**0.120**	0.062

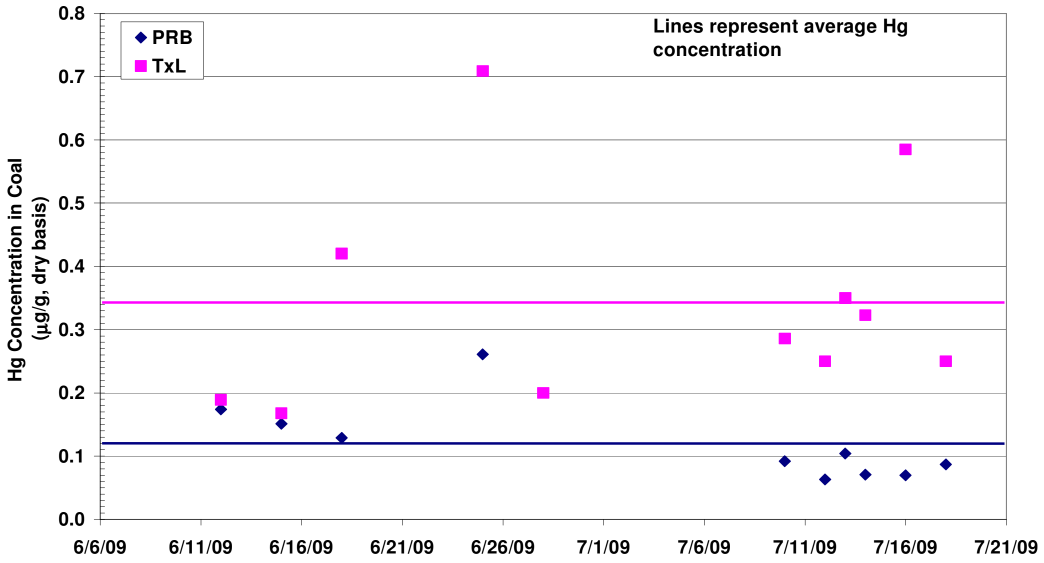


Figure 4-12. Coal Mercury Concentrations Measured during Phase IV Parametric Tests

Table 4-31. Hg Concentration in Ash Samples from Phase IV Parametric Tests

Condition	Date	Time	Ash Hg Content (µg/g)			
			Field			
			1	4&5	6&7	All Fields*
			Avg	Avg	Avg	Avg
Baseline	6/11/2009	1800	0.043	0.040	0.028	0.04
Baseline	6/12/2009	1700	0.047	0.039	N/A	0.05
Darco Hg LH 1.89 lb/Macf	6/13/2009	1755	0.128	0.084	N/A	0.13
Darco Hg LH 1.89 lb/Macf	6/14/2009	1615	0.586	0.177	0.061	0.58
Darco Hg LH 0.48lb/Macf	6/15/2009	1555	0.477	1.307	0.126	0.48
Darco Hg LH 0.48 lb/Macf	6/16/2009	1540	0.287	1.224	0.148	0.29
Darco Hg LH 0.99 lb/Macf	6/17/2009	1615	0.380	0.547	0.166	0.38
Darco Hg LH 0.99 lb/Macf	6/18/2009	1600	0.471	0.541	0.142	0.47
Baseline	6/21/2009	1615	0.033	0.809	0.064	0.04
Sorbtech C-PAC 0.96 lb/Macf	6/22/2009	1440	0.435	0.194	0.044	0.43
Norit Hg LH EXP-224 0.95 lb/Macf	6/23/2009	1600	0.263	0.272	0.282	0.26
Calgon FLUEPAC CF Plus 0.95 lb/Macf	6/24/2009	1600	0.202	0.563	0.261	0.20
Calgon CF Plus Ultra (2 bags); Darco Hg-LH (1 bag)	6/25/2009	1630/1745	0.279	N/A	N/A	0.28
Alt fuel, Continuous ACI, Darco Hg LH 1.00 lb/Macf	6/28/2009	820/1500	0.630	N/A	0.254	0.63
Darco Hg 0.47 lb/Macf	7/8/2009	900	0.240	0.447	N/A	0.24
171ppm Br to Coal	7/9/2009	1850	0.272	N/A	N/A	0.27
176ppm Br to Coal + Darco Hg 0.47 lb/Macf	7/10/2009	1600	0.484	0.375	0.397	0.48
164ppm Br to Coal + Darco Hg 0.61 lb/Macf	7/11/2009	1100	0.286	0.703	N/A	0.29
122ppm Br to Coal + Darco Hg 0.48 lb/Macf	7/12/2009	1200/1500	0.708	0.592	N/A	0.71
Darco Hg LH 1.89 lb/Macf upstream ESP injection	7/14/2009	1420	0.627	0.646	0.105	0.63
Darco Hg LH 0.48lb Macf/1.73 lb/Macf upstream ESP injection	7/15/2009	1220	0.397	0.425	0.093	0.40
Darco Hg LH 1.06 lb/Macf upstream ESP injection	7/22/2009	1715	0.811	N/A	N/A	0.81
Darco Hg LH 1.01 lb/Macf upstream ESP injection	7/23/2009	1730	0.623	N/A	N/A	0.62

* All fields average is a collection percentage weighted average of the fields, not a linear average. The fractional split is 0.994/0.004/0.002 for fields 1/ 4&5 / 6&7, respectively.

Table 4-32. LOI of Ash Samples from Phase IV Parametric Tests

Condition	Date	Time	Ash LOI (%)			
			Field			
			1	4&5	6&7	All Fields*
			Avg	Avg	Avg	Avg
Baseline	6/11/2009	1800	0.08	0.39	1.48	0.08
Baseline	6/12/2009	1700	0.10	0.45	N/A	0.10
Darco Hg LH 1.89 lb/Macf	6/13/2009	1755	0.16	0.27	N/A	0.16
Darco Hg LH 1.89 lb/Macf	6/14/2009	1615	0.30	0.43	0.98	0.30
Darco Hg LH 0.48lb/Macf	6/15/2009	1555	0.28	0.50	1.17	0.28
Darco Hg LH 0.48 lb/Macf	6/16/2009	1540	0.19	0.57	1.15	0.19
Darco Hg LH 0.99 lb/Macf	6/17/2009	1615	0.18	0.54	0.98	0.19
Darco Hg LH 0.99 lb/Macf	6/18/2009	1600	0.18	0.54	1.06	0.19
Baseline	6/21/2009	1615	0.04	0.58	1.32	0.04
Sorbtech C-PAC 0.96 lb/Macf	6/22/2009	1440	0.19	0.59	1.24	0.19
Norit Hg LH EXP-224 0.95 lb/Macf	6/23/2009	1600	0.14	0.54	0.42	0.14
Calgon FLUEPAC CF Plus 0.95 lb/Macf	6/24/2009	1600	0.13	0.37	0.27	0.13
Calgon CF Plus Ultra (2 bags); Darco Hg-LH (1 bag)	6/25/2009	1630/1745	0.14	N/A	N/A	0.13
Alt fuel, Continuous ACI, Darco Hg LH 1.00 lb/Macf	6/28/2009	820/1500	0.25	N/A	0.86	0.25
Darco Hg 0.47 lb/Macf	7/8/2009	900	0.07	0.54	N/A	0.07
171ppm Br to Coal	7/9/2009	1850	0.06	N/A	N/A	0.06
176ppm Br to Coal + Darco Hg 0.47 lb/Macf	7/10/2009	1600	0.06	0.42	0.22	0.06
164ppm Br to Coal + Darco Hg 0.61 lb/Macf	7/11/2009	1100	0.11	0.43	N/A	0.11
122ppm Br to Coal + Darco Hg 0.48 lb/Macf	7/12/2009	1200/1500	0.11	0.44	N/A	0.11
Darco Hg LH 1.89 lb/Macf upstream ESP injection	7/14/2009	1420	0.17	0.52	1.46	0.17
Darco Hg LH 0.48lb Macf/1.73 lb/Macf upstream ESP injection	7/15/2009	1220	0.13	0.68	1.37	0.13
Darco Hg LH 1.06 lb/Macf upstream ESP injection	7/22/2009	1715	0.28	N/A	N/A	0.28
Darco Hg LH 1.01 lb/Macf upstream ESP injection	7/23/2009	1730	0.18	N/A	N/A	0.18

* All fields average is a collection percentage weighted average of the fields, not a linear average. The fractional split is 0.994/0.004/0.002 for fields 1/ 4&5 / 6&7, respectively.

Table 4-33. FGD Absorber Solids Analyses for Phase IV

Date	6/11/2009	6/12/2009	6/18/2009	7/12/2009	7/13/2009	7/14/2009
Condition	Baseline	Baseline	ACI	Br + ACI	Baseline	Upstream ESP ACI
Time	12:15	10:30	16:45	10:45	12:50	11:20
pH		5.82	5.68	5.60	5.62	5.64
Temperature				56	60	60.4
ORP		55	-48.6			
ORP, actual		272	168.4	196.2	176.3	164
Ca, mg/g	232	238	239	231	236	239
Mg, mg/g	1.03	0.67	0.54	0.69	0.33	0.50
SO3, mg/g	<7	<7	<7	<7	<7	<7
SO4, mg/g	481	493	474	478	505	485
CO3, mg/g	30.7	29.9	49.7	29.8	24.1	29.0
inerts, wt%	3.20	1.83	2.27	3.22	1.26	1.72
solids, wt%	2.18	2.92	2.38	3.00	7.91	7.68
oxidation, %	100.0	100.0	100.0	100.0	100.0	100.0
utilization, %	89.3	89.6	84.8	89.4	91.7	89.1
Closures						
Weight, %	-4.2	-3.5	-3.6	-4.8	-3.3	-4.7
Molar, %	2.8	2.9	1.9	2.9	2.2	4.1

Table 4-34. FGD Absorber Liquor Analyses for Phase IV

Date	6/11/2009	6/12/2009	6/18/2009	7/12/2009	7/13/2009	7/14/2009
Condition	Baseline	Baseline	ACI	Br + ACI	Baseline	Upstream ESP ACI
Ca, mg/L	855	861	843	832	867	861
Mg, mg/L	2985	2791	3333	3302	3568	3705
Na, mg/L	9837	8981	11014	11660	12657	12904
Br, mg/L	203	184	235	508	529	503
Cl, mg/L	15739	15097	18340	19089	20926	19901
CO3, mg/L	210	145	169	169	173	184
SO3, mg/L	5.29	3.94	3.08	3.02	3.17	4.45
SO4, mg/L	13109	12107	14490	15438	15411	14735
Charge Imbalance						
Calculated, %	-2.3	-3.2	-3.5	-4.3	-3.5	-0.1

4.6 Trace Metals Measurements

Trace Metals Measurements in Coal, Fly Ash, FGD, and Flue Gas

During baseline, ACI (1.89 lb/Macf Darco Hg-LH), and ACI + Br (0.48 lb/Macf Darco Hg + 122 ppm Br to coal, dry basis) test days, trace element characterizations were performed on several process streams including coal, ESP ash, FGD liquors and solids, and flue gas at the ESP outlet and stack. These measurements were made to determine the effects of bromide addition and sorbent addition on the fate of trace elements across the system.

One sample of each coal type, PRB and TxL, was obtained for each test condition (baseline, ACI, ACI + Br). Table 4-35 shows the daily sample trace element concentrations as well as the averages over the three days. The 7/14/09 TxL sample was significantly lower in most trace metals concentrations than the 7/12/09 and 7/13/09 TxL samples. The trace metals concentrations of the three daily PRB samples were more consistent than the TxL samples. Because of the difficulties in obtaining representative coal samples, the average trace metals concentrations for each coal type were used for conducting mass balance calculations. A weighted average, blended fuel, trace element concentration was calculated for each day using the average PRB and TxL individual trace element concentrations measured. The daily weighted averages were based upon the BTU percentage of each type of fuel burned that day and are shown in Table 4-36.

Table 4-35. Trace Elements Concentrations for TxL and PRB Samples for July 12-14, 2009

Date	**7/12/09**		**7/13/09**		**7/14/09**		**Average**	
Coal Type	**PRB**	**TxL**	**PRB**	**TxL**	**PRB**	**TxL**	**PRB**	**TxL**
	Coal Trace Element Concentration (ppm, dry)							
Ag	0.1	0.2	0.1	0.4	0.1	0.1	0.1	0.2
As	4.3	2.2	2.6	1.7	1.3	1.0	2.7	1.7
Ba	380	350	356	197	400	89.4	379	212
Be	10	NR	NR	NR	NR	NR	NR	NR
Cd	0.05	0.09	0.09	0.10	0.07	0.04	0.07	0.08
Co	2.0	3.9	3.0	3.2	2.3	1.5	2.4	2.9
Cr	5.8	23.3	5.2	17.2	4.6	4.9	5.2	15.1
Cu	8.9	16.7	11.9	20.7	9.1	4.5	10.0	14.0
Hg	0.1	0.3	0.1	0.4	0.1	0.3	0.1	0.3
Mn	13.4	143	27.7	133	14.4	26.0	18.5	101
Ni	7.7	13.9	9.6	11.5	8.0	3.7	8.4	9.7
Pb	2.5	8.2	2.5	6.7	2.3	2.0	2.4	5.6
Sb	NR	NR	NR	NR	NR	NR	NR	NR
Se	<1	7.4	<1	5.3	<1	4.1	1.0	5.6
Tl	0.19	0.19	0.04	0.09	0.04	0.07	0.09	0.12
V	12.7	48.5	18.1	40.9	14.8	10.7	15.2	33.4
Zn	9.5	13.2	29.8	13.2	8.8	7.2	16.0	11.2

* NR indicates that that element was not analyzed.

Table 4-36. Weighted Average Coal Trace Elements Concentrations for July 12-14, 2009

Date	7/13/09	7/14/09	7/12/09
Condition	**Baseline**	**ACI**	**ACI + Br**
Coal Blend Wt% TxL/PRB	63 / 37	64 / 36	60 / 40
	Coal Trace Element Concentration (lb/TBTU)*		
Ag	19.1	19.2	18.7
As	205	204	209
Ba	27246	27078	27812
Be	NR	NR	NR
Cd	7.3	7.3	7.3
Co	268	269	267
Cr	1140	1151	1107
Cu	1244	1248	1230
Hg	22.2	22.5	21.5
Mn	6998	7081	6719
Ni	919	920	915
Pb	441	444	430
Sb	NR	NR	NR
Se	388	392	373
Tl	10.6	10.6	10.5
V	2653	2672	2591
Zn	1293	1288	1309

* NR indicates that that element was not analyzed.

Method 29 measurements were made in triplicate for each condition (baseline, ACI, and ACI + Br) at the ESP outlet and stack locations; data for each run are listed in Appendix L. Tables 4-37 and 4-38 present the average emissions and 95% confidence intervals for each measured species at the ESP outlet and stack, respectively, for each mercury control condition evaluated. The entry "ND" followed by parentheses indicates that the measured value was below the method detection limit, with the detection limit listed in the parentheses.

Table 4-37. ESP Outlet Flue Gas Trace Metals Concentrations, Average of Three Runs for Each Test Condition

Date	**7/13/09**		**7/14/09**		**7/12/09**	
Condition	**Baseline**		**ACI**		**ACI + Br**	
	ESP Outlet Emissions (lb/TBTU)	**95% Confidence Interval**	**ESP Outlet Emissions (lb/TBTU)**	**95% Confidence Interval**	**ESP Outlet Emissions (lb/TBTU)**	**95% Confidence Interval**
Ag	ND (0.3)	0.2	0.4	0.1	ND (0.2)	0.0
As	ND (0.7)	0.4	ND (1.4)	0.3	ND (0.6)	0.0
Ba	86.4	166	214	56.9	34.4	36.3
Be	0.1	0.1	0.2	0.0	0.0	0.0
Cd	ND (0.1)	0.0	ND (0.1)	0.1	ND (0.1)	0.0
Co	0.8	1.0	2.3	0.3	0.3	0.4
Cr	ND (3.8)	0.2	6.4	0.7	3.4	1.1
Cu	2.9	3.2	6.5	1.2	2.4	1.6
Hg	17.6	12.9	9.6	3.9	9.4	1.3
Mn	29.6	45.5	71.5	68.0	14.9	11.2
Ni	ND (3.0)	0.7	ND (4.3)	0.3	3.7	2.3
Pb	2.7	6.6	4.7	0.9	ND (2.4)	5.3
Sb	ND (0.4)	0.2	ND (0.7)	0.1	ND (0.4)	0.1
Se	471	485	548	126	580	96.5
Tl	ND (0.1)	0.1	ND (0.2)	0.0	ND (0.1)	0.0
V	6.8	13.3	19.8	4.6	3.2	4.1
Zn	10.9	4.0	13.7	2.5	10.0	10.4

Table 4-38. Stack Flue Gas Trace Metals Concentrations, Average of Three Runs for Each Condition

Date	**7/13/09**		**7/14/09**		**7/12/09**	
Condition	**Baseline**		**ACI**		**ACI + Br**	
	Stack Emissions (lb/TBTU)	**95% Confidence Interval**	**Stack Emissions (lb/TBTU)**	**95% Confidence Interval**	**Stack Emissions (lb/TBTU)**	**95% Confidence Interval**
Ag	ND (0.2)	0.0	ND (0.2)	0.0	ND (0.3)	0.1
As	ND (0.7)	0.0	ND (0.7)	0.0	ND (0.7)	0.1
Ba	22.7	13.1	38.3	19.3	18.8	3.9
Be	ND (0.0)	0.0	0.0	0.0	ND (0.0)	0.0
Cd	ND (0.1)	0.0	ND (0.1)	0.0	ND (0.2)	0.3
Co	0.2	0.0	0.3	0.2	0.1	0.0
Cr	ND (2.9)	0.8	12.0	36.7	ND (3.2)	0.8
Cu	1.2	0.3	2.0	0.5	1.3	0.4
Hg	11.4	6.4	5.7	2.0	5.3	0.5
Mn	48.6	19.8	57.5	63.3	15.2	9.1
Ni	ND (2.9)	1.8	ND (4.3)	4.1	ND (2.6)	0.8
Pb	ND (1.2)	0.2	ND (1.6)	0.19	ND (1.6)	0.3
Sb	ND (0.4)	0.0	ND (0.4)	0.1	ND (0.4)	0.0
Se	62.9	9.8	58.2	6.4	81.0	25.5
Tl	ND (0.1)	0.0	ND (0.1)	0.0	ND (0.1)	0.0
V	1.8	0.9	3.8	2.0	1.6	0.6
Zn	6.8	3.2	6.7	4.7	11.8	5.1

Trace metal removals were calculated by comparing the measured emission rates of the various species at each sampling location (ESP outlet or stack) to the coal input rate; results are tabulated in Table 4-39. Those values marked with an NC were not calculable because both the coal and M29 concentrations were below the analytical detection limit. Those values with a greater than symbol indicate that removal was at least that value because the M29 measurement values were below the detection limit.

Table 4-39. Trace Metals Removal from Coal to ESP Outlet and Coal to Stack

Date	7/13/09		7/14/09		7/12/09	
Condition	**Baseline**		**ACI**		**ACI + Br**	
	Coal to ESP Outlet Removal	**Coal to Stack Removal**	**Coal to ESP Outlet Removal**	**Coal to Stack Removal**	**Coal to ESP Outlet Removal**	**Coal to Stack Removal**
Ag	> 98.5%	> 98.8%	97.8%	> 98.9%	> 98.8%	> 98.5%
As	> 99.7%	> 99.7%	> 99.3%	> 99.7%	> 99.7%	> 99.7%
Ba	99.7%	99.9%	99.2%	99.9%	99.9%	99.9%
Be	NC	NC	NC	NC	NC	NC
Cd	> 98.8%	> 98.9%	> 98.2%	> 98.8%	> 99.0%	> 97.7%
Co	99.7%	99.9%	99.2%	99.9%	99.9%	99.9%
Cr	> 99.7%	> 99.7%	99.4%	99.0%	99.7%	> 99.7%
Cu	99.8%	99.9%	99.5%	99.8%	99.8%	99.9%
Hg	20.9%	48.8%	57.3%	74.8%	56.3%	75.5%
Mn	99.6%	99.3%	99.0%	99.2%	99.8%	99.8%
Ni	> 99.7%	> 99.7%	> 99.5%	> 99.5%	99.6%	> 99.7%
Pb	99.4%	> 99.7%	98.9%	> 99.6%	> 99.4%	> 99.6%
Sb	NC	NC	NC	NC	NC	NC
Se	-21.4%	83.8%	-39.6%	85.2%	-55.7%	78.3%
Tl	> 99.2%	> 99.3%	> 98.5%	> 99.2%	> 99.3%	> 99.3%
V	99.7%	99.9%	99.3%	99.9%	99.9%	99.9%
Zn	99.2%	99.5%	98.9%	99.5%	99.2%	99.1%

Trace element removal across the ESP was very high (> 98.5%; most metals exceeding 99%) for all metals except selenium and mercury. Because selenium and mercury existed primarily in the vapor-phase, removal of these elements across the ESP was expected to be lower than that of the other metals which existed primarily in the particulate phase at flue gas temperatures experienced downstream of the air heater. Measured mercury removal across the ESP was 21% at baseline conditions and increased to ~57% during ACI and ACI+Br testing. Mercury was the only element that consistently experienced increased removal with the application of ACI and ACI+Br. For the other elements, small increases or decreases in removal were experienced at the two Hg control test conditions when compared to baseline operation. No trends in trace metals removal should be extracted from these small changes because the obtained data set was small, measured flue gas concentrations were low, and the variability in trace metals concentrations was high.

The FGD scrubber provided additional removal of all trace metals, as shown by an increase in coal-to-stack trace element removal as compared to coal-to-ESP outlet removal. Flue gas measurements showed no selenium removal across the ESP, but the FGD removed a significant amount of selenium (78 – 85%). Selenium was most likely present in the flue gas as an acid gas

(SeO_2) that would be expected to be readily removed by the FGD. The selenium removal across the FGD system was somewhat higher than the coal-to-stack SO_2 removal of ~73%.

There was little difference in coal-to-stack trace metals removal between the three test conditions (baseline, ACI, ACI + Br) evaluated. Any differences in calculated removal may have arisen due to the difficulty in obtaining accurate trace metals concentrations at low flue gas concentrations.

Table 4-40 shows the concentration of each measured element in fly ash sampled from the ESP during each test condition. The listed values represent a weighted average of analysis conducted on fly ash from the first field (which captured 94.1% of fly ash) and the 4th/5th fields (which captured 0.9% of the fly ash). Ash trace element concentrations by ESP field are provided in Appendix M.

Table 4-40. Fly Ash Trace Element Concentrations

	Ash Trace Element Concentration (lb/TBTU)		
Date	**6/12/09**	**7/14/09**	**7/12/09**
Condition	**Baseline**	**ACI**	**ACI + Br**
Ag	17.3	18.2	15.9
As	300	225	198
Ba	40278	26274	26676
Be	85.5	68.3	62.2
Cd	11.9	12.4	9.9
Co	364	322	299
Cr	1414	1325	1266
Cu	1764	1627	1538
Hg	0.5	8.8	11.7
Mn	5894	7836	7931
Ni	1036	937	871
Pb	623	619	542
Sb	51.3	54.2	48.3
Se	253	309	225
Tl	19.1	12.8	8.9
V	3020	2984	2819
Zn	1350	1234	1239

Table 4-41 shows the percentage of each trace element present in the coal, captured in the fly ash. The removal values were greater than 90% for all elements except selenium and were often greater than 100%. These high removal levels agree with the M29 measurements at the ESP outlet which indicated >99% removal for these metals. Fly ash selenium values indicated 65 – 80% removal in the ESP ash, which does not agree with the 0% removal predicted by M29 measurements at the ESP outlet. The fraction of mercury captured by the fly ash trended with the mercury removal calculated from M29 measurements.

The difficulties in obtaining representative coal and ash trace metals concentrations is evidenced by this selenium result as well as by calculated trace metals removal by the fly ash often exceeding 100%; however, the mass balance closure was acceptable for most metals, being within ±20%.

Table 4-41. Percentage of Coal Trace Elements Removed in the Fly Ash

	Percentage of Trace Element Removal from Coal by Fly Ash (%)		
Date	**6/12/09**	**7/14/09**	**7/12/09**
Condition	**Baseline**	**ACI**	**ACI + Br**
Ag	90.6%	94.8%	85.0%
As	146%	110%	94.7%
Ba	148%	97.0%	95.9%
Be	NC	NC	NC
Cd	163%	170%	136%
Co	136%	120%	112%
Cr	124%	115%	114%
Cu	142%	130%	125%
Hg	2.3%	39.1%	54.4%
Mn	84.2%	111%	118%
Ni	113%	102%	95.2%
Pb	141%	139%	126%
Sb	NC	NC	NC
Se	65.0%	78.6%	60.4%
Tl	180%	121%	84.8%
V	114%	112%	109%
Zn	105%	95.8%	94.7%

Collected fly ash from Limestone was also tested for trace metals leaching. The fly ash samples were leached using the SPLP test protocol. Table 4-42 below shows the leaching concentration results for the different test conditions. Table 4-43 shows the percentage of each trace metal that leached.

Table 4-42. Trace Elements Leachate Concentrations for SPLP Tests

	Leachate Concentration (µg/L)					
	Baseline		ACI		ACI + Br	
Element	Field 1	Fields 4&5	Field 1	Fields 4&5	Field 1	Fields 4&5
Ag	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
As	< 1	1.49	< 1	< 1	1.06	2.63
Ba	336	310	1930	485	2040	575
Be	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cd	0.464	1.21	0.642	1.17	0.502	1.24
Co	0.804	1.18	1.15	1.38	1.22	1.26
Cr	413	1040	680	2530	565	1260
Cu	1.03	1.76	1.68	1.56	1.27	1.15
Hg	0.023	0.018	0.008	0.008	0.013	0.009
Mn	3.74	5.52	5.64	6.14	5.23	5.31
Ni	1.35	2.14	1.81	2.64	1.67	2.22
Pb	< 2	< 2	< 2	< 2	< 2	< 2
Sb	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Se	454	2300	536	1660	316	1370
Tl	0.488	0.754	0.06	0.83	0.043	0.816
V	61.1	134	98.7	146	93.3	176
Zn	1.27	2.65	12.1	4.72	10.25	4.99

Table 4-43. Percentage of Trace Element Leached for SPLP Tests

	% of Ash Element Leached					
	Baseline		ACI		ACI + Br	
Element	Field 1	Fields 4&5	Field 1	Fields 4&5	Field 1	Fields 4&5
Ag	< 0.83%	< 0.71%	< 0.83%	< 0.67%	< 0.91%	< 0.71%
As	< 0.10%	0.07%	< 0.13%	< 0.05%	0.15%	0.13%
Ba	0.24%	0.21%	2.18%	0.29%	2.17%	0.34%
Be	< 0.07%	< 0.07%	< 0.09%	< 0.07%	< 0.09%	< 0.09%
Cd	1.16%	1.42%	1.61%	1.23%	1.43%	1.31%
Co	0.06%	0.07%	0.11%	0.09%	0.12%	0.08%
Cr	8.56%	16.64%	15.21%	39.53%	12.64%	19.24%
Cu	0.02%	0.02%	0.03%	0.02%	0.02%	0.01%
Hg	0.92%	0.90%	0.03%	0.02%	0.04%	0.03%
Mn	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Ni	0.04%	0.05%	0.06%	0.06%	0.05%	0.05%
Pb	< 0.09%	< 0.06%	< 0.10%	< 0.06%	< 0.10%	< 0.06%
Sb	< 0.23%	< 0.11%	< 0.22%	< 0.10%	< 0.24%	< 0.11%
Se	55.37%	21.60%	53.07%	17.66%	41.58%	15.57%
Tl	0.75%	0.84%	0.13%	0.87%	0.14%	0.82%
V	0.59%	0.79%	0.98%	0.77%	0.94%	0.93%
Zn	0.03%	0.03%	0.29%	0.05%	0.24%	0.05%

As shown in Table 4-42, the leachate concentrations for most elements were less than 10 ppb, with the exception of Ba, Cr, Se, and V. Of those elements, as shown in Table 4-40, only Cr and Se showed a percent leached of greater than 2%.

Most elements showed few significant differences in leaching behavior between baseline and test conditions. A *significant difference* occurred when the difference between the two results was greater than a factor of 2 (> 100%). Hg concentration in the leachate and percentage of Hg leached both decreased from baseline to the test conditions. Ba and Zn concentrations in the leachate and percentage of Ba and Zn leached both increased from baseline to the test conditions.

Table 4-44 and 4-45 present the concentrations of trace metals in the FGD absorber solids and liquor phases, respectively. Because the ACI and ACI+Br test conditions were each only maintained for ~12 hours, the FGD system did not achieve steady-state for these conditions. Data are presented here to document the trace metals concentrations, but are not intended to be used to analyze the impacts of mercury controls on FGD metals concentrations. To make such evaluations, test conditions would need to be maintained longer, more samples would need to be obtained, and the FGD input streams (limestone, makeup water) would need to be characterized.

Table 4-44. Trace Elements Concentrations of FGD absorber Solids.

	Trace Element Concentration (µg/g)		
Date	**7/13/09**	**7/14/09**	**7/12/09**
Condition	**Baseline**	**ACI**	**ACI + Br**
Ag	ND (0.4)	ND (0.4)	ND (0.4)
Al	1140	710	683
As	2.7	1.7	1.8
Ba	30.6	19.1	18.1
Be	ND (0.2)	ND (0.2)	ND (0.2)
Cd	ND (0.1)	ND (0.1)	ND (0.1)
Co	1.6	1.5	1.7
Cr	14.2	5.4	6.1
Cu	6.0	3.9	4.3
Fe	2580	1450	1710
Hg	2.2	1.5	1.5
Mn	120	72.6	86.6
Mo	1.3	0.65	0.93
Ni	23.6	22.5	21.9
Pb	0.82	0.60	0.42
Sb	0.18	0.11	0.12
Se	142	84.2	107
Sn	ND (4)	ND (4)	ND (4)
Sr	247	243	233
Ti	97.5	67.2	63.6
Tl	0.075	0.042	0.047
V	12.6	19.1	10.5
Zn	12.1	12.4	14.3

Table 4-45. Trace Elements Concentrations of FGD Absorber Liquors.

	Trace Element Concentration (µg/L)		
Date	**7/13/09**	**7/14/09**	**7/12/09**
Element	**Baseline**	**ACI**	**ACI + Br**
Ag	ND (0.4)	ND (0.4)	ND (0.4)
Al	1250	1380	904
As	91.9	85.7	89.1
Ba	441	498	444
Be	2.7	2.8	ND (2)
Cd	12.9	12.1	12.2
Co	74.9	74	71.9
Cr	37.4	39.1	37.1
Cu	328	334	297
Fe	67.8	116	82
Hg	ND (2.7)	3.4	3.3
Mn	530000	520000	494000
Mo	1770	1760	1680
Ni	1170	1160	1120
Pb	ND (10)	ND (10)	ND (10)
Sb	9.3	10.0	9.2
Se	19300	18800	17700
Sn	ND (40)	ND (40)	ND (40)
Sr	7550	7570	7580
Ti	ND (50)	ND (50)	ND (50)
Tl	8.4	8.4	7.7
V	76.5	74.3	49.8
Zn	251	238	254

Evaluation of Cooper XFM Trace Metals Measurement Technique

This section compares the results from EPA Method 29 and an adaptation of CES' XFM method for arsenic, cadmium, chromium, iron, mercury, lead, selenium, and strontium. Most of these metals were chosen for their regulatory importance; however, iron and strontium were evaluated because both metals were well above their detection limits and thus provided a good means of comparison between the two methods. Although the XFM has not been optimized for this measurement application, the primary objective of this comparison was to evaluate the XFM method's potential to facilitate more efficient and timely evaluation of control options for mercury and other trace metals. Additional XFM metals data for aluminum, silver, barium, beryllium, cobalt, copper, manganese, molybdenum, nickel, lead, antimony, tin, titanium, thallium, vanadium, and zinc are provided in the Appendix N.

Simultaneous flue gas samples were collected using both EPA Method 29 and Cooper XFM at the ESP outlet and at the stack. At both locations, three Method 29 runs were performed on one baseline day, one day during which 1.89 lb/Macf ACI was carried out, and one day during $CaBr_2$ injection. In an adjacent duct at both locations, six XFM runs were performed per day; i.e., two XFM runs per single Method 29 run. The XFM runs were collected during the same time period as the Method 29 runs to enable direct comparison of results.

Results from the trace metal characterization measurements are illustrated in Figures 4-13 through 4-18; the y-axis on each plot is a log scale so all the obtained data can be clearly illustrated. Figures 4-19 and 4-20 illustrate Method 29 data for all three conditions at the ESP outlet and stack, respectively. All reported values represent the sum of particulate and vapor phase data and are presented as $\mu g/Nm^3$ dry normalized to 3% O_2. Stack arsenic results obtained with XFM are not presented because the data did not pass quality validation checks, likely due to probe contamination.

In the case of Method 29, many of the measured metals concentrations were below the detection limit. In the event that one portion of a given sample (i.e. the particulate) showed a detectable amount of a specific metal while the other portion (i.e. vapor phase) was a non-detect, the two portions were added together and designated with a less than symbol (* above the bar in the figures) if the non-detect was greater than 50% of the detected value. If the non-detect was less than 50% of the detected value, only the detected value was reported.

Although all metals were at least partially removed across the FGD, the limited amount of data available showed no general trend of increased removal of metals, except for mercury, with the implementation of mercury control technologies (see Figures 4-19 and 4-20). The collected data were too limited to allow for conclusions to be drawn as to the impact of mercury control technologies on the emissions of other trace metals. More data are necessary to account for the fluctuations associated with operating variability.

In general, the results obtained with the two measurement methods were comparable, although no specific numerical criteria were established to characterize equivalency. The two methods provided comparable results for the vapor-phase metals (Se, As, Hg). In cases where metal concentrations were below the Method 29 detection limit (DL; i.e. As, Cd, Cr), the XFM results were also very low, albeit still above the DL of the method.

The lower concentrations measured by XFM for the ash-related elements may be due to a bias associated with the XFM sampling procedure, which was performed sub-isokinetically; fly ash deposited in the probe was not analyzed. However, the Method 29 and XFM sampling events occurred in adjoining ducts as single point measurements. Stratification across the ESP outlet is a documented phenomenon at LMS; therefore, the measured concentration differences may be real.

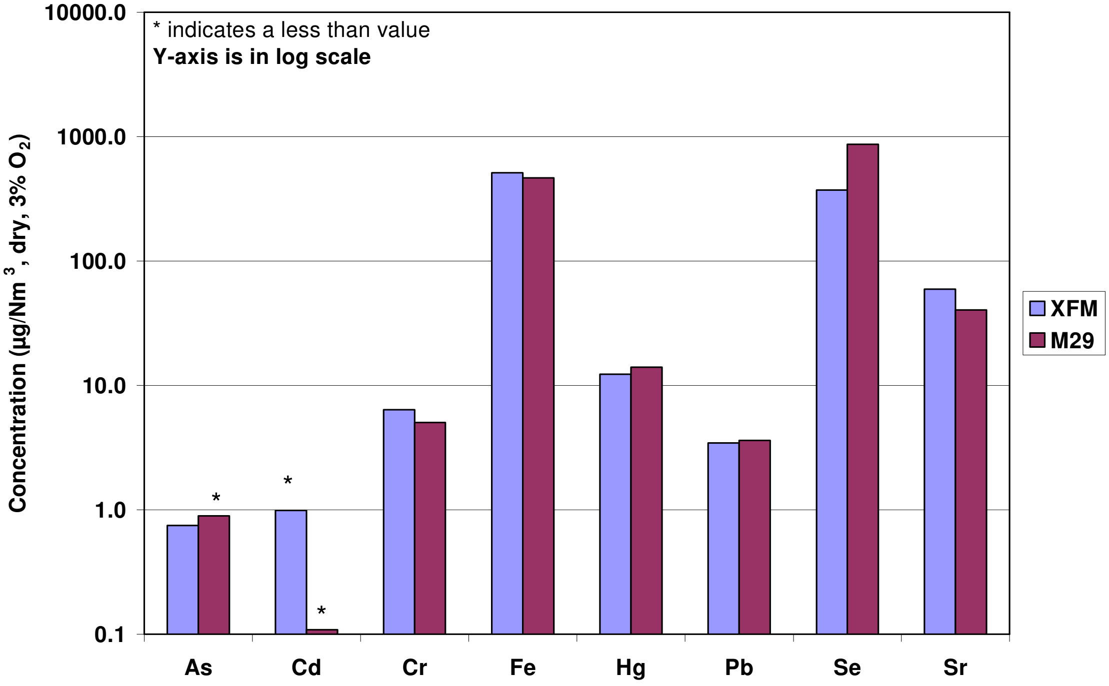


Figure 4-13. Comparison of Average XFM and M29 Metals Concentrations at the ESP Outlet on 7/12/09 ($CaBr_2$ + 0.48 lb/MMacf ACI)

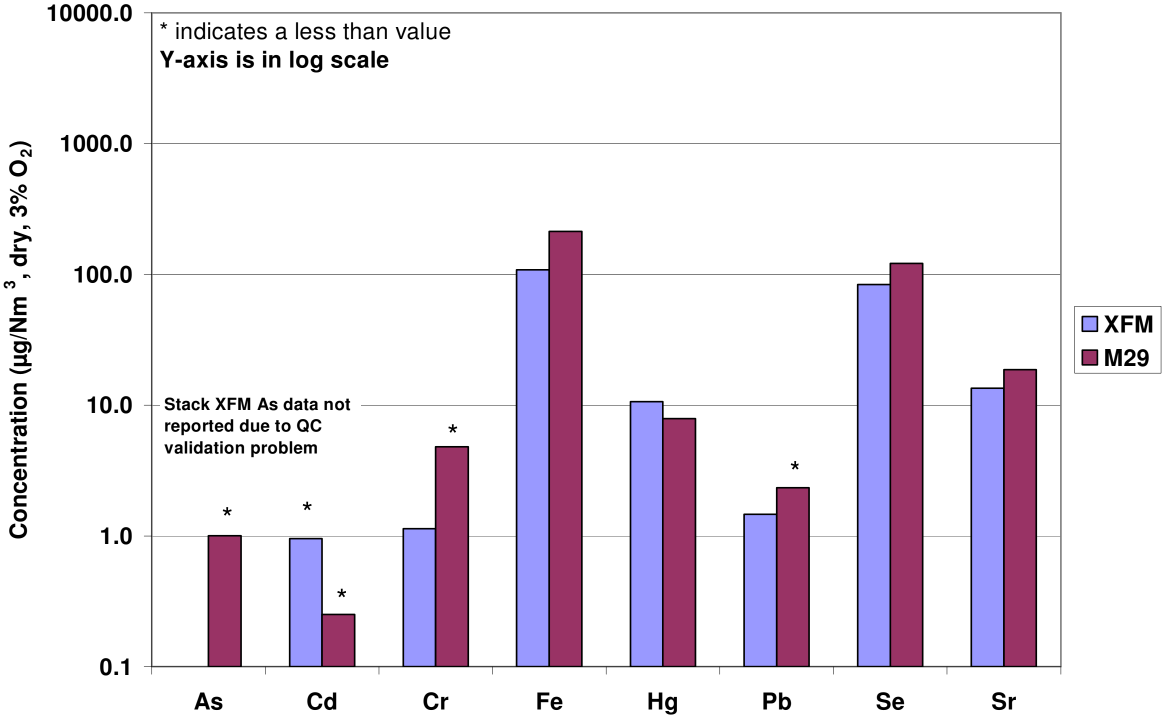


Figure 4-14. Comparison of Average XFM and M29 Stack Metals Concentrations on 7/12/09 ($CaBr_2$ + 0.48 lb/MMacf ACI)

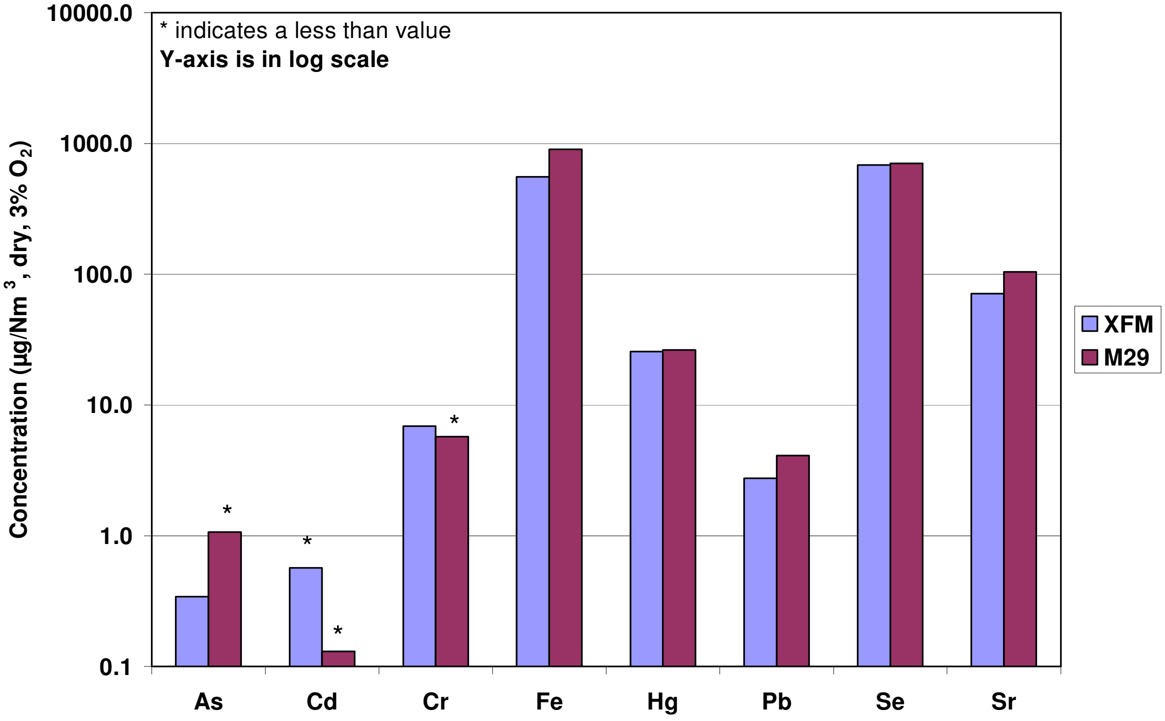


Figure 4-15. Comparison of Average XFM and M29 Metals Concentrations at the ESP Outlet on 7/13/09 (Baseline Conditions)

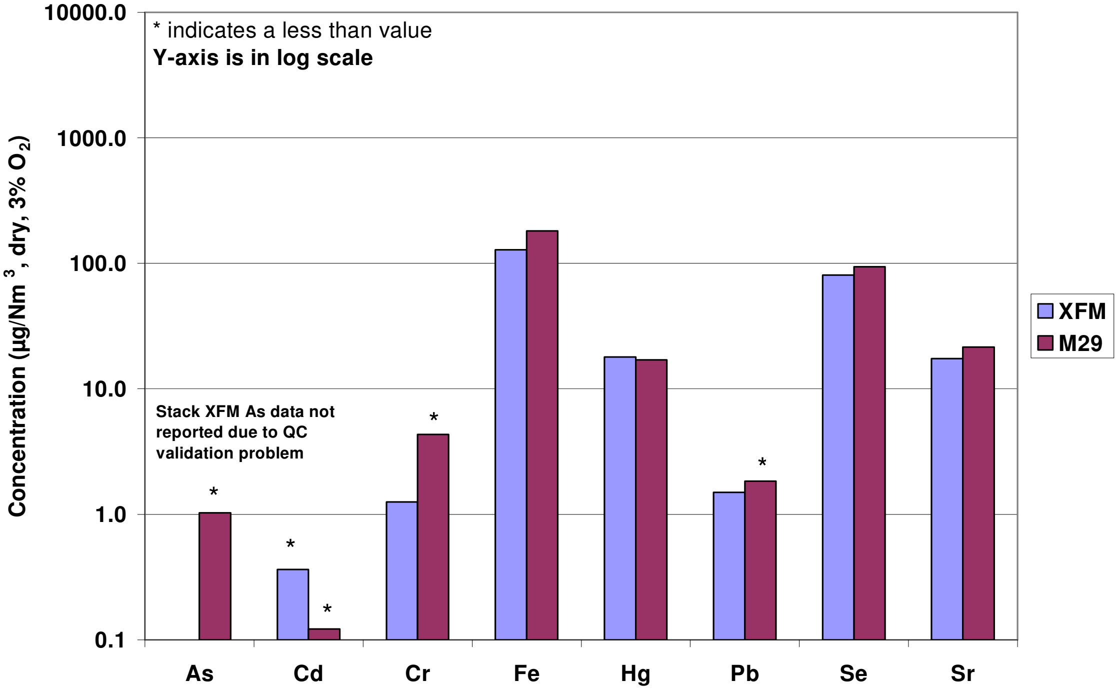


Figure 4-16. Comparison of Average XFM and M29 Stack Metals Concentrations on 7/13/09 (Baseline Conditions)

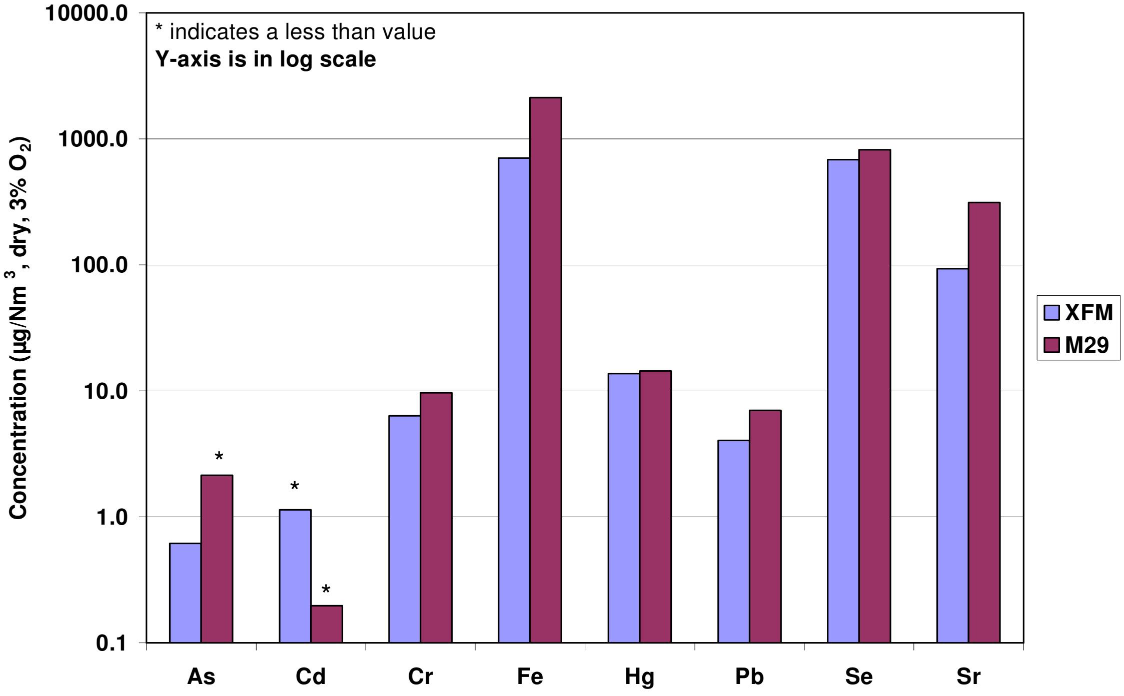


Figure 4-17. Comparison of Average XFM and M29 Metals Concentrations at the ESP Outlet on 7/14/09 (1.9 lb/MMacf ACI)

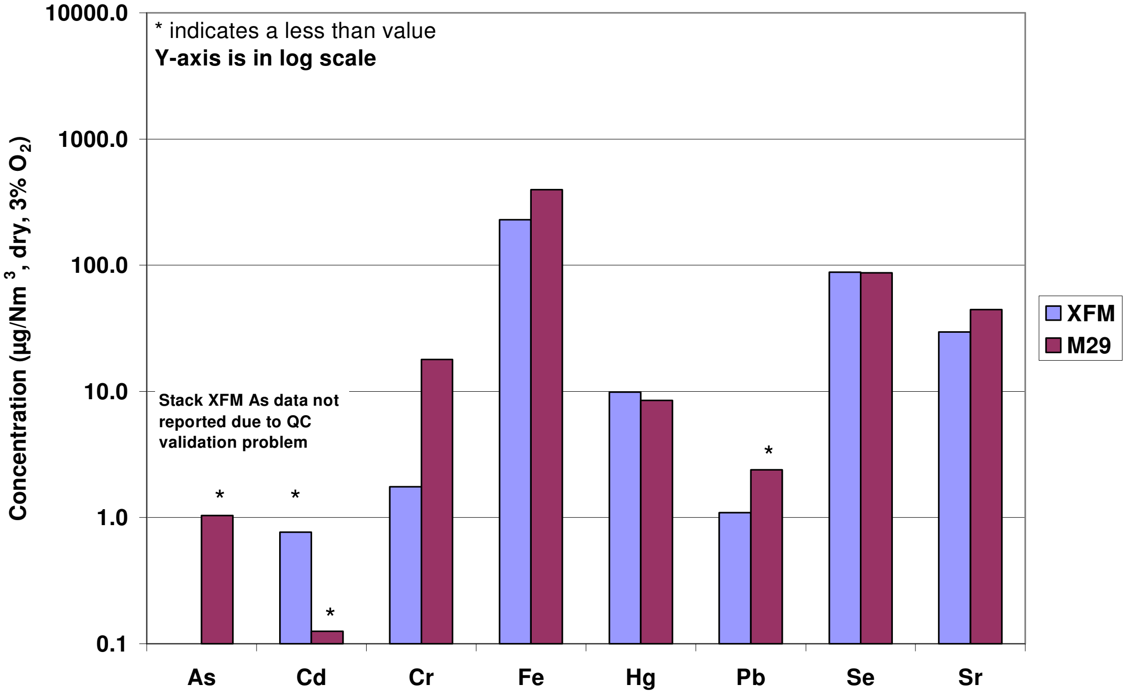


Figure 4-18. Comparison of Average XFM and M29 Stack Metals Concentrations on 7/14/09 (1.9 lb/MMacf ACI)

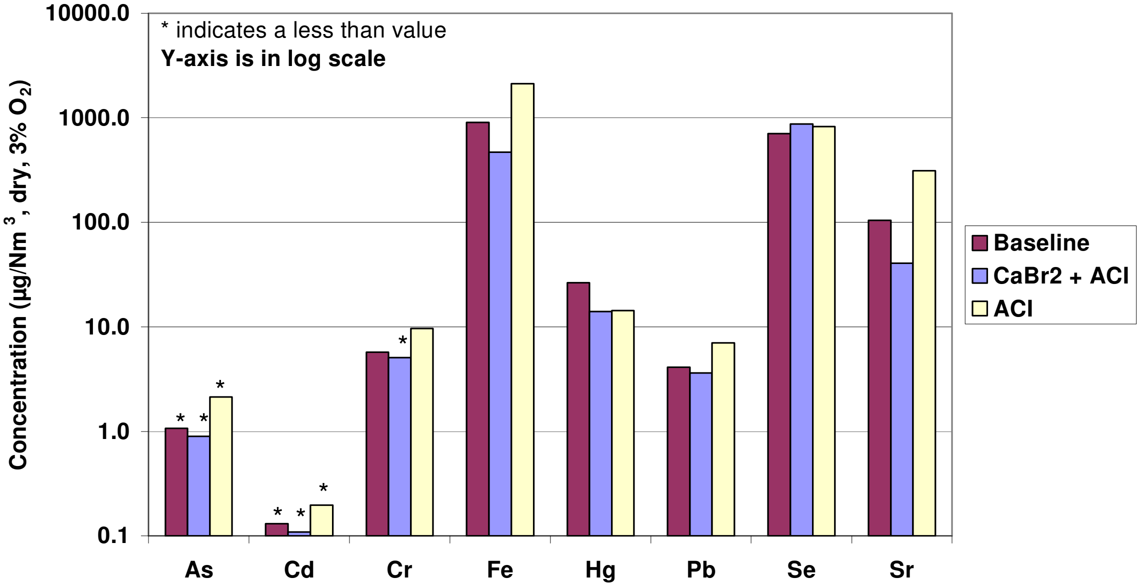


Figure 4-19. Method 29 ESP Outlet Data for Three Test Conditions

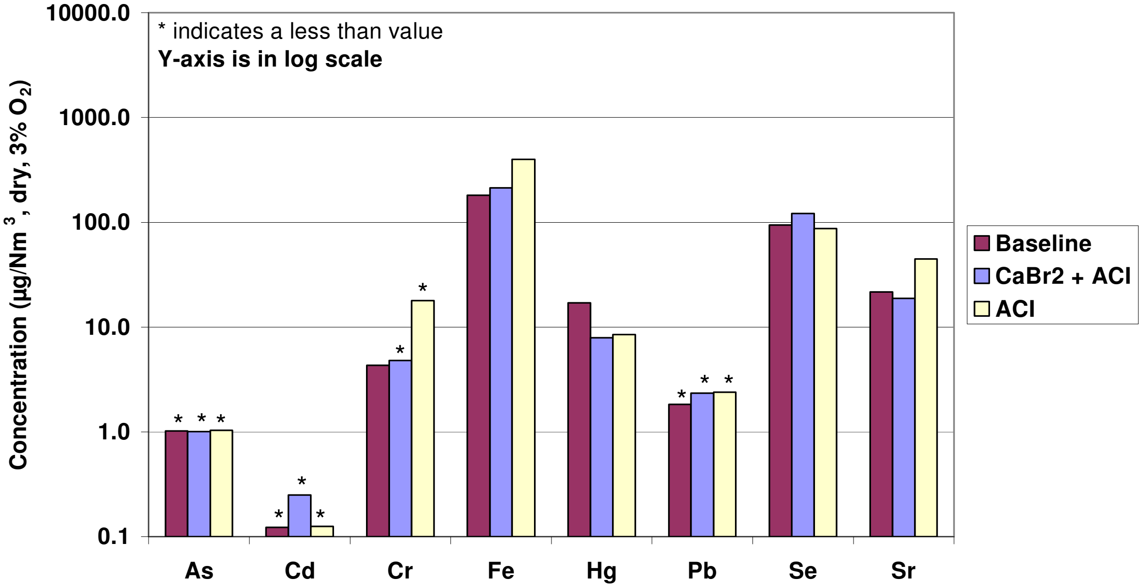


Figure 4-20. Method 29 Stack Data for Three Test Conditions

4.7 In-line Sorbent Particle Size Distribution Analysis

Measurements were conducted to evaluate the particle size of suspended sorbent material just prior to being injected into the flue gas. The objective of this characterization was to determine if the mean sorbent particle size changed, primarily through agglomeration, as it was transferred across the sorbent injection system. Results obtained at the sorbent lance location were compared to those for the respective sorbent prior to addition to the transfer line. This information is important as it provides indication of the sorbent particle size, and subsequently its effective surface area, as it is injected into the flue gas duct. The particle size measurements were conducted by Malvern Instruments, Inc.

Malvern used an Insitec Laser Diffraction system to measure in-situ particle size distribution (PSD) of activated carbon as it traveled through transfer lines from the carbon feeder to the injection lances. The Insitec system operates by continuously aspirating a representative sample of material out of the main process stream using a venturi eductor, dispersing the sample into a measurement chamber, then returning the sample to the main line using the same undiluted, aspirated gas stream. The optical portion of the system is cleaned with an air purge stream. A Malvern Instruments J-probe was employed to ensure that a representative sample was obtained by allowing for isokinetic sampling while minimizing collisions of particles with the sample tube walls. The installation included a Vortab® flow conditioner to straighten and homogenize flow.

PSD measurements were made over a range of injection rates for two different carbons: (1) a normal ground Darco Hg-LH with approximate mean diameter of 20 µm (denoted as standard Darco Hg-LH in this section), and, (2) a finely ground Darco Hg-LH, which was prepared by further grinding the normal sorbent to a mean diameter of ~ 6 µm. For each test condition, measurements were made over intervals ranging from 30 minutes to 3 hours. Data were analyzed to determine average values for each test period. Since each test condition was only performed once, the PSD data analyses presented below are not statistically rigorous; however, several observations can be made from the available data.

A test was conducted on 7/14/09 to evaluate bag-to-bag carbon PSD variability for the standard Darco Hg-LH sorbent. Grab samples were taken from totes 8090537 and 8081606 and analyzed for PSD. The PSD was also determined for carbon from each bag during injection at a rate of 2 lb/Macf. Table 4-46 compares Dv50, Dv90, and light transmission for the four different tests. Figure 4-21 shows a particle size frequency distribution for the two injection tests. Dv50 and Dv90 represent the particle size at which 50 and 90% of the particles are smaller than those sizes, respectively. Light transmission is the percentage of light that passes through the sample stream and is measured by the detector. An equipment error resulted in insufficient light transmission for samples taken during sorbent injection periods for this first test only. This issue was corrected for all other tests. While this error makes quantitative comparisons between injection and non-injection tests difficult to make, qualitative comparisons between the two injection tests can still be made.

Measurements showed that the carbon particles from bag 8090537 were approximately 15% larger than those from bag 8081606 when considering both Dv50 and Dv90 values obtained during offline measurements of sorbent collected directly from the bags. Malvern indicated that historic measurements with milled particles have shown that this level of variation between storage bags is common and does not represent a significant size difference. The variation between particle size distributions from the bag or injection at 2 lb/Macf cannot be compared due to the light transmission error noted previously for the injected samples.

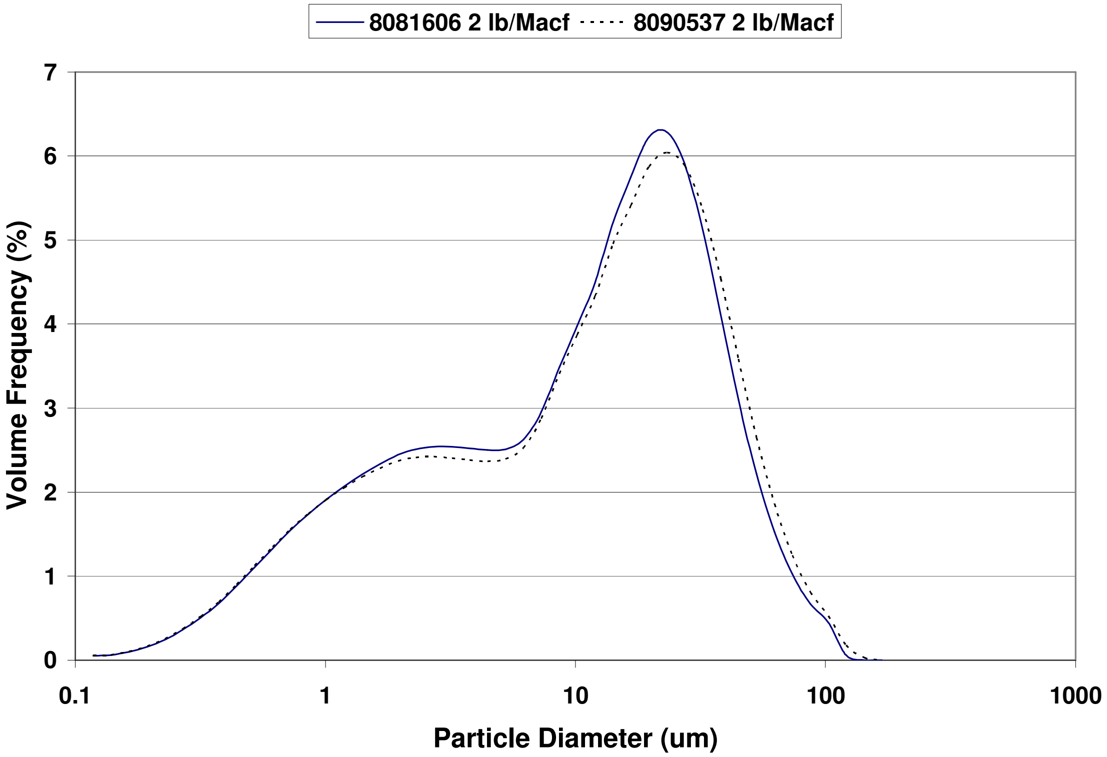


Figure 4-21. Particle Size Frequency for Standard Darco Hg-LH Injected at 2 lb/Macf

Table 4-46. Particle Size and Light Transmission for Two Separate Bags of Standard Darco Hg-LH

Test Condition	Dv 50 (µm)	Dv 90 (µm)	Light Transmission (%)
Bag 8081606 Offline	12.29	40.63	44.5
Bag 8081606 2 lb/Macf	11.04*	36.72*	2.7*
Bag 8090537 Offline	14.37	46.69	43.7
Bag 8090537 2 lb/Macf	11.55*	39.75*	3.0*

* These numbers are inaccurate due to an equipment error; however, they can be used for relative comparisons to other data obtained with the same equipment error.

The impact of injection rate on the PSD of suspended carbon in the sorbent transfer line was tested on 7/15/09. Continuous PSD measurements were made while sorbent injection rates were varied from 0.5 to 2 lb/Macf in increments of 0.25 lb/Macf. Table 4-47 shows Dv50, Dv90, light transmission, and specific surface area (SSA) results obtained during these tests. Specific surface area is calculated as the ratio of the surface area of a particle to its volume; this calculation assumes a solid particle and does not account for any accessible internal surface area. As shown in Table 4-47, transmission decreased as injection rate increased. The decrease in light transmission combined with the relatively constant SSA indicates that no significant particle agglomeration occurred in the carbon transfer line. Light transmission would be expected to decrease as the carbon concentration in the stream increases. The constant SSA indicates that particle size remained constant. There was no consistent trend of Dv50 and Dv90 with injection rate. Particle size frequency did not significantly change with injection rate (Figure 4-22); the variation in particle size between injection rates was similar to the observed bag-to-bag PSD variation (Table 4-46).

Table 4-47. Impact of Injection Rate on Sorbent Particle Size and Light Transmission - Standard Darco Hg-LH

Injection Rate (lb/Macf)	Dv 50 (µm)	Dv 90 (µm)	Light Transmission (%)	SSA (m^2/cc)
0.5	19.51	56.09	48.4	1.452
0.75	20.52	59.60	34.3	1.434
1.0	20.18	55.51	23.8	1.460
1.25	18.59	50.8	20.3	1.537
1.5	17.76	47.04	17.3	1.593
1.75	20.03	53.43	14.0	1.461
2.0	22.66	60.11	11.0	1.349

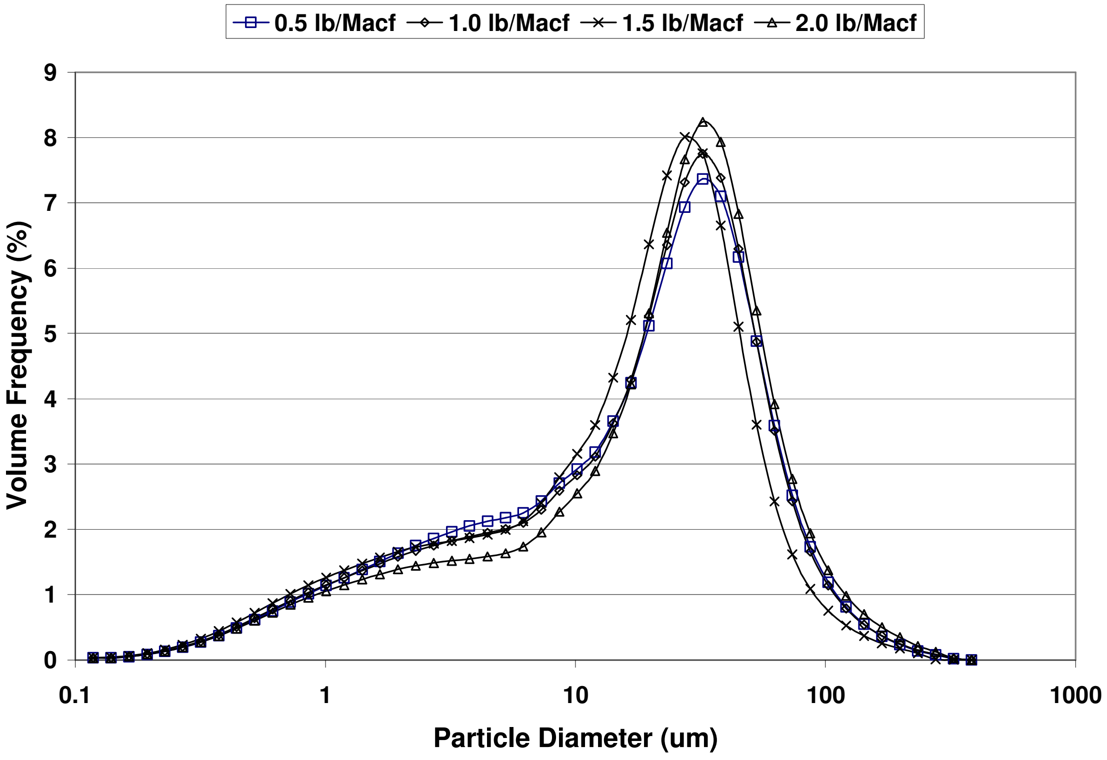


Figure 4-22. Particle Size Frequency for Different Injection Rates of Standard Darco Hg-LH

PSD measurements were made on 7/16/09 to evaluate the finely-ground Darco Hg-LH activated carbon. Figure 4-23 shows the particle frequency plots for four different injection rates. For the injection rate labeled “dispersed”, the data represent the first few minutes of injection when the rate should be low and agglomeration effects minimal. For the dispersed sample, a bimodal size distribution was seen with primary peaks near 3 µm and 15 µm. This bimodal distribution is common for re-ground samples which are usually first ground to a specific size and then ground again to a second smaller size. In the case of finely ground Darco Hg-LH, the carbon was ground to Dv50 size of ~ 20 µm and then re-ground to a size of ~ 6 µm. Particle size in the transfer line increased with feed rate for the finely ground carbon, while little increase was observed with the standard carbon over the same range of injection rates (Figure 4-22). At injection rates of 1 lb/Macf and greater, the particle size of the finely ground carbon was even larger than that of the normal ground carbon (Figure 4-24). The carbon feeder plugged at the highest tested injection rate (2 lb/Macf) of the finely ground carbon. The PSD for the finely ground carbon was broader than that of the standard carbon. These data suggest that particle agglomeration occurred with the finely-ground Darco Hg-LH carbon.

Table 4-48 shows Dv50 and SSA values for the finely ground and normal ground carbons measured at different feed rates. SSA measurements underestimate available surface area because it assumes a solid particle and does not account for pore space. SSA measurements for agglomerated particles may further under-represent the available surface area because the SSA model treats the agglomerated particle as a single solid entity of a uniform diameter. In reality, the agglomerated particle is comprised of several small particles, which create additional internal surface area that is not captured by the SSA model.

Table 4-48. Particle Size and SSA for Finely Ground and Standard Darco Hg-LH

Injection Rate	Darco Hg-LH - Normal Grind		Darco Hg-LH - Finely Ground	
(lb/Macf)	Dv50 (µm)	SSA (m^2/cc)	Dv50 (µm)	SSA (m^2/cc)
Dispersed	-	-	6.73	2.768
0.5	19.51	1.452	12.89	1.775
1.0	20.18	1.460	23.19	1.417
2.0	22.66	1.349	43.13	1.087

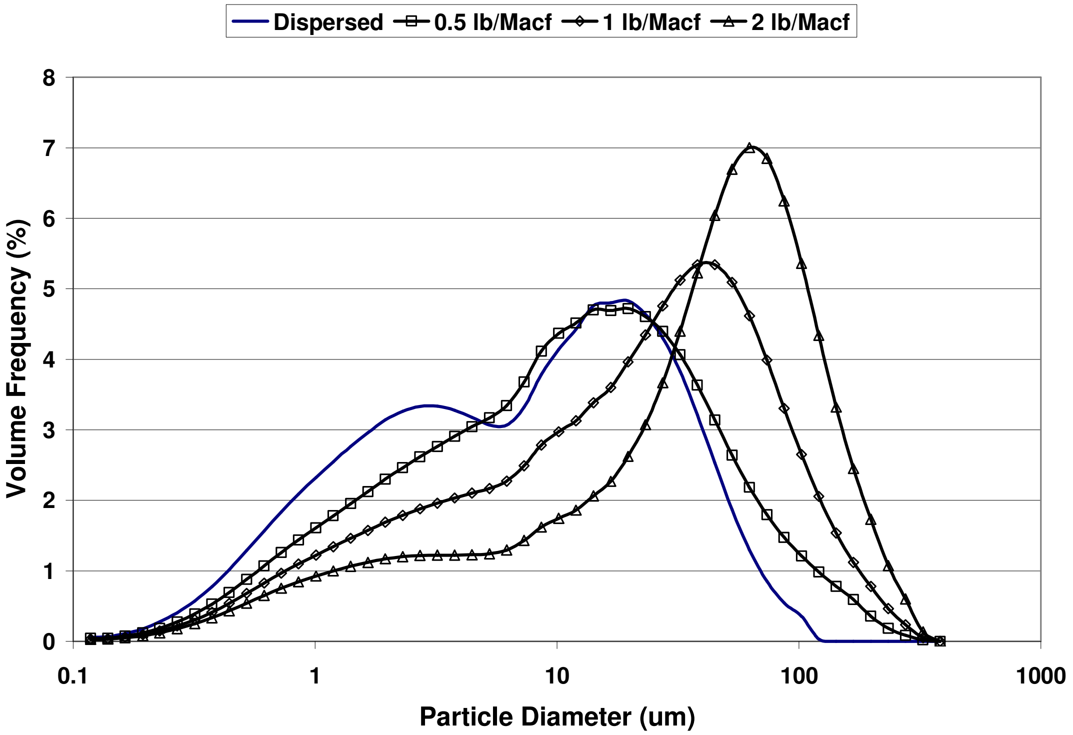


Figure 4-23. Particle Size Frequency as a Function of Injection Rate for Finely Ground Darco Hg-LH

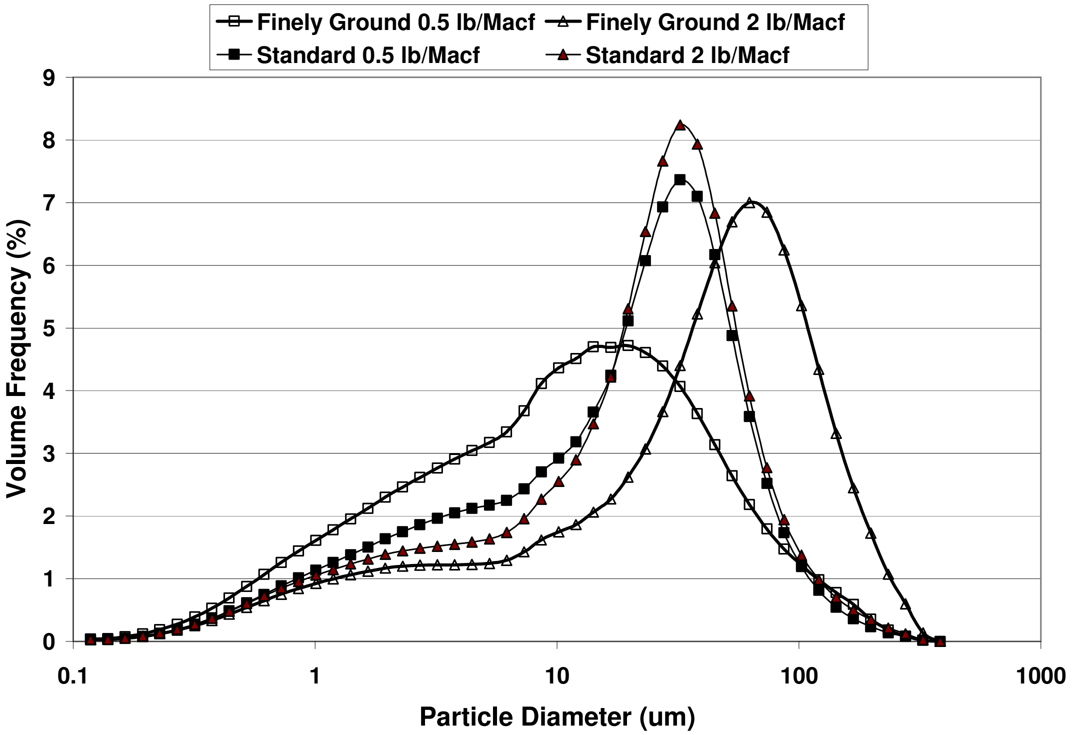


Figure 4-24. PSD Comparison of Standard and Finely-Ground Carbon

The standard Darco Hg-LH carbon evaluated at LMS showed typical bag to bag variation in size distribution, and no significant agglomeration with increased injection rate. The finely ground version of this carbon showed a broader particle size distribution than the standard carbon and showed increased particle agglomeration with increased injection rate. This agglomeration effect was large enough that at injection rates of 1 lb/Macf and higher the mean particle size for the finely ground carbon was greater than that for the standard carbon. This increased particle size has implications on the effectiveness of particle grinding as a way to enhance carbon coverage within the duct and, subsequently, mercury capture with ACI, and thus warrants further study. Additional testing of different carbons and particle sizes, as well as more replicate data, are needed to determine if the phenomena observed for the finely ground Darco Hg-LH were specific to this particular carbon, to all finely ground carbons, or whether this single day of test results was an anomaly. If carbon particle agglomeration is a problem, agglomerated particles should be mechanically cleaved immediately upstream of the sorbent lances.

4.8 ESP Outlet Particulate Emissions

Particulate concentration measurements were made with Method 17 at ESP inlet ports that serve both the 2C and 2D ESPs and at the ESP outlet duct 2D2. For all particulate measurements, tabulated values are presented as milligrain/dscf at 7% O_2 and as 10^{-3} lb/MMBtu. Method 17 measurements were made for baseline operation and three activated carbon injection rates: 0.5, 1.0, and 1.9 lb/MMacf.

Particulate concentration measurements were also made with Method 5 as part of the M29 measurements conducted at three test conditions: baseline operation, calcium bromide plus ACI, and ACI at 1.9 lb/MMacf. Method 5 results, as well as a comparison to Method 17 results, are provided in Appendix O. Inlet particulate loading measurements by port are presented in Figure 4-25.

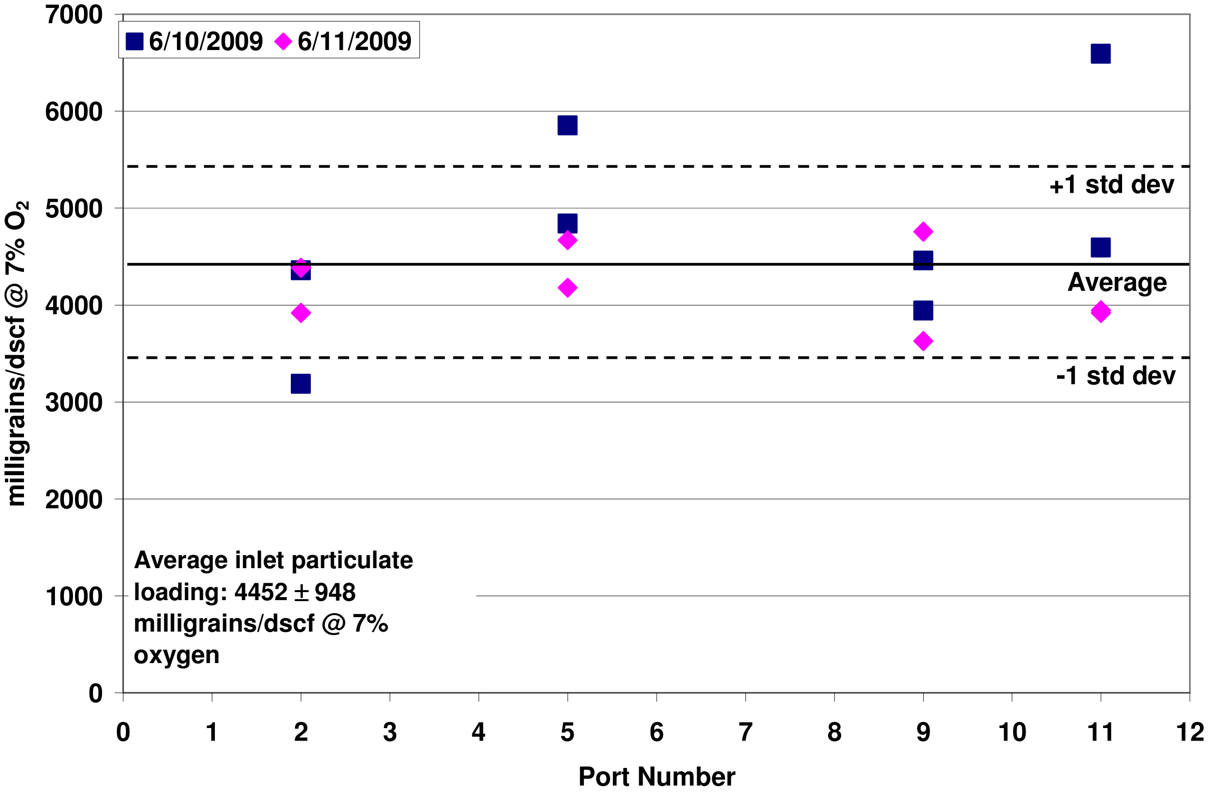


Figure 4-25. Baseline Particulate Loading Measurements at ESP Inlet by Port Number

Baseline particulate loading measurements at the ESP outlet are summarized in Table 4-49. Measured loadings ranged from 2.4 – 3.7 milligrain/dscf (7% O_2), with an average duct loading of 3.0 ± 0.65 milligrain/dscf, with the highest concentration measured at the bottom of the duct and the lowest measured at the top. Although all sampling was conducted within a 2-hour time period, each duct section was sampled sequentially, thus at a different time than the others.

Table 4-49. Baseline Particulate Loading Measurements at Outlet (Method 17)

Top or Bottom Half Traverse of Duct?	Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Top	6/10/2009	14:11	14:36	2.37	5.02
Bottom	6/11/2009	14:54	15:19	3.67	7.78
Top	6/11/2009	15:42	16:07	3.00	6.35
Average				**3.01**	**6.38**
Std Dev				**0.65**	**1.38**

Particulate loading measurements were made for three different activated carbon injection rates: 0.5 lb/MMacf, 1.0 lb/MMacf, and 1.9 lb/MMacf. Inlet and outlet particulate loading measurements were collected for 0.5 lb/MMacf and 1.0 lb/MMacf; however, only outlet measurements were collected for 1.9 lb/MMacf. The data for 1.0 lb/MMacf is shown in Table 4-50, the rest of the data are located in Appendix O.

Table 4-50. Inlet Particulate Loading Measurements for Sorbent Injection Test at 1.0 lb/MMacf (Method 17)

Run #	Port #	Date	Start Time	End Time	Inlet Particulate Loading (milligrain/dscf at 7% O_2)	Inlet Particulate Loading (10^{-3} lb/MMBtu)
1	2D2-2	6/17/2009	08:30	08:55	3130	6629
2	2D2-5	6/17/2009	09:31	09:56	5372	11377
3	2D2-9	6/17/2009	10:45	11:10	3605	7635
4	2D2-11	6/17/2009	11:23	11:48	4358	9231
5	2D2-11	6/17/2009	13:10	13:35	4515	9563
6	2D2-9	6/17/2009	13:47	14:12	3774	7993
7	2D2-5	6/17/2009	14:24	14:49	4254	9010
8	2D2-2	6/17/2009	14:58	15:23	2881	6102
Average					**3986**	**8442**
Std Dev					**807**	**1708**

Figure 4-26 compares particulate loading measurements made at the top and bottom of the ESP outlet duct for the various sorbent injection rates. During both baseline and sorbent injection, particulate concentrations were higher at the bottom of the duct than at the top. At the bottom of the duct, particulate concentrations were not affected by carbon injection; at the top of the duct, particulate concentrations were lower during sorbent injection than during baseline operation.

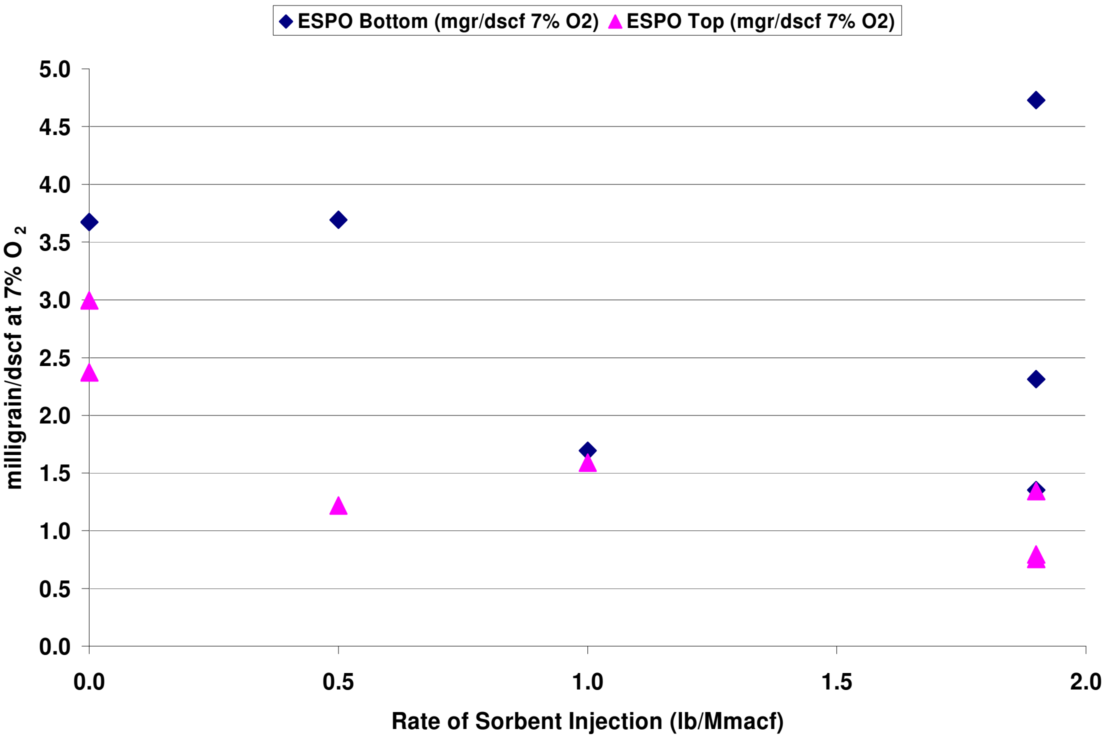


Figure 4-26. Comparison of Outlet Particulate Loading Measurements Made at the Bottom and Top Portions of the Duct

The average inlet particulate loading was relatively steady over the three days tested. Activated carbon injection into the ESP did not negatively effect measured particulate removal across the ESP for injection rates up to 1.0 lb/MMacf. The baseline removal was calculated as 99.93%, with an increase to 99.95% removal at an ACI rate of 0.5 lb/MMacf, and 99.96% removal at an ACI rate of 1.0 lb/MMacf. Since the average outlet concentration measurements for 1.9 lb/MMacf were in the same range as the average outlet concentration measurements of the other conditions, it is probable there was no negative effect on particulate matter removal at this rate either.

Activated Carbon Injection Process Economics

Capital and operating costs associated with various targeted levels of mercury control were developed for ACI at a hypothetical 500-MW electric generating station firing primarily Texas Lignite. The assumed configuration for this hypothetical plant is similar to LMS – it fires a 70/30 blend of Texas Lignite/PRB; it is equipped with a large-SCA ESP for particulate control and a limestone forced oxidation FGD for SO_2 control. The FGD does not create a salable gypsum byproduct. The activated carbon injection lances are installed upstream of the AH. The characteristics of the plant are summarized in Table 4-51. Average TxL and PRB coal compositions from the phase IV test at LMS were used to calculate an average coal mercury input of 970 lb/yr and ESP inlet mercury concentration of 40 $\mu g/dNm^3$ at 3% O_2. Baseline mercury removal across the ESP was measured to be 5%.

Table 4-51. Process Parameters for Hypothetical Plant in Economic Analysis

Parameter	Value
Coal Type	70/30 TxL/PRB blend
Particulate Control	Large-SCA ESP
SO_2 Control	Wet Limestone FGD, Inhibited Oxidation (Sulfur Emulsion)
Net Unit Load	500 MW
Net Heat Rate	9800 Btu/kwh
Unit Capacity Factor	0.85
Flue Gas Temperature at ESP Inlet	310°F
Flue Gas Flow Rate at ESP Inlet	1.9×10^6 acfm
Baseline Vapor Phase Hg Concentration at ESP Inlet	40 $\mu g/dNm^3$ at 3% O_2
Baseline Hg Removal across ESP	5%
Baseline Vapor Phase Hg Concentration at ESP Outlet	38 $\mu g/dNm^3$ at 3% O_2

Note: Flue gas conditions and activated carbon injection rates are provided as if injecting at the ESP Inlet to maintain uniformity for reference and comparison; however, the economic analysis was completed using the data while injecting at the AH Inlet injection location.

Economic analyses were derived for targeted mercury reductions of 50% and 70% across the system with recommendations on how to achieve 90% removal. The projected annual cost associated with a carbon injection system was composed of the following components:

Sorbent cost – This is the yearly cost of the sorbent. For this analysis, the chosen sorbent was Norit Americas' DARCO Hg-LH, currently available at an estimated $1.20/lb to $1.50/lb F.O.B. The delivery cost of the sorbent to the LMS plant from Norit's plant in Marshall, Texas was assumed to be $0.02125/lb. The DARCO Hg-LH sorbent performance curve generated during the Phase IV parametric tests (performed in 2009) with injection upstream of the air heater was used to estimate the sorbent injection rates needed to achieve 50% and 70% mercury reduction at the stack. As a means of easy comparison between economic analyses, this analysis focuses solely on Darco Hg-LH.

- ***Ash mitigation cost*** – This is the cost associated with treatment of the fly ash to make it viable for sale to the concrete industry. Several different ash mitigation scenarios were considered.
  - In the case of 50% mercury reduction at the stack, the required sorbent injection rate is only 0.18 lb/Macf. Based on the data obtained in this project, the fly ash containing this amount of carbon can be sold directly without the use of any ash mitigation techniques.
  - For the case of 70% mercury reduction, a sorbent injection rate of 1.3 lb/Macf is needed. In this case, the fly ash is not viable to sell for concrete and will need to be landfilled (at a cost of $22.6/ton for lost sales and landfilling). Phase IV data suggests this to be the case for all sorbent injection rates above 0.5 lb/Macf.
- ***Operating and maintenance cost*** – Labor is required to monitor the operation of the sorbent injection system, coordinate sorbent shipments, and provide routine maintenance. It was assumed that over the course of one year, an average of one hour per day would be needed, at a loaded labor rate of $50/hr. A spare parts budget of $5000/yr was allocated. The capital cost estimate already includes a spare feeder.

- ***Amortized capital cost*** – This is the cost associated with installation of the carbon injection system. The economic life of the equipment was assumed to be 15 years at an interest rate of 8%, for a capital recovery factor of 0.12.

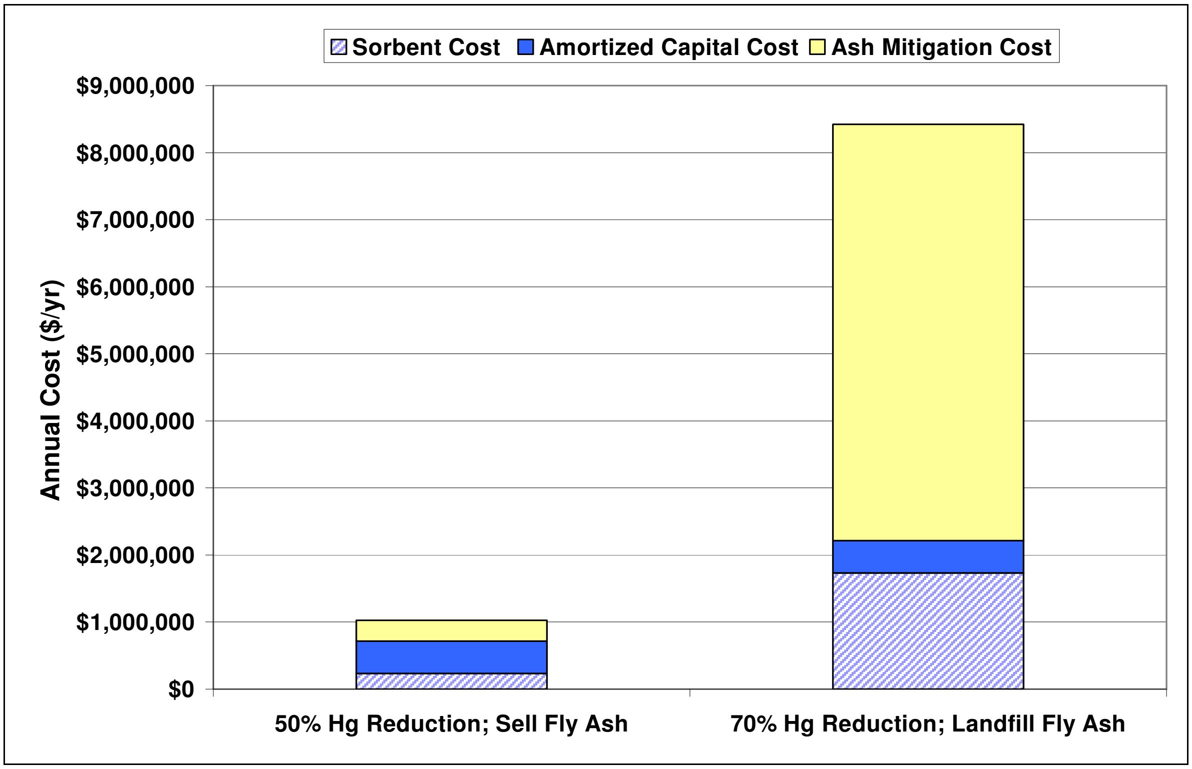
Table 4-52 and Figure 4-27 show the annual cost to achieve 50% and 70% mercury reduction at the stack. For each case the annual cost is broken down into its contributing components: sorbent cost, amortized capital cost, and ash mitigation costs. The cost for operating and maintaining the process is not presented in Figure 1 as it is too small (~$25,000) to appear. The results presented here are "first-year" costs, meaning the sorbent costs are presented in 2010 dollars while capital costs have been amortized over fifteen years.

To achieve 50% mercury reduction at the stack, the annual cost is projected to be $1.00M - $1.05M. To achieve 70% mercury reduction, the annual cost increases to $8.1M - $8.4M. The cost associated with ash mitigation (i.e. disposal of 100% of fly ash) contributes 73-77% of the annual cost associated with 70% mercury reduction.

The cost breakdown for 50% mercury removal assumes that a control scenario is implemented that is sufficient to preserve the ability to sell the fly ash by maintaining proper activated carbon injection rates. Should the engineering controls be insufficient to preserve the fly ash quality, all of the ash would need to be landfilled; this case is shown at the bottom of Table 2. The cost for 50% mercury reduction increases from $1.00M - $1.05M to $6.90M - $6.94M when all of the fly ash must be landfilled.

Table 4-52. Annual Cost Breakdown for ACI Upstream of AH

Targeted % Hg Reduction at Stack		50%	70%
Injection Location		Upstream of AH	Upstream of AH
Sorbent		Darco Hg-LH	Darco Hg-LH
ACI Injection rate	lb/Macf	0.18	1.3
ACI Injection rate at full load	lb/hr	21	153
ACI Injection	lb/yr	155,171	1,140,281
Foam Index Result (drops; BL = 3 drops)		9	14
Ash Disposal Plan		Sell all ash	Landfill Fly Ash (see below)
Rejection Rate of Fly Ash	%	5%	N/A
Total Annual Cost: Carbon+Capital+Ash Mitigation	**$/yr**	**$1,002,957-$1,049,508**	**N/A**
Annual carbon cost (including shipping)	$/yr	$189,503-$236,054	$1,392,568-$1,734,652
Operating and Maintenance	$/yr	$23,200	$23,200
Amortized Capital Cost For ACI System	$/yr	$480,000	$480,000
Ash Mitigation Cost	$/yr	$310,254	N/A
Lost Ash Sales + Landfill Cost	$/yr	$310,254	N/A
Case Name		50% Hg Reduction; Landfill Fly Ash	70% Hg Reduction; Landfill Fly Ash
Ash Disposal Plan		Landfill all ash	Landfill all ash
Rejection Rate of Fly Ash	%	100%	100%
Total Annual Cost: Carbon+Capital+Lost Ash Sales + Landfill	**$/yr**	**$6,897,784-$6,944,335**	**$8,100,849-$8,442,933**
Lost Ash Sales + Landfill Cost	$/yr	$6,205,081	$6,205,081



Note: Figure shows Sorbent Cost at $1.50/lb F.O.B.

Figure 4-27. Total Annual Cost of ACI for Two Different Levels of Hg Removal at the Stack

Table 4-53 presents the cost of ACI in units of $/lb Hg removed for removal across the ESP/FGD system. If the FGD system produced a salable gypsum byproduct, there would be concerns about possible carbon breakthrough from the ESP contaminating the gypsum product and resulting in lost sales. Testing at LMS did show visible signs of carbon breaking through the ESP; however, the testing was not on a scale to determine whether this would have an impact on the inert content and color of the FGD byproduct. The cost for mercury removal across the ESP/FGD systems ranged from $4,180/lb - $4,374/lb for 50% reduction at the stack, to $24,115/lb - $25,134/lb for 70% reduction at the stack.

Table 4-53. Cost of ACI in $/lb Hg Removed

Targeted % Hg Reduction at Stack	**%**	**50%**	**70%**
FGD Outlet Hg (BL)	lb/yr	480	480
Hg removed by ACI across ESP/FGD	lb/yr	240	336
FGD Outlet Hg (w/ ACI)	lb/yr	240	144
$/lb Hg removed (ESP + FGD)	**$/lb**	**$4,180- $4,374**	**$24,115- $25,134**

Recommendations to potentially achieve 90% Hg Removal

The mercury removal objectives of this analysis are met using 0.18 lb/Macf Darco Hg-LH to achieve an overall system removal of 50% while preserving fly ash integrity. With 1.3 lb/Macf Darco Hg-LH injection, system removals of 70% could be achieved (air heater inlet to stack, with 15% flue gas bypass), but ash integrity is compromised at injection rates above 0.5 lb/Macf.

Results from this test program showed that 90% removal of mercury was not achievable using a carbon injection rate conducive for fly ash resale. In addition, parametric test results suggest that 90% removal may not be possible at LMS using only an ACI control process. It is probable that with a combination of technologies, LMS could possibly achieve 90% Hg removal at the stack. An investigation of these options and their potential costs is presented below:

- Elimination of 15% FGD Bypass;
- Control FGD Hg Re-Emissions with Additives;
- SO_3 Mitigation;
- Injection of Finely Ground Carbon; and
- Improved Sorbent Distribution.

Elimination of FGD Bypass

The LMS FGD system currently operates with, on average, a 10-15% gas bypass. Flue gas characterization tests showed that ~96% of oxidized mercury is captured across the scrubber. If all of the flue gas was flowed through the FGD (eliminate any bypass), LMS could expect to achieve 2-6% additional mercury removal (assuming that 96% of the oxidized mercury previously being bypassed is removed in the FGD).

The elimination of the FGD bypass would result in an expected increase in FGD reagent usage and disposal costs assuming the plant would elect to capture more SO_2 (upon eliminating the bypass). There may be some positive impact on costs, however, such as reduced SO_2 emissions and the associated value of emissions credits.

Mercury Re-Emission Additives

As mentioned previously, intermittent mercury re-emissions were observed throughout the test program. The addition of re-emission additives to the FGD system can be used in combination with sorbent injection to potentially increase overall system mercury removal. Mercury re-emissions evolve from the liquor phase as previously scrubbed oxidized mercury is reduced to its elemental form. Re-emission additives work by precipitating oxidized mercury from the liquor phase before it is chemically reduced. Re-emission additives are ideal for increasing overall system mercury removal; however, their performance is highly dependent on the amount of oxidized mercury entering the FGD system as well as the chemical composition and operating conditions of the absorber.

Direct costs associated with a re-emission additive system would include capital and operational costs. Indirect costs associated with the additive system would include the potentially negative impact on gypsum quality, although the theoretical plant does not sell its gypsum byproduct. Each of these cost estimates and the assumptions associated with the estimates are discussed in the following sections.

Capital Costs

In determining a reasonable capital cost estimate, a simple system design was completed. This design assumed that the FGD additive would be unloaded, stored, and pumped from a storage tank to the injection locations using two (2) additive feed pumps (1 operating, 1 spare). The additive would be injected into the recycle slurry pumps' suction on each of the five (5) operating absorbers. The additive would be metered based on the mercury concentration at the absorber inlet and the estimated effectiveness of the additive.

Other injection locations that were considered include the limestone slurry storage tank and the absorber slurry reagent tanks. These two locations would not be as ideal, as they both increase the liquid-phase residence time of the additive and its exposure to trace metals present in the slurry. Mercury re-emission additives not only precipitate mercury but are capable of precipitating other trace metals. Freshly ground limestone introduces a significant amount of trace metals into the slurry system. This competition between mercury and other trace metals would reduce the overall effectiveness of the additive and would therefore require an excess of additive to counter the presence of trace metals. It is important that the additive is introduced at the point where the residence time can be minimized, thus making the recycle pump suction an ideal location for addition.

The typical reagent flow rate for a chemical additive was calculated to be 0.3 gallons per hour (gph), with a maximum addition rate of 3 gph, depending on what additive is selected. For the purposes of the capital cost estimate, the flow rate did not significantly impact the economic analysis.

The following capital equipment was assumed in researching and developing the cost estimate:

- Small storage tank with required heaters and instrumentation;
- Two (2) additive feed pumps (one operating, one spare);
- Flow meters and flow control valves for each absorber (to meter the flow based on absorber operating status, inlet mercury, etc.); and
- Necessary piping and instrumentation to control the process.

Based on the scope and based on other similar chemical injection projects, the total capital cost would be expected to be between \$1M – \$3M. A more detailed estimate would need to be completed to determine the cost with greater accuracy.

Operating Costs

Operating costs for an additive injection system include reagent and maintenance costs. The actual reagent costs will depend on the additive selected and the resulting usage rate of that additive. For purposes of this cost estimate, a range of expected additive costs were obtained and are presented in Table 4-54.

Table 4-54. Estimated Range of Costs for Annual Additive Consumption

	Low	Average	High
Additive Cost, per lb	$2	$5	$7
Dosage Range, gram additive to gram oxidized Hg	4	102	200
Annual Cost with 50% Hg Removal Upstream of FGD	$8,300	$107,500	$206,700
Annual Cost with 70% Hg Removal Upstream of FGD	$4,900	$64,100	$123,300

The labor required to monitor the operation of the additive injection system, coordinate additive shipments, and provide routine maintenance was estimated to be two hours per week. At a loaded labor rate of $50/hr, a total yearly cost for labor would be $5,200. A spare parts budget of $1,000/yr would be sufficient. With these assumptions, the total maintenance cost would be: $6,200.

Therefore, the total operating costs would range from $10,200 to $172,900 depending on the removal rate achieved upstream of the FGD and the additive selected. A more accurate estimate of reagent costs would require further investigation to determine the optimal additive and dosage rate.

SO_3 Mitigation

Mercury removal rates are directly affected by the SO_3 concentration in the flue gas. Vaporous SO_3 is formed during the combustion process as sulfur in the fuel is oxidized. Typically 1 to 2% of the sulfur is oxidized to SO_3 in the boiler; however, the amount of SO_3 formed can vary based on the coal fuel/oxygen stoichiometry, combustion temperature, and the presence of catalyst such as nickel and vanadium. As flue gas passes through the selective catalytic reduction (SCR) system, additional SO_3 is formed as a portion of the sulfur dioxide (SO_2) is converted to SO_3 as it passes through the catalyst. Normally, 0.5% to 2% of the SO_2 entering the SCR is converted to SO_3.

SO_3 directly competes with mercury for adsorption on unburned carbon and/or injected carbon. By implementing an SO_3 mitigation technology, LMS could expect to achieve higher mercury removal. Figure 4-28 below illustrates the effect of SO_3, and provides indication of how mercury capture in fly ash greatly improves as SO_3 concentrations decrease to very low values.

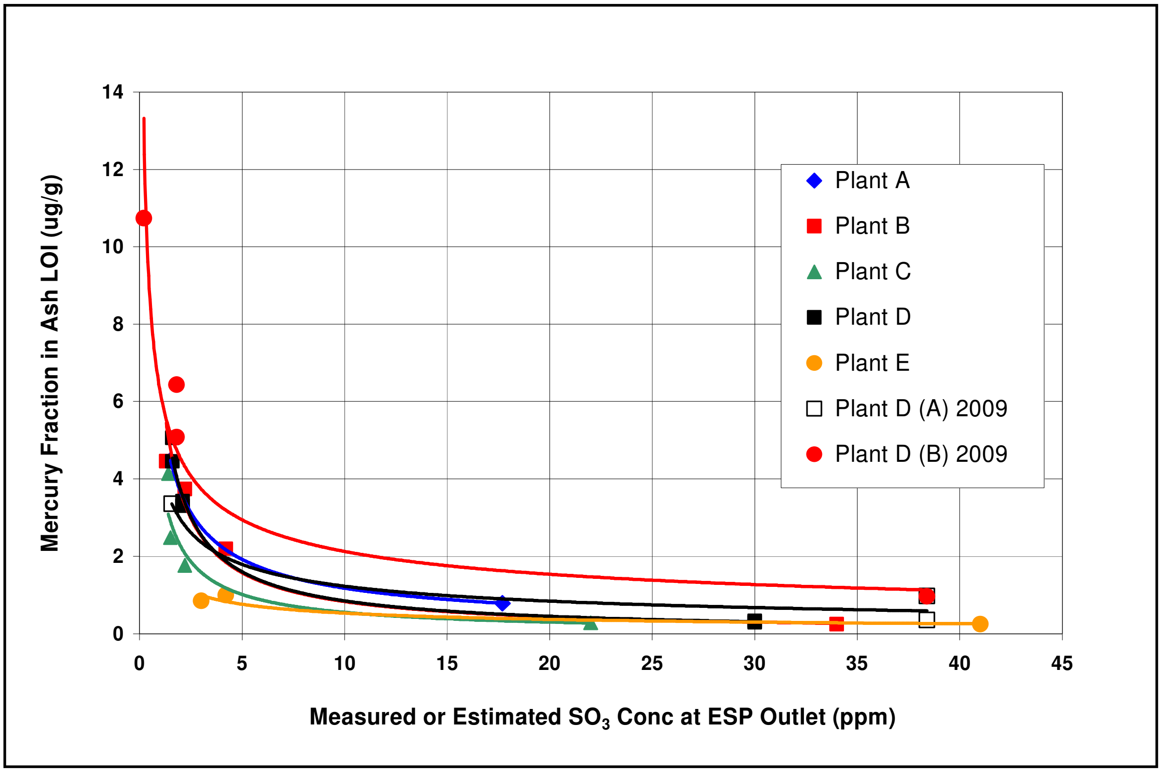


Figure 4-28. Impact of SO_3 on Hg Capture in Ash

There are two main categories of SO_3 mitigation processes, dry-injection and wet-injection. In a dry injection process, solid reagent is pneumatically conveyed to the injection location where it is blown into the flue gas ducts, much like the ACI process. The wet injection process dissolves the reagent and delivers it to the flue gas as a clear liquid. The liquid is sprayed into the duct using dual-fluid, air-atomizing nozzles designed to produce very fine droplets. The injected droplets dry quickly and form extremely small solid reagent particles with a large overall surface area for improved reaction. The advantages of wet injection are better distribution within the duct and higher SO_3 removals, allowing a utility to achieve SO_3 levels of <5ppm.

A typical dry sorbent injection system costs $4-5M for a single 500 to 800 MW unit whereas a typical wet injection system costs around $6M. Typical reagents costs for a theoretical 500 MW plant burning 70/30 TxL/PRB blend would run $200,000- 300,000/year for a dry injection system depending on the dry reagent and around $250,000/year for a wet injection system.

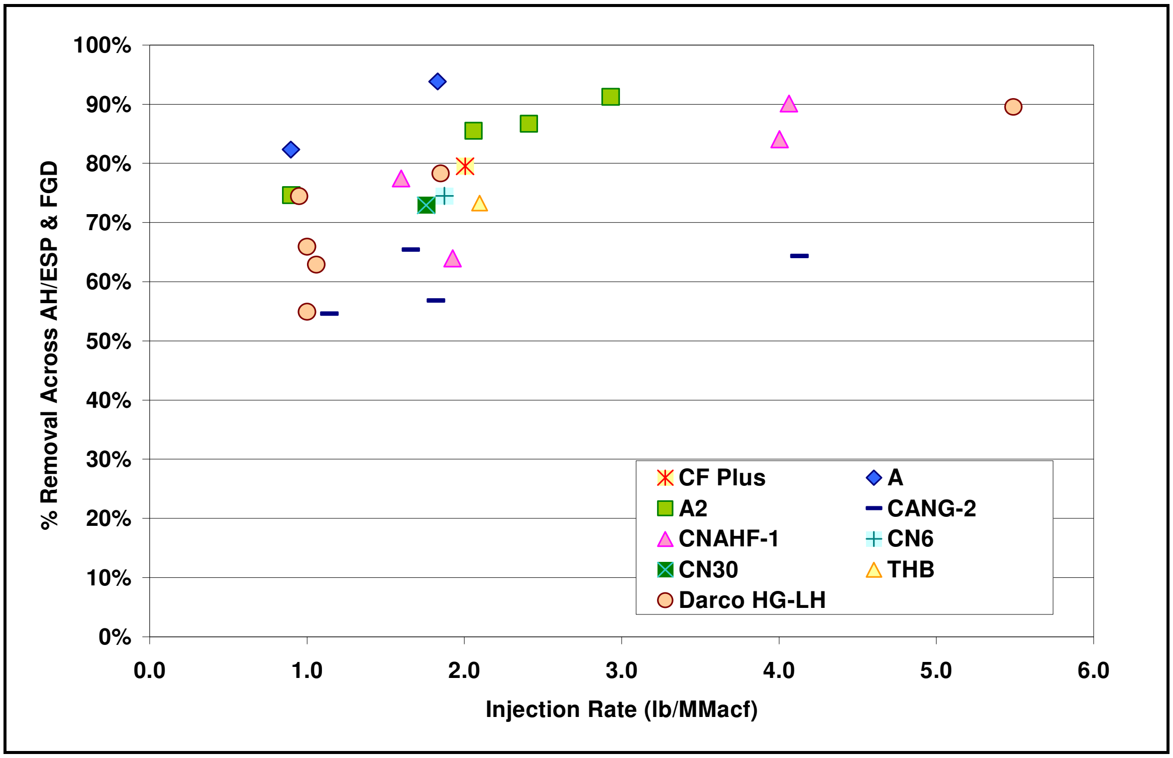
Injection of Finely Ground Carbon

The injection of smaller sorbent particles should improve sorbent-gas contact in the duct and, subsequently, improve mercury removal performance. Unfortunately, results from this program indicated challenges associated with the agglomeration of a finely-ground carbon sorbent during transport and feeding. Typically a 20 – 60% increase in sorbent cost would be expected for the decrease in particle size. Additional development is needed to determine cost-effective means to effectively transport and inject finely-ground carbon particles.

Improved Sorbent Injection

Previous testing has shown improvements in mercury removal when locating the sorbent injection lances upstream of the air preheater and with the use of a lance design with more energetic lance nozzles. URS has developed a proprietary design for carbon injection lances which were implemented in the 2009 test program. The lances are designed to increase gas turbulence and recirculation downstream of the lance and to distribute carbon particles more evenly along the length of the lance. This test program represents the first time this lance design has been tested in a flue gas application.

At Limestone, the testing was somewhat inconclusive in that there were uncertainties associated with changes in the number of lances used and plugging of the solids dispersion lances. However, CFD models presented in Figures 2-4 and 2-5 show the improvement in distribution expected to be achieved over the traditional simple pipe lance design delivery system. Figure 4-29 shows predicted mercury removal across the system utilizing several different sorbents through the solids dispersion lance assuming 95% removal of oxidized mercury across the FGD.



Note: Removal across the FGD assumes 95% removal of oxidized Hg across the Scrubber.

Figure 4-29. Predicted Hg Removal across the AH/ESP & FGD, Solids Dispersion Lance

As shown in Figure 4-29, there are several instances in which the solids dispersion lance achieved >70% removal at injection rates <1.3 lb/Macf using Darco Hg-LH and other various sorbents (A2 and A). Additionally, the figure shows an instance in which the solids dispersion lance achieved >90% mercury removal below 2.0 lb/Macf sorbent injection. Based on these results, it seems that increased mercury removal is achievable with the use of a more energetic solids dispersion lance resulting in improved sorbent distribution. To determine the approximate cost for a full-scale installation, a more detailed review would need to be conducted of the plant requirements, duct dimensions, and final design options.

5.0 CONCLUSIONS AND RECOMMENDATIONS

A multi-phase sorbent injection test program was conducted as part of Cooperative Agreement DE-FC26-06NT42779, "Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD." The project was primarily funded by the U.S. DOE National Energy Technology Laboratory. EPRI, NRG Texas, Luminant (formerly TXU), and AEP were project co-funders. URS Group was the prime contractor, and Apogee Scientific and ADA-ES were subcontractors.

The host site for this program was NRG Texas' Limestone Electric Generating Station (LMS) Units 1 and 2, located in Jewett, Texas. The 900-MW units typically fire a 70/30 wt% blend of Texas lignite and Powder River Basin coal, and are equipped with cold-side ESPs and limestone forced oxidation FGD systems.

This program focused on the use of several sorbent injection technologies to reduce flue gas mercury emissions with special emphasis placed on the resulting impacts on fly ash quality. The LMS units generate high quality, low LOI fly ash that is used for cement replacement in concrete production, providing both an environmental benefit (e.g., landfill avoidance, CO_2 emissions avoidance for the concrete manufacturer) and an economic benefit to the plant. The use of sorbent injection to control mercury emissions at LMS has the potential to jeopardize the beneficial re-use of the ash in concrete. Most sorbents are made of activated carbon and are injected upstream of the ESP. The carbon is captured along with the fly ash by the ESP. The presence of carbon in the ash is problematic for concrete production because of its impact on air entrainment in the concrete product. The natural air content of concrete is about 2%; however an air content of 6% is generally required to prevent cracking during cold weather. Air entrainment in concrete is achieved by using surfactants called Air Entraining Agents (AEAs) to stabilize a well-distributed air void system in the concrete. Carbon in the fly ash has a strong tendency to adsorb these surfactants, thus making it more difficult to entrain air in the concrete. Fly ash with elevated carbon content requires additional AEA (i.e., have a higher AEA demand) to create the necessary air voids. While low AEA demand is desired, ashes with higher AEA demand may be acceptable in concrete so long as the demand is consistent over time. Consistency must be inherent within each batch of fly ash and from batch-to-batch because the ready-mix concrete manufacturer cannot easily adjust the AEA dosage to the AEA demand of each batch of fly ash received.

In this project, several approaches were evaluated for reducing the impact of sorbent injection on fly ash quality. These included use of more ash compatible sorbents (such as non-carbon mercury sorbents and passivation of activated carbon to reduce AEA demand), minimizing sorbent use (such as relocation of the injection location, use of finer sorbent size distribution, better sorbent distribution lances) to reduce the amount of sorbent in the ash, and the use of Toxecon™ II technology (injection of activated carbon between ESP fields) to preserve quality of the fly ash in the ESP fields prior to carbon injection.

At the time when this project was awarded, pending federal legislation targeted 70% reduction in mercury emissions from the fleet of coal fired power plants. Accordingly, the objective of this project was to achieve 50 – 70% system mercury removal at LMS with sorbent injection while maintaining the integrity of fly ash for use in concrete. This project identified several technology options that should meet this goal. However, the power industry now faces a possible MACT standard that could require greater than 90% mercury removal for some coal-fired facilities. Therefore, the project team set an additional, informal goal of determining the highest possible mercury removal that can be achieved at LMS. The regulatory emissions target for LMS is still unknown, but the project team evaluated mercury control technologies for their ability to maintain stack mercury concentrations at less than 2 µg/dNm^3 (1.35 lb/TBTU) at 3% O_2 while preserving fly ash integrity. As will be discussed below, achieving this goal will be difficult for LMS as it currently operates, partly because of the variable nature of TxL coal with respect to mercury and chloride concentrations; it also possesses significantly higher mercury and sulfur concentrations than typical PRB coal. These factors combine to result in lower general performance and higher variability for mercury control options implemented in this flue gas, as compared to PRB-derived flue gas.

Baseline (i.e., 70/30 TxL/PRB coal blend, no mercury controls) mercury emissions for Units 1 and 2 were measured at several points in the test program. The baseline measurements indicated that less than 5% of the flue gas mercury was removed by the fly ash. Baseline ESP outlet mercury concentrations averaged 20 µg/dNm^3 and ranged from 15 – 25 µg/dNm^3. Mercury oxidation at the ESP outlet averaged 50%, but could vary from 25 – 75%. With ~15% of the flue gas bypassing the FGD, mercury removal across the system averaged only 22%, with FGD outlet concentrations ranging from 12 – 19 µg/dNm^3. The data suggest there were intermittent mercury re-emissions from the FGD system; the percent of oxidized mercury at the ESP outlet that was re-emitted from the FGD ranged from -27% to 17%.

Various approaches for implementing sorbent injection while preserving fly ash integrity are described below. For each approach, mercury removal results are presented in terms of the official program goal of 50–70% removal and in terms of the informal but more stringent goal of achieving < 2 µg/dNm^3 stack Hg concentration. The impacts of each technology on fly ash integrity and other balance of plant effects are also discussed. Most of the technological approaches were evaluated in short-term parametric tests, with each test condition lasting between several hours and two days. Such tests work well for quickly screening technologies for their potential to remove and oxidize mercury. Continuous long-term tests of the most promising technologies are needed to quantify variability in mercury removal performance and fly ash integrity. One such long-term test was conducted as part of this project - the continuous injection of 2.0 lb/Macf Darco Hg-LH upstream of the ESP over a two-month period.

Use of Non-Carbon Sorbents

Perhaps the most obvious first approach to minimizing the effect of sorbent injection on fly ash integrity is the use of non-carbon sorbents that do not increase AEA demand of the fly ash; however, non-carbon sorbents have historically demonstrated lower mercury adsorption capacities than carbon sorbents. Only one non-carbon sorbent was identified in this program that was available in sufficient quantity and had sufficient historical test data to merit the expense of a field trial. This non-carbon sorbent was BASF's MS200, an enhanced molecular sieve material. In short-term parametric tests across Unit 1A ESP, BASF MS200 reached a plateau of 50% mercury removal across the AH/ESP at 6 lb/Macf. BASF conducted further studies on their own and determined that the non-carbon BASF MS200 have quite different physical characteristics compared to activated carbons and this may lead to non optimized feed and dispersion of the sorbent when used with activated carbon injection equipment. Further development of this sorbent is being conducted by BASF. Because several carbon based sorbents achieved higher mercury removal and higher ESP outlet oxidation at lower injection rates, no further tests were conducted with BASF MS200.

Reduction of Carbon Injection Rate

Several approaches were tested in an attempt to reduce the carbon injection rate while still achieving high levels of mercury removal, thus limiting the increase in AEA demand of the fly ash. These approaches included identification of the most reactive sorbents (thus requiring the lowest injection rate), sorbent grinding to increase effective surface area, use of enhancement additives (such as calcium bromide to the coal), and improvements to the distribution of the sorbent within the duct.

Evaluation of Carbon Sorbents for Reactivity

For LMS, the ideal carbon sorbent will have high reactivity associated with both the adsorption and oxidation of mercury so as to best leverage the FGD system's ability to remove oxidized mercury from the flue gas. Carbon sorbents from Norit Americas, Calgon Carbon, and Sorbent Technologies were evaluated for mercury removal across the AH/ESP, mercury oxidation at the ESP outlet, and mercury removal across the system (AH/ESP/FGD).

In parametric tests conducted in 2007 across the Unit 1A ESP, Norit's Darco Hg and Darco Hg-LH and Sorbent Technologies' B-PAC all achieved 70% removal across the AH/ESP at injection rates of 1.5 – 2 lb/Macf. At these injection rates, AEA demand tests indicated that some of these sorbents may result in ash suitable for concrete use. An injection rate of ~4.0 lb/Macf Darco Hg-LH or B-PAC was required to achieve 90% removal across the AH/ESP; however, this rate was too high to maintain the integrity of the fly ash. Because the rate of 2.0 lb/Macf Darco Hg-LH met the project's removal objectives and had promise for maintaining fly ash integrity, a sixty-day test was conducted at this injection rate.

During the long-term test, mercury removal across the AH/ESP varied from 30 to 97%, averaging 82% as measured by SCEM. Mercury removals calculated from the fly ash mercury concentrations showed a lower removal (66%) while Ontario Hydro measurements made in another duct indicated only 40% removal. The poor agreement using different measurements is quite likely due to stratification and placement of the sampling probes. Still, the data illustrate the significant variability in mercury control effectiveness that can be expected at Limestone. Mercury oxidation averaged 80% at the ESP outlet during the two-month continuous injection test, as measured by both SCEM and Ontario Hydro. With injection of 2 lb/Macf Darco Hg-LH, the fly ash quality was diminished but was deemed just within specifications for use in concrete; however, at this injection rate, the ash marketer predicted it would be difficult for the plant to maintain ash consistency sufficient for the concrete market. These difficulties surfaced in follow-on tests conducted in 2009, when an injection rate of 0.5 lb/Macf Darco Hg-LH was deemed suitable for fly ash integrity, but an injection rate of 2.0 lb/Macf exceeded the threshold AEA demand and could thus not be marketed for concrete use. From the cumulative set of data from this program, an injection rate of 0.5 lb/Macf Darco Hg-LH was consistently suitable for ash integrity, with foam index similar to baseline ash. Higher injection rates and other carbon sorbents would require further full-scale testing to better define the maximum acceptable injection rate for ash integrity.

As observed in the sixty-day test with Darco Hg-LH and as well as with other carbon sorbents evaluated in the 2007 parametric tests, mercury oxidation at the ESP outlet ranged from 60% to greater than 80%. The degree of mercury oxidation was independent of sorbent injection rate. The 2007 test program focused on measuring mercury removal across the AH/ESP because FGD outlet measurements were not possible with only ¼ of the unit being treated; however, theoretical mercury removal across the AH/ESP/FGD system were calculated assuming no mercury re-emissions and 100% of the flue gas is treated by the FGD. Based on the 2007 results, a rate of 0.5 lb/Macf Darco Hg-LH was estimated to obtain 50% reduction in mercury at the ESP outlet; this subsequently translated to 90% removal across the AH/ESP/FGD, when considering mercury oxidation levels at the ESP outlet. However, as will be discussed below, repeat tests conducted on Unit 2 in 2009 indicated lower mercury removal; for example, 0.5 lb/Macf Darco Hg-LH resulted in only 50% removal across the AH/ESP/FGD.

Follow-on testing was conducted on Unit 2 in 2009, this time with carbon injected over the entirety of Unit 2 rather than just the Unit 1A ESP as in 2007. By treating the entire unit, flue gas mercury measurements could be made across the FGD system; however, 10–15% of the flue gas bypassed the FGD system, so measured AH-to-stack mercury removals were somewhat lower than what would be expected if there were no bypass.

In 2009, mercury removal performance of all sorbents was extremely variable across Unit 2, a phenomenon that was also observed in 2007's two-month injection test of Darco Hg-LH at 2.0 lb/Macf across Unit 1. However, measured mercury removals across Unit 2 were lower in 2009. As noted previously, in 2007 Darco Hg and Darco Hg-LH achieved 70% reduction in mercury at the ESP outlet at injection rates of 1.5 – 2 lb/Macf. In 2009, neither of these sorbents achieved greater than 60% removal across the AH/ESP at these rates. Likewise, mercury oxidation at the ESP outlet was lower during both baseline and sorbent injection for 2009 vs. 2007 tests. These results suggest a possible difference in operating conditions, boiler and gas cleanup configuration, flue gas mercury reactivity and/or a change in the coal characteristics between Unit 1 and 2. Despite the lower and more variable mercury removal performance, all tested sorbents met the program goals of 50-70% AH-to-stack mercury removal. However, none of the sorbents exceeded 80% AH-to-stack removal, and none achieved less than 5 $\mu g/dNm^3$ at the stack. By increasing the PRB content of the fuel blend from 70/30 to 55/45 TxL/PRB, stack mercury concentrations decreased from ~6 to nearly 3 $\mu g/dNm^3$ with 1.8 lb/Macf Darco Hg-LH.

One new sorbent from Calgon Carbon (labeled A) was designed for sulfur tolerance and it did show improvement over other sorbents tested. In three separate tests, it achieved 80% mercury removal across AH/ESP at ~1.8 lb/Macf, as compared to 60% removal for Darco Hg-LH. However, tests with Calgon's A sorbent were very short in duration and mercury removal across the FGD was not measured because only ¼ of the unit was treated.

Results from the Phase 4 tests were used to conduct an economic analysis to project costs for controlling mercury to various degrees at a 500-MW plant configured and operated in a similar manner as LMS. Test results indicated that 50% system removal of mercury could be achieved with an ACI addition rate of 0.2 lb/Macf; furthermore, this addition rate results in a saleable fly ash byproduct. Total projected first year costs for maintaining 50% mercury removal range from \$1.00M - \$1.05M. To achieve 70% system removal, an ACI rate of 1.8 lb/Macf would be required. Test results indicated that carbon injection rates higher than 0.5 lb/Macf would result in the fly ash not being marketable for cement replacement in concrete production and would therefore require landfilling; this would thus apply to the 70% removal case. Therefore, the total projected first year cost for achieving 70% removal with ACI would range from \$8.1M - \$8.4M; here, approximately 75% of the total costs would be associated with the loss of fly ash sales and subsequent landfill requirements.

Results from the Phase 4 tests indicated that 90% mercury removal may not be attainable at LMS using activated carbon injection. It is therefore not possible to project costs for this level of control. It is likely that a combination of control technologies or process modification may be required to achieve 90% removal. Possible control scenarios could include elimination of the FGD bypass, control of mercury re-emissions from the FGD unit, flue gas SO_3 mitigation, injection of finely-ground activated carbon, and improved sorbent distribution in the flue gas duct.

Evaluation of Finely Ground Sorbent
One way to increase the reactivity of a sorbent is to grind it to a smaller particle size so that there is more surface area available for reaction. This concept was tested with finely ground Darco Hg-LH prepared off site and then shipped to Limestone in bulk bags. The finely ground carbon did not improve mercury removal across the ESP compared to normally supplied unground activated carbon. In-situ particle size measurements in the transport line showed agglomeration of the AC particles. Agglomeration was significant enough that at injection rates of 1 lb/Macf and higher the mean particle size for the finely ground carbon was greater than that for the standard carbon. It is uncertain if agglomeration occurred in the bulk bags during shipment or in the sorbent feed system. It is also uncertain if different sorbents have different agglomeration characteristics. Some AC suppliers utilize “on-site” grinding and other de-agglomeration techniques that appear to be more successful in enhancing ACI effectiveness. Thus, use of finer sorbent sizes to reduce the amount of sorbent needed is still not well understood and is being investigated further.

Evaluation of Enhancement Additive – Calcium Bromide Addition to Coal
Tests were conducted to evaluate the addition of calcium bromide to the coal in an attempt to improve mercury oxidation and enhance sorbent performance so as to lower the required sorbent injection rate. The addition of bromine to the coal up to a rate of 175 ppm (as Br; dry basis) did not improve mercury removal across the AH/ESP in the absence of sorbent injection; it provided nominal improvement in mercury removal across the system, with stack mercury concentrations ranging from 7 – 12 $\mu g/dNm^3$.

The combination of 0.5 lb/Macf Darco Hg carbon and 97 ppm Br resulted in stack mercury concentrations decreasing to 5.9 $\mu g/dNm^3$, as compared to 11.0 $\mu g/dNm^3$ with sorbent alone. The lowest stack mercury concentration achieved was 2.6 $\mu g/dNm^3$ with the addition of 280 ppm Br and 1.6 lb/Macf finely ground Darco Hg-LH.

While the combination of bromide addition and sorbent injection came closest of all tested technologies to reaching the informal, more stringent goal of < 2 $\mu g/dNm^3$ Hg at the stack, the required sorbent injection rate of 1.6 lb/Macf finely ground Darco Hg-LH was high enough to potentially jeopardize the beneficial use of ash and the required bromide injection rate could adversely impact the scrubber system. Without changes in scrubber blowdown rates, high bromide addition rates will cause the steady-state FGD Br level to increase, which may possibly lead to corrosion problems in alloy-based scrubbers. The high bromide injection rates (>200 ppm by weight in coal) would also cost Limestone Units 1 and 2 more than $2 million in annual chemical cost alone. Long-term testing would be required to better evaluate both of these possible negative impacts.

Relocation of Sorbent Injection Lances

The injection lances were moved from upstream of the ESP (2007 and 2009 test location) to upstream of the air heater (2009 test location) in an attempt to provide additional sorbent mixing and duct residence time. Injection of sorbent upstream of the air heater did not improve mercury removal as compared to injection upstream of the ESP. However, only eight injection lances were used upstream of the AH, due to port constraints, compared to 16 lances used upstream of the ESP. Any gains in residence time from injecting upstream of the AH may have been offset by decreased lateral sorbent distribution caused by the reduced number of lances. Alternatively, mercury removal performance at LMS may have been reaction-limited rather than mass transfer-limited, in which case improvements to sorbent distribution would not have resulted in increased mercury removal.

Improvement of Sorbent Distribution within Duct

The second approach was to improving sorbent distribution was to use solid dispersion lances designed to increase the contact between flue gas mercury and the sorbent. Modeling by computational fluid dynamics showed that the dispersion should improve sorbent coverage by a factor of 2 – 5 (depending on distance from lance) compared to the traditional lances. Use of the alternate lance design did not result in increased mercury removal as compared to the traditional lances that were employed for most of the test program. However, at the conclusion of the tests, an inspection of the dispersion lances revealed that some plugging of the nozzles and inlet plenum occurred during injection (partly due to debris in the carbon). It is unknown how much of an effect the plugging had on the distribution of carbon in the duct and the resulting performance of the dispersion lances. Again, if the mercury removal at LMS was reaction-limited, rather than mass transfer-limited, then the dispersion lances would not have resulted in increased mercury removal. Further testing of the dispersion lances is warranted to address operational problems and evaluate the lances while operating at true design specifications.

Use of Low Ash Impact Carbons

Norit Americas, Sorbent Technologies, and Calgon Carbon all have developed low ash impact versions of their standard brominated activated carbons, labeled EXP-224, C-PAC, and CF Plus Ultra, respectively. One approach used by some of the suppliers is to passivate the carbon sorbent so that it is not as reactive with AEAs. In all cases these sorbents showed lower mercury removals than their standard counterparts; however, all passivated sorbents still met the 50 – 70% system mercury removal target at an injection rate of ~ 1 lb/Macf. Concrete compatibility tests were limited with these sorbents, but initial results indicated that all sorbents would meet

AEA demand requirements. Based on the system removal performance plateau observed with Darco Hg-LH, it appears unlikely that these sorbents would achieve higher mercury removal at higher injection rates.

Toxecon™ II

EPRI's patented Toxecon™ II involves the injection of dry sorbent between the fields of an ESP, thus allowing for the untreated ash in the front fields to be segregated from the treated sorbent/ash mixture (pending a re-design of the ash handling system). Toxecon™ II therefore maintains the integrity of the bulk (>90%) of the fly ash, which is an advantage to plants such as LMS that market their fly ash as a beneficial cement replacement in concrete. Alternatively, sorbent injection can be staged such that lances inject a small amount of sorbent upstream of the ESP and additional sorbent is injected downstream in the Toxecon™ II configuration to minimize sorbent effects on collected fly ash.

Based on initial parametric test results (for injection upstream of the ESP), Norit DARCO Hg and Norit DARCO Hg-LH were selected for further testing in the Toxecon™ II and staged configurations. Mercury reductions up to 60% were measured at the ESP outlet using the Toxecon™ II configuration. However, the Toxecon™ II system could not achieve higher removals, even with a second injection grid design. Properly designing an injection grid that can uniformly cover the space between ESP fields remains a challenge. ADA-ES, designer of the Toxecon™ II injection grid, is continuing to refine the distribution grid to optimize the coverage across the ESP face. The mercury oxidation at the Toxecon™ II outlet was 70 to 80%. Thus, even at 60% removal, the total removal that can potentially be achieved across the combination of ESP and FGD could exceed 90%.

Particulate filters collected during Toxecon™ II injection were considerably blackened, providing visual evidence of carbon penetration through the ESP; however, particulate emissions remained below regulatory limits. The small amounts of carbon not captured by the ESP would likely be captured by the FGD. EPRI is currently investigating the benefits of adding AC to the FGD as a means to reduce mercury in the scrubber liquor and possibly reduce mercury re-emissions from the scrubber.

The staged injection arrangement did not offer any improvement in mercury removal over other injection configurations.

Trace Metals

EPRI funded measurements were made to determine the effect that mercury control systems have on trace element removal. Flue gas trace metals concentrations were measured by Method 29 on baseline, ACI (1.89 lb/Macf Darco Hg-LH), and ACI + Br (0.48 lb/Macf Darco Hg + 122 ppm Br to coal, dry basis) test days. Associated coal, ash, and FGD samples were also analyzed. In addition, flue gas trace metals were measured using an emerging alternate method, Cooper Environmental Services' X-Ray Filter Method (XFM); tests represented the first use of this method on coal fired flue gas. The XFM method showed promising potential as an alternative to EPA's Method 29, with the particular advantage of faster turn-around of analytical results. In general, measured trace metals were comparable for Method 29 and XFM, although no specific numerical criteria were established to characterize equivalency.

Trace element removal across the ESP was very high (> 98.5%; most metals exceeding 99%) for all metals except selenium and mercury. The FGD scrubber provided additional removal of all trace metals. Flue gas measurements showed no selenium removal across the ESP (although ash selenium concentrations indicated some removal); the FGD removed a significant amount of selenium (78 – 85%). Selenium was most likely present in the flue gas as an acid gas (SeO_2) that was readily removed by the FGD.

Mercury was the only trace element that consistently showed increased removal with the application of ACI and ACI+Br. For the other elements, small increases or decreases in removal were experienced at the two Hg control test conditions when compared to baseline operation. No trends in trace metals removal should be extracted from these small changes because the obtained data set was small, measured flue gas concentrations were low, and the variability in trace metals concentrations was high.

Fly ash samples and their associated leachates were analyzed for trace metals content. Most elements showed few significant differences in leaching behavior between baseline and mercury control test conditions. A significant difference occurred when the difference between the two results was greater than a factor of 2 (> 100%). By this criterion, Hg concentration in the leachate and percentage of Hg leached both decreased from baseline to the test conditions, indicating stabilization of mercury in the fly ash. Ba and Zn concentrations in the leachate and percentage of Ba and Zn leached both increased from baseline to the mercury control test conditions.

Recommendations

The mercury removal objectives of this program were met by most of the process configurations and conditions evaluated. At 0.5 lb/Macf Darco Hg-LH, an overall system removal of 50% was achieved with fly ash integrity was preserved. With 1 – 2 lb/Macf sorbent injection, system mercury removals (air heater inlet to stack, with 15% flue gas bypass) of 60 – 70% could be achieved but ash integrity was compromised. While this fly ash may not be suitable for the concrete market, it would likely be suitable for other markets requiring lower quality ash. A 60% mercury removal across the ESP could also be achieved with Toxecon™ II at higher injection rates (2 to 5 lbs/MMacf) while preserving ~90% of the beneficial use of ash.

Although test results showed that the program objectives could be achieved using a number of process configurations, sorbents, and injection rates, they also indicated that higher mercury removals at LMS may be challenging to maintain cost effectively, especially if there is a desire to preserve the beneficial use of ash. Besides trying to limit the amount of carbon in the fly ash, the variability in mercury emissions and removal with time will make maintaining a consistent ash to carbon ratio very difficult.

For all sorbents evaluated, mercury removal performance across the AH/ESP was extremely variable over time and across the ducts tested, which is one of the challenges associated with mercury removal in TxL flue gas. Additional removal would be expected by eliminating the 10–15% of FGD bypass.

The cumulative results from four years of testing show that promising mercury control technologies will need to be rigorously tested at LMS for several months before the variability in mercury removal and ash integrity can be adequately assessed. It is probable that a combination of technologies will be necessary for LMS to achieve $< 2\ \mu g/dNm^3$ Hg at the stack. To accomplish this goal while maintaining fly ash integrity, various combinations of the following approaches merit further investigation:

- Injection of finely ground carbons

  The injection of smaller sorbent particles should improve sorbent-gas contact in the duct and, subsequently, improve mercury removal performance. Results from this program indicated challenges associated with the agglomeration of a finely-ground carbon sorbent during transport and feeding. Additional development work should focus on mechanical means to either prevent sorbent agglomeration or re-disperse the particles prior to injection as well as the development of fine-particle sorbents resistant to agglomeration.

- Improvements to the injection system

  While the short tests at Limestone with locating the injection system upstream of the airheater and with improving the sorbent distribution with a modified injecting lance design did not appear to improve mercury control effectiveness, the testing was somewhat inclusive in that there were uncertainties associated with changes in the number of lances used and lance pluggage. Testing at other sites showed improvements in mercury removal when locating the sorbent injection lances upstream of the airheater and with the use of a lance design with more energetic lance nozzles. Thus, these options should be re-visited.

- Use of low ash impact (LAI) carbon and non-carbon sorbents

  LAI carbons and non-carbon sorbents evaluated in this program demonstrated beneficial qualities related to the reuse properties of fly ash. Results also showed that these sorbents removed less mercury than the regularly supplied carbons and may be limited to the amount of removal achieved (i.e., performance plateau was observed relative to injection rate) in the TxL/PRB derived flue gas. Future work should focus on the development of LAI and non-carbon sorbents with better mercury capacities or removal properties in TxL flue gas.

- Use of sulfur tolerant sorbent

  Calgon Carbon's sulfur tolerant sorbent showed promising results for mercury removal and oxidation, performing better than other sorbents at similar injection rates during a limited number of tests. These results suggest this sorbent, and possibly other sulfur-tolerant carbons, could be more effective than regular ACs in TxL/PRB-derived flue gas. TxL/PRB-derived flue gas is expected to contain higher SO_2 levels than a PRB (only)-derived flue gas.

- Increase fraction of PRB fired at LMS

  Increasing the fraction of PRB in the LMS fuel blend should improve the ability to achieve higher levels of system mercury removal, as demonstrated by limited testing in which the PRB fraction was increased from 30% to 45%. Results showed that lower mercury emissions were observed at LMS, both during baseline operation and with sorbent injection, when the ratio of PRB/TxL fired was increased. Because only limited data were obtained at alternate fuel blends, additional tests should be considered to better characterize sorbent injection performance and variability at higher PRB/TxL combustion ratios.

  However, with increased PRB fraction, the amount of ash in the flue gas will also decrease. Thus, the amount of AC that can be injected while still maintaining ash use acceptability may also decrease since the ash to carbon ratios will be lower for PRB than TxL coal.

- Combination of bromide addition to the coal with sorbent addition

  The highest system mercury removal was achieved with 280 ppm Br and 1.6 lb/Macf finely ground Darco Hg-LH. While the combination of bromide addition and sorbent injection appears capable of reaching the team's informal, more stringent goal of < 2 $\mu g/dNm^3$ Hg at the stack, the required sorbent injection rate of 1.6 lb/Macf finely ground Darco Hg-LH was high enough to potentially jeopardize the beneficial use of ash, and the required bromide injection rate could adversely impact the scrubber system. The high bromide dosage needed will also increase the annual operating cost (for chemicals) quite significantly (>$2 million per yr for Limestone 1 and 2). Longer-term testing would be required to evaluate performance and fly ash property variability at these conditions as well as to evaluate any impact on FGD performance when operating at steady-state bromine conditions.

- Use of re-emissions additives

  Results of the Phase IV testing indicated periods when mercury re-emissions from the FGD system were apparent. This phenomenon offsets some of the benefits associated with mercury oxidation across the AH/ESP, resulting in lower system removals. Additional mercury control testing at LMS should include evaluation of chemical FGD additives for controlling re-emissions.

- Toxecon™ II

  TOXECON II may still prove to be a viable option for Limestone if overall mercury emissions (coal to stack) needs to be maintained >90% (or < 2 $\mu g/dNm^3$ Hg) while still preserving most of the beneficial ash use. Even with the current non-optimized injection system and ~60% mercury removal across the ESP, the overall removals could exceed 90% due to the high mercury oxidation observed at the ESP outlet. Further optimization of the injection grid and/or supplemental boiler bromide addition could achieve even higher removal effectiveness. The impact of capturing small amounts of activated carbon in the FGD needs to be assessed for its possible positive benefits (e.g., keep mercury on the solids, lower re-emissions capture other trace toxics) and negative benefits (hard to separate from gypsum).

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Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD

Appendices

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APPENDIX A –QUALITY ASSURANCE/QUALITY CONTROL RESULTS AND DISCUSSION

The quality assurance measures implemented for this project are summarized in this appendix. The QA/QC measures addressed the following critical measurement parameters: 1) total and speciated mercury in flue gas at the ESP inlet, and ESP outlet; and 2) mercury content in the coal and byproducts solids.

Specific quantitative data quality objectives established for the project, expressed as precision, accuracy and completeness are summarized in Table A-1.

Source Sampling Equipment

QA/QC measures conducted prior to and during the field test program included calibrations of the sorbent injection and sampling systems, as well as internal quality control checks related to analytical instruments and measurements. Each of these topics is discussed in the following sections.

Calibration of Injection and Sampling Equipment

The following calibration procedures were used for the sorbent injection and source sampling equipment during the course of the project. Records of all manufacturer calibration and field calibrations for all injection and sampling equipment are maintained in the URS and Apogee project files.

Sorbent Injection System

Before the testing program began on Unit 1, the sorbent injection system was calibrated over the range of expected sorbent injection rates to ensure accurate delivery of sorbent to the duct injection points. Prior to the start of each injection test the specific feed-rate desired was confirmed by timed catch and weigh of the sorbent at the eductor inlet location. This calibration was repeated at the completion of the test to determine if any significant shift in feed-rate may have occurred during the test period that was not evident from the loss-of weight system. Throughout the 60-day extended injection the unit was calibrated to ensure accurate delivery of the sorbent.

Table A-55. Quality Assurance Objectives for Critical Measurement Parameters

Critical Parameter (Method)	Sampling Method	Experimental Conditions	Precision	Accuracy
Mercury in Flue Gas (Method 7470 Digestion; CVAA Analysis)	Ontario Hydro Method	Matrix Spike and Duplicates	10% Relative Percent Difference	85-115% Recovery
Mercury in Flue Gas (KCl/$SnCl_2$ Impingers, CVAA Analysis)	Semi-continuous Gas Analyzer (SCEM)	Matrix Spike (Method of Standard Additions)/ Replicate Assays/ Relative Accuracy Testing	20% Relative Percent Difference	80-120% Recovery
Mercury in Flue Gas (Dry Sorbent Trap, CVAFS Analysis)	Modified Appendix K	Matrix Spike and Duplicates	10% Relative Percent Difference	85-115% Recovery
		Field Spikes	NA	80-120% Recovery
Mercury in Coal, (ASTM 3684; HF Digestion; CVAA Analysis) [1]	Grab Sample Composites	Matrix Spike and Triplicates	25% Relative Percent Difference	NA
		Coal NIST Standard Reference Materials	NA	80-120% Recovery
Mercury in ESP Fly Ash [1] (HF Digestion CVAA Analysis)	Grab Sample Composites	Matrix Spike and Duplicates	10% Relative Percent Difference	85-115% (Detected) 75-125% (Not Detected) Recovery
		Fly Ash NIST Standard Reference Materials	NA	85-115% Recovery

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[1] All coal and ESP fly ash samples were to be analyzed in triplicate.

The loss-of-weight load cell system was checked prior to the test by adding and then removing a calibration weight and the resulting step change in the system is noted. Additionally the static weight of the bulk bag containing the sorbent was recorded at the start and completion of each test. The accuracy and consistency of volumetric feeding of dry sorbents is susceptible to changes due to material density, moisture, and plugging. The combined method of a pre- and post-static weight of the sorbent loaded on the system gave a finite measure of the total amount of sorbent injected. The pre- and post-catch weigh calibration technique provided the known feed-rate at the beginning and end of each test. The real-time loss-of-weight load cell system gave the operators rapid indication of any significant change in feed-rate during the test period.

Various components of the source sampling equipment were calibrated prior to use in the field test program. These calibrations are summarized below:

Type S pitot tube calibration – design and construction of pitot tube according to EPA requirement, inspection according to EPA Method 2.
Sample nozzle calibration – clean, inspect and calibrate according to EPA Method 5
Temperature measuring devices – calibrate against a NIST-traceable mercury-in-glass thermometer, confirm linearity using a traceable precision voltage generator.
Dry gas meter and orifice – semi-annual calibration using traceable calibrated critical orifices.

SCEM Analyzers

The analyzers were calibrated for elemental mercury, and sample flow rate, following installation at the test sites and periodically throughout the testing program. The calibration of both the Au-CVAAS analyzer, which measures the mass of mercury desorbed, and the mass flow meter in the monitor, which measures the total sample volume through the analyzer, were checked daily during testing. The analyzer was calibrated by introducing a spike of vapor phase elemental mercury standard into the analyzer upstream of the gold wire or just upstream of the impinger solutions. These quality control samples are important for ensuring proper transport of mercury through the various flow lines. The mercury vapor for the spike was taken from the air space in a vial containing liquid elemental mercury. The mercury spike concentration is calculated from the vapor pressure of mercury and the temperature of the vial. The vial temperature was measured with a precision thermometer.

QA/QC results for SCEM analyzer measurements, met the acceptance criteria of 85-115% recovery. In most cases, when spike recoveries were outside the specification, the unit was recalibrated or other corrective action was taken.

The calibration of the mass flow meter was checked by connecting the operating meter in series with a pre-calibrated dry cal meter and verifying measured flow rates across the range expected during testing.

Documentation of analyzer calibration and any system maintenance was recorded in the project notebook. Verification of computerized analyzer calculations was conducted manually on a periodic basis. Any data collected during periods of suspect analyzer operation were flagged as questionable data.

Table A-56. Quality Control Checks performed on the SCEMs

The following QA/QC checks were performed on the mercury SCEMs:

Setup QC Parameter	Passing Criterion
Leak Check	<3% leak
MFM Calibration Check	97-103%
Spike thru totals impingers and heated line	85-115%
Spike thru elementals impingers and heated line	85-115%

Each morning, the following QA/QC checks were performed:

Morning QC Parameter	Passing Criterion
Leak Check	<3% leak
MFM Check-single point	97-103%
2 QC Spikes (upstream of gold, or in flue gas)	(85-115% in flue gas) (90-110% in air)

Each day, these additional QA/QC checks were performed:

Daily QC Parameter	Passing Criterion
QC Spikes in Flue Gas (*at least* twice/day)	85-115%
QC spike thru totals impingers and heated line (every other day)	85-115%
QC spike thru elementals impingers and heated line (every other day)	85-115%

Internal Quality Control Checks

Quality control procedures were also included in this test program for both sampling and analytical activities. In most instances, strict adherence to prescribed method-defined procedures for each sampling and analytical effort is the most applicable QC check. However, in some cases specific QC samples were planned to assess overall measurement data quality. QC samples for the critical measurement parameters are summarized in Table A-3.

The QC analyses conducted during the testing program were designed to provide a quantitative assessment of the measurement system data. The two aspects of data quality that are of primary concern are precision and accuracy. Accuracy reflects the degree to which the measured value represents the actual or "true" value for a given parameter and includes elements of both bias and precision. Precision is a measure of the variability associated with the measurement system.

Precision

EPA defines precision as "a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions." For this project, precision estimates were based on conditions that encompass as many components of variability as are feasible, which includes variability in the sample matrix itself, as well as imprecision in sample collection, preparation, and analysis. Precision data were reported for analytical duplicate samples.

Where estimated from duplicate (two) results, precision was expressed in terms of relative percent difference (RPD) between results for analytical duplicates. RPD was calculated as follows:

$$\text{RPD} = \frac{|X_1 - X_2|}{\text{Mean}} \text{ x } 100$$

RPD is related to percent coefficient of variation (CV) by (RPD = CV x $\sqrt{2}$).

Where estimated from triplicate (three) results, precision was expressed in terms of relative standard deviation (RSD) between results for analytical replicates. RSD was calculated as follows:

$$\text{RSD} = \frac{|\text{Standard Deviation}|}{\text{Mean}} \text{ x } 100$$

These terms are independent of the error (bias) of the analyses and reflect only the degree to which the measurements agree with one another, not the degree to which they agree with the "true" value for the parameter measured.

Accuracy

Accuracy, according to EPA's definition is "the degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted reference or true value, T." Accuracy includes components of both bias (systematic error) and imprecision (random error). Bias may be estimated from the average of a set of individual accuracy measurements.

For this project, accuracy objectives are expressed in terms of individual measurements. Individual measurements were compared with the objectives presented previously in Table A-3. In the final analysis, the average accuracy (i.e., bias), calculated as percent recovery, were reported and used to assess the impact on project objectives. Percent recovery was calculated as follows:

$$\%\text{ Recovery} = \frac{\text{Measured Value}}{\text{Reference Value}} \text{ x } 100$$

In the case of matrix spiked samples, measured value in the above equation represents the difference between the spiked sample measurement result and the unspiked sample results. The reference value represents the amount of spike added to the sample.

Table A-57. QC Samples for Critical Measurement Parameter

Parameter	Field Blank [2]	Trip (reagent) Blank [3]	Matrix Spike	Replicates	Standard Material Analysis
Mercury in Flue Gas (Ontario Hydro method)	1 per batch of $KMnO_4$ reagent	1 per batch of $KMnO_4$ reagent	1 per sample location	Duplicate, every sample	-
Mercury in Flue Gas (semi-continuous analyzer)	-	-	1 per day	Duplicate, 1 per day	-
Mercury in Flue Gas (Sorbent Traps)	1 per sample event	1 per analysis set of 20 traps	1 per 10 samples	"B" trap analysis on every sample pair for breakthrough All in duplicate	
Mercury in Coal	NA	NA	1 per 10 samples	Triplicate all samples	1 per batch prepared
Mercury ESP Fly Ash Solids [4]	NA	NA	1 per 10 samples	Duplicate, 1 per 10 samples	1 per batch prepared

Ontario Hydro

Source sampling field data for the three Ontario Hydro verification tests conducted during baseline and long term test phases are summarized. Percent isokinetics, a measure of sample representativeness, were within acceptable limits for all test runs.

QA/QC results for reagent blanks, field blanks and laboratory analyses from the Ontario Hydro verification trips are provided in Table A-4. All results were within the data quality objectives of the test program and the results as a whole did not indicate a significant contamination or bias in the analytical results for the Ontario Hydro method.

QA/QC results for reagent blanks, field blanks, and laboratory analyses from the Ontario Hydro verification trips are provided in Tables A-5 through A-7. All results were within the data quality objectives of the test program and the results as whole did not indicate a significant contamination or bias in the analytical results for the Ontario Hydro method.

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[2] Field blank impinger solutions are used to perform a matrix matched instrument calibration to compensate for possible background contribution in the blank sampling train and to compensate for matrix interference.

[3] Analysis of the reagent blank is not generally conducted unless appreciable amounts of target analyte are noted in the field blank.

[4] These samples were to be analyzed in triplicate.

Table A-58. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – Baseline (6/20, 6/21/07)

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-59. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – Long-Term Trip #1 (7/10, 7/11/07)

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	101-102%	95-104%	99-100%	97-99%	102-104%
Matrix Spike	Treated	85-115%	85-115%	104%	100%	100%	98%	110%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.6-2%	0.4-0.7%	NC	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	104%	114%	90%	NA	103%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.6-2%	0.1-2%	0.2-3%	NC	NC

Table A-60. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – Long-Term Trip #2 (7/31, 8/1/07)

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	**KCl**	**H2O2**	**Filter**	**PNR/Nitric Rinse**
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	99-100%	99-110%	96-105%	100-102%	100-102%
Matrix Spike	Treated	85-115%	85-115%	97-101%	95-103%	105%	97%	87-98%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.24-0.78%	0.1-0.56%	NC	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	100%	104%	97%	100%	100%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.4-1%	0.2-2%	0.5-2%	NC	NC

Table A-61. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – Long-Term Trip #3 (8/14, 8/15/07)

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	101-102%	100-104%	98.00%	100-102%	98-99%
Matrix Spike	Treated	85-115%	85-115%	101-106%	94-95%	102%	97%	102%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.3-0.9%	0.1-1%	NC	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	100%	94%	98-101%	100%	97%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.4-0.6%	0.2-1%	1.0%	NC	NC

Mercury in Coal and Ash

Results for mercury in coal were determined by Consol Energy Laboratories (Consol) using Method ASTM D6722 “Determination of Mercury in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by High Temperature Combustion Atomic Absorption Spectrometry.” In this method the test specimen is heated in a tube furnace in a stream of oxygen. The gas stream containing the mercury vapor passes through a pre-packed portion of the combustion train where ash, moisture, halogens, and minerals are removed. The purified gas stream containing the mercury vapor then passes through an amalgamator tube containing gold-plated ceramic beads, which collect the mercury. When all the mercury has been collected, the amalgamator is heated, releasing the mercury vapor which is then transported through a cuvette positioned in the path length of an atomic absorption spectrometer.

Consol performed a duplicate analysis for each coal sample. Results for the coal QA/QC are presented in Table A-8. The criteria used to determine if the duplicate passes was an ASTM reproducibility limit [0.008+(0.06*(average Hg results))]. If the absolute difference between the two mercury results was less than the calculated ASTM reproducibility limit then the precision was considered passing. Consol also analyzed a standard reference material (SRM) every 10 samples. The laboratory used the SRM as a continuing calibration verification (CCV) and bracketed their data with it.

The relative percent difference (RPD) of coal sample 7/3/07 Mill H and 7/29/2007 Mill J were 52% and 34%, respectively. This is greater than the 25% acceptance criteria. Also the ASTM reproducibility of several coal samples failed. This is not atypical of coal precision. This is due to the difficulty to digest a completely homogenized coal sample.

Results for mercury in ash were determined by URS Corporation. Ash samples were digested using a general hydrofluoric acid and aqua regia digestion and analyzed for mercury by cold vapor atomic absorption (CVAA).

To verify the quality of the fly ash mercury data, URS used analytical method blanks, matrix spikes, post digestion spikes, duplicates, SRMs, and CCVs. Results for the ash QA/QC are presented in Table A-9. Matrix spikes (MSs) are a known volume of mercury that has been added to the ash sample before it has been digested, recovered, and analyzed for mercury. The purpose is to ensure mercury has not been lost during the analytical process. Because these spikes are prepared before the sample has been analyzed, the amount added is an educated guess based on typical mercury levels in ash samples. If the unspiked ash sample is greater than four times the spiked amount, then the spike is deemed inappropriate and a post digestion spike (PDS) is performed or the sample is simple re-digested and re-spiked with the appropriate amount of spike. With a few exceptions, results were within the data quality objectives of the test program and the results as a whole do not indicate a significant bias in the analytical results for the ash samples.

The MS on ash sample from Baseline 6/22/07 field 6&7F2A recovered at 84% due to digested spike amount being inappropriate. A PDS was performed on this sample and recovered at 97.0%. The MS on ash sample from Long Term 6/29/07 field 3F2A recovered at 27.3% due to digested spike amount being inappropriate. A PDS was performed on this sample and recovered at 98.5%. The MS on ash sample from Long Term 6/29/07 field 4&5F1A recovered at 118.4% due to digested spike amount being inappropriate. A PDS was performed on this sample and recovered at 96.3%. The MS on ash sample from Long Term 7/21/07 field 3F3A recovered at 51.9% due to digested spike amount being inappropriate. Two PDSs were performed on this sample and recovered at 99.4% and 101.5%. The spike was not added to MS on ash sample Baseline 6/20/07 field 1F1A due to analyst error. A PDS was performed on this sample and recovered at 96.7%. Because all PDSs passed criteria data quality was not impacted due to failing MSs.

The RPD for an ash sample that is detected below two times the reporting limit (RL) does not affect the quality of the data. The results for ash sample Long Term 8/3/07 field 1F3B were detected less than two times the RL; therefore, the RPD of 20.0% does not affect the quality of the data.

Table A-62. QA/QC Results for Mercury Analyses of Coal Samples

Description	Coal type	Hg (ppm)	Hg (ppm)	% RPD	ASTM Reproducibility Limit	Absolute Difference	Fail?
			Objective →	<25%			Pass
6/21/2007 Mill H	Lignite	0.198	0.191	4	0.020	0.007	pass
6/21/2007 Mill J	PRB	0.212	0.218	3	0.021	0.007	pass
6/21/2007 Mill K	Lignite	0.079	0.071	11	0.013	0.008	pass
6/25/2007 Mill J	PRB	0.217	0.227	4	0.021	0.010	pass
6/25/2007 Mill K	Lignite	0.150	0.156	4	0.017	0.006	pass
6/27/2007 Mill H	Lignite	0.068	0.066	2	0.012	0.001	pass
6/29/2007 Mill H	Lignite	0.105	0.105	0	0.014	0.000	pass
6/29/2007 Mill K	PRB	0.120	0.140	16	0.016	0.021	**fail**
6/29/2007 Mill F	Lignite	0.217	0.202	7	0.021	0.015	pass
7/3/2007 Mill H	Lignite	0.170	0.100	52	0.016	0.070	**fail**
7/3/2007 Mill K	PRB	0.082	0.083	1	0.013	0.001	pass
7/5/2007 Mill H	Lignite	0.217	0.176	21	0.020	0.041	**fail**
7/5/2007 Mill J	Lignite	0.284	0.270	5	0.025	0.015	pass
7/5/2007 Mill K	PRB	0.083	0.080	3	0.013	0.003	pass
7/8/2007 Mill J	Lignite	0.095	0.097	3	0.014	0.002	pass
7/8/2007 Mill K	PRB	0.210	0.204	3	0.020	0.006	pass
7/9/2007 Mill H	Lignite	0.114	0.109	4	0.015	0.005	pass
7/9/2007 Mill J	Lignite	0.292	0.284	3	0.025	0.008	pass
7/9/2007 Mill K	PRB	0.169	0.179	5	0.018	0.009	pass
7/19/2007 Mill J	PRB	0.091	0.088	4	0.013	0.004	pass
7/19/2007 Mill F	Lignite	0.172	0.185	7	0.019	0.013	pass
7/22/2007 Mill H	Lignite	0.194	0.198	2	0.020	0.004	pass
7/22/2007 Mill G	Lignite	0.164	0.146	12	0.017	0.018	**fail**
7/22/2007 Mill J	PRB	0.093	0.115	21	0.014	0.022	**fail**
7/25/2007 Mill J	PRB	0.099	0.095	4	0.014	0.004	pass
7/25/2007 Mill H	Lignite	0.162	0.145	11	0.017	0.017	pass
7/27/2007 Mill J	PRB	0.091	0.113	21	0.014	0.022	**fail**

Description	Coal type	Hg (ppm)	Hg (ppm)	% RPD	ASTM Reproducibility Limit	Absolute Difference	Fail?
Objective →				<25%			**Pass**
7/27/2007 Mill H	Lignite	0.209	0.233	11	0.021	0.023	**fail**
7/27/2007 Mill K	Lignite	0.181	0.216	17	0.020	0.035	**fail**
7/29/2007 Mill H	Lignite	0.138	0.136	2	0.016	0.003	pass
7/29/2007 Mill J	PRB	0.084	0.060	34	0.012	0.024	**fail**
7/29/2007 Mill K	Lignite	0.257	0.247	4	0.023	0.010	pass
8/7/2007 Mill J	PRB	0.101	0.094	7	0.014	0.007	pass
8/7/2007 Mill K	Lignite	0.166	0.171	3	0.018	0.005	pass
8/9/2007 Mill H	Lignite	0.195	0.190	3	0.020	0.005	pass
8/9/2007 Mill J	PRB	0.062	0.071	13	0.012	0.009	pass
8/9/2007 Mill K	Lignite	0.639	0.590	8	0.045	0.049	**fail**
8/15/2007 Mill K	Lignite	0.144	0.153	6	0.017	0.009	pass
8/15/2007 Mill H	Lignite	0.204	0.217	6	0.021	0.013	pass
8/17/2007 Mill J	PRB	0.223	0.207	8	0.021	0.017	pass
8/17/2007 Mill K	Lignite	0.181	0.206	13	0.020	0.025	**fail**
8/17/2007 Mill H	Lignite	0.079	0.094	17	0.013	0.015	**fail**
8/19/2007 Mill J	PRB	0.089	0.100	11	0.014	0.011	pass
8/19/2007 Mill H	Lignite	0.186	0.170	9	0.019	0.016	pass
8/19/2007 Mill K	Lignite	0.224	0.225	1	0.021	0.001	pass
8/21/2007 Mill H	Lignite	0.225	0.223	1	0.021	0.002	pass
8/21/2007 Mill J	PRB	0.123	0.144	15	0.016	0.021	**fail**
6/20/2007 Mill H	Lignite	0.122	0.140	14	0.016	0.018	**fail**
6/20/2007 Mill J	PRB	0.0928	0.100	8	0.014	0.008	pass
6/20/2007 Mill K	Lignite	0.241	0.239	1	0.022	0.002	pass
7/11/2007 Mill H	Lignite	0.300	0.300	0	0.026	0.000	pass
7/11/2007 Mill J	Lignite	0.258	0.281	9	0.024	0.024	pass
7/11/2007 Mill K	PRB	0.0544	0.0640	16	0.012	0.010	pass

Table A-63. QA/QC Results for Mercury Analyses of Ash Samples

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD [5]	Reference Ash Recovery	CCV [6]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 8/10/07 Samples from 6/20/07 and 6/22/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	105.0	--	--	--
	NIST Ash 1633b [7,8]	--	--	--	114.2	--
	Calibration verification	--	--	--	-	98.4-102.0
	Replicate Analysis Range	--	--	2.53-4.65	--	--
	Matrix Spike [9] Ranges (Ash from BL 6/20/07 1F2B, 6/22/07 1F1A, and 6/22/07 2F3A)	--	102.0-107.3	--	--	--
	PDS [10] Ranges	--	--	--	--	--
Analysis on 8/15/07 Samples from 6/22/07	DI Water Blank	<DL				
	Blank	<DL	95.0	--	--	--
	NIST Ash 1633b	--	--	--	107.8	--
	Calibration verification	--	--	--	--	97.0-104.3
	Replicate Analysis Range	--	--	0.00-4.58	--	--
	Matrix Spike Ranges (Ash from BL 6/22/07 4&5F3A, 6/22/07 6&7F2A and 6/22/07 3F2A)	--	**83.9** -102.8	--	--	--
	PDS Ranges (Ash from BL 6/22/07 6&7F2A)	--	97.0	--	--	--
Analysis on 8/16/07 Samples from 6/28/07 and 6/29/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	101.0	--	--	--
	NIST Ash 1633b	--	--	--	102.8	--
	Calibration verification	--	--	--	-	90.3-102.3
	Replicate Analysis Range	--	--	1.13-4.05	--	--
	Matrix Spike Ranges (Ash LT 6/28/07 1F2A, 6/29/08 2F3A, and 6/29/07 3F2A)	--	**27.3** -102.4	--	--	--
	PDS Ranges (Ash from LT 6/29/07 3F2A)	--	89.4	--	--	--
Analysis on 8/16/07 Samples from 7/5/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	94.0	--	--	--
	NIST Ash 1633b	--	--	--	94.3	--
	Calibration verification	--	--	--	-	95.7-98.5
	Replicate Analysis Range	--	--	0.03-2.24	--	--
	Matrix Spike Ranges (Ash from LT 7/5/07 3F2A, 7/5/07 4&5F1A, and 7/5/07 6&7F3A)	--	**33.2** -97.3	--	--	--
	PDS Ranges (Ash from LT 7/5/07 6&7F3A)	--	98.5	--	--	--

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[5] RPD = Relative Percent Deviation.

[6] CCV = Continuing calibration verification

[7] NIST = National Institute of Standards and Technology.

[8] NIST Ash 1633b has an uncertified mercury value of 0.141 µg/g.

[9] Matrix spikes, spikes that have been digested along with the sample.

[10] PDS = Post Digestion Spike.

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD[11]	Reference Ash Recovery	CCV[12]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 8/29/07 Samples from 6/29/07 and 7/5/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	99.0	--	--	--
	NIST Ash 1633b	--	--	--	102.8-104.3	--
	Calibration verification	--	--	--	-	100.1-101.9
	Replicate Analysis Range	--	--	1.66-2.82	--	--
	Matrix Spike Ranges (Ash from LT 6/29/07 4&5F1A, 7/5/07 1F2A, and 7/5/07 2F3A)	--	102.3 -**118.4**	--	--	--
	PDS Ranges (Ash from LT 6/29/07 4&5F1A)	--	96.3	--	--	--
Analysis on 9/7/07 Samples from 7/9/07, 7/10/07, 7/21/07, and 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	99.0	--	--	--
	NIST Ash 1633b	--	98.9	--	100.7-105.7	--
	Calibration verification	--	--	--	-	97.4-103.7
	Replicate Analysis Range	--	--	0.00-2.45	--	--
	Matrix Spike Ranges (Ash from LT 6/29/07 4&5F1A, 7/5/07 1F2A, and 7/5/07 2F3A)	--	98.2-109.1	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 10/3/07 Samples from 7/21/07, 7/28/07, 8/3/07 and 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	99.0	--	--	--
	NIST Ash 1633b	--	--	--	102.8-104.3	--
	Calibration verification	--	--	--	-	100.1-101.9
	Replicate Analysis Range	--	--	0.58-**20**	--	--
	Matrix Spike Ranges (Ash from LT 7/21/07 3F3A, 7/28/07 1F1A, 8/3/07 1F3B, and 8/18/07 3F3A)	--	**51.9-**104.2	--	--	--
	PDS Ranges (Ash from LT 7/21/07 3F3A)	--	99.4-101.5	--	--	--
Analysis on 10/3/07 Samples from 7/21/07, 8/11/07, and 8/17/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	104.0	--	--	--
	NIST Ash 1633b	--	--	--	103.5	--
	Calibration verification	--	--	--	-	98.9-104.5
	Replicate Analysis Range	--	--	0.41-3.76	--	--
	Matrix Spike Ranges (Ash from LT 8/11/07 1F1A, 8/17/07 1F1B)	--	103-115	--	--	--
	PDS Ranges (Ash from LT 7/21/07 4&5F1A, 7/21/07 6&7F1A, and 8/17/07 1F1B)	--	101.9-104.8	--	--	--

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[11] RPD = Relative Percent Deviation.
[12] CCV = Continuing calibration verification

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD[13]	Reference Ash Recovery	CCV[14]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 10/5/07 Samples from 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	98.0	--	--	--
	NIST Ash 1633b	--	--	--	100.0	--
	Calibration verification	--	--	--	-	99.2-101.7
	Replicate Analysis Range	--	--	2.05	--	--
	Matrix Spike Ranges (Ash from LT 8/18/07 1F1A, 8/18/07 4&5F1A, and 8/18/07 6&7F1A)	--	102.4	--	--	--
	PDS Ranges (Ash from LT 8/18/07 4&5F1A)	--	97.7	--	--	--
Analysis on 10/24/07 Reanalysis of samples from 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	106.0	--	--	--
	NIST Ash 1633b	--	--	--	106.4	--
	Calibration verification	--	--	--	-	98.3-101.9
	Replicate Analysis Range	--	--	0.08-2.37	--	--
	Matrix Spike Ranges (Ash from LT 8/18/07 4&5F1A and LT 8/18/07 6&7F1A)	--	90.0-101.6	--	--	--
	PDS Ranges (Ash from LT 8/18/07 4&5F1A)	--	101.6	--	--	--
Analysis on 12/28/07 Reanalysis of samples from 7/5/07 and 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	102.0	--	--	--
	NIST Ash 1633b	--	--	--	102.1	--
	Calibration verification	--	--	--	-	99.3-103.0
	Replicate Analysis Range	--	--	0.78-4.34	--	--
	Matrix Spike Ranges	--	--	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 1/19/08 Samples from 7/3/07, 7/19/07, 7/22/07, 7/25/07, 7/27/07, 7/29/07, 8/9/07, 8/15/07, and 8/19/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	99.0	--	--	--
	NIST Ash 1633b	--	--	--	96.5	--
	Calibration verification	--	--	--	-	99.3-101.9
	Replicate Analysis Range	--	--	0.53	--	--
	Matrix Spike Ranges (Ash from LT 7/3/07 1F1A)	--	91.0	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 1/23/08 Samples from 6/20/07, 6/29/07, 7/8/07, and 8/13/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	104.0	--	--	--
	NIST Ash 1633b	--	--	--	102.1	--
	Calibration verification	--	--	--	-	99.3-103.0
	Replicate Analysis Range	--	--	0.97-1.06	--	--
	Matrix Spike Ranges (Ash from BL 6/20/07 1F1A, LT 6/29/07 1F3A, and LT 8/13/07 1F1A)	--	**0.00**-101.9	--	--	--
	PDS Ranges (Ash from BL 6/20/07 1F1A)	--	96.7	--	--	--

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[13] RPD = Relative Percent Deviation.

[14] CCV = Continuing calibration verification

Sample Analysis Batch Date	**Sample**	**Method Blank**	**MS Recovery**	**RPD 15**	**Reference Ash Recovery**	**CCV 16**
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 1/23/08 Samples from 7/4/07, 7/10/07, 7/11/07, and 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	112.0	--	--	--
	NIST Ash 1633b	--	--	--	107.8	--
	Calibration verification	--	--	--	-	98.4-104.7
	Replicate Analysis Range	--	--	3.08-3.15	--	--
	Matrix Spike Ranges (Ash from LT 7/4/07 1F1A, 7/10/07 1F2A, and 7/11/07 1F3A)	--	88.8-108.8	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 1/24/08 Samples from 7/28/07, 7/31/07, and 8/1/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	103.0	--	--	--
	NIST Ash 1633b	--	--	--	105.7	--
	Calibration verification	--	--	--	-	97.7-105.5
	Replicate Analysis Range	--	--	0.86-3.38	--	--
	Matrix Spike Ranges (Ash from LT 7/28/07 4&5F1A, 7/31/07 1F2A, and 8/1/07 1F3A)	--	90.3-96.8	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 1/31/08 Sample Reanalysis from 7/11/07, 7/28/07, and 8/18/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	103.0	--	--	--
	NIST Ash 1633b	--	--	--	105.7	--
	Calibration verification	--	--	--	-	97.7-105.5
	Replicate Analysis Range	--	--	2.33-3.10	--	--
	Matrix Spike Ranges (Ash from LT-7/11/07-1F3A, LT-7/28/07-6&7F3A, & LT-8/18/07-4&5F1A)	--	102.5-106.8	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 1/31/08 Samples from 8/5/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	99.0	--	--	--
	NIST Ash 1633b	--	--	--	103.5	--
	Calibration verification	--	--	--	-	97.9-105.9
	Replicate Analysis Range	--	--	0.17-1.52	--	--
	Matrix Spike Ranges (Ash from LT-8/5/07-1F1A)	--	102.5	--	--	--
	PDS Ranges (Ash from LT-8/5/07-4&5F1A)	--	107.0	--	--	--

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[15] RPD = Relative Percent Deviation.

[16] CCV = Continuing calibration verification

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD[17]	Reference Ash Recovery	CCV[18]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 2/5/08 Samples from 6/18/07, 7/9/07, and 7/28/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	101.0	--	--	--
	NIST Ash 1633b	--	--	--	102.8	--
	Calibration verification	--	--	--	-	100.6-102.8
	Replicate Analysis Range	--	--	2.41-5.12	--	--
	Matrix Spike Ranges (Ash from BL 6/18/07 1F2B, BL 6/18/07 1F3A, LT 7/9/07 1F1A, and LT 7/28/07 2F2A)	--	106.1-**117.1**[19]	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 2/11/08 Samples from 7/28/07 and 8/5/07	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	102.0	--	--	--
	NIST Ash 1633b	--	--	--	105.7-110.6	--
	Calibration verification	--	--	--	-	97.9-101.2
	Replicate Analysis Range	--	--	1.39-3.94	--	--
	Matrix Spike Ranges (Ash from LT-7/28/07-3F1A, LT-8/5/07-2F2A, LT-8/5/07-3F3A, and LT-8/5/07-6&7F2A)	--	105.6-112.2	--	--	--
	PDS Ranges	--	98.5	--	--	--

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[17] RPD = Relative Percent Deviation.

[18] CCV = Continuing calibration verification

[19] Parent sample to spike was not detected; therefore, acceptable criteria is ±25%.

QA/QC Results for 2009 Testing

Table A-64. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – 6/12/09

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-65. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – 6/18/09

QA Check	**Sample**	**Objective (KMnO4 and KCl)**	**Objective (NI and PNR)**	**Ontario Hydro Sample Fractions**				
				KMnO4	**KCl**	**H2O2**	**Filter**	**PNR/Nitric Rinse**
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-66. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – 7/9/09

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-67. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – 7/10/09

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-68. QA/QC Results for Mercury Analyses of Ontario Hydro Impinger Solutions – 7/11/09

QA Check	Sample	Objective (KMnO4 and KCl)	Objective (NI and PNR)	Ontario Hydro Sample Fractions				
				KMnO4	KCl	H2O2	Filter	PNR/Nitric Rinse
DI Water Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Reagent Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Field Blank	All	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Lab QC Standard Recovery	Treated and Untreated	90-110%	85-115%	98-101 %	97-99%	101-101%	97-99%	97-114%
Matrix Spike	Treated	85-115%	85-115%	108%	104%	99-100%	NA	111%
Replicate Analysis RPD	Treated	< 10%	< 15%	0.1-0.8%	0.1-1%	0.7-9%	NC	NC
Matrix Spike	Untreated	85-115%	85-115%	89-109%	97-103%	100-105%	NA	106-111%
Replicate Analysis RPD	Untreated	< 10%	< 15%	0.1-0.3%	0-0.6%	0.1-0.8%	NC	NC

Table A-69. QA/QC Results for Mercury Analyses of Coal Samples

Description	Coal type	Hg (ppm)	Hg (ppm)	% RPD	ASTM Reproducibility Limit	Absolute Difference	Fail?
			Objective →	<25%			Pass
6/12/2009	PRB	0.170	0.178	4.62	0.0184	0.0080	Pass
6/12/2009	Lignite	0.184	0.194	4.98	0.0193	0.0094	Pass
6/15/2009	Lignite	0.146	0.157	7.02	0.0171	0.0106	Pass
6/15/2009	PRB	0.165	0.171	3.69	0.0181	0.0062	Pass
6/18/2009	Lignite	0.435	0.406	6.94	0.0332	0.0292	Pass
6/18/2009	PRB	0.123	0.135	9.23	0.0158	0.0119	Pass
6/25/2009	PRB	0.255	0.266	4.29	0.0236	0.0112	Pass
6/25/2009	Lignite	0.722	0.695	3.85	0.0505	0.0273	Pass
6/28/2009	PRB	0.835	0.861	3.00	0.0589	0.0255	Pass
6/28/2009	Lignite	0.201	0.199	0.66	0.0200	0.0013	Pass
7/10/2009	PRB	0.090	0.095	5.13	0.0135	0.0047	Pass
7/10/2009	Lignite	0.287	0.284	0.95	0.0251	0.0027	Pass
7/12/2009	PRB	0.068	0.058	14.74	0.0118	0.0093	Pass
7/12/2009	Lignite	0.247	0.254	2.62	0.0230	0.0066	Pass
7/13/2009	Lignite	0.359	0.342	4.95	0.0290	0.0173	Pass
7/13/2009	PRB	0.105	0.104	1.26	0.0143	0.0013	Pass
7/14/2009	Lignite	0.313	0.332	5.96	0.0274	0.0192	Pass
7/14/2009	PRB	0.076	0.067	13.08	0.0123	0.0093	Pass
7/16/2009	Lignite	0.572	0.598	4.48	0.0431	0.0262	Pass
7/16/2009	PRB	0.073	0.068	7.55	0.0122	0.0053	Pass
7/18/2009	Lignite	0.253	0.247	2.68	0.0230	0.0067	Pass
7/18/2009	PRB	0.083	0.091	9.23	0.0132	0.0080	Pass

Table A-70. QA/QC Results for Mercury Analyses of Ash Samples

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD [20]	Reference Ash Recovery	CCV [21]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
Analysis on 7/31/09; samples from 6/11-6/14/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	106	--	--	--
	NIST Ash 1633b [22,23]	--	--	--	**122**	--
	Calibration verification	--	--	--	--	100.5-102.5
	Replicate Analysis Range	--	--	0-5.5	--	--
	Matrix Spike [24] Ranges (Ash from 6/11/09 2F2C, 6/13/09 2F11D, and 6/14/09 2F11D)	--	103-109	--	--	--
	PDS [25] Ranges	--	--	--	--	--
Analysis on 8/5/09; samples from 6/15/09 and 6/16/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	104	--	--	--
	NIST Ash 1633b	--	--	--	107	--
	Calibration verification	--	--	--	--	99.1-100.9
	Replicate Analysis Range	--	--	0.68-0.69	--	--
	Matrix Spike Ranges (Ash from 6/15/09 2F3D and 6/16/09 2F11D)	--	91.6-95.8	--	--	--
	PDS Ranges	--	--	--	--	--
Analysis on 8/5/09; samples from 6/21-6/25/09 and 6/28/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	101	--	--	--
	NIST Ash 1633b	--	--	--	106	--
	Calibration verification	--	--	--	--	99.6-101.2
	Replicate Analysis Range	--	--	0-2.7	--	--
	Matrix Spike Ranges (Ash 6/21/09 2F14C, 6/22/09 2F11C, 6/23/09 2F2C, 6/24/09 2F11C; 6/25/09 2F2C; 6/28/09 2F14C)	--	96-104.9	--	--	--
	PDS Ranges	--	--	--	--	--
Analyzed 8/6/09; samples from 6/15/09 and 7/8-7/12/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	102	--	--	--
	NIST Ash 1633b	--	--	--	109	--
	Calibration verification	--	--	--	--	99.3-101.2
	Replicate Analysis Range	--	--	0.27-4.41	--	--
	Matrix Spike Ranges (Ash from 7/8/09 2F2C, 7/9/09 2F2C, 7/10/09 2F11C, and 7/12/09 2F2C)	--	94.7-107.8	--	--	--

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[20] RPD = Relative Percent Deviation.

[21] CCV = Continuing calibration verification

[22] NIST = National Institute of Standards and Technology.

[23] NIST Ash 1633b has an uncertified mercury value of 0.141 µg/g.

[24] Matrix spikes, spikes that have been digested along with the sample.

[25] PDS = Post Digestion Spike.

Sample Analysis Batch Date	Sample	Method Blank	MS Recovery	RPD [20]	Reference Ash Recovery	CCV [21]
	Objective→	**<DL**	**85-115%-detect 75-125%-non-detect**	**<10%**	**85-115%**	**85-115%**
	PDS Ranges (Ash from 6/15/09 2F11C)	--	92.8	--	--	--
Analyzed 8/12/09; samples from 6/17-6/18/09 and 7/8/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	98	--	--	--
	NIST Ash 1633b	--	--	--	105	--
	Calibration verification	--	--	--	--	95.7-97.2
	Replicate Analysis Range	--	--	0.15-0.84	--	--
	Matrix Spike Ranges (Ash from 6/17/09 2F2D, 6/17/09 2F11C, 6/18/09 2F3D, and 7/8/09 2F2C)	--	93.1-97.4	--	--	--
	PDS Ranges	--	--	--	--	--
Analyzed 8/19/09; samples from 7/12/09, 7/14-7/15/09, and 7/22-7/23/09	DI Water Blank	<DL	--	--	--	--
	Blank	<DL	102	--	--	--
	NIST Ash 1633b	--	--	--	106	--
	Calibration verification	--	--	--	--	99-100.1
	Replicate Analysis Range	--	--	0.19-1.58	--	--
	Matrix Spike Ranges (Ash from 7/12/09 2F11C, 7/14/09 2F14C, 7/15/09 2F2C, and 7/23/09 2F1C)	--	93.2-98.3	--	--	--
	PDS Ranges	--	--	--	--	--

Table A-71. QA/QC Results for Mercury Analysis on ESP Outlet Appendix K Sorbent Tubes

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2 (%)	Relative Deviation Between Tubes (%)
6/11/2009	9:16:44	17:16:55	N/A	0.5	N/A
6/11/2009	17:42:59	01:43:13	123.3%	0.2	N/A
6/12/2009	8:55:20	16:55:39	N/A	0.5	N/A
6/12/2009	17:24:32	01:24:54	N/A	0.4	N/A
6/13/2009	10:52:52	16:53:43	N/A	1.6	2.2%
6/13/2009	10:52:52	16:53:43	109.3%	0.5	
6/13/2009	17:21:45	01:22:01	N/A	1.0	2.3%
6/13/2009	17:21:45	01:22:01	114.6%	0.0	
6/14/2009	7:57:26	15:07:03	N/A	1.0	N/A
6/14/2009	15:25:43	23:26:03	103.9%	0.0	N/A
6/15/2009	8:53:37	16:53:54	N/A	0.4	N/A
6/15/2009	18:00:52	02:01:12	N/A	0.6	N/A
6/16/2009	7:53:55	15:54:17	119.5%	0.0	N/A
6/16/2009	17:58:30	22:58:42	N/A	0.5	N/A
6/17/2009	7:52:52	15:45:48	N/A	0.8	N/A
6/17/2009	16:15:00	00:15:23	115.3%	0.0	N/A
6/18/2009	7:53:38	15:54:00	N/A	1.2	N/A
6/21/2009	8:42:27	16:42:44	112.6%	0.2	N/A
6/21/2009	17:31:21	01:31:42	N/A	0.4	N/A
6/22/2009	11:57:05	14:57:14	95.9%	0.0	N/A
6/22/2009	15:44:08	19:44:20	N/A	1.3	N/A
6/23/2009	11:15:03	15:15:11	85.3%	0.9	N/A

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2 (%)	Relative Deviation Between Tubes (%)
6/23/2009	15:59:11	19:59:23	N/A	1.0	N/A
6/24/2009	10:42:02	13:42:12	N/A	1.7	N/A
6/24/2009	14:18:00	16:18:05	N/A	4.4	N/A
6/26/2009	9:42:00	12:42:06	N/A	1.7	N/A
6/26/2009	13:58:20	18:58:29	118.2%	0.0	N/A
6/27/2009	11:58:47	16:29:01	N/A	1.9	N/A
6/27/2009	17:11:08	20:11:14	89.7%	0.0	N/A
6/28/2009	9:59:34	12:59:40	N/A	9.4	N/A
6/28/2009	13:24:50	15:54:55	115.7%	0.0	N/A
7/8/2009	11:30:03	14:30:07	121.7%	0.4	N/A
7/8/2009	16:15:15	17:09:48	N/A	17.5	N/A
7/9/2009	11:55:22	14:55:29	114.5%	0.0	N/A
7/10/2009	8:49:08	11:49:14	112.8%	0.0	N/A
7/10/2009	14:20:19	16:40:16	N/A	4.5	N/A
7/11/2009	9:10:02	11:35:39	123.7%	1.1	N/A
7/11/2009	14:00:44	16:03:32	N/A	4.3	N/A
7/12/2009	8:14:59	11:15:07	108.2%	0.0	N/A
7/12/2009	12:56:12	15:36:20	N/A	2.6	N/A
7/13/2009	7:55:05	10:55:14	109.7%	0.0	N/A
7/14/2009	7:37:16	10:37:25	109.3%	0.0	N/A
7/14/2009	13:33:54	16:34:03	N/A	2.5	N/A
7/15/2009	9:48:06	12:48:15	114.8%	1.2	N/A
7/15/2009	13:26:39	16:24:55	N/A	2.5	N/A
7/16/2009	9:50:00	12:50:10	105.3%	1.2	N/A

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2 (%)	Relative Deviation Between Tubes (%)
7/16/2009	13:18:32	16:18:43	N/A	0.0	N/A
7/21/2009	11:29:44	13:09:03	N/A	1.9	-3.9%
7/21/2009	14:10:02	15:49:17	106.1%	0.0	1.4%
7/21/2009	14:10:02	15:49:17	N/A	3.0	
7/22/2009	10:54:06	12:36:06	N/A	0.0	-0.1%
7/22/2009	10:54:06	12:36:06	104.7%	3.3	
7/22/2009	13:15:08	14:53:05	N/A	0.0	0.1%
7/22/2009	13:15:08	14:53:05	106.7%	0.0	
7/22/2009	15:31:59	17:09:03	N/A	0.0	1.0%
7/22/2009	15:31:59	17:09:03	106.4%	1.9	
7/23/2009	11:23:56	12:58:15	119.4%	0.0	-1.6%
7/23/2009	11:23:56	12:58:15	N/A	1.4	
7/23/2009	13:40:06	15:14:03	110.8%	0.0	1.7%
7/23/2009	13:40:06	15:14:03	N/A	1.9	
7/23/2009	15:58:56	17:33:02	N/A	2.5	0.0%
7/23/2009	15:58:56	17:33:02	N/A	2.2	

Table A-72. QA/QC Results for Mercury Analysis on Stack Appendix K Sorbent Tube

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2(%)	Relative Deviation Between Tubes (%)
6/11/2009	9:16:02	17:16:25	N/A	0.7	N/A
6/11/2009	17:31:16	01:31:40	116.0%	0.6	N/A
6/12/2009	8:10:39	16:04:38	N/A	0.4	N/A
6/12/2009	16:22:06	00:22:32	112.4%	0.0	N/A
6/13/2009	11:39:37	17:47:16	N/A	1.5	0.8%
6/13/2009	11:39:37	17:47:16	115.6%	0.0	
6/13/2009	18:00:12	02:00:36	N/A	2.1	0.2%
6/13/2009	18:00:12	02:00:36	116.4%	0.0	
6/14/2009	8:57:20	16:01:52	N/A	2.0	N/A
6/14/2009	16:20:04	00:20:29	N/A	0.9	0.5%
6/14/2009	16:20:04	00:20:29	114.3%	0.0	
6/15/2009	10:21:19	16:30:22	N/A	1.4	N/A
6/15/2009	17:23:57	01:24:23	106.0%	0.0	N/A
6/16/2009	9:12:50	17:13:17	N/A	0.6	N/A
6/16/2009	19:01:46	00:02:03	N/A	0.6	N/A
6/17/2009	9:17:09	17:17:35	N/A	2.3	N/A
6/17/2009	18:06:56	02:07:22	106.7%	0.0	N/A
6/18/2009	8:55:17	16:55:43	N/A	0.8	N/A
6/21/2009	9:48:00	17:48:27	105.1%	0.0	N/A
6/21/2009	18:52:33	02:53:00	N/A	0.9	N/A
6/22/2009	11:56:32	14:56:41	88.3%	0.0	N/A
6/22/2009	15:44:24	19:42:40	N/A	1.6	N/A

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2(%)	Relative Deviation Between Tubes (%)
6/23/2009	11:15:12	15:15:26	78.6%	0.0	N/A
6/23/2009	15:57:27	19:57:42	N/A	0.0	N/A
6/24/2009	10:40:16	13:40:28	104.9%	0.0	N/A
6/24/2009	14:13:40	15:43:17	N/A	5.7	N/A
6/26/2009	9:30:02	13:00:16	N/A	1.5	N/A
6/26/2009	13:52:50	18:53:10	124.8%	0.0	N/A
6/27/2009	12:00:28	16:30:46	N/A	3.9	N/A
6/27/2009	16:57:40	19:57:52	102.2%	25.8	N/A
6/28/2009	10:00:10	13:00:23	N/A	5.3	N/A
6/28/2009	13:21:23	15:51:34	111.2%	0.0	N/A
7/8/2009	11:25:22	14:25:32	112.4%	0.0	N/A
7/8/2009	16:15:10	17:10:05	N/A	9.7	N/A
7/9/2009	11:55:06	14:55:17	107.5%	0.0	N/A
7/10/2009	8:30:44	11:30:57	113.0%	0.0	N/A
7/10/2009	14:20:06	16:56:32	N/A	3.8	N/A
7/11/2009	9:10:20	12:10:33	113.1%	0.9	N/A
7/11/2009	14:00:15	16:09:04	N/A	5.3	N/A
7/12/2009	8:23:00	11:23:14	110.2%	1.7	N/A
7/12/2009	12:30:39	15:30:52	N/A	2.3	N/A
7/13/2009	7:51:23	10:51:35	104.1%	0.9	N/A
7/13/2009	12:53:22	15:53:35	N/A	3.1	N/A
7/14/2009	7:35:50	10:36:04	105.4%	1.1	N/A
7/14/2009	13:30:54	16:31:08	N/A	3.8	N/A

Date	Start Time	Stop Time	Spiked Bed Recovery (%)	Breakthrough to Bed 2(%)	Relative Deviation Between Tubes (%)
7/15/2009	9:47:32	12:47:48	103.2%	0.7	N/A
7/15/2009	13:25:30	16:22:35	N/A	2.5	N/A
7/16/2009	9:48:07	12:48:23	101.8%	0.0	N/A
7/16/2009	13:18:35	16:18:52	N/A	0.0	N/A

APPENDIX B – MERCURY SCEM CALCULATIONS

Methodology for Generating Mercury Concentrations in units of μg/dNm^3 at 3% O_2

This section explains how vapor-phase mercury concentrations are obtained from the mercury SCEMs.

The mercury SCEMs use a gold amalgamation column coupled with a CVAA. The flue gas is conditioned to remove the acid gas constituents (which can harm the gold's ability to adsorb mercury). It is also conditioned to either convert all the mercury to the elemental phase or to remove the oxidized mercury, leaving just the elemental phase. The CVAA can only detect the elemental form of mercury.

A measured flow rate of conditioned flue gas is passed over the gold amalgamation column for a fixed period of time. The flow rate is measured by a mass flow meter. The flow meter is calibrated to generate flow rates in the units of normal cubic meters (Nm^3), where normal means the gas flow has been corrected to 32°F.

As the flue gas passes over the gold, the mercury in the flue gas adsorbs to the gold. Once a measured quantity of flue gas has passed over the gold, the gold is heated to desorb the mercury. This desorbed mercury is detected by the CVAA. The size of the peak generated by the CVAA correlates to a mass of mercury, as determined by a calibration curve. To produce the mercury concentration in μg/dNm^3, the mass of mercury is divided by the volume of flue gas sampled.

These mercury measurements are initially calculated at the actual O_2 concentration in the duct. For each mercury concentration, an oxygen concentration is measured. The mercury data are corrected to a 3% O_2 basis in order to account for dilution effects from location to location. The calculation for conversion to 3% O_2 is:

$$\text{Hg}\ [\mu\text{g/dNm}^3 \text{ at } 3\%\ O_2] = \text{Hg}\ [\mu\text{g/dNm}^3 \text{ at } x\%\ O_2] * (20.9-3) / (20.9-x)$$

where x represents the actual O_2 concentration measured.

Each mercury SCEM produces a datum point every three to seven minutes, depending on the sample time needed to collect a detectable amount of mercury on the gold. The sample time increases as the flue gas mercury concentration decreases.

Methodology for Data Analysis of Parametric Results

This appendix explains how the raw data gathered by the mercury SCEMs are manipulated to produce the vapor phase mercury removal results for the parametric test conditions. A parametric test condition consists of a carbon type and carbon injection rate.

Mercury SCEMs were employed at the ESP inlet and ESP outlet locations. An average mercury concentration was calculated for each location at each test condition. Each test condition lasted from two to three hours. During each test period, flue gas mercury concentrations were measured by the SCEMs. The test period was run long enough for the mercury concentrations to reach a steady state. At each location the steady-state data were averaged to generate an average mercury concentration for the test condition. Mercury removals across the ESP were calculated for each injection rate using these average mercury concentrations.

Methodology for Data Analysis of Long-Term Results

The long-term carbon injection test was run for a one-month period. Over this time period, mercury SCEM data were collected every three to seven minutes at the ESP inlet and ESP outlet locations. Because of the huge volume of data, the mercury concentrations were reduced to one-hour averages. These one-hour averages were used for the plots in this report and for calculations of percent removal across the ESP.

APPENDIX C – PLANT DATA TABLE

Table C-1. Parametric Phase 1 Unit 1 Hourly Average Process Data

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/ HR	Btu/kW hr	TON/ HR	TON/ HR	TON/ HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
12/3/06 1:00	878	6042	9685	580.2	444.3	135.9	23.4	1.17	3.1	288	288	2368	7.9	1.4	0.1	#N/A
12/3/06 2:00	880	6082	9685	580.7	445.0	135.7	23.4	1.17	3.1	289	287	2364	7.7	1.4	0.1	#N/A
12/3/06 3:00	886	6104	9685	562.6	433.0	129.6	23.0	1.18	3.1	290	285	2361	7.5	1.2	0.1	#N/A
12/3/06 4:00	876	6033	9685	557.6	429.8	127.8	22.9	1.20	3.2	288	284	2362	7.3	1.2	0.1	#N/A
12/3/06 5:00	877	6019	9685	572.3	439.6	132.7	23.2	1.19	3.1	287	285	2362	7.5	1.3	0.1	#N/A
12/3/06 6:00	879	6044	9685	585.4	448.4	137.0	23.4	1.17	3.1	287	285	2372	6.2	1.6	0.2	#N/A
12/3/06 7:00	882	6076	9685	594.6	454.5	140.1	23.6	1.16	3.1	285	285	2394	6.9	1.7	0.2	#N/A
12/3/06 8:00	882	6087	9685	600.1	456.9	143.2	23.9	1.14	3.1	285	284	2397	10.9	1.7	0.2	#N/A
12/3/06 9:00	882	6077	9685	600.9	455.4	145.4	24.2	1.14	3.1	286	285	2387	6.9	1.7	0.2	#N/A
12/3/06 10:00	885	6081	9685	595.3	447.8	147.5	24.8	1.13	3.1	288	287	2385	6.6	1.6	0.2	#N/A
12/3/06 11:00	882	6066	9685	585.8	428.0	157.8	26.9	1.15	3.1	288	287	2383	6.7	1.5	0.2	#N/A
12/3/06 12:00	879	6071	9685	581.9	424.8	157.1	27.0	1.16	3.1	284	285	2361	6.9	1.5	0.2	#N/A
12/3/06 13:00	878	6058	9685	587.6	427.9	159.7	27.2	1.16	3.0	285	286	2375	7.0	1.5	0.2	#N/A
12/3/06 14:00	881	6102	9685	589.5	429.0	160.5	27.2	1.16	3.0	285	286	2364	6.9	1.5	0.2	#N/A
12/3/06 15:00	884	6084	9685	583.3	425.3	158.0	27.1	1.16	3.0	287	288	2341	6.7	1.5	0.1	#N/A
12/3/06 16:00	882	6093	9685	575.2	420.4	154.8	26.9	1.17	3.0	289	289	2339	6.8	1.4	0.1	#N/A
12/3/06 17:00	881	6067	9685	568.4	416.4	152.0	26.7	1.18	3.1	289	290	2352	7.0	1.3	0.1	#N/A
12/3/06 18:00	883	6092	9685	568.6	416.5	152.1	26.8	1.19	3.1	289	291	2392	7.7	1.3	0.1	#N/A
12/3/06 19:00	889	6125	9685	572.4	418.8	153.6	26.8	1.19	3.0	290	291	2386	7.8	1.3	0.1	#N/A
12/3/06 20:00	889	6131	9685	573.9	419.7	154.2	26.9	1.19	3.1	291	292	2387	7.9	1.3	0.1	#N/A
12/3/06 21:00	889	6123	9685	577.9	422.1	155.8	27.0	1.19	3.1	290	291	2383	7.8	1.3	0.1	#N/A
12/3/06 22:00	891	6159	9685	579.4	423.0	156.4	27.0	1.19	3.0	290	290	2389	7.9	1.3	0.1	#N/A
12/3/06 23:00	893	6160	9685	575.2	420.5	154.7	26.9	1.19	3.0	290	288	2373	7.9	1.3	0.1	#N/A
12/4/06 0:00	891	6161	9685	567.0	415.6	151.4	26.7	1.20	3.0	286	285	2387	7.5	1.3	0.1	#N/A
12/4/06 1:00	886	6121	9685	571.5	418.3	153.2	26.8	1.20	3.1	286	285	2386	7.5	1.3	0.1	#N/A
12/4/06 2:00	890	6131	9685	576.9	421.6	155.3	26.9	1.19	3.0	285	285	2383	7.7	1.4	0.1	#N/A
12/4/06 3:00	892	6156	9685	574.9	420.4	154.6	26.9	1.19	3.0	284	284	2377	7.7	1.3	0.1	#N/A
12/4/06 4:00	891	6134	9685	573.1	419.2	153.8	26.8	1.19	3.0	284	284	2392	8.0	1.2	0.1	#N/A
12/4/06 5:00	888	6101	9685	574.8	420.0	154.8	26.9	1.19	3.1	285	285	2391	8.0	1.3	0.1	#N/A
12/4/06 6:00	890	6131	9685	577.2	420.9	156.3	27.1	1.19	3.0	286	286	2389	8.7	1.4	0.1	#N/A
12/4/06 7:00	888	6103	9685	582.3	424.0	158.3	27.2	1.18	3.0	287	286	2393	8.9	1.5	0.1	#N/A
12/4/06 8:00	890	6132	9685	590.9	430.1	160.8	27.2	1.17	3.0	288	286	2379	8.6	1.6	0.2	#N/A
12/4/06 9:00	892	6148	9685	584.4	427.3	157.1	26.9	1.17	3.0	289	288	2373	7.7	1.5	0.2	#N/A
12/4/06 10:00	886	6094	9685	576.3	421.2	155.2	26.9	1.17	3.1	291	291	2367	7.8	1.4	0.1	#N/A

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
12/4/06 11:00	882	6051	9685	581.6	424.3	157.3	27.0	1.17	3.1	293	292	2367	8.1	1.5	0.1	#N/A
12/4/06 12:00	885	6121	9685	584.5	426.3	158.2	27.1	1.17	3.0	294	292	2372	8.3	1.5	0.1	#N/A
12/4/06 13:00	886	6098	9685	582.6	424.9	157.6	27.1	1.17	3.1	291	292	2350	8.3	1.4	0.1	#N/A
12/4/06 14:00	887	6103	9685	576.3	420.7	155.6	27.0	1.17	3.0	289	290	2339	7.9	1.4	0.1	#N/A
12/4/06 15:00	884	6097	9685	572.6	418.4	154.2	26.9	1.18	3.1	289	288	2336	7.8	1.3	0.1	#N/A
12/4/06 16:00	882	6118	9685	574.7	419.7	155.0	27.0	1.18	3.1	289	289	2338	7.5	1.3	0.1	#N/A
12/4/06 17:00	885	6091	9685	575.9	420.5	155.3	27.0	1.18	3.0	289	290	2332	7.3	1.3	0.1	#N/A
12/4/06 18:00	883	6082	9685	579.5	422.9	156.6	27.0	1.18	3.1	290	290	2354	7.5	1.4	0.1	#N/A
12/4/06 19:00	885	6092	9685	587.1	428.0	159.1	27.1	1.17	3.0	289	290	2357	7.7	1.4	0.2	#N/A
12/4/06 20:00	886	6106	9685	588.3	428.8	159.5	27.1	1.16	3.0	287	288	2363	7.8	1.5	0.2	#N/A
12/4/06 21:00	885	6098	9685	589.5	429.6	159.9	27.1	1.16	3.0	287	287	2354	7.7	1.5	0.2	#N/A
12/4/06 22:00	887	6119	9685	588.6	429.0	159.6	27.1	1.16	3.0	288	287	2368	7.9	1.5	0.2	#N/A
12/4/06 23:00	885	6120	9685	586.0	427.3	158.7	27.1	1.16	3.1	289	288	2372	8.0	1.6	0.2	#N/A
12/5/06 0:00	885	6099	9685	586.1	427.4	158.7	27.1	1.16	3.0	291	288	2369	8.2	1.6	0.2	#N/A
12/5/06 1:00	885	6097	9685	583.7	425.8	157.9	27.1	1.17	3.0	290	288	2370	8.2	1.5	0.2	#N/A
12/5/06 2:00	885	6105	9685	583.6	425.7	157.9	27.1	1.17	3.0	288	287	2364	7.9	1.5	0.2	#N/A
12/5/06 3:00	885	6091	9685	581.8	424.5	157.3	27.0	1.17	3.0	288	287	2370	7.8	1.5	0.2	#N/A
12/5/06 4:00	886	6092	9685	578.1	422.0	156.1	27.0	1.17	3.0	289	288	2374	7.9	1.4	0.1	#N/A
12/5/06 5:00	877	6041	9685	568.3	407.8	160.4	28.2	1.18	3.0	296	291	2347	8.1	1.4	0.1	#N/A
12/5/06 6:00	876	6053	9685	568.9	397.0	171.9	30.2	1.18	3.1	292	288	2352	8.2	1.4	0.1	#N/A
12/5/06 7:00	883	6088	9685	575.1	401.5	173.6	30.2	1.18	3.0	290	287	2351	8.1	1.4	0.2	#N/A
12/5/06 8:00	886	6103	9685	574.0	401.0	173.0	30.1	1.19	3.0	289	287	2362	8.1	1.4	0.2	#N/A
12/5/06 9:00	885	6088	9685	572.0	399.7	172.3	30.1	1.19	3.0	288	287	2354	8.0	1.4	0.1	#N/A
12/5/06 10:00	867	5982	9685	556.3	389.2	167.1	30.0	1.19	3.0	291	288	2339	8.0	1.4	0.1	#N/A
12/5/06 11:00	881	6083	9685	564.5	394.7	169.8	30.1	1.20	3.1	293	290	2355	8.4	1.4	0.1	#N/A
12/5/06 12:00	881	6090	9685	566.5	396.0	170.5	30.1	1.20	3.0	297	293	2343	8.6	1.4	0.1	#N/A
12/5/06 13:00	882	6069	9670	566.7	396.2	170.6	30.1	1.20	3.1	297	294	2341	8.7	1.4	0.2	#N/A
12/5/06 14:00	882	6067	9695	568.5	397.4	171.2	30.1	1.19	3.0	294	291	2342	8.3	1.4	0.2	#N/A
12/5/06 15:00	879	6082	9744	571.8	399.5	172.3	30.1	1.19	3.1	295	293	2355	8.3	1.4	0.2	#N/A
12/5/06 16:00	881	6106	9819	576.6	402.8	173.9	30.2	1.19	3.0	297	295	2352	8.4	1.4	0.2	#N/A
12/5/06 17:00	881	6092	9775	576.6	402.7	173.9	30.2	1.18	3.0	297	294	2348	8.2	1.4	0.2	#N/A
12/5/06 18:00	883	6100	9723	576.1	402.4	173.7	30.2	1.18	3.0	296	292	2359	8.1	1.4	0.1	#N/A
12/5/06 19:00	879	6071	9718	574.1	401.1	173.1	30.1	1.18	3.1	296	292	2363	8.1	1.4	0.1	#N/A
12/5/06 20:00	880	6091	9750	581.6	406.1	175.6	30.2	1.17	3.0	295	290	2360	8.1	1.4	0.1	#N/A
12/5/06 21:00	883	6087	9724	579.8	404.9	174.9	30.2	1.18	3.0	292	287	2358	7.7	1.4	0.1	#N/A
12/5/06 22:00	883	6079	9628	571.5	399.4	172.2	30.1	1.18	3.0	291	287	2363	7.6	1.4	0.1	#N/A
12/5/06 23:00	875	6012	9674	570.3	401.1	169.2	29.7	1.18	3.1	295	292	2343	7.6	1.4	0.1	#N/A

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/ HR	Btu/kW hr	TON/ HR	TON/ HR	TON/ HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
12/6/06 0:00	838	5792	9749	555.4	388.2	167.2	30.1	1.17	3.1	293	291	2291	7.3	1.4	0.1	#N/A
12/6/06 1:00	889	6157	9782	589.5	412.6	176.9	30.0	1.17	3.0	289	284	2373	7.6	1.4	0.1	#N/A
12/6/06 2:00	894	6094	9583	588.3	411.7	176.6	30.0	1.16	3.0	288	284	2373	7.5	1.4	0.2	#N/A
12/6/06 3:00	893	6110	9547	581.1	406.6	174.5	30.0	1.17	3.0	288	285	2375	7.6	1.4	0.1	#N/A
12/6/06 4:00	889	6077	9564	574.9	402.2	172.7	30.0	1.17	3.0	290	286	2372	7.6	1.3	0.1	#N/A
12/6/06 5:00	886	6054	9647	582.9	407.9	175.0	30.0	1.17	3.1	290	287	2385	6.9	1.3	0.1	#N/A
12/6/06 6:00	888	6074	9701	591.4	413.9	177.4	30.0	1.16	3.0	291	288	2394	7.4	1.4	0.2	#N/A
12/6/06 7:00	890	6118	9724	593.4	415.4	178.0	30.0	1.15	3.0	292	289	2380	7.4	1.4	0.2	#N/A
12/6/06 8:00	890	6107	9664	594.9	416.4	178.5	30.0	1.15	3.0	292	290	2382	7.5	1.4	0.2	#N/A
12/6/06 9:00	891	6118	9577	591.8	414.2	177.5	30.0	1.15	3.0	292	289	2391	7.5	1.4	0.1	#N/A
12/6/06 10:00	890	6110	9649	588.8	411.5	177.3	30.1	1.16	3.0	294	291	2387	7.6	1.3	0.1	#N/A
12/6/06 11:00	888	6114	9627	587.2	410.4	176.8	30.1	1.16	3.0	297	292	2380	7.5	1.3	0.1	#N/A
12/6/06 12:00	865	5945	9717	575.1	402.2	172.9	30.1	1.16	3.1	301	297	2341	7.7	1.4	0.1	#N/A
12/6/06 13:00	847	5838	9831	572.0	405.0	167.0	29.2	1.15	3.0	301	301	2329	7.9	1.4	0.2	#N/A
12/6/06 14:00	874	6026	9644	578.4	414.9	163.6	28.3	1.16	3.0	301	299	2369	8.5	1.4	0.1	#N/A
12/6/06 15:00	873	6006	9628	573.3	411.2	162.1	28.3	1.16	3.0	302	300	2388	8.9	1.4	0.2	#N/A
12/6/06 16:00	884	6095	9679	581.3	417.0	164.4	28.3	1.17	8.0	304	301	2427	8.9	1.4	0.1	#N/A
12/6/06 17:00	884	6104	9706	582.0	417.5	164.6	28.3	1.17	3.1	301	299	2423	9.1	1.4	0.1	#N/A
12/6/06 18:00	884	6094	9708	585.8	420.2	165.6	28.3	1.16	3.1	299	298	2407	9.0	1.4	0.2	#N/A
12/6/06 19:00	884	6106	9777	591.6	424.3	167.3	28.3	1.16	3.0	298	298	2408	9.6	1.5	0.2	#N/A
12/6/06 20:00	886	6121	9695	592.8	425.1	167.7	28.3	1.15	3.0	296	298	2412	9.6	1.5	0.1	#N/A
12/6/06 21:00	888	6107	9657	589.6	422.8	166.8	28.3	1.16	3.0	296	298	2418	9.0	1.4	0.1	#N/A
12/6/06 22:00	885	6117	9688	586.6	420.7	165.9	28.3	1.16	3.1	294	297	2430	8.8	1.4	0.1	#N/A
12/6/06 23:00	884	6112	9620	583.5	418.5	165.0	28.3	1.16	3.1	293	296	2400	8.9	1.4	0.1	#N/A
12/7/06 0:00	866	6000	9711	571.6	410.1	161.6	28.3	1.17	3.1	293	293	2380	8.4	1.4	0.1	#N/A
12/7/06 1:00	883	6117	9702	580.3	416.2	164.0	28.3	1.17	3.0	293	292	2386	8.4	1.4	0.1	#N/A
12/7/06 2:00	884	6095	9586	573.0	411.0	162.0	28.3	1.18	3.0	292	291	2383	8.1	1.3	0.1	#N/A
12/7/06 3:00	882	6065	9664	571.5	409.9	161.6	28.3	1.18	3.0	291	289	2366	7.9	1.3	0.1	#N/A
12/7/06 4:00	883	6092	9659	568.3	407.7	160.6	28.3	1.19	3.0	293	289	2372	7.9	1.3	0.1	#N/A
12/7/06 5:00	882	6054	9707	567.6	407.1	160.4	28.3	1.19	3.0	293	290	2375	7.4	1.3	0.1	#N/A
12/7/06 6:00	880	6070	9737	573.0	411.0	161.9	28.3	1.19	3.0	293	290	2396	8.3	1.3	0.1	#N/A
12/7/06 7:00	883	6073	9791	578.0	414.6	163.4	28.3	1.18	3.0	296	292	2417	8.6	1.3	0.1	#N/A
12/7/06 8:00	881	6085	9685	573.1	411.1	162.0	28.3	1.18	3.0	297	294	2407	8.8	1.3	0.1	#N/A
12/7/06 9:00	882	6100	9630	571.8	410.2	161.6	28.3	1.19	3.0	299	295	2403	8.7	1.3	0.1	#N/A
12/7/06 10:00	881	6093	9678	568.8	407.8	161.0	28.3	1.19	3.0	300	296	2401	8.9	1.2	0.1	#N/A
12/7/06 11:00	881	6091	9707	568.5	406.9	161.6	28.4	1.19	3.0	300	296	2395	9.0	1.2	0.1	#N/A
12/7/06 12:00	880	6093	9778	571.2	408.6	162.6	28.5	1.19	3.0	302	299	2385	9.1	1.3	0.1	#N/A

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/ HR	Btu/kW hr	TON/ HR	TON/ HR	TON/ HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
12/7/06 13:00	881	6086	9781	574.9	410.8	164.2	28.6	1.19	3.0	302	299	2400	9.1	1.4	0.1	#N/A
12/7/06 14:00	882	6100	9776	578.3	412.8	165.5	28.6	1.18	3.0	297	295	2397	8.8	1.4	0.1	#N/A
12/7/06 15:00	882	6099	9776	577.3	412.2	165.0	28.6	1.18	3.0	297	295	2390	8.7	1.3	0.1	#N/A
12/7/06 16:00	881	6110	9776	579.9	413.8	166.1	28.6	1.18	3.0	297	295	2394	8.5	1.4	0.1	#N/A
12/7/06 17:00	883	6112	9776	580.0	413.8	166.2	28.7	1.18	3.0	295	294	2385	8.2	1.4	0.2	#N/A
12/7/06 18:00	882	6126	9776	576.9	411.9	164.9	28.6	1.18	3.0	294	293	2411	8.6	1.4	0.2	#N/A
12/7/06 19:00	879	6104	9776	578.6	413.0	165.7	28.6	1.18	3.1	291	290	2410	8.5	1.5	0.2	#N/A
12/7/06 20:00	882	6103	9776	584.5	416.5	168.0	28.7	1.17	3.0	288	287	2404	8.1	1.5	0.2	#N/A
12/7/06 21:00	882	6127	9776	586.1	417.5	168.6	28.8	1.17	3.0	286	285	2401	7.9	1.6	0.2	#N/A
12/7/06 22:00	883	6091	9776	585.2	416.4	168.8	28.8	1.17	3.0	285	282	2395	7.7	1.6	0.2	#N/A
12/7/06 23:00	880	6092	9776	589.0	419.1	169.9	28.8	1.16	3.0	284	282	2410	7.6	1.6	0.2	#N/A
12/8/06 0:00	882	6081	9776	595.3	423.6	171.7	28.8	1.15	3.0	285	281	2401	7.7	1.6	0.2	#N/A
12/8/06 1:00	881	6077	9776	602.2	429.8	172.3	28.6	1.14	3.1	286	280	2410	7.9	1.6	0.2	#N/A
12/8/06 2:00	887	6090	9776	603.0	432.4	170.6	28.3	1.13	3.0	283	278	2418	8.8	1.7	0.2	#N/A
12/8/06 3:00	882	6063	9776	597.0	428.1	168.8	28.3	1.13	3.1	281	277	2420	10.4	1.6	0.2	#N/A
12/8/06 4:00	882	6040	9776	599.6	430.0	169.6	28.3	1.13	3.0	281	277	2414	11.6	1.7	0.2	#N/A
12/8/06 5:00	881	6068	9776	595.6	427.2	168.5	28.3	1.13	3.1	278	275	2413	11.0	1.8	0.3	#N/A
12/8/06 6:00	885	6083	9776	603.7	434.0	169.7	28.1	1.13	3.0	278	274	2421	11.4	1.9	0.3	#N/A
12/8/06 7:00	888	6123	9776	612.5	440.6	171.8	28.1	1.12	3.0	280	275	2436	11.4	2.0	0.3	#N/A
12/8/06 8:00	891	6120	9776	615.7	442.9	172.7	28.1	1.12	3.0	279	275	2441	12.4	1.9	0.3	#N/A
12/8/06 9:00	892	6141	9776	600.4	432.0	168.4	28.0	1.12	3.0	278	274	2419	8.4	1.8	0.3	#N/A
12/8/06 10:00	884	6058	9776	593.3	427.0	166.3	28.0	1.14	3.1	278	277	2384	7.4	1.7	0.3	#N/A
12/8/06 11:00	885	6084	9776	591.1	425.4	165.7	28.0	1.14	3.1	280	278	2388	7.5	1.7	0.3	#N/A
12/8/06 12:00	885	6070	9776	590.8	425.2	165.7	28.0	1.15	3.0	281	279	2404	7.5	1.7	0.3	#N/A
12/8/06 13:00	889	6096	9776	592.2	426.2	166.1	28.0	1.15	3.0	283	281	2392	7.7	1.7	0.3	#N/A
12/8/06 14:00	890	6113	9776	590.2	424.7	165.5	28.0	1.15	3.1	286	284	2367	8.0	1.7	0.3	#N/A
12/8/06 15:00	892	6122	9776	584.1	420.4	163.7	28.0	1.16	3.0	287	286	2343	8.1	1.7	0.3	#N/A
12/8/06 16:00	888	6131	9776	581.6	418.6	163.0	28.0	1.17	3.1	288	286	2345	8.2	1.6	0.3	#N/A
12/8/06 17:00	883	6073	9776	579.7	417.2	162.4	28.0	1.17	3.0	286	284	2330	7.5	1.7	0.3	#N/A
12/8/06 18:00	881	6060	9776	579.3	417.0	162.3	28.0	1.17	3.0	286	284	2347	7.6	1.7	0.3	#N/A
12/8/06 19:00	880	6080	9776	581.6	418.6	163.0	28.0	1.17	3.1	287	284	2357	7.7	1.7	0.3	#N/A
12/8/06 20:00	882	6083	9776	579.1	416.8	162.3	28.0	1.17	3.0	285	284	2365	7.6	1.7	0.3	#N/A
12/8/06 21:00	881	6059	9776	576.4	414.9	161.5	28.0	1.17	3.0	286	284	2358	7.6	1.6	0.3	#N/A
12/8/06 22:00	881	6038	9776	575.8	414.5	161.3	28.0	1.17	3.1	283	281	2356	7.6	1.6	0.3	#N/A
12/8/06 23:00	878	6019	9776	575.4	414.1	161.3	28.0	1.17	3.0	284	282	2353	7.8	1.6	0.3	#N/A
12/9/06 0:00	881	6055	9776	577.2	415.4	161.8	28.0	1.17	3.0	285	284	2367	7.8	1.6	0.2	#N/A
12/9/06 1:00	881	6075	9776	576.4	414.9	161.6	28.0	1.17	3.1	285	285	2365	8.0	1.6	0.3	#N/A

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/ HR	Btu/kW hr	TON/ HR	TON/ HR	TON/ HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
12/9/06 2:00	880	6030	9776	581.3	418.4	163.0	28.0	1.17	3.0	287	286	2359	7.8	1.6	0.3	#N/A
12/9/06 3:00	880	6063	9776	583.5	419.9	163.5	28.0	1.16	3.1	286	285	2341	8.1	1.7	0.3	#N/A
12/9/06 4:00	881	6080	9776	584.2	420.5	163.7	28.0	1.16	3.0	285	284	2342	7.9	1.6	0.3	#N/A
12/9/06 5:00	882	6037	9776	582.9	419.5	163.4	28.0	1.16	3.0	283	282	2345	9.4	1.6	0.2	#N/A
12/9/06 6:00	879	6030	9776	589.0	423.9	165.1	28.0	1.15	3.1	284	281	2337	7.7	1.5	0.2	#N/A
12/9/06 7:00	879	6020	9776	596.8	429.5	167.3	28.0	1.14	3.0	285	282	2340	7.9	1.5	0.2	#N/A
12/9/06 8:00	885	6107	9776	597.9	430.3	167.6	28.0	1.13	3.0	284	282	2344	8.2	1.5	0.2	#N/A
12/9/06 9:00	881	6029	9776	601.4	432.7	168.7	28.0	1.13	3.0	282	280	2339	8.0	1.6	0.3	#N/A
12/9/06 10:00	883	6064	9776	600.9	432.5	168.5	28.0	1.13	3.0	283	281	2343	7.8	1.7	0.3	#N/A
12/9/06 11:00	884	6067	9776	597.5	430.0	167.6	28.0	1.13	3.0	284	282	2370	7.9	1.6	0.3	#N/A
12/9/06 12:00	881	6061	9776	602.9	434.1	168.8	28.0	1.13	3.0	286	285	2364	8.2	1.7	0.3	#N/A
12/9/06 13:00	884	6080	9776	604.5	436.9	167.6	27.7	1.12	3.0	288	286	2393	8.4	1.6	0.3	#N/A
12/9/06 14:00	880	6044	9776	600.1	433.8	166.3	27.7	1.12	3.0	290	288	2371	8.4	1.6	0.3	#N/A
12/9/06 15:00	881	6035	9776	600.9	434.4	166.5	27.7	1.12	3.1	292	290	2345	8.5	1.6	0.3	#N/A
12/9/06 16:00	881	6067	9776	605.2	438.3	166.9	27.6	1.12	3.0	293	291	2347	8.7	1.7	0.3	#N/A
12/9/06 17:00	885	6080	9776	594.4	430.9	163.5	27.5	1.13	3.0	293	292	2355	8.4	1.6	0.3	#N/A
12/9/06 18:00	882	6042	9776	586.6	425.5	161.1	27.5	1.14	3.1	292	291	2358	8.6	1.5	0.2	#N/A
12/9/06 19:00	879	6045	9776	583.3	425.1	158.2	27.1	1.15	3.1	291	291	2369	8.6	1.5	0.2	#N/A
12/9/06 20:00	878	6019	9776	587.2	428.4	158.8	27.1	1.15	3.1	291	291	2379	8.5	1.5	0.2	#N/A
12/9/06 21:00	882	6014	9776	593.1	433.3	159.8	26.9	1.14	3.0	291	290	2395	8.4	1.5	0.2	#N/A
12/9/06 22:00	884	6053	9776	587.3	428.4	158.9	27.1	1.14	3.0	290	290	2404	8.5	1.5	0.2	#N/A
12/9/06 23:00	881	6039	9776	585.6	427.0	158.6	27.1	1.15	3.0	291	291	2388	8.6	1.5	0.2	#N/A
12/10/06 0:00	874	5981	9776	595.8	435.5	160.3	26.9	1.14	3.1	292	293	2375	8.8	1.6	0.2	#N/A
12/10/06 1:00	883	6095	9776	613.4	450.2	163.2	26.6	1.12	3.0	290	292	2383	8.8	1.7	0.3	#N/A
12/10/06 2:00	890	6078	9776	588.4	429.4	159.0	27.0	1.13	3.0	288	289	2393	8.4	1.5	0.2	#N/A
12/10/06 3:00	879	6003	9776	581.1	423.2	157.8	27.2	1.14	3.1	288	288	2382	8.5	1.5	0.2	#N/A
12/10/06 4:00	878	6010	9776	588.4	429.4	159.1	27.0	1.14	3.1	289	288	2365	8.4	1.5	0.2	#N/A
12/10/06 5:00	881	6051	9776	585.6	427.7	157.9	27.0	1.15	3.0	289	289	2371	8.2	1.5	0.2	#N/A
12/10/06 6:00	879	6017	9776	583.4	426.5	156.9	26.9	1.15	3.1	289	290	2384	8.5	1.5	0.2	#N/A
12/10/06 7:00	878	6022	9776	590.0	431.1	158.9	26.9	1.15	3.1	290	289	2394	8.7	1.5	0.2	#N/A
12/10/06 8:00	882	6103	9776	596.1	435.7	160.4	26.9	1.14	3.0	289	288	2399	8.3	1.6	0.3	#N/A
12/10/06 9:00	880	6072	9776	604.9	442.3	162.6	26.9	1.13	3.0	288	287	2398	8.5	1.6	0.3	#N/A
12/10/06 10:00	887	6106	9776	598.7	434.9	163.8	27.4	1.13	3.0	286	286	2402	8.4	1.6	0.3	#N/A
12/10/06 11:00	884	6072	9776	583.1	422.0	161.1	27.6	1.15	3.0	287	286	2400	8.3	1.4	0.2	#N/A
12/10/06 12:00	878	6068	9776	584.3	423.2	161.1	27.6	1.16	3.1	287	285	2404	8.4	1.5	0.2	#N/A
12/10/06 13:00	881	6080	9776	585.6	425.4	160.2	27.4	1.16	3.0	289	289	2407	8.5	1.5	0.2	#N/A
12/10/06 14:00	881	6079	9776	589.1	429.4	159.7	27.1	1.15	3.0	290	291	2395	8.6	1.5	0.2	#N/A

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
and Time	MW	KLB/ HR	Btu/kW hr	TON/ HR	TON/ HR	TON/ HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
12/10/06 15:00	882	6122	9776	587.0	427.3	159.7	27.2	1.16	3.0	291	290	2392	8.7	1.4	0.2	#N/A
12/10/06 16:00	880	6081	9776	586.5	426.8	159.7	27.2	1.16	3.0	291	290	2400	8.6	1.4	0.2	#N/A
12/10/06 17:00	882	6075	9776	585.7	426.0	159.7	27.3	1.16	3.0	292	291	2397	8.6	1.4	0.2	#N/A
12/10/06 18:00	879	6065	9776	585.7	426.0	159.7	27.3	1.16	3.0	292	291	2393	9.1	1.4	0.2	#N/A
12/10/06 19:00	881	6065	9776	586.8	427.2	159.7	27.2	1.15	3.0	292	288	2391	8.4	1.5	0.2	#N/A
12/10/06 20:00	878	6064	9776	595.1	435.4	159.7	26.8	1.15	3.0	292	292	2387	8.6	1.6	0.3	#N/A
12/10/06 21:00	879	6064	9776	604.5	444.9	159.6	26.4	1.14	3.0	294	293	2395	9.0	1.7	0.3	#N/A
12/10/06 22:00	887	6124	9776	596.0	436.4	159.6	26.8	1.13	3.0	294	294	2420	9.0	1.7	0.3	#N/A
12/10/06 23:00	882	6076	9776	583.1	423.4	159.7	27.4	1.15	3.1	295	294	2401	9.1	1.6	0.3	#N/A

Table C-2. Parametric Phase 2 Unit 1 Hourly Average Process Data

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/20/07 1:00	874	6050	9872	612.4	453.6	158.8	25.9	1.12	3.2	299	297	2300	10.0	1.8	0.2	0.2
4/20/07 2:00	878	6043	9872	636.7	474.5	162.3	25.5	1.09	3.1	299	294	2296	9.0	2.0	0.2	0.2
4/20/07 3:00	884	6108	9872	624.0	463.6	160.5	25.7	1.09	3.1	298	294	2303	9.2	1.8	0.2	0.2
4/20/07 4:00	870	5979	9872	604.6	446.9	157.6	26.1	1.09	3.2	298	293	2273	9.2	1.7	0.2	0.2
4/20/07 5:00	885	6069	9872	627.4	466.5	160.9	25.6	1.09	3.1	298	294	2307	9.5	1.8	0.2	0.2
4/20/07 6:00	890	6087	9872	631.4	469.9	161.5	25.6	1.08	3.1	297	296	2315	10.0	1.8	0.2	0.2
4/20/07 7:00	889	6121	9872	631.2	468.8	162.4	25.7	1.08	3.1	296	296	2318	9.2	1.8	0.2	0.2
4/20/07 8:00	888	6124	9872	627.7	465.2	162.5	25.9	1.09	3.1	295	295	2316	9.2	1.8	0.2	0.2
4/20/07 9:00	888	6128	9872	613.2	452.8	160.4	26.2	1.10	3.1	294	293	2320	9.2	1.6	0.2	0.2
4/20/07 10:00	883	6069	9872	608.4	448.7	159.7	26.2	1.11	3.2	294	294	2326	9.2	1.6	0.1	0.2
4/20/07 11:00	886	6093	9872	601.9	443.1	158.8	26.4	1.12	3.1	298	297	2326	10.4	1.5	0.1	0.2
4/20/07 12:00	880	6055	9872	604.7	445.6	159.2	26.3	1.12	3.2	298	299	2316	10.2	1.5	0.1	0.2
4/20/07 13:00	883	6090	9872	613.2	452.8	160.4	26.2	1.12	3.1	300	300	2323	10.2	1.5	0.1	0.2
4/20/07 14:00	887	6107	9872	612.0	451.8	160.2	26.2	1.11	3.1	302	300	2324	10.3	1.5	0.1	0.2
4/20/07 15:00	887	6087	9872	602.9	443.9	158.9	26.4	1.12	3.1	303	302	2325	10.4	1.4	0.1	0.2
4/20/07 16:00	885	6081	9872	598.0	439.7	158.3	26.5	1.13	3.1	304	303	2321	10.5	1.4	0.1	0.2
4/20/07 17:00	884	6093	9872	596.8	438.7	158.1	26.5	1.14	3.1	306	303	2330	10.3	1.4	0.1	0.2
4/20/07 18:00	888	6112	9872	602.2	442.3	159.9	26.6	1.14	3.1	305	303	2329	10.4	1.4	0.1	0.2
4/20/07 19:00	888	6150	9872	605.1	443.7	161.3	26.7	1.14	3.1	302	302	2337	10.7	1.4	0.1	0.2
4/20/07 20:00	889	6146	9872	603.8	442.6	161.1	26.7	1.14	3.1	303	301	2341	10.6	1.5	0.1	0.2
4/20/07 21:00	891	6128	9872	603.8	442.6	161.2	26.7	1.14	3.1	302	300	2336	10.4	1.4	0.1	0.2
4/20/07 22:00	889	6149	9872	600.5	439.8	160.7	26.8	1.14	3.1	301	300	2334	10.5	1.4	0.1	0.2
4/20/07 23:00	887	6081	9872	596.4	436.3	160.1	26.8	1.14	3.1	299	299	2324	10.4	1.4	0.1	0.2
4/21/07 0:00	887	6087	9872	593.0	433.4	159.6	26.9	1.14	3.1	298	298	2305	10.4	1.4	0.1	0.2
4/21/07 1:00	851	5891	9872	562.8	409.9	152.9	27.2	1.15	3.2	297	295	2249	10.1	1.3	0.1	0.2
4/21/07 2:00	719	4924	9872	487.9	368.8	119.2	24.4	1.15	3.2	300	292	2000	9.2	1.4	0.1	0.2
4/21/07 3:00	824	5637	9872	558.8	436.6	122.1	21.9	1.14	3.2	294	292	2149	9.9	1.4	0.1	0.2
4/21/07 4:00	864	5923	9872	581.8	438.3	143.5	24.7	1.14	3.1	296	293	2257	10.3	1.4	0.1	0.2
4/21/07 5:00	845	5766	9872	563.4	417.1	146.3	26.0	1.14	3.1	293	293	2194	10.0	1.3	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/21/07 6:00	883	6121	9872	592.6	431.6	161.0	27.2	1.14	3.2	296	293	2294	11.1	1.4	0.1	0.2
4/21/07 7:00	884	6110	9872	587.8	431.3	156.4	26.6	1.15	3.1	293	291	2286	10.5	1.4	0.1	0.2
4/21/07 8:00	886	6061	9872	572.5	420.8	151.7	26.5	1.17	3.1	291	289	2287	10.5	1.4	0.1	0.2
4/21/07 9:00	881	6081	9872	572.1	420.2	152.0	26.6	1.18	3.2	293	290	2294	10.6	1.4	0.1	0.2
4/21/07 10:00	883	6069	9872	582.0	426.9	155.1	26.7	1.17	3.1	295	292	2302	10.6	1.4	0.1	0.2
4/21/07 11:00	886	6090	9872	589.5	432.3	157.2	26.7	1.16	3.1	297	294	2309	10.6	1.4	0.1	0.2
4/21/07 12:00	888	6131	9872	591.6	436.1	155.5	26.3	1.16	3.1	300	297	2318	10.8	1.4	0.1	0.2
4/21/07 13:00	888	6088	9872	590.2	435.0	155.1	26.3	1.15	3.1	302	299	2316	10.8	1.4	0.1	0.2
4/21/07 14:00	888	6113	9872	588.7	434.0	154.7	26.3	1.16	3.1	303	299	2313	10.6	1.4	0.1	0.2
4/21/07 15:00	886	6105	9872	581.8	429.0	152.7	26.3	1.16	3.1	304	301	2327	10.6	1.4	0.1	0.2
4/21/07 16:00	888	6090	9872	585.7	431.9	153.9	26.3	1.16	3.1	304	303	2329	10.5	1.4	0.1	0.2
4/21/07 17:00	888	6106	9872	591.0	435.7	155.4	26.3	1.16	3.1	304	304	2340	10.6	1.4	0.1	0.2
4/21/07 18:00	887	6100	9872	596.1	439.3	156.8	26.3	1.15	3.1	307	305	2335	10.3	1.4	0.1	0.2
4/21/07 19:00	885	6094	9872	592.6	436.7	155.8	26.3	1.15	3.1	305	304	2314	10.6	1.4	0.1	0.2
4/21/07 20:00	881	6055	9872	586.1	432.1	154.0	26.3	1.15	3.1	302	302	2304	10.5	1.4	0.1	0.2
4/21/07 21:00	881	6070	9872	587.3	433.0	154.3	26.3	1.15	3.1	301	301	2293	10.7	1.4	0.1	0.2
4/21/07 22:00	879	6060	9872	583.2	430.1	153.1	26.3	1.15	3.1	300	298	2289	10.6	1.4	0.1	0.2
4/21/07 23:00	877	6041	9872	584.0	430.6	153.4	26.3	1.16	3.1	297	295	2282	10.7	1.4	0.1	0.2
4/22/07 0:00	877	6064	9872	581.1	428.6	152.5	26.2	1.16	3.1	296	292	2285	10.6	1.4	0.1	0.2
4/22/07 1:00	882	6028	9872	578.3	426.5	151.7	26.2	1.16	3.1	294	291	2280	10.5	1.4	0.1	0.2
4/22/07 2:00	879	6006	9872	570.7	421.1	149.6	26.2	1.17	3.2	294	292	2281	10.7	1.4	0.1	0.2
4/22/07 3:00	876	5979	9872	578.1	426.4	151.7	26.2	1.16	3.2	295	292	2271	10.6	1.4	0.1	0.2
4/22/07 4:00	879	6046	9872	577.6	426.0	151.5	26.2	1.17	3.1	297	293	2285	10.7	1.4	0.1	0.2
4/22/07 5:00	879	6026	9872	571.7	421.8	149.9	26.2	1.17	3.1	298	294	2293	10.7	1.4	0.1	0.2
4/22/07 6:00	878	6021	9872	571.2	421.4	149.7	26.2	1.17	3.2	299	295	2292	10.6	1.4	0.1	0.2
4/22/07 7:00	861	5933	9872	568.0	421.5	146.5	25.8	1.18	3.2	298	295	2256	10.8	1.4	0.1	0.2
4/22/07 8:00	884	6067	9872	587.1	431.7	155.4	26.5	1.16	3.1	296	294	2310	10.9	1.4	0.1	0.2
4/22/07 9:00	885	6106	9872	587.8	432.1	155.7	26.5	1.16	3.1	297	294	2307	10.7	1.5	0.1	0.2
4/22/07 10:00	885	6110	9872	584.6	429.8	154.8	26.5	1.16	3.1	297	293	2297	10.8	1.5	0.1	0.2
4/22/07 11:00	886	6051	9872	580.1	426.6	153.5	26.5	1.16	3.1	299	294	2288	10.9	1.4	0.1	0.2
4/22/07 12:00	882	6043	9872	585.6	430.6	155.0	26.5	1.16	3.1	300	296	2311	10.8	1.4	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/22/07 13:00	882	6070	9872	595.8	438.7	157.0	26.4	1.15	3.1	302	299	2328	11.0	1.4	0.1	0.2
4/22/07 14:00	887	6082	9872	594.7	438.3	156.4	26.3	1.14	3.1	303	301	2323	10.8	1.4	0.1	0.2
4/22/07 15:00	885	6066	9872	593.7	437.6	156.1	26.3	1.14	3.1	304	301	2324	10.7	1.4	0.1	0.2
4/22/07 16:00	885	6100	9872	589.2	434.3	154.8	26.3	1.15	3.1	304	301	2326	10.7	1.4	0.1	0.2
4/22/07 17:00	883	6051	9872	587.3	433.0	154.3	26.3	1.15	3.1	305	302	2320	10.8	1.4	0.1	0.2
4/22/07 18:00	884	6049	9872	590.6	435.4	155.2	26.3	1.15	3.1	306	302	2317	10.8	1.4	0.1	0.2
4/22/07 19:00	885	6075	9872	590.1	435.0	155.1	26.3	1.15	3.1	306	303	2327	10.9	1.4	0.1	0.2
4/22/07 20:00	884	6070	9872	589.5	434.6	154.9	26.3	1.15	3.1	305	304	2328	11.0	1.4	0.1	0.2
4/22/07 21:00	885	6111	9872	584.1	430.7	153.4	26.3	1.16	3.2	303	302	2328	10.8	1.4	0.1	0.2
4/22/07 22:00	883	6067	9872	585.6	431.9	153.7	26.2	1.16	3.2	300	298	2330	10.7	1.4	0.1	0.2
4/22/07 23:00	885	6088	9872	581.6	429.0	152.7	26.2	1.16	3.1	301	298	2317	10.8	1.4	0.1	0.2
4/23/07 0:00	885	6108	9872	577.2	425.8	151.3	26.2	1.17	3.1	300	299	2321	10.8	1.4	0.1	0.2
4/23/07 1:00	882	6051	9872	578.2	426.5	151.7	26.2	1.17	3.2	299	297	2306	10.7	1.4	0.1	0.2
4/23/07 2:00	881	6062	9872	588.0	433.5	154.5	26.3	1.16	3.1	299	296	2310	10.7	1.5	0.1	0.2
4/23/07 3:00	882	6054	9872	599.9	442.0	157.9	26.3	1.15	3.1	300	296	2322	10.7	1.5	0.1	0.2
4/23/07 4:00	887	6109	9872	605.2	445.8	159.4	26.3	1.13	3.1	299	297	2318	10.8	1.6	0.1	0.2
4/23/07 5:00	887	6099	9872	601.4	443.0	158.3	26.3	1.13	3.1	300	297	2322	10.8	1.5	0.1	0.2
4/23/07 6:00	886	6067	9872	598.1	440.6	157.4	26.3	1.13	3.1	302	296	2320	11.3	1.5	0.1	0.2
4/23/07 7:00	886	6056	9872	594.0	437.8	156.2	26.3	1.13	3.1	303	297	2326	10.8	1.5	0.1	0.2
4/23/07 8:00	883	6097	9872	592.2	436.5	155.7	26.3	1.14	3.1	303	298	2346	10.9	1.5	0.1	0.2
4/23/07 9:00	883	6072	9872	593.4	437.4	156.1	26.3	1.14	3.1	300	297	2348	9.7	1.5	0.1	0.2
4/23/07 10:00	883	6070	9872	597.2	440.1	157.1	26.3	1.14	3.2	298	297	2334	9.7	1.6	0.1	0.2
4/23/07 11:00	886	6146	9872	597.6	440.3	157.3	26.3	1.15	3.1	298	297	2344	9.7	1.5	0.1	0.2
4/23/07 12:00	887	6113	9872	592.0	436.4	155.6	26.3	1.15	3.1	299	297	2397	9.5	1.5	0.1	0.2
4/23/07 13:00	885	6102	9872	595.4	438.8	156.6	26.3	1.15	3.1	300	299	2419	9.4	1.5	0.1	0.2
4/23/07 14:00	887	6092	9872	601.2	442.9	158.3	26.3	1.14	3.1	302	302	2345	9.5	1.5	0.1	0.2
4/23/07 15:00	888	6101	9872	599.9	442.0	157.9	26.3	1.14	3.1	303	302	2336	9.3	1.5	0.1	0.2
4/23/07 16:00	886	6102	9872	600.1	442.2	157.9	26.3	1.14	3.1	303	302	2345	9.1	1.5	0.1	0.2
4/23/07 17:00	885	6097	9872	603.8	444.8	159.0	26.3	1.13	3.1	302	302	2339	9.6	1.5	0.1	0.2
4/23/07 18:00	885	6112	9872	610.1	449.3	160.8	26.4	1.12	3.1	302	302	2332	9.5	1.5	0.1	0.2
4/23/07 19:00	887	6091	9872	617.9	454.8	163.0	26.4	1.11	3.1	302	302	2340	9.5	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/23/07 20:00	884	6121	9872	625.7	460.4	165.3	26.4	1.10	3.1	301	301	2328	9.7	1.6	0.1	0.2
4/23/07 21:00	885	6143	9872	636.6	471.7	165.0	25.9	1.09	3.1	301	300	2340	9.3	1.6	0.1	0.2
4/23/07 22:00	889	6119	9872	641.9	475.5	166.4	25.9	1.08	3.1	301	300	2344	9.1	1.7	0.1	0.2
4/23/07 23:00	890	6097	9872	642.9	476.2	166.7	25.9	1.07	3.1	303	301	2326	9.2	1.7	0.2	0.2
4/24/07 0:00	889	6122	9872	632.7	468.9	163.8	25.9	1.07	3.1	300	298	2318	9.2	1.6	0.1	0.2
4/24/07 1:00	888	6084	9872	630.1	467.0	163.0	25.9	1.07	3.1	301	297	2327	9.3	1.6	0.1	0.2
4/24/07 2:00	882	6045	9872	638.1	472.7	165.3	25.9	1.07	3.2	301	297	2314	9.0	1.6	0.1	0.2
4/24/07 3:00	886	6099	9872	643.8	476.8	167.0	25.9	1.06	3.1	299	297	2309	8.8	1.6	0.1	0.2
4/24/07 4:00	888	6144	9872	636.3	471.5	164.8	25.9	1.07	3.1	300	296	2320	8.6	1.6	0.1	0.2
4/24/07 5:00	891	6127	9872	620.1	458.5	161.6	26.1	1.08	3.1	299	296	2329	8.6	1.5	0.1	0.2
4/24/07 6:00	886	6088	9872	607.0	447.9	159.0	26.2	1.10	3.1	298	295	2317	8.6	1.4	0.1	0.2
4/24/07 7:00	884	6069	9872	605.0	446.5	158.5	26.2	1.11	3.2	298	295	2316	9.0	1.4	0.1	0.2
4/24/07 8:00	885	6102	9872	605.6	447.0	158.6	26.2	1.12	3.1	300	296	2326	8.9	1.4	0.1	0.2
4/24/07 9:00	885	6131	9872	604.0	445.8	158.2	26.2	1.13	3.2	300	297	2315	9.2	1.4	0.1	0.2
4/24/07 10:00	885	6131	9872	603.3	445.3	158.0	26.2	1.13	3.1	301	296	2324	8.9	1.4	0.1	0.2
4/24/07 11:00	884	6148	9872	604.9	446.5	158.4	26.2	1.13	3.1	301	296	2317	8.9	1.3	0.1	0.2
4/24/07 12:00	889	6116	9872	603.8	445.7	158.1	26.2	1.13	3.1	299	296	2317	8.9	1.3	0.1	0.2
4/24/07 13:00	886	6110	9872	605.2	446.7	158.5	26.2	1.13	3.1	301	297	2321	13.2	1.3	0.1	0.2
4/24/07 14:00	886	6110	9872	606.3	447.5	158.8	26.2	1.13	3.1	304	297	2319	8.4	1.3	0.1	0.2
4/24/07 15:00	888	6111	9872	604.6	446.3	158.3	26.2	1.13	3.1	302	299	2331	8.5	1.4	0.1	0.2
4/24/07 16:00	888	6127	9872	598.0	441.5	156.5	26.2	1.14	3.1	299	298	2331	9.5	1.4	0.1	0.2
4/24/07 17:00	889	6154	9872	584.8	432.1	152.7	26.1	1.15	3.1	299	298	2329	9.6	1.3	0.1	0.2
4/24/07 18:00	885	6106	9872	574.2	422.4	151.8	26.4	1.17	3.2	299	297	2331	9.5	1.3	0.1	0.2
4/24/07 19:00	879	6077	9872	586.3	430.4	155.8	26.6	1.17	3.2	298	297	2300	9.8	1.4	0.1	0.2
4/24/07 20:00	882	6111	9872	605.2	445.8	159.4	26.3	1.15	3.1	297	295	2302	9.8	1.5	0.1	0.2
4/24/07 21:00	888	6140	9872	614.0	454.3	159.7	26.0	1.13	3.1	298	295	2309	9.4	1.6	0.1	0.2
4/24/07 22:00	889	6139	9872	612.9	453.6	159.3	26.0	1.12	3.1	300	295	2311	9.3	1.6	0.1	0.2
4/24/07 23:00	892	6104	9872	604.7	447.4	157.3	26.0	1.13	3.1	300	296	2315	9.4	1.6	0.1	0.2
4/25/07 0:00	889	6106	9872	596.1	441.0	155.1	26.0	1.13	3.1	299	297	2324	9.8	1.5	0.1	0.2
4/25/07 1:00	885	6100	9872	592.7	438.4	154.3	26.0	1.14	3.1	299	295	2317	10.0	1.5	0.1	0.2
4/25/07 2:00	887	6103	9872	588.3	435.1	153.2	26.0	1.15	3.1	298	278	2297	8.9	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/25/07 3:00	887	6085	9872	581.5	430.0	151.5	26.1	1.16	3.2	297	282	2308	8.9	1.5	0.1	0.2
4/25/07 4:00	883	6108	9872	582.7	430.9	151.8	26.1	1.16	3.2	298	285	2294	9.7	1.6	0.1	0.2
4/25/07 5:00	885	6118	9872	585.0	432.7	152.4	26.0	1.17	3.1	295	284	2301	9.4	1.6	0.1	0.2
4/25/07 6:00	885	6110	9872	587.2	434.2	152.9	26.0	1.16	3.1	295	286	2301	9.4	1.6	0.1	0.2
4/25/07 7:00	887	6052	9872	592.8	438.5	154.3	26.0	1.16	3.1	294	289	2290	9.2	1.6	0.1	0.2
4/25/07 8:00	886	6105	9872	597.3	441.8	155.4	26.0	1.15	3.1	293	289	2304	9.1	1.6	0.1	0.2
4/25/07 9:00	889	6087	9872	595.8	440.7	155.0	26.0	1.14	3.1	295	289	2286	8.8	1.6	0.1	0.2
4/25/07 10:00	887	6069	9872	596.3	441.1	155.2	26.0	1.14	3.2	296	291	2285	8.4	1.6	0.1	0.2
4/25/07 11:00	886	6101	9872	598.1	442.5	155.6	26.0	1.14	3.1	299	294	2303	8.2	1.6	0.1	0.2
4/25/07 12:00	886	6076	9872	600.0	443.9	156.1	26.0	1.13	3.2	298	294	2303	8.9	1.6	0.1	0.2
4/25/07 13:00	886	6061	9872	602.7	445.9	156.8	26.0	1.13	3.1	296	296	2315	9.2	1.5	0.1	0.2
4/25/07 14:00	884	6054	9872	609.4	450.9	158.4	26.0	1.12	3.1	298	298	2315	8.3	1.5	0.1	0.2
4/25/07 15:00	886	6083	9872	618.3	457.6	160.7	26.0	1.11	3.1	300	300	2325	9.0	1.5	0.1	0.2
4/25/07 16:00	888	6105	9872	614.8	455.0	159.8	26.0	1.11	3.1	297	298	2322	9.3	1.4	0.1	0.2
4/25/07 17:00	887	6103	9872	614.4	454.7	159.7	26.0	1.11	3.1	298	298	2321	9.2	1.4	0.1	0.2
4/25/07 18:00	889	6097	9872	609.0	450.7	158.3	26.0	1.11	3.1	299	299	2318	9.6	1.5	0.1	0.2
4/25/07 19:00	890	6112	9872	590.6	436.8	153.8	26.0	1.13	3.1	298	299	2319	9.0	1.4	0.1	0.2
4/25/07 20:00	882	6083	9872	590.4	436.7	153.7	26.0	1.15	3.2	294	295	2304	9.4	1.5	0.1	0.2
4/25/07 21:00	886	6060	9872	600.3	447.0	153.3	25.5	1.14	3.2	294	294	2298	9.2	1.7	0.2	0.2
4/25/07 22:00	885	6094	9872	609.5	452.6	157.0	25.8	1.13	3.1	291	293	2291	8.8	1.9	0.2	0.2
4/25/07 23:00	885	6080	9872	607.7	449.3	158.5	26.1	1.12	3.1	291	292	2290	8.5	2.1	0.2	0.2
4/26/07 0:00	884	6016	9872	600.0	443.5	156.5	26.1	1.12	3.1	290	289	2279	7.9	2.1	0.2	0.2
4/26/07 1:00	885	6041	9872	597.3	441.4	155.9	26.1	1.12	3.1	288	289	2300	7.5	2.2	0.2	0.2
4/26/07 2:00	886	6041	9872	595.1	439.8	155.3	26.1	1.13	3.1	289	289	2298	7.4	2.4	0.2	0.2
4/26/07 3:00	885	6033	9872	593.7	438.7	155.0	26.1	1.13	3.2	290	289	2292	7.3	2.3	0.2	0.2
4/26/07 4:00	884	6017	9872	600.7	444.0	156.7	26.1	1.13	3.1	291	289	2279	7.3	2.2	0.2	0.2
4/26/07 5:00	885	6042	9872	608.6	449.9	158.7	26.1	1.12	3.1	291	288	2287	7.2	1.9	0.2	0.2
4/26/07 6:00	886	6099	9872	611.1	455.6	155.5	25.4	1.12	3.1	289	286	2286	7.8	1.9	0.2	0.2
4/26/07 7:00	889	6127	9872	601.3	450.1	151.2	25.1	1.12	3.1	288	286	2290	7.3	1.7	0.2	0.2
4/26/07 8:00	888	6063	9872	590.7	442.1	148.5	25.1	1.14	3.1	286	284	2270	7.3	1.6	0.1	0.2
4/26/07 9:00	886	6078	9872	585.1	438.0	147.2	25.2	1.15	3.1	288	287	2271	7.5	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/26/07 10:00	885	6048	9872	581.5	434.8	146.7	25.2	1.15	3.2	291	289	2257	7.8	1.5	0.1	0.2
4/26/07 11:00	884	6066	9872	582.8	428.8	154.0	26.4	1.16	3.1	294	291	2256	8.6	1.4	0.1	0.2
4/26/07 12:00	883	6065	9872	588.5	432.7	155.9	26.5	1.15	3.1	297	293	2266	8.9	1.4	0.1	0.2
4/26/07 13:00	885	6089	9872	596.3	438.5	157.8	26.5	1.15	3.1	299	296	2267	9.3	1.5	0.1	0.2
4/26/07 14:00	886	6088	9872	605.5	445.4	160.1	26.4	1.14	3.1	301	298	2275	9.5	1.6	0.1	0.2
4/26/07 15:00	889	6100	9872	604.1	444.4	159.8	26.4	1.13	3.1	303	300	2296	9.4	1.6	0.1	0.2
4/26/07 16:00	887	6104	9872	599.6	441.0	158.6	26.5	1.13	3.1	304	301	2304	8.8	1.6	0.1	0.2
4/26/07 17:00	886	6075	9872	598.5	440.1	158.3	26.5	1.13	3.1	303	300	2307	8.8	1.6	0.2	0.2
4/26/07 18:00	889	6088	9872	593.5	436.4	157.1	26.5	1.14	3.1	301	301	2329	8.3	1.6	0.2	0.2
4/26/07 19:00	884	6044	9872	594.3	437.0	157.3	26.5	1.14	3.1	301	301	2310	8.4	1.6	0.2	0.2
4/26/07 20:00	883	6073	9872	600.9	442.0	158.9	26.4	1.13	3.2	301	302	2312	8.3	1.6	0.2	0.2
4/26/07 21:00	887	6088	9872	607.8	447.1	160.7	26.4	1.13	3.1	301	301	2305	8.3	1.6	0.2	0.2
4/26/07 22:00	888	6137	9872	598.7	440.3	158.4	26.5	1.13	3.1	296	297	2313	8.9	1.5	0.1	0.2
4/26/07 23:00	889	6098	9872	590.2	433.9	156.3	26.5	1.14	3.1	296	296	2311	8.8	1.5	0.1	0.2
4/27/07 0:00	886	6078	9872	581.9	427.6	154.2	26.5	1.15	3.2	297	296	2303	9.0	1.4	0.1	0.2
4/27/07 1:00	884	6063	9872	581.2	424.2	157.0	27.0	1.16	3.1	298	297	2301	8.9	1.3	0.1	0.2
4/27/07 2:00	884	6051	9872	586.7	428.0	158.6	27.0	1.16	3.1	299	298	2300	8.9	1.3	0.1	0.2
4/27/07 3:00	885	6076	9872	590.5	430.8	159.7	27.0	1.15	3.1	299	298	2298	9.2	1.3	0.1	0.2
4/27/07 4:00	886	6116	9872	590.8	431.0	159.8	27.1	1.15	3.1	299	298	2297	9.6	1.3	0.1	0.2
4/27/07 5:00	886	6116	9872	592.9	432.5	160.4	27.1	1.15	3.1	296	295	2315	9.3	1.4	0.1	0.2
4/27/07 6:00	888	6068	9872	590.3	430.6	159.7	27.1	1.15	3.1	294	293	2312	9.1	1.3	0.1	0.2
4/27/07 7:00	887	6077	9872	587.0	428.3	158.8	27.0	1.15	3.1	293	293	2298	9.1	1.3	0.1	0.2
4/27/07 8:00	887	6086	9872	582.4	425.0	157.4	27.0	1.16	3.1	295	293	2292	9.3	1.3	0.1	0.2
4/27/07 9:00	886	6091	9872	580.8	423.8	157.0	27.0	1.16	3.1	297	295	2291	9.6	1.3	0.1	0.2
4/27/07 10:00	885	6090	9872	579.0	422.6	156.5	27.0	1.17	3.1	298	298	2296	9.8	1.3	0.1	0.2
4/27/07 11:00	886	6092	9872	580.0	423.2	156.8	27.0	1.17	3.1	299	299	2291	9.8	1.3	0.1	0.2
4/27/07 12:00	885	6101	9872	579.9	423.2	156.7	27.0	1.17	3.2	301	300	2301	9.7	1.3	0.1	0.2
4/27/07 13:00	886	6155	9872	577.0	421.1	155.9	27.0	1.18	3.1	300	301	2314	9.8	1.3	0.1	0.2
4/27/07 14:00	889	6112	9872	571.7	417.3	154.3	27.0	1.19	3.1	302	301	2324	9.9	1.2	0.1	0.2
4/27/07 15:00	885	6102	9872	566.6	413.6	152.9	27.0	1.19	3.2	303	301	2324	9.2	1.2	0.1	0.2
4/27/07 16:00	884	6083	9872	569.3	415.6	153.7	27.0	1.19	3.1	304	303	2317	8.7	1.2	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/27/07 17:00	884	6128	9872	575.6	420.1	155.5	27.0	1.19	3.1	305	304	2325	9.1	1.3	0.1	0.2
4/27/07 18:00	890	6118	9872	573.4	418.6	154.8	27.0	1.19	3.1	303	301	2327	9.3	1.3	0.1	0.2
4/27/07 19:00	889	6090	9872	563.0	411.1	151.9	27.0	1.20	3.1	301	300	2307	9.4	1.2	0.1	0.2
4/27/07 20:00	884	6064	9872	565.2	412.7	152.5	27.0	1.20	3.1	301	299	2307	9.6	1.2	0.1	0.2
4/27/07 21:00	881	6042	9872	581.5	424.3	157.1	27.0	1.19	3.1	300	298	2298	9.5	1.3	0.1	0.2
4/27/07 22:00	886	6064	9872	596.4	434.9	161.4	27.1	1.16	3.1	298	298	2303	9.8	1.4	0.1	0.2
4/27/07 23:00	891	6148	9872	597.2	435.5	161.7	27.1	1.15	3.1	298	297	2310	9.9	1.4	0.1	0.2
4/28/07 0:00	889	6138	9872	586.8	428.1	158.7	27.1	1.16	3.1	298	297	2314	9.7	1.4	0.1	0.2
4/28/07 1:00	886	6081	9872	581.8	424.6	157.2	27.0	1.16	3.1	298	296	2318	9.8	1.4	0.1	0.2
4/28/07 2:00	884	6094	9872	583.7	425.8	157.9	27.0	1.17	3.1	297	295	2321	9.7	1.4	0.1	0.2
4/28/07 3:00	887	6057	9872	585.8	427.4	158.4	27.0	1.16	3.1	298	295	2312	9.6	1.4	0.1	0.2
4/28/07 4:00	887	6064	9872	585.9	427.5	158.5	27.0	1.16	3.1	299	296	2302	9.6	1.4	0.1	0.2
4/28/07 5:00	885	6076	9872	589.2	429.8	159.4	27.1	1.15	3.1	300	296	2305	9.4	1.4	0.1	0.2
4/28/07 6:00	885	6065	9872	592.5	432.2	160.3	27.1	1.15	3.1	301	296	2310	9.5	1.5	0.1	0.2
4/28/07 7:00	879	6077	9872	606.5	442.2	164.3	27.1	1.14	3.2	299	297	2315	10.1	1.5	0.1	0.2
4/28/07 8:00	889	6138	9872	614.9	448.2	166.7	27.1	1.12	3.0	298	297	2334	10.0	1.6	0.1	0.2
4/28/07 9:00	892	6119	9872	604.2	440.6	163.7	27.1	1.12	3.1	299	295	2331	10.0	1.5	0.1	0.2
4/28/07 10:00	888	6066	9872	597.5	435.7	161.8	27.1	1.13	3.1	297	295	2312	9.6	1.5	0.1	0.2
4/28/07 11:00	888	6076	9872	591.7	431.7	160.1	27.1	1.14	3.1	298	296	2311	9.5	1.4	0.1	0.2
4/28/07 12:00	889	6074	9872	577.8	421.7	156.1	27.0	1.15	3.2	300	299	2307	9.5	1.4	0.1	0.2
4/28/07 13:00	880	6027	9872	580.8	423.8	157.0	27.0	1.16	3.2	302	302	2303	9.9	1.4	0.1	0.2
4/28/07 14:00	884	6110	9872	589.0	429.7	159.3	27.1	1.16	3.1	303	304	2311	10.0	1.4	0.1	0.2
4/28/07 15:00	887	6098	9872	587.1	428.3	158.8	27.0	1.16	3.1	303	304	2313	10.1	1.4	0.1	0.2
4/28/07 16:00	888	6078	9872	585.1	426.9	158.2	27.0	1.16	3.1	306	305	2319	9.7	1.4	0.1	0.2
4/28/07 17:00	885	6071	9872	585.6	427.2	158.4	27.0	1.16	3.1	306	305	2321	9.9	1.4	0.1	0.2
4/28/07 18:00	883	6082	9872	590.9	431.0	159.9	27.1	1.16	3.2	305	305	2322	9.7	1.4	0.1	0.2
4/28/07 19:00	890	6088	9872	588.4	429.3	159.1	27.0	1.15	3.1	304	304	2320	9.2	1.4	0.1	0.2
4/28/07 20:00	887	6106	9872	581.3	424.2	157.2	27.0	1.16	3.1	305	303	2321	9.8	1.4	0.1	0.2
4/28/07 21:00	889	6113	9872	580.1	423.3	156.8	27.0	1.17	3.2	304	303	2316	9.8	1.4	0.1	0.2
4/28/07 22:00	890	6114	9872	577.5	421.5	156.1	27.0	1.18	3.1	302	303	2315	9.8	1.4	0.1	0.2
4/28/07 23:00	890	6117	9872	575.0	419.7	155.3	27.0	1.18	3.1	301	303	2314	9.8	1.4	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/29/07 0:00	892	6105	9872	569.5	415.7	153.8	27.0	1.19	3.1	302	301	2322	10.0	1.5	0.1	0.2
4/29/07 1:00	889	6103	9872	565.3	412.8	152.5	27.0	1.20	3.1	304	301	2318	10.2	1.5	0.1	0.2
4/29/07 2:00	886	6139	9872	567.3	414.2	153.1	27.0	1.20	3.2	302	300	2307	10.1	1.6	0.1	0.2
4/29/07 3:00	891	6104	9872	569.1	415.5	153.6	27.0	1.20	3.1	299	299	2306	10.2	1.6	0.1	0.2
4/29/07 4:00	888	6161	9872	564.8	412.4	152.4	27.0	1.21	3.2	300	301	2325	10.0	1.5	0.1	0.2
4/29/07 5:00	894	6086	9872	560.9	409.6	151.3	27.0	1.21	3.1	301	298	2320	9.8	1.5	0.1	0.2
4/29/07 6:00	888	6129	9872	557.3	407.0	150.3	27.0	1.22	3.2	301	297	2310	10.3	1.4	0.1	0.2
4/29/07 7:00	889	6120	9872	556.8	406.7	150.1	27.0	1.22	3.1	298	295	2313	9.8	1.4	0.1	0.2
4/29/07 8:00	887	6068	9872	565.7	413.0	152.7	27.0	1.22	3.1	297	295	2319	9.9	1.5	0.1	0.2
4/29/07 9:00	889	6086	9872	576.9	421.0	155.9	27.0	1.20	3.1	301	296	2327	10.1	1.6	0.1	0.2
4/29/07 10:00	891	6120	9872	580.9	423.9	157.0	27.0	1.18	3.1	303	297	2329	10.0	1.6	0.2	0.2
4/29/07 11:00	890	6151	9872	583.6	425.8	157.8	27.0	1.18	3.1	303	298	2328	10.0	1.6	0.2	0.2
4/29/07 12:00	891	6141	9872	583.6	425.8	157.8	27.0	1.18	3.1	305	300	2337	9.9	1.6	0.1	0.2
4/29/07 13:00	889	6172	9872	579.6	423.0	156.6	27.0	1.18	3.1	306	301	2327	9.9	1.6	0.1	0.2
4/29/07 14:00	892	6137	9872	576.1	420.4	155.7	27.0	1.19	3.1	307	303	2331	9.9	1.6	0.1	0.2
4/29/07 15:00	892	6121	9872	571.3	417.0	154.2	27.0	1.19	3.1	308	305	2328	9.5	1.5	0.1	0.2
4/29/07 16:00	889	6118	9872	570.1	416.1	153.9	27.0	1.19	3.1	308	306	2333	9.6	1.6	0.1	0.2
4/29/07 17:00	888	6146	9872	568.8	415.3	153.5	27.0	1.20	3.1	309	307	2336	9.9	1.6	0.1	0.2
4/29/07 18:00	885	6157	9872	571.9	417.5	154.4	27.0	1.20	3.2	306	305	2321	9.8	1.6	0.1	0.2
4/29/07 19:00	890	6100	9872	581.4	424.2	157.1	27.0	1.19	3.1	305	305	2340	9.9	1.7	0.2	0.2
4/29/07 20:00	893	6128	9872	580.9	423.9	157.0	27.0	1.18	3.1	305	306	2330	10.0	1.7	0.2	0.2
4/29/07 21:00	891	6143	9872	577.4	421.3	156.1	27.0	1.19	3.1	305	306	2343	9.6	1.6	0.2	0.2
4/29/07 22:00	875	6073	9872	567.2	439.7	127.5	22.5	1.19	3.2	307	310	2323	9.8	1.7	0.2	0.2
4/29/07 23:00	877	5986	9872	574.6	450.3	124.3	21.6	1.18	3.1	305	308	2310	9.7	1.7	0.2	0.2
4/30/07 0:00	883	6039	9872	567.1	417.7	149.4	26.3	1.18	3.2	305	303	2316	10.0	1.6	0.1	0.2
4/30/07 1:00	880	6034	9872	567.1	415.3	151.8	26.8	1.19	3.1	305	301	2311	10.2	1.6	0.1	0.2
4/30/07 2:00	877	6049	9872	579.2	422.4	156.8	27.1	1.18	3.2	303	299	2310	10.2	1.7	0.2	0.2
4/30/07 3:00	893	6063	9872	594.0	432.8	161.1	27.1	1.16	3.1	302	298	2308	10.3	1.8	0.2	0.2
4/30/07 4:00	896	6108	9872	582.6	424.7	157.9	27.1	1.16	3.1	302	298	2310	10.2	1.6	0.1	0.2
4/30/07 5:00	891	6086	9872	571.1	416.5	154.6	27.1	1.17	3.1	302	298	2307	9.8	1.5	0.1	0.2
4/30/07 6:00	887	6038	9872	573.2	418.0	155.2	27.1	1.18	3.2	301	298	2308	10.4	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
4/30/07 7:00	887	6041	9872	581.6	424.0	157.6	27.1	1.17	3.1	301	298	2312	10.3	1.7	0.2	0.2
4/30/07 8:00	891	6109	9872	583.8	425.4	158.4	27.1	1.17	3.1	306	299	2315	10.5	1.7	0.2	0.2
4/30/07 9:00	892	6096	9872	578.8	419.5	159.3	27.5	1.17	3.1	308	302	2320	10.2	1.6	0.2	0.2
4/30/07 10:00	888	6113	9872	575.4	417.1	158.4	27.5	1.18	3.2	306	301	2317	9.4	1.6	0.1	0.2
4/30/07 11:00	889	6066	9872	579.7	420.1	159.6	27.5	1.18	3.2	305	300	2315	9.6	1.6	0.2	0.2
4/30/07 12:00	890	6091	9872	582.4	422.0	160.3	27.5	1.17	3.1	308	303	2320	9.6	1.6	0.1	0.2
4/30/07 13:00	890	6092	9872	584.6	423.6	161.0	27.5	1.17	3.1	308	305	2324	9.5	1.6	0.1	0.2
4/30/07 14:00	888	6155	9859	584.7	423.7	161.0	27.5	1.17	3.1	306	303	2339	9.6	1.6	0.2	0.2
4/30/07 15:00	893	6114	9723	584.5	423.6	160.9	27.5	1.17	3.1	304	300	2306	9.3	1.7	0.2	0.2
4/30/07 16:00	891	6107	9687	579.9	420.3	159.6	27.5	1.17	3.1	305	301	2322	9.3	1.6	0.2	0.2
4/30/07 17:00	890	6103	9679	578.5	419.2	159.2	27.5	1.17	3.1	305	302	2330	9.4	1.6	0.2	0.2
4/30/07 18:00	890	6082	9678	578.1	419.0	159.2	27.5	1.18	3.1	303	301	2319	9.4	1.6	0.2	0.2
4/30/07 19:00	888	6114	9598	576.3	417.6	158.6	27.5	1.18	3.2	300	299	2324	9.1	1.6	0.2	0.2
4/30/07 20:00	891	6111	9690	576.8	418.1	158.8	27.5	1.18	3.1	300	297	2316	8.8	1.6	0.1	0.2
4/30/07 21:00	891	6071	9732	580.9	421.0	159.9	27.5	1.18	3.1	297	297	2300	9.0	1.6	0.2	0.2
4/30/07 22:00	892	6070	9621	580.4	420.6	159.8	27.5	1.17	3.1	299	297	2296	9.0	1.6	0.2	0.2
4/30/07 23:00	890	6075	9631	580.9	421.0	159.9	27.5	1.17	3.1	299	296	2295	8.8	1.6	0.1	0.2
5/1/07 0:00	891	6070	9601	579.9	422.0	157.9	27.2	1.17	3.1	300	295	2306	8.9	1.6	0.1	0.2
5/1/07 1:00	886	6051	9676	581.9	424.9	157.0	27.0	1.16	3.2	301	296	2299	9.1	1.7	0.2	0.2
5/1/07 2:00	889	6095	9754	590.7	432.3	158.4	26.8	1.16	3.1	300	296	2296	9.1	1.9	0.2	0.2
5/1/07 3:00	896	6103	9574	578.6	423.7	155.0	26.8	1.16	3.1	300	296	2304	8.9	1.8	0.2	0.2
5/1/07 4:00	888	6067	9544	575.1	418.6	156.4	27.2	1.17	3.2	300	296	2303	8.9	1.9	0.2	0.2
5/1/07 5:00	885	6097	9754	581.6	422.9	158.6	27.3	1.17	3.2	297	295	2310	8.6	2.1	0.2	0.2
5/1/07 6:00	889	6090	9801	591.0	429.7	161.4	27.3	1.16	3.1	297	294	2317	8.5	2.4	0.3	0.2
5/1/07 7:00	894	6144	9638	583.8	424.5	159.3	27.3	1.17	3.1	298	294	2323	8.0	2.4	0.2	0.2
5/1/07 8:00	889	6124	9632	576.6	422.1	154.5	26.8	1.17	3.2	298	293	2301	7.9	2.3	0.2	0.2
5/1/07 9:00	892	6076	9667	574.6	419.6	155.0	27.0	1.18	3.1	297	287	2312	7.6	2.3	0.2	0.2
5/1/07 10:00	891	6057	9639	571.9	418.4	153.4	26.8	1.18	3.2	297	285	2303	7.7	2.2	0.2	0.2
5/1/07 11:00	887	6037	9606	568.2	416.7	151.5	26.7	1.18	3.1	297	286	2283	7.9	2.1	0.2	0.2
5/1/07 12:00	884	6056	9732	573.3	419.8	153.5	26.8	1.18	3.1	297	285	2285	8.6	2.0	0.2	0.2
5/1/07 13:00	890	6049	9669	578.1	422.6	155.5	26.9	1.18	3.1	294	287	2304	8.3	2.0	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/1/07 14:00	892	6086	9602	576.4	421.6	154.8	26.9	1.18	3.1	294	290	2301	8.1	2.0	0.2	0.2
5/1/07 15:00	891	6085	9569	570.6	418.1	152.5	26.7	1.18	3.2	292	262	2281	8.4	1.9	0.2	0.2
5/1/07 16:00	887	6073	9657	572.3	419.2	153.1	26.8	1.18	4.3	292	279	2292	8.3	1.9	0.2	0.2
5/1/07 17:00	889	6103	9670	577.3	422.2	155.1	26.9	1.18	3.3	293	287	2316	8.2	2.0	0.2	0.2
5/1/07 18:00	889	6091	9733	582.7	425.4	157.2	27.0	1.18	3.3	295	291	2329	8.0	2.0	0.2	0.2
5/1/07 19:00	890	6099	9734	586.6	425.5	161.2	27.5	1.17	3.3	296	290	2326	7.9	1.9	0.2	0.2
5/1/07 20:00	892	6097	9647	586.3	423.2	163.1	27.8	1.16	3.2	297	288	2313	7.8	1.8	0.2	0.2
5/1/07 21:00	890	6109	9716	588.1	426.2	161.9	27.5	1.16	3.2	299	292	2326	8.2	1.7	0.1	0.2
5/1/07 22:00	892	6089	9703	588.6	426.5	162.1	27.5	1.16	3.2	301	294	2329	8.4	1.6	0.1	0.2
5/1/07 23:00	890	6082	9661	589.9	427.4	162.5	27.5	1.15	3.2	302	298	2316	8.9	1.6	0.1	0.2
5/2/07 0:00	889	6089	9636	589.1	426.8	162.2	27.5	1.15	3.2	301	295	2312	8.6	1.6	0.1	0.2
5/2/07 1:00	889	6102	9717	591.3	428.5	162.9	27.5	1.15	3.2	302	295	2308	8.8	1.6	0.1	0.2
5/2/07 2:00	890	6092	9705	591.8	428.8	163.0	27.5	1.15	3.2	303	298	2309	8.7	1.6	0.1	0.2
5/2/07 3:00	890	6071	9710	594.9	431.0	163.9	27.5	1.15	3.2	305	299	2315	9.1	1.6	0.1	0.2
5/2/07 4:00	891	6121	9681	595.4	431.4	164.0	27.5	1.15	3.1	306	301	2322	9.3	1.6	0.1	0.2
5/2/07 5:00	892	6083	9651	591.9	429.1	162.9	27.5	1.15	3.0	306	300	2324	9.0	1.6	0.1	0.2
5/2/07 6:00	877	6010	9743	593.9	437.8	156.0	26.3	1.14	3.0	314	304	2302	9.4	1.6	0.1	0.2
5/2/07 7:00	885	6139	9809	602.2	442.9	159.2	26.4	1.14	3.1	300	296	2346	9.0	1.6	0.1	0.2
5/2/07 8:00	894	6116	9622	598.3	440.0	158.3	26.5	1.14	2.9	297	293	2332	8.6	1.5	0.1	0.2
5/2/07 9:00	889	6092	9685	596.2	438.4	157.8	26.5	1.14	3.1	298	294	2330	8.6	1.5	0.1	0.2
5/2/07 10:00	891	6130	9662	592.0	435.3	156.7	26.5	1.15	3.0	300	294	2298	8.6	1.5	0.1	0.2
5/2/07 11:00	889	6097	9703	590.4	434.1	156.3	26.5	1.15	3.1	298	294	2309	8.6	1.5	0.1	0.2
5/2/07 12:00	886	6085	9577	580.5	426.2	154.3	26.6	1.16	3.1	301	295	2299	8.6	1.5	0.1	0.2
5/2/07 13:00	880	6075	9772	587.7	432.2	155.5	26.5	1.16	3.3	301	302	2328	8.7	1.6	0.1	0.2
5/2/07 14:00	889	6089	9710	590.1	433.9	156.2	26.5	1.15	3.3	301	301	2340	8.4	1.6	0.1	0.2
5/2/07 15:00	886	6073	9702	588.0	432.3	155.7	26.5	1.15	3.2	300	302	2320	7.9	1.6	0.1	0.2
5/2/07 16:00	887	6081	9753	595.1	437.6	157.4	26.5	1.15	3.4	298	300	2336	8.0	1.5	0.1	0.2
5/2/07 17:00	887	6087	9779	601.2	442.2	159.0	26.5	1.14	3.1	301	302	2312	8.4	1.5	0.1	0.2
5/2/07 18:00	886	6078	9776	603.2	443.7	159.5	26.4	1.13	3.1	301	303	2320	8.8	1.6	0.1	0.2
5/2/07 19:00	884	6108	9758	601.4	442.3	159.0	26.4	1.13	3.1	302	303	2316	8.8	1.5	0.1	0.2
5/2/07 20:00	884	6080	9650	595.7	438.1	157.6	26.5	1.13	3.1	299	301	2327	8.5	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/2/07 21:00	887	6044	9643	592.6	435.8	156.8	26.5	1.14	3.1	296	272	2302	8.3	1.5	0.1	0.2
5/2/07 22:00	887	6051	9621	593.6	436.5	157.1	26.5	1.14	3.2	296	262	2281	8.0	1.5	0.1	0.2
5/2/07 23:00	887	6047	9602	591.3	434.7	156.6	26.5	1.14	3.1	296	266	2278	8.0	1.5	0.1	0.2
5/3/07 0:00	886	6019	9639	596.0	438.3	157.8	26.5	1.14	3.1	297	277	2285	8.0	1.5	0.1	0.2
5/3/07 1:00	886	6057	9680	596.0	438.3	157.7	26.5	1.13	3.3	297	286	2283	7.9	1.6	0.1	0.2
5/3/07 2:00	889	6078	9661	593.6	436.5	157.1	26.5	1.14	3.0	297	291	2285	8.2	1.6	0.1	0.2
5/3/07 3:00	890	6057	9542	584.3	429.5	154.8	26.5	1.15	2.9	297	293	2264	8.2	1.6	0.1	0.2
5/3/07 4:00	894	6140	9308	555.7	409.1	146.6	26.4	1.18	2.6	298	292	2209	8.1	1.3	0.1	0.2
5/3/07 5:00	888	6059	9308	532.1	399.1	133.0	25.0	1.22	2.7	300	292	2235	8.5	1.0	0.1	0.2
5/3/07 6:00	875	5972	9348	512.7	386.9	125.8	24.5	1.26	3.0	298	292	2211	9.6	0.9	0.1	0.2
5/3/07 7:00	840	5756	9596	501.2	429.6	71.6	14.3	1.28	3.1	298	299	2181	9.1	0.9	0.1	0.2
5/3/07 8:00	886	6039	9656	529.7	452.8	76.9	14.5	1.28	3.4	295	291	2301	9.8	0.8	0.1	0.2
5/3/07 9:00	887	6069	9742	535.8	458.8	76.9	14.4	1.27	3.5	296	292	2311	10.1	0.8	0.1	0.2
5/3/07 10:00	887	6095	9759	538.8	461.4	77.4	14.4	1.27	3.5	295	291	2341	9.9	0.8	0.1	0.2
5/3/07 11:00	857	5839	9724	520.9	446.0	75.0	14.4	1.26	3.5	289	289	2275	9.3	0.8	0.1	0.2
5/3/07 12:00	886	6070	9705	538.8	461.8	77.0	14.3	1.26	3.4	291	283	2311	9.6	0.8	0.1	0.2
5/3/07 13:00	886	6077	9593	535.9	459.3	76.6	14.3	1.26	3.4	294	287	2294	9.7	0.8	0.1	0.2
5/3/07 14:00	849	5873	9689	511.2	436.5	74.7	14.6	1.27	3.5	295	289	2268	9.5	0.8	0.1	0.2
5/3/07 15:00	629	4328	9672	377.9	304.6	73.3	19.4	1.27	3.9	298	293	1905	7.8	0.8	0.1	0.1
5/3/07 16:00	595	4036	9747	362.3	289.9	72.4	20.0	1.26	10.3	283	284	1865	7.2	0.8	0.1	0.1
5/3/07 17:00	587	3989	9714	361.3	289.8	71.6	19.8	1.25	3.9	283	283	1855	7.2	0.8	0.1	0.1
5/3/07 18:00	588	3977	9656	360.8	295.3	65.5	18.1	1.24	4.0	281	275	1858	7.2	0.8	0.1	0.1
5/3/07 19:00	588	3986	9599	358.0	293.1	64.9	18.1	1.24	4.0	280	272	1860	7.0	0.8	0.1	0.1
5/3/07 20:00	602	4109	9686	370.6	303.2	67.4	18.2	1.24	3.9	281	274	1878	7.2	0.8	0.1	0.1
5/3/07 21:00	671	4560	9690	414.0	339.8	74.2	17.9	1.24	3.6	284	276	1975	7.4	0.8	0.1	0.1
5/3/07 22:00	701	4751	9678	432.4	362.1	70.3	16.3	1.24	3.4	287	282	2029	7.6	0.8	0.1	0.1
5/3/07 23:00	864	5968	9666	532.7	427.2	105.5	19.8	1.24	3.3	297	292	2269	8.9	0.8	0.1	0.2
5/4/07 0:00	890	6099	9657	545.0	416.7	128.3	23.5	1.25	3.3	303	298	2333	9.5	0.8	0.1	0.2
5/4/07 1:00	889	6113	9744	545.7	405.6	140.1	25.7	1.25	3.2	302	298	2329	9.5	0.8	0.1	0.2
5/4/07 2:00	891	6112	9719	544.6	404.7	139.8	25.7	1.25	3.2	304	299	2315	9.6	0.8	0.1	0.2
5/4/07 3:00	889	6130	9714	544.0	404.3	139.7	25.7	1.25	3.2	304	301	2298	9.9	0.8	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/4/07 4:00	889	6128	9742	545.0	405.1	139.9	25.7	1.26	3.2	304	303	2314	10.1	0.8	0.1	0.2
5/4/07 5:00	890	6142	9748	545.9	405.7	140.2	25.7	1.26	3.2	306	303	2321	10.2	0.8	0.1	0.2
5/4/07 6:00	890	6143	9722	543.0	403.6	139.4	25.7	1.26	3.2	306	303	2317	10.8	0.8	0.1	0.2
5/4/07 7:00	850	5886	9694	515.5	372.7	142.8	27.7	1.26	3.3	307	302	2262	10.5	0.8	0.1	0.1
5/4/07 8:00	827	5684	9771	496.9	351.6	145.3	29.2	1.27	3.2	312	305	2208	10.3	0.8	0.1	0.2
5/4/07 9:00	804	5562	9510	468.5	330.2	138.3	29.5	1.29	3.3	301	300	2159	10.0	0.7	0.1	0.1
5/4/07 10:00	744	5185	9490	425.4	311.6	113.8	26.7	1.32	3.3	304	300	2059	9.5	0.7	0.1	0.1
5/4/07 11:00	726	4984	9586	410.7	302.4	108.3	26.4	1.33	3.4	305	297	2028	9.4	0.7	0.1	0.2
5/4/07 12:00	677	4598	9752	389.3	276.8	112.5	28.9	1.34	3.6	302	294	1982	9.3	0.7	0.1	0.2
5/4/07 13:00	712	4831	9647	409.0	284.4	124.5	30.4	1.33	3.4	303	293	2067	9.8	0.7	0.1	0.2
5/4/07 14:00	752	5105	9712	436.3	295.0	141.3	32.4	1.32	3.3	305	298	2125	10.3	0.8	0.1	0.2
5/4/07 15:00	851	5881	9744	497.8	347.2	150.7	30.3	1.32	3.2	308	302	2259	10.9	0.8	0.1	0.2
5/4/07 16:00	891	6122	9708	513.4	370.9	142.5	27.8	1.33	3.2	310	306	2310	11.2	0.8	0.1	0.2
5/4/07 17:00	893	6109	9684	510.0	369.9	140.1	27.5	1.33	3.2	311	308	2300	11.1	0.7	0.1	0.2
5/4/07 18:00	805	5524	9643	457.7	336.8	120.9	26.4	1.34	3.2	310	308	2169	10.2	0.7	0.1	0.2
5/4/07 19:00	766	5258	9727	442.8	326.9	115.9	26.2	1.33	3.4	307	305	2087	9.9	0.8	0.1	0.1
5/4/07 20:00	730	4994	9968	439.6	323.3	116.2	26.4	1.32	3.3	303	301	2041	9.5	1.2	0.1	0.2
5/4/07 21:00	706	4810	9888	429.3	304.3	125.0	29.1	1.29	3.3	302	296	1980	8.9	1.5	0.1	0.2
5/4/07 22:00	774	5271	9684	460.7	335.2	125.5	27.2	1.28	3.2	300	296	2074	9.4	1.3	0.1	0.2
5/4/07 23:00	878	6030	9614	517.6	388.1	129.5	25.0	1.29	3.3	303	301	2293	10.6	1.1	0.1	0.2

Table C-3. Parametric Phase 3 Unit 1 Hourly Average Process Data

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/22/07 1:00	887	6122	9774	602.0	443.0	158.9	26.4	1.14	3.1	303	300	2346	9.9	1.8	0.2	0.2
5/22/07 2:00	889	6133	9774	602.5	443.5	159.0	26.4	1.14	3.1	300	299	2349	9.8	1.8	0.2	0.2
5/22/07 3:00	892	6107	9774	605.0	445.3	159.8	26.4	1.13	3.1	301	299	2347	9.8	1.8	0.2	0.2
5/22/07 4:00	891	6118	9774	608.1	447.5	160.7	26.4	1.13	3.1	301	299	2345	10.1	1.9	0.2	0.2
5/22/07 5:00	890	6176	9774	600.1	441.8	158.3	26.4	1.13	3.2	299	298	2336	9.6	1.8	0.2	0.2
5/22/07 6:00	894	6137	9774	591.3	435.5	155.9	26.4	1.15	3.2	297	281	2314	10.3	1.8	0.2	0.2
5/22/07 7:00	889	6108	9774	587.1	432.4	154.7	26.3	1.16	3.2	298	285	2321	9.6	1.7	0.1	0.2
5/22/07 8:00	889	6114	9774	592.2	436.1	156.1	26.4	1.16	3.2	298	286	2295	9.7	1.8	0.1	0.2
5/22/07 9:00	889	6116	9774	589.3	434.0	155.3	26.3	1.16	3.2	298	289	2295	9.5	1.7	0.1	0.2
5/22/07 10:00	891	6107	9774	583.5	429.9	153.6	26.3	1.16	3.2	298	293	2304	9.6	1.7	0.2	0.2
5/22/07 11:00	889	6093	9774	585.8	431.5	154.3	26.3	1.16	3.1	300	295	2291	9.7	1.8	0.2	0.2
5/22/07 12:00	876	6025	9774	579.7	427.2	152.6	26.3	1.16	3.2	300	296	2292	9.5	1.8	0.2	0.2
5/22/07 13:00	882	6096	9774	580.3	427.6	152.7	26.3	1.17	3.1	301	296	2316	9.7	1.8	0.2	0.2
5/22/07 14:00	872	6051	9774	574.4	423.4	151.0	26.3	1.17	3.2	303	296	2292	9.7	1.9	0.2	0.2
5/22/07 15:00	797	5444	9774	518.0	381.2	136.8	26.4	1.17	3.2	297	293	1951	9.0	1.9	0.2	0.2
5/22/07 16:00	649	4450	9774	435.2	311.1	124.1	28.5	1.17	3.5	295	288	1946	8.3	1.9	0.2	0.2
5/22/07 17:00	650	4438	9774	438.2	310.9	127.3	29.1	1.15	3.5	295	286	1966	8.1	1.8	0.1	0.2
5/22/07 18:00	588	4014	9774	399.6	267.6	132.0	33.0	1.14	3.9	293	284	1899	8.0	1.8	0.1	0.2
5/22/07 19:00	644	4370	9774	441.5	296.4	145.0	32.8	1.12	3.5	289	278	1950	7.9	1.8	0.1	0.2
5/22/07 20:00	724	4915	9774	497.4	347.5	149.9	30.1	1.12	3.3	291	283	2066	8.1	1.8	0.2	0.2
5/22/07 21:00	768	5301	9774	523.6	377.2	146.4	28.0	1.12	3.2	294	291	2093	8.0	1.8	0.2	0.2
5/22/07 22:00	710	4836	9774	486.6	343.2	143.4	29.5	1.12	3.3	295	292	1991	7.7	1.8	0.1	0.2
5/22/07 23:00	795	5430	9774	540.0	385.7	154.2	28.6	1.12	3.1	296	292	2140	8.0	1.8	0.1	0.2
5/23/07 0:00	876	6065	9774	599.1	444.8	154.3	25.8	1.13	3.2	299	295	2284	9.0	1.8	0.1	0.2
5/23/07 1:00	888	6115	9774	604.0	450.4	153.6	25.4	1.13	3.1	299	295	2321	8.9	1.8	0.2	0.2
5/23/07 2:00	888	6104	9774	602.6	449.4	153.3	25.4	1.13	3.1	298	293	2309	8.8	1.8	0.2	0.2
5/23/07 3:00	891	6070	9774	600.0	447.4	152.6	25.4	1.13	3.1	298	292	2299	8.8	1.8	0.2	0.2
5/23/07 4:00	886	6049	9774	593.0	449.8	143.2	24.1	1.13	3.1	297	292	2299	8.6	1.8	0.2	0.2
5/23/07 5:00	884	6068	9774	595.6	454.6	141.0	23.7	1.14	3.1	298	293	2306	8.7	1.8	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/23/07 6:00	850	5893	9774	567.8	435.1	132.7	23.4	1.14	3.1	297	292	2250	9.1	1.9	0.2	0.2
5/23/07 7:00	715	4893	9774	492.3	400.3	92.1	18.7	1.14	3.1	294	288	2020	7.7	2.0	0.2	0.2
5/23/07 8:00	795	5436	9774	550.3	444.0	106.3	19.3	1.12	3.1	296	290	2134	8.3	2.0	0.2	0.2
5/23/07 9:00	803	5608	9774	540.3	418.0	122.4	22.6	1.13	3.2	297	290	2207	8.1	2.0	0.2	0.2
5/23/07 10:00	668	4586	9774	450.3	366.4	83.9	18.6	1.13	3.5	291	286	1952	7.5	2.1	0.2	0.2
5/23/07 11:00	540	3724	9774	371.7	306.4	65.3	17.6	1.12	4.1	295	284	1816	7.8	2.0	0.2	0.2
5/23/07 12:00	610	4138	9774	436.4	362.6	73.7	16.9	1.10	3.4	300	284	1880	7.8	2.0	0.2	0.2
5/23/07 13:00	590	4055	9774	405.7	341.2	64.6	15.9	1.10	3.9	291	282	1884	7.8	1.9	0.2	0.2
5/23/07 14:00	551	3749	9774	382.0	319.9	62.1	16.3	1.10	4.0	288	279	1807	7.7	1.8	0.1	0.2
5/23/07 15:00	570	3872	9774	397.1	332.0	65.1	16.4	1.10	3.9	290	282	1836	7.7	1.7	0.1	0.2
5/23/07 16:00	660	4500	9774	461.3	387.8	73.5	15.9	1.09	3.5	295	286	1981	7.8	1.7	0.1	0.2
5/23/07 17:00	722	4923	9774	500.3	425.9	74.3	14.9	1.10	3.2	295	289	2079	7.9	1.7	0.1	0.2
5/23/07 18:00	723	4933	9774	503.2	428.7	74.5	14.8	1.10	3.2	295	290	2088	7.9	1.8	0.1	0.2
5/23/07 19:00	699	4789	9774	488.2	413.1	75.1	15.4	1.10	3.3	294	288	2043	7.6	1.9	0.1	0.2
5/23/07 20:00	626	4300	9774	436.0	362.3	73.7	16.9	1.10	3.7	297	287	1947	7.4	1.8	0.2	0.2
5/23/07 21:00	641	4366	9774	448.0	372.8	75.2	16.8	1.09	3.5	295	286	1940	7.6	1.8	0.2	0.2
5/23/07 22:00	600	4094	9774	418.9	345.7	73.2	17.5	1.10	3.8	294	284	1898	7.5	1.8	0.2	0.2
5/23/07 23:00	791	5386	9774	555.0	455.7	99.2	17.9	1.09	3.1	300	293	2174	8.4	1.8	0.2	0.2
5/24/07 0:00	884	6089	9774	607.5	464.1	143.4	23.6	1.10	3.2	305	298	2353	8.7	1.8	0.2	0.2
5/24/07 1:00	883	6105	9774	608.1	464.5	143.5	23.6	1.11	3.1	306	299	2342	8.7	1.9	0.2	0.2
5/24/07 2:00	886	6123	9774	605.9	462.7	143.2	23.6	1.12	3.1	304	299	2351	8.7	1.8	0.2	0.2
5/24/07 3:00	886	6102	9774	603.4	460.5	142.9	23.7	1.13	3.1	302	298	2341	8.5	1.8	0.2	0.2
5/24/07 4:00	886	6102	9774	602.1	452.9	149.2	24.8	1.13	3.1	303	299	2355	8.6	1.7	0.2	0.2
5/24/07 5:00	887	6115	9774	600.4	450.3	150.1	25.0	1.13	3.1	305	300	2348	8.7	1.7	0.2	0.2
5/24/07 6:00	878	6055	9774	596.4	446.6	149.9	25.1	1.13	3.1	305	300	2325	8.6	1.7	0.1	0.2
5/24/07 7:00	858	5860	9774	584.6	432.9	151.7	25.9	1.13	3.1	305	300	2284	8.6	1.7	0.1	0.2
5/24/07 8:00	883	6044	9774	600.9	446.6	154.3	25.7	1.13	3.1	306	302	2329	8.9	1.6	0.1	0.2
5/24/07 9:00	882	6067	9774	599.3	445.7	153.6	25.6	1.13	3.1	310	304	2342	9.2	1.4	0.1	0.2
5/24/07 10:00	883	6073	9774	596.2	447.0	149.2	25.0	1.13	3.1	309	302	2382	9.2	1.3	0.1	0.2
5/24/07 11:00	882	6117	9774	593.7	445.3	148.4	25.0	1.14	3.1	309	301	2293	9.5	1.3	0.1	0.2
5/24/07 12:00	886	6089	9774	592.5	444.4	148.1	25.0	1.15	3.1	309	302	2294	9.5	1.3	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/24/07 13:00	883	6109	9774	595.1	446.3	148.8	25.0	1.15	3.1	308	301	2298	9.6	1.4	0.1	0.2
5/24/07 14:00	884	6097	9774	598.9	449.2	149.7	25.0	1.14	3.1	308	302	2295	9.6	1.4	0.1	0.2
5/24/07 15:00	887	6123	9774	595.2	446.4	148.8	25.0	1.14	3.1	311	305	2298	9.7	1.4	0.1	0.2
5/24/07 16:00	883	6115	9774	593.8	445.3	148.5	25.0	1.15	3.1	313	307	2308	9.8	1.4	0.1	0.2
5/24/07 17:00	840	5857	9774	559.8	413.8	146.0	26.1	1.15	3.2	312	308	2248	9.5	1.5	0.1	0.2
5/24/07 18:00	694	4759	9774	472.8	338.8	134.0	28.3	1.15	3.3	316	306	1935	8.1	1.5	0.1	0.2
5/24/07 19:00	594	4128	9774	415.4	329.4	86.0	20.7	1.14	3.8	312	309	1831	8.1	1.6	0.1	0.2
5/24/07 20:00	634	4265	9774	460.0	383.0	77.0	16.7	1.10	3.4	298	277	1856	8.0	1.6	0.1	0.2
5/24/07 21:00	855	5920	9774	591.8	468.6	123.2	20.8	1.09	3.1	298	258	2232	9.4	1.6	0.1	0.2
5/24/07 22:00	822	5608	9774	572.7	459.0	113.7	19.8	1.10	3.2	297	273	2158	8.7	1.6	0.1	0.2
5/24/07 23:00	874	6017	9774	608.5	470.0	138.5	22.8	1.10	3.2	301	277	2235	9.2	1.6	0.1	0.2
5/25/07 0:00	888	6108	9774	618.4	466.3	152.1	24.6	1.10	3.1	303	273	2256	9.3	1.6	0.1	0.2
5/25/07 1:00	887	6116	9774	622.9	467.2	155.7	25.0	1.10	3.1	304	266	2251	9.3	1.6	0.1	0.2
5/25/07 2:00	890	6180	9774	618.3	463.7	154.5	25.0	1.11	3.1	302	282	2271	9.4	1.6	0.1	0.2
5/25/07 3:00	894	6154	9774	602.5	451.9	150.6	25.0	1.12	3.1	300	289	2287	9.2	1.5	0.1	0.2
5/25/07 4:00	888	6106	9774	597.9	448.5	149.4	25.0	1.13	3.1	302	293	2281	9.2	1.4	0.1	0.2
5/25/07 5:00	887	6110	9774	599.5	449.6	149.8	25.0	1.14	3.1	304	296	2290	9.1	1.4	0.1	0.2
5/25/07 6:00	891	6160	9774	594.8	446.2	148.7	25.0	1.14	3.1	307	297	2286	9.3	1.4	0.1	0.2
5/25/07 7:00	892	6191	9774	572.6	428.6	144.1	25.2	1.17	3.1	308	297	2289	9.3	1.2	0.1	0.2
5/25/07 8:00	889	6151	9774	549.2	409.0	140.2	25.5	1.21	3.2	307	297	2292	9.2	1.0	0.1	0.2
5/25/07 9:00	881	6087	9774	544.1	405.2	138.9	25.5	1.23	3.2	306	297	2293	9.0	0.9	0.1	0.2
5/25/07 10:00	882	6082	9774	551.0	410.4	140.6	25.5	1.24	3.1	309	298	2294	9.1	0.9	0.1	0.2
5/25/07 11:00	884	6119	9774	554.0	412.6	141.4	25.5	1.24	3.1	310	300	2284	9.5	0.9	0.1	0.2
5/25/07 12:00	808	5651	9774	502.1	370.8	131.3	26.2	1.24	3.2	308	303	2152	9.1	0.9	0.1	0.2
5/25/07 13:00	641	4358	9774	401.2	328.8	72.5	18.1	1.24	3.6	296	296	1882	8.2	0.9	0.1	0.1
5/25/07 14:00	846	5837	9774	528.7	382.3	146.4	27.7	1.23	3.1	301	295	2185	9.1	0.9	0.1	0.2
5/25/07 15:00	887	6118	9774	545.1	389.4	155.7	28.6	1.24	3.1	309	303	2267	9.6	0.9	0.1	0.2
5/25/07 16:00	883	6094	9774	544.3	388.8	155.5	28.6	1.25	3.1	308	303	2268	9.2	0.9	0.1	0.2
5/25/07 17:00	885	6122	9774	544.8	389.2	155.6	28.6	1.25	3.1	306	303	2266	9.3	0.9	0.1	0.2
5/25/07 18:00	885	6115	9774	543.5	388.2	155.3	28.6	1.25	3.1	306	304	2272	9.3	0.9	0.1	0.2
5/25/07 19:00	886	6109	9774	542.8	387.7	155.1	28.6	1.26	3.1	307	305	2273	9.3	0.9	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/25/07 20:00	885	6097	9774	541.7	387.0	154.7	28.6	1.25	3.1	308	306	2274	9.5	0.9	0.1	0.2
5/25/07 21:00	884	6084	9774	546.1	390.1	156.0	28.6	1.25	3.1	308	307	2267	9.5	0.9	0.1	0.2
5/25/07 22:00	886	6125	9774	547.4	391.1	156.4	28.6	1.25	3.1	306	304	2271	9.6	0.9	0.1	0.2
5/25/07 23:00	888	6084	9774	546.8	390.6	156.2	28.6	1.24	3.1	305	301	2268	9.1	0.9	0.1	0.2
5/26/07 0:00	887	6094	9774	544.6	389.0	155.6	28.6	1.25	3.1	306	302	2276	9.1	0.9	0.1	0.2
5/26/07 1:00	886	6112	9774	540.4	386.0	154.4	28.6	1.25	3.1	307	304	2274	9.4	0.9	0.1	0.2
5/26/07 2:00	884	6081	9774	539.9	385.6	154.3	28.6	1.26	3.1	309	305	2266	9.4	0.9	0.1	0.2
5/26/07 3:00	884	6075	9774	544.5	389.0	155.5	28.6	1.25	3.1	310	306	2269	9.3	0.9	0.1	0.2
5/26/07 4:00	884	6083	9774	548.9	392.1	156.8	28.6	1.24	3.1	309	305	2258	9.6	0.9	0.1	0.2
5/26/07 5:00	879	6035	9774	568.7	412.1	156.6	27.5	1.23	3.2	309	307	2249	9.5	1.1	0.1	0.2
5/26/07 6:00	884	6023	9774	596.2	444.2	152.0	25.5	1.18	3.1	307	304	2274	9.8	1.3	0.1	0.2
5/26/07 7:00	886	6124	9774	614.8	455.4	159.4	25.9	1.14	3.1	307	302	2297	9.6	1.4	0.1	0.2
5/26/07 8:00	887	6107	9774	630.4	466.3	164.1	26.0	1.11	3.1	306	301	2297	9.8	1.6	0.2	0.2
5/26/07 9:00	889	6158	9774	637.1	471.1	166.0	26.1	1.09	3.1	305	300	2311	9.9	1.7	0.2	0.2
5/26/07 10:00	893	6137	9774	623.3	461.2	162.1	26.0	1.09	3.1	304	299	2317	9.7	1.6	0.2	0.2
5/26/07 11:00	888	6091	9774	613.7	454.4	159.3	26.0	1.10	3.1	304	299	2307	9.7	1.6	0.2	0.2
5/26/07 12:00	884	6060	9774	610.5	452.1	158.4	25.9	1.11	3.1	304	297	2299	9.5	1.6	0.2	0.2
5/26/07 13:00	884	6067	9774	613.8	454.4	159.4	26.0	1.11	3.1	305	298	2280	9.6	1.6	0.2	0.2
5/26/07 14:00	886	6075	9774	615.0	455.3	159.7	26.0	1.10	3.1	305	299	2288	9.6	1.7	0.2	0.2
5/26/07 15:00	885	6063	9774	616.9	460.7	156.2	25.3	1.10	3.1	307	300	2290	9.6	1.7	0.2	0.2
5/26/07 16:00	886	6074	9774	618.1	462.4	155.6	25.2	1.10	3.1	308	301	2292	9.7	1.7	0.2	0.2
5/26/07 17:00	887	6104	9774	615.1	460.2	154.9	25.2	1.10	3.1	309	301	2290	10.7	1.7	0.2	0.2
5/26/07 18:00	890	6158	9774	595.1	445.2	149.9	25.2	1.12	3.1	308	300	2275	10.0	1.5	0.2	0.2
5/26/07 19:00	883	6071	9774	583.2	436.2	146.9	25.2	1.15	3.2	304	297	2260	9.6	1.3	0.1	0.2
5/26/07 20:00	880	6016	9774	597.5	447.0	150.5	25.2	1.14	3.2	305	297	2264	9.6	1.4	0.2	0.2
5/26/07 21:00	885	6040	9774	610.7	456.9	153.8	25.2	1.13	3.1	306	298	2278	9.4	1.6	0.2	0.2
5/26/07 22:00	888	6076	9774	614.2	459.5	154.7	25.2	1.11	3.1	306	300	2274	9.5	1.6	0.2	0.2
5/26/07 23:00	888	6086	9774	609.5	455.9	153.6	25.2	1.11	3.1	306	300	2272	9.6	1.6	0.2	0.2
5/27/07 0:00	886	6073	9774	604.2	452.0	152.2	25.2	1.12	3.1	308	300	2267	9.8	1.6	0.2	0.2
5/27/07 1:00	880	6073	9774	612.0	457.8	154.1	25.2	1.11	3.2	306	299	2280	9.9	1.8	0.2	0.2
5/27/07 2:00	887	6046	9774	621.3	464.8	156.5	25.2	1.10	3.1	303	299	2274	9.5	1.9	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx Out
Start Date and Time	MW	KLB/HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MMBtu	lb/MMBtu	lb/MMBtu
5/27/07 3:00	887	6060	9774	624.7	467.3	157.4	25.2	1.09	3.1	307	296	2280	9.1	2.0	0.2	0.2
5/27/07 4:00	887	6049	9774	625.1	467.6	157.4	25.2	1.09	3.1	306	296	2286	9.1	2.0	0.2	0.2
5/27/07 5:00	886	6060	9774	626.3	468.6	157.7	25.2	1.08	3.1	307	296	2273	9.0	2.0	0.2	0.2
5/27/07 6:00	876	6012	9774	615.5	460.5	155.0	25.2	1.09	3.1	305	297	2249	9.4	1.9	0.2	0.2
5/27/07 7:00	815	5601	9774	575.9	425.0	150.8	26.2	1.09	3.2	303	293	2145	8.5	1.9	0.2	0.2
5/27/07 8:00	882	6024	9774	617.1	462.8	154.2	25.0	1.09	3.1	306	296	2288	9.0	1.8	0.2	0.2
5/27/07 9:00	883	6020	9774	616.2	462.2	154.0	25.0	1.09	3.1	305	298	2294	9.0	1.8	0.2	0.2
5/27/07 10:00	881	6008	9774	611.4	458.6	152.8	25.0	1.09	3.1	304	299	2292	9.1	1.8	0.2	0.2
5/27/07 11:00	883	6045	9774	604.4	453.3	151.1	25.0	1.10	3.1	306	301	2296	9.3	1.7	0.2	0.2
5/27/07 12:00	882	6060	9774	582.2	436.7	145.5	25.0	1.13	3.1	306	301	2302	9.6	1.6	0.2	0.2
5/27/07 13:00	883	6107	9774	558.3	417.4	140.9	25.2	1.17	3.1	304	299	2278	9.4	1.3	0.1	0.2
5/27/07 14:00	882	6049	9774	547.4	398.9	148.6	27.1	1.20	3.2	302	298	2266	9.4	1.2	0.1	0.2
5/27/07 15:00	882	6048	9774	542.4	395.5	146.8	27.1	1.23	3.2	302	297	2264	9.3	1.1	0.1	0.2
5/27/07 16:00	883	6058	9774	536.1	391.4	144.8	27.0	1.24	3.1	302	296	2262	9.4	1.1	0.1	0.2
5/27/07 17:00	882	6048	9774	533.8	388.7	145.0	27.2	1.26	3.1	302	296	2231	9.4	1.1	0.1	0.2
5/27/07 18:00	883	6061	9774	533.9	388.2	145.7	27.3	1.26	3.1	304	299	2241	9.5	1.0	0.1	0.2
5/27/07 19:00	882	6049	9774	532.7	387.4	145.3	27.3	1.26	3.1	306	301	2245	9.4	1.0	0.1	0.2
5/27/07 20:00	883	6060	9774	535.6	389.3	146.3	27.3	1.26	3.1	308	303	2253	9.4	1.0	0.1	0.2
5/27/07 21:00	883	6074	9774	539.1	391.7	147.4	27.4	1.26	3.1	311	302	2266	9.4	1.0	0.1	0.2
5/27/07 22:00	883	6048	9774	538.4	391.2	147.2	27.3	1.26	3.1	307	301	2266	9.4	1.0	0.1	0.2
5/27/07 23:00	883	6022	9774	537.7	390.7	147.0	27.3	1.26	3.1	305	299	2259	9.2	0.9	0.1	0.2

Table C-4. Long Term Unit 1 Hourly Average Process Data

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/19/07 1:00	886	6141	9790	577.6	429.7	147.9	25.6	1.18	2.1	307	302	2198	10.1	2.4	0.2	0.2
6/19/07 2:00	889	6093	9773	578.5	430.4	148.1	25.6	1.18	2.0	304	300	2216	10.0	2.4	0.2	0.2
6/19/07 3:00	887	6124	9753	580.6	431.9	148.6	25.6	1.18	2.1	304	299	2215	10.1	2.4	0.2	0.2
6/19/07 4:00	886	6148	9803	582.9	433.7	149.2	25.6	1.18	2.1	303	299	2209	10.0	2.3	0.2	0.2
6/19/07 5:00	889	6151	9762	578.0	426.5	151.5	26.2	1.18	2.1	305	298	2202	9.9	2.2	0.2	0.2
6/19/07 6:00	888	6115	9673	569.0	402.4	166.7	29.3	1.19	2.1	305	299	2201	10.5	2.2	0.2	0.2
6/19/07 7:00	883	6069	9724	567.7	400.3	167.5	29.5	1.19	2.1	304	300	2190	10.3	2.2	0.2	0.2
6/19/07 8:00	884	6077	9721	569.0	399.9	169.0	29.7	1.19	2.1	306	302	2190	10.3	2.1	0.2	0.2
6/19/07 9:00	882	6096	9760	570.5	401.1	169.4	29.7	1.19	2.1	309	304	2215	10.5	2.1	0.2	0.2
6/19/07 10:00	881	6058	9689	567.5	394.8	172.8	30.4	1.19	2.1	309	307	2194	10.5	2.2	0.2	0.2
6/19/07 11:00	857	5993	9748	552.5	382.6	169.9	30.8	1.20	2.1	310	307	2146	10.3	2.1	0.2	0.2
6/19/07 12:00	871	5973	9897	566.5	399.8	166.7	29.4	1.20	2.3	307	305	2185	10.4	2.0	0.2	0.2
6/19/07 13:00	889	6116	9767	580.7	412.6	168.1	29.0	1.19	2.4	306	308	2229	10.6	2.1	0.2	0.2
6/19/07 14:00	882	6095	9777	576.4	410.6	165.8	28.8	1.18	2.4	307	307	2230	10.6	2.1	0.2	0.2
6/19/07 15:00	874	6041	9810	566.8	403.7	163.1	28.8	1.18	2.4	306	307	2244	10.5	2.2	0.2	0.2
6/19/07 16:00	881	6052	9762	569.8	405.9	164.0	28.8	1.18	2.4	309	309	2241	10.5	2.2	0.2	0.2
6/19/07 17:00	882	6098	9725	576.7	407.6	169.1	29.3	1.18	2.4	311	314	2241	10.6	2.3	0.2	0.2
6/19/07 18:00	857	5944	9823	563.0	392.2	170.7	30.3	1.18	2.4	315	322	2202	10.4	2.4	0.2	0.2
6/19/07 19:00	876	6084	9794	573.0	408.9	164.1	28.6	1.18	2.4	314	321	2235	10.7	2.1	0.2	0.2
6/19/07 20:00	878	6093	9798	571.7	411.3	160.5	28.1	1.19	2.4	316	325	2246	10.7	2.0	0.2	0.2
6/19/07 21:00	885	6120	9773	571.4	411.6	159.7	28.0	1.19	2.4	315	324	2272	10.7	2.0	0.2	0.2
6/19/07 22:00	884	6123	9807	569.5	410.4	159.2	27.9	1.19	2.4	309	316	2270	10.5	2.1	0.2	0.2
6/19/07 23:00	885	6111	9788	572.4	412.3	160.1	28.0	1.19	2.4	308	313	2263	10.6	2.1	0.2	0.2
6/20/07 0:00	883	6140	9819	571.1	411.4	159.6	28.0	1.20	2.4	305	309	2240	10.6	2.1	0.2	0.2
6/20/07 1:00	886	6106	9808	571.7	411.8	159.9	28.0	1.20	2.3	303	306	2237	10.6	2.2	0.2	0.2
6/20/07 2:00	886	6102	9724	570.8	411.3	159.5	27.9	1.19	2.4	304	306	2235	10.7	2.2	0.2	0.2
6/20/07 3:00	884	6092	9768	573.1	412.8	160.3	28.0	1.19	2.4	304	306	2233	10.4	2.2	0.2	0.2
6/20/07 4:00	885	6101	9796	575.4	414.3	161.1	28.0	1.19	2.4	304	306	2234	10.5	2.2	0.2	0.2
6/20/07 5:00	885	6094	9761	576.7	415.1	161.5	28.0	1.18	2.4	305	305	2236	10.2	2.2	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/20/07 6:00	884	6102	9783	579.6	417.1	162.5	28.0	1.18	2.4	305	304	2236	10.7	2.2	0.2	0.2
6/20/07 7:00	885	6093	9749	579.8	417.9	161.9	27.9	1.18	2.4	304	303	2231	10.4	2.2	0.2	0.2
6/20/07 8:00	884	6088	9759	581.7	419.3	162.4	27.9	1.17	2.4	304	303	2220	9.9	2.0	0.2	0.2
6/20/07 9:00	882	6111	9751	579.0	417.5	161.5	27.9	1.17	2.4	306	304	2216	8.1	2.0	0.2	0.2
6/20/07 10:00	878	6099	9794	576.3	415.5	160.7	27.9	1.18	2.4	307	303	2225	7.7	2.0	0.2	0.2
6/20/07 11:00	870	6010	9937	575.1	414.8	160.4	27.9	1.18	2.4	309	308	2222	8.1	2.1	0.2	0.2
6/20/07 12:00	872	6018	9741	576.0	415.7	160.3	27.8	1.17	2.4	310	307	2224	8.0	2.2	0.2	0.2
6/20/07 13:00	876	6031	9739	573.8	414.9	158.9	27.7	1.17	2.4	307	307	2217	8.3	2.2	0.2	0.2
6/20/07 14:00	868	5958	9711	569.6	422.4	147.3	25.9	1.17	2.4	309	308	2206	7.9	2.2	0.2	0.2
6/20/07 15:00	866	5929	9939	589.5	498.6	90.9	15.4	1.16	2.4	314	306	2218	7.9	2.4	0.2	0.2
6/20/07 16:00	882	6089	9915	607.6	527.3	80.2	13.2	1.13	2.4	312	302	2233	8.0	2.4	0.2	0.2
6/20/07 17:00	888	6105	9905	615.1	533.4	81.8	13.3	1.12	2.4	313	303	2258	8.1	2.4	0.2	0.2
6/20/07 18:00	889	6115	9801	611.1	529.8	81.3	13.3	1.12	2.4	312	304	2254	7.9	2.4	0.2	0.2
6/20/07 19:00	888	6129	9736	605.0	524.5	80.5	13.3	1.12	2.4	314	305	2241	8.1	2.5	0.2	0.2
6/20/07 20:00	887	6094	9689	602.9	522.4	80.5	13.3	1.13	2.4	311	303	2235	7.9	2.5	0.2	0.2
6/20/07 21:00	887	6084	9710	601.0	520.3	80.7	13.4	1.13	2.4	310	301	2235	7.9	2.4	0.2	0.2
6/20/07 22:00	884	6097	9727	601.0	520.3	80.7	13.4	1.13	2.4	309	301	2212	7.8	2.2	0.2	0.2
6/20/07 23:00	885	6086	9750	604.7	523.5	81.2	13.4	1.13	2.4	306	300	2233	7.6	2.3	0.2	0.2
6/21/07 0:00	880	6109	9655	590.2	474.2	116.1	19.7	1.14	2.3	311	308	2226	7.6	2.4	0.2	0.2
6/21/07 1:00	884	6111	9549	572.6	416.6	156.0	27.2	1.16	2.5	307	308	2232	7.8	2.2	0.2	0.2
6/21/07 2:00	880	6055	9643	564.2	410.5	153.7	27.2	1.18	2.5	301	303	2217	7.3	2.1	0.2	0.2
6/21/07 3:00	877	6023	9725	566.0	413.4	152.7	27.0	1.19	2.4	300	302	2207	7.3	2.1	0.2	0.2
6/21/07 4:00	878	6048	9750	572.4	417.9	154.5	27.0	1.18	2.4	299	303	2207	7.4	2.1	0.2	0.2
6/21/07 5:00	880	6089	9823	576.6	420.9	155.7	27.0	1.18	2.4	299	302	2203	7.3	2.0	0.2	0.2
6/21/07 6:00	882	6081	9837	577.8	421.7	156.1	27.0	1.18	2.3	300	302	2191	7.7	2.1	0.2	0.2
6/21/07 7:00	882	6074	9752	577.4	421.5	155.9	27.0	1.17	2.3	299	301	2189	7.6	2.1	0.2	0.2
6/21/07 8:00	886	6111	9742	577.9	419.9	158.0	27.3	1.18	2.3	300	301	2220	7.6	2.0	0.2	0.2
6/21/07 9:00	888	6129	9749	576.8	416.7	160.1	27.7	1.18	2.3	303	302	2232	8.0	2.0	0.2	0.2
6/21/07 10:00	887	6131	9780	574.1	412.0	162.1	28.2	1.19	2.4	301	302	2234	7.9	2.0	0.2	0.2
6/21/07 11:00	888	6122	9741	571.5	409.5	162.0	28.4	1.19	2.4	303	303	2224	7.9	2.0	0.2	0.2
6/21/07 12:00	886	6104	9747	570.7	408.9	161.8	28.4	1.20	2.3	304	303	2227	8.0	2.0	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/21/07 13:00	887	6131	9714	565.2	405.0	160.2	28.3	1.20	2.4	301	288	2220	7.2	2.1	0.2	0.2
6/21/07 14:00	884	6121	9773	563.7	403.9	159.8	28.3	1.21	2.3	299	299	2209	7.5	2.1	0.2	0.2
6/21/07 15:00	883	6135	9859	566.7	406.0	160.7	28.4	1.21	2.4	300	301	2212	7.6	2.1	0.2	0.2
6/21/07 16:00	886	6119	9812	569.8	408.3	161.6	28.4	1.20	4.4	302	302	2219	7.5	2.1	0.2	0.2
6/21/07 17:00	884	6163	9800	571.7	411.9	159.7	27.9	1.20	2.3	301	302	2211	7.3	2.1	0.2	0.2
6/21/07 18:00	888	6131	9835	569.6	413.2	156.5	27.5	1.20	2.3	300	300	2208	7.4	2.2	0.2	0.2
6/21/07 19:00	886	6106	9801	570.9	413.5	157.4	27.6	1.20	2.3	301	301	2222	7.5	2.2	0.2	0.2
6/21/07 20:00	883	6124	9796	573.5	417.4	156.1	27.2	1.19	2.3	300	302	2216	7.4	2.3	0.2	0.2
6/21/07 21:00	888	6103	9840	577.8	421.3	156.5	27.1	1.19	2.3	299	300	2214	7.4	2.3	0.2	0.2
6/21/07 22:00	887	6126	9800	576.2	419.6	156.6	27.2	1.19	2.3	298	297	2214	7.3	2.3	0.2	0.2
6/21/07 23:00	888	6077	9734	578.2	419.1	159.1	27.5	1.18	2.3	297	297	2215	7.1	2.2	0.2	0.2
6/22/07 0:00	885	6116	9801	579.1	420.7	158.4	27.4	1.18	2.3	298	297	2229	7.2	2.2	0.2	0.2
6/22/07 1:00	888	6082	9754	577.8	421.0	156.8	27.1	1.18	2.3	298	298	2227	7.2	2.2	0.2	0.2
6/22/07 2:00	886	6072	9797	580.9	422.7	158.2	27.2	1.18	2.3	299	299	2215	7.3	2.2	0.2	0.2
6/22/07 3:00	889	6104	9741	578.5	421.8	156.6	27.1	1.17	2.3	299	298	2220	7.3	2.1	0.2	0.2
6/22/07 4:00	887	6073	9661	571.7	415.4	156.3	27.3	1.18	2.3	298	298	2210	7.3	2.1	0.2	0.2
6/22/07 5:00	883	6081	9712	573.8	417.9	155.9	27.2	1.18	2.3	300	300	2198	7.3	2.1	0.2	0.2
6/22/07 6:00	887	6119	9695	572.7	417.8	154.9	27.1	1.19	2.3	299	298	2209	7.6	2.1	0.2	0.2
6/22/07 7:00	891	6120	9713	573.1	418.0	155.0	27.1	1.19	2.3	297	297	2216	7.3	2.0	0.2	0.2
6/22/07 8:00	888	6152	9732	571.3	416.8	154.5	27.0	1.19	2.3	298	297	2210	7.2	2.0	0.2	0.2
6/22/07 9:00	889	6133	9778	571.0	416.6	154.4	27.0	1.20	2.3	297	297	2216	7.2	1.9	0.2	0.2
6/22/07 10:00	892	6116	9785	571.3	416.7	154.6	27.1	1.20	2.3	299	299	2219	7.3	1.9	0.2	0.2
6/22/07 11:00	891	6110	9785	572.6	417.6	154.9	27.1	1.19	2.5	301	301	2227	7.4	1.9	0.2	0.2
6/22/07 12:00	889	6119	9760	575.6	419.8	155.8	27.1	1.19	2.5	304	304	2227	7.7	1.9	0.2	0.2
6/22/07 13:00	890	6139	9771	577.5	421.1	156.3	27.1	1.19	2.4	306	307	2227	7.9	1.9	0.2	0.2
6/22/07 14:00	890	6145	9799	577.4	421.1	156.3	27.1	1.19	2.5	308	308	2232	8.0	1.9	0.2	0.2
6/22/07 15:00	890	6140	9798	579.1	422.3	156.8	27.1	1.19	2.5	308	309	2250	8.1	1.9	0.2	0.2
6/22/07 16:00	891	6150	9747	577.5	421.2	156.3	27.1	1.18	2.5	308	309	2247	8.1	1.9	0.2	0.2
6/22/07 17:00	884	6104	9856	582.4	426.2	156.2	26.8	1.18	2.5	308	309	2234	8.3	2.0	0.2	0.2
6/22/07 18:00	882	6081	10078	607.2	448.7	158.5	26.1	1.15	2.5	304	305	2245	7.9	2.4	0.2	0.2
6/22/07 19:00	891	6172	9794	600.8	445.3	155.6	25.9	1.14	2.4	304	303	2252	7.9	2.4	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/22/07 20:00	891	6150	9516	577.0	424.0	152.9	26.5	1.16	2.5	302	303	2245	7.7	2.1	0.2	0.2
6/22/07 21:00	884	6104	9626	566.7	414.8	151.9	26.8	1.18	2.5	301	300	2238	7.4	2.0	0.2	0.2
6/22/07 22:00	884	6085	9700	564.0	412.4	151.6	26.9	1.20	2.4	301	301	2228	7.4	1.9	0.2	0.2
6/22/07 23:00	884	6091	9719	562.7	410.7	152.0	27.0	1.20	2.4	301	299	2210	7.5	1.9	0.2	0.2
6/23/07 0:00	881	6084	9839	567.7	414.7	153.0	27.0	1.20	2.4	302	299	2205	7.7	2.1	0.2	0.2
6/23/07 1:00	883	6124	9843	570.6	417.0	153.6	26.9	1.20	2.4	301	300	2201	7.6	2.2	0.2	0.2
6/23/07 2:00	888	6078	9777	569.8	416.3	153.5	26.9	1.20	2.3	300	298	2204	7.4	2.2	0.2	0.2
6/23/07 3:00	886	6096	9693	567.5	414.5	153.1	27.0	1.20	2.4	302	298	2193	7.5	2.3	0.2	0.2
6/23/07 4:00	887	6094	9716	564.7	412.3	152.4	27.0	1.20	2.4	301	296	2183	7.3	2.3	0.2	0.2
6/23/07 5:00	884	6051	9651	565.3	412.7	152.5	27.0	1.20	2.4	301	297	2187	7.0	2.3	0.2	0.2
6/23/07 6:00	882	6090	9745	571.0	417.3	153.7	26.9	1.20	2.4	301	298	2196	7.3	2.3	0.2	0.2
6/23/07 7:00	888	6091	9727	568.4	415.2	153.1	26.9	1.20	2.4	299	297	2204	7.1	2.2	0.2	0.2
6/23/07 8:00	884	6059	9683	566.8	414.0	152.9	27.0	1.19	2.4	299	298	2204	7.0	2.2	0.2	0.2
6/23/07 9:00	883	6063	9753	571.8	418.0	153.8	26.9	1.19	2.4	300	298	2198	7.2	2.2	0.2	0.2
6/23/07 10:00	884	6074	9738	574.4	420.1	154.3	26.9	1.18	2.4	301	299	2205	7.1	2.2	0.2	0.2
6/23/07 11:00	882	6056	9847	585.4	428.8	156.6	26.7	1.17	2.4	303	301	2219	7.2	2.3	0.2	0.2
6/23/07 12:00	887	6106	9867	588.1	431.0	157.1	26.7	1.16	2.4	304	302	2233	7.4	2.2	0.2	0.2
6/23/07 13:00	889	6120	9692	578.8	423.6	155.2	26.8	1.17	2.4	306	304	2227	7.5	2.0	0.2	0.2
6/23/07 14:00	887	6104	9597	567.1	414.2	152.9	27.0	1.18	2.4	306	305	2219	7.5	1.9	0.2	0.2
6/23/07 15:00	882	6083	9662	566.6	413.8	152.8	27.0	1.19	2.4	308	306	2227	7.6	2.0	0.2	0.2
6/23/07 16:00	884	6096	9712	567.8	414.7	153.1	27.0	1.20	2.4	310	308	2221	7.6	2.1	0.2	0.2
6/23/07 17:00	881	6056	9845	577.5	422.5	155.0	26.8	1.19	2.4	311	309	2215	7.7	2.2	0.2	0.2
6/23/07 18:00	886	6093	9827	585.4	428.8	156.6	26.8	1.17	2.3	311	310	2229	7.7	2.4	0.2	0.2
6/23/07 19:00	884	6132	9798	584.9	428.4	156.5	26.8	1.17	2.4	307	304	2219	7.4	2.4	0.2	0.2
6/23/07 20:00	884	6135	9765	588.1	430.9	157.1	26.7	1.17	2.4	301	299	2228	7.1	2.4	0.2	0.2
6/23/07 21:00	889	6121	9707	581.4	425.5	155.8	26.8	1.17	2.4	298	296	2227	7.0	2.3	0.2	0.2
6/23/07 22:00	888	6096	9592	569.0	415.2	153.8	27.0	1.18	2.4	296	294	2211	6.9	2.2	0.2	0.2
6/23/07 23:00	881	6065	9690	568.8	414.8	154.0	27.1	1.19	2.4	296	294	2195	6.8	2.2	0.2	0.2
6/24/07 0:00	879	6068	9911	583.4	427.0	156.5	26.8	1.18	2.3	295	294	2189	6.8	2.4	0.2	0.2
6/24/07 1:00	884	6094	9892	597.1	438.0	159.1	26.7	1.16	2.4	298	296	2198	7.1	2.6	0.2	0.2
6/24/07 2:00	888	6157	9849	596.1	437.2	158.9	26.7	1.15	2.4	298	296	2209	7.3	2.7	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/24/07 3:00	883	6171	9882	594.6	435.9	158.7	26.7	1.15	2.4	299	294	2209	7.2	2.6	0.2	0.2
6/24/07 4:00	886	6152	9873	596.3	437.3	159.0	26.7	1.15	2.4	299	292	2218	7.3	2.5	0.2	0.2
6/24/07 5:00	888	6097	9803	597.3	438.2	159.2	26.6	1.15	2.4	298	294	2222	7.3	2.5	0.2	0.2
6/24/07 6:00	885	6104	9806	599.1	440.3	158.7	26.5	1.14	2.4	298	295	2222	7.7	2.4	0.2	0.2
6/24/07 7:00	885	6073	9809	601.3	442.7	158.6	26.4	1.14	2.4	298	296	2217	7.2	2.2	0.2	0.2
6/24/07 8:00	885	6090	9820	605.8	447.1	158.7	26.2	1.13	2.4	299	297	2224	7.2	2.1	0.2	0.2
6/24/07 9:00	884	6085	9821	609.5	450.6	158.9	26.1	1.12	2.5	300	298	2228	7.3	2.0	0.2	0.2
6/24/07 10:00	887	6106	9743	608.4	450.0	158.3	26.0	1.12	2.4	301	299	2230	7.3	2.0	0.2	0.2
6/24/07 11:00	885	6106	9792	606.4	449.0	157.4	26.0	1.12	2.5	301	300	2240	7.3	2.0	0.2	0.2
6/24/07 12:00	885	6095	9743	605.5	448.3	157.2	26.0	1.13	2.5	303	303	2246	7.5	2.0	0.2	0.2
6/24/07 13:00	886	6135	9681	596.5	440.3	156.2	26.2	1.13	2.4	306	305	2248	7.8	2.0	0.2	0.2
6/24/07 14:00	887	6132	9635	583.6	429.3	154.3	26.4	1.15	2.5	307	306	2247	8.3	1.9	0.2	0.2
6/24/07 15:00	883	6093	9656	579.3	425.0	154.3	26.6	1.16	2.5	309	307	2240	8.6	1.8	0.1	0.2
6/24/07 16:00	881	6098	9802	584.5	428.7	155.8	26.7	1.17	2.5	311	309	2239	8.3	1.8	0.2	0.2
6/24/07 17:00	880	6107	9956	595.9	438.2	157.7	26.5	1.16	2.5	311	311	2250	8.2	1.9	0.2	0.2
6/24/07 18:00	883	6129	9976	605.5	446.9	158.6	26.2	1.15	2.4	308	309	2263	7.9	2.0	0.2	0.2
6/24/07 19:00	887	6144	9866	607.5	449.9	157.5	25.9	1.14	2.4	307	307	2275	7.9	2.0	0.2	0.2
6/24/07 20:00	885	6159	9846	605.1	449.2	155.9	25.8	1.13	2.5	305	305	2254	7.9	2.0	0.2	0.2
6/24/07 21:00	886	6124	9882	605.9	450.7	155.3	25.6	1.13	2.5	302	303	2261	7.7	1.9	0.2	0.2
6/24/07 22:00	885	6143	9828	604.4	449.3	155.1	25.7	1.13	2.5	302	303	2263	7.8	1.9	0.2	0.2
6/24/07 23:00	887	6134	9727	598.5	444.5	154.1	25.7	1.14	2.4	302	303	2262	7.8	1.8	0.2	0.2
6/25/07 0:00	885	6130	9730	595.0	440.6	154.4	25.9	1.14	2.5	303	302	2258	7.8	1.8	0.1	0.2
6/25/07 1:00	885	6144	9773	590.6	436.8	153.8	26.0	1.15	2.5	303	302	2261	8.1	1.7	0.1	0.2
6/25/07 2:00	883	6118	9842	592.2	438.2	154.0	26.0	1.16	2.5	302	301	2260	8.0	1.7	0.1	0.2
6/25/07 3:00	885	6087	9759	596.8	442.0	154.8	25.9	1.15	2.4	301	300	2260	7.8	1.7	0.1	0.2
6/25/07 4:00	885	6110	9784	597.4	442.5	154.9	25.9	1.14	2.5	301	301	2253	8.2	1.7	0.1	0.2
6/25/07 5:00	883	6132	9804	600.4	445.0	155.4	25.9	1.14	2.4	302	302	2248	8.1	1.8	0.1	0.2
6/25/07 6:00	883	6206	9778	593.5	439.6	153.9	25.9	1.15	2.2	302	302	2227	7.6	1.7	0.1	0.2
6/25/07 7:00	885	6161	9814	586.4	434.3	152.1	25.9	1.16	2.1	300	300	2203	7.8	1.6	0.1	0.2
6/25/07 8:00	878	6196	9868	581.6	430.7	150.9	25.9	1.18	2.0	300	300	2198	7.8	1.6	0.1	0.2
6/25/07 9:00	872	6268	10091	584.3	432.2	152.0	26.0	1.19	1.9	300	301	2195	7.8	1.7	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/25/07 10:00	874	6238	10121	585.1	432.7	152.4	26.0	1.19	2.1	300	300	2209	7.9	1.7	0.1	0.2
6/25/07 11:00	874	6198	10102	582.4	430.7	151.7	26.0	1.19	2.2	300	300	2226	8.0	1.6	0.1	0.2
6/25/07 12:00	872	6185	9957	579.3	428.4	150.9	26.1	1.19	2.3	299	295	2224	8.0	1.5	0.1	0.2
6/25/07 13:00	878	6227	9997	583.2	431.2	151.9	26.0	1.19	2.3	301	295	2229	7.8	1.6	0.1	0.2
6/25/07 14:00	881	6233	10048	588.0	434.9	153.0	26.0	1.19	2.3	302	298	2229	8.1	1.6	0.1	0.2
6/25/07 15:00	881	6241	10114	591.3	437.4	153.9	26.0	1.18	2.2	304	300	2221	8.3	1.6	0.1	0.2
6/25/07 16:00	882	6250	10100	594.3	439.7	154.7	26.0	1.18	2.3	305	301	2244	8.6	1.6	0.1	0.2
6/25/07 17:00	883	6265	10095	595.5	440.6	154.9	26.0	1.18	2.2	306	302	2246	8.7	1.6	0.1	0.2
6/25/07 18:00	882	6248	10018	592.2	438.1	154.1	26.0	1.18	2.2	306	304	2245	8.5	1.6	0.1	0.2
6/25/07 19:00	882	6134	9898	585.8	433.3	152.5	26.0	1.17	2.2	306	305	2231	8.3	1.6	0.1	0.2
6/25/07 20:00	880	6114	9835	584.9	432.6	152.3	26.0	1.17	2.3	307	307	2223	8.2	1.6	0.1	0.2
6/25/07 21:00	879	6140	9865	588.3	435.2	153.2	26.0	1.17	2.3	307	306	2224	8.5	1.6	0.1	0.2
6/25/07 22:00	880	6171	9965	594.7	439.9	154.7	26.0	1.16	2.3	306	306	2236	8.5	1.7	0.1	0.2
6/25/07 23:00	884	6239	10048	605.2	447.8	157.4	26.0	1.16	2.3	304	305	2252	8.3	1.8	0.1	0.2
6/26/07 0:00	886	6176	9937	605.0	447.7	157.4	26.0	1.15	2.2	303	302	2251	8.0	1.9	0.2	0.2
6/26/07 1:00	886	6156	9903	603.1	446.3	156.9	26.0	1.15	2.2	304	302	2241	8.1	1.9	0.2	0.2
6/26/07 2:00	884	6134	9800	598.6	442.8	155.8	26.0	1.14	2.2	304	301	2232	8.0	1.9	0.2	0.2
6/26/07 3:00	881	6108	9817	597.1	441.8	155.4	26.0	1.14	2.2	304	301	2217	8.1	1.9	0.2	0.2
6/26/07 4:00	882	6102	9783	596.0	440.9	155.1	26.0	1.14	2.3	303	301	2229	8.2	1.9	0.2	0.2
6/26/07 5:00	876	6161	9806	589.3	433.1	156.3	26.5	1.15	2.3	305	303	2229	8.2	1.9	0.2	0.2
6/26/07 6:00	870	6125	10071	598.7	442.7	156.0	26.1	1.15	2.2	306	299	2213	8.0	2.0	0.2	0.2
6/26/07 7:00	880	6120	10060	614.6	454.8	159.8	26.0	1.13	2.1	304	298	2209	8.1	2.1	0.2	0.2
6/26/07 8:00	883	6189	9842	606.4	448.6	157.7	26.0	1.13	6.6	303	298	2222	8.1	2.0	0.2	0.2
6/26/07 9:00	880	6183	9864	599.3	443.3	155.9	26.0	1.14	4.7	304	300	2225	8.3	1.8	0.2	0.2
6/26/07 10:00	882	6154	9900	595.2	440.4	154.8	26.0	1.15	2.0	303	299	2204	8.3	1.7	0.1	0.2
6/26/07 11:00	881	6140	9775	589.5	435.8	153.7	26.1	1.15	2.0	304	300	2201	8.4	1.7	0.1	0.2
6/26/07 12:00	880	6140	9828	589.2	435.0	154.2	26.2	1.16	2.0	305	301	2220	8.7	1.6	0.1	0.2
6/26/07 13:00	883	6149	9832	589.1	435.7	153.4	26.0	1.16	2.0	309	304	2223	9.2	1.6	0.1	0.2
6/26/07 14:00	884	6145	9828	588.6	435.3	153.2	26.0	1.17	2.0	308	305	2210	9.7	1.5	0.1	0.2
6/26/07 15:00	884	6168	9800	585.0	432.6	152.3	26.0	1.17	1.9	309	297	2214	8.5	1.5	0.1	0.2
6/26/07 16:00	883	6133	9879	583.8	431.8	152.1	26.0	1.17	1.9	309	296	2210	8.1	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/26/07 17:00	879	6162	9925	588.0	434.9	153.1	26.0	1.17	1.9	308	297	2201	8.4	1.5	0.1	0.2
6/26/07 18:00	881	6173	10054	599.4	443.5	155.9	26.0	1.16	1.8	308	298	2191	8.9	1.5	0.1	0.2
6/26/07 19:00	882	6127	9972	600.1	444.7	155.4	25.9	1.15	1.8	312	302	2188	9.1	1.5	0.1	0.2
6/26/07 20:00	879	6109	9791	587.1	433.9	153.1	26.1	1.15	2.1	316	304	2204	9.3	1.5	0.1	0.2
6/26/07 21:00	879	6163	9879	586.4	433.5	152.9	26.1	1.16	2.2	311	301	2232	9.6	1.5	0.1	0.2
6/26/07 22:00	883	6163	9831	584.1	431.8	152.2	26.1	1.17	2.3	305	292	2213	9.0	1.6	0.1	0.2
6/26/07 23:00	886	6130	9707	575.5	425.7	149.8	26.0	1.18	2.2	299	272	2192	7.9	1.5	0.1	0.2
6/27/07 0:00	885	6136	9633	564.4	418.3	146.1	25.9	1.19	2.2	299	275	2187	8.1	1.4	0.1	0.2
6/27/07 1:00	882	6094	9633	555.9	415.8	140.0	25.2	1.21	2.1	301	278	2175	8.0	1.2	0.1	0.2
6/27/07 2:00	884	6081	9583	547.9	411.3	136.7	24.9	1.22	2.1	302	290	2175	9.0	1.1	0.1	0.2
6/27/07 3:00	882	6077	9607	541.1	406.4	134.7	24.9	1.24	2.1	302	293	2176	9.3	1.0	0.1	0.1
6/27/07 4:00	881	6040	9676	539.2	405.1	134.1	24.9	1.25	2.1	303	295	2176	9.6	0.9	0.1	0.1
6/27/07 5:00	873	6184	9765	534.9	401.6	133.3	24.9	1.26	2.1	302	294	2171	9.3	0.9	0.1	0.1
6/27/07 6:00	876	6187	9957	537.5	403.1	134.4	25.0	1.28	2.1	303	294	2200	9.8	0.8	0.1	0.1
6/27/07 7:00	882	6173	9940	541.4	404.0	137.4	25.4	1.28	2.1	306	297	2210	9.8	0.8	0.1	0.1
6/27/07 8:00	883	6218	10034	544.9	403.6	141.3	25.9	1.27	2.1	309	299	2224	9.4	0.8	0.1	0.2
6/27/07 9:00	881	6236	10082	550.5	420.6	129.9	23.6	1.27	2.1	310	300	2227	9.6	0.8	0.1	0.2
6/27/07 10:00	886	6218	10007	552.0	423.5	128.6	23.3	1.27	2.0	311	300	2233	9.1	0.8	0.1	0.2
6/27/07 11:00	887	6192	9978	552.9	424.5	128.4	23.2	1.26	2.0	314	302	2234	9.1	0.8	0.1	0.2
6/27/07 12:00	884	6123	9922	553.0	445.2	107.9	19.5	1.25	2.0	324	309	2205	9.2	0.8	0.1	0.2
6/27/07 13:00	878	6141	9951	555.8	476.1	79.7	14.3	1.24	2.0	333	318	2197	9.5	0.9	0.1	0.2
6/27/07 14:00	886	6242	10011	562.8	489.4	73.4	13.0	1.24	2.1	321	313	2222	9.6	0.8	0.1	0.2
6/27/07 15:00	888	6247	9904	561.3	489.9	71.4	12.7	1.24	2.1	315	308	2227	9.6	0.9	0.1	0.2
6/27/07 16:00	890	6247	9944	561.6	490.2	71.3	12.7	1.24	2.1	313	306	2236	9.7	0.9	0.1	0.2
6/27/07 17:00	894	6192	9905	562.6	491.1	71.5	12.7	1.24	2.0	316	308	2242	9.7	0.9	0.1	0.2
6/27/07 18:00	894	6165	9875	559.8	488.7	71.2	12.7	1.23	2.0	318	310	2234	9.8	0.9	0.1	0.2
6/27/07 19:00	881	6050	9717	547.2	455.7	91.5	16.7	1.23	2.1	322	319	2205	10.2	0.9	0.1	0.2
6/27/07 20:00	874	6134	9811	542.5	409.4	133.2	24.5	1.24	2.1	311	319	2189	10.1	0.8	0.1	0.1
6/27/07 21:00	880	6128	9854	539.0	404.2	134.7	25.0	1.26	2.1	302	305	2206	10.1	0.8	0.1	0.1
6/27/07 22:00	880	6095	9762	536.2	402.1	134.0	25.0	1.26	2.2	302	299	2194	9.9	0.7	0.1	0.2
6/27/07 23:00	880	6105	9780	533.3	400.0	133.3	25.0	1.27	2.2	306	303	2196	10.1	0.7	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/28/07 0:00	880	6103	9797	530.8	398.1	132.7	25.0	1.28	2.2	306	304	2197	10.3	0.8	0.1	0.2
6/28/07 1:00	879	6074	9798	531.3	398.6	132.8	25.0	1.28	2.2	308	304	2200	10.5	0.8	0.1	0.2
6/28/07 2:00	880	6073	9842	532.5	399.4	133.1	25.0	1.28	2.2	307	305	2203	10.4	0.8	0.1	0.2
6/28/07 3:00	881	6071	9778	533.4	400.1	133.3	25.0	1.27	2.2	308	306	2198	10.7	0.8	0.1	0.2
6/28/07 4:00	880	6066	9735	533.4	400.1	133.3	25.0	1.27	2.2	307	305	2193	10.5	0.8	0.1	0.2
6/28/07 5:00	876	6169	9820	533.5	400.1	133.4	25.0	1.28	2.2	307	306	2197	10.1	0.8	0.1	0.2
6/28/07 6:00	881	6254	9933	539.4	404.0	135.4	25.1	1.29	2.2	305	302	2210	11.3	0.8	0.1	0.2
6/28/07 7:00	883	6249	10028	540.8	390.2	150.7	27.9	1.29	2.2	308	308	2200	11.2	0.8	0.1	0.2
6/28/07 8:00	873	6152	10089	538.0	384.3	153.7	28.6	1.29	2.5	302	303	2202	11.2	0.8	0.1	0.2
6/28/07 9:00	878	6160	10068	543.7	388.4	155.2	28.6	1.28	2.4	305	304	2214	11.1	0.9	0.1	0.2
6/28/07 10:00	884	6160	9909	543.5	398.4	145.1	26.7	1.27	2.4	311	308	2216	10.8	0.9	0.1	0.2
6/28/07 11:00	884	6176	9886	544.4	402.0	142.4	26.2	1.27	2.4	314	308	2230	10.8	0.9	0.1	0.2
6/28/07 12:00	885	6161	9927	546.1	404.6	141.5	25.9	1.26	2.3	312	309	2222	11.0	0.9	0.1	0.2
6/28/07 13:00	884	6105	9941	554.4	412.6	141.8	25.6	1.25	2.2	314	310	2218	11.3	0.9	0.1	0.2
6/28/07 14:00	881	6047	10068	574.4	430.1	144.4	25.1	1.22	2.2	317	312	2207	11.2	1.1	0.1	0.2
6/28/07 15:00	884	6070	10062	596.3	447.3	149.1	25.0	1.18	2.0	314	311	2206	11.1	1.4	0.1	0.2
6/28/07 16:00	885	6128	10072	620.5	468.3	152.2	24.5	1.15	2.1	312	310	2213	11.0	1.6	0.2	0.2
6/28/07 17:00	885	6168	10001	623.7	469.0	154.7	24.8	1.13	2.1	311	308	2217	10.8	1.8	0.2	0.2
6/28/07 18:00	884	6202	9984	622.8	467.1	155.7	25.0	1.12	2.1	311	307	2228	10.7	1.8	0.2	0.2
6/28/07 19:00	883	6232	9987	625.2	468.9	156.3	25.0	1.12	2.1	308	306	2234	10.3	1.8	0.2	0.2
6/28/07 20:00	876	6197	9991	620.4	470.2	150.2	24.2	1.11	2.1	309	306	2217	10.2	1.8	0.2	0.2
6/28/07 21:00	870	6172	10030	620.0	465.0	154.9	25.0	1.11	2.1	307	305	2225	10.3	1.8	0.2	0.2
6/28/07 22:00	871	6201	10039	617.5	463.2	154.3	25.0	1.11	2.1	304	301	2219	9.8	1.8	0.2	0.2
6/28/07 23:00	874	6183	10064	619.1	464.3	154.7	25.0	1.12	2.1	301	299	2219	9.7	1.8	0.2	0.2
6/29/07 0:00	877	6328	10004	615.8	464.7	151.1	24.5	1.13	2.1	303	301	2232	9.8	1.8	0.2	0.2
6/29/07 1:00	875	6374	10100	607.4	462.4	145.0	23.9	1.15	2.1	310	310	2237	9.8	1.6	0.2	0.2
6/29/07 2:00	878	6376	10148	605.5	469.0	136.5	22.5	1.17	2.2	311	312	2235	10.0	1.5	0.1	0.2
6/29/07 3:00	895	6275	10172	613.3	468.2	145.0	23.7	1.16	2.2	308	307	2238	10.1	1.5	0.1	0.2
6/29/07 4:00	895	6146	9723	597.1	447.8	149.2	25.0	1.15	2.2	303	301	2233	10.1	1.4	0.1	0.2
6/29/07 5:00	884	6068	9702	589.0	441.8	147.2	25.0	1.15	2.2	301	299	2198	9.7	1.4	0.1	0.2
6/29/07 6:00	876	6101	9796	590.9	443.2	147.7	25.0	1.15	2.3	301	298	2209	10.5	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/29/07 7:00	880	6077	9907	594.5	445.8	148.6	25.0	1.15	2.2	299	298	2223	10.0	1.5	0.1	0.2
6/29/07 8:00	877	6039	9908	602.5	451.9	150.6	25.0	1.14	2.2	301	298	2218	10.0	1.6	0.2	0.2
6/29/07 9:00	883	6149	9987	621.4	466.1	155.3	25.0	1.12	2.2	302	300	2225	10.0	1.6	0.2	0.2
6/29/07 10:00	890	6198	9943	623.3	467.5	155.8	25.0	1.11	2.2	304	303	2242	9.8	1.6	0.2	0.2
6/29/07 11:00	879	6123	9720	603.9	477.3	126.7	21.0	1.12	2.3	309	308	2232	9.9	1.6	0.2	0.2
6/29/07 12:00	871	6118	9967	611.0	530.5	80.5	13.2	1.12	2.2	315	319	2234	9.9	1.6	0.2	0.2
6/29/07 13:00	885	6159	9929	620.2	541.8	78.4	12.6	1.12	2.2	312	313	2241	9.8	1.7	0.2	0.2
6/29/07 14:00	884	6160	9900	623.5	544.6	78.9	12.7	1.11	2.2	309	309	2214	9.9	1.7	0.2	0.2
6/29/07 15:00	884	6190	9922	623.8	544.9	78.9	12.7	1.11	2.3	309	310	2239	9.8	1.7	0.2	0.1
6/29/07 16:00	887	6160	9931	623.6	545.5	78.1	12.5	1.11	2.4	313	311	2264	9.8	1.7	0.2	0.1
6/29/07 17:00	889	6120	9805	620.0	542.5	77.5	12.5	1.10	2.3	312	311	2276	9.7	1.7	0.2	0.2
6/29/07 18:00	884	6130	9786	618.3	541.0	77.3	12.5	1.10	2.3	310	310	2267	9.6	1.7	0.2	0.2
6/29/07 19:00	885	6150	9869	620.3	542.8	77.5	12.5	1.11	2.3	309	310	2252	9.5	1.8	0.2	0.2
6/29/07 20:00	884	6194	9801	612.6	536.0	76.6	12.5	1.12	2.3	308	308	2248	9.5	1.7	0.2	0.2
6/29/07 21:00	888	6129	9791	608.9	532.8	76.1	12.5	1.12	2.2	306	307	2249	9.5	1.7	0.2	0.2
6/29/07 22:00	885	6127	9785	607.2	531.3	75.9	12.5	1.13	2.3	305	307	2252	9.2	1.7	0.2	0.2
6/29/07 23:00	882	6133	9837	605.4	529.7	75.7	12.5	1.13	2.3	306	307	2247	9.4	1.7	0.2	0.2
6/30/07 0:00	880	6101	9857	604.6	529.0	75.5	12.5	1.13	2.3	307	307	2242	9.6	1.7	0.2	0.2
6/30/07 1:00	879	6091	9844	608.7	532.6	76.1	12.5	1.12	2.3	307	307	2238	9.6	1.7	0.2	0.2
6/30/07 2:00	880	6130	9883	608.6	532.5	76.1	12.5	1.12	2.2	304	305	2243	9.7	1.8	0.2	0.2
6/30/07 3:00	881	6082	9777	606.8	531.0	75.8	12.5	1.12	2.2	303	303	2227	9.6	1.9	0.2	0.2
6/30/07 4:00	880	6077	9805	605.6	529.9	75.7	12.5	1.12	2.3	302	303	2220	9.6	1.9	0.2	0.2
6/30/07 5:00	879	6074	9805	607.5	531.6	75.9	12.5	1.12	2.3	303	304	2225	9.4	2.0	0.2	0.2
6/30/07 6:00	879	6056	9833	612.8	536.2	76.6	12.5	1.11	2.3	303	302	2221	9.3	2.0	0.2	0.2
6/30/07 7:00	879	6077	9893	622.4	544.6	77.8	12.5	1.10	2.2	304	302	2225	9.3	2.0	0.2	0.2
6/30/07 8:00	883	6120	9802	620.5	542.9	77.6	12.5	1.10	2.2	304	302	2231	9.4	1.9	0.2	0.2
6/30/07 9:00	878	6142	9801	618.9	541.5	77.4	12.5	1.10	2.3	304	302	2232	9.4	1.9	0.2	0.2
6/30/07 10:00	876	6167	9949	621.4	543.3	78.1	12.6	1.11	2.2	304	301	2229	9.4	1.9	0.2	0.2
6/30/07 11:00	884	6142	9783	612.0	530.3	81.7	13.3	1.11	2.2	305	302	2219	9.6	1.8	0.2	0.2
6/30/07 12:00	884	6142	9755	607.8	525.8	82.0	13.5	1.12	2.3	308	305	2224	9.6	1.7	0.2	0.2
6/30/07 13:00	879	6124	9819	604.1	515.4	88.7	14.7	1.13	2.3	311	309	2227	9.8	1.7	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
6/30/07 14:00	879	6101	9865	603.8	491.4	112.4	18.6	1.13	2.2	314	310	2221	9.8	1.8	0.2	0.2
6/30/07 15:00	880	6162	9850	599.2	521.0	78.1	13.0	1.14	2.3	317	317	2224	9.5	1.7	0.2	0.2
6/30/07 16:00	880	6113	9852	596.7	520.4	76.3	12.8	1.14	2.3	314	313	2230	9.7	1.6	0.2	0.2
6/30/07 17:00	879	6090	9833	599.4	522.8	76.7	12.8	1.14	2.3	315	313	2207	9.9	1.6	0.2	0.2
6/30/07 18:00	879	6089	9887	606.0	528.5	77.5	12.8	1.13	2.2	314	313	2214	9.9	1.6	0.2	0.2
6/30/07 19:00	881	6108	9882	607.7	530.0	77.7	12.8	1.13	2.2	313	312	2215	9.7	1.6	0.2	0.2
6/30/07 20:00	881	6123	9784	605.9	528.4	77.5	12.8	1.13	2.2	311	310	2216	9.7	1.6	0.2	0.2
6/30/07 21:00	880	6142	9814	601.3	524.4	76.9	12.8	1.13	2.2	309	308	2221	9.4	1.5	0.1	0.2
6/30/07 22:00	880	6123	9775	596.9	520.6	76.4	12.8	1.14	2.3	305	305	2208	9.6	1.5	0.1	0.2
6/30/07 23:00	880	6096	9777	595.9	519.7	76.2	12.8	1.14	2.3	306	305	2205	9.6	1.5	0.1	0.2
7/1/07 0:00	878	6112	9814	596.9	520.6	76.4	12.8	1.14	2.3	308	305	2226	9.6	1.5	0.1	0.2
7/1/07 1:00	879	6131	9902	596.2	519.9	76.3	12.8	1.15	2.2	308	304	2223	9.7	1.4	0.1	0.2
7/1/07 2:00	874	6021	9827	590.8	515.2	75.6	12.8	1.14	2.3	307	304	2186	9.4	1.5	0.1	0.2
7/1/07 3:00	876	6060	9829	597.1	520.7	76.4	12.8	1.14	2.3	307	304	2202	9.5	1.5	0.1	0.2
7/1/07 4:00	883	6119	9848	605.5	528.1	77.4	12.8	1.13	2.3	308	305	2223	9.6	1.6	0.1	0.2
7/1/07 5:00	880	6116	9853	604.3	525.8	78.5	13.0	1.13	2.2	308	305	2221	9.5	1.6	0.1	0.2
7/1/07 6:00	881	6141	9882	608.5	529.3	79.3	13.0	1.13	2.3	306	304	2227	9.7	1.5	0.1	0.2
7/1/07 7:00	883	6179	9792	607.3	527.1	80.2	13.2	1.13	2.3	306	302	2230	10.4	1.5	0.1	0.2
7/1/07 8:00	876	6150	9874	606.7	480.1	126.6	20.9	1.13	2.2	311	304	2225	9.8	1.5	0.1	0.2
7/1/07 9:00	884	6125	9835	610.0	455.5	154.4	25.3	1.13	2.2	308	300	2242	9.8	1.5	0.1	0.2
7/1/07 10:00	885	6138	9765	603.6	451.5	152.1	25.2	1.13	2.2	309	301	2241	9.8	1.5	0.1	0.2
7/1/07 11:00	884	6134	9869	609.3	455.7	153.5	25.2	1.13	2.3	311	303	2258	10.0	1.5	0.1	0.2
7/1/07 12:00	884	6180	9933	612.2	458.0	154.2	25.2	1.13	2.2	311	304	2256	10.1	1.5	0.1	0.2
7/1/07 13:00	884	6146	9832	606.7	453.9	152.8	25.2	1.13	2.2	312	305	2256	10.0	1.5	0.1	0.2
7/1/07 14:00	883	6152	9814	605.5	452.9	152.6	25.2	1.13	2.3	313	306	2249	10.1	1.5	0.1	0.2
7/1/07 15:00	883	6127	9779	598.3	447.5	150.7	25.2	1.14	2.2	312	304	2256	10.0	1.5	0.1	0.2
7/1/07 16:00	876	6079	9767	590.9	442.0	148.9	25.2	1.14	2.3	311	303	2236	10.0	1.4	0.1	0.2
7/1/07 17:00	880	6116	9820	595.7	445.6	150.1	25.2	1.15	2.3	312	304	2240	10.2	1.5	0.1	0.2
7/1/07 18:00	883	6136	9856	599.0	448.1	150.9	25.2	1.15	2.3	313	306	2250	10.2	1.5	0.1	0.2
7/1/07 19:00	885	6133	9897	606.1	453.4	152.6	25.2	1.14	2.2	315	307	2263	10.2	1.6	0.2	0.2
7/1/07 20:00	884	6202	9898	600.8	449.5	151.4	25.2	1.14	2.3	315	306	2261	10.1	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/1/07 21:00	886	6169	9824	600.4	449.1	151.3	25.2	1.15	2.3	311	302	2257	10.1	1.5	0.1	0.2
7/1/07 22:00	885	6148	9883	603.4	451.4	152.0	25.2	1.14	2.2	311	302	2259	10.2	1.5	0.1	0.2
7/1/07 23:00	887	6147	9857	604.0	451.9	152.2	25.2	1.14	2.2	312	303	2255	10.2	1.5	0.1	0.2
7/2/07 0:00	886	6146	9804	602.5	450.7	151.8	25.2	1.14	2.3	313	304	2248	10.2	1.4	0.1	0.2
7/2/07 1:00	885	6159	9859	603.3	451.3	152.0	25.2	1.14	2.3	313	304	2257	10.1	1.4	0.1	0.2
7/2/07 2:00	886	6136	9841	603.5	451.5	152.0	25.2	1.14	2.3	310	302	2261	10.2	1.4	0.1	0.2
7/2/07 3:00	885	6094	9826	605.7	453.1	152.6	25.2	1.13	2.3	309	302	2259	10.3	1.5	0.1	0.2
7/2/07 4:00	884	6110	9838	611.3	457.4	154.0	25.2	1.12	2.2	307	300	2255	10.3	1.5	0.1	0.2
7/2/07 5:00	884	6169	9799	613.1	458.7	154.4	25.2	1.12	2.2	306	299	2254	9.9	1.5	0.1	0.2
7/2/07 6:00	882	6179	9953	614.8	459.9	154.9	25.2	1.12	2.2	305	299	2259	9.8	1.5	0.1	0.2
7/2/07 7:00	885	6150	9899	618.3	462.6	155.7	25.2	1.11	2.2	304	298	2257	10.3	1.5	0.1	0.2
7/2/07 8:00	886	6172	9876	618.4	462.7	155.8	25.2	1.11	2.2	305	299	2253	10.1	1.6	0.2	0.2
7/2/07 9:00	887	6161	9801	615.5	460.5	155.0	25.2	1.11	2.2	306	298	2253	10.0	1.6	0.2	0.2
7/2/07 10:00	886	6121	9750	612.7	458.4	154.3	25.2	1.12	2.2	304	297	2249	9.9	1.5	0.1	0.2
7/2/07 11:00	885	6118	9801	613.9	459.3	154.7	25.2	1.12	2.2	305	297	2242	9.9	1.6	0.2	0.2
7/2/07 12:00	886	6140	9825	610.9	457.0	153.9	25.2	1.12	2.1	307	299	2232	10.1	1.6	0.2	0.2
7/2/07 13:00	888	6138	9691	599.9	448.8	151.1	25.2	1.13	2.1	310	302	2225	10.0	1.5	0.2	0.2
7/2/07 14:00	883	6112	9738	597.5	446.9	150.6	25.2	1.14	2.1	310	303	2227	10.1	1.6	0.2	0.2
7/2/07 15:00	885	6130	9788	597.9	447.3	150.6	25.2	1.14	2.1	310	303	2228	10.1	1.6	0.2	0.2
7/2/07 16:00	885	6156	9739	591.5	442.5	149.0	25.2	1.15	2.1	309	303	2232	10.1	1.6	0.2	0.2
7/2/07 17:00	884	6099	9796	593.7	444.1	149.6	25.2	1.15	2.1	309	304	2233	10.2	1.6	0.2	0.2
7/2/07 18:00	886	6102	9746	593.9	444.3	149.6	25.2	1.15	2.1	310	305	2224	10.2	1.6	0.2	0.2
7/2/07 19:00	884	6079	9792	596.8	446.4	150.3	25.2	1.14	2.1	310	305	2220	10.2	1.5	0.1	0.2
7/2/07 20:00	274	2173	9811	187.7	140.4	47.3	25.2	1.04	13.7	282	276	2218	39.0	1.5	0.1	0.1
7/2/07 21:00	0	623	9814	0.0	0.0	0.0	#N/A	1.00	19.2	227	216	1622	60.0	0.5	0.0	0.0
7/2/07 22:00	5	316	9814	0.0	0.0	0.0	#N/A	1.00	17.6	210	196	1451	23.2	0.0	0.0	0.0
7/2/07 23:00	12	441	9814	0.2	0.0	0.2	100.0	1.00	18.3	206	193	1439	28.8	0.0	0.0	0.0
7/3/07 0:00	6	265	9814	7.1	7.1	0.0	0.0	1.00	18.3	199	187	1475	28.2	0.1	0.0	0.0
7/3/07 1:00	71	892	9814	71.3	66.4	4.9	6.8	1.00	14.7	214	196	1500	11.3	0.9	0.2	0.3
7/3/07 2:00	153	1398	9814	127.4	115.4	11.9	9.4	1.00	12.4	223	208	1431	10.1	1.3	0.3	0.7
7/3/07 3:00	245	2002	9814	168.5	166.3	2.2	1.3	1.00	9.5	242	232	1320	9.6	1.5	0.4	0.7

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/3/07 4:00	407	3042	9715	279.7	227.7	52.0	18.6	1.01	5.5	253	253	1393	10.4	1.4	0.2	0.3
7/3/07 5:00	597	4181	9478	430.2	352.6	77.6	18.0	1.03	3.5	275	277	1666	13.0	1.5	0.1	0.2
7/3/07 6:00	692	4764	9582	494.7	378.9	115.7	23.4	1.05	3.1	294	291	1842	13.0	1.6	0.1	0.2
7/3/07 7:00	808	5656	9613	563.8	420.5	143.3	25.4	1.08	3.0	298	293	2116	11.2	1.6	0.2	0.2
7/3/07 8:00	840	5755	9644	581.1	435.9	145.2	25.0	1.10	3.0	301	297	2234	10.5	1.5	0.1	0.2
7/3/07 9:00	864	5951	9767	594.7	446.1	148.7	25.0	1.11	3.0	304	301	2275	10.5	1.5	0.1	0.2
7/3/07 10:00	864	5936	9700	595.5	446.7	148.8	25.0	1.11	3.0	305	302	2282	10.4	1.6	0.2	0.2
7/3/07 11:00	850	5877	9743	585.2	439.0	146.3	25.0	1.12	3.0	306	300	2260	10.5	1.6	0.2	0.2
7/3/07 12:00	794	5405	9755	549.6	412.2	137.4	25.0	1.11	3.0	304	296	2148	10.1	1.6	0.2	0.2
7/3/07 13:00	858	5925	9765	594.9	446.2	148.7	25.0	1.11	3.0	306	297	2246	10.2	1.6	0.2	0.2
7/3/07 14:00	880	6090	9764	607.0	455.3	151.8	25.0	1.12	2.9	312	307	2301	10.7	1.5	0.1	0.2
7/3/07 15:00	881	6150	9811	603.7	452.9	150.9	25.0	1.12	2.8	309	299	2309	10.0	1.5	0.1	0.2
7/3/07 16:00	869	6040	9823	596.7	441.8	155.0	26.0	1.13	2.9	311	297	2274	8.8	1.4	0.1	0.2
7/3/07 17:00	880	6110	9901	605.9	454.4	151.5	25.0	1.13	2.8	308	298	2299	10.0	1.5	0.1	0.2
7/3/07 18:00	883	6104	9776	600.0	450.0	150.0	25.0	1.13	2.8	307	299	2294	10.5	1.5	0.1	0.2
7/3/07 19:00	879	6071	9790	599.5	449.7	149.9	25.0	1.13	2.9	308	300	2297	10.3	1.5	0.1	0.2
7/3/07 20:00	879	6107	9814	602.3	451.7	150.6	25.0	1.13	2.9	306	284	2282	9.3	1.6	0.1	0.2
7/3/07 21:00	886	6186	9700	584.0	437.8	146.2	25.0	1.15	2.8	304	280	2287	8.9	1.4	0.1	0.2
7/3/07 22:00	885	6126	9441	556.2	412.9	143.3	25.8	1.19	2.8	303	290	2267	9.7	1.2	0.1	0.2
7/3/07 23:00	869	6061	9466	530.4	383.5	146.9	27.7	1.23	2.9	311	299	2241	10.3	1.0	0.1	0.2
7/4/07 0:00	881	6075	9587	527.4	376.7	150.7	28.6	1.26	2.9	308	296	2240	10.5	0.9	0.1	0.2
7/4/07 1:00	884	6107	9700	529.4	378.1	151.3	28.6	1.28	2.8	310	297	2255	10.4	0.9	0.1	0.2
7/4/07 2:00	884	6129	9675	524.5	374.0	150.4	28.7	1.29	2.8	313	299	2252	10.7	0.8	0.1	0.2
7/4/07 3:00	885	6136	9719	524.1	372.6	151.5	28.9	1.30	2.8	316	301	2250	10.5	0.8	0.1	0.2
7/4/07 4:00	886	6129	9759	524.3	373.6	150.7	28.7	1.30	2.8	317	302	2259	10.8	0.8	0.1	0.2
7/4/07 5:00	888	6157	9794	525.5	375.2	150.3	28.6	1.31	2.8	318	303	2257	10.5	0.8	0.1	0.2
7/4/07 6:00	887	6151	9804	529.0	376.1	152.9	28.9	1.30	2.8	319	305	2264	10.6	0.8	0.1	0.2
7/4/07 7:00	885	6149	9940	532.7	378.8	153.9	28.9	1.30	2.8	320	303	2263	10.9	0.9	0.1	0.2
7/4/07 8:00	887	6102	9891	533.2	378.6	154.6	29.0	1.29	2.7	313	300	2240	10.6	0.9	0.1	0.2
7/4/07 9:00	884	6102	9871	535.3	378.9	156.3	29.2	1.28	2.6	312	299	2238	10.7	0.9	0.1	0.2
7/4/07 10:00	886	6069	9817	535.6	379.2	156.4	29.2	1.27	2.6	313	300	2244	10.7	1.0	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/4/07 11:00	885	6071	9755	535.5	379.1	156.4	29.2	1.27	2.6	314	300	2227	10.7	1.0	0.1	0.2
7/4/07 12:00	883	6112	9740	536.4	379.7	156.6	29.2	1.27	2.7	316	298	2235	10.7	1.0	0.1	0.2
7/4/07 13:00	883	6120	9785	536.1	379.6	156.5	29.2	1.27	2.6	313	300	2241	10.7	0.9	0.1	0.2
7/4/07 14:00	884	6099	9778	536.4	379.8	156.6	29.2	1.27	2.6	314	302	2235	10.8	0.9	0.1	0.2
7/4/07 15:00	885	6090	9742	535.4	379.1	156.4	29.2	1.27	2.6	316	304	2226	10.8	0.9	0.1	0.2
7/4/07 16:00	884	6090	9807	535.4	379.1	156.3	29.2	1.27	2.6	317	306	2232	10.7	0.9	0.1	0.2
7/4/07 17:00	885	6088	9750	534.6	378.5	156.1	29.2	1.27	2.6	320	307	2243	11.0	0.9	0.1	0.2
7/4/07 18:00	886	6095	9633	528.0	373.7	154.3	29.2	1.28	2.6	320	307	2235	10.6	0.9	0.1	0.2
7/4/07 19:00	885	6099	9624	519.7	367.9	151.9	29.2	1.29	2.7	319	307	2217	10.7	0.9	0.1	0.2
7/4/07 20:00	883	6087	9703	514.5	368.5	146.0	28.4	1.31	2.6	316	305	2211	10.4	0.9	0.1	0.2
7/4/07 21:00	875	6049	9685	507.4	377.7	129.6	25.6	1.32	2.6	318	306	2189	10.5	0.9	0.1	0.2
7/4/07 22:00	865	6036	9884	510.1	423.3	86.9	17.0	1.32	2.7	317	311	2186	10.0	0.9	0.1	0.1
7/4/07 23:00	876	6102	9840	516.3	426.4	89.9	17.4	1.32	2.6	317	308	2211	10.1	0.9	0.1	0.2
7/5/07 0:00	870	6053	9841	514.5	388.6	125.9	24.5	1.32	2.7	323	309	2205	10.2	0.9	0.1	0.2
7/5/07 1:00	881	6102	9907	525.1	374.7	150.4	28.6	1.31	2.7	316	304	2223	10.3	0.9	0.1	0.2
7/5/07 2:00	884	6042	9869	529.7	376.2	153.5	29.0	1.30	2.6	313	302	2211	10.5	0.9	0.1	0.2
7/5/07 3:00	879	5985	9884	541.6	386.8	154.7	28.6	1.27	2.7	314	301	2220	10.6	1.0	0.1	0.2
7/5/07 4:00	878	5988	10119	571.1	407.9	163.2	28.6	1.23	2.7	315	303	2232	10.6	1.3	0.1	0.2
7/5/07 5:00	882	6069	10156	598.4	432.1	166.4	27.8	1.18	2.5	314	303	2240	10.2	1.6	0.2	0.2
7/5/07 6:00	886	6144	9988	604.5	448.9	155.6	25.7	1.15	2.6	310	303	2258	10.6	1.5	0.2	0.2
7/5/07 7:00	889	6129	9886	605.3	449.8	155.4	25.7	1.14	2.6	310	304	2281	10.9	1.5	0.2	0.2
7/5/07 8:00	887	6120	9837	602.8	448.0	154.8	25.7	1.13	2.6	312	305	2276	10.7	1.5	0.2	0.2
7/5/07 9:00	886	6108	9752	600.1	446.1	154.0	25.7	1.14	2.6	313	304	2279	10.6	1.5	0.2	0.2
7/5/07 10:00	883	6125	9798	600.9	446.7	154.3	25.7	1.14	2.5	313	302	2264	9.5	1.5	0.1	0.2
7/5/07 11:00	884	6131	9808	601.0	446.7	154.3	25.7	1.14	2.5	313	302	2255	10.2	1.5	0.1	0.2
7/5/07 12:00	886	6128	9835	600.7	446.5	154.2	25.7	1.14	2.5	312	302	2248	10.4	1.5	0.1	0.2
7/5/07 13:00	882	6117	9768	598.5	447.8	150.7	25.2	1.14	2.4	313	305	2248	10.5	1.5	0.2	0.2
7/5/07 14:00	882	6126	9758	593.0	443.0	150.0	25.3	1.14	2.5	315	309	2244	10.4	1.5	0.1	0.2
7/5/07 15:00	881	6080	9854	597.2	444.0	153.2	25.6	1.14	7.2	311	306	2242	10.6	1.4	0.1	0.2
7/5/07 16:00	882	6070	9854	601.6	447.1	154.4	25.7	1.14	2.5	311	305	2237	10.2	1.5	0.2	0.2
7/5/07 17:00	882	6097	9900	605.1	449.7	155.4	25.7	1.13	2.4	311	305	2241	10.4	1.5	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/5/07 18:00	882	6107	9796	605.3	449.8	155.5	25.7	1.13	2.4	313	307	2244	10.6	1.5	0.2	0.2
7/5/07 19:00	883	6137	9798	600.8	446.6	154.2	25.7	1.13	2.5	314	309	2242	10.4	1.4	0.1	0.2
7/5/07 20:00	887	6192	9620	579.3	431.1	148.2	25.6	1.16	2.4	314	309	2238	10.5	1.3	0.1	0.2
7/5/07 21:00	886	6182	9453	550.1	400.7	149.3	27.1	1.20	2.5	319	310	2240	10.2	1.0	0.1	0.2
7/5/07 22:00	882	6138	9563	532.6	380.5	152.2	28.6	1.24	2.5	314	301	2231	9.6	0.8	0.1	0.2
7/5/07 23:00	884	6146	9717	534.4	381.7	152.7	28.6	1.27	2.5	312	301	2221	10.0	0.8	0.1	0.2
7/6/07 0:00	885	6157	9764	537.5	383.9	153.6	28.6	1.28	2.5	315	304	2224	10.7	0.8	0.1	0.2
7/6/07 1:00	887	6151	9904	543.8	388.4	155.4	28.6	1.27	2.5	315	304	2216	10.7	0.8	0.1	0.2
7/6/07 2:00	891	6149	9927	549.9	392.8	157.1	28.6	1.26	2.4	316	305	2214	10.7	0.8	0.1	0.2
7/6/07 3:00	891	6142	9902	552.7	394.8	158.0	28.6	1.25	2.5	318	306	2232	10.9	0.9	0.1	0.2
7/6/07 4:00	891	6173	9856	553.1	395.0	158.0	28.6	1.25	2.4	316	307	2237	11.0	0.9	0.1	0.2
7/6/07 5:00	892	6173	9873	550.5	393.2	157.3	28.6	1.25	2.4	316	305	2232	10.9	0.8	0.1	0.2
7/6/07 6:00	891	6155	9835	547.2	390.9	156.3	28.6	1.25	2.5	316	304	2228	10.7	0.8	0.1	0.2
7/6/07 7:00	891	6150	9797	543.3	388.0	155.2	28.6	1.26	2.5	313	304	2215	11.0	0.8	0.1	0.2
7/6/07 8:00	889	6160	9775	543.1	387.9	155.2	28.6	1.26	2.5	310	302	2194	10.6	0.8	0.1	0.2
7/6/07 9:00	890	6175	9782	543.4	388.1	155.3	28.6	1.27	2.4	311	301	2204	10.8	0.7	0.1	0.2
7/6/07 10:00	892	6155	9762	540.3	385.9	154.4	28.6	1.27	2.4	313	304	2205	10.7	0.7	0.1	0.2
7/6/07 11:00	891	6139	9798	538.9	384.9	154.0	28.6	1.27	2.5	315	306	2202	10.7	0.7	0.1	0.2
7/6/07 12:00	889	6133	9816	541.1	386.5	154.6	28.6	1.27	2.5	318	310	2208	10.8	0.7	0.1	0.2
7/6/07 13:00	883	6101	9777	538.3	381.1	157.1	29.2	1.27	2.4	319	311	2204	10.8	0.8	0.1	0.2
7/6/07 14:00	867	5978	9856	534.6	381.3	153.3	28.7	1.26	2.4	320	313	2188	10.7	0.8	0.1	0.2
7/6/07 15:00	760	5279	9839	464.6	329.7	134.9	29.0	1.25	2.5	326	317	2034	10.2	0.9	0.1	0.1
7/6/07 16:00	688	4698	9676	421.5	289.5	132.0	31.3	1.24	2.6	316	306	1862	10.3	0.9	0.1	0.1
7/6/07 17:00	801	5535	9726	498.0	356.9	141.0	28.3	1.23	2.5	314	305	2038	10.3	0.9	0.1	0.1
7/6/07 18:00	854	5919	9796	532.6	380.4	152.2	28.6	1.24	2.5	314	303	2151	10.5	0.9	0.1	0.2
7/6/07 19:00	880	6118	9770	547.0	390.7	156.3	28.6	1.24	2.5	317	307	2190	10.9	0.9	0.1	0.2
7/6/07 20:00	884	6203	9821	545.7	389.7	155.9	28.6	1.25	2.5	318	308	2207	10.9	0.9	0.1	0.2
7/6/07 21:00	888	6164	9842	541.3	386.6	154.6	28.6	1.26	2.6	318	309	2225	11.0	0.9	0.1	0.2
7/6/07 22:00	886	6169	9760	538.5	384.6	153.8	28.6	1.27	2.6	319	310	2229	11.3	0.9	0.1	0.2
7/6/07 23:00	886	6178	9808	534.3	381.7	152.7	28.6	1.28	2.6	321	312	2231	11.2	0.8	0.1	0.2
7/7/07 0:00	884	6137	9844	537.2	383.7	153.5	28.6	1.28	2.6	318	314	2227	11.2	0.8	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/7/07 1:00	885	6165	9932	541.7	387.0	154.8	28.6	1.28	2.6	318	314	2227	11.4	0.8	0.1	0.2
7/7/07 2:00	888	6193	9824	537.5	384.0	153.6	28.6	1.28	2.6	318	316	2228	11.4	0.8	0.1	0.1
7/7/07 3:00	885	6154	9822	539.2	385.2	154.1	28.6	1.28	2.6	318	315	2231	11.1	0.8	0.1	0.1
7/7/07 4:00	884	6106	9984	549.9	392.8	157.1	28.6	1.27	2.6	318	315	2228	11.2	0.9	0.1	0.2
7/7/07 5:00	881	6083	10011	559.0	401.4	157.5	28.2	1.24	2.6	321	316	2220	11.0	1.1	0.1	0.2
7/7/07 6:00	884	6069	10148	577.2	424.8	152.4	26.4	1.21	2.6	318	317	2230	11.2	1.3	0.1	0.2
7/7/07 7:00	890	6072	10057	585.3	430.4	154.9	26.5	1.18	2.7	313	314	2250	11.3	1.4	0.1	0.2
7/7/07 8:00	884	6161	9885	581.7	425.9	155.8	26.8	1.17	2.7	313	309	2252	11.3	1.4	0.1	0.2
7/7/07 9:00	883	6157	9875	580.9	424.7	156.2	26.9	1.18	2.7	312	310	2243	11.2	1.4	0.1	0.2
7/7/07 10:00	883	6118	9837	582.0	424.4	157.6	27.1	1.18	2.7	313	313	2231	11.1	1.4	0.1	0.2
7/7/07 11:00	880	6160	10028	594.2	435.4	158.8	26.7	1.17	2.7	313	313	2253	11.1	1.5	0.2	0.2
7/7/07 12:00	884	6175	9960	595.0	437.0	158.0	26.6	1.16	2.7	312	315	2260	11.2	1.4	0.1	0.2
7/7/07 13:00	873	6066	9851	583.8	431.5	152.3	26.1	1.16	2.7	316	320	2254	11.2	1.4	0.1	0.2
7/7/07 14:00	883	6160	9725	581.0	432.9	148.1	25.5	1.17	2.7	319	322	2266	11.4	1.3	0.1	0.2
7/7/07 15:00	877	6155	9901	585.6	431.8	153.8	26.3	1.18	2.8	316	320	2257	11.4	1.4	0.1	0.2
7/7/07 16:00	881	6137	9980	595.8	439.9	155.9	26.2	1.16	2.7	314	318	2258	11.2	1.4	0.1	0.2
7/7/07 17:00	883	6174	9966	595.4	440.0	155.4	26.1	1.16	2.7	315	317	2284	11.0	1.4	0.1	0.2
7/7/07 18:00	884	6191	9927	592.1	437.6	154.4	26.1	1.16	2.7	314	315	2287	11.2	1.4	0.1	0.2
7/7/07 19:00	883	6207	9854	588.1	434.8	153.3	26.1	1.17	2.7	311	314	2270	11.2	1.4	0.1	0.2
7/7/07 20:00	884	6182	9868	585.8	433.2	152.6	26.1	1.17	2.7	311	312	2277	11.1	1.4	0.1	0.2
7/7/07 21:00	883	6148	9950	588.1	434.8	153.3	26.1	1.17	2.7	311	313	2267	10.9	1.4	0.1	0.2
7/7/07 22:00	884	6137	9890	591.3	437.1	154.2	26.1	1.17	2.7	311	313	2254	10.8	1.4	0.1	0.2
7/7/07 23:00	884	6140	9870	593.0	438.3	154.7	26.1	1.16	2.7	311	312	2258	10.8	1.4	0.1	0.2
7/8/07 0:00	883	6146	9907	596.2	440.6	155.7	26.1	1.15	2.7	311	312	2266	10.9	1.4	0.2	0.2
7/8/07 1:00	854	5950	9919	577.4	427.2	150.2	26.0	1.15	2.7	309	310	2217	10.8	1.4	0.2	0.2
7/8/07 2:00	873	6083	9852	588.7	435.2	153.5	26.1	1.16	2.7	310	310	2241	11.0	1.4	0.2	0.2
7/8/07 3:00	885	6210	9858	595.0	439.7	155.3	26.1	1.16	2.7	310	310	2274	11.0	1.4	0.2	0.2
7/8/07 4:00	887	6184	9859	594.9	439.6	155.3	26.1	1.16	2.7	312	311	2270	11.1	1.4	0.1	0.2
7/8/07 5:00	886	6183	9875	598.1	441.9	156.2	26.1	1.16	2.7	312	312	2267	11.0	1.4	0.1	0.2
7/8/07 6:00	886	6174	9948	603.0	445.4	157.6	26.1	1.15	2.7	313	312	2268	10.5	1.5	0.2	0.2
7/8/07 7:00	886	6169	9932	607.3	448.5	158.8	26.2	1.14	2.7	311	310	2261	11.2	1.5	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/8/07 8:00	882	6171	9938	599.7	442.6	157.1	26.2	1.14	2.7	311	307	2259	10.7	1.5	0.2	0.2
7/8/07 9:00	883	6159	9875	598.9	442.4	156.5	26.1	1.15	2.7	312	307	2260	10.8	1.5	0.2	0.2
7/8/07 10:00	880	6137	9937	600.4	443.5	156.9	26.1	1.14	2.7	308	308	2266	10.7	1.5	0.2	0.2
7/8/07 11:00	881	6152	9915	603.0	445.3	157.7	26.2	1.14	2.7	309	309	2271	10.8	1.5	0.2	0.2
7/8/07 12:00	882	6166	9860	600.2	443.8	156.5	26.1	1.14	2.7	312	310	2263	10.9	1.6	0.2	0.2
7/8/07 13:00	882	6173	9839	593.5	438.5	155.0	26.1	1.15	2.7	313	312	2255	10.8	1.5	0.2	0.2
7/8/07 14:00	881	6146	9842	589.5	435.7	153.8	26.1	1.16	2.6	314	314	2266	10.7	1.5	0.2	0.2
7/8/07 15:00	879	6137	9868	590.1	436.2	154.0	26.1	1.16	2.6	314	315	2266	10.2	1.5	0.2	0.2
7/8/07 16:00	878	6136	9906	590.7	436.5	154.1	26.1	1.16	2.6	316	316	2256	10.3	1.6	0.2	0.2
7/8/07 17:00	878	6131	9916	594.8	439.5	155.3	26.1	1.16	2.5	318	316	2254	10.5	1.6	0.2	0.2
7/8/07 18:00	879	6140	9905	596.4	440.6	155.8	26.1	1.15	2.3	315	315	2235	10.5	1.6	0.2	0.2
7/8/07 19:00	877	6156	9921	597.4	441.3	156.0	26.1	1.15	2.2	314	314	2213	10.6	1.6	0.2	0.2
7/8/07 20:00	869	6126	9942	594.3	443.5	150.8	25.4	1.15	2.2	316	318	2217	10.4	1.6	0.2	0.2
7/8/07 21:00	865	6218	10145	596.9	444.4	152.6	25.6	1.16	2.2	312	313	2228	10.3	1.6	0.2	0.2
7/8/07 22:00	869	6241	10088	591.9	440.8	151.1	25.5	1.17	2.1	307	305	2209	10.4	1.5	0.2	0.2
7/8/07 23:00	871	6197	10181	594.7	442.8	151.9	25.5	1.17	2.2	307	305	2206	10.3	1.5	0.2	0.2
7/9/07 0:00	873	6174	10117	595.6	443.4	152.2	25.6	1.16	2.2	308	306	2204	10.4	1.6	0.2	0.2
7/9/07 1:00	874	6191	10086	596.5	444.0	152.4	25.6	1.16	2.2	308	306	2204	10.3	1.6	0.2	0.2
7/9/07 2:00	875	6202	10050	594.9	442.9	152.0	25.5	1.16	2.2	305	305	2210	10.3	1.7	0.2	0.2
7/9/07 3:00	876	6215	9949	586.5	437.0	149.6	25.5	1.17	2.2	305	302	2220	10.5	1.7	0.2	0.2
7/9/07 4:00	876	6183	9937	580.3	432.5	147.8	25.5	1.18	2.2	305	302	2200	10.4	1.5	0.2	0.2
7/9/07 5:00	874	6143	9945	581.2	433.2	148.1	25.5	1.18	2.2	306	303	2207	10.2	1.5	0.2	0.2
7/9/07 6:00	874	6136	10005	587.3	437.5	149.8	25.5	1.18	2.2	308	304	2218	10.2	1.6	0.2	0.2
7/9/07 7:00	875	6150	9990	588.6	438.5	150.2	25.5	1.17	2.2	309	305	2212	10.3	1.5	0.2	0.2
7/9/07 8:00	874	6171	10025	590.0	439.5	150.6	25.5	1.17	2.2	309	306	2210	10.3	1.5	0.2	0.2
7/9/07 9:00	875	6210	10036	587.0	437.3	149.7	25.5	1.18	2.2	306	306	2217	10.5	1.5	0.2	0.2
7/9/07 10:00	875	6229	9949	577.2	430.3	146.9	25.5	1.19	2.2	306	304	2206	10.4	1.4	0.1	0.2
7/9/07 11:00	874	6193	9822	573.4	427.5	145.8	25.4	1.20	2.2	309	305	2192	10.5	1.4	0.1	0.2
7/9/07 12:00	875	6145	9821	578.2	431.0	147.2	25.5	1.20	2.2	311	306	2201	10.6	1.5	0.2	0.2
7/9/07 13:00	874	6162	10021	582.6	434.2	148.4	25.5	1.19	2.2	311	307	2201	10.5	1.5	0.2	0.2
7/9/07 14:00	871	6247	10089	580.5	432.6	147.8	25.5	1.19	2.2	308	306	2206	10.4	1.6	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/9/07 15:00	877	6213	10190	589.6	439.1	150.4	25.5	1.19	2.2	307	306	2231	10.4	1.6	0.2	0.2
7/9/07 16:00	880	6210	10141	591.7	442.1	149.6	25.3	1.18	2.2	310	308	2218	10.3	1.6	0.2	0.2
7/9/07 17:00	877	6232	10010	588.3	441.2	147.1	25.0	1.18	2.3	312	310	2220	10.7	1.6	0.2	0.2
7/9/07 18:00	875	6220	10120	590.7	443.0	147.7	25.0	1.18	2.2	310	309	2240	10.5	1.7	0.2	0.2
7/9/07 19:00	877	6207	10074	595.1	446.3	148.8	25.0	1.17	2.2	310	308	2227	10.5	1.7	0.2	0.2
7/9/07 20:00	877	6165	10060	597.8	448.4	149.5	25.0	1.16	2.2	309	308	2218	10.5	1.7	0.2	0.2
7/9/07 21:00	875	6150	10141	608.1	456.0	152.0	25.0	1.15	2.2	309	308	2220	10.2	1.8	0.2	0.2
7/9/07 22:00	873	6197	10158	617.0	462.8	154.2	25.0	1.13	2.2	308	307	2226	10.3	1.8	0.2	0.2
7/9/07 23:00	868	6308	10233	621.9	466.4	155.5	25.0	1.13	2.3	307	305	2229	10.2	1.7	0.2	0.2
7/10/07 0:00	866	6428	10434	625.6	469.2	156.4	25.0	1.14	2.3	306	305	2252	10.1	1.7	0.2	0.2
7/10/07 1:00	871	6454	10537	634.2	475.6	158.5	25.0	1.14	2.3	304	304	2255	10.0	1.7	0.2	0.2
7/10/07 2:00	875	6479	10479	632.1	474.1	158.0	25.0	1.14	2.3	304	302	2257	9.9	1.7	0.2	0.2
7/10/07 3:00	881	6351	10463	638.9	479.2	159.7	25.0	1.13	2.2	305	302	2254	10.1	1.7	0.2	0.2
7/10/07 4:00	878	6381	10357	638.4	478.8	159.6	25.0	1.12	2.3	308	303	2252	10.2	1.6	0.1	0.2
7/10/07 5:00	879	6288	10304	640.7	480.5	160.2	25.0	1.11	2.5	309	303	2274	9.9	1.6	0.1	0.2
7/10/07 6:00	882	6132	9996	631.0	473.3	157.7	25.0	1.09	2.5	309	304	2267	10.4	1.6	0.1	0.2
7/10/07 7:00	877	6104	9952	630.7	473.0	157.7	25.0	1.09	2.5	309	303	2266	10.8	1.7	0.2	0.2
7/10/07 8:00	885	6114	9843	630.3	472.7	157.6	25.0	1.08	2.5	310	303	2266	10.3	1.7	0.2	0.2
7/10/07 9:00	881	6138	9771	622.0	466.5	155.5	25.0	1.09	2.5	311	303	2269	10.4	1.6	0.1	0.2
7/10/07 10:00	882	6125	9753	610.0	457.5	152.5	25.0	1.10	2.5	309	302	2259	10.3	1.5	0.1	0.2
7/10/07 11:00	880	6084	9622	590.2	442.6	147.6	25.0	1.12	2.5	309	303	2250	10.3	1.4	0.1	0.2
7/10/07 12:00	874	6044	9694	579.6	434.7	144.9	25.0	1.15	2.6	310	304	2248	10.3	1.3	0.1	0.2
7/10/07 13:00	869	5985	9840	587.8	440.7	147.1	25.0	1.15	2.6	310	306	2240	10.4	1.4	0.1	0.2
7/10/07 14:00	869	5996	10066	615.2	460.7	154.5	25.1	1.13	2.5	309	308	2240	10.4	1.5	0.1	0.2
7/10/07 15:00	876	6138	10038	627.9	469.5	158.4	25.2	1.10	2.5	311	309	2250	10.3	1.6	0.1	0.2
7/10/07 16:00	879	6186	9914	618.0	462.3	155.6	25.2	1.11	2.4	310	309	2252	10.3	1.5	0.1	0.2
7/10/07 17:00	880	6109	9795	606.9	454.0	152.9	25.2	1.12	2.4	312	309	2244	10.6	1.5	0.1	0.2
7/10/07 18:00	877	6051	9787	605.4	452.9	152.5	25.2	1.12	2.4	312	310	2242	10.4	1.5	0.1	0.2
7/10/07 19:00	881	6090	9860	616.6	461.3	155.3	25.2	1.11	2.4	314	311	2255	10.4	1.6	0.1	0.2
7/10/07 20:00	883	6120	9844	613.8	459.2	154.6	25.2	1.11	2.4	311	311	2257	10.4	1.6	0.1	0.2
7/10/07 21:00	879	6088	9888	617.7	462.1	155.6	25.2	1.11	2.4	311	310	2256	10.5	1.6	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/10/07 22:00	878	6087	9934	627.8	469.7	158.1	25.2	1.10	2.4	310	309	2257	10.4	1.7	0.2	0.2
7/10/07 23:00	885	6116	9791	622.1	465.0	157.2	25.3	1.09	2.4	310	307	2252	10.3	1.7	0.2	0.2
7/11/07 0:00	880	6082	9732	615.0	459.6	155.5	25.3	1.10	2.4	308	305	2252	10.3	1.6	0.1	0.2
7/11/07 1:00	880	6097	9765	611.2	456.8	154.4	25.3	1.11	2.4	309	304	2249	10.3	1.6	0.1	0.2
7/11/07 2:00	877	6032	9725	605.7	452.5	153.2	25.3	1.11	2.4	310	302	2214	10.3	1.6	0.1	0.2
7/11/07 3:00	870	5978	9802	606.9	454.3	152.6	25.1	1.11	2.4	315	304	2212	10.5	1.6	0.1	0.2
7/11/07 4:00	884	6105	9766	609.8	455.8	153.9	25.2	1.11	2.4	311	300	2234	10.3	1.6	0.1	0.2
7/11/07 5:00	882	6077	9760	608.1	454.3	153.8	25.3	1.12	2.4	310	299	2238	10.2	1.6	0.1	0.2
7/11/07 6:00	783	5425	9830	547.2	380.7	166.5	30.4	1.12	2.7	308	303	2074	9.6	1.7	0.1	0.2
7/11/07 7:00	765	5255	9880	535.0	375.2	159.8	29.9	1.11	2.3	308	305	2013	10.1	1.6	0.2	0.2
7/11/07 8:00	872	5982	9756	600.5	446.4	154.0	25.7	1.11	2.4	308	299	2196	9.7	1.5	0.2	0.2
7/11/07 9:00	877	6040	9736	601.4	450.2	151.2	25.1	1.12	4.8	308	299	2209	9.8	1.6	0.2	0.2
7/11/07 10:00	879	6063	9753	600.3	449.5	150.9	25.1	1.12	2.4	309	299	2211	9.4	1.6	0.2	0.2
7/11/07 11:00	881	6065	9685	597.4	447.4	150.0	25.1	1.13	2.4	310	301	2224	9.5	1.6	0.2	0.2
7/11/07 12:00	878	6056	9745	596.5	446.4	150.1	25.2	1.13	2.4	312	302	2217	9.3	1.5	0.2	0.2
7/11/07 13:00	878	6097	9878	601.1	448.9	152.3	25.3	1.13	2.4	314	304	2205	9.5	1.5	0.2	0.2
7/11/07 14:00	879	6107	9840	602.5	451.1	151.5	25.1	1.13	2.3	313	304	2201	9.3	1.6	0.2	0.2
7/11/07 15:00	885	6121	9839	604.2	452.2	151.9	25.1	1.13	2.2	314	304	2209	9.5	1.6	0.3	0.2
7/11/07 16:00	887	6122	9667	597.6	447.5	150.0	25.1	1.14	2.2	315	306	2210	9.6	1.5	0.2	0.2
7/11/07 17:00	882	6073	9685	589.4	441.6	147.8	25.1	1.14	2.2	314	307	2201	9.7	1.5	0.2	0.2
7/11/07 18:00	880	6076	9747	586.5	439.4	147.0	25.1	1.15	2.2	315	307	2197	9.7	1.5	0.2	0.2
7/11/07 19:00	881	6077	9723	582.2	436.1	146.0	25.1	1.16	2.3	316	308	2204	9.7	1.4	0.2	0.2
7/11/07 20:00	880	6079	9785	582.5	436.6	145.9	25.0	1.16	2.3	314	308	2207	9.8	1.5	0.2	0.2
7/11/07 21:00	877	6052	9688	574.3	431.3	143.0	24.9	1.17	2.3	312	308	2197	10.0	1.4	0.2	0.2
7/11/07 22:00	873	6000	9752	573.9	430.8	143.1	24.9	1.17	2.3	312	308	2192	9.9	1.5	0.2	0.2
7/11/07 23:00	874	5982	9848	584.9	438.6	146.2	25.0	1.16	2.3	312	307	2199	9.6	1.6	0.3	0.2
7/12/07 0:00	879	6037	9739	583.6	437.1	146.5	25.1	1.15	2.3	311	305	2205	9.9	1.6	0.3	0.2
7/12/07 1:00	874	6038	9725	581.6	431.5	150.1	25.8	1.16	2.4	312	304	2197	10.0	1.6	0.2	0.2
7/12/07 2:00	870	6009	9789	580.6	427.3	153.3	26.4	1.16	2.4	312	303	2193	9.5	1.6	0.3	0.2
7/12/07 3:00	866	5910	9820	583.8	429.6	154.1	26.4	1.15	2.3	318	305	2187	9.6	1.6	0.3	0.2
7/12/07 4:00	879	6070	9828	596.3	444.7	151.6	25.4	1.14	2.4	313	303	2213	9.3	1.6	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/12/07 5:00	883	6089	9774	596.2	443.6	152.6	25.6	1.14	2.3	313	301	2222	9.7	1.6	0.3	0.2
7/12/07 6:00	883	6046	9740	597.3	444.2	153.1	25.6	1.13	2.3	312	301	2220	10.1	1.6	0.3	0.2
7/12/07 7:00	883	6049	9778	596.2	443.3	152.8	25.6	1.13	2.4	311	300	2214	10.6	1.6	0.3	0.2
7/12/07 8:00	882	6051	9692	593.5	441.5	152.1	25.6	1.14	2.4	312	300	2219	10.3	1.6	0.3	0.2
7/12/07 9:00	879	6078	9704	592.1	440.4	151.6	25.6	1.14	2.4	311	300	2232	10.3	1.6	0.2	0.2
7/12/07 10:00	884	6055	9666	588.7	438.0	150.7	25.6	1.15	2.3	311	300	2217	10.4	1.5	0.2	0.2
7/12/07 11:00	882	6065	9684	581.8	433.1	148.7	25.6	1.15	2.3	313	301	2202	10.8	1.5	0.2	0.2
7/12/07 12:00	880	6019	9697	583.3	434.1	149.2	25.6	1.16	2.3	316	304	2211	11.0	1.5	0.2	0.2
7/12/07 13:00	878	6062	9715	585.3	435.5	149.7	25.6	1.15	2.3	316	306	2215	11.0	1.5	0.2	0.2
7/12/07 14:00	882	6026	9771	588.9	438.2	150.7	25.6	1.15	2.2	317	305	2208	10.9	1.5	0.2	0.2
7/12/07 15:00	880	6079	9740	587.6	437.2	150.4	25.6	1.15	2.2	317	308	2196	10.8	1.5	0.2	0.2
7/12/07 16:00	884	6047	9728	582.8	433.8	149.0	25.6	1.16	2.2	319	307	2201	10.8	1.3	0.2	0.2
7/12/07 17:00	884	6073	9702	580.7	432.3	148.4	25.6	1.16	2.2	320	310	2214	10.9	1.2	0.2	0.2
7/12/07 18:00	886	6087	9743	587.8	437.4	150.4	25.6	1.16	2.2	319	311	2224	10.9	1.2	0.2	0.2
7/12/07 19:00	879	6136	10031	603.8	448.8	155.0	25.7	1.15	2.2	325	315	2248	11.0	1.2	0.2	0.2
7/12/07 20:00	876	6135	10117	614.0	456.1	157.9	25.7	1.13	2.2	327	320	2274	11.2	1.3	0.2	0.2
7/12/07 21:00	871	6153	10150	621.3	461.7	159.6	25.7	1.12	2.2	326	319	2281	11.2	1.4	0.2	0.2
7/12/07 22:00	862	6148	10108	614.0	457.0	157.0	25.6	1.11	2.2	327	318	2293	11.0	1.4	0.2	0.2
7/12/07 23:00	855	6069	10025	603.5	450.0	153.5	25.4	1.12	2.3	326	316	2287	10.7	1.4	0.2	0.2
7/13/07 0:00	850	6076	9983	591.4	439.7	151.7	25.7	1.13	2.3	326	317	2273	10.6	1.4	0.2	0.2
7/13/07 1:00	656	4882	9961	439.5	340.8	98.7	22.5	1.15	3.0	322	316	2011	10.5	1.3	0.2	0.2
7/13/07 2:00	391	3298	9167	230.0	177.0	53.0	23.1	1.13	6.3	295	287	1700	9.9	1.2	0.2	0.2
7/13/07 3:00	91	1032	9002	43.1	42.8	0.3	0.7	1.00	13.8	267	252	1393	23.9	0.8	0.2	0.2
7/13/07 4:00	0	121	9002	0.0	0.0	0.0	#N/A	1.00	19.6	200	232	1394	91.9	0.0	0.0	0.0
7/13/07 5:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.1	197	232	1394	93.5	0.0	0.0	0.0
7/13/07 6:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.3	211	217	1395	34.5	0.0	0.0	0.0
7/13/07 7:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	159	163	1395	16.8	0.0	0.0	0.0
7/13/07 8:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	135	134	1395	11.8	0.0	0.0	0.0
7/13/07 9:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	120	118	1394	13.8	0.0	0.0	0.0
7/13/07 10:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.1	110	108	1394	11.2	0.0	0.0	0.0
7/13/07 11:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.3	104	103	1394	9.9	0.0	0.0	0.0

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/13/07 12:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.1	100	99	1394	9.0	0.0	0.0	0.0
7/13/07 13:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.2	98	97	1394	9.0	0.0	0.0	0.0
7/13/07 14:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.3	97	96	1394	9.1	0.0	0.0	0.0
7/13/07 15:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	96	96	1394	15.4	0.0	0.0	0.0
7/13/07 16:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.3	98	96	1394	28.5	0.0	0.0	0.0
7/13/07 17:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.3	99	98	1394	25.4	0.0	0.0	0.0
7/13/07 18:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.1	100	99	1394	22.9	0.0	0.0	0.0
7/13/07 19:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.2	101	100	1394	19.8	0.0	0.0	0.0
7/13/07 20:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	99	98	1394	20.6	0.0	0.0	0.0
7/13/07 21:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	97	96	1394	18.5	0.0	0.0	0.0
7/13/07 22:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	96	95	1394	30.6	0.0	0.0	0.0
7/13/07 23:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.9	94	94	1394	20.8	0.0	0.0	0.0
7/14/07 0:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	92	91	1394	17.5	0.0	0.0	0.0
7/14/07 1:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	91	90	1394	16.8	0.0	0.0	0.0
7/14/07 2:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	90	88	1394	15.7	0.0	0.0	0.0
7/14/07 3:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	89	87	1394	14.8	0.0	0.0	0.0
7/14/07 4:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	87	86	1394	14.2	0.0	0.0	0.0
7/14/07 5:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	86	85	1394	14.1	0.0	0.0	0.0
7/14/07 6:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	85	84	1393	14.7	0.0	0.0	0.0
7/14/07 7:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	84	83	1394	13.6	0.0	0.0	0.0
7/14/07 8:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	83	82	1394	13.5	0.0	0.0	0.0
7/14/07 9:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	83	82	1394	12.9	0.0	0.0	0.0
7/14/07 10:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	82	80	1394	12.0	0.0	0.0	0.0
7/14/07 11:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.6	81	80	1394	12.0	0.0	0.0	0.0
7/14/07 12:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	81	80	1394	12.2	0.0	0.0	0.0
7/14/07 13:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	81	80	1394	12.7	0.0	0.0	0.0
7/14/07 14:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	81	80	1395	12.0	0.0	0.0	0.0
7/14/07 15:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	81	80	1395	11.8	0.0	0.0	0.0
7/14/07 16:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	82	81	1394	11.8	0.0	0.0	0.0
7/14/07 17:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	82	81	1394	11.0	0.0	0.0	0.0
7/14/07 18:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	81	81	1394	10.8	0.0	0.0	0.0

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/14/07 19:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	82	81	1394	10.6	0.0	0.0	0.0
7/14/07 20:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	81	81	1394	10.6	0.0	0.0	0.0
7/14/07 21:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	82	82	1394	10.7	0.0	0.0	0.0
7/14/07 22:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.4	82	82	1394	10.3	0.0	0.0	0.0
7/14/07 23:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.5	83	82	1394	10.3	0.0	0.0	0.0
7/15/07 0:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	82	1394	9.8	0.0	0.0	0.0
7/15/07 1:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	21.2	83	82	1394	9.5	0.0	0.0	0.0
7/15/07 2:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	82	1395	9.2	0.0	0.0	0.0
7/15/07 3:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	82	1394	9.2	0.0	0.0	0.0
7/15/07 4:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	82	1394	9.4	0.0	0.0	0.0
7/15/07 5:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	81	1394	9.4	0.0	0.0	0.0
7/15/07 6:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	81	1394	9.3	0.0	0.0	0.0
7/15/07 7:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	81	1394	9.5	0.0	0.0	0.0
7/15/07 8:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	80	1394	9.0	0.0	0.0	0.0
7/15/07 9:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	80	1395	9.1	0.0	0.0	0.0
7/15/07 10:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	80	1394	9.0	0.0	0.0	0.0
7/15/07 11:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	80	80	1394	9.2	0.0	0.0	0.0
7/15/07 12:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	80	80	1394	9.3	0.0	0.0	0.0
7/15/07 13:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	80	80	1394	9.3	0.0	0.0	0.0
7/15/07 14:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	80	80	1394	9.3	0.0	0.0	0.0
7/15/07 15:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	80	1394	9.2	0.0	0.0	0.0
7/15/07 16:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	81	1394	9.0	0.0	0.0	0.0
7/15/07 17:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	81	1394	8.9	0.0	0.0	0.0
7/15/07 18:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	81	81	1394	9.0	0.0	0.0	0.0
7/15/07 19:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	82	1394	9.1	0.0	0.0	0.0
7/15/07 20:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	82	82	1394	9.0	0.0	0.0	0.0
7/15/07 21:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	83	1394	9.0	0.0	0.0	0.0
7/15/07 22:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	83	1394	9.1	0.0	0.0	0.0
7/15/07 23:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	83	1394	9.1	0.0	0.0	0.0
7/16/07 0:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	84	83	1394	8.8	0.0	0.0	0.0
7/16/07 1:00	0	6	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	82	1394	8.8	0.0	0.0	0.0

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/16/07 2:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	82	1394	8.9	0.0	0.0	0.0
7/16/07 3:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	84	82	1394	9.1	0.0	0.0	0.0
7/16/07 4:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.8	83	82	1394	9.2	0.0	0.0	0.0
7/16/07 5:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.7	83	82	1394	9.2	0.0	0.0	0.0
7/16/07 6:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.7	83	83	1330	22.4	0.0	0.0	0.0
7/16/07 7:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	20.6	85	89	1104	18.6	0.0	0.0	0.0
7/16/07 8:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	18.5	97	97	1066	24.1	0.0	0.0	0.0
7/16/07 9:00	0	5	9002	0.0	0.0	0.0	#N/A	1.00	18.4	128	114	1054	25.4	0.0	0.0	0.0
7/16/07 10:00	0	1	9002	0.0	0.0	0.0	#N/A	1.00	19.4	152	128	1021	20.6	0.0	0.0	0.0
7/16/07 11:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	19.2	164	136	1007	18.2	0.0	0.0	0.0
7/16/07 12:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	19.0	182	148	1035	20.3	0.1	0.0	0.0
7/16/07 13:00	0	0	9002	0.0	0.0	0.0	#N/A	1.00	19.0	195	158	1050	21.8	0.0	0.0	0.0
7/16/07 14:00	0	29	9002	0.0	0.0	0.0	#N/A	1.00	18.7	205	165	1044	21.2	0.0	0.0	0.0
7/16/07 15:00	0	241	9002	0.0	0.0	0.0	#N/A	1.00	18.2	218	173	1066	22.1	0.1	0.0	0.0
7/16/07 16:00	8	491	9002	11.7	11.7	0.0	0.0	1.00	17.1	220	189	1069	25.1	0.2	0.0	0.1
7/16/07 17:00	40	583	9002	47.4	47.4	0.0	0.0	1.00	15.0	213	201	1076	10.4	0.9	0.2	0.3
7/16/07 18:00	63	710	9002	55.7	55.7	0.0	0.0	1.00	14.5	214	205	1091	9.9	0.9	0.2	0.3
7/16/07 19:00	113	1100	9002	73.7	52.8	20.9	28.4	1.00	12.6	217	210	1188	10.9	0.8	0.2	0.5
7/16/07 20:00	143	1307	9002	91.4	54.7	36.7	40.1	1.00	11.5	220	215	1245	10.6	0.8	0.2	0.7
7/16/07 21:00	224	1929	9002	135.0	93.4	41.7	30.9	1.00	9.9	235	228	1368	10.1	0.9	0.2	0.6
7/16/07 22:00	379	3136	9002	233.2	172.6	60.6	26.0	1.03	6.3	248	240	1544	9.5	1.0	0.2	0.3
7/16/07 23:00	453	3640	9002	286.2	214.7	71.5	25.0	1.10	4.9	257	248	1630	9.6	1.1	0.1	0.1
7/17/07 0:00	643	4652	9392	434.1	340.5	93.6	21.6	1.12	3.5	276	267	1894	11.1	1.3	0.1	0.2
7/17/07 1:00	841	5949	9852	587.0	439.6	147.5	25.1	1.12	2.9	301	288	2241	11.8	1.4	0.1	0.2
7/17/07 2:00	878	6191	9927	608.0	456.0	152.0	25.0	1.13	2.9	309	292	2308	11.2	1.5	0.1	0.2
7/17/07 3:00	890	6170	9884	611.8	458.8	153.0	25.0	1.13	2.9	311	295	2314	11.0	1.5	0.1	0.2
7/17/07 4:00	891	6120	9743	606.0	448.4	157.6	26.0	1.13	2.8	312	296	2300	11.0	1.4	0.1	0.2
7/17/07 5:00	887	6062	9706	601.2	442.4	158.8	26.4	1.13	2.8	312	297	2291	11.0	1.4	0.1	0.2
7/17/07 6:00	888	6087	9623	593.6	436.5	157.1	26.5	1.13	2.8	312	298	2282	11.0	1.4	0.1	0.2
7/17/07 7:00	886	6078	9565	580.5	426.7	153.8	26.5	1.15	2.9	314	297	2275	11.2	1.3	0.1	0.2
7/17/07 8:00	883	6035	9673	584.3	429.5	154.8	26.5	1.16	2.9	307	297	2249	11.0	1.3	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/17/07 9:00	889	6106	9763	592.6	435.7	156.9	26.5	1.15	2.8	310	296	2262	11.0	1.3	0.2	0.2
7/17/07 10:00	890	6102	9776	593.1	436.1	157.0	26.5	1.15	2.8	314	298	2268	10.9	1.4	0.2	0.2
7/17/07 11:00	889	6122	9764	594.9	437.5	157.4	26.5	1.15	2.8	316	300	2261	10.7	1.5	0.3	0.2
7/17/07 12:00	890	6098	9715	598.0	439.8	158.2	26.5	1.15	2.8	317	302	2265	10.9	1.5	0.3	0.2
7/17/07 13:00	889	6121	9795	601.3	442.3	159.0	26.4	1.14	2.8	313	299	2279	10.9	1.5	0.3	0.2
7/17/07 14:00	876	6039	9757	595.3	437.8	157.6	26.5	1.14	2.9	309	297	2250	10.9	1.4	0.2	0.2
7/17/07 15:00	882	6045	9770	599.0	440.5	158.5	26.5	1.13	2.8	309	301	2241	10.9	1.4	0.2	0.2
7/17/07 16:00	768	5438	9717	505.7	371.3	134.4	26.6	1.11	5.2	308	302	1999	15.8	1.4	0.2	0.2
7/17/07 17:00	35	872	9679	1.1	0.8	0.3	30.4	1.00	17.3	272	257	1372	36.5	0.4	0.1	0.1
7/17/07 18:00	52	692	9679	26.9	26.9	0.0	0.0	1.00	15.9	251	211	1451	37.1	0.4	0.1	0.1
7/17/07 19:00	122	1167	9679	80.8	80.8	0.0	0.0	1.00	12.6	240	200	1504	14.1	0.9	0.2	0.4
7/17/07 20:00	215	1688	9679	132.3	132.3	0.0	0.0	1.00	10.5	249	215	1530	10.8	1.1	0.3	0.6
7/17/07 21:00	296	2210	9679	183.1	183.1	0.0	0.0	1.00	7.3	261	226	1463	10.2	1.3	0.3	0.4
7/17/07 22:00	427	3003	9236	270.3	268.1	2.2	0.8	1.00	5.4	279	240	1568	10.9	1.4	0.3	0.2
7/17/07 23:00	608	4213	8261	388.9	340.2	48.7	12.5	1.02	3.6	298	254	1805	12.9	1.4	0.2	0.1
7/18/07 0:00	700	4881	8726	456.5	343.4	113.1	24.8	1.06	3.3	312	268	2019	11.7	1.4	0.2	0.2
7/18/07 1:00	701	4781	9342	472.6	341.9	130.8	27.7	1.08	3.3	310	267	1972	11.5	1.3	0.2	0.2
7/18/07 2:00	716	4859	9582	484.7	350.4	134.3	27.7	1.10	3.3	310	266	1973	11.2	1.3	0.2	0.2
7/18/07 3:00	752	5091	9535	501.8	364.4	137.4	27.4	1.12	3.1	312	267	2007	12.2	1.3	0.2	0.2
7/18/07 4:00	769	5301	9691	513.3	368.3	145.0	28.3	1.13	3.1	306	272	2050	12.8	1.3	0.2	0.2
7/18/07 5:00	774	5259	9737	515.1	366.2	148.8	28.9	1.14	3.1	297	286	2067	10.7	1.3	0.2	0.2
7/18/07 6:00	787	5314	9685	521.7	370.9	150.7	28.9	1.14	3.1	298	288	2083	10.9	1.3	0.2	0.2
7/18/07 7:00	799	5436	9730	536.0	381.2	154.8	28.9	1.14	3.1	298	289	2102	10.5	1.3	0.2	0.2
7/18/07 8:00	799	5449	9712	537.6	382.4	155.3	28.9	1.13	3.1	296	290	2099	10.8	1.3	0.2	0.2
7/18/07 9:00	800	5439	9712	539.7	383.8	155.9	28.9	1.13	3.1	297	291	2112	10.7	1.3	0.2	0.2
7/18/07 10:00	800	5466	9680	539.0	383.4	155.7	28.9	1.13	5.0	300	292	2111	10.7	1.3	0.2	0.2
7/18/07 11:00	802	5453	9646	534.1	379.8	154.3	28.9	1.14	3.3	301	292	2111	10.9	1.3	0.2	0.2
7/18/07 12:00	800	5453	9603	529.4	376.4	153.0	28.9	1.14	3.1	301	293	2109	10.6	1.4	0.2	0.2
7/18/07 13:00	797	5449	9676	531.0	377.6	153.4	28.9	1.14	3.1	303	293	2110	10.7	1.5	0.3	0.2
7/18/07 14:00	798	5431	9760	537.4	382.1	155.2	28.9	1.14	3.1	303	294	2106	9.3	1.5	0.3	0.2
7/18/07 15:00	801	5443	9740	540.1	384.1	156.0	28.9	1.13	3.1	303	295	2112	8.4	1.6	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/18/07 16:00	801	5457	9603	537.4	382.2	155.2	28.9	1.13	3.1	303	295	2122	8.4	1.6	0.3	0.2
7/18/07 17:00	800	5437	9645	536.9	381.9	155.1	28.9	1.13	3.1	303	295	2125	8.6	1.5	0.3	0.2
7/18/07 18:00	800	5426	9632	535.3	380.6	154.6	28.9	1.13	3.0	303	296	2110	8.4	1.4	0.3	0.2
7/18/07 19:00	800	5457	9663	532.2	378.5	153.7	28.9	1.14	3.0	305	296	2090	8.4	1.4	0.3	0.2
7/18/07 20:00	799	5457	9676	528.6	375.9	152.7	28.9	1.14	3.0	301	293	2090	8.2	1.4	0.2	0.2
7/18/07 21:00	798	5470	9651	526.7	374.5	152.2	28.9	1.15	2.9	301	288	2106	8.2	1.4	0.2	0.2
7/18/07 22:00	797	5472	9759	529.8	377.1	152.8	28.8	1.15	2.9	300	289	2105	8.0	1.4	0.2	0.2
7/18/07 23:00	801	5426	9645	530.3	379.5	150.8	28.4	1.15	2.9	300	290	2094	8.4	1.4	0.2	0.2
7/19/07 0:00	801	5423	9592	527.2	376.8	150.4	28.5	1.15	2.9	301	292	2091	8.3	1.4	0.2	0.2
7/19/07 1:00	798	5425	9646	530.7	376.6	154.2	29.0	1.14	3.0	302	291	2088	8.8	1.4	0.2	0.2
7/19/07 2:00	798	5412	9669	537.1	381.1	156.0	29.0	1.14	2.9	301	291	2103	8.8	1.5	0.2	0.2
7/19/07 3:00	803	5453	9610	532.9	378.1	154.8	29.0	1.14	2.9	300	291	2103	9.0	1.5	0.2	0.2
7/19/07 4:00	799	5444	9562	528.3	373.9	154.3	29.2	1.14	3.0	300	290	2092	9.2	1.5	0.2	0.2
7/19/07 5:00	799	5431	9637	530.4	373.8	156.6	29.5	1.15	2.9	298	289	2082	8.7	1.5	0.2	0.2
7/19/07 6:00	801	5435	9503	525.3	370.2	155.1	29.5	1.15	2.9	298	288	2082	8.8	1.5	0.2	0.2
7/19/07 7:00	798	5414	9589	526.1	370.7	155.4	29.5	1.15	2.9	298	289	2077	9.1	1.5	0.2	0.2
7/19/07 8:00	798	5408	9642	533.8	376.2	157.6	29.5	1.14	2.9	299	290	2097	9.4	1.6	0.3	0.2
7/19/07 9:00	800	5442	9657	536.3	378.0	158.3	29.5	1.14	2.9	300	292	2111	9.5	1.7	0.3	0.2
7/19/07 10:00	799	5445	9616	534.6	376.8	157.8	29.5	1.14	2.9	301	293	2097	9.3	1.6	0.3	0.2
7/19/07 11:00	800	5430	9642	535.4	377.4	158.0	29.5	1.13	2.9	302	294	2097	9.3	1.6	0.3	0.2
7/19/07 12:00	799	5437	9693	538.4	379.5	158.9	29.5	1.13	2.9	305	295	2100	9.4	1.6	0.3	0.2
7/19/07 13:00	800	5462	9677	538.8	379.8	159.0	29.5	1.13	2.9	305	296	2104	10.0	1.6	0.3	0.2
7/19/07 14:00	801	5467	9616	534.2	376.5	157.7	29.5	1.14	3.0	301	293	2112	9.0	1.6	0.3	0.2
7/19/07 15:00	801	5465	9590	528.9	372.8	156.2	29.5	1.14	2.9	299	286	2096	8.7	1.5	0.2	0.2
7/19/07 16:00	799	5453	9614	525.2	370.0	155.1	29.5	1.15	2.8	298	285	2071	8.6	1.5	0.2	0.2
7/19/07 17:00	797	5421	9650	530.8	374.0	156.7	29.5	1.15	2.8	298	288	2066	8.9	1.6	0.3	0.2
7/19/07 18:00	801	5435	9664	533.9	377.0	156.9	29.4	1.14	2.7	300	289	2073	9.1	1.6	0.3	0.2
7/19/07 19:00	803	5487	9600	525.2	373.4	151.7	28.9	1.15	2.7	300	289	2081	9.2	1.5	0.2	0.2
7/19/07 20:00	799	5434	9583	520.8	370.3	150.5	28.9	1.16	2.7	300	288	2081	8.7	1.4	0.2	0.2
7/19/07 21:00	798	5414	9619	525.8	373.9	151.9	28.9	1.16	2.7	300	289	2073	8.5	1.5	0.2	0.2
7/19/07 22:00	798	5479	9670	528.5	375.8	152.7	28.9	1.15	2.7	301	289	2078	8.3	1.5	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/19/07 23:00	800	5475	9689	529.4	376.5	152.9	28.9	1.15	2.7	298	288	2081	8.7	1.6	0.3	0.2
7/20/07 0:00	799	5423	9654	530.7	377.3	153.4	28.9	1.15	2.7	298	288	2074	8.8	1.7	0.3	0.2
7/20/07 1:00	800	5436	9722	539.5	382.1	157.4	29.2	1.14	2.7	300	289	2076	9.2	1.7	0.3	0.2
7/20/07 2:00	805	5497	9621	532.8	377.2	155.6	29.2	1.14	2.6	299	289	2077	9.1	1.6	0.3	0.2
7/20/07 3:00	802	5467	9591	524.1	371.0	153.1	29.2	1.15	2.7	297	289	2069	8.9	1.5	0.3	0.2
7/20/07 4:00	801	5424	9558	520.5	368.4	152.1	29.2	1.16	2.7	298	290	2062	8.9	1.4	0.2	0.2
7/20/07 5:00	801	5428	9569	518.5	366.9	151.5	29.2	1.16	2.7	300	291	2059	8.6	1.3	0.2	0.2
7/20/07 6:00	801	5420	9554	519.2	367.5	151.7	29.2	1.16	2.7	300	292	2064	8.5	1.4	0.2	0.2
7/20/07 7:00	800	5415	9609	521.8	369.4	152.5	29.2	1.16	2.7	301	292	2060	8.9	1.5	0.2	0.2
7/20/07 8:00	801	5432	9628	523.8	370.7	153.0	29.2	1.16	2.7	301	293	2069	8.9	1.6	0.3	0.2
7/20/07 9:00	802	5454	9619	520.7	368.6	152.2	29.2	1.16	2.6	302	295	2084	9.0	1.6	0.3	0.2
7/20/07 10:00	801	5440	9602	518.9	367.2	151.7	29.2	1.17	2.7	303	296	2085	9.0	1.6	0.3	0.2
7/20/07 11:00	800	5462	9614	519.4	367.6	151.8	29.2	1.17	2.7	303	296	2093	8.8	1.6	0.3	0.2
7/20/07 12:00	801	5458	9649	518.9	367.3	151.6	29.2	1.17	2.7	299	281	2072	6.6	1.5	0.2	0.2
7/20/07 13:00	799	5485	9684	521.1	368.9	152.3	29.2	1.17	2.7	298	283	2070	7.3	1.6	0.3	0.2
7/20/07 14:00	803	5486	9734	521.2	368.9	152.3	29.2	1.17	2.7	297	285	2079	7.9	1.7	0.3	0.2
7/20/07 15:00	804	5447	9645	517.4	366.2	151.2	29.2	1.18	2.7	297	287	2074	8.1	1.7	0.3	0.2
7/20/07 16:00	801	5445	9631	516.4	365.4	150.9	29.2	1.18	2.6	298	288	2077	8.3	1.7	0.3	0.2
7/20/07 17:00	803	5471	9619	515.0	364.5	150.5	29.2	1.18	2.7	300	289	2085	8.8	1.6	0.3	0.2
7/20/07 18:00	801	5448	9646	513.2	363.2	150.0	29.2	1.18	2.7	299	289	2092	8.5	1.5	0.2	0.2
7/20/07 19:00	799	5412	9685	522.5	369.8	152.7	29.2	1.18	2.7	300	290	2092	9.0	1.6	0.3	0.2
7/20/07 20:00	803	5445	9684	528.4	374.1	154.4	29.2	1.16	2.6	301	292	2090	8.9	1.6	0.3	0.2
7/20/07 21:00	805	5478	9634	521.9	369.4	152.5	29.2	1.16	2.6	302	293	2082	8.9	1.5	0.2	0.2
7/20/07 22:00	805	5490	9488	507.5	359.2	148.4	29.2	1.18	2.6	300	292	2074	8.2	1.3	0.2	0.2
7/20/07 23:00	799	5424	9524	502.7	355.7	147.0	29.2	1.19	2.6	298	289	2065	8.3	1.2	0.2	0.2
7/21/07 0:00	799	5411	9567	503.4	356.2	147.2	29.2	1.20	2.6	300	289	2056	8.5	1.2	0.2	0.2
7/21/07 1:00	797	5433	9701	512.3	362.5	149.8	29.2	1.19	2.6	301	289	2060	8.7	1.3	0.2	0.2
7/21/07 2:00	801	5465	9769	522.0	369.5	152.5	29.2	1.19	2.5	298	289	2071	8.7	1.4	0.2	0.2
7/21/07 3:00	805	5456	9722	523.2	370.3	152.8	29.2	1.17	2.5	299	289	2073	8.7	1.4	0.2	0.2
7/21/07 4:00	804	5445	9653	521.2	368.9	152.3	29.2	1.17	2.5	300	290	2073	8.7	1.4	0.2	0.2
7/21/07 5:00	804	5436	9579	516.4	365.5	150.9	29.2	1.17	2.5	300	291	2074	8.3	1.3	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/21/07 6:00	799	5394	9607	519.9	368.0	151.9	29.2	1.17	2.6	301	292	2072	8.6	1.4	0.2	0.2
7/21/07 7:00	799	5406	9743	533.1	377.4	155.7	29.2	1.16	2.5	301	292	2074	9.1	1.6	0.3	0.2
7/21/07 8:00	803	5453	9666	539.3	381.9	157.5	29.2	1.14	2.5	301	293	2084	8.9	1.6	0.3	0.2
7/21/07 9:00	804	5477	9754	539.9	382.3	157.6	29.2	1.14	2.5	301	294	2091	8.7	1.5	0.2	0.2
7/21/07 10:00	804	5476	9613	536.9	380.1	156.8	29.2	1.14	2.5	301	296	2097	8.8	1.5	0.2	0.2
7/21/07 11:00	802	5491	9662	536.0	379.5	156.5	29.2	1.14	2.6	301	295	2103	9.0	1.5	0.3	0.2
7/21/07 12:00	803	5500	9684	532.5	377.0	155.5	29.2	1.15	2.5	300	295	2100	9.0	1.5	0.3	0.2
7/21/07 13:00	802	5493	9678	530.5	375.6	154.9	29.2	1.15	2.6	301	295	2091	9.1	1.5	0.2	0.2
7/21/07 14:00	803	5473	9646	530.8	375.8	155.0	29.2	1.15	2.6	301	296	2096	9.4	1.5	0.3	0.2
7/21/07 15:00	804	5494	9608	527.2	373.2	154.0	29.2	1.16	2.6	303	296	2102	9.7	1.5	0.2	0.2
7/21/07 16:00	803	5485	9527	520.6	368.5	152.1	29.2	1.16	2.5	304	297	2096	9.5	1.4	0.2	0.2
7/21/07 17:00	800	5473	9630	519.2	367.5	151.7	29.2	1.17	2.6	304	298	2084	9.4	1.4	0.2	0.2
7/21/07 18:00	799	5445	9675	524.7	371.5	153.3	29.2	1.17	2.5	302	296	2080	9.1	1.5	0.3	0.2
7/21/07 19:00	801	5451	9765	533.8	378.0	155.8	29.2	1.16	2.5	307	295	2083	9.6	1.6	0.3	0.2
7/21/07 20:00	803	5508	9749	536.3	379.7	156.6	29.2	1.15	2.6	303	295	2079	9.8	1.6	0.3	0.2
7/21/07 21:00	807	5485	9648	530.0	375.2	154.8	29.2	1.15	2.5	300	294	2073	9.5	1.5	0.3	0.2
7/21/07 22:00	803	5448	9606	525.6	372.0	153.6	29.2	1.15	2.5	302	294	2080	9.2	1.4	0.2	0.2
7/21/07 23:00	803	5458	9608	525.2	371.8	153.4	29.2	1.16	2.5	303	295	2078	9.4	1.4	0.2	0.2
7/22/07 0:00	805	5474	9594	523.1	370.3	152.8	29.2	1.16	2.6	305	297	2092	9.2	1.4	0.2	0.2
7/22/07 1:00	857	5925	9912	578.8	421.5	157.3	27.2	1.16	2.5	310	302	2194	9.9	1.4	0.2	0.2
7/22/07 2:00	888	6103	9865	602.3	444.6	157.7	26.2	1.15	2.5	309	301	2254	10.1	1.6	0.3	0.2
7/22/07 3:00	887	6099	9715	595.3	438.7	156.6	26.3	1.14	2.4	310	301	2229	10.0	1.6	0.3	0.2
7/22/07 4:00	886	6073	9657	589.4	433.8	155.6	26.4	1.15	2.4	312	303	2222	10.4	1.6	0.3	0.2
7/22/07 5:00	888	6094	9704	585.9	431.0	155.0	26.4	1.15	2.4	313	303	2239	9.7	1.5	0.3	0.2
7/22/07 6:00	889	6088	9696	586.2	431.2	155.0	26.4	1.16	2.4	314	304	2241	9.8	1.5	0.3	0.2
7/22/07 7:00	889	6113	9711	586.8	431.6	155.1	26.4	1.16	2.4	316	307	2239	9.6	1.5	0.3	0.2
7/22/07 8:00	888	6127	9740	590.3	434.5	155.7	26.4	1.16	2.4	314	305	2234	9.9	1.5	0.2	0.2
7/22/07 9:00	888	6134	9801	595.9	439.3	156.6	26.3	1.15	2.3	311	303	2245	9.9	1.6	0.3	0.2
7/22/07 10:00	890	6110	9816	600.4	443.0	157.4	26.2	1.15	2.4	312	302	2243	9.8	1.7	0.3	0.2
7/22/07 11:00	891	6135	9760	599.5	442.3	157.2	26.2	1.14	2.3	316	304	2252	10.0	1.7	0.3	0.2
7/22/07 12:00	891	6151	9741	594.0	437.7	156.3	26.3	1.15	2.4	315	307	2252	10.0	1.6	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/22/07 13:00	882	6083	9737	588.5	433.2	155.3	26.4	1.15	2.4	315	307	2230	10.1	1.6	0.3	0.2
7/22/07 14:00	880	6044	9818	595.7	439.0	156.7	26.3	1.14	2.4	319	309	2228	9.9	1.6	0.3	0.2
7/22/07 15:00	888	6141	9809	605.3	446.7	158.7	26.2	1.14	2.3	321	311	2253	9.8	1.6	0.3	0.2
7/22/07 16:00	890	6145	9782	601.9	443.9	158.0	26.2	1.14	2.3	318	311	2264	10.2	1.6	0.3	0.2
7/22/07 17:00	886	6118	9772	599.7	442.2	157.5	26.3	1.14	2.4	317	309	2267	9.9	1.6	0.3	0.2
7/22/07 18:00	881	6040	9807	601.1	443.3	157.8	26.2	1.13	2.3	317	311	2239	9.9	1.7	0.3	0.2
7/22/07 19:00	886	6094	9746	601.2	444.8	156.4	26.0	1.13	2.3	320	311	2235	9.9	1.7	0.3	0.2
7/22/07 20:00	885	6128	9656	588.7	435.5	153.2	26.0	1.14	2.3	321	310	2239	9.8	1.6	0.3	0.2
7/22/07 21:00	880	6094	9724	582.2	429.7	152.6	26.2	1.16	2.3	319	310	2225	9.8	1.5	0.3	0.2
7/22/07 22:00	879	6055	9787	584.4	431.4	153.0	26.2	1.16	2.3	315	307	2221	9.8	1.6	0.3	0.2
7/22/07 23:00	881	6030	9835	590.8	436.9	153.9	26.0	1.15	2.3	313	304	2233	10.2	1.6	0.3	0.2
7/23/07 0:00	884	6046	9690	590.5	436.7	153.8	26.1	1.15	2.3	312	303	2234	10.0	1.7	0.3	0.2
7/23/07 1:00	885	6075	9644	582.1	429.5	152.6	26.2	1.15	2.3	311	303	2233	9.9	1.6	0.2	0.2
7/23/07 2:00	879	6020	9676	578.6	426.5	152.1	26.3	1.16	2.3	311	303	2227	9.9	1.5	0.2	0.2
7/23/07 3:00	878	6017	9840	593.3	439.1	154.2	26.0	1.15	2.2	311	304	2229	10.2	1.7	0.3	0.2
7/23/07 4:00	882	6098	9753	596.5	441.9	154.6	25.9	1.14	2.2	311	304	2236	10.1	1.8	0.3	0.2
7/23/07 5:00	884	6070	9711	594.0	439.7	154.3	26.0	1.14	2.2	312	304	2231	9.6	1.8	0.3	0.2
7/23/07 6:00	883	6069	9711	591.9	437.9	154.0	26.0	1.14	2.2	312	302	2215	9.3	1.8	0.3	0.2
7/23/07 7:00	888	6125	9712	594.7	440.3	154.4	26.0	1.14	2.1	311	300	2212	9.4	1.8	0.3	0.2
7/23/07 8:00	888	6092	9746	600.2	445.0	155.2	25.9	1.14	2.0	310	300	2209	10.0	1.8	0.3	0.2
7/23/07 9:00	889	6097	9841	609.8	453.3	156.5	25.7	1.13	2.0	313	301	2212	9.7	2.0	0.4	0.2
7/23/07 10:00	892	6137	9744	607.2	451.0	156.2	25.7	1.13	2.0	312	302	2211	10.1	1.9	0.3	0.2
7/23/07 11:00	892	6126	9756	604.1	448.4	155.7	25.8	1.13	2.0	314	304	2214	10.0	1.9	0.3	0.2
7/23/07 12:00	891	6106	9731	602.6	447.1	155.5	25.8	1.13	2.0	317	306	2216	10.0	1.9	0.3	0.2
7/23/07 13:00	891	6114	9718	600.4	445.2	155.2	25.9	1.13	2.0	318	308	2206	9.9	1.9	0.4	0.2
7/23/07 14:00	889	6123	9768	598.6	443.6	155.0	25.9	1.14	2.0	315	306	2203	9.3	1.8	0.3	0.2
7/23/07 15:00	891	6104	9718	595.1	440.6	154.5	26.0	1.14	2.0	316	307	2202	9.4	1.8	0.3	0.2
7/23/07 16:00	889	6106	9727	593.9	443.1	150.9	25.4	1.14	2.0	317	307	2214	9.7	1.7	0.3	0.2
7/23/07 17:00	885	6144	9801	593.7	445.2	148.4	25.0	1.15	2.0	315	308	2207	9.7	1.7	0.3	0.2
7/23/07 18:00	880	6063	9812	589.1	441.8	147.3	25.0	1.15	2.0	314	306	2199	9.4	1.7	0.3	0.2
7/23/07 19:00	878	6086	9819	591.0	443.3	147.7	25.0	1.15	2.0	315	304	2194	9.4	1.7	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/23/07 20:00	882	6031	9746	590.1	442.6	147.5	25.0	1.15	2.0	313	304	2179	9.4	1.8	0.3	0.2
7/23/07 21:00	880	6038	9670	582.4	436.8	145.6	25.0	1.15	2.0	313	303	2180	9.2	1.8	0.3	0.2
7/23/07 22:00	878	6013	9634	581.7	436.2	145.4	25.0	1.15	2.0	311	302	2180	8.9	1.9	0.4	0.2
7/23/07 23:00	879	6009	9723	589.0	441.7	147.3	25.0	1.15	2.0	307	301	2182	9.6	2.1	0.4	0.2
7/24/07 0:00	885	6057	9700	591.7	443.8	147.9	25.0	1.14	2.0	307	300	2189	9.6	2.2	0.4	0.2
7/24/07 1:00	883	6060	9649	582.3	436.7	145.6	25.0	1.15	2.0	307	299	2187	9.7	2.2	0.4	0.2
7/24/07 2:00	880	6024	9611	571.6	428.7	142.9	25.0	1.16	2.0	308	298	2179	9.8	2.0	0.4	0.2
7/24/07 3:00	880	5991	9602	568.9	426.7	142.2	25.0	1.17	2.0	309	298	2166	9.5	1.8	0.3	0.2
7/24/07 4:00	882	6007	9610	570.1	427.6	142.5	25.0	1.17	2.0	311	298	2173	9.3	1.8	0.3	0.2
7/24/07 5:00	881	6016	9685	577.6	433.2	144.4	25.0	1.17	2.0	308	297	2177	8.6	1.9	0.3	0.2
7/24/07 6:00	885	6082	9790	589.7	442.3	147.4	25.0	1.16	2.0	303	296	2190	8.3	2.1	0.4	0.2
7/24/07 7:00	890	6072	9796	599.1	448.4	150.7	25.2	1.15	2.0	303	296	2188	8.2	2.2	0.4	0.2
7/24/07 8:00	894	6068	9730	601.6	446.8	154.8	25.7	1.13	2.0	304	297	2195	8.2	2.1	0.4	0.2
7/24/07 9:00	892	6099	9617	594.6	441.6	153.0	25.7	1.14	2.0	304	298	2203	8.1	1.9	0.3	0.2
7/24/07 10:00	890	6059	9663	594.7	441.7	153.0	25.7	1.14	2.0	306	298	2199	7.7	1.8	0.3	0.2
7/24/07 11:00	890	6079	9657	596.0	442.7	153.3	25.7	1.14	2.0	307	300	2184	8.1	1.7	0.3	0.2
7/24/07 12:00	583	4211	7562	384.1	274.8	109.3	28.5	1.09	5.5	264	308	1871	11.1	1.6	0.2	0.3
7/24/07 13:00	450	3120	7131	323.4	241.9	81.4	25.2	1.07	4.8	251	303	1634	7.4	1.6	0.2	0.2
7/24/07 14:00	738	5007	9381	510.8	394.5	116.2	22.8	1.07	3.2	299	295	2040	7.5	1.8	0.3	0.2
7/24/07 15:00	873	6097	9500	593.2	444.8	148.3	25.0	1.11	2.9	307	298	2259	8.0	2.0	0.4	0.2
7/24/07 16:00	881	6047	9568	584.7	438.5	146.2	25.0	1.13	2.5	309	302	2233	7.6	2.1	0.4	0.2
7/24/07 17:00	881	5997	9462	570.2	427.6	142.5	25.0	1.15	2.5	310	303	2224	8.1	2.1	0.4	0.2
7/24/07 18:00	879	5965	9549	565.1	423.8	141.3	25.0	1.17	2.5	309	302	2208	8.4	2.1	0.4	0.2
7/24/07 19:00	877	5946	9636	566.4	424.8	141.6	25.0	1.17	2.5	311	303	2199	8.4	2.1	0.4	0.2
7/24/07 20:00	877	5949	9670	576.0	432.0	144.0	25.0	1.17	2.5	311	303	2213	8.8	2.1	0.4	0.2
7/24/07 21:00	880	5983	9670	580.0	435.0	145.0	25.0	1.16	2.5	311	304	2218	8.5	2.0	0.4	0.2
7/24/07 22:00	881	5987	9610	579.5	434.7	144.9	25.0	1.15	2.4	311	305	2224	8.3	1.8	0.3	0.2
7/24/07 23:00	880	5978	9683	580.1	435.0	145.0	25.0	1.15	2.5	310	304	2217	8.8	1.9	0.3	0.2
7/25/07 0:00	880	6001	9658	579.5	434.6	144.8	25.0	1.16	2.5	312	302	2222	8.8	2.1	0.4	0.2
7/25/07 1:00	879	6016	9690	578.3	433.8	144.5	25.0	1.16	2.5	310	301	2223	9.6	2.2	0.4	0.2
7/25/07 2:00	882	5983	9601	571.9	429.0	143.0	25.0	1.16	2.4	308	298	2213	9.7	2.2	0.4	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/25/07 3:00	879	5956	9569	568.8	426.7	142.2	25.0	1.17	2.4	307	298	2210	9.8	2.1	0.4	0.2
7/25/07 4:00	879	5961	9596	568.7	426.6	142.2	25.0	1.17	2.4	308	298	2210	10.0	2.1	0.4	0.2
7/25/07 5:00	880	6019	9579	565.2	423.9	141.3	25.0	1.18	2.4	309	297	2209	9.7	2.1	0.4	0.2
7/25/07 6:00	880	6004	9688	565.9	424.5	141.5	25.0	1.18	2.2	306	296	2186	10.0	2.0	0.4	0.2
7/25/07 7:00	889	6025	9715	574.6	430.9	143.6	25.0	1.18	2.1	307	295	2186	10.6	2.1	0.4	0.2
7/25/07 8:00	890	6031	9670	579.1	434.3	144.7	25.0	1.17	2.1	307	295	2177	10.1	2.2	0.4	0.2
7/25/07 9:00	889	6052	9707	584.7	438.6	146.2	25.0	1.16	2.2	307	295	2200	9.7	2.3	0.4	0.2
7/25/07 10:00	890	6085	9745	586.8	440.0	146.8	25.0	1.16	2.2	310	297	2196	9.7	2.2	0.4	0.2
7/25/07 11:00	880	6087	9712	580.2	433.5	146.8	25.3	1.16	2.2	315	303	2201	9.9	2.0	0.4	0.2
7/25/07 12:00	887	6070	9713	583.6	437.5	146.2	25.0	1.16	2.2	313	301	2204	9.8	2.0	0.4	0.2
7/25/07 13:00	891	6096	9674	581.6	436.2	145.4	25.0	1.17	2.2	314	302	2194	10.0	2.0	0.4	0.2
7/25/07 14:00	889	6105	9660	574.3	430.8	143.6	25.0	1.18	2.2	313	301	2199	10.1	1.9	0.4	0.2
7/25/07 15:00	887	6081	9709	577.3	433.0	144.3	25.0	1.18	2.3	312	301	2201	9.9	1.9	0.4	0.2
7/25/07 16:00	888	6084	9725	583.3	437.4	145.8	25.0	1.17	2.2	313	302	2204	10.0	1.9	0.4	0.2
7/25/07 17:00	888	6129	9794	587.6	440.6	146.9	25.0	1.17	2.2	314	303	2215	10.1	1.9	0.4	0.2
7/25/07 18:00	891	6110	9797	590.7	443.0	147.6	25.0	1.16	2.2	313	303	2217	10.2	1.9	0.4	0.2
7/25/07 19:00	891	6091	9757	589.8	442.4	147.5	25.0	1.16	2.2	313	303	2216	10.2	2.0	0.4	0.2
7/25/07 20:00	890	6100	9732	591.0	443.2	147.8	25.0	1.15	2.2	313	303	2222	10.1	2.0	0.4	0.2
7/25/07 21:00	890	6131	9761	589.6	442.2	147.4	25.0	1.16	2.2	311	299	2220	9.8	2.0	0.4	0.2
7/25/07 22:00	891	6095	9699	590.2	442.7	147.6	25.0	1.15	2.2	310	297	2200	9.7	2.0	0.4	0.2
7/25/07 23:00	889	6088	9785	597.3	448.0	149.3	25.0	1.15	2.2	309	295	2199	10.0	2.0	0.4	0.2
7/26/07 0:00	885	6105	9943	607.6	455.7	151.9	25.0	1.14	2.2	307	294	2206	10.0	2.0	0.4	0.2
7/26/07 1:00	886	6017	9853	615.7	461.8	153.9	25.0	1.12	2.2	307	295	2201	9.7	2.1	0.4	0.2
7/26/07 2:00	886	6029	9736	615.7	461.8	153.9	25.0	1.10	2.2	307	295	2202	9.9	2.2	0.4	0.2
7/26/07 3:00	885	6020	9548	601.3	451.0	150.3	25.0	1.11	2.2	307	295	2200	9.9	2.0	0.4	0.2
7/26/07 4:00	885	6002	9594	599.9	449.9	150.0	25.0	1.11	2.2	308	296	2207	10.3	2.0	0.4	0.2
7/26/07 5:00	885	6065	9636	603.7	452.8	150.9	25.0	1.12	2.2	310	297	2205	9.6	2.1	0.4	0.2
7/26/07 6:00	885	6027	9674	601.3	451.0	150.3	25.0	1.12	2.1	307	295	2189	9.9	2.3	0.4	0.2
7/26/07 7:00	886	6043	9695	606.7	455.0	151.7	25.0	1.11	2.1	306	295	2188	9.6	2.3	0.4	0.2
7/26/07 8:00	887	6065	9722	614.4	460.8	153.6	25.0	1.11	2.1	305	294	2184	9.7	2.2	0.3	0.2
7/26/07 9:00	890	6111	9714	613.7	460.2	153.4	25.0	1.11	2.0	306	295	2195	9.4	2.1	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/26/07 10:00	884	6046	9633	600.4	450.1	150.3	25.0	1.12	2.1	307	296	2198	9.4	2.1	0.2	0.2
7/26/07 11:00	880	5999	9696	599.3	448.9	150.4	25.1	1.12	2.1	309	298	2201	9.9	2.1	0.3	0.2
7/26/07 12:00	886	6082	9716	607.5	455.4	152.0	25.0	1.12	2.1	310	299	2220	10.1	2.3	0.3	0.2
7/26/07 13:00	886	6082	9832	620.5	465.8	154.7	24.9	1.11	2.1	311	301	2237	10.0	2.4	0.3	0.2
7/26/07 14:00	889	6102	9860	625.3	469.7	155.6	24.9	1.10	2.1	311	302	2235	9.7	2.5	0.3	0.2
7/26/07 15:00	886	6064	9740	619.6	465.1	154.4	24.9	1.09	2.1	311	301	2236	9.6	2.6	0.3	0.2
7/26/07 16:00	886	6076	9711	620.6	466.0	154.6	24.9	1.09	2.1	308	297	2247	8.5	2.5	0.3	0.2
7/26/07 17:00	885	6066	9697	620.9	466.2	154.7	24.9	1.09	2.1	306	289	2239	8.6	2.4	0.3	0.2
7/26/07 18:00	891	6098	9664	618.2	464.0	154.2	24.9	1.10	2.0	307	291	2238	9.1	2.3	0.3	0.2
7/26/07 19:00	890	6079	9609	614.5	461.1	153.4	25.0	1.10	2.1	305	281	2241	7.7	2.1	0.2	0.2
7/26/07 20:00	890	6086	9658	611.2	458.5	152.8	25.0	1.11	2.1	304	286	2229	8.0	2.0	0.2	0.2
7/26/07 21:00	889	6073	9638	610.4	457.8	152.6	25.0	1.11	2.0	304	288	2220	7.2	1.9	0.2	0.2
7/26/07 22:00	889	6078	9710	610.3	457.7	152.6	25.0	1.11	2.1	305	291	2207	9.0	1.9	0.2	0.2
7/26/07 23:00	890	6081	9684	609.3	456.9	152.4	25.0	1.11	2.1	307	294	2217	9.4	2.0	0.2	0.2
7/27/07 0:00	889	6083	9657	606.5	454.7	151.8	25.0	1.12	2.1	309	297	2228	9.6	2.0	0.2	0.2
7/27/07 1:00	886	6142	9676	605.1	453.6	151.5	25.0	1.12	2.1	309	296	2231	9.7	2.0	0.2	0.2
7/27/07 2:00	890	6090	9777	607.0	455.1	151.9	25.0	1.13	2.1	307	295	2240	9.6	2.0	0.2	0.2
7/27/07 3:00	892	6072	9633	607.3	455.3	151.9	25.0	1.12	2.2	307	296	2245	9.9	2.0	0.2	0.2
7/27/07 4:00	888	6102	9687	606.2	454.5	151.7	25.0	1.12	2.2	309	296	2228	10.1	2.0	0.2	0.2
7/27/07 5:00	891	6076	9742	607.4	455.5	152.0	25.0	1.12	2.1	308	296	2230	9.4	2.0	0.2	0.2
7/27/07 6:00	891	6077	9692	606.5	454.7	151.8	25.0	1.12	2.1	310	297	2225	9.6	2.0	0.2	0.2
7/27/07 7:00	889	6106	9693	604.8	453.4	151.5	25.0	1.12	2.2	308	297	2241	10.0	1.9	0.2	0.2
7/27/07 8:00	889	6087	9688	606.6	454.8	151.8	25.0	1.12	2.2	304	296	2236	9.8	1.9	0.2	0.2
7/27/07 9:00	889	6100	9702	610.5	457.9	152.6	25.0	1.12	2.1	305	297	2239	10.2	2.0	0.2	0.2
7/27/07 10:00	892	6107	9728	609.1	456.8	152.3	25.0	1.12	2.1	307	298	2252	10.2	2.0	0.2	0.2
7/27/07 11:00	891	6112	9668	605.7	454.0	151.7	25.0	1.12	2.2	307	301	2265	10.1	1.9	0.2	0.2
7/27/07 12:00	888	6095	9739	607.6	455.6	152.0	25.0	1.12	2.1	310	303	2260	10.3	1.9	0.2	0.2
7/27/07 13:00	888	6119	9830	612.3	459.5	152.9	25.0	1.12	2.2	312	305	2258	9.6	2.0	0.2	0.2
7/27/07 14:00	889	6123	9823	614.2	461.1	153.1	24.9	1.11	2.1	312	306	2268	10.0	2.0	0.2	0.2
7/27/07 15:00	845	5844	9881	589.6	497.8	91.8	15.6	1.11	2.3	319	309	2212	9.8	2.1	0.2	0.2
7/27/07 16:00	801	5562	9928	565.3	565.3	0.0	0.0	1.10	2.5	317	312	2136	9.1	2.3	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/27/07 17:00	802	5459	9728	564.8	564.8	0.0	0.0	1.09	2.5	304	291	2115	7.9	2.2	0.3	0.2
7/27/07 18:00	802	5450	9660	557.9	557.9	0.0	0.0	1.09	2.5	307	296	2105	9.0	2.1	0.2	0.2
7/27/07 19:00	785	5343	10078	588.1	550.5	37.6	6.4	1.07	2.6	311	303	2093	9.1	2.1	0.2	0.2
7/27/07 20:00	800	5438	10051	615.2	567.2	47.9	7.8	1.01	2.2	314	307	2091	9.2	2.2	0.3	0.2
7/27/07 21:00	788	5407	9160	560.5	560.5	0.0	0.0	1.03	2.5	308	298	2079	8.9	2.1	0.2	0.2
7/27/07 22:00	795	5418	9554	574.3	545.3	29.0	5.1	1.05	2.6	308	298	2086	8.2	2.1	0.2	0.2
7/27/07 23:00	879	5960	9618	630.6	552.3	78.2	12.4	1.05	2.5	307	301	2243	9.2	2.0	0.2	0.2
7/28/07 0:00	888	6062	9639	632.1	553.1	79.0	12.5	1.06	2.5	305	301	2269	9.8	1.9	0.2	0.2
7/28/07 1:00	887	6054	9681	636.1	556.6	79.5	12.5	1.06	2.5	303	300	2275	9.6	1.9	0.2	0.2
7/28/07 2:00	848	5847	9783	618.9	566.3	52.6	8.5	1.06	2.5	307	299	2216	9.4	1.9	0.2	0.2
7/28/07 3:00	786	5370	9859	586.9	586.9	0.0	0.0	1.05	2.5	301	294	2069	8.4	2.0	0.2	0.2
7/28/07 4:00	795	5414	9751	595.4	592.5	2.9	0.5	1.03	2.5	308	299	2094	8.4	2.1	0.2	0.2
7/28/07 5:00	863	5860	9623	634.1	575.5	58.6	9.2	1.03	2.4	306	299	2204	8.9	1.9	0.2	0.2
7/28/07 6:00	885	6032	9486	634.5	563.2	71.4	11.2	1.04	2.5	305	298	2251	9.4	1.9	0.2	0.2
7/28/07 7:00	886	6039	9599	632.2	568.7	63.5	10.0	1.06	2.5	305	297	2260	10.0	1.9	0.2	0.2
7/28/07 8:00	888	6093	9568	628.4	567.2	61.1	9.7	1.07	2.5	305	296	2283	9.7	1.8	0.2	0.2
7/28/07 9:00	866	5966	9623	610.5	557.8	52.7	8.6	1.08	2.5	310	301	2259	9.8	1.8	0.2	0.2
7/28/07 10:00	887	6080	9654	621.6	570.7	50.9	8.2	1.09	2.5	306	305	2277	9.7	1.8	0.2	0.2
7/28/07 11:00	889	6066	9663	623.3	572.4	50.9	8.2	1.09	2.5	307	304	2272	9.9	1.8	0.2	0.2
7/28/07 12:00	888	6085	9766	630.2	579.3	50.9	8.1	1.08	2.5	309	306	2270	10.1	1.7	0.2	0.2
7/28/07 13:00	891	6104	9677	628.3	577.3	50.9	8.1	1.08	2.5	311	306	2269	10.3	1.6	0.2	0.2
7/28/07 14:00	889	6103	9683	625.8	574.9	51.0	8.1	1.09	2.5	313	307	2262	10.2	1.6	0.2	0.2
7/28/07 15:00	889	6107	9711	627.6	576.7	50.9	8.1	1.08	2.5	315	309	2259	9.9	1.6	0.2	0.2
7/28/07 16:00	847	5847	9821	607.5	576.4	31.2	5.1	1.08	2.4	318	309	2214	9.8	1.6	0.2	0.2
7/28/07 17:00	889	6163	9766	626.4	575.6	50.8	8.1	1.08	2.5	317	307	2305	9.9	1.6	0.2	0.2
7/28/07 18:00	891	6121	9597	615.1	564.3	50.8	8.3	1.10	2.5	317	308	2292	9.9	1.5	0.2	0.2
7/28/07 19:00	890	6136	9580	600.7	534.1	66.6	11.1	1.12	2.5	317	311	2288	9.8	1.4	0.2	0.2
7/28/07 20:00	884	6073	9693	598.5	496.8	101.8	17.0	1.13	2.5	318	312	2296	9.5	1.4	0.2	0.2
7/28/07 21:00	883	6116	9817	605.0	503.2	101.8	16.8	1.13	2.5	317	310	2280	9.8	1.4	0.2	0.2
7/28/07 22:00	891	6101	9763	604.6	502.8	101.8	16.8	1.13	2.5	314	308	2282	9.8	1.4	0.2	0.2
7/28/07 23:00	882	6070	9800	607.8	531.6	76.2	12.5	1.12	2.6	316	311	2277	10.1	1.5	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/29/07 0:00	886	6086	9949	625.0	550.2	74.8	12.0	1.11	2.4	314	313	2276	10.0	1.5	0.2	0.2
7/29/07 1:00	868	5962	9717	601.4	476.3	125.1	20.8	1.10	2.4	312	310	2247	9.7	1.5	0.2	0.2
7/29/07 2:00	885	6100	9774	614.1	473.6	140.5	22.9	1.11	2.5	310	308	2282	9.9	1.5	0.2	0.2
7/29/07 3:00	888	6039	9712	614.3	471.4	142.9	23.3	1.10	2.5	308	306	2268	10.3	1.5	0.2	0.2
7/29/07 4:00	885	6038	9681	616.3	473.0	143.3	23.3	1.10	2.5	308	305	2271	10.3	1.5	0.2	0.2
7/29/07 5:00	885	6056	9779	619.6	475.6	144.0	23.2	1.09	2.5	309	304	2265	9.8	1.5	0.2	0.2
7/29/07 6:00	886	6037	9727	619.4	477.8	141.6	22.9	1.09	2.5	311	305	2273	9.9	1.5	0.2	0.2
7/29/07 7:00	881	6049	9770	629.3	542.0	87.2	13.9	1.08	2.5	315	305	2260	9.5	1.5	0.2	0.2
7/29/07 8:00	886	6071	9785	632.2	557.9	74.3	11.8	1.07	2.5	313	300	2278	9.9	1.6	0.2	0.2
7/29/07 9:00	884	6088	9787	633.7	556.9	76.8	12.1	1.07	2.5	320	307	2288	9.7	1.6	0.2	0.2
7/29/07 10:00	889	6088	9752	631.8	538.3	93.4	14.8	1.08	2.4	315	308	2285	9.9	1.6	0.2	0.2
7/29/07 11:00	886	6105	9661	622.8	516.3	106.5	17.1	1.08	2.5	313	306	2272	10.3	1.5	0.2	0.2
7/29/07 12:00	884	6080	9809	627.2	510.9	116.3	18.5	1.08	2.5	311	306	2274	10.0	1.6	0.2	0.2
7/29/07 13:00	888	6114	9682	624.9	488.9	136.0	21.8	1.08	2.5	312	308	2276	10.1	1.6	0.2	0.2
7/29/07 14:00	887	6050	9607	618.6	473.9	144.7	23.4	1.09	2.5	313	309	2275	9.9	1.5	0.2	0.2
7/29/07 15:00	887	6069	9599	612.0	467.9	144.1	23.5	1.10	2.4	313	310	2275	9.6	1.5	0.2	0.2
7/29/07 16:00	886	6063	9603	604.8	462.5	142.3	23.5	1.11	2.5	312	311	2287	9.9	1.5	0.2	0.2
7/29/07 17:00	884	6101	9754	613.6	477.7	135.9	22.1	1.11	2.5	317	311	2299	10.1	1.5	0.2	0.2
7/29/07 18:00	885	6120	9968	632.3	550.7	81.7	12.9	1.10	2.5	319	316	2302	9.8	1.6	0.2	0.2
7/29/07 19:00	892	6135	9722	621.8	492.9	128.9	20.7	1.10	2.4	319	316	2296	9.5	1.5	0.2	0.2
7/29/07 20:00	884	6073	9633	606.8	444.6	162.1	26.7	1.11	2.5	315	311	2294	9.6	1.5	0.2	0.2
7/29/07 21:00	883	6059	9645	606.7	444.6	162.2	26.7	1.11	2.5	313	310	2286	9.8	1.6	0.2	0.2
7/29/07 22:00	888	6132	9748	607.7	445.3	162.4	26.7	1.12	2.5	315	309	2274	9.6	1.6	0.2	0.2
7/29/07 23:00	890	6144	9665	599.4	439.0	160.3	26.7	1.13	2.5	315	309	2282	10.1	1.5	0.2	0.2
7/30/07 0:00	891	6108	9626	596.0	436.5	159.5	26.8	1.14	2.5	312	306	2288	10.2	1.5	0.2	0.2
7/30/07 1:00	888	6089	9742	601.7	440.8	160.9	26.7	1.14	2.5	310	303	2290	10.1	1.6	0.2	0.2
7/30/07 2:00	889	6125	9741	603.2	441.9	161.3	26.7	1.13	2.5	308	303	2270	10.1	1.6	0.2	0.2
7/30/07 3:00	889	6118	9801	605.7	443.8	161.9	26.7	1.13	2.5	309	303	2281	10.1	1.6	0.2	0.2
7/30/07 4:00	891	6107	9801	606.3	444.2	162.0	26.7	1.13	2.5	308	302	2280	10.2	1.6	0.2	0.2
7/30/07 5:00	889	6102	9798	607.5	445.7	161.8	26.6	1.13	2.5	309	303	2275	10.0	1.6	0.2	0.2
7/30/07 6:00	886	6112	9793	607.5	446.9	160.6	26.4	1.12	2.5	308	302	2263	10.1	1.7	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/30/07 7:00	885	6057	9761	605.5	445.4	160.1	26.4	1.12	2.5	306	299	2266	10.6	1.7	0.2	0.2
7/30/07 8:00	884	6086	9767	608.4	447.5	160.8	26.4	1.12	2.5	307	300	2263	10.1	1.7	0.2	0.2
7/30/07 9:00	887	6089	9747	605.9	445.8	160.2	26.4	1.12	2.5	309	302	2285	10.1	1.8	0.2	0.2
7/30/07 10:00	887	6072	9674	599.7	441.1	158.6	26.5	1.13	5.1	309	302	2282	10.2	1.8	0.2	0.2
7/30/07 11:00	885	6076	9663	595.7	438.0	157.6	26.5	1.13	2.5	310	303	2270	10.0	1.7	0.2	0.2
7/30/07 12:00	883	6124	9749	596.8	438.9	157.9	26.5	1.14	2.5	314	304	2264	10.3	1.6	0.2	0.2
7/30/07 13:00	892	6095	9704	597.3	439.3	158.1	26.5	1.14	2.6	315	305	2289	10.0	1.6	0.2	0.2
7/30/07 14:00	888	6088	9798	606.4	446.0	160.3	26.4	1.13	2.7	314	306	2294	10.2	1.6	0.2	0.2
7/30/07 15:00	889	6098	9797	615.0	452.5	162.5	26.4	1.12	2.7	315	308	2297	10.1	1.6	0.2	0.2
7/30/07 16:00	891	6098	9810	620.8	457.0	163.9	26.4	1.11	2.7	318	310	2302	10.1	1.6	0.2	0.2
7/30/07 17:00	892	6138	9736	618.9	455.5	163.4	26.4	1.10	2.6	319	311	2317	9.9	1.6	0.2	0.2
7/30/07 18:00	890	6102	9725	620.7	456.8	163.9	26.4	1.10	2.7	319	311	2315	9.9	1.6	0.2	0.2
7/30/07 19:00	889	6108	9752	623.1	458.6	164.5	26.4	1.10	2.6	317	310	2312	10.1	1.6	0.2	0.2
7/30/07 20:00	890	6093	9771	630.1	463.8	166.2	26.4	1.09	2.6	318	310	2324	10.1	1.7	0.2	0.2
7/30/07 21:00	889	6132	9783	632.2	465.4	166.8	26.4	1.09	2.7	320	311	2312	9.9	1.7	0.2	0.2
7/30/07 22:00	895	6131	9653	621.8	457.6	164.2	26.4	1.09	2.6	315	309	2309	9.7	1.7	0.2	0.2
7/30/07 23:00	891	6102	9592	614.0	451.8	162.2	26.4	1.10	2.7	313	306	2311	9.9	1.7	0.2	0.2
7/31/07 0:00	891	6089	9590	609.3	448.2	161.0	26.4	1.11	2.7	312	306	2303	10.2	1.7	0.2	0.2
7/31/07 1:00	890	6115	9651	604.0	444.2	159.7	26.4	1.12	2.7	313	305	2308	9.8	1.7	0.2	0.2
7/31/07 2:00	891	6084	9660	599.1	440.7	158.5	26.5	1.13	2.7	313	304	2316	9.8	1.6	0.2	0.2
7/31/07 3:00	890	6086	9641	597.6	439.5	158.1	26.5	1.13	2.7	312	303	2308	10.1	1.6	0.2	0.2
7/31/07 4:00	890	6089	9661	595.3	437.7	157.5	26.5	1.14	2.7	313	304	2316	10.0	1.6	0.2	0.2
7/31/07 5:00	889	6088	9730	595.9	438.2	157.7	26.5	1.14	2.7	314	305	2311	9.7	1.5	0.2	0.2
7/31/07 6:00	888	6108	9722	596.1	438.4	157.8	26.5	1.14	2.6	314	306	2301	10.1	1.6	0.2	0.2
7/31/07 7:00	886	6121	9710	591.8	435.2	156.7	26.5	1.15	2.6	313	305	2300	10.7	1.6	0.2	0.2
7/31/07 8:00	884	6093	9808	593.8	436.7	157.2	26.5	1.15	2.5	309	302	2299	10.2	1.6	0.2	0.2
7/31/07 9:00	886	6103	9765	595.5	437.9	157.6	26.5	1.15	2.5	310	303	2291	10.2	1.5	0.2	0.2
7/31/07 10:00	886	6116	9750	593.0	436.0	157.0	26.5	1.15	2.5	311	304	2288	10.2	1.5	0.2	0.2
7/31/07 11:00	885	6116	9744	589.6	433.5	156.2	26.5	1.15	2.5	311	304	2289	10.4	1.4	0.2	0.2
7/31/07 12:00	885	6096	9776	588.1	432.4	155.7	26.5	1.16	2.5	311	303	2294	10.5	1.5	0.2	0.2
7/31/07 13:00	884	6067	9805	593.0	436.0	157.0	26.5	1.15	2.5	313	304	2306	10.5	1.5	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
7/31/07 14:00	885	6086	9742	594.5	437.1	157.4	26.5	1.15	2.5	314	305	2304	10.5	1.5	0.2	0.2
7/31/07 15:00	887	6057	9777	596.5	438.7	157.9	26.5	1.14	2.5	314	307	2300	10.4	1.4	0.2	0.2
7/31/07 16:00	885	6057	9763	601.6	442.5	159.1	26.4	1.13	2.5	316	309	2302	10.4	1.5	0.2	0.2
7/31/07 17:00	883	6090	9803	609.8	448.6	161.2	26.4	1.12	2.5	319	310	2294	10.4	1.5	0.2	0.2
7/31/07 18:00	886	6086	9842	613.9	451.7	162.2	26.4	1.12	2.5	318	310	2292	10.5	1.5	0.2	0.2
7/31/07 19:00	889	6108	9722	607.5	446.9	160.6	26.4	1.12	2.5	317	309	2295	10.5	1.6	0.2	0.2
7/31/07 20:00	890	6114	9616	592.1	435.4	156.8	26.5	1.13	2.4	316	308	2290	10.2	1.6	0.2	0.2
7/31/07 21:00	883	6085	9680	587.2	431.7	155.5	26.5	1.15	2.4	315	308	2273	10.4	1.7	0.2	0.2
7/31/07 22:00	883	6068	9826	599.8	441.1	158.7	26.5	1.14	2.4	313	307	2280	10.2	2.0	0.2	0.2
7/31/07 23:00	885	6131	9885	606.7	446.3	160.4	26.4	1.14	2.4	309	304	2288	10.1	2.3	0.3	0.2
8/1/07 0:00	891	6137	9809	603.9	444.2	159.7	26.4	1.13	2.4	308	303	2301	10.0	2.2	0.2	0.2
8/1/07 1:00	887	6136	9717	599.8	441.1	158.7	26.5	1.14	2.4	308	304	2286	10.2	2.1	0.2	0.2
8/1/07 2:00	886	6060	9789	599.2	440.7	158.5	26.5	1.14	2.4	308	303	2274	10.2	2.0	0.2	0.2
8/1/07 3:00	889	6102	9694	599.2	440.7	158.5	26.5	1.14	2.4	307	302	2282	10.0	2.0	0.2	0.2
8/1/07 4:00	889	6088	9697	598.3	440.0	158.3	26.5	1.14	2.3	306	302	2283	10.2	1.8	0.2	0.2
8/1/07 5:00	888	6101	9699	597.6	439.5	158.1	26.5	1.14	2.3	308	303	2271	9.7	1.8	0.2	0.2
8/1/07 6:00	886	6069	9806	605.1	445.2	160.0	26.4	1.13	2.3	310	304	2264	9.9	1.9	0.2	0.2
8/1/07 7:00	885	6118	9896	616.0	453.2	162.7	26.4	1.12	2.3	310	304	2269	9.8	2.0	0.2	0.2
8/1/07 8:00	890	6138	9815	616.8	453.9	163.0	26.4	1.11	2.2	310	302	2268	10.0	2.0	0.2	0.2
8/1/07 9:00	889	6123	9760	614.0	451.8	162.2	26.4	1.11	2.3	310	302	2260	10.2	2.0	0.2	0.2
8/1/07 10:00	889	6109	9665	606.6	446.2	160.4	26.4	1.12	2.3	308	303	2265	10.2	1.9	0.2	0.2
8/1/07 11:00	887	6092	9698	602.3	443.0	159.3	26.4	1.12	2.3	307	304	2262	10.1	1.8	0.2	0.2
8/1/07 12:00	886	6098	9750	602.7	443.3	159.4	26.4	1.13	2.3	309	306	2247	10.2	1.8	0.2	0.2
8/1/07 13:00	881	6046	9768	599.9	465.0	134.9	22.5	1.13	2.3	316	310	2241	10.2	1.8	0.2	0.2
8/1/07 14:00	877	6047	9843	612.3	530.4	81.9	13.4	1.11	2.2	318	304	2225	9.3	1.9	0.2	0.2
8/1/07 15:00	885	6084	9729	610.2	528.9	81.4	13.3	1.11	2.3	310	289	2260	7.8	1.9	0.2	0.2
8/1/07 16:00	881	6030	9706	610.1	528.7	81.3	13.3	1.11	2.3	310	296	2260	7.4	1.9	0.2	0.2
8/1/07 17:00	880	6041	9776	613.5	531.7	81.8	13.3	1.10	2.3	311	295	2247	8.0	2.0	0.2	0.2
8/1/07 18:00	881	6042	9762	616.5	534.3	82.1	13.3	1.10	2.3	310	293	2242	8.3	2.0	0.3	0.2
8/1/07 19:00	883	6038	9732	614.9	532.9	81.9	13.3	1.10	2.3	310	296	2238	8.8	2.0	0.3	0.2
8/1/07 20:00	882	6078	9752	618.6	536.2	82.4	13.3	1.10	2.3	310	297	2229	9.1	2.0	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/1/07 21:00	884	6070	9779	620.7	538.0	82.7	13.3	1.09	2.3	309	296	2231	9.2	2.1	0.4	0.2
8/1/07 22:00	885	6047	9671	614.8	532.9	81.9	13.3	1.10	2.3	308	296	2224	9.2	2.0	0.4	0.2
8/1/07 23:00	885	6093	9650	612.3	530.7	81.6	13.3	1.10	2.3	309	297	2228	9.5	2.0	0.3	0.2
8/2/07 0:00	885	6106	9697	607.7	526.6	81.0	13.3	1.11	2.3	308	297	2242	9.4	1.9	0.3	0.2
8/2/07 1:00	886	6121	9698	604.6	523.9	80.6	13.3	1.12	2.3	309	298	2230	9.8	1.8	0.3	0.2
8/2/07 2:00	882	6123	9727	596.9	517.2	79.7	13.3	1.13	2.3	308	298	2224	9.3	1.7	0.3	0.2
8/2/07 3:00	884	6019	9681	589.5	510.8	78.8	13.4	1.14	2.3	308	297	2214	9.4	1.5	0.3	0.2
8/2/07 4:00	884	6054	9632	589.9	511.1	78.8	13.4	1.14	2.3	309	299	2210	9.5	1.5	0.2	0.2
8/2/07 5:00	885	6087	9757	598.6	519.3	79.3	13.2	1.14	2.3	311	300	2214	9.3	1.5	0.2	0.2
8/2/07 6:00	880	6129	10006	613.3	552.2	61.2	10.0	1.13	2.3	312	302	2224	9.7	1.6	0.3	0.2
8/2/07 7:00	869	6090	10039	612.0	544.1	67.9	11.1	1.12	2.2	313	304	2199	10.0	1.7	0.3	0.2
8/2/07 8:00	885	6185	10001	628.0	536.8	91.2	14.5	1.11	2.3	313	303	2235	9.8	1.7	0.3	0.2
8/2/07 9:00	889	6142	9896	629.2	523.1	106.1	16.9	1.10	2.2	313	303	2236	9.7	1.7	0.3	0.2
8/2/07 10:00	887	6115	9627	606.0	497.6	108.4	17.9	1.11	2.2	310	303	2233	9.6	1.6	0.3	0.2
8/2/07 11:00	885	6098	9594	594.7	483.7	111.0	18.7	1.13	2.3	310	305	2219	9.6	1.5	0.2	0.2
8/2/07 12:00	889	6153	9606	586.6	477.7	108.9	18.6	1.15	2.3	311	308	2220	9.7	1.4	0.2	0.2
8/2/07 13:00	890	6159	9581	575.1	470.5	104.6	18.2	1.17	2.3	314	309	2224	9.7	1.3	0.2	0.2
8/2/07 14:00	891	6171	9559	560.3	470.2	90.1	16.1	1.20	2.3	318	311	2222	9.8	1.1	0.2	0.2
8/2/07 15:00	888	6165	9447	539.2	471.7	67.5	12.5	1.23	2.3	321	311	2205	9.4	0.9	0.1	0.2
8/2/07 16:00	882	6101	9581	526.2	460.7	65.5	12.4	1.26	2.2	315	308	2179	9.3	0.8	0.1	0.2
8/2/07 17:00	881	6099	9601	519.5	456.5	63.0	12.1	1.29	2.2	316	307	2187	9.6	0.8	0.1	0.2
8/2/07 18:00	879	6081	9727	518.3	460.1	58.1	11.2	1.30	2.2	317	308	2187	9.5	0.7	0.1	0.1
8/2/07 19:00	878	6077	9790	521.2	463.2	58.1	11.1	1.30	2.2	317	307	2181	9.3	0.7	0.1	0.2
8/2/07 20:00	879	6127	9784	520.9	462.9	58.0	11.1	1.31	2.2	312	303	2177	9.6	0.7	0.1	0.2
8/2/07 21:00	882	6088	9825	521.0	463.0	58.0	11.1	1.31	2.2	311	302	2178	9.5	0.7	0.1	0.2
8/2/07 22:00	883	6090	9848	520.2	462.2	58.0	11.1	1.31	2.1	313	303	2186	10.4	0.7	0.1	0.2
8/2/07 23:00	882	6077	9822	519.6	461.6	58.0	11.2	1.31	2.2	315	305	2179	10.8	0.7	0.1	0.2
8/3/07 0:00	882	6080	9791	521.1	463.1	58.0	11.1	1.30	2.2	317	307	2186	10.9	0.7	0.1	0.2
8/3/07 1:00	882	6084	9793	522.4	464.4	58.0	11.1	1.30	2.2	318	308	2190	11.1	0.7	0.1	0.2
8/3/07 2:00	883	6060	9761	520.2	462.2	58.0	11.1	1.30	2.2	316	307	2182	11.1	0.7	0.1	0.1
8/3/07 3:00	881	6065	9755	521.6	463.6	58.0	11.1	1.30	2.2	314	306	2185	10.8	0.7	0.1	0.1

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/3/07 4:00	882	6056	9738	522.7	464.7	58.0	11.1	1.30	2.2	312	305	2175	10.7	0.7	0.1	0.2
8/3/07 5:00	882	6047	9740	524.5	466.5	58.0	11.1	1.29	2.1	316	306	2165	10.6	0.7	0.1	0.1
8/3/07 6:00	883	6036	9716	525.4	467.4	58.0	11.0	1.29	2.2	317	307	2169	10.8	0.8	0.1	0.1
8/3/07 7:00	881	6035	9728	526.0	468.0	58.0	11.0	1.28	2.2	317	304	2167	11.8	0.8	0.1	0.1
8/3/07 8:00	880	6016	9860	540.2	482.2	58.0	10.7	1.27	2.2	313	302	2188	11.0	0.9	0.1	0.2
8/3/07 9:00	887	6008	10013	567.7	509.8	57.9	10.2	1.23	2.1	314	303	2203	11.0	1.2	0.2	0.2
8/3/07 10:00	891	6016	9933	589.2	531.2	58.0	9.8	1.19	2.1	316	305	2200	11.0	1.4	0.3	0.2
8/3/07 11:00	886	6102	9995	607.5	531.7	75.9	12.5	1.15	2.2	316	305	2204	10.9	1.6	0.3	0.2
8/3/07 12:00	884	6143	10019	621.3	539.1	82.2	13.2	1.13	2.2	317	306	2216	10.9	1.8	0.3	0.2
8/3/07 13:00	887	6154	9917	622.7	541.0	81.7	13.1	1.11	2.1	317	308	2216	11.0	1.8	0.3	0.2
8/3/07 14:00	883	6137	9793	613.9	532.9	81.0	13.2	1.11	2.2	317	309	2223	10.9	1.7	0.3	0.2
8/3/07 15:00	883	6098	9746	605.5	524.7	80.8	13.3	1.12	2.2	317	308	2215	10.7	1.6	0.3	0.2
8/3/07 16:00	880	6077	9758	600.9	520.4	80.5	13.4	1.12	2.2	317	309	2204	10.8	1.6	0.3	0.2
8/3/07 17:00	881	6139	9814	604.2	523.1	81.1	13.4	1.13	2.2	319	309	2206	10.6	1.6	0.3	0.2
8/3/07 18:00	885	6166	9824	605.7	524.1	81.6	13.5	1.13	2.2	320	309	2207	10.5	1.6	0.3	0.2
8/3/07 19:00	885	6114	9844	604.7	522.6	82.1	13.6	1.14	2.2	316	308	2213	10.2	1.6	0.3	0.2
8/3/07 20:00	883	6129	9738	598.2	517.5	80.7	13.5	1.14	2.2	314	305	2210	10.1	1.6	0.3	0.2
8/3/07 21:00	882	6132	9781	591.3	511.6	79.7	13.5	1.15	2.2	314	304	2208	10.2	1.5	0.3	0.2
8/3/07 22:00	882	6103	9775	589.6	510.2	79.5	13.5	1.15	2.2	314	302	2203	10.0	1.4	0.3	0.2
8/3/07 23:00	880	6113	9784	590.9	509.8	81.1	13.7	1.15	2.2	312	301	2212	10.0	1.4	0.2	0.2
8/4/07 0:00	881	6072	9851	600.6	517.0	83.6	13.9	1.15	2.3	312	300	2212	10.0	1.5	0.3	0.2
8/4/07 1:00	881	6145	9860	601.5	518.6	83.0	13.8	1.14	2.3	313	299	2220	10.2	1.5	0.3	0.2
8/4/07 2:00	886	6073	9757	597.4	515.1	82.3	13.8	1.14	2.3	310	298	2214	10.0	1.5	0.3	0.2
8/4/07 3:00	883	6045	9751	598.0	515.6	82.4	13.8	1.13	2.3	311	297	2210	10.1	1.4	0.3	0.2
8/4/07 4:00	882	6057	9753	598.6	515.8	82.8	13.8	1.13	2.3	311	298	2215	9.9	1.4	0.2	0.2
8/4/07 5:00	882	6065	9721	597.2	514.3	82.9	13.9	1.13	2.3	310	298	2215	9.4	1.4	0.2	0.2
8/4/07 6:00	883	6045	9695	593.6	511.1	82.4	13.9	1.14	2.3	310	298	2212	9.9	1.4	0.3	0.2
8/4/07 7:00	880	6041	9624	588.5	506.8	81.7	13.9	1.14	2.3	309	298	2208	10.3	1.4	0.3	0.2
8/4/07 8:00	882	6069	9637	584.0	503.0	81.1	13.9	1.15	2.3	309	297	2216	9.9	1.4	0.3	0.2
8/4/07 9:00	880	6087	9716	583.3	502.4	81.0	13.9	1.16	2.3	310	298	2224	9.8	1.4	0.2	0.2
8/4/07 10:00	884	6062	9757	587.6	506.0	81.6	13.9	1.16	2.3	312	300	2225	9.4	1.4	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/4/07 11:00	883	6123	9744	587.2	505.7	81.5	13.9	1.16	2.3	310	302	2224	9.5	1.4	0.2	0.2
8/4/07 12:00	885	6111	9834	588.3	506.6	81.7	13.9	1.16	2.3	312	304	2210	9.0	1.4	0.2	0.2
8/4/07 13:00	886	6107	9850	590.3	508.3	82.0	13.9	1.16	2.3	311	306	2210	9.6	1.4	0.2	0.2
8/4/07 14:00	886	6089	9818	590.5	508.5	82.0	13.9	1.16	2.3	311	306	2217	9.9	1.5	0.3	0.2
8/4/07 15:00	885	6107	9785	591.5	509.4	82.1	13.9	1.15	2.3	312	307	2233	9.8	1.5	0.3	0.2
8/4/07 16:00	885	6098	9795	593.1	511.4	81.7	13.8	1.15	2.3	313	307	2237	10.0	1.5	0.3	0.2
8/4/07 17:00	885	6111	9778	595.0	513.0	81.9	13.8	1.15	2.3	314	308	2231	10.1	1.5	0.3	0.2
8/4/07 18:00	885	6140	9818	594.4	512.5	81.9	13.8	1.15	2.3	315	308	2239	10.0	1.5	0.3	0.2
8/4/07 19:00	887	6111	9738	592.2	510.6	81.5	13.8	1.15	2.3	313	307	2234	10.0	1.4	0.3	0.2
8/4/07 20:00	884	6131	9763	592.2	510.7	81.5	13.8	1.15	2.3	311	306	2238	10.1	1.4	0.3	0.2
8/4/07 21:00	885	6149	9865	590.2	508.9	81.2	13.8	1.16	2.3	310	304	2247	10.0	1.4	0.2	0.2
8/4/07 22:00	885	6139	9780	581.0	501.1	79.9	13.8	1.17	2.3	308	301	2235	10.1	1.3	0.2	0.2
8/4/07 23:00	883	6077	9745	577.7	498.2	79.4	13.8	1.17	2.3	308	301	2216	10.1	1.3	0.2	0.2
8/5/07 0:00	879	6087	9807	578.8	499.2	79.6	13.8	1.17	2.3	309	300	2212	9.7	1.3	0.2	0.2
8/5/07 1:00	880	6088	9873	582.6	502.5	80.1	13.8	1.17	2.3	308	298	2220	9.9	1.4	0.2	0.2
8/5/07 2:00	886	6079	9747	577.1	497.8	79.4	13.8	1.17	2.2	307	298	2206	9.6	1.4	0.2	0.2
8/5/07 3:00	884	6082	9640	564.4	486.9	77.6	13.7	1.18	2.3	305	295	2193	9.5	1.3	0.2	0.2
8/5/07 4:00	882	6042	9604	556.7	479.9	76.8	13.8	1.20	2.3	307	294	2188	9.9	1.2	0.2	0.2
8/5/07 5:00	878	6038	9728	562.2	483.4	78.8	14.0	1.20	2.3	309	295	2199	9.9	1.2	0.2	0.2
8/5/07 6:00	881	6083	9822	572.4	492.2	80.3	14.0	1.20	2.3	310	296	2203	10.1	1.3	0.2	0.2
8/5/07 7:00	886	6077	9848	578.2	497.2	81.1	14.0	1.19	2.3	308	295	2198	10.2	1.3	0.2	0.2
8/5/07 8:00	885	6093	9779	582.9	501.2	81.7	14.0	1.18	2.3	308	296	2209	10.2	1.3	0.3	0.2
8/5/07 9:00	884	6130	9797	584.4	502.5	82.0	14.0	1.17	2.3	310	296	2213	10.2	1.3	0.3	0.2
8/5/07 10:00	883	6164	9805	583.3	501.5	81.8	14.0	1.17	2.3	311	297	2204	10.3	1.3	0.3	0.2
8/5/07 11:00	888	6155	9802	581.3	499.8	81.5	14.0	1.18	2.3	310	297	2208	10.3	1.3	0.2	0.2
8/5/07 12:00	885	6145	9772	576.7	495.8	80.9	14.0	1.18	2.3	311	298	2206	10.2	1.3	0.2	0.2
8/5/07 13:00	885	6088	9706	572.6	492.3	80.3	14.0	1.18	2.3	312	300	2194	10.1	1.3	0.2	0.2
8/5/07 14:00	881	6064	9784	574.6	494.0	80.6	14.0	1.18	2.3	313	301	2197	10.3	1.3	0.2	0.2
8/5/07 15:00	881	6073	9827	578.0	497.2	80.8	14.0	1.18	2.3	315	302	2210	10.2	1.4	0.2	0.2
8/5/07 16:00	879	6097	9856	583.6	502.8	80.8	13.8	1.17	2.3	318	304	2228	10.4	1.4	0.2	0.2
8/5/07 17:00	880	6105	9875	588.9	507.5	81.4	13.8	1.17	2.3	316	304	2236	10.3	1.4	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/5/07 18:00	884	6088	9755	588.6	507.2	81.4	13.8	1.16	2.2	314	304	2236	10.4	1.4	0.2	0.2
8/5/07 19:00	882	6060	9743	590.0	508.4	81.6	13.8	1.15	2.3	314	305	2230	10.4	1.5	0.2	0.2
8/5/07 20:00	880	6058	9866	598.0	515.3	82.7	13.8	1.14	2.3	315	306	2232	10.6	1.6	0.2	0.2
8/5/07 21:00	879	6133	9881	599.9	516.9	83.0	13.8	1.14	2.3	314	305	2253	10.5	1.6	0.2	0.2
8/5/07 22:00	887	6119	9813	596.0	513.6	82.5	13.8	1.14	2.2	310	302	2263	10.4	1.5	0.2	0.2
8/5/07 23:00	887	6111	9735	592.0	510.2	81.9	13.8	1.14	2.3	310	302	2251	10.5	1.6	0.2	0.2
8/6/07 0:00	882	6078	9854	597.9	515.2	82.7	13.8	1.14	2.3	308	301	2248	10.3	1.7	0.2	0.2
8/6/07 1:00	884	6128	9868	599.5	516.5	82.9	13.8	1.14	2.2	307	299	2249	10.1	1.8	0.2	0.2
8/6/07 2:00	889	6125	9689	591.2	509.5	81.7	13.8	1.15	2.3	306	297	2243	10.4	1.7	0.2	0.2
8/6/07 3:00	887	6100	9695	583.8	503.1	80.7	13.8	1.16	2.3	306	295	2237	10.5	1.7	0.2	0.2
8/6/07 4:00	886	6091	9685	580.1	499.9	80.2	13.8	1.16	2.3	307	295	2233	10.3	1.7	0.2	0.2
8/6/07 5:00	883	6078	9677	582.2	501.7	80.5	13.8	1.17	2.3	307	295	2231	10.0	1.7	0.2	0.2
8/6/07 6:00	880	6082	9900	593.9	512.1	81.8	13.8	1.16	2.3	308	296	2230	10.0	1.8	0.2	0.2
8/6/07 7:00	886	6121	9893	597.5	515.6	81.9	13.7	1.15	2.2	308	295	2245	10.2	1.9	0.2	0.2
8/6/07 8:00	888	6139	9740	591.5	510.4	81.1	13.7	1.15	2.2	308	295	2245	10.1	1.9	0.3	0.2
8/6/07 9:00	887	6119	9688	582.7	502.9	79.9	13.7	1.16	2.3	309	296	2237	10.1	2.0	0.3	0.2
8/6/07 10:00	882	6070	9697	579.7	500.3	79.4	13.7	1.17	6.6	309	297	2226	9.8	2.0	0.3	0.2
8/6/07 11:00	881	6055	9795	584.0	504.0	80.0	13.7	1.16	2.7	311	299	2225	9.9	2.0	0.3	0.2
8/6/07 12:00	879	6064	9865	591.8	510.7	81.1	13.7	1.16	2.3	313	300	2237	10.0	2.0	0.3	0.2
8/6/07 13:00	881	6136	9800	588.5	507.8	80.7	13.7	1.16	2.3	314	300	2236	9.9	2.0	0.3	0.2
8/6/07 14:00	880	6114	9674	575.1	496.3	78.7	13.7	1.17	2.3	313	301	2223	9.9	1.7	0.2	0.2
8/6/07 15:00	880	6051	9686	571.1	493.0	78.2	13.7	1.18	2.3	315	302	2213	10.0	1.7	0.2	0.2
8/6/07 16:00	879	6040	9816	578.3	499.1	79.2	13.7	1.18	2.3	316	304	2230	9.8	1.9	0.2	0.2
8/6/07 17:00	875	6040	9960	588.1	507.5	80.6	13.7	1.17	2.3	314	305	2242	9.8	2.1	0.2	0.2
8/6/07 18:00	879	6062	9917	599.3	517.1	82.2	13.7	1.15	2.2	313	306	2248	9.4	2.1	0.3	0.2
8/6/07 19:00	884	6082	9802	600.7	518.3	82.4	13.7	1.14	2.2	316	306	2258	9.4	2.0	0.2	0.2
8/6/07 20:00	882	6057	9751	602.7	520.0	82.7	13.7	1.13	2.3	316	306	2264	9.5	1.9	0.2	0.2
8/6/07 21:00	880	6083	9860	608.2	524.7	83.4	13.7	1.12	2.3	315	306	2262	9.6	1.9	0.2	0.2
8/6/07 22:00	882	6133	9826	602.2	519.6	82.6	13.7	1.13	2.3	312	303	2266	9.4	1.8	0.2	0.2
8/6/07 23:00	886	6104	9646	588.4	507.8	80.6	13.7	1.14	2.3	313	301	2259	9.6	1.6	0.2	0.2
8/7/07 0:00	878	6078	9732	585.6	505.4	80.3	13.7	1.15	2.3	311	298	2251	9.4	1.6	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/7/07 1:00	879	6048	9879	595.7	514.1	81.7	13.7	1.15	2.3	309	298	2261	9.9	1.6	0.2	0.2
8/7/07 2:00	882	6086	9877	599.6	517.4	82.2	13.7	1.14	2.2	308	297	2272	9.2	1.7	0.2	0.2
8/7/07 3:00	884	6065	9774	599.1	517.0	82.2	13.7	1.14	2.2	307	296	2260	9.4	1.6	0.2	0.2
8/7/07 4:00	883	6061	9758	597.8	515.8	82.0	13.7	1.13	2.3	307	297	2257	9.2	1.6	0.2	0.2
8/7/07 5:00	883	6055	9712	595.9	514.2	81.7	13.7	1.13	2.3	308	296	2256	9.1	1.6	0.2	0.2
8/7/07 6:00	884	6072	9584	584.6	504.5	80.1	13.7	1.14	2.3	306	296	2244	9.6	1.5	0.2	0.2
8/7/07 7:00	879	6027	9707	583.2	503.3	79.9	13.7	1.15	2.2	305	294	2235	9.7	1.5	0.2	0.2
8/7/07 8:00	876	6034	9826	591.9	510.7	81.1	13.7	1.15	2.2	307	295	2235	9.7	1.6	0.2	0.2
8/7/07 9:00	880	6147	9821	591.1	510.1	81.0	13.7	1.15	2.2	308	296	2244	9.7	1.6	0.2	0.2
8/7/07 10:00	884	6097	9779	585.0	504.8	80.1	13.7	1.16	2.2	308	298	2235	9.6	1.5	0.2	0.2
8/7/07 11:00	880	6123	9828	581.8	502.2	79.7	13.7	1.16	2.2	310	299	2234	9.6	1.5	0.2	0.2
8/7/07 12:00	877	6056	9951	593.6	512.3	81.4	13.7	1.16	2.2	313	302	2247	9.6	1.6	0.2	0.2
8/7/07 13:00	879	6085	10089	611.1	528.1	83.0	13.6	1.14	2.2	317	304	2254	9.8	1.8	0.2	0.2
8/7/07 14:00	884	6116	9931	610.5	529.7	80.8	13.2	1.13	2.2	318	305	2256	9.8	1.8	0.2	0.2
8/7/07 15:00	884	6160	9751	599.0	519.6	79.4	13.3	1.13	2.2	318	306	2251	9.5	1.7	0.2	0.2
8/7/07 16:00	883	6083	9740	592.5	514.0	78.6	13.3	1.14	2.2	320	308	2245	9.5	1.6	0.2	0.2
8/7/07 17:00	877	6050	9865	603.9	523.9	80.0	13.2	1.13	2.2	321	309	2248	9.6	1.8	0.2	0.2
8/7/07 18:00	881	6090	9841	607.1	526.7	80.4	13.2	1.12	2.2	319	308	2262	9.4	1.8	0.2	0.2
8/7/07 19:00	881	6083	9844	611.1	530.2	80.9	13.2	1.12	2.2	320	309	2262	9.6	1.8	0.2	0.2
8/7/07 20:00	873	6066	9795	600.4	522.8	77.6	12.9	1.12	2.2	319	306	2238	9.6	1.8	0.2	0.2
8/7/07 21:00	875	6059	9781	599.0	522.9	76.2	12.7	1.13	2.2	316	304	2246	9.8	1.7	0.2	0.2
8/7/07 22:00	879	6031	9786	603.3	525.4	77.9	12.9	1.12	2.3	315	303	2244	9.7	1.7	0.2	0.2
8/7/07 23:00	878	6077	9835	608.7	530.1	78.5	12.9	1.12	2.3	312	301	2247	9.9	1.8	0.2	0.2
8/8/07 0:00	882	6063	9835	615.0	535.6	79.3	12.9	1.11	2.3	311	301	2257	9.9	1.8	0.2	0.2
8/8/07 1:00	881	6076	9888	622.4	542.1	80.3	12.9	1.10	2.3	313	301	2265	9.9	1.9	0.2	0.2
8/8/07 2:00	881	6074	9891	630.3	549.1	81.2	12.9	1.09	2.3	313	300	2257	9.7	1.9	0.2	0.2
8/8/07 3:00	882	6104	9866	635.1	553.4	81.7	12.9	1.08	2.2	312	299	2248	9.6	1.9	0.2	0.2
8/8/07 4:00	883	6115	9770	629.6	548.7	80.9	12.8	1.08	2.3	311	298	2252	9.8	1.9	0.2	0.2
8/8/07 5:00	882	6086	9781	625.9	545.5	80.4	12.8	1.09	2.4	305	297	2260	9.4	1.8	0.2	0.2
8/8/07 6:00	884	6070	9712	619.5	539.8	79.6	12.9	1.09	2.3	306	297	2258	9.5	1.8	0.2	0.2
8/8/07 7:00	882	6068	9669	611.6	532.9	78.6	12.9	1.10	2.4	307	297	2253	9.7	1.7	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/8/07 8:00	880	6085	9753	611.0	532.5	78.5	12.9	1.10	2.3	310	298	2248	9.8	1.7	0.2	0.2
8/8/07 9:00	880	6076	9819	611.1	532.5	78.6	12.9	1.11	2.3	310	299	2243	9.9	1.6	0.2	0.2
8/8/07 10:00	878	6040	9897	621.5	541.7	79.9	12.8	1.10	2.3	308	300	2252	9.6	1.8	0.2	0.2
8/8/07 11:00	879	6075	9921	634.1	552.7	81.4	12.8	1.08	2.2	310	300	2257	9.8	1.9	0.2	0.2
8/8/07 12:00	883	6107	9847	634.5	553.1	81.5	12.8	1.08	2.2	313	302	2249	9.8	1.9	0.2	0.2
8/8/07 13:00	884	6126	9729	622.9	542.9	80.0	12.9	1.09	2.2	313	303	2248	9.7	1.8	0.2	0.2
8/8/07 14:00	884	6057	9741	619.6	540.0	79.6	12.8	1.09	2.2	312	304	2246	9.4	1.8	0.2	0.2
8/8/07 15:00	879	6079	9739	617.3	537.9	79.4	12.9	1.10	2.3	313	303	2244	9.5	1.8	0.2	0.2
8/8/07 16:00	883	6047	9745	617.8	538.4	79.4	12.9	1.10	2.2	314	305	2247	9.5	1.8	0.2	0.2
8/8/07 17:00	881	6082	9725	608.2	530.0	78.2	12.9	1.10	2.3	314	306	2252	9.7	1.7	0.2	0.2
8/8/07 18:00	879	6045	9726	602.0	524.6	77.4	12.9	1.11	2.3	314	306	2254	9.6	1.7	0.1	0.2
8/8/07 19:00	876	6045	9779	603.1	525.5	77.6	12.9	1.12	2.3	313	305	2251	9.7	1.7	0.2	0.2
8/8/07 20:00	826	5681	9937	582.6	500.8	81.8	14.0	1.11	2.3	320	309	2173	9.3	1.8	0.2	0.2
8/8/07 21:00	815	5580	9943	589.4	503.3	86.0	14.6	1.08	2.3	335	314	2143	9.1	1.9	0.2	0.2
8/8/07 22:00	820	5666	9863	599.5	511.6	87.9	14.7	1.06	2.3	331	310	2160	9.1	1.9	0.2	0.2
8/8/07 23:00	814	5598	9896	601.2	513.0	88.2	14.7	1.05	2.4	321	303	2149	9.0	2.0	0.2	0.2
8/9/07 0:00	830	5682	9741	604.5	517.2	87.4	14.5	1.05	2.3	317	303	2149	9.3	2.0	0.2	0.2
8/9/07 1:00	881	6083	9579	622.2	539.4	82.8	13.3	1.06	2.4	311	301	2246	9.6	1.8	0.2	0.2
8/9/07 2:00	878	6006	9568	609.4	530.2	79.2	13.0	1.08	2.4	310	299	2245	9.6	1.8	0.2	0.2
8/9/07 3:00	876	6022	9631	605.9	526.9	79.0	13.0	1.10	2.4	310	296	2242	9.8	1.8	0.2	0.2
8/9/07 4:00	879	6017	9669	602.0	523.5	78.5	13.0	1.11	2.4	310	295	2247	9.8	1.8	0.2	0.2
8/9/07 5:00	879	6045	9650	593.8	516.7	77.1	13.0	1.12	2.5	309	295	2252	9.5	2.0	0.2	0.2
8/9/07 6:00	877	6036	9672	587.6	511.5	76.1	13.0	1.14	2.5	309	296	2248	9.6	2.1	0.2	0.2
8/9/07 7:00	879	6023	9726	591.8	515.1	76.7	13.0	1.14	2.5	310	296	2257	9.4	2.2	0.2	0.2
8/9/07 8:00	880	6099	9780	595.5	518.4	77.2	13.0	1.14	2.4	309	294	2261	9.9	2.3	0.2	0.2
8/9/07 9:00	887	6103	9744	594.0	516.9	77.0	13.0	1.14	2.4	309	295	2252	9.8	2.3	0.2	0.2
8/9/07 10:00	887	6105	9713	587.8	511.6	76.2	13.0	1.15	2.4	311	297	2254	9.6	2.2	0.2	0.2
8/9/07 11:00	884	6121	9717	582.0	506.7	75.3	12.9	1.16	2.4	313	299	2267	9.6	2.0	0.2	0.2
8/9/07 12:00	883	6081	9843	588.8	512.5	76.3	13.0	1.16	2.4	315	303	2268	9.7	2.0	0.2	0.2
8/9/07 13:00	885	6100	9850	593.5	516.6	77.0	13.0	1.15	2.4	318	306	2260	9.2	2.1	0.2	0.2
8/9/07 14:00	885	6108	9795	593.1	516.2	76.9	13.0	1.15	2.4	319	308	2263	9.3	2.2	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/9/07 15:00	887	6118	9810	595.5	518.2	77.3	13.0	1.15	2.3	320	309	2267	9.2	2.5	0.2	0.2
8/9/07 16:00	884	6119	9805	588.6	512.3	76.3	13.0	1.15	2.3	322	311	2259	9.4	2.6	0.3	0.2
8/9/07 17:00	879	6062	9818	588.1	511.9	76.2	13.0	1.15	2.3	320	309	2254	9.6	2.6	0.3	0.2
8/9/07 18:00	881	6047	9759	588.8	512.5	76.3	13.0	1.15	2.2	318	308	2250	9.4	2.8	0.3	0.2
8/9/07 19:00	880	6025	9766	590.6	514.0	76.6	13.0	1.15	2.2	314	308	2246	9.3	2.8	0.3	0.2
8/9/07 20:00	881	6060	9741	594.2	517.2	77.0	13.0	1.14	2.2	314	308	2255	9.3	2.7	0.3	0.2
8/9/07 21:00	881	6112	9746	587.4	511.3	76.1	13.0	1.15	2.3	313	306	2260	9.3	2.5	0.2	0.2
8/9/07 22:00	881	6080	9776	583.8	508.3	75.6	12.9	1.16	2.3	310	305	2254	9.4	2.2	0.2	0.2
8/9/07 23:00	883	6084	9748	581.1	505.9	75.2	12.9	1.16	2.2	312	304	2253	9.5	2.0	0.2	0.2
8/10/07 0:00	879	6076	9761	579.0	504.2	74.9	12.9	1.17	2.3	315	306	2246	9.9	1.9	0.2	0.2
8/10/07 1:00	877	6097	9832	581.9	506.6	75.3	12.9	1.17	2.3	313	307	2239	10.0	2.1	0.2	0.2
8/10/07 2:00	873	6028	9858	580.5	502.3	78.2	13.5	1.17	2.2	316	306	2234	10.0	2.1	0.2	0.2
8/10/07 3:00	878	6044	9734	578.0	482.2	95.8	16.6	1.17	2.2	319	311	2234	9.9	2.0	0.2	0.2
8/10/07 4:00	877	6059	9780	577.6	478.5	99.1	17.2	1.17	2.2	319	311	2241	9.4	2.0	0.2	0.2
8/10/07 5:00	878	6071	9839	578.6	479.9	98.7	17.1	1.17	2.2	320	309	2244	9.1	2.3	0.2	0.2
8/10/07 6:00	878	6058	9839	582.2	484.4	97.8	16.8	1.17	2.3	317	305	2244	9.6	2.2	0.2	0.2
8/10/07 7:00	881	6051	9750	582.0	484.8	97.2	16.7	1.16	2.3	316	305	2233	9.6	2.0	0.2	0.2
8/10/07 8:00	879	6063	9765	585.8	488.0	97.8	16.7	1.16	2.3	316	305	2232	10.0	2.0	0.2	0.2
8/10/07 9:00	882	6079	9837	593.2	491.9	101.3	17.1	1.15	2.2	318	307	2248	10.2	2.1	0.2	0.2
8/10/07 10:00	882	6060	9792	592.4	490.2	102.3	17.3	1.15	2.2	320	310	2251	10.1	2.0	0.2	0.2
8/10/07 11:00	881	6061	9797	593.0	489.9	103.1	17.4	1.15	2.3	321	313	2250	10.0	1.9	0.2	0.2
8/10/07 12:00	881	6089	9734	588.8	488.5	100.3	17.0	1.15	2.3	322	314	2262	10.0	1.7	0.2	0.2
8/10/07 13:00	880	6055	9812	587.5	493.5	94.0	16.0	1.15	2.3	322	314	2267	10.1	1.8	0.2	0.2
8/10/07 14:00	880	6046	9779	588.9	494.8	94.1	16.0	1.15	2.3	318	315	2259	9.9	2.0	0.2	0.2
8/10/07 15:00	879	6047	9843	595.6	500.0	95.5	16.0	1.14	2.3	318	315	2248	10.0	2.2	0.2	0.2
8/10/07 16:00	882	6069	9798	598.0	496.9	101.1	16.9	1.14	2.2	316	314	2241	10.0	2.2	0.2	0.2
8/10/07 17:00	881	6121	9779	591.9	487.4	104.5	17.7	1.14	2.3	316	315	2243	10.0	2.1	0.2	0.2
8/10/07 18:00	880	6058	9850	596.2	488.5	107.7	18.1	1.14	2.3	316	315	2252	9.8	2.0	0.2	0.2
8/10/07 19:00	877	6040	9984	614.5	506.8	107.7	17.5	1.13	2.3	316	315	2256	9.8	2.0	0.2	0.2
8/10/07 20:00	876	6071	10101	634.7	545.4	89.3	14.1	1.09	2.2	321	318	2269	9.6	2.0	0.2	0.2
8/10/07 21:00	883	6153	9857	626.8	548.4	78.4	12.5	1.09	2.2	319	312	2262	9.6	2.0	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/10/07 22:00	888	6094	9714	616.3	539.2	77.0	12.5	1.10	2.2	314	307	2262	9.8	2.0	0.2	0.2
8/10/07 23:00	881	6063	9707	615.6	538.7	76.9	12.5	1.10	2.3	311	306	2264	10.0	2.1	0.2	0.2
8/11/07 0:00	875	6035	9831	620.5	542.9	77.6	12.5	1.09	2.2	311	307	2267	9.7	2.2	0.2	0.2
8/11/07 1:00	860	5960	9768	606.1	528.0	78.0	12.9	1.09	2.2	319	312	2235	9.3	2.4	0.2	0.2
8/11/07 2:00	876	5993	9670	607.3	530.0	77.3	12.7	1.10	2.3	311	306	2234	9.3	2.6	0.3	0.2
8/11/07 3:00	877	5978	9606	599.8	523.6	76.2	12.7	1.10	2.2	309	303	2227	9.6	2.6	0.3	0.2
8/11/07 4:00	875	5957	9633	596.5	520.8	75.8	12.7	1.11	2.3	308	302	2231	9.7	2.6	0.3	0.2
8/11/07 5:00	866	5897	9643	587.7	512.9	74.8	12.7	1.12	2.3	312	305	2221	9.5	2.6	0.3	0.2
8/11/07 6:00	868	5932	9615	589.3	507.1	82.2	14.0	1.12	2.2	320	309	2231	9.4	2.6	0.3	0.2
8/11/07 7:00	875	6023	9712	597.4	520.9	76.5	12.8	1.12	2.3	312	303	2239	9.3	2.6	0.3	0.2
8/11/07 8:00	880	6017	9702	599.1	523.4	75.8	12.6	1.12	2.3	309	303	2251	9.6	2.8	0.3	0.2
8/11/07 9:00	881	6011	9719	597.2	522.5	74.6	12.5	1.12	2.2	308	302	2251	9.5	2.7	0.3	0.2
8/11/07 10:00	877	6047	9739	599.3	524.3	75.0	12.5	1.12	2.3	309	302	2251	9.5	2.8	0.3	0.2
8/11/07 11:00	879	6040	9869	610.8	534.3	76.5	12.5	1.12	2.3	310	304	2244	9.5	2.8	0.3	0.2
8/11/07 12:00	882	6066	9797	614.0	536.7	77.3	12.6	1.11	2.2	313	306	2259	9.6	2.8	0.3	0.2
8/11/07 13:00	883	6073	9794	614.0	536.5	77.5	12.6	1.11	2.2	314	307	2268	9.6	2.7	0.3	0.2
8/11/07 14:00	884	6071	9730	613.6	536.2	77.4	12.6	1.11	2.3	315	308	2262	9.6	2.6	0.3	0.2
8/11/07 15:00	882	6075	9748	609.9	532.9	77.0	12.6	1.11	2.3	317	309	2252	9.3	2.4	0.2	0.2
8/11/07 16:00	882	6065	9774	611.9	534.6	77.2	12.6	1.11	2.2	317	311	2245	9.3	2.2	0.2	0.2
8/11/07 17:00	881	6084	9822	614.4	536.9	77.5	12.6	1.11	2.2	318	312	2246	9.3	2.0	0.2	0.2
8/11/07 18:00	883	6088	9770	612.4	535.1	77.3	12.6	1.11	2.2	318	312	2243	8.9	2.0	0.2	0.2
8/11/07 19:00	884	6074	9736	607.1	530.5	76.6	12.6	1.11	2.2	318	312	2253	8.9	2.0	0.2	0.2
8/11/07 20:00	882	6098	9682	602.8	526.7	76.1	12.6	1.12	2.3	316	311	2256	9.0	1.9	0.2	0.2
8/11/07 21:00	883	6075	9742	599.5	523.9	75.7	12.6	1.13	2.3	315	310	2249	9.3	1.8	0.2	0.2
8/11/07 22:00	882	6079	9691	595.8	521.2	74.6	12.5	1.13	2.3	315	309	2261	9.5	1.7	0.2	0.2
8/11/07 23:00	881	6073	9790	596.0	521.5	74.5	12.5	1.14	2.2	314	308	2266	9.6	1.6	0.1	0.2
8/12/07 0:00	879	6107	9854	598.0	523.3	74.7	12.5	1.14	2.3	312	306	2275	9.6	1.6	0.1	0.2
8/12/07 1:00	882	6107	9932	600.6	525.5	75.1	12.5	1.14	2.2	310	304	2260	9.6	1.6	0.1	0.2
8/12/07 2:00	885	6089	9742	595.3	520.9	74.4	12.5	1.14	2.2	311	305	2261	9.7	1.5	0.1	0.2
8/12/07 3:00	883	6085	9751	593.0	518.8	74.1	12.5	1.14	2.3	309	304	2261	10.1	1.4	0.1	0.2
8/12/07 4:00	882	6064	9768	597.1	522.5	74.7	12.5	1.14	2.2	308	303	2252	10.5	1.5	0.1	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/12/07 5:00	882	6075	9835	598.6	523.8	74.8	12.5	1.14	2.2	309	303	2255	10.1	1.6	0.1	0.2
8/12/07 6:00	882	6089	9788	599.6	524.7	74.9	12.5	1.13	2.3	309	302	2267	10.0	1.6	0.2	0.2
8/12/07 7:00	883	6079	9796	600.6	525.5	75.1	12.5	1.13	2.3	308	302	2260	10.7	1.6	0.2	0.2
8/12/07 8:00	883	6066	9798	602.3	527.0	75.3	12.5	1.13	2.2	310	304	2255	10.2	1.7	0.2	0.2
8/12/07 9:00	880	6100	9827	604.2	528.7	75.5	12.5	1.13	2.3	310	304	2267	10.3	1.7	0.2	0.2
8/12/07 10:00	881	6107	9826	605.6	529.9	75.7	12.5	1.13	2.2	311	304	2268	10.4	1.7	0.2	0.2
8/12/07 11:00	884	6111	9728	598.7	523.9	74.8	12.5	1.13	2.2	311	306	2249	10.3	1.7	0.2	0.2
8/12/07 12:00	882	6093	9723	595.7	520.9	74.9	12.6	1.14	2.3	313	308	2264	10.2	1.6	0.2	0.2
8/12/07 13:00	881	6078	9806	597.7	522.2	75.5	12.6	1.14	2.2	315	311	2262	10.2	1.6	0.2	0.2
8/12/07 14:00	882	6099	9837	597.8	522.1	75.7	12.7	1.14	2.2	317	312	2247	10.1	1.7	0.2	0.2
8/12/07 15:00	882	6126	9738	592.5	517.4	75.2	12.7	1.15	2.2	318	312	2242	10.0	1.7	0.2	0.2
8/12/07 16:00	883	6092	9777	588.0	513.5	74.5	12.7	1.15	2.3	319	314	2244	10.0	1.8	0.2	0.2
8/12/07 17:00	881	6078	9812	587.8	513.3	74.5	12.7	1.15	2.3	321	315	2248	10.1	1.9	0.2	0.2
8/12/07 18:00	880	6082	9871	591.9	516.8	75.1	12.7	1.15	2.2	320	314	2245	10.1	2.0	0.2	0.2
8/12/07 19:00	883	6095	9797	590.2	515.3	74.9	12.7	1.15	2.2	319	314	2253	9.9	2.0	0.2	0.2
8/12/07 20:00	882	6055	9777	591.4	516.3	75.0	12.7	1.15	2.3	319	313	2252	9.9	2.0	0.2	0.2
8/12/07 21:00	881	6083	9810	592.1	516.9	75.1	12.7	1.15	2.2	318	313	2272	10.1	2.0	0.2	0.2
8/12/07 22:00	881	6109	9796	588.2	513.7	74.6	12.7	1.15	2.3	317	311	2271	10.4	1.9	0.2	0.2
8/12/07 23:00	881	6064	9793	590.4	515.5	74.9	12.7	1.15	2.3	315	309	2260	10.5	1.8	0.2	0.2
8/13/07 0:00	877	6101	9891	599.3	523.1	76.2	12.7	1.14	2.2	314	309	2266	10.5	1.8	0.2	0.2
8/13/07 1:00	882	6093	9949	607.4	530.1	77.3	12.7	1.13	2.3	315	308	2276	10.4	1.8	0.2	0.2
8/13/07 2:00	883	6074	9927	616.0	537.4	78.5	12.8	1.12	2.2	314	309	2271	10.6	1.8	0.2	0.2
8/13/07 3:00	882	6144	9898	613.1	534.9	78.1	12.7	1.11	2.2	314	308	2270	10.4	1.8	0.2	0.2
8/13/07 4:00	884	6149	9774	603.3	526.5	76.7	12.7	1.12	2.3	314	305	2248	10.5	1.7	0.2	0.2
8/13/07 5:00	879	6021	9686	593.4	518.1	75.3	12.7	1.13	2.2	312	304	2234	10.4	1.7	0.2	0.2
8/13/07 6:00	880	6018	9744	597.4	521.6	75.9	12.7	1.13	2.2	311	303	2262	10.2	1.9	0.2	0.2
8/13/07 7:00	881	6023	9712	597.3	521.5	75.9	12.7	1.13	2.2	310	303	2261	10.1	2.0	0.2	0.2
8/13/07 8:00	881	6045	9701	593.0	517.7	75.2	12.7	1.13	2.2	311	303	2255	10.4	1.9	0.2	0.2
8/13/07 9:00	879	6042	9705	590.3	515.4	74.9	12.7	1.14	2.3	312	303	2247	10.3	2.0	0.2	0.2
8/13/07 10:00	879	6052	9760	591.0	516.0	75.0	12.7	1.14	2.3	312	305	2250	10.1	2.1	0.2	0.2
8/13/07 11:00	881	6074	9670	586.3	512.0	74.3	12.7	1.15	2.3	313	307	2247	10.3	2.1	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/13/07 12:00	881	6050	9704	582.2	508.5	73.7	12.7	1.15	2.2	315	310	2244	10.1	2.1	0.2	0.2
8/13/07 13:00	881	6044	9679	577.2	504.2	73.0	12.7	1.16	2.3	314	311	2241	10.1	2.1	0.2	0.2
8/13/07 14:00	876	6061	9731	577.9	504.8	73.1	12.6	1.17	2.3	316	311	2247	10.0	2.3	0.2	0.2
8/13/07 15:00	883	6050	9762	577.8	504.7	73.1	12.7	1.17	2.2	315	311	2230	10.0	2.3	0.2	0.2
8/13/07 16:00	882	6065	9749	574.1	501.5	72.5	12.6	1.18	2.2	316	311	2213	9.7	2.3	0.2	0.2
8/13/07 17:00	883	6063	9711	570.4	498.4	72.0	12.6	1.18	2.2	318	312	2218	9.9	2.2	0.2	0.2
8/13/07 18:00	880	6016	9714	571.0	498.9	72.1	12.6	1.18	2.3	318	312	2228	9.6	2.2	0.2	0.2
8/13/07 19:00	878	5995	9842	584.1	510.1	74.0	12.7	1.17	2.3	319	312	2253	9.9	2.2	0.2	0.2
8/13/07 20:00	880	6057	9861	594.8	519.3	75.5	12.7	1.15	2.2	318	311	2261	10.1	2.2	0.2	0.2
8/13/07 21:00	881	6094	9840	597.9	521.9	75.9	12.7	1.14	2.2	316	310	2261	9.9	2.0	0.2	0.2
8/13/07 22:00	884	6058	9753	598.2	522.2	76.0	12.7	1.14	2.2	315	310	2261	10.2	1.9	0.2	0.2
8/13/07 23:00	882	6040	9759	603.6	526.8	76.8	12.7	1.13	2.3	316	310	2257	10.2	1.8	0.2	0.2
8/14/07 0:00	874	6072	9884	610.3	532.5	77.7	12.7	1.12	2.3	316	312	2246	10.2	1.9	0.2	0.2
8/14/07 1:00	860	5942	9958	606.5	524.8	81.7	13.5	1.11	2.2	325	316	2239	10.0	2.0	0.2	0.2
8/14/07 2:00	859	5900	9975	622.9	539.5	83.4	13.4	1.08	2.2	325	317	2225	9.3	2.1	0.2	0.2
8/14/07 3:00	864	5888	9922	637.0	552.1	84.8	13.3	1.06	2.2	321	313	2219	9.2	2.3	0.2	0.2
8/14/07 4:00	875	5991	9690	634.4	546.7	87.7	13.8	1.05	2.2	320	313	2242	9.2	2.2	0.2	0.2
8/14/07 5:00	880	6018	9513	621.1	533.0	88.2	14.2	1.06	2.3	318	311	2263	9.3	2.1	0.2	0.2
8/14/07 6:00	878	5984	9634	623.1	534.6	88.5	14.2	1.07	2.3	318	310	2253	9.7	2.2	0.2	0.2
8/14/07 7:00	880	6021	9632	621.7	519.0	102.7	16.5	1.08	2.3	319	313	2261	9.7	2.2	0.2	0.2
8/14/07 8:00	877	6043	9797	627.4	483.8	143.6	22.9	1.08	2.3	318	318	2252	9.6	2.2	0.2	0.2
8/14/07 9:00	883	6033	9726	627.9	474.9	153.0	24.4	1.08	2.2	313	311	2262	9.6	2.1	0.3	0.2
8/14/07 10:00	880	6062	9692	623.4	473.0	150.4	24.1	1.08	2.5	312	309	2282	9.7	2.0	0.3	0.2
8/14/07 11:00	879	6038	9735	619.4	472.2	147.2	23.8	1.08	2.5	314	311	2261	9.8	2.0	0.3	0.2
8/14/07 12:00	873	6019	9726	620.9	479.1	141.8	22.8	1.09	2.5	319	315	2261	9.6	1.9	0.3	0.2
8/14/07 13:00	870	6026	10027	639.0	552.0	87.0	13.6	1.07	2.5	330	320	2262	9.3	2.0	0.3	0.2
8/14/07 14:00	884	6110	9933	651.2	568.7	82.5	12.7	1.06	2.5	320	313	2262	9.5	2.0	0.3	0.2
8/14/07 15:00	887	6110	9839	654.3	571.7	82.6	12.6	1.05	2.4	318	312	2248	9.4	2.0	0.3	0.2
8/14/07 16:00	885	6069	9714	643.4	562.2	81.2	12.6	1.05	2.4	320	313	2237	9.1	2.0	0.3	0.2
8/14/07 17:00	882	6054	9713	637.6	557.4	80.2	12.6	1.06	2.4	321	313	2225	9.1	2.0	0.3	0.2
8/14/07 18:00	882	6094	9603	622.5	544.5	78.0	12.5	1.07	2.4	320	312	2225	9.1	1.9	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O_2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO_2 In	SO_2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/14/07 19:00	881	6066	9567	607.1	531.3	75.8	12.5	1.09	2.4	319	310	2219	9.2	1.7	0.2	0.2
8/14/07 20:00	878	6039	9740	610.9	534.6	76.3	12.5	1.10	2.4	317	309	2232	9.2	1.6	0.2	0.2
8/14/07 21:00	879	6069	9893	625.5	547.1	78.4	12.5	1.09	2.4	316	308	2244	9.3	1.7	0.2	0.2
8/14/07 22:00	886	6119	9857	629.4	550.4	79.0	12.5	1.09	2.4	315	306	2244	9.0	1.8	0.3	0.2
8/14/07 23:00	888	6083	9655	614.9	538.0	76.9	12.5	1.09	2.4	314	306	2249	9.1	1.7	0.3	0.2
8/15/07 0:00	881	6033	9705	612.2	535.5	76.8	12.5	1.10	2.4	313	305	2221	9.3	1.7	0.3	0.2
8/15/07 1:00	880	6065	9792	613.2	535.6	77.6	12.7	1.10	2.4	313	305	2225	9.3	1.6	0.3	0.2
8/15/07 2:00	879	6072	9794	611.5	534.3	77.2	12.6	1.11	2.4	313	304	2233	9.1	1.6	0.3	0.2
8/15/07 3:00	881	6061	9790	614.2	537.2	76.9	12.5	1.11	2.4	311	303	2231	9.2	1.5	0.3	0.2
8/15/07 4:00	883	6084	9648	605.7	530.1	75.6	12.5	1.11	2.3	311	302	2233	9.4	1.4	0.3	0.2
8/15/07 5:00	869	5952	9681	594.3	500.5	93.9	15.8	1.12	2.5	315	306	2226	9.4	1.4	0.3	0.2
8/15/07 6:00	876	6017	9914	613.7	482.5	131.2	21.4	1.11	2.5	317	308	2248	10.2	1.5	0.3	0.2
8/15/07 7:00	882	6067	9884	624.6	479.8	144.8	23.2	1.09	2.5	311	304	2261	10.1	1.5	0.3	0.2
8/15/07 8:00	884	6050	9851	634.0	486.7	147.3	23.2	1.08	6.2	311	304	2246	10.3	1.5	0.3	0.2
8/15/07 9:00	885	6112	9770	636.5	488.9	147.6	23.2	1.07	2.3	312	305	2238	10.4	1.5	0.3	0.2
8/15/07 10:00	884	6096	9583	614.7	470.2	144.5	23.5	1.09	2.3	312	306	2246	10.3	1.4	0.2	0.2
8/15/07 11:00	880	6039	9646	611.7	464.2	147.5	24.1	1.10	2.3	312	307	2248	10.3	1.4	0.2	0.2
8/15/07 12:00	880	6066	9869	628.5	477.7	150.9	24.0	1.09	2.3	314	307	2251	10.4	1.4	0.2	0.2
8/15/07 13:00	881	6153	10013	643.8	489.2	154.6	24.0	1.08	2.3	315	311	2250	11.1	1.5	0.3	0.2
8/15/07 14:00	884	6059	9739	626.5	471.6	154.9	24.7	1.08	2.2	317	311	2226	10.8	1.5	0.3	0.2
8/15/07 15:00	883	6101	9577	609.8	457.3	152.6	25.0	1.09	2.3	318	313	2231	11.0	1.5	0.2	0.2
8/15/07 16:00	879	6038	9670	602.6	451.1	151.5	25.1	1.11	2.3	318	313	2233	10.5	1.5	0.2	0.2
8/15/07 17:00	874	6004	9850	615.6	462.3	153.4	24.9	1.10	2.4	319	312	2245	9.7	1.7	0.3	0.2
8/15/07 18:00	879	6032	9925	631.6	475.9	155.7	24.6	1.09	2.3	317	311	2254	9.4	2.0	0.3	0.2
8/15/07 19:00	882	6108	9813	632.0	476.2	155.7	24.6	1.08	2.3	316	311	2264	9.3	1.9	0.3	0.2
8/15/07 20:00	885	6101	9784	628.9	473.6	155.3	24.7	1.08	2.3	315	310	2272	10.3	2.0	0.3	0.2
8/15/07 21:00	883	6153	9734	617.5	463.8	153.7	24.9	1.09	2.3	314	308	2265	10.7	1.9	0.3	0.2
8/15/07 22:00	887	6111	9647	605.5	453.5	152.0	25.1	1.11	2.3	313	306	2267	10.7	1.9	0.3	0.2
8/15/07 23:00	885	6083	9592	593.5	443.3	150.2	25.3	1.13	2.3	311	304	2261	10.8	1.8	0.3	0.2
8/16/07 0:00	879	6041	9700	596.3	445.7	150.7	25.3	1.13	2.3	312	304	2243	10.7	1.7	0.3	0.2
8/16/07 1:00	877	6053	9807	603.6	451.9	151.7	25.1	1.13	2.3	312	304	2240	9.8	1.7	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/16/07 2:00	881	6051	9789	607.3	455.2	152.2	25.1	1.12	2.3	313	304	2246	9.6	1.7	0.3	0.2
8/16/07 3:00	882	6085	9721	601.8	450.4	151.4	25.2	1.12	2.3	313	304	2242	9.4	1.8	0.3	0.2
8/16/07 4:00	882	6075	9720	595.1	444.7	150.4	25.3	1.13	2.3	312	304	2245	10.0	1.7	0.3	0.2
8/16/07 5:00	880	6030	9746	593.4	443.2	150.2	25.3	1.13	2.3	312	304	2243	10.6	1.7	0.3	0.2
8/16/07 6:00	881	6059	9736	591.1	441.2	149.9	25.4	1.14	2.3	312	304	2229	10.6	1.7	0.3	0.2
8/16/07 7:00	881	6054	9635	587.0	437.7	149.3	25.4	1.14	2.3	313	304	2227	10.8	1.7	0.3	0.2
8/16/07 8:00	880	6041	9720	585.7	436.6	149.1	25.5	1.15	2.3	313	305	2240	10.7	1.7	0.3	0.2
8/16/07 9:00	880	6055	9698	583.2	434.4	148.8	25.5	1.15	2.3	315	307	2237	10.7	1.8	0.3	0.2
8/16/07 10:00	879	6055	9737	584.4	435.5	148.9	25.5	1.16	2.3	315	308	2232	10.7	1.7	0.3	0.2
8/16/07 11:00	880	6091	9837	586.2	437.0	149.2	25.4	1.16	2.3	315	310	2241	10.8	1.8	0.3	0.2
8/16/07 12:00	880	6118	9700	576.8	428.9	147.8	25.6	1.17	2.3	315	310	2242	10.9	1.8	0.3	0.2
8/16/07 13:00	879	6094	9700	568.9	422.2	146.7	25.8	1.18	2.3	316	311	2243	10.8	1.9	0.3	0.2
8/16/07 14:00	877	6049	9809	575.2	427.6	147.6	25.7	1.18	2.4	317	310	2239	10.7	2.0	0.4	0.2
8/16/07 15:00	878	6085	9893	583.0	434.2	148.7	25.5	1.17	2.3	315	309	2245	10.8	2.2	0.4	0.2
8/16/07 16:00	881	6104	9810	580.6	432.2	148.4	25.6	1.17	2.3	312	307	2263	11.0	2.2	0.4	0.2
8/16/07 17:00	878	6108	9816	582.1	433.5	148.6	25.5	1.17	2.3	312	306	2265	11.1	2.2	0.4	0.2
8/16/07 18:00	879	6081	9932	588.5	439.0	149.5	25.4	1.17	2.3	311	303	2259	11.0	2.2	0.4	0.2
8/16/07 19:00	880	6089	9882	590.8	441.0	149.8	25.4	1.16	2.3	310	304	2255	11.2	2.3	0.4	0.2
8/16/07 20:00	880	6114	9866	592.5	442.4	150.1	25.3	1.15	2.3	310	304	2259	11.2	2.5	0.5	0.2
8/16/07 21:00	879	6126	9884	591.6	441.6	150.0	25.4	1.15	2.3	309	301	2241	11.3	2.5	0.5	0.2
8/16/07 22:00	882	6079	9854	594.2	443.9	150.3	25.3	1.15	2.3	308	300	2236	11.2	2.3	0.4	0.2
8/16/07 23:00	882	6090	9826	593.3	443.1	150.2	25.3	1.15	2.3	309	300	2235	11.2	2.2	0.4	0.2
8/17/07 0:00	882	6071	9701	582.2	433.6	148.6	25.5	1.15	2.3	310	300	2238	10.9	2.2	0.4	0.2
8/17/07 1:00	880	6064	9666	578.9	430.8	148.1	25.6	1.16	2.3	312	301	2232	10.8	2.3	0.4	0.2
8/17/07 2:00	878	6008	9746	584.4	435.5	148.9	25.5	1.16	2.3	312	301	2229	10.7	2.3	0.4	0.2
8/17/07 3:00	881	6055	9738	585.2	436.2	149.0	25.5	1.16	2.3	313	302	2228	10.7	2.1	0.4	0.2
8/17/07 4:00	880	6076	9689	581.0	432.6	148.4	25.5	1.16	2.3	311	303	2239	11.1	2.0	0.3	0.2
8/17/07 5:00	880	6046	9756	583.6	434.8	148.8	25.5	1.16	2.3	314	304	2247	11.5	2.2	0.4	0.2
8/17/07 6:00	880	6030	9790	589.8	440.1	149.7	25.4	1.15	2.3	313	304	2237	11.5	2.5	0.5	0.2
8/17/07 7:00	881	6074	9770	589.7	440.1	149.6	25.4	1.15	2.3	311	303	2246	11.8	2.4	0.5	0.2
8/17/07 8:00	883	6067	9730	587.5	438.2	149.3	25.4	1.15	2.3	311	302	2256	11.4	2.2	0.4	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/17/07 9:00	882	6057	9670	582.3	433.7	148.6	25.5	1.16	2.3	312	302	2252	11.2	2.1	0.4	0.2
8/17/07 10:00	878	6079	9698	579.9	431.6	148.3	25.6	1.16	2.3	311	303	2237	11.3	2.2	0.4	0.2
8/17/07 11:00	884	6076	9761	581.8	433.2	148.6	25.5	1.17	2.3	311	302	2236	11.1	2.3	0.4	0.2
8/17/07 12:00	885	6088	9731	580.3	432.0	148.4	25.6	1.17	2.3	313	304	2247	11.1	2.2	0.4	0.2
8/17/07 13:00	884	6105	9752	579.9	431.6	148.3	25.6	1.17	2.3	315	308	2254	11.2	2.2	0.4	0.2
8/17/07 14:00	885	6120	9731	575.4	427.8	147.7	25.7	1.18	2.3	317	309	2244	11.2	2.2	0.4	0.2
8/17/07 15:00	884	6073	9749	580.1	431.7	148.4	25.6	1.18	2.3	318	307	2246	11.1	2.2	0.4	0.2
8/17/07 16:00	886	6071	9829	584.9	435.8	149.0	25.5	1.17	2.3	315	306	2258	11.0	2.2	0.4	0.2
8/17/07 17:00	873	6044	9700	569.9	412.2	157.7	27.7	1.17	2.3	324	308	2228	11.1	2.1	0.4	0.2
8/17/07 18:00	867	6019	9351	537.8	392.2	145.6	27.1	1.19	2.3	323	307	2206	10.9	1.9	0.5	0.2
8/17/07 19:00	881	6047	9635	565.0	423.7	141.3	25.0	1.19	2.3	312	302	2216	10.8	1.9	0.5	0.2
8/17/07 20:00	881	6059	9774	569.0	424.7	144.3	25.4	1.19	2.2	310	301	2217	11.0	1.9	0.5	0.2
8/17/07 21:00	882	6088	9768	563.6	419.0	144.6	25.7	1.20	2.2	310	299	2208	11.3	1.9	0.4	0.2
8/17/07 22:00	881	6079	9696	562.9	420.3	142.6	25.3	1.20	2.2	312	299	2197	11.2	1.9	0.4	0.2
8/17/07 23:00	882	6059	9826	564.3	423.2	141.1	25.0	1.20	2.1	312	300	2197	11.3	2.0	0.4	0.2
8/18/07 0:00	880	6077	9754	564.1	423.1	141.0	25.0	1.20	2.2	311	298	2191	11.1	1.9	0.4	0.2
8/18/07 1:00	881	6122	9865	567.7	425.8	141.9	25.0	1.20	2.1	310	298	2202	11.3	1.9	0.4	0.2
8/18/07 2:00	887	6089	9765	568.2	426.2	142.0	25.0	1.20	2.2	311	299	2213	11.4	1.7	0.4	0.2
8/18/07 3:00	884	6062	9856	579.6	434.7	144.9	25.0	1.19	2.2	313	301	2209	11.8	1.9	0.4	0.2
8/18/07 4:00	884	6094	9912	589.4	442.1	147.3	25.0	1.17	2.3	314	300	2205	12.3	2.1	0.5	0.2
8/18/07 5:00	888	6100	9773	589.8	442.3	147.4	25.0	1.16	2.3	313	299	2223	11.7	2.1	0.5	0.2
8/18/07 6:00	885	6117	9750	587.2	440.4	146.8	25.0	1.16	2.3	312	298	2233	11.6	2.1	0.5	0.2
8/18/07 7:00	885	6120	9777	587.1	440.3	146.8	25.0	1.16	2.3	311	298	2230	11.2	2.2	0.5	0.2
8/18/07 8:00	887	6111	9750	583.5	437.6	145.8	25.0	1.16	2.3	313	300	2229	11.0	2.2	0.5	0.2
8/18/07 9:00	886	6092	9777	581.7	436.3	145.4	25.0	1.17	2.4	314	302	2233	11.2	2.2	0.5	0.2
8/18/07 10:00	884	6102	9783	584.2	438.1	146.0	25.0	1.17	2.4	315	304	2232	11.1	2.2	0.5	0.2
8/18/07 11:00	884	6118	9792	586.1	439.6	146.5	25.0	1.17	2.3	313	304	2248	10.8	2.3	0.5	0.2
8/18/07 12:00	883	6134	9830	586.8	440.1	146.7	25.0	1.17	2.3	313	305	2257	10.8	2.2	0.5	0.2
8/18/07 13:00	885	6113	9800	585.5	439.1	146.4	25.0	1.17	2.3	315	306	2263	10.9	2.2	0.5	0.2
8/18/07 14:00	885	6088	9690	577.9	433.5	144.5	25.0	1.17	2.3	319	307	2248	11.0	2.1	0.4	0.2
8/18/07 15:00	882	6060	9739	573.9	430.4	143.5	25.0	1.17	2.4	318	308	2252	10.8	2.1	0.4	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/18/07 16:00	881	6061	9736	575.4	431.6	143.9	25.0	1.18	2.4	319	310	2231	10.9	2.2	0.4	0.2
8/18/07 17:00	881	6101	9768	579.9	434.9	145.0	25.0	1.18	2.3	322	312	2242	11.1	2.2	0.4	0.2
8/18/07 18:00	884	6107	9850	580.6	435.5	145.1	25.0	1.18	2.3	320	309	2254	10.9	2.2	0.4	0.2
8/18/07 19:00	880	6100	9828	577.6	433.2	144.4	25.0	1.18	2.3	315	307	2257	10.7	2.2	0.4	0.2
8/18/07 20:00	878	6055	9843	576.9	432.7	144.2	25.0	1.18	2.2	315	306	2242	10.7	2.2	0.4	0.2
8/18/07 21:00	881	6081	9791	574.8	431.1	143.7	25.0	1.18	2.2	316	307	2235	11.1	2.0	0.4	0.2
8/18/07 22:00	882	6064	9734	570.0	427.5	142.5	25.0	1.18	2.2	318	307	2234	11.3	1.9	0.4	0.2
8/18/07 23:00	880	6017	9735	570.9	428.2	142.7	25.0	1.18	2.1	316	306	2222	11.3	1.9	0.4	0.2
8/19/07 0:00	879	6001	9788	579.0	434.3	144.7	25.0	1.17	2.1	314	306	2201	11.3	2.1	0.4	0.2
8/19/07 1:00	881	6057	9702	577.9	433.4	144.5	25.0	1.17	2.1	316	306	2199	11.5	2.1	0.4	0.2
8/19/07 2:00	884	6061	9670	574.4	430.8	143.6	25.0	1.17	2.1	314	304	2208	11.7	2.1	0.4	0.2
8/19/07 3:00	884	6082	9708	575.4	431.5	143.8	25.0	1.18	2.1	313	301	2208	11.6	2.1	0.4	0.2
8/19/07 4:00	881	6070	9685	570.4	427.8	142.6	25.0	1.18	2.1	313	301	2201	11.8	2.1	0.4	0.2
8/19/07 5:00	879	6033	9766	568.4	426.3	142.1	25.0	1.18	2.1	311	299	2196	12.0	2.0	0.4	0.2
8/19/07 6:00	879	5982	9749	574.7	431.0	143.6	25.0	1.18	2.1	312	300	2191	12.2	1.9	0.4	0.2
8/19/07 7:00	882	5991	9681	576.8	432.6	144.2	25.0	1.17	2.1	314	301	2187	11.6	1.9	0.4	0.2
8/19/07 8:00	883	6019	9642	577.9	433.4	144.5	25.0	1.17	2.1	316	303	2202	11.6	1.8	0.3	0.2
8/19/07 9:00	884	6063	9649	579.5	434.6	144.8	25.0	1.17	2.1	316	302	2208	11.6	1.8	0.3	0.2
8/19/07 10:00	884	6035	9744	584.3	438.2	146.1	25.0	1.16	2.1	315	302	2203	11.4	1.9	0.4	0.2
8/19/07 11:00	886	6053	9721	587.4	440.5	146.9	25.0	1.16	2.0	317	304	2201	11.4	1.9	0.3	0.2
8/19/07 12:00	885	6064	9694	586.3	439.7	146.6	25.0	1.16	2.1	319	306	2211	11.4	1.6	0.3	0.2
8/19/07 13:00	886	6105	9652	579.2	434.4	144.8	25.0	1.16	2.1	320	308	2213	11.4	1.4	0.2	0.2
8/19/07 14:00	880	6077	9654	572.7	429.5	143.2	25.0	1.17	2.1	319	308	2207	11.5	1.3	0.2	0.2
8/19/07 15:00	883	6027	9713	579.6	434.7	144.8	25.0	1.17	2.1	321	309	2211	11.5	1.3	0.2	0.2
8/19/07 16:00	882	6067	9775	583.7	437.8	145.9	25.0	1.16	2.1	324	309	2218	11.7	1.3	0.2	0.2
8/19/07 17:00	887	6072	9789	587.4	440.6	146.8	25.0	1.16	2.0	324	311	2228	11.6	1.3	0.2	0.2
8/19/07 18:00	886	6057	9752	588.9	441.7	147.2	25.0	1.16	2.1	324	312	2228	11.7	1.4	0.2	0.2
8/19/07 19:00	883	6085	9816	591.6	443.7	147.9	25.0	1.15	2.1	321	311	2228	11.5	1.5	0.3	0.2
8/19/07 20:00	885	6101	9818	593.7	445.3	148.4	25.0	1.15	2.0	321	309	2228	11.4	1.6	0.3	0.2
8/19/07 21:00	884	6112	9816	594.5	445.9	148.6	25.0	1.15	2.1	320	308	2227	11.5	1.7	0.3	0.2
8/19/07 22:00	885	6115	9780	594.1	445.6	148.5	25.0	1.15	2.0	320	308	2235	11.5	1.7	0.3	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/19/07 23:00	886	6111	9791	589.5	442.1	147.3	25.0	1.15	2.1	320	307	2231	11.5	1.5	0.3	0.2
8/20/07 0:00	881	6128	9731	587.0	440.3	146.7	25.0	1.16	2.1	319	308	2219	11.6	1.5	0.3	0.2
8/20/07 1:00	882	6105	9823	589.8	442.4	147.4	25.0	1.16	2.0	317	305	2215	11.6	1.5	0.3	0.2
8/20/07 2:00	885	6095	9762	586.0	439.5	146.5	25.0	1.16	2.1	313	303	2211	11.7	1.6	0.3	0.2
8/20/07 3:00	884	6058	9758	586.1	439.6	146.5	25.0	1.16	2.0	313	301	2220	12.0	1.6	0.3	0.2
8/20/07 4:00	880	6103	9773	587.6	440.7	146.9	25.0	1.16	2.1	312	300	2220	12.4	1.7	0.3	0.2
8/20/07 5:00	884	6100	9745	585.3	439.0	146.3	25.0	1.16	2.1	312	300	2223	12.8	1.6	0.3	0.2
8/20/07 6:00	882	6078	9781	586.7	435.4	151.3	25.8	1.16	2.2	313	300	2238	12.8	1.5	0.3	0.2
8/20/07 7:00	883	6131	9782	581.5	430.4	151.2	26.0	1.16	2.2	312	299	2236	13.1	1.5	0.3	0.2
8/20/07 8:00	881	6134	9722	573.3	425.0	148.4	25.9	1.18	2.2	310	297	2238	9.6	1.4	0.2	0.2
8/20/07 9:00	881	6082	9787	573.5	428.8	144.8	25.2	1.18	2.2	312	299	2224	7.2	1.4	0.2	0.2
8/20/07 10:00	879	6078	9847	579.5	433.8	145.8	25.1	1.18	2.2	312	300	2220	10.5	1.5	0.3	0.2
8/20/07 11:00	883	6052	9877	590.8	442.6	148.3	25.1	1.16	2.2	313	301	2218	7.3	1.5	0.3	0.2
8/20/07 12:00	883	6102	9897	595.1	446.3	148.8	25.0	1.15	2.2	315	303	2224	8.6	1.5	0.3	0.2
8/20/07 13:00	883	6126	9861	592.0	444.0	148.0	25.0	1.15	2.2	318	305	2241	8.6	1.5	0.3	0.2
8/20/07 14:00	883	6109	9720	582.3	436.7	145.6	25.0	1.16	2.3	317	306	2239	8.5	1.4	0.2	0.2
8/20/07 15:00	881	6063	9762	581.5	436.1	145.4	25.0	1.16	2.4	321	308	2256	18.6	1.4	0.2	0.2
8/20/07 16:00	881	6055	9761	583.7	437.8	145.9	25.0	1.16	2.3	322	310	2233	23.0	1.4	0.2	0.2
8/20/07 17:00	880	6087	9809	583.9	437.9	145.9	25.0	1.16	2.3	321	311	2233	8.7	1.4	0.2	0.2
8/20/07 18:00	880	6080	9892	590.8	443.1	147.6	25.0	1.16	2.3	322	311	2239	9.1	1.4	0.2	0.2
8/20/07 19:00	883	6086	9877	595.5	446.7	148.9	25.0	1.15	2.2	322	311	2243	9.1	1.5	0.3	0.2
8/20/07 20:00	882	6086	9877	601.0	450.7	150.2	25.0	1.14	2.2	322	311	2242	9.2	1.5	0.3	0.2
8/20/07 21:00	878	6144	9973	605.7	454.3	151.4	25.0	1.14	2.3	319	307	2244	9.2	1.5	0.3	0.2
8/20/07 22:00	887	6071	9809	608.2	456.1	152.0	25.0	1.13	2.2	316	305	2241	9.0	1.5	0.3	0.2
8/20/07 23:00	885	6078	9741	606.5	454.8	151.6	25.0	1.12	2.2	316	305	2228	9.2	1.5	0.3	0.2
8/21/07 0:00	883	6110	9727	602.0	451.5	150.5	25.0	1.13	2.2	314	302	2223	9.3	1.5	0.3	0.2
8/21/07 1:00	883	6054	9798	604.3	453.2	151.0	25.0	1.12	2.2	314	301	2226	9.2	1.5	0.2	0.2
8/21/07 2:00	880	6037	9875	613.6	460.2	153.4	25.0	1.11	2.2	313	300	2224	9.1	1.5	0.3	0.2
8/21/07 3:00	883	6082	9801	617.3	463.0	154.3	25.0	1.10	2.2	313	300	2221	9.1	1.5	0.3	0.2
8/21/07 4:00	885	6087	9750	613.0	459.8	153.2	25.0	1.11	2.2	314	302	2223	8.8	1.5	0.2	0.2
8/21/07 5:00	884	6078	9677	607.5	455.6	151.9	25.0	1.11	2.3	314	301	2217	8.6	1.4	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/21/07 6:00	883	6065	9678	602.7	452.0	150.7	25.0	1.12	2.3	311	300	2224	8.7	1.5	0.2	0.2
8/21/07 7:00	883	6064	9707	599.8	449.9	149.9	25.0	1.12	2.2	312	300	2229	8.9	1.5	0.2	0.2
8/21/07 8:00	880	6079	9743	597.7	448.3	149.4	25.0	1.13	2.3	310	299	2228	9.4	1.5	0.2	0.2
8/21/07 9:00	883	6082	9727	597.0	447.8	149.2	25.0	1.14	2.2	310	300	2245	9.4	1.5	0.2	0.2
8/21/07 10:00	882	6096	9785	592.8	444.6	148.2	25.0	1.14	2.3	311	300	2250	9.0	1.4	0.2	0.2
8/21/07 11:00	881	6067	9786	596.4	447.3	149.1	25.0	1.14	2.2	314	301	2245	8.9	1.5	0.2	0.2
8/21/07 12:00	881	6088	9784	597.3	448.0	149.3	25.0	1.14	2.2	316	303	2252	9.0	1.5	0.2	0.2
8/21/07 13:00	884	6073	9738	598.1	448.6	149.5	25.0	1.14	2.2	318	305	2266	9.2	1.5	0.2	0.2
8/21/07 14:00	881	6094	9783	594.5	445.9	148.6	25.0	1.14	2.2	319	307	2269	8.9	1.5	0.2	0.2
8/21/07 15:00	879	6080	9782	591.0	443.3	147.8	25.0	1.15	2.2	318	307	2255	8.8	1.6	0.2	0.2
8/21/07 16:00	881	6038	9795	590.7	443.0	147.7	25.0	1.14	2.2	317	307	2233	8.8	1.8	0.3	0.2
8/21/07 17:00	866	6003	9767	585.1	461.5	123.6	21.1	1.14	2.2	320	313	2201	8.5	2.0	0.4	0.2
8/21/07 18:00	868	6026	9946	598.8	523.9	74.9	12.5	1.13	2.3	318	316	2210	7.9	2.3	0.4	0.2
8/21/07 19:00	885	6084	9778	604.9	529.3	75.6	12.5	1.13	2.2	315	312	2241	7.8	2.3	0.5	0.2
8/21/07 20:00	884	6090	9768	602.1	526.9	75.3	12.5	1.13	2.2	315	312	2244	7.3	2.5	0.5	0.2
8/21/07 21:00	883	6089	9784	601.1	525.9	75.1	12.5	1.13	2.3	314	310	2234	7.5	2.6	0.5	0.2
8/21/07 22:00	884	6074	9756	598.1	523.3	74.8	12.5	1.13	2.3	313	309	2232	7.7	2.6	0.5	0.2
8/21/07 23:00	883	6061	9739	597.5	522.8	74.7	12.5	1.13	2.2	311	309	2229	7.5	2.5	0.5	0.2
8/22/07 0:00	881	6097	9724	592.9	518.8	74.1	12.5	1.14	2.2	310	310	2227	7.7	2.2	0.4	0.2
8/22/07 1:00	881	6079	9750	589.0	515.4	73.6	12.5	1.15	2.4	311	306	2222	8.0	2.1	0.4	0.2
8/22/07 2:00	879	6023	9750	588.0	514.5	73.5	12.5	1.15	2.3	308	305	2212	7.7	2.0	0.4	0.2
8/22/07 3:00	880	6057	9772	591.2	517.3	73.9	12.5	1.14	2.2	307	303	2211	8.0	1.9	0.3	0.2
8/22/07 4:00	882	6066	9745	593.0	518.9	74.1	12.5	1.14	2.3	307	303	2218	7.7	1.7	0.3	0.2
8/22/07 5:00	882	6051	9793	600.0	525.0	75.0	12.5	1.14	2.2	308	304	2231	7.2	1.6	0.3	0.2
8/22/07 6:00	880	6095	9866	606.6	530.8	75.8	12.5	1.13	2.2	307	303	2235	8.2	1.6	0.3	0.2
8/22/07 7:00	881	6085	9900	613.7	535.9	77.8	12.7	1.12	2.3	307	303	2225	8.2	1.5	0.3	0.2
8/22/07 8:00	860	5952	9852	603.6	523.7	80.0	13.3	1.11	2.2	309	307	2201	8.4	1.5	0.2	0.2
8/22/07 9:00	877	6077	9779	609.6	534.2	75.4	12.4	1.11	2.2	315	312	2231	8.9	1.5	0.2	0.2
8/22/07 10:00	864	6054	9858	605.4	529.4	75.9	12.5	1.11	2.3	315	308	2240	8.7	1.5	0.2	0.2
8/22/07 11:00	873	6032	9865	615.2	537.5	77.7	12.6	1.10	2.3	319	311	2246	8.9	1.5	0.2	0.2
8/22/07 12:00	884	6107	9822	618.1	540.9	77.3	12.5	1.10	2.6	313	309	2281	9.3	1.4	0.2	0.2

Date and	Gross Gen	Steam Flow	Gross HR	Total Fuel	Total Lignite	Total PRB	Total PRB	Btu Gain	Econ O2	Temp A APH Out	Temp B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	NOx
Start Date and Time	MW	KLB/ HR	Btu/kWhr	TON/HR	TON/HR	TON/HR	% Weight		%	DEGF	DEGF	KSCF	%	lb/MM Btu	lb/MM Btu	lb/M MBtu
8/22/07 13:00	884	6130	9732	608.9	532.8	76.1	12.5	1.11	8.0	313	308	2282	9.5	1.4	0.2	0.2
8/22/07 14:00	881	6089	9784	608.2	532.2	76.0	12.5	1.12	3.0	312	308	2284	9.5	1.4	0.2	0.2
8/22/07 15:00	881	6092	9859	609.9	533.6	76.2	12.5	1.12	2.6	311	307	2273	9.6	1.4	0.2	0.2
8/22/07 16:00	883	6101	9831	609.5	533.3	76.2	12.5	1.12	2.6	314	309	2259	10.0	1.5	0.2	0.2
8/22/07 17:00	880	6096	9732	598.7	500.9	97.8	16.3	1.13	2.6	312	309	2262	9.4	1.6	0.3	0.2
8/22/07 18:00	877	6044	9739	592.1	445.8	146.3	24.7	1.14	2.6	316	318	2275	9.3	1.7	0.3	0.2
8/22/07 19:00	879	6079	9751	591.7	443.8	147.9	25.0	1.14	2.6	310	312	2268	9.5	1.7	0.3	0.2
8/22/07 20:00	879	6101	9823	593.1	444.8	148.3	25.0	1.15	2.5	311	310	2266	9.8	1.7	0.3	0.2
8/22/07 21:00	880	6107	9873	595.2	446.3	148.8	25.0	1.15	2.5	309	308	2270	9.7	1.7	0.3	0.2
8/22/07 22:00	884	6094	9813	595.0	446.3	148.7	25.0	1.15	2.5	306	305	2264	9.7	1.7	0.3	0.2
8/22/07 23:00	882	6084	9823	597.5	448.2	149.4	25.0	1.14	2.6	305	304	2273	10.0	1.6	0.3	0.2

APPENDIX D – DUCT VELOCITY RESULTS

For all runs, port A was on the far right, when facing downstream the direction of flue gas flow and additional ports ran the width of the duct alphabetically.

Table D-1. Inlet Delta P, Temperature, and Velocity Measurements (performed 11/29/06)

date	11/29/06
time	1700-1740
moisture	13.5
O2	5
CO2	16
static	-11
barometric	29.32
gas m.w.	29.04
pitot correction factor	0.84
absolute stack pressure	28.51

Port Depth (in.)	**B**			**E**			**H**		
	Delta P (in. H_20)	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^{o}F)**	**Velocity (ft/sec)**
32.675	1.15	329	75.18	0.47	311	47.51	0.8	319	62.30
62.525	0.96	328	68.64	0.43	318	45.65	0.77	323	61.28
92.375	0.69	328	58.20	0.44	317	46.15	0.63	321	55.36
122.225	0.83	328	63.83	0.74	330	60.34	1.2	336	77.14
152.095	1.1	321	73.15	0.81	324	62.89	1.4	335	83.26

Port Depth (in.)	**L**			**M**			**O**		
	Delta P (in. H_20)	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^{o}F)**	**Velocity (ft/sec)**
32.675	0.77	311	60.81	0.68	304	56.89	0.94	311	67.19
62.525	0.79	310	61.56	0.49	301	48.19	0.91	313	66.19
92.375	0.56	309	51.79	0.43	296	45.00	0.55	313	51.46
122.225	0.84	315	63.68	0.62	302	54.25	0.7	310	57.94
152.095	0.66	307	56.15	0.54	305	50.73	0.85	300	63.43

Data compiled from single velocity traverse, performed 11/29/06. Moisture is average of inlet runs from 11/30/06.

Table D-2. ACI Ports Delta P, Temperature, and Velocity Measurements (performed 11/28/06)

date	11/28/06
time	1450-1502
moisture	13.5
O2	5
CO2	16
static	-11
barometric	29.32
gas m.w.	29.04
pitot correction factor	0.84
absolute stack pressure	28.51

Port Depth (in.)	**A**			**C**			**E**	
	Delta P (in. $H_2$0)	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. $H_2$0)**	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. $H_2$0)**	**T (^{o}F)**
17.625	0.86	300	63.81	0.77	302	60.45	0.3	324
52.875	0.92	333	67.41	0.65	322	56.27	0.25	324
88.125	0.66	331	57.03	0.65	326	56.41	0.27	327
123.375	0.72	330	59.52	0.85	326	64.51	0.31	328

Port Depth (in.)	**G**			**I**		
	Delta P (in. $H_2$0)	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. $H_2$0)**	**T (^{o}F)**	**Velocity (ft/sec)**
17.625	0.85	330	64.67	0.75	325	60.56
52.875	0.77	332	61.63	0.7	327	58.58
88.125	0.63	333	55.78	0.63	326	55.54
123.375	0.9	332	66.63	0.64	325	55.94

Data compiled from single velocity traverse, performed 11/28/06. Moisture and O2/CO2 compiled from inlet runs performed 11/30/06.

Table D-3. Toxecon Delta P, Temperature, and Velocity Measurements (performed 4/30/07)

date	4/30/07
time	1031-1256
moisture	12
O2	7.6
CO2	12
static	-12
barometric	29.78
gas m.w.	28.76
pitot correction factor	0.84
absolute stack pressure	28.90

Port Depth (in.)	**B**			**C**			**D**			**E**		
	Delta P (in. H_20)	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^oF)**	**Velocity (ft/sec)**
10	0.005	257	4.72	0.005	336	4.97	0.008	242	5.90	0.008	243	5.91
31	0.019	337	9.69	0.014	335	8.31	0.008	334	6.28	0.01	332	7.01
42	0.02	338	9.95	0.014	337	8.32	0.01	334	7.02	0.012	333	7.68
63	0.019	337	9.69	0.016	336	8.89	0.01	335	7.02	0.008	334	6.28
84	0.021	335	10.18	0.02	334	9.93	0.014	334	8.31	0.013	332	7.99
105	0.021	300	9.95	0.023	323	10.57	0.017	332	9.14	0.019	326	9.63

Data compiled from single M17 run, 4/30/07

Table D-4. Duct 1A1 Delta P, Temperature, and Velocity Measurements (performed 4/26/07)

date	4/26/07
time	1046-1226
moisture	12
O2	7.6
CO2	12
static	-13.5
barometric	29.6
gas m.w.	28.76
pitot correction factor	0.84
absolute stack pressure	28.61

Port Depth (in.)	**F**			**G**			**H**		
	Delta P (in. H_20)	**T (°F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (°F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (°F)**	**Velocity (ft/sec)**
24	0.61	324	54.75	0.62	323	55.16	0.62	322	55.13
38.5	0.71	325	59.11	0.68	324	57.81	0.66	322	56.88
53	0.97	322	68.96	0.99	324	69.75	0.89	322	66.05
67.5	0.62	320	55.06	0.55	323	51.96	0.53	322	50.97
82	0.65	320	56.38	0.4	323	44.31	0.48	321	48.48
96.5	0.52	322	50.49	0.4	323	44.31	0.42	322	45.37
111	0.57	318	52.72	0.62	321	55.09	0.56	321	52.36
126	1.3	318	79.62	1.3	318	79.62	1.4	317	82.58

Data compiled from single M17 run, performed 4/26/07.

Table D-5. Duct 1A2 Delta P, Temperature, and Velocity Measurements (performed 11/30/06)

date	11/30/06
time	--
moisture	14.4
O2	6.85
CO2	13.67
static	-12
barometric	29.44
gas m.w.	28.67
pitot correction factor	0.84
absolute stack pressure	28.56

Port Depth (in.)	**A**			**B**			**C**		
	delta P (in. H_20)	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^oF)**	**Velocity (ft/sec)**
5.777	0.42	333	45.80	0.43	333	46.35	0.46	333	47.94
17.33	0.49	333	49.47	0.49	333	49.47	0.5	333	49.98
28.88	0.53	333	51.45	0.53	333	51.45	0.53	333	51.45
40.43	0.63	333	56.10	0.77	333	62.02	0.76	333	61.62
51.98	0.61	333	55.20	0.7	333	59.13	0.73	333	60.39
63.53	0.47	333	48.45	0.41	333	45.26	0.45	333	47.41
75.08	0.44	333	46.88	0.3	333	38.71	0.45	333	47.41
86.63	0.39	333	44.14	0.32	333	39.98	0.38	333	43.57
98.18	0.34	333	41.21	0.26	333	36.04	0.29	333	38.06

Data compiled from single velocity traverse, performed 11/30/06. Data sheet only included delta Ps. Barometric pressure taken from inlet runs 11/30/06. Moisture, O2/CO2, static pressure and average stack temperature compiled from 1a1 runs performed 6/20/07 and 6/21/07.

Table D-6. Duct 1B1 Delta P, Temperature, and Velocity Measurements (performed 11/30/06)

date	11/30/06
time	--
moisture	14.8
O2	5.9
CO2	14
static	-12
barometric	29.44
gas m.w.	28.63
pitot correction factor	0.84
absolute stack pressure	28.56

Port Depth (in.)	**A**			**B**		
	Delta P (in. H_20)	**T (^{o}F)**	**Velocity (ft/sec)**	**Delta P (in. H_20)**	**T (^{o}F)**	**Velocity (ft/sec)**
5.777	0.56	284	51.26	0.98	284	67.81
17.33	0.76	284	59.72	0.91	284	65.35
28.88	0.72	284	58.13	0.74	284	58.93
40.43	0.68	284	56.49	0.75	284	59.33
51.98	0.69	284	56.90	0.75	284	59.33
63.53	0.68	284	56.49	0.76	284	59.72
75.08	0.77	284	60.11	0.8	284	61.27
86.63	0.92	284	65.71	0.9	284	64.99
98.18	0.33	284	39.35	0.72	284	58.13

Data compiled from single velocity traverse, performed 11/30/06. Data sheet only included delta Ps. Barometric pressure taken from inlet runs 11/30/06. Moisture, O2/CO2, static pressure and average stack temperature compiled from 1b2 runs performed 6/20/07 and 6/21/07.

Table D-7. Duct 1B2 Delta P, Temperature, and Velocity Measurements (performed 6/20/07)

date	6/20/07
time	1010-1224
moisture	15
O2	5.8
CO2	14
static	-12
barometric	29.72
gas m.w.	28.60
pitot correction factor	0.84
absolute stack pressure	28.84

Port Depth (in.)	**F**			**G**			**H**		
	Delta P (in. $H_2$0)	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. $H_2$0)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. $H_2$0)**	**T (^oF)**	**Velocity (ft/sec)**
24	0.91	283	65.02	0.83	286	62.22	0.89	287	64.47
38.5	0.91	282	64.97	0.95	287	66.61	0.98	288	67.70
53	0.64	282	54.49	0.97	288	67.35	0.85	291	63.18
67.5	0.94	282	66.04	0.78	286	60.32	0.92	288	65.59
82	0.96	278	66.56	0.74	286	58.75	0.9	287	64.83
96.5	0.78	279	60.03	0.75	284	59.07	0.55	286	50.65
111	0.80	279	60.80	0.84	284	62.51	0.64	286	54.64
126	0.86	278	62.99	0.83	283	62.09	0.65	286	55.06

Data compiled from single M5/OH run, performed 6/20/07.

Table D-8. Velocity Traverse for ESP Inlet 2D1 Parametric Phase IV

date	6/10/2009
time	908-1736
moisture	14.03
O_2	5.55
CO_2	12.67
static	-12.50
barometric	29.36
gas m.w.	28.53
pitot correction factor	0.84
absolute stack pressure	28.44

		D1			**D2**			**D3**			**D4**	
Port Depth (in.)	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**
24	0.76	335	62.0	1.45	345	86.1	1.35	334	82.5	0.93	329	67.1
48	1.10	343	74.9	1.35	346	83.1	0.92	340	68.4	1.03	337	71.4
72	0.96	346	70.1	0.74	345	61.5	0.70	339	59.6	0.92	337	67.4
96	1.15	346	76.7	0.96	344	70.0	0.84	337	65.2	1.05	337	72.3
120	1.10	335	74.6	0.92	345	68.6	0.90	334	67.2	1.10	329	73.2

Data compiled from Method 17 Runs performed on ESP Inlet Duct 2D-1 on 6-10-09. Velocity data is the average of two separate runs at each port, moisture data is the average of two separate moisture trains--one performed in conjunction with the 4 morning samples, one performed with the 4 afternoon samples. Ports are named from left to right facing downstream (facing the ESP).

Table D-9. Velocity Travese for ESP Outlet 2D1 Parametric Phase IV

date	6/10/2009
time	905-1744
moisture	14.57
O_2	4.92
CO_2	12.67
static	-13.00
barometric	29.42
gas m.w.	28.44
pitot correction factor	0.84
absolute stack pressure	28.40

		A			**B**			**C**	
Port Depth (in.)	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**
12	0.67	336	58.1	0.72	323	59.8	0.81	324	63.5
24	0.77	335	62.5	0.76	337	62.0	0.82	327	64.0
36	0.67	336	58.3	0.57	337	53.9	0.64	329	56.5
48	1.30	336	81.2	1.20	336	78.1	1.40	328	83.9
60	1.20	331	77.8	1.10	336	74.7	0.87	330	66.2
72	0.65	335	57.2	0.85	334	65.6	0.80	333	63.4
84	0.66	338	58.0	0.75	339	61.6	0.74	336	61.1
96	0.78	340	62.9	0.79	339	63.3	0.63	338	56.4
108	0.82	341	64.6	0.77	340	62.7	0.70	336	59.4
120	0.97	340	70.4	0.98	340	70.7	1.00	334	71.2

Data compiled from Method 17 Runs performed on ESP Outlet Duct 2D-1 on 6-10-09. Velocity data is the average of two separate readings at each port depth, moisture data is the average of two separate moisture trains--one performed in conjunction with the morning sample (taken from the points on the bottom half of the duct), one performed with the afternoon sample (taken from the top half of the duct). Ports are named from left to right facing upstream (facing the ESP).

Table D-10. Single Point Velocity Measurement for ESP Outlet 2C1 Parametric Phase IV

date	6/11/2009
time	1109- 1717
moisture	14.22
O_2	5.60
CO_2	13.83
static	-13.00
barometric	29.32
gas m.w.	28.72
pitot correction factor	0.84
absolute stack pressure	28.40

		B	
Port Depth (in.)	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**
84	0.72	323	59.5

dP, stack temperature, and O2 data compiled from single Appendix K run on 6-11-09. Moisture, CO2, and static pressure data taken from corresponding Method 17 Run performed on Outlet 2D1 on the afternoon of 6-11-09.

Table D-11. Single Point Velocity Measurement at the Stack Parametric Phase IV

date	7/12/2009
time	802-1537
moisture	18.81
O_2	5.60
CO_2	14.00
static	0.30
barometric	29.26
gas m.w.	28.12
pitot correction factor	0.84
absolute stack pressure	29.28

Port Depth (in.)	**Delta P (in. H_2O)**	**T (^oF)**	**Velocity (ft/sec)**
84	1.58	162	78.6

Data compiled from 3 Method 29 runs performed on 7/12/09. All runs performed in a single port at a single port depth.

APPENDIX E – ASH ANALYTICAL RESULTS

Table E-1. Parametric Phase I Ash Hg and LOI Analysis – Baseline

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
Baseline	12/1/2006	9:45	1F1A		0.21
Baseline	12/1/2006	9:45	1F2A		0.20
Baseline	12/1/2006	9:45	1F3A		0.19
Baseline	12/1/2006	16:30	1F1A	<0.025	0.17
Baseline	12/1/2006	16:30	1F2A	<0.025	0.12
Baseline	12/1/2006	16:30	1F3A	<0.025	0.12
Baseline	12/2/2006	10:40	1F1A		0.17
Baseline	12/2/2006	10:40	1F2A		0.15
Baseline	12/2/2006	10:40	1F3A		0.15
Baseline	12/2/2006	13:15	1F1A		0.15
Baseline	12/2/2006	13:15	1F2A		0.13
Baseline	12/2/2006	13:15	1F3A		0.12
Baseline	12/2/2006	16:00	1F1A	<0.025	0.10
Baseline	12/2/2006	16:00	1F2A	<0.025	0.12
Baseline	12/2/2006	16:00	1F3A	<0.025	0.08
Baseline Average Phase I - Field 1				**<0.025**	**0.15**

Table E-2. Ash Hg and LOI Analysis from Parametric Phase I

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F1A		0.23
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F2A		0.18
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F3A		0.20
Darco at 1lb/Macf*	12/2/2006	16:00	1F1A		0.31
Darco at 1lb/Macf*	12/2/2006	16:00	1F2A		0.29
Darco at 1lb/Macf*	12/2/2006	16:00	1F3A		0.26
Darco at 1.5lb/Macf*	12/2/2006	16:00	1F1A		0.33
Darco at 1.5lb/Macf*	12/2/2006	16:00	1F2A		0.35
Darco at 1.5lb/Macf*	12/2/2006	16:00	1F3A		0.32
Darco at 2lb/Macf*	12/2/2006	16:00	1F1A		0.42
Darco at 2lb/Macf*	12/2/2006	16:00	1F2A		0.40
Darco at 2lb/Macf*	12/2/2006	16:00	1F3A		0.40
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F1A		0.19
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F2A		0.19
Darco at 0.5lb/Macf*	12/2/2006	16:00	1F3A		0.19
Darco at 0.6lb/Macf	12/9/2006	12:20	1F1A		0.28
Darco at 0.6lb/Macf	12/9/2006	12:20	1F2A		0.25
Darco at 0.6lb/Macf	12/9/2006	12:20	1F3A		0.24
Darco at 0.6lb/Macf	12/9/2006	14:45	1F1A		0.32
Darco at 0.6lb/Macf	12/9/2006	14:45	1F2A		0.29
Darco at 0.6lb/Macf	12/9/2006	14:45	1F3A		0.23
Darco at 0.6lb/Macf	12/9/2006	17:05	1F1A	0.478	0.17
Darco at 0.6lb/Macf	12/9/2006	17:05	1F2A	0.538	0.12
Darco at 0.6lb/Macf	12/9/2006	17:05	1F3A	0.467	0.09
Darco Composite**	12/9/2006	12:20,14:45,17:05	1F1A		0.16
Darco Composite**	12/9/2006	12:20,14:45,17:05	1F2A		0.15
Darco Composite**	12/9/2006	12:20,14:45,17:05	1F3A		0.12

*Simulated blends of Darco Hg and baseline ash collected on 12/2/06.

**Composite of ash from 12:20, 14:45, and 17:05

Table E-3. Parametric Phase II & III Ash Hg and LOI Analysis - Baseline

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
Baseline	4/19/2007	12:15	1F1A	<0.025	0.10
Baseline	4/19/2007	12:15	1F2A	<0.025	0.17
Baseline	4/19/2007	12:15	1F3A	<0.025	0.09
Baseline	4/20/2007	14:30	1F1A	<0.025	0.09
Baseline	4/20/2007	14:30	1F2A	<0.025	0.06
Baseline	4/20/2007	14:30	1F3A	<0.025	0.04
Baseline	4/27/2007	15:10	1F1A	0.036	0.09
Baseline	4/27/2007	15:10	1F2A	0.158	0.11
Baseline	4/27/2007	15:10	1F3A	0.171	0.08
Baseline	4/27/2007	15:20	6&7F1A	0.348	0.59
Baseline	4/27/2007	15:20	6&7F2A	0.497	0.52
Baseline	4/27/2007	15:20	6&7F3A	0.900	0.34
Baseline	4/28/2007	12:20	1F1A	0.029	0.10
Baseline	4/28/2007	12:20	1F2A	<0.025	0.05
Baseline	4/28/2007	12:20	1F3A	0.036	0.01
Baseline	4/28/2007	12:40	6&7F1A	0.153	0.73
Baseline	4/28/2007	12:40	6&7F2A	0.244	0.65
Baseline	4/28/2007	12:40	6&7F3A	0.455	0.36
Baseline	4/29/2007	14:20	1F1A	<0.025	0.06
Baseline	4/29/2007	14:20	1F2A	<0.025	0.06
Baseline	4/29/2007	14:20	1F3A	<0.025	0.04
Baseline	4/29/2007	14:20	6&7F1A	0.089	0.73
Baseline	4/29/2007	14:20	6&7F2A	0.120	0.51
Baseline	4/29/2007	14:20	6&7F3A	0.152	0.26
Baseline	4/29/2007	15:30	5FEF	0.284	0.50
Baseline Average Phase II - Field 1				**0.045**	**0.08**
Baseline Average Phase II - Field 5				**0.284**	**0.50**
Baseline Average Phase II - Field 6&7				**0.329**	**0.52**

Table E-4. Parametric Phase II & III Ash Hg and LOI Analysis

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
BASF MS200 at 12lb/Macf	4/22/2007	16:30	1F1A	0.423	0.99
BASF MS200 at 12lb/Macf	4/22/2007	16:30	1F2A	0.442	0.56
BASF MS200 at 12lb/Macf	4/22/2007	16:30	1F3A	0.314	0.15
C-PAC at 1.5lb/Macf	4/23/2007	16:55	1F1A	0.351	0.20
C-PAC at 1.5lb/Macf	4/23/2007	16:55	1F2A	0.579	0.39
C-PAC at 1.5lb/Macf	4/23/2007	16:55	1F3A	0.533	0.40
Darco Hg at 1lb/Macf	4/24/2007	13:25	1F1A	0.357	0.08
Darco Hg at 1lb/Macf	4/24/2007	13:25	1F2A	0.410	0.12
Darco Hg at 1lb/Macf	4/24/2007	13:25	1F3A	0.398	0.14
Darco Hg at 2lb/Macf	4/24/2007	16:20	1F1A	0.522	0.19
Darco Hg at 2lb/Macf	4/24/2007	16:20	1F2A	0.609	0.24
Darco Hg at 2lb/Macf	4/24/2007	16:20	1F3A	0.543	0.32
Cal HGR-LH at 2lb/Macf	4/25/2007	16:35	1F1A	0.397	0.22
Cal HGR-LH at 2lb/Macf	4/25/2007	16:35	1F2A	0.478	0.32
Cal HGR-LH at 2lb/Macf	4/25/2007	16:35	1F3A	0.282	0.22
Toxecon II at 2lb/Macf	4/30/2007	12:00	6&7F1A	0.124	0.73
Toxecon II at 2lb/Macf	4/30/2007	12:00	6&7F2A	0.161	0.72
Toxecon II at 2lb/Macf	4/30/2007	12:00	6&7F3A	0.259	0.41
Toxecon II at 2lb/Macf	4/30/2007	13:00	5F3A	0.079*	0.33
Toxecon II at 2lb/Macf	4/30/2007	12:30	5F1A	0.368	0.56
Toxecon II at 5lb/Macf	4/30/2007	17:00	6&7F1A	1.063	0.82
Toxecon II at 5lb/Macf	4/30/2007	17:00	6&7F2A	0.363	0.74
Toxecon II at 5lb/Macf	4/30/2007	17:00	6&7F3A	0.206	0.42
Toxecon II at 5lb/Macf	4/30/2007	17:20	5F1A	4.63	10.9
Darco Hg@3lbs/Macf	5/2/2007	16:20	1F1A	0.401	0.215
Darco Hg@3lbs/Macf	5/2/2007	16:20	1F2A	0.247	0.090
Darco Hg@3lbs/Macf	5/2/2007	16:20	1F3A	0.551	0.265
Toxecon II @ 6lb/Macf*	5/23/2007	16:50	5F3A	2.86	8.602

Table E-5. Summary of Long Term Baseline Ash Hg & LOI Analysis on Side A

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
Baseline	6/18/2007	16:39	1F1A	<0.025	0.34
Baseline	6/18/2007	16:34	1F2A	<0.025	0.25
Baseline	6/18/2007	16:30	1F3A	0.029	0.18
Baseline	6/20/2007	11:15	1F1A	<0.025	0.16
Baseline	6/20/2007	11:15	1F2A	<0.024	0.18
Baseline	6/20/2007	11:15	1F3A	<0.023	0.14
Baseline	6/22/2007	12:10	1F1A	0.043	0.03
Baseline	6/22/2007	10:45	1F2A	0.035	0.03
Baseline	6/22/2007	10:30	1F3A	0.034	0.04
Baseline Average LT - Field 1 Side A				**0.029**	**0.15**
Baseline	6/22/2007	10:20	2F1A	<0.025	0.23
Baseline	6/22/2007	10:20	2F2A	<0.024	0.15
Baseline	6/22/2007	10:20	2F3A	0.040	0.11
Baseline Average LT - Field 2 Side A				**0.030**	**0.16**
Baseline	6/22/2007	11:30	3F1A	<0.025	0.36
Baseline	6/22/2007	11:30	3F2A	<0.025	0.31
Baseline	6/22/2007	11:30	3F3A	<0.025	0.27
Baseline Average LT - Field 3 Side A				**0.025**	**0.31**
Baseline	6/22/2007	11:35	4&5F1A	2.060	2.71
Baseline	6/22/2007	11:40	4&5F2A	0.674	0.88
Baseline	6/22/2007	11:35	4&5F3A	<0.025	0.47
Baseline Average LT - Field 4&5 Side A				**0.920**	**1.36**
Baseline	6/22/2007	11:50	6&7F1A	0.759	4.30
Baseline	6/22/2007	11:05	6&7F2A	1.460	2.55
Baseline	6/22/2007	11:50	6&7F3A	0.128	0.89
Baseline Average LT - Field 6&7 Side A				**0.782**	**2.58**

Table E-6. Summary of Long Term Baseline Ash Hg & LOI Analysis on Side B

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
Baseline	6/18/2007	16:25	1F1B	0.048	0.59
Baseline	6/18/2007	16:22	1F2B	0.042	0.49
Baseline	6/18/2007	16:19	1F3B	0.028	0.22
Baseline	6/20/2007	13:40	1F1B	0.053	0.03
Baseline	6/20/2007	13:40	1F2B	0.051	0.03
Baseline	6/20/2007	13:40	1F3B	0.042	0.01
Baseline Average LT - Field 1 Side B				**0.044**	**0.23**

Table E-7. Summary of Long Term Ash Hg & LOI Analysis on Side A Field 1

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	6/28/2007	14:00	1F1A	0.394	0.40
LT Darco Hg-LH @ 2.0lb/Macf	6/28/2007	14:00	1F2A	0.569	0.53
LT Darco Hg-LH @ 2.0lb/Macf	6/28/2007	14:00	1F3A	0.371	0.30
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	1F1A	0.711	0.54
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	1F2A	0.920	0.88
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	1F3A	0.720	0.50
LT Darco Hg-LH @ 2.0lb/Macf	7/3/2007	11:30	1F1A	0.570	0.54
LT Darco Hg-LH @ 2.0lb/Macf	7/3/2007	11:30	1F2A	0.715	0.67
LT Darco Hg-LH @ 2.0lb/Macf	7/3/2007	11:30	1F3A	0.384	0.58
LT Darco Hg-LH @ 2.0lb/Macf	7/4/2007	14:40	1F1A	0.650	0.60
LT Darco Hg-LH @ 2.0lb/Macf	7/4/2007	14:40	1F2A	0.756	0.58
LT Darco Hg-LH @ 2.0lb/Macf	7/4/2007	14:40	1F3A	1.060	0.89
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	1F1A	0.633	0.63
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	1F2A	0.722	0.60
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	1F3A*	0.300	0.67
LT Darco Hg-LH @ 2.0lb/Macf	7/8/2007	11:20	1F1A	0.889	0.59
LT Darco Hg-LH @ 2.0lb/Macf	7/8/2007	11:20	1F2A	1.099	0.94
LT Darco Hg-LH @ 2.0lb/Macf	7/8/2007	11:20	1F3A*	0.244	0.40
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	14:30	1F1A	0.888	0.47
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	14:30	1F2A	0.986	0.54
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	14:30	1F3A*	0.132	0.17
LT Darco Hg-LH @ 2.0lb/Macf	7/10/2007	11:20	1F1A	0.561	0.43
LT Darco Hg-LH @ 2.0lb/Macf	7/10/2007	11:20	1F2A	0.86	0.39
LT Darco Hg-LH @ 2.0lb/Macf	7/10/2007	11:20	1F3A*	0.128	0.22
LT Darco Hg-LH @ 2.0lb/Macf	7/11/2007	15:07	1F1A	0.613	0.46
LT Darco Hg-LH @ 2.0lb/Macf	7/11/2007	15:07	1F2A	0.688	0.45
LT Darco Hg-LH @ 2.0lb/Macf	7/11/2007	15:07	1F3A*	0.164	0.30
LT Darco Hg-LH @ 2.0lb/Macf	7/19/2007	17:40	1F1A	0.626	0.48
LT Darco Hg-LH @ 2.0lb/Macf	7/19/2007	17:40	1F2A	0.723	0.47
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:11	1F1A	0.957	0.56
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:12	1F2A	1.080	0.53
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:17	1F3A*	0.161	0.24
LT Darco Hg-LH @ 2.0lb/Macf	7/22/2007	14:30	1F1A	0.749	0.49
LT Darco Hg-LH @ 2.0lb/Macf	7/22/2007	14:30	1F2A	1.126	0.48
LT Darco Hg-LH @ 2.0lb/Macf	7/25/2007	12:25	1F1A	0.998	0.60
LT Darco Hg-LH @ 2.0lb/Macf	7/25/2007	12:25	1F2A	1.094	0.57
LT Darco Hg-LH @ 2.0lb/Macf	7/25/2007	12:25	1F3A*	0.776	0.60
LT Darco Hg-LH @ 2.0lb/Macf	7/27/2007	15:13	1F1A	0.638	0.60
LT Darco Hg-LH @ 2.0lb/Macf	7/27/2007	15:13	1F2A	0.770	0.49
LT Darco Hg-LH @ 2.0lb/Macf	7/27/2007	15:13	1F3A*	0.372	0.36

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	14:55	1F1A	0.510	0.38
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	14:55	1F2A	0.643	0.40
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	14:55	1F3A*	0.525	0.47
LT Darco Hg-LH @ 2.0lb/Macf	7/29/2007	18:15	1F1A	0.440	0.43
LT Darco Hg-LH @ 2.0lb/Macf	7/29/2007	18:15	1F2A	0.494	0.41
LT Darco Hg-LH @ 2.0lb/Macf	7/29/2007	18:15	1F3A*	0.474	0.38
LT Darco Hg-LH @ 2.0lb/Macf	7/31/2007	14:50	1F1A	0.740	0.66
LT Darco Hg-LH @ 2.0lb/Macf	7/31/2007	14:50	1F2A	0.700	0.47
LT Darco Hg-LH @ 2.0lb/Macf	7/31/2007	14:50	1F3A*	0.424	0.34
LT Darco Hg-LH @ 2.0lb/Macf	8/1/2007	12:15	1F1A	0.463	0.41
LT Darco Hg-LH @ 2.0lb/Macf	8/1/2007	12:15	1F2A	0.571	0.44
LT Darco Hg-LH @ 2.0lb/Macf	8/1/2007	12:15	1F3A*	0.440	0.24
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	8:00	1F1A	0.604	1.31
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	8:00	1F2A	0.671	1.15
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	8:00	1F3A*	0.420	0.93
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	1F1A	0.722	0.68
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	1F2A	0.807	0.61
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	1F3A*	0.562	0.64
LT Darco Hg-LH @ 2.0lb/Macf	8/9/2007	21:00	1F1A	0.361	0.37
LT Darco Hg-LH @ 2.0lb/Macf	8/9/2007	21:00	1F2A	0.512	0.42
LT Darco Hg-LH @ 2.0lb/Macf	8/9/2007	21:00	1F3A*	0.512	0.21
LT Darco Hg-LH @ 2.0lb/Macf	8/11/2007	18:00	1F1A	0.492	0.41
LT Darco Hg-LH @ 2.0lb/Macf	8/11/2007	18:00	1F2A	0.563	0.38
LT Darco Hg-LH @ 2.0lb/Macf	8/11/2007	18:00	1F3A*	0.626	0.23
LT Darco Hg-LH @ 2.0lb/Macf	8/13/2007	11:00	1F1A	0.470	0.56
LT Darco Hg-LH @ 2.0lb/Macf	8/13/2007	11:00	1F2A	0.586	0.64
LT Darco Hg-LH @ 2.0lb/Macf	8/13/2007	11:00	1F3A*	0.474	0.32
LT Darco Hg-LH @ 2.0lb/Macf	8/15/2007	11:00	1F1A	0.392	0.50
LT Darco Hg-LH @ 2.0lb/Macf	8/15/2007	11:00	1F2A	0.318	0.44
LT Darco Hg-LH @ 2.0lb/Macf	8/15/2007	11:00	1F3A*	0.403	0.64
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	1F1A	0.584	0.26
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	1F2A	0.744	0.55
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	1F3A*	0.580	0.46
LT Darco Hg-LH @ 2.0lb/Macf	8/19/2007	14:00	1F1A	0.731	0.73
LT Darco Hg-LH @ 2.0lb/Macf	8/19/2007	14:00	1F2A	0.794	0.57
LT Darco Hg-LH @ 2.0lb/Macf	8/19/2007	14:00	1F3A*	0.743	0.48

* Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007. Hg and LOI content of the ash are reported as an average of hoppers 1A and 2A for each field in report.

Table E-8. Summary of Long Term Ash Hg & LOI Analysis on Side A Field 2

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	2F1A	1.440	0.53
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	2F2A	2.060	0.61
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	2F3A	1.270	0.49
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	2F1A	1.700	1.00
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	2F2A	1.930	1.14
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	2F3A*	0.967	0.73
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:27	2F1A	2.330	0.87
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:25	2F2A	2.640	0.71
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:00	2F1A	1.896	0.70
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:00	2F2A	1.662	0.56
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:00	2F3A*	1.047	0.52
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:23	2F3A	0.978	0.47
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	2F1A	1.937	0.89
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	2F2A	2.390	0.97
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	2F3A*	1.277	0.72
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	2F1A	1.500	0.66
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	2F2A	1.810	0.60
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	2F3A*	1.630	0.59

* Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007. Hg and LOI content of the ash are reported as an average of hoppers 1A and 2A for each field in report.

Table E-9. Summary of Long Term Ash Hg & LOI Analysis on Side A Field 3

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	3F1A	3.470	0.65
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	3F2A	3.210	0.85
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	3F3A	2.290	0.63
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	3F1A	2.930	1.05
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	3F2A	3.300	1.49
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	3F3A*	1.760	0.96
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:38	3F1A	2.730	1.01
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	13:00	3F2A	4.750	1.29
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:31	3F3A*	2.240	0.87
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	3F1A	3.940	0.84
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	3F2A	3.381	0.87
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	3F3A*	2.003	0.68
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	3F1A	3.566	0.71
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	3F2A	2.878	0.77
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	3F3A*	2.000	0.46
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	3F1A	2.700	0.78
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	3F2A	2.800	1.01
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	3F3A*	2.180	0.80

* Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007. Hg and LOI content of the ash are reported as an average of hoppers 1A and 2A for each field in report.

Table E-10. Summary of Long Term Ash Hg & LOI Analysis on Side A Fields 4&5

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	4&5F1A	3.870	0.80
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	4&5F2A	3.660	0.90
LT Darco Hg-LH @ 2.0lb/Macf	6/29/2007	13:00	4&5F3A	3.250	0.73
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	4&5F1A	3.480	0.98
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	4&5F2A	4.150	1.74
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	4&5F3A*	3.270	0.79
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:41	4&5F1A	3.230	1.31
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:42	4&5F2A	3.450	1.48
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:49	4&5F3A*	0.796	0.81
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	4&5F1A	2.870	1.45
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	4&5F2A	4.916	1.42
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:10	4&5F3A*	3.871	0.79
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	4&5F1A	4.060	0.80
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	4&5F2A	3.710	0.94
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	4&5F3A*	3.533	0.96
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	4&5F1A	1.900	0.84
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	4&5F2A	2.350	1.17
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	4&5F3A*	3.290	1.00

* Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007. Hg and LOI content of the ash are reported as an average of hoppers 1A and 2A for each field in report.

Table E-11. Summary of Long Term Ash Hg & LOI Analysis on Side A Fields 5&6

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	6&7F1A	2.870	1.76
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	6&7F2A	1.020	1.49
LT Darco Hg-LH @ 2.0lb/Macf	7/5/2007	14:10	6&7F3A*	3.450	1.12
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:56	6&7F1A	2.610	1.70
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:52	6&7F2A	1.140	1.81
LT Darco Hg-LH @ 2.0lb/Macf	7/21/2007	12:50	6&7F3A*	6.600	1.03
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:20	6&7F1A	2.092	2.59
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:20	6&7F2A	3.366	1.71
LT Darco Hg-LH @ 2.0lb/Macf	7/28/2007	15:20	6&7F3A*	4.470	0.99
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	6&7F1A	1.225	1.35
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	6&7F2A	1.390	1.37
LT Darco Hg-LH @ 2.0lb/Macf	8/5/2007	15:30	6&7F3A*	3.831	0.93
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	6&7F1A	1.303	1.19
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	6&7F2A	0.973	1.58
LT Darco Hg-LH @ 2.0lb/Macf	8/18/2007	13:00	6&7F3A*	2.863	1.02

* Hopper 3A ash was contaminated with economizer ash for all periods after 7/4/2007. Hg and LOI content of the ash are reported as an average of hoppers 1A and 2A for each field in report.

Table E-12. Summary of Long Term Ash Hg & LOI Analysis on Side B (Untreated ESP)

Condition	Date of Sample	Time of Sample	Field & Hopper	Ash Hg Content (ug/g)	Ash LOI Content (%)
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	14:30	1F1B	0.094	0.25
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	14:30	1F3B	0.085	0.09
LT Darco Hg-LH @ 2.0lb/Macf	7/9/2007	11:40	1F2B	0.054	0.11
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	14:55	1F1B	0.064	0.21
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	14:55	1F2B	0.070	0.35
LT Darco Hg-LH @ 2.0lb/Macf	8/3/2007	14:55	1F3B	0.050	0.14
LT Darco Hg-LH @ 2.0lb/Macf	8/17/2007	11:30	1F1B	<0.025	0.25
LT Darco Hg-LH @ 2.0lb/Macf	8/17/2007	11:30	1F2B	<0.024	0.14
LT Darco Hg-LH @ 2.0lb/Macf	8/17/2007	11:30	1F3B	<0.025	0.13
Average LT - Field 1 Side B				**0.055**	**0.19**

APPENDIX F – MASS BALANCE METHODOLOGY AND RESULTS

Table F-1. ESP Parameters for Material Balance

fraction coal ash reporting as fly ash	0.85	
fraction fly ash captured in ESP	0.9995	
	fraction fly ash captured per field (per LMS)	treated ash Hg content (average of fields 1A & 2A) (ppm)
ESP field 1	0.94	used daily value
ESP field 2	0.042	1.915
ESP field 3	0.01	3.246
ESP field 4&5	0.004	3.705
ESP field 6&7	0.002	1.964

For baseline ash, only field 1 data were used. All downstream fields had mercury concentrations similar to field 1

During long-term injection, the first field ash mercury concentrations come from the daily analyzed value. For downstream fields, used an average of data collected in each field, as it was reasonably consistent from week to week of the test.

Table F-2. Mass Balance Results

Date		**12/2/2006**	**12/9/2006**	**6/18/2007**	**6/20/2007**	**6/20/2007**	**6/21/2007**
Condition		**Parametric Baseline**	**Darco Hg - 0.6 lb/Macf**	**Long-term Baseline**	**Long-term Baseline**	**Long-term Baseline**	**Long-term Baseline**
Inputs:	**Units**						
Time Coal Sampled		10:30	10:30	*Ave*	*Ave*	*Ave*	*Ave*
Time Coal should hit Furnace		10:30	10:30	16:34	22:00	22:00	13:00
Load, Gross at time Coal hit Furnace	MW (gross)	883	884	886	*886*	*886*	890
Btu Ratio	Btu blend/6399 Btu			1.16	*1.13*	*1.13*	1.2
% Coal 2 (PRB)				25.57	13.45	13.45	28.35
Time Ash Sampled		16:00	17:05	16:34	11:15	10:45	13:00
Load, Gross at time Ash Sampled	MW (gross)	881	883	886	*876*	*876*	890
Gross Heat Rate	Btu/kW-h	9685	9776	9703	*9773*	*9773*	9727
Fraction Coal 1 by Wt.	wt. Fraction	0.731	0.72	0.7443	0.8655	0.8655	0.7165
Coal 1 Hg (TxL)	µg/g, dry	0.199	0.139	*0.198*	0.185	0.185	*0.198*
Coal 1 Ash (TxL)	wt%, dry	22.28	15.08	*21.22*	22.55	22.55	*21.22*
Coal 1 Moisture (TxL)	wt%	31.19	31.34	*32.49*	33.10	33.10	*32.49*
Coal 1 Heating Value (TxL)	Btu/lb, dry	10149	10962	*9946*	9514	9514	*9946*
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	9486	9644	*10248*	*10248*	*10248*	*10248*
Coal 2 Hg (PRB)	µg/g, dry	0.116	0.143	*0.096*	0.097	0.097	*0.096*
Coal 2 Ash (PRB)	wt%, dry	7.16	9.12	*8.09*	7.06	7.06	*8.09*
Coal 2 Moisture (PRB)	wt%	31.16	29.71	*32.93*	30.57	30.57	*32.93*
Coal 2 Heating Value (PRB)	Btu/lb, dry	11901	11667	*11645*	11718	11718	*11645*
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	9583	9651	*10228*	10033	10033	*10228*
Date Ash Sampled				6/18/2007	6/20/2007	6/22/2007	Ave
Time Ash Sampled				16:34	11:15	10:45	
Treated Ash Hg (from URS lab) - first field only	µg/g	0.025	0.494	0.029	0.025	0.025	0.030
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.025	0.494	0.029	0.025	0.025	0.030
Untreated Ash Hg (from URS lab)	µg/g			0.039	0.049	0.049	0.053
SCEM start time				14:30	10:00	13:50	11:00
SCEM end time				18:30	12:24	16:15	15:30
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	26.13	23.19		26.62	22.71	
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	15.57	11.66		18.49	#N/A	21.11
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	22.78	18.87		24.14	26.57	
OH start time					10:10	13:50	11:01
OH end time					12:25	16:04	15:32
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2				28.75	22.88	26.47
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2				22.65	28.54	20.89
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.70	0.70	0.71	0.83	0.83	0.68
Composite F-factor	dscf/MMBtu at 3% O2	11110	11263	11959	11924	11924	11958
Gas flow rate	dscfm at 3% O2	1582951	1622706	1714491	1720128	1720128	1725107
Gas flow rate	dry Nm3/min	41785	42835	45258	45406	45406	45538
Coal feed rate	ton/hr (dry)	402	387	414	441	441	415
Mercury Rate in Coal	g/h	64.5	49.2	64.7	69.5	69.5	63.7
Mercury Rate in Coal	lb/Tbtu	16.6	12.6	16.6	17.7	17.7	16.2
Hg Concentration from Coal	µg/dNm3 at 3% O2	25.7	19.2	23.8	25.5	25.5	23.3
Mercury Rate in Ash Treated, weighted	g/h	1.4	19.8	1.7	1.7	1.7	1.7
Mercury Rate in Ash Untreated	g/h			2.2	3.4	3.4	3.0
SCEM Mercury Rate ESP Inlet	g/h	65.5	59.6		72.5	61.9	
SCEM Mercury Rate ESP Outlet Treated	g/h	39.0	30.0		50.4		57.7
SCEM Mercury Rate ESP Outlet Untreated	g/h	57.1	48.5		65.8	72.4	
OH Mercury Rate ESP Outlet Treated	g/h				78.3	62.3	72.3
OH Mercury Rate ESP Outlet Untreated	g/h				61.7	77.8	57.1
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.177	0.140	0.172	0.174	0.174	0.169
wtd ash	wt%, as recd	12.53	9.25	12.05	13.72	13.72	11.80
wtd moisture	wt%	31.2	30.9	32.6	32.8	32.8	32.6
wtd Btu	Btu/lb, as recd	7309	7715	6995	6603	6603	7025
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		102%	121%		104%	89%	
SCEM ESP outlet untreated Hg/Coal Hg		89%	99%		95%	104%	
Percent Removal:							
treated ash Hg/Coal Hg		2%	40%	3%	2%	2%	3%
treated SCEM Hg/Coal Hg		39%	39%		27%		9%
treated OH Hg/Coal Hg					-13%	10%	-14%
treated ash Hg/inlet ESP Hg							
treated SCEM Hg/inlet ESP Hg							
treated OH Hg/inlet ESP Hg					-8%	-1%	
untreated ash Hg/inlet ESP Hg					5%	5%	
untreated SCEM Hg/inlet ESP Hg		13%	19%		9%	-17%	
untreated OH Hg/inlet ESP Hg					15%	-26%	
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.59	0.99		1.33		1.07
(Coal In/OH Out) Treated					0.87	1.08	0.86
(SCEM In/SCEM Out) Treated		1.62	1.20		1.39		
(SCEM In/OH Out) Treated					0.91	0.97	
(Coal In/SCEM Out) Untreated					1.00	0.92	
(Coal In/OH Out) Untreated					1.07	0.86	1.06
(SCEM In/SCEM Out) Untreated					1.05	0.82	
(SCEM In/OH Out) Untreated					1.11	0.76	
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)		57%	57%		49%		
OH/coal basis (assuming 69% ox)					26%	41%	

Date		**6/22/2007**	**Average**	**6/25/2007**	**6/28/2007**	**6/29/2007**	**7/3/2007**
Condition		**Long-term Baseline**	**Baseline**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**
Inputs:	**Units**						
Time Coal Sampled		*Ave*		22:30	*Ave*	21:00	16:30
Time Coal should hit Furnace		10:45		22:30	14:00	21:00	16:30
Load, Gross at time Coal hit Furnace	MW (gross)	890	887	882	879	889	878
Btu Ratio	Btu blend/6399 Btu	1.19	1.16	1.16	1.21	1.12	1.13
% Coal 2 (PRB)		28.48	21.86	27.53	100	24.98	25
Time Ash Sampled		10:45		0:00	14:00	13:00	11:30
Load, Gross at time Ash Sampled	MW (gross)	890	884	881	879	888	795
Gross Heat Rate	Btu/kW-h	9783	9752	10010	10032	9689	9934
Fraction Coal 1 by Wt.	wt. Fraction	0.7152	0.78	0.7247	0	0.7502	0.75
Coal 1 Hg (TxL)	µg/g, dry	*0.198*	*0.198*	0.222	*0.198*	0.210	0.135
Coal 1 Ash (TxL)	wt%, dry	*21.22*	*21.22*	20.76	*21.22*	23.25	24.25
Coal 1 Moisture (TxL)	wt%	*32.49*	*32.49*	33.67	*32.49*	32.30	33.08
Coal 1 Heating Value (TxL)	Btu/lb, dry	*9946*	*9946*	10040	*9946*	9392	9380
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	*10248*	10287	*10248*	*10248*	10256
Coal 2 Hg (PRB)	µg/g, dry	*0.096*	*0.096*	0.153	*0.096*	0.118	0.083
Coal 2 Ash (PRB)	wt%, dry	*8.09*	*8.09*	7.63	*8.09*	9.54	9.72
Coal 2 Moisture (PRB)	wt%	*32.93*	*32.93*	33.39	*32.93*	33.19	33.08
Coal 2 Heating Value (PRB)	Btu/lb, dry	*11645*	*11645*	11718	*11645*	11471	11572
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	*10228*	10033	*10228*	*10228*	9772
Date Ash Sampled		6/22/2007		*Ave*	6/28/2007	6/29/2007	7/3/2007
Time Ash Sampled		10:45			14:00	13:00	11:30
Treated Ash Hg (from URS lab) - first field only	µg/g	0.037	0.030	*0.665*	0.445	0.784	0.556
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.037	0.030	*0.757*	0.550	0.868	0.655
Untreated Ash Hg (from URS lab)	µg/g		0.053				
SCEM start time		8:45		19:00	12:00	19:00	14:30
SCEM end time		12:45		23:59	16:00	23:00	18:30
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	23.73	24.35	14.89		27.04	31.67
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	21.85	#N/A	4.93	1.63	4.93	4.37
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	25.39	25.37	21.92	9.43	17.97	16.19
OH start time							
OH end time							
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2		26.03				
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2		24.03				
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.68	0.75	0.69	0.00	0.71	0.71
Composite F-factor	dscf/MMBtu at 3% O2	11958	11945	11920	11942	11959	11810
Gas flow rate	dscfm at 3% O2	1734680	1722907	1753585	1755207	1715985	1716449
Gas flow rate	dry Nm3/min	45791	45480	46290	46332	45297	45309
Coal feed rate	ton/hr (dry)	417	426	420	379	434	439
Mercury Rate in Coal	g/h	64.0	66.2	77.4	33.0	73.5	48.5
Mercury Rate in Coal	lb/Tbtu	16.2	16.9	19.3	8.2	18.8	12.3
Hg Concentration from Coal	µg/dNm3 at 3% O2	23.3	24.3	27.9	11.9	27.1	17.8
Mercury Rate in Ash Treated, weighted	g/h	2.1	1.8	42.0	13.0	57.8	45.7
Mercury Rate in Ash Untreated	g/h		3.0				
SCEM Mercury Rate ESP Inlet	g/h	65.2	66.5	41.4		73.5	86.1
SCEM Mercury Rate ESP Outlet Treated	g/h	60.0	56.0	13.7	4.5	13.4	11.9
SCEM Mercury Rate ESP Outlet Untreated	g/h	69.8	69.3	60.9	26.2	48.8	44.0
OH Mercury Rate ESP Outlet Treated	g/h		71.0				
OH Mercury Rate ESP Outlet Untreated	g/h		65.5				
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.169	0.171	0.203	0.096	0.187	0.122
wtd ash	wt%, as recd	11.79	12.61	11.38	5.43	13.40	13.80
wtd moisture	wt%	32.6	32.7	33.6	32.9	32.5	33.1
wtd Btu	Btu/lb, as recd	7027	6850	6975	7810	6684	6644
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		102%	98%	53%		100%	177%
SCEM ESP outlet untreated Hg/Coal Hg		109%	103%	79%	80%	66%	91%
Percent Removal:							
treated ash Hg/Coal Hg		3%	3%	54%	39%	79%	94%
treated SCEM Hg/Coal Hg		6%	14%	82%	86%	82%	76%
treated OH Hg/Coal Hg			-5%				
treated ash Hg/inlet ESP Hg				102%		79%	53%
treated SCEM Hg/inlet ESP Hg				67%		82%	86%
treated OH Hg/inlet ESP Hg			-7%				
untreated ash Hg/inlet ESP Hg			5%				
untreated SCEM Hg/inlet ESP Hg		-7%	-4%	-47%		34%	49%
untreated OH Hg/inlet ESP Hg			2%				
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.03	1.14	1.39	1.88	1.03	0.84
(Coal In/OH Out) Treated			0.94				
(SCEM In/SCEM Out) Treated		1.05	1.22	0.74		1.03	1.49
(SCEM In/OH Out) Treated			0.94				
(Coal In/SCEM Out) Untreated			0.96				
(Coal In/OH Out) Untreated			0.99				
(SCEM In/SCEM Out) Untreated			0.93				
(SCEM In/OH Out) Untreated			0.94				
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)			49%	88%	90%	87%	83%
OH/coal basis (assuming 69% ox)			34%				

Date		**7/4/2007**	**7/5/2007**	**7/8/2007**	**7/9/2007**	**7/10/2007**	**7/10/2007**
Condition		**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**
Inputs:	**Units**						
Time Coal Sampled		*Ave*	16:41	0:30	16:12	*Ave*	*Ave*
Time Coal should hit Furnace		14:40	16:41	0:30	16:12	14:00	14:00
Load, Gross at time Coal hit Furnace	MW (gross)	887	882	881	881	869	869
Btu Ratio	Btu blend/6399 Btu	1.27	1.13	1.15	1.18	1.12	1.12
% Coal 2 (PRB)		100	38.53	26.14	24.99	25.2	25.2
Time Ash Sampled		14:40	14:10	11:20	14:30	11:20	11:20
Load, Gross at time Ash Sampled	MW (gross)	887	879	882	875	875	875
Gross Heat Rate	Btu/kW-h	9735	9922	10003	10127	10039	10039
Fraction Coal 1 by Wt.	wt. Fraction	0	0.6147	0.7386	0.7501	0.748	0.748
Coal 1 Hg (TxL)	µg/g, dry	*0.198*	0.237	0.207	0.231	*0.198*	*0.198*
Coal 1 Ash (TxL)	wt%, dry	*21.22*	22.50	15.70	24.53	*21.22*	*21.22*
Coal 1 Moisture (TxL)	wt%	*32.49*	33.66	33.72	29.99	*32.49*	*32.49*
Coal 1 Heating Value (TxL)	Btu/lb, dry	*9946*	9614	10635	10898	*9946*	*9946*
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	*10248*	10115	*10248*	*10248*	*10248*
Coal 2 Hg (PRB)	µg/g, dry	*0.096*	0.081	0.096	0.111	*0.096*	*0.096*
Coal 2 Ash (PRB)	wt%, dry	*8.09*	9.00	9.66	8.84	*8.09*	*8.09*
Coal 2 Moisture (PRB)	wt%	*32.93*	32.96	30.17	31.78	*32.93*	*32.93*
Coal 2 Heating Value (PRB)	Btu/lb, dry	*11645*	11559	11458	11602	*11645*	*11645*
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	*10228*	10086	*10228*	*10228*	*10228*
Date Ash Sampled		7/4/2007	7/5/2007	7/8/2007	7/9/2007	7/10/2007	7/10/2007
Time Ash Sampled		14:40	14:10	11:20	14:30	11:20	11:20
Treated Ash Hg (from URS lab) - first field only	µg/g	0.822	0.678	0.994	0.937	0.711	0.711
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.904	0.769	1.066	1.012	0.800	0.800
Untreated Ash Hg (from URS lab)	µg/g				0.078		
SCEM start time		12:40	14:40	0:00	14:15	12:10	15:20
SCEM end time		16:40	18:40	4:00	18:15	14:30	17:35
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	10.32	35.19	37.12	34.14	26.69	32.88
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	0.93	3.19	3.62	5.54	4.47	6.00
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	9.94	22.49	22.65	22.42	20.85	20.87
OH start time						12:10	15:20
OH end time						14:24	17:35
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2					14.89	19.98
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2					35.54	38.71
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.00	0.57	0.71	0.74	0.72	0.72
Composite F-factor	dscf/MMBtu at 3% O2	11942	11955	11800	11959	11959	11959
Gas flow rate	dscfm at 3% O2	1719341	1744579	1732933	1778373	1739597	1739597
Gas flow rate	dry Nm3/min	45386	46052	45744	46944	45920	45920
Coal feed rate	ton/hr (dry)	371	422	406	403	421	421
Mercury Rate in Coal	g/h	32.3	67.8	65.6	73.5	65.8	65.8
Mercury Rate in Coal	lb/Tbtu	8.2	17.1	16.4	18.2	16.6	16.6
Hg Concentration from Coal	µg/dNm3 at 3% O2	11.9	24.5	23.9	26.1	23.9	23.9
Mercury Rate in Ash Treated, weighted	g/h	20.9	43.3	46.9	65.1	46.5	46.5
Mercury Rate in Ash Untreated	g/h				5.0		
SCEM Mercury Rate ESP Inlet	g/h	28.1	97.2	101.9	96.1	73.5	90.6
SCEM Mercury Rate ESP Outlet Treated	g/h	2.5	8.8	9.9	15.6	12.3	16.5
SCEM Mercury Rate ESP Outlet Untreated	g/h	27.1	62.1	62.2	63.1	57.4	57.5
OH Mercury Rate ESP Outlet Treated	g/h					41.0	55.0
OH Mercury Rate ESP Outlet Untreated	g/h					97.9	106.7
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.096	0.177	0.178	0.201	0.172	0.172
wtd ash	wt%, as recd	5.43	11.50	9.45	14.39	12.08	12.08
wtd moisture	wt%	32.9	33.4	32.8	30.4	32.6	32.6
wtd Btu	Btu/lb, as recd	7810	6906	7298	7701	6991	6991
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		87%	143%	155%	131%	112%	138%
SCEM ESP outlet untreated Hg/Coal Hg		84%	92%	95%	86%	87%	87%
Percent Removal:							
treated ash Hg/Coal Hg		65%	64%	72%	88%	71%	71%
treated SCEM Hg/Coal Hg		92%	87%	85%	79%	81%	75%
treated OH Hg/Coal Hg						38%	16%
treated ash Hg/inlet ESP Hg		74%	44%	46%	68%	63%	51%
treated SCEM Hg/inlet ESP Hg		91%	91%	90%	84%	83%	82%
treated OH Hg/inlet ESP Hg						44%	39%
untreated ash Hg/inlet ESP Hg					5%		
untreated SCEM Hg/inlet ESP Hg		4%	36%	39%	34%	22%	37%
untreated OH Hg/inlet ESP Hg						-33%	-18%
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.38	1.30	1.15	0.91	1.12	1.04
(Coal In/OH Out) Treated						0.75	0.65
(SCEM In/SCEM Out) Treated		1.20	1.87	1.79	1.19	1.25	1.44
(SCEM In/OH Out) Treated						0.84	0.89
(Coal In/SCEM Out) Untreated					1.08		
(Coal In/OH Out) Untreated							
(SCEM In/SCEM Out) Untreated					1.41		
(SCEM In/OH Out) Untreated							
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)		95%	91%	89%	85%	87%	82%
OH/coal basis (assuming 69% ox)						59%	45%

Date		**7/11/2007**	**7/19/2007**	**7/21/2007**	**7/22/2007**	**7/25/2007**	**7/27/2007**
Condition		**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**
Inputs:	**Units**						
Time Coal Sampled		*Ave*	8:20	*Ave*	0:05	15:56	22:00
Time Coal should hit Furnace		16:15	8:20	12:12	0:05	15:56	22:00
Load, Gross at time Coal hit Furnace	MW (gross)	881	799	803	806	888	792
Btu Ratio	Btu blend/6399 Btu	1.14	1.14	1.15	1.17	1.17	1.05
% Coal 2 (PRB)		25.49	29.52	29.21	29.23	25.01	8.6
Time Ash Sampled		15:07	15:01	12:12	14:30	12:25	15:13
Load, Gross at time Ash Sampled	MW (gross)	891	801	803	890	892	820
Gross Heat Rate	Btu/kW-h	9627	9621	9730	9599	9822	9573
Fraction Coal 1 by Wt.	wt. Fraction	0.7451	0.7048	0.7079	0.7077	0.7499	0.914
Coal 1 Hg (TxL)	µg/g, dry	0.285	0.179	*0.198*	0.175	0.154	0.210
Coal 1 Ash (TxL)	wt%, dry	19.51	19.47	*21.22*	17.19	20.31	23.04
Coal 1 Moisture (TxL)	wt%	32.71	32.95	*32.49*	36.14	31.86	33.76
Coal 1 Heating Value (TxL)	Btu/lb, dry	10008	10184	*9946*	10417	10097	9667
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	10336	*10248*	*10248*	10302	*10248*
Coal 2 Hg (PRB)	µg/g, dry	0.059	0.090	*0.096*	0.104	0.097	0.102
Coal 2 Ash (PRB)	wt%, dry	6.39	7.42	*8.09*	8.65	7.36	7.70
Coal 2 Moisture (PRB)	wt%	30.27	32.65	*32.93*	32.68	31.76	34.80
Coal 2 Heating Value (PRB)	Btu/lb, dry	11770	11794	*11645*	12326	10257	11748
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	10049	*10228*	*10228*	11570	*10228*
Date Ash Sampled		7/11/2007	7/19/2007**	7/21/2007	7/22/2007**	7/25/2007	7/27/2007
Time Ash Sampled		15:07	15:01	12:12	14:30	12:25	15:13
Treated Ash Hg (from URS lab) - first field only	µg/g	0.651	0.675	1.020	0.938	1.046	0.704
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.744	0.766	1.090	1.013	1.115	0.793
Untreated Ash Hg (from URS lab)	µg/g						
SCEM start time		9:30	6:20	10:10	0:00	11:00	21:30
SCEM end time		11:45	10:20	14:10	4:00	17:00	23:59
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	32.04	17.29	24.43	29.31	24.86	19.24
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	8.39	2.73	1.28	0.43	3.93	6.31
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	27.00	18.92	17.19	14.07	19.91	19.16
OH start time		9:32					
OH end time		11:45					
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2	18.52					
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	41.68					
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.71	0.67	0.68	0.66	0.75	0.90
Composite F-factor	dscf/MMBtu at 3% O2	11959	11959	11958	11958	12404	11963
Gas flow rate	dscfm at 3% O2	1689645	1532962	1558051	1542810	1802104	1511331
Gas flow rate	dry Nm3/min	44602	40466	41128	40726	47570	39895
Coal feed rate	ton/hr (dry)	405	361	374	353	430	385
Mercury Rate in Coal	g/h	83.5	49.8	57.1	49.4	54.4	70.1
Mercury Rate in Coal	lb/Tbtu	21.7	14.3	16.1	14.1	13.8	20.4
Hg Concentration from Coal	µg/dNm3 at 3% O2	31.2	20.5	23.2	20.2	19.1	29.3
Mercury Rate in Ash Treated, weighted	g/h	37.4	33.9	54.8	40.2	63.1	51.2
Mercury Rate in Ash Untreated	g/h						
SCEM Mercury Rate ESP Inlet	g/h	85.7	42.0	60.3	71.6	71.0	46.1
SCEM Mercury Rate ESP Outlet Treated	g/h	22.4	6.6	3.2	1.1	11.2	15.1
SCEM Mercury Rate ESP Outlet Untreated	g/h	72.2	45.9	42.4	34.4	56.8	45.9
OH Mercury Rate ESP Outlet Treated	g/h	49.6					
OH Mercury Rate ESP Outlet Untreated	g/h	111.5					
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.227	0.152	0.168	0.154	0.139	0.201
wtd ash	wt%, as recd	10.92	10.68	11.73	9.47	11.63	14.38
wtd moisture	wt%	32.1	32.9	32.6	35.1	31.8	33.8
wtd Btu	Btu/lb, as recd	7110	7157	7035	7133	6910	6511
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		103%	84%	105%	145%	130%	66%
SCEM ESP outlet untreated Hg/Coal Hg		86%	92%	74%	70%	104%	65%
Percent Removal:							
treated ash Hg/Coal Hg		45%	68%	96%	81%	116%	73%
treated SCEM Hg/Coal Hg		73%	87%	94%	98%	79%	78%
treated OH Hg/Coal Hg		41%					
treated ash Hg/inlet ESP Hg		44%	81%	91%	56%	89%	111%
treated SCEM Hg/inlet ESP Hg		74%	84%	95%	99%	84%	67%
treated OH Hg/inlet ESP Hg		42%					
untreated ash Hg/inlet ESP Hg							
untreated SCEM Hg/inlet ESP Hg		16%	-9%	30%	52%	20%	0%
untreated OH Hg/inlet ESP Hg		-30%					
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.40	1.23	0.99	1.20	0.73	1.06
(Coal In/OH Out) Treated		0.96					
(SCEM In/SCEM Out) Treated		1.43	1.04	1.04	1.73	0.95	0.69
(SCEM In/OH Out) Treated		0.99					
(Coal In/SCEM Out) Untreated							
(Coal In/OH Out) Untreated							
(SCEM In/SCEM Out) Untreated							
(SCEM In/OH Out) Untreated							
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)		81%	91%	96%	98%	86%	85%
OH/coal basis (assuming 69% ox)		61%					

Date		**7/28/2007**	**7/29/2007**	**7/31/2007**	**7/31/2007**	**8/1/2007**	**8/3/2007**
Condition		**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**
Inputs:	**Units**						
Time Coal Sampled		*Ave*	22:00	*Ave*	*Ave*	*Ave*	*Ave*
Time Coal should hit Furnace		14:55	22:00	14:50	14:50	12:15	8:00
Load, Gross at time Coal hit Furnace	MW (gross)	890	886	889	889	884	876
Btu Ratio	Btu blend/6399 Btu	1.08	1.12	1.14	1.14	1.13	1.27
% Coal 2 (PRB)		8.1	26.7	26.46	26.46	26.45	100
Time Ash Sampled		14:55	18:15	14:50	14:50	12:15	8:00
Load, Gross at time Ash Sampled	MW (gross)	890	893	889	889	884	876
Gross Heat Rate	Btu/kW-h	9723	9703	9738	9738	9755	9953
Fraction Coal 1 by Wt.	wt. Fraction	0.919	0.733	0.7354	0.7354	0.7355	0
Coal 1 Hg (TxL)	µg/g, dry	*0.198*	0.195	*0.198*	*0.198*	*0.198*	*0.198*
Coal 1 Ash (TxL)	wt%, dry	*21.22*	21.22	*21.22*	*21.22*	*21.22*	*21.22*
Coal 1 Moisture (TxL)	wt%	*32.49*	30.67	*32.49*	*32.49*	*32.49*	*32.49*
Coal 1 Heating Value (TxL)	Btu/lb, dry	*9946*	9878	*9946*	*9946*	*9946*	*9946*
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	*10248*	*10248*	*10248*	*10248*	*10248*
Coal 2 Hg (PRB)	µg/g, dry	*0.096*	0.072	*0.096*	*0.096*	*0.096*	*0.096*
Coal 2 Ash (PRB)	wt%, dry	*8.09*	6.59	*8.09*	*8.09*	*8.09*	*8.09*
Coal 2 Moisture (PRB)	wt%	*32.93*	30.87	*32.93*	*32.93*	*32.93*	*32.93*
Coal 2 Heating Value (PRB)	Btu/lb, dry	*11645*	11880	*11645*	*11645*	*11645*	*11645*
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	*10228*	*10228*	*10228*	*10228*	*10228*
Date Ash Sampled		7/28/2007	7/29/2007	7/31/2007	8/1/2007	8/1/2007	8/3/2007
Time Ash Sampled		14:55	18:15	14:50	14:50	12:15	8:00
Treated Ash Hg (from URS lab) - first field only	µg/g	0.577	0.467	0.720	0.720	0.517	0.638
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.674	0.571	0.808	0.808	0.618	0.731
Untreated Ash Hg (from URS lab)	µg/g						0.061
SCEM start time		11:00	20:00	10:00	14:01	9:20	4:00
SCEM end time		17:00	23:59	12:45	16:13	11:36	8:00
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	22.08	23.66	23.56	25.56	27.84	12.85
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	4.14	3.50	4.04	3.21	6.02	0.40
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	17.29	15.51	16.11	19.45	17.73	7.08
OH start time				10:00	14:01	9:20	
OH end time				12:45	16:13	11:36	
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2			9.63	9.34	17.05	
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2			30.83	31.84	26.48	
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.91	0.70	0.70	0.70	0.71	0.00
Composite F-factor	dscf/MMBtu at 3% O2	11963	11958	11959	11959	11959	11942
Gas flow rate	dscfm at 3% O2	1726337	1712524	1725661	1725661	1718413	1736163
Gas flow rate	dry Nm3/min	45570	45206	45552	45552	45361	45830
Coal feed rate	ton/hr (dry)	429	413	416	416	415	375
Mercury Rate in Coal	g/h	73.9	60.6	64.6	64.6	64.4	32.6
Mercury Rate in Coal	lb/Tbtu	18.8	15.5	16.5	16.5	16.5	8.2
Hg Concentration from Coal	µg/dNm3 at 3% O2	27.0	22.3	23.7	23.7	23.7	11.9
Mercury Rate in Ash Treated, weighted	g/h	45.0	31.5	46.1	46.1	35.1	17.1
Mercury Rate in Ash Untreated	g/h						1.4
SCEM Mercury Rate ESP Inlet	g/h	60.4	64.2	64.4	69.9	75.8	35.3
SCEM Mercury Rate ESP Outlet Treated	g/h	11.3	9.5	11.0	8.8	16.4	1.1
SCEM Mercury Rate ESP Outlet Untreated	g/h	47.3	42.1	44.0	53.2	48.3	19.5
OH Mercury Rate ESP Outlet Treated	g/h			26.3	25.5	46.4	
OH Mercury Rate ESP Outlet Untreated	g/h			84.3	87.0	72.1	
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.190	0.162	0.171	0.171	0.171	0.096
wtd ash	wt%, as recd	13.60	12.00	11.97	11.97	11.97	5.43
wtd moisture	wt%	32.5	30.7	32.6	32.6	32.6	32.9
wtd Btu	Btu/lb, as recd	6803	7212	7004	7004	7004	7810
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		82%	106%	100%	108%	118%	108%
SCEM ESP outlet untreated Hg/Coal Hg		64%	69%	68%	82%	75%	60%
Percent Removal:							
treated ash Hg/Coal Hg		61%	52%	71%	71%	55%	52%
treated SCEM Hg/Coal Hg		85%	84%	83%	86%	75%	97%
treated OH Hg/Coal Hg				59%	61%	28%	
treated ash Hg/inlet ESP Hg		74%	49%	72%	66%	46%	48%
treated SCEM Hg/inlet ESP Hg		81%	85%	83%	87%	78%	97%
treated OH Hg/inlet ESP Hg				59%	63%	39%	
untreated ash Hg/inlet ESP Hg							4%
untreated SCEM Hg/inlet ESP Hg		22%	34%	32%	24%	36%	45%
untreated OH Hg/inlet ESP Hg				-31%	-25%	5%	
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.31	1.48	1.13	1.18	1.25	1.79
(Coal In/OH Out) Treated				0.89	0.90	0.79	
(SCEM In/SCEM Out) Treated		1.07	1.57	1.13	1.27	1.47	1.94
(SCEM In/OH Out) Treated				0.89	0.97	0.93	
(Coal In/SCEM Out) Untreated							1.56
(Coal In/OH Out) Untreated							
(SCEM In/SCEM Out) Untreated							1.69
(SCEM In/OH Out) Untreated							
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)		89%	89%	88%	90%	82%	98%
OH/coal basis (assuming 69% ox)				73%	74%	53%	

Date		**8/5/2007**	**8/7/2007**	**8/9/2007**	**8/11/2007**	**8/13/2007**	**8/14/2007**
Condition		**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**
Inputs:	**Units**						
Time Coal Sampled		*Ave*	8:05	7:52 / Ave	*Ave*	*Ave*	*Ave*
Time Coal should hit Furnace		15:30	8:05	7:52	18:00	11:00	14:30
Load, Gross at time Coal hit Furnace	MW (gross)	878	875	881	885	881	884
Btu Ratio	Btu blend/6399 Btu	1.17	1.14	1.14	1.11	1.15	1.05
% Coal 2 (PRB)		25.82	25.62	23.66	12.62	25.35	12.64
Time Ash Sampled		15:30	8:05	21:00	18:00	11:00	14:30
Load, Gross at time Ash Sampled	MW (gross)	878	875	879	885	881	884
Gross Heat Rate	Btu/kW-h	9837	9836	9785	9746	9670	9818
Fraction Coal 1 by Wt.	wt. Fraction	0.7418	0.7438	0.7634	0.8738	0.7465	0.8736
Coal 1 Hg (TxL)	µg/g, dry	*0.198*	0.193	0.180	*0.198*	*0.198*	*0.198*
Coal 1 Ash (TxL)	wt%, dry	*21.22*	19.94	25.54	*21.22*	*21.22*	*21.22*
Coal 1 Moisture (TxL)	wt%	*32.49*	32.49	31.75	*32.49*	*32.49*	*32.49*
Coal 1 Heating Value (TxL)	Btu/lb, dry	*9946*	10178	9234	*9946*	*9946*	*9946*
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	*10248*	10300	*10248*	*10248*	*10248*
Coal 2 Hg (PRB)	µg/g, dry	*0.096*	0.067	*0.096*	*0.096*	*0.096*	*0.096*
Coal 2 Ash (PRB)	wt%, dry	*8.09*	8.29	*8.09*	*8.09*	*8.09*	*8.09*
Coal 2 Moisture (PRB)	wt%	*32.93*	32.35	*32.93*	*32.93*	*32.93*	*32.93*
Coal 2 Heating Value (PRB)	Btu/lb, dry	*11645*	11581	*11645*	*11645*	*11645*	*11645*
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	*10228*	*10228*	*10228*	*10228*	*10228*
Date Ash Sampled		8/5/2007	*Ave*	8/9/2007	8/11/2007	8/13/2007	*Ave*
Time Ash Sampled		15:30		21:00	18:00	11:00	
Treated Ash Hg (from URS lab) - first field only	µg/g	0.765	*0.665*	0.462	0.560	0.510	*0.665*
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	0.851	*0.757*	0.566	0.658	0.611	*0.757*
Untreated Ash Hg (from URS lab)	µg/g		*0.053*				*0.053*
SCEM start time		13:30	6:00	6:00	16:00	7:00	11:30
SCEM end time		17:30	10:00	9:00	20:00	13:00	13:45
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	29.00	17.93	17.49	25.48	26.25	25.84
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	3.14	3.22	5.32	6.51	5.47	7.65
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	16.55	15.35	16.64	16.04	23.87	16.56
OH start time							11:30
OH end time							13:45
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2						21.91
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2						33.39
Calculated Values:							
Fraction Coal 1 by Btu	Btu Fraction	0.71	0.72	0.72	0.86	0.72	0.86
Composite F-factor	dscf/MMBtu at 3% O2	11959	11959	12003	11962	11959	11962
Gas flow rate	dscfm at 3% O2	1721317	1715867	1724307	1720174	1698114	1730912
Gas flow rate	dry Nm3/min	45438	45294	45517	45408	44825	45691
Coal feed rate	ton/hr (dry)	416	408	440	425	411	427
Mercury Rate in Coal	g/h	64.8	59.5	63.7	71.4	64.1	71.8
Mercury Rate in Coal	lb/Tbtu	16.5	15.2	16.3	18.2	16.6	18.2
Hg Concentration from Coal	µg/dNm3 at 3% O2	23.8	21.9	23.3	26.2	23.8	26.2
Mercury Rate in Ash Treated, weighted	g/h	48.7	40.4	41.2	42.2	34.6	48.8
Mercury Rate in Ash Untreated	g/h		2.8				3.4
SCEM Mercury Rate ESP Inlet	g/h	79.1	48.7	47.8	69.4	70.6	70.8
SCEM Mercury Rate ESP Outlet Treated	g/h	8.6	8.7	14.5	17.7	14.7	21.0
SCEM Mercury Rate ESP Outlet Untreated	g/h	45.1	41.7	45.4	43.7	64.2	45.4
OH Mercury Rate ESP Outlet Treated	g/h						60.1
OH Mercury Rate ESP Outlet Untreated	g/h						91.5
Weighted Average Coal Values:							
wtd Hg	ug/g, dry	0.172	0.160	0.160	0.185	0.172	0.185
wtd ash	wt%, as recd	12.03	11.45	14.59	13.20	12.07	13.20
wtd moisture	wt%	32.6	32.5	32.0	32.5	32.6	32.5
wtd Btu	Btu/lb, as recd	6997	7118	6659	6853	6992	6853
SCEM vs Coal Hg Ratios:							
SCEM inlet Hg/Coal Hg		122%	82%	75%	97%	110%	99%
SCEM ESP outlet untreated Hg/Coal Hg		70%	70%	71%	61%	100%	63%
Percent Removal:							
treated ash Hg/Coal Hg		75%	68%	65%	59%	54%	68%
treated SCEM Hg/Coal Hg		87%	85%	77%	75%	77%	71%
treated OH Hg/Coal Hg							16%
treated ash Hg/inlet ESP Hg		62%	83%	86%	61%	49%	69%
treated SCEM Hg/inlet ESP Hg		89%	82%	70%	74%	79%	70%
treated OH Hg/inlet ESP Hg							15%
untreated ash Hg/inlet ESP Hg			6%				5%
untreated SCEM Hg/inlet ESP Hg		43%	14%	5%	37%	9%	36%
untreated OH Hg/inlet ESP Hg							-29%
Hg Mass Balance Ratio:							
(Coal In/SCEM Out) Treated		1.13	1.21	1.14	1.19	1.30	1.03
(Coal In/OH Out) Treated							0.66
(SCEM In/SCEM Out) Treated		1.38	0.99	0.86	1.16	1.43	1.01
(SCEM In/OH Out) Treated							0.65
(Coal In/SCEM Out) Untreated			1.33				1.47
(Coal In/OH Out) Untreated							0.76
(SCEM In/SCEM Out) Untreated			1.09				1.45
(SCEM In/OH Out) Untreated							0.75
Overall Removal - assuming 95% oxidized Hg removed by FGD:							
SCEM/coal basis (assuming 74% ox)		91%	90%	84%	83%	84%	79%
OH/coal basis (assuming 69% ox)							45%

Date		**8/14/2007**	**8/15/2007**	**8/17/2007**	**8/18/2007**	**8/19/2007**	**8/21/2007**	**Averages**
Condition		**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Darco HG-LH 2.0 lb/Macf**	**Long Term Injection**
Inputs:	**Units**							
Time Coal Sampled		*Ave*	7:52	22:30	*Ave*	21:30	7:10	
Time Coal should hit Furnace		14:30	7:52	22:30	13:00	21:30	7:10	
Load, Gross at time Coal hit Furnace	MW (gross)	884	886	881	891	885	885	873
Btu Ratio	Btu blend/6399 Btu	1.05	1.08	1.2	1.17	1.15	1.13	1.14
% Coal 2 (PRB)		12.64	23.28	24.98	25	25	24.99	30.60
Time Ash Sampled		14:30	11:00	11:30	13:00	14:00	7:10	
Load, Gross at time Ash Sampled	MW (gross)	884	876	887	891	886	885	874
Gross Heat Rate	Btu/kW-h	9818	9851	9881	9817	9781	9631	9811
Fraction Coal 1 by Wt.	wt. Fraction	0.8736	0.7672	0.7502	0.75	0.75	0.7501	0.69
Coal 1 Hg (TxL)	µg/g, dry	*0.198*	0.180	0.204	*0.198*	0.201	0.224	*0.198*
Coal 1 Ash (TxL)	wt%, dry	*21.22*	25.54	16.50	*21.22*	18.43	18.95	*21.22*
Coal 1 Moisture (TxL)	wt%	*32.49*	31.75	33.28	*32.49*	28.66	32.83	*32.49*
Coal 1 Heating Value (TxL)	Btu/lb, dry	*9946*	9234	10695	*9946*	10303	10293	*9946*
Coal 1 F-factor (TxL)	dry scf/Mbtu, 0% O2	*10248*	10300	*10248*	*10248*	*10248*	10264	*10248*
Coal 2 Hg (PRB)	µg/g, dry	*0.096*	*0.096*	0.087	*0.096*	0.095	0.134	*0.096*
Coal 2 Ash (PRB)	wt%, dry	*8.09*	*8.09*	8.69	*8.09*	7.23	9.41	*8.09*
Coal 2 Moisture (PRB)	wt%	*32.93*	*32.93*	49.60	*32.93*	31.85	30.87	*32.93*
Coal 2 Heating Value (PRB)	Btu/lb, dry	*11645*	*11645*	11793	*11645*	11771	11557	*11645*
Coal 2 F-factor (PRB)	dry scf/Mbtu, 0% O2	*10228*	*10228*	*10228*	*10228*	*10228*	10119	*10228*
Date Ash Sampled		*Ave*	8/15/2007	8/17/2007	8/18/2007	8/19/2007	*Ave*	
Time Ash Sampled			11:00	11:30	13:00	14:00		
Treated Ash Hg (from URS lab) - first field only	µg/g	*0.665*	0.371		0.636	0.756	*0.665*	*0.665*
Treated Ash Hg (from URS lab) - weighted for all fields	µg/g	*0.757*	0.480		0.729	0.842	*0.757*	*0.780*
Untreated Ash Hg (from URS lab)	µg/g	*0.053*		0.025			*0.053*	*0.053*
SCEM start time		15:00	9:30	20:00	11:00	17:30	7:30	
SCEM end time		17:10	11:38	23:59	15:00	21:30	10:30	
SCEM ESP Inlet	µg/dry Nm3 @ 3% O2	21.61	26.83	19.83	26.80	29.38		24.97
SCEM ESP Outlet Treated	µg/dry Nm3 @ 3% O2	7.73	2.42	4.02	6.72	4.52	3.07	4.23
SCEM ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	16.40	15.17	16.65	15.87	18.64	18.17	17.65
OH start time		15:00	9:30					
OH end time		17:10	11:38					
OH ESP Outlet Treated	µg/dry Nm3 @ 3% O2	22.37	10.77					16.05
OH ESP Outlet Untreated	µg/dry Nm3 @ 3% O2	30.58	26.51					32.84
Calculated Values:								
Fraction Coal 1 by Btu	Btu Fraction	0.86	0.73	0.78	0.72	0.73	0.72	0.66
Composite F-factor	dscf/MMBtu at 3% O2	11962	12003	11960	11959	11959	11937	11958
Gas flow rate	dscfm at 3% O2	1730912	1746890	1735258	1743535	1725327	1695946	1706819
Gas flow rate	dry Nm3/min	45691	46113	45806	46024	45544	44768	45055
Coal feed rate	ton/hr (dry)	427	446	397	422	406	402	409
Mercury Rate in Coal	g/h	71.8	64.8	62.9	66.0	64.3	73.4	61.9
Mercury Rate in Coal	lb/Tbtu	18.2	16.3	15.9	16.6	16.4	19.0	15.9
Hg Concentration from Coal	µg/dNm3 at 3% O2	26.2	23.4	22.9	23.9	23.5	27.3	22.9
Mercury Rate in Ash Treated, weighted	g/h	48.8	35.6		42.6	41.4	38.7	42.4
Mercury Rate in Ash Untreated	g/h	3.4		1.1			2.7	2.9
SCEM Mercury Rate ESP Inlet	g/h	59.2	74.2	54.5	74.0	80.3		67.5
SCEM Mercury Rate ESP Outlet Treated	g/h	21.2	6.7	11.0	18.6	12.4	8.2	11.4
SCEM Mercury Rate ESP Outlet Untreated	g/h	45.0	42.0	45.8	43.8	50.9	48.8	47.7
OH Mercury Rate ESP Outlet Treated	g/h	61.3	29.8					43.4
OH Mercury Rate ESP Outlet Untreated	g/h	83.8	73.3					88.8
Weighted Average Coal Values:								
wtd Hg	ug/g, dry	0.185	0.160	0.175	0.173	0.175	0.201	0.167
wtd ash	wt%, as recd	13.20	14.63	9.35	12.10	11.09	11.17	11.60
wtd moisture	wt%	32.5	32.0	37.4	32.6	29.5	32.3	32.6
wtd Btu	Btu/lb, as recd	6853	6653	6838	6988	7518	7183	7050
SCEM vs Coal Hg Ratios:								
SCEM inlet Hg/Coal Hg		83%	115%	87%	112%	125%		109%
SCEM ESP outlet untreated Hg/Coal Hg		63%	65%	73%	66%	79%	66%	77%
Percent Removal:								
treated ash Hg/Coal Hg		68%	55%		65%	64%	53%	68%
treated SCEM Hg/Coal Hg		70%	90%	82%	72%	81%	89%	82%
treated OH Hg/Coal Hg		15%	54%					30%
treated ash Hg/inlet ESP Hg		82%	48%		58%	52%		66%
treated SCEM Hg/inlet ESP Hg		64%	91%	80%	75%	85%		82%
treated OH Hg/inlet ESP Hg		-4%	60%					40%
untreated ash Hg/inlet ESP Hg		6%		2%				5%
untreated SCEM Hg/inlet ESP Hg		24%	43%	16%	41%	37%		23%
untreated OH Hg/inlet ESP Hg		-42%	1%					-43%
Hg Mass Balance Ratio:								
(Coal In/SCEM Out) Treated		1.03	1.53		1.08	1.20	1.56	1.15
(Coal In/OH Out) Treated		0.65	0.99					0.72
(SCEM In/SCEM Out) Treated		0.85	1.76		1.21	1.49		1.25
(SCEM In/OH Out) Treated		0.54	1.14					0.79
(Coal In/SCEM Out) Untreated		1.48		1.34			1.43	1.22
(Coal In/OH Out) Untreated		0.82						0.68
(SCEM In/SCEM Out) Untreated		1.22		1.16				1.33
(SCEM In/OH Out) Untreated		0.68						0.74
Overall Removal - assuming 95% oxidized Hg removed by FGD:								
SCEM/coal basis (assuming 74% ox)		79%	93%	88%	80%	86%	92%	87%
OH/coal basis (assuming 69% ox)		44%	70%					54%

APPENDIX G – ESP OUTLET SCEM IGS FILTER CHANGES

The IGS filter on the treated ESP outlet was changed three different times during long-term testing. The first change occurred 6/20/07 during baseline testing. The second change occurred 6/28/07 during long-term injection. The third change occurred on 7/11/07 during long-term injection.

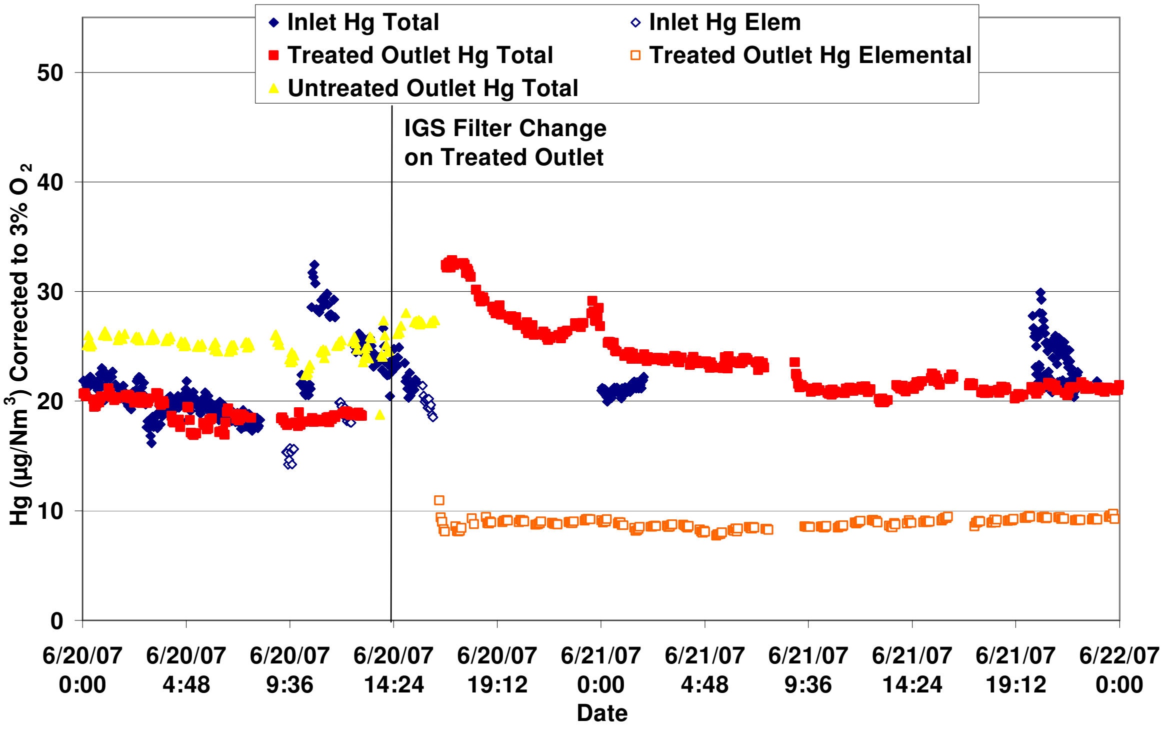


Figure G-1. IGS Filter Change on Treated Outlet June 20, 2007

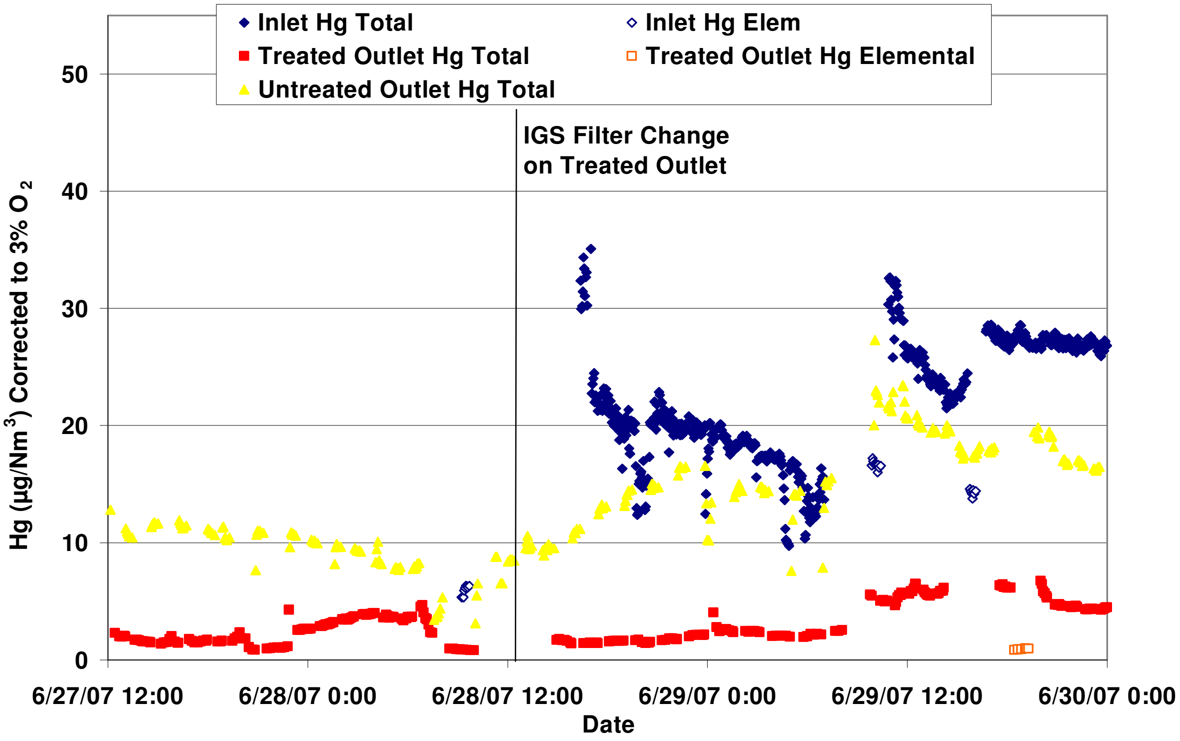


Figure G-2. IGS Filter Change on Treated Outlet June 28, 2007

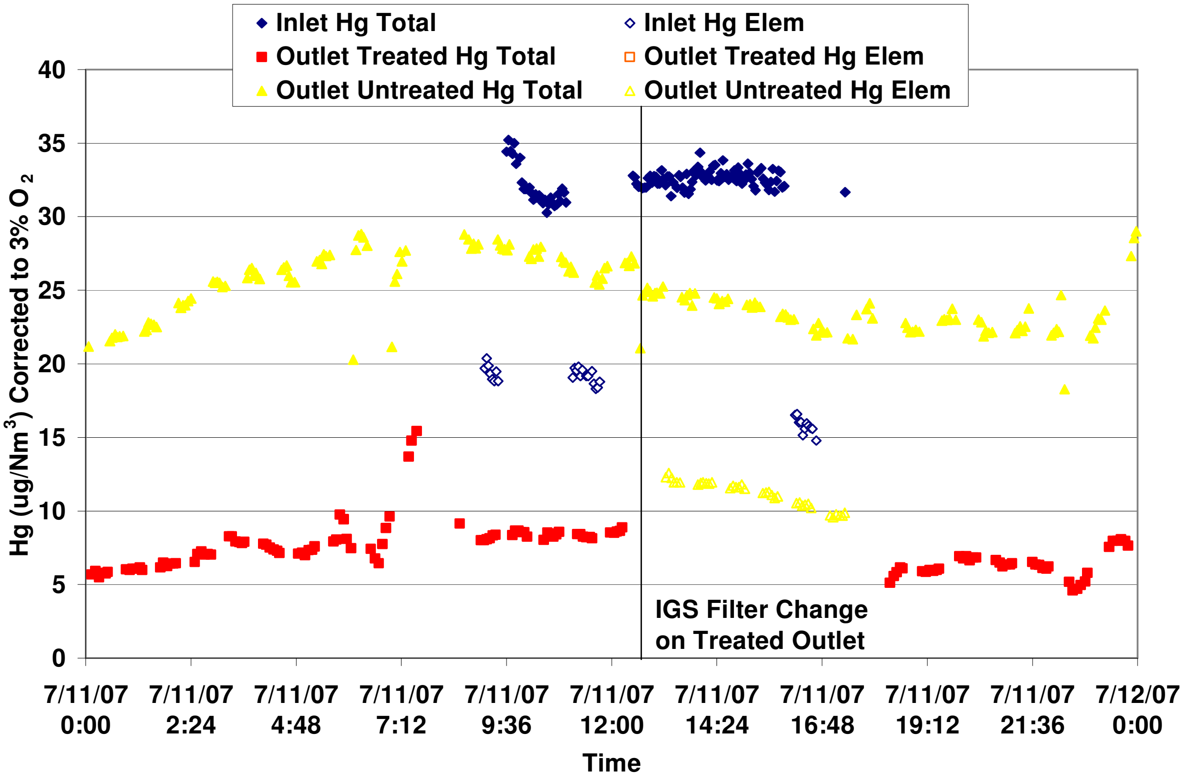


Figure G-3. IGS Filter Change on Treated Outlet July 11, 2007

APPENDIX H – COAL ANALYTICAL RESULTS

Table H-1. Analyses of Texas Lignite Fired during Phase I Parametric Tests

Coal Type	TxL	TxL	TxL	TxL	TxL	TxL	Average	St Dev
Date	12/1/2006	12/1/2006	12/2/2006	12/2/2006	12/9/2006	12/9/2006		
Time	10:15	10:15	10:30	10:30	10:30	10:40		
% Moisture	32.74	32.22	31.19	31.48	31.34	32.49	31.91	0.66
Dry Basis:								
Btu/lb	-	-	10149	-	10962	10823	10645	434.85
% Carbon	-	-	57.18	-	62.93	-	60.06	4.07
% Hydrogen	-	-	4.06	-	4.43	-	4.25	0.26
% Nitrogen	-	-	0.86	-	0.88	-	0.87	0.01
% Sulfur	-	-	1.07	-	0.84	0.73	0.88	0.17
% Ash	-	-	22.28	19.63	15.08	16.15	18.29	3.30
% Oxygen	-	-	14.59	-	15.84	-	15.22	0.88
Hg (ppm)	0.184	0.21	0.199	0.243	0.119	0.159	0.186	0.04
Cl (ppm)	7.75	34.9	32.8	38.4	50.9	34.3	33.2	14.09
Br (ppm)	9.63	9.8	9.74	9.1	10.3	10.4	9.8	0.47
F (ppm)	35.8	49	92.1	74	57.2	39.9	58	21.54

Table H-2. Analyses of PRB Fired during Phase I Parametric Tests

Coal Type	PRB	PRB	PRB	Average	St Dev
Date	12/1/2006	12/2/2006	12/9/2006		
Time	10:15	10:30	10:50		
% Moisture	30.38	31.16	29.71	30.42	0.73
Dry Basis:					
Btu/lb	-	11901	11667	11784	165
% Carbon	-	69.06	67.86	68.46	0.85
% Hydrogen	-	4.50	4.44	4.47	0.04
% Nitrogen	-	0.71	0.78	0.75	0.05
% Sulfur	-	0.42	0.67	0.55	0.18
% Ash	-	7.16	9.12	8.14	1.39
% Oxygen	-	18.15	17.13	17.64	0.72
Hg (ppm)	0.104	0.116	0.143	0.121	0.020
Cl (ppm)	12.1	20.2	NR	16.2	5.7
Br (ppm)	< 1	< 1	< 1	< 1	0
F (ppm)	61.8	70.5	68.6	67.0	4.6

NR = Not reported, value measured was 138 ppm Cl, which is an order of magnitude higher than any other known Cl value for PRB coal for this plant.

Table H-3. Analyses of TxL Fired during Phase II Parametric Tests

Coal Type	TxL	TxL	TxL	TxL	Average	St Dev
Date	4/19/2007	4/19/2007	4/20/2007	4/20/2007		
Time	14:20	14:30	13:00	13:00		
% Moisture	33.16	32.47	32.34	32.63	32.65	0.36
Dry Basis:						
Btu/lb	9965	10803	9105	10042	9979	695
% Sulfur	1	0.78	0.78	0.87	0.858	0.104
% Ash	19.74	13.8	27.24	20.33	20.278	5.499
Hg (ppm)	0.156	0.132	0.175	0.237	0.175	0.045
Cl (ppm)	36	-	47	-	40	10
Br (ppm)	5.81	-	5.8	-	5.805	0.007
F (ppm)	77	-	89.5	-	83.250	8.839

Table H-4. Analyses of PRB Fired during Phase II Parametric Tests

Coal Type	PRB	PRB	Average	St Dev
Date	4/19/2007	4/20/2007		
Time	14:25	13:00		
% Moisture	31.89	31.47	31.68	0.30
Dry Basis:				
Btu/lb	11301	11268	11285	23
% Sulfur	0.58	0.56	0.570	0.014
% Ash	10.45	10.49	10.470	0.028
Hg (ppm)	0.166	0.12	0.143	0.033
Cl (ppm)	12	37	25	18
Br (ppm)	4.99	4.64	4.815	0.247
F (ppm)	77.9	43.2	60.550	24.537

Table H-5. Analysis of TxL Fired during Long-Term Tests

Coal Type	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**
Date	6/20/2007	6/20/2007	6/21/2007	6/21/2007	6/25/2007	6/29/2007	7/3/2007	7/5/2007	7/5/2007	7/8/2007
Time	22:00	22:00	22:30	22:30	22:30	21:00	16:30	16:38	16:44	0:30
% Moisture	33.40	32.80	33.16	34.33	33.67	32.30	33.08	34.39	32.93	33.72
Dry Basis:										
Heating Value, Dry Btu/lb	9447	9580	9989	10003	10040	9392	9380	9859	9368	10635
% Carbon	-	-	-	-	58.86	-	55.37	-	-	62.14
% Hydrogen	-	-	-	-	5.05	-	4.73	-	-	5.19
% Nitrogen	-	-	-	-	0.88	-	0.82	-	-	0.86
% Sulfur	1.00	1.52	1.57	1.35	1.33	1.14	0.95	0.91	0.93	0.86
% Ash	22.67	22.43	21.25	21.06	20.76	23.25	24.25	21.15	23.85	15.70
% Oxygen	-	-	-	-	13.12	-	13.88	-	-	15.24
Hg (ppm)	0.131	0.240	0.195	0.215	0.222	0.210	0.135	0.197	0.277	0.207
Cl (ppm)	-	-	-	-	<5	-	<5	-	-	52
Br (ppm)	-	-	-	-	<1.0	-	<1.0	-	-	<1.0
F-factor - dry scf/Mbtu, 0% O2	-	-	-	-	10287	-	10256	-	-	10115

Coal Type	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**
Date	7/9/2007	7/9/2007	7/11/2007	7/11/2007	7/19/2007	7/22/2007	7/22/2007	7/25/2007	7/27/2007	7/27/2007
Time	16:15	16:10	16:15	16:10	8:20	0:05	0:05	15:56	22:00	22:00
% Moisture	29.98	30.00	32.42	33.00	32.95	42.74	29.54	31.86	34.13	33.39
Dry Basis:										
Heating Value, Dry Btu/lb	11794	10001	10235	9780	10184	10422	10411	10097	9690	9643
% Carbon	-	-	-	-	60.25	-	-	59.39	-	-
% Hydrogen	-	-	-	-	5.07	-	-	5.05	-	-
% Nitrogen	-	-	-	-	0.92	-	-	0.84	-	-
% Sulfur	0.89	1.18	1.23	0.94	1.04	0.97	0.92	1.24	1.15	1.11
% Ash	27.85	21.21	18.80	20.22	19.47	17.43	16.94	20.31	22.73	23.35
% Oxygen	-	-	-	-	13.25	-	-	13.16	-	-
Hg (ppm)	0.174	0.288	0.300	0.270	0.179	0.196	0.155	0.154	0.221	0.199
Cl (ppm)	-	-	-	-	<5	-	-	37	-	-
Br (ppm)	-	-	-	-	<1.0	-	-	<1.0	-	-
F-factor - dry scf/Mbtu, 0% O2	-	-	-	-	10336	-	-	10302	-	-

Coal Type	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**	**TxL**
Date	7/29/2007	7/29/2007	8/7/2007	8/9/2007	8/9/2007	8/15/2007	8/15/2007	8/17/2007	8/17/2007
Time	22:00	22:00	7:45	8:05	8:15	7:50	7:55	22:30	22:30
% Moisture	32.24	29.10	30.85	32.49	31.58	31.30	32.20	33.03	33.52
Dry Basis:									
Heating Value, Dry Btu/lb	9858	9897	9916	10178	9672	8808	9660	10814	10576
% Carbon	-	-	57.48	-	-	51.82	57.20	-	-
% Hydrogen	-	-	4.82	-	-	4.55	5.04	-	-
% Nitrogen	-	-	0.85	-	-	0.73	0.82	-	-
% Sulfur	0.94	0.95	1.04	1.41	5.79*	0.71	0.80	1.39	1.72
% Ash	21.46	20.97	20.95	19.94	23.29	28.77	22.30	15.79	17.20
% Oxygen	-	-	14.85	-	-	13.40	13.82	-	-
Hg (ppm)	0.137	0.252	0.168	0.193	0.615	0.148	0.211	0.193	0.215
Cl (ppm)	-	-	58	-	-	177	160	-	-
Br (ppm)	-	-	<1.0	-	-	<1.0	<1.0	-	-
F-factor - dry scf/Mbtu, 0% O2	-	-	10021	-	-	10239	10360	-	-

* Value is not typical, and was disregarded in calculations.

Coal Type	**TxL**	**TxL**	**TxL**		
Date	8/19/2007	8/19/2007	8/21/2007	**Average**	**St Dev**
Time	21:30	21:30	7:10		
% Moisture	21.95	35.37	32.83	**32.51**	**3.10**
Dry Basis:					
Heating Value, Dry Btu/lb	10391	10214	10293	**10007**	**540**
% Carbon	-	-	60.54	**58.12**	**3.11**
% Hydrogen	-	-	5.11	**4.96**	**0.21**
% Nitrogen	-	-	0.88	**0.84**	**0.05**
% Sulfur	1.02	0.99	0.94	**1.25**	**0.89**
% Ash	17.93	18.92	18.95	**20.97**	**3.07**
% Oxygen	-	-	13.57	**13.81**	**0.76**
Hg (ppm)	0.178	0.225	0.224	**0.22**	**0.09**
Cl (ppm)	-	-	36	**59**	**65**
Br (ppm)	-	-	<1.0	**1**	**0**
F-factor - dry scf/Mbtu, 0% O2	-	-	10264	**10242**	**108**

Table H-6. Analysis of PRB Fired during Long Term Tests

Coal Type	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**
Date	6/20/2007	6/21/2007	6/25/2007	6/27/2007	6/29/2007	6/29/2007	7/3/2007	7/5/2007	7/8/2007	7/9/2007
Time	22:00	22:30	22:30	15:55	21:00	21:00	16:40	16:46	0:30	16:05
% Moisture	30.57	31.11	33.39	32.91	34.18	32.20	33.08	32.96	30.17	31.78
Dry Basis:										
Btu/lb	11653	11816	11718	11792	11209	11732	11572	11559	11458	11602
% Carbon	-	-	68.59	-	-	-	67.39	-	67.16	-
% Hydrogen	-	-	5.49	-	-	-	4.75	-	5.47	-
% Nitrogen	-	-	0.72	-	-	-	0.82	-	0.74	-
% Sulfur	0.70	0.58	0.61	0.53	0.74	0.50	0.53	0.60	0.59	0.54
% Ash	7.06	7.02	7.63	7.44	10.97	8.10	9.72	9.00	9.66	8.84
% Oxygen	-	-	16.96	-	-	-	16.79	-	16.38	-
Hg (ppm)	0.097	0.075	0.153	0.067	0.105	0.130	0.083	0.081	0.096	0.111
Cl (ppm)	-	-	6	-	-	-	<5	-	<5	-
Br (ppm)	-	-	<1.0	-	-	-	<1.0	-	<1.0	-
F-factor - dry scf/Mbtu, 0% O2	-	-	10033	-	-	-	9772	-	10086	-

Coal Type	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**	**PRB**
Date	7/11/2007	7/19/2007	7/22/2007	7/25/2007	7/27/2007	7/29/2007	8/7/2007	8/9/2007	8/17/2007	8/19/2007
Time	16:18	8:10	0:05	15:51	22:00	22:00	7:40	8:10	22:30	21:30
% Moisture	30.27	32.65	32.68	31.76	34.80	30.87	29.10	32.35	49.60	31.85
Dry Basis:										
Btu/lb	11770	11794	12326	10257	11748	11880	11906	11581	11793	11771
% Carbon	-	69.14	-	69.08	-	-	69.52	-	-	-
% Hydrogen	-	5.50	-	5.56	-	-	5.47	-	-	-
% Nitrogen	-	0.71	-	0.72	-	-	0.71	-	-	-
% Sulfur	0.48	0.53	0.53	0.57	0.50	0.52	0.45	0.60	0.54	0.58
% Ash	6.39	7.42	8.65	7.36	7.70	6.59	6.45	8.29	8.69	7.23
% Oxygen	-	16.70	-	16.70	-	-	17.39	-	-	-
Hg (ppm)	0.059	0.090	0.104	0.097	0.102	0.072	0.098	0.067	0.087	0.095
Cl (ppm)	-	<5	-	84	-	-	44	-	-	-
Br (ppm)	-	<1.0	-	<1.0	-	-	<1.0	-	-	-
F-factor - dry scf/Mbtu, 0% O2	-	10049	-	11570	-	-	9964	-	-	-

Coal Type	**PRB**	**PRB**	**PRB**
Date	8/21/2007	**Average**	**St Dev**
Time	7:15		
% Moisture	30.87	**32.82**	**4.25**
Dry Basis:			
Btu/lb	11557	**11643**	**400**
% Carbon	67.72	**68.37**	**0.94**
% Hydrogen	5.56	**5.40**	**0.29**
% Nitrogen	0.79	**0.74**	**0.04**
% Sulfur	0.57	**0.56**	**0.06**
% Ash	9.41	**8.08**	**1.23**
% Oxygen	15.95	**16.70**	**0.45**
Hg (ppm)	0.134	**0.10**	**0.02**
Cl (ppm)	<5	**22**	**31**
Br (ppm)	<1.0	**<1.0**	**0.0**
F-factor - dry scf/Mbtu, 0% O2	10119	**10228**	**603**

APPENDIX I – CONCRETE ANALYTICAL RESULTS

The following paragraphs describe and procedures for the foam index testing conduscted by URS.

The foam index test is a titration used to indicate the air entrainment additive (AEA) adsorptive capacity of carbon present in the fly ash. In this test, a fly ash samples are titrated to a stable foam point using air entrainment additive (AEA). URS uses Grace Construction Product's Daravair 1000 diluted to a 1% solids concentration for titrating. There are two types of foam index tests that URS performs. The first type is "full-scale" and uses fly ash that was collected at field sites during activated carbon injection testing. The second type is "bench-scale" and uses baseline fly ash and activated carbon that is mixed in appropriate amounts to simulate activated carbon injection rates.

Materials and Apparatus

- De-ionized water
- 1% solids vinsol rosin solution made fresh daily from Daravair 1000 (see below)
- Auto pipettor (calibrated to deliver 25 µL drops – see below)
- Portland cement
- Fly ash sample
- Powdered activated carbon (if performing bench-scale addition tests)

Health and Safety

- Vinsol rosin is a skin irritant. Prolonged skin contact can result in burns.
- Will cause eye burns if eye contact occurs
- Nitrile gloves required
- Safety glasses required (goggles recommended)
- Lab coat or long sleeves required
- All waste and rinses containing vinsol rosin, Portland cement, or vinsol rosin must be disposed of in approved 55-gallon drum located in lab D-119.
- Notify lab manager when 55-gallon drum is ¾ full.

Quality Control and Verification

- Pipettor will be calibrated daily to achieve a 25 µL drop.
- 1% solids vinsol resin solution will be replaced once per week as needed.
- Jars/lids will be kept clean and free of cracks or will be replaced.
- Each new batch of 1% vinsol solution should produce the following results with Baldwin baseline fly ash (average of three trials): 4 ± 1 drops.

Notes and Helpful Suggestions

- All tests should be completed in triplicate.
- It is easiest to weigh out all fly ash/carbon/cement for a batch of tests first and then start the titrations.
- Record all times, drops and data on the foam index data sheets.
- Waste from all tests should be disposed of in 55-gallon drum labeled for foam index waste. All jars/graduated cylinders/flasks should be rinsed thoroughly and rinses be added to the 55-gallon drum.

How to make a 1% Vinsol Rosin solution

1. Use a glass graduated cylinder to measure 9.5 ± 0.1 mL of Daravair 1000.
2. Pour the 9.5 ± 0.1mL of Daravair 1000 into a 50 mL volumetric flask.
3. Use DI H_2O to rinse the graduated cylinder three times and pour into the flask with the Daravair 1000. Fill the volumetric flask to the 50 mL line.
4. Shake flask to mix well.
5. Rinse the graduated cylinder with vinsol rosin at least three more time with DI H_2O and pour into the 55-gallon drum labeled for foam index waste.

Procedure 1 - Full-scale Foam Index Test:

1. Place 6 g ± 0.1 g fly ash in a clean dry jar.
2. Place 24 g ± 0.1 g Portland cement into jar.
3. Add 70 g ± 0.1 g DI water to the fly ash/cement mixture. Immediately close the cap tightly and shake the mixture for 20 second with a firm, consistent motion.
4. Record time when step 5 is started on jar.
5. Remove cap and add 1 drop of 1% vinsol solution to the fly ash/cement/water mixture. Immediately close cap and tightly and shake the mixture for 20 seconds with a firm and consistent motion.
6. Remove the cap and observe the surface of the mixture for foam. If there is no foam, repeat step 6 using 1 drop increments. Continue to repeat step 5 until foam covers entire surface of mixture and is stable for 30 seconds. It is very important to keep track of the number of drops added to the mixture.
7. When foam covers the entire surface of the mixture and is stable for 30 seconds, shake the mixture for an additional 20 seconds. If the foam remains stable and covers the entire surface after 60 seconds, the endpoint has been achieved. If foam is not stable, repeat step 5 until foam is stable for 60 seconds.
8. Record time and total number of drops used.

Step 9 – Optional Modified Step

9. Let glass jar sit until foam is no longer stable. Record time when foam is no longer stable.

Procedure 2 - Bench-scale Foam Index Test:

1. Place X g ± 0.1 g baseline fly ash in a clean dry jar. X is determined from foam index test matrix.
2. Place X g ± 0.1 g designated activated carbon into jar. X is determine from foam index test matrix.
3. Place 24 g ± 0.1 g Portland cement into jar.
4. Add 70 g ± 0.1 g DI water to the fly ash/cement mixture. Immediately close the cap tightly and shake the mixture for 20 second with a firm, consistent motion.
5. Record time when step 6 is started on jar.
6. Remove cap and add 1 drop of 1% vinsol solution to the fly ash/cement/water mixture. Immediately close cap and tightly and shake the mixture for 20 seconds with a firm and consistent motion.
7. Remove the cap and observe the surface of the mixture for foam. If there is no foam, repeat step 6 using 1 drop increments. Continue to repeat step 6 until foam covers entire surface of mixture and is stable for 30 seconds. It is very important to keep track of the number of drops added to the mixture.
8. When foam covers the entire surface of the mixture and is stable for 30 seconds, shake the mixture for an additional 20 seconds. If the foam remains stable and covers the entire surface after 60 seconds, the endpoint has been achieved. If foam is not stable, repeat step 6 until foam is stable for 60 seconds.
9. Record time on jar and total number of drops used in book.

Step 10 – Optional Modified Step

10. Let glass jar sit until foam is no longer stable. Record time when foam is no longer stable.

The following paragraphs detail the foam index testing procedure used by Headwaters.

I. Purpose

The following specification is set forth to maintain consistency and guidelines for performing the aforementioned test. This procedure is not drawn from a published ASTM procedure and is the standard operating procedure for this facility. The Area Q.C. Coordinators will determine frequency of testing.

II. Equipment

MB-VR air entraining agent (AEA)
Type I or Type II water as defined by ASTM D1193, **11.01**
Hamilton Beach Blender, 10 speed with glass canister
Disposable 10cc slip tip syringes, Fisher catalog #14-826-13

250mL graduated cylinder
100mL graduated cylinder
Scale reading to 0.1g
Stopwatch

III. Procedure

1. All samples should be dried prior to analysis.

2. Make a 1:4 dilution** of MB-VR by diluting 20mL of AEA with 80mL of water.
3. Place 200mL of water into Hamilton Beach Blender. Add 80.0g of Class F fly ash to be tested. For Class C fly ash, use 40.0g.
4. Mix the solution for 10 seconds on the “Blend” speed. (Blender will have the “HI” button depressed. Then, pushing the “Blend” button to turn on the blender.) Turn off the blender.
5. Remove the blender lid. Ensure that there are no air pockets between the tip of the dropper and the AEA. Add drops of diluted AEA. The starting point for the drops should be at least one drop less than the anticipated number of drops. If stable foam is obtained with the first amount, of AEA added, repeat the test using less AEA.
6. Replace the blender lid and mix on the “Blend” speed for 10 seconds. Remove the lid and view the stability of the foam.
7. Repeat steps 5 and 6 until enough AEA is present to produce a solid layer of air bubbles on top of the solution. This means that no windows appear from bubbles that have popped. There is no time limit for the layer to remain intact.
8. When stable foam has been achieved, replace the blender lid and mix for an additional 10 seconds.
9. If the foam remains stable, record the amount of AEA required to produce the layer of bubbles. If any windows appear, repeat steps 5 through 7 until the foam remains stable after step 8.

Table I-1. Headwaters Concrete Results Using Ash from Long-Term Injection; Individual Cylinder 7-Day Compressive Strength

	7-Day Compressive Strength (psi of unconfined compressive strength)		
	Control with Portland Cement (no ash)	**Untreated Ash Truck Sample**	**Multi-Field Blend***
	10/30/2007	6/26/2007	7/9/07 & 8/2/07
Cylinder 1	3938	3745	3526
Cylinder 2	3948	3660	3729
Cylinder 3	4162	3734	3734
Average	4016	3713	3663

* Blended sample made by blending 50:50 first field samples from hoppers 1A and 2A collected on 7/9/07. Ash from hopper 1F3A on 7/9/07 was not used due to its coarseness. This 50:50 blend was then mixed 80:20 with Field 3F3A from 8/2/07 to give a final blend of hoppers used to prepare concrete mixes. No first field ash from 8/2/07 was used because plant went to all PRB before it could be collected.

** Reported average of three individual cylinders. See Appendix for the individual cylinder results.

Table I-2. First Field Long Term Concrete Data Unit 1 A-Side (Treated Duct), from LMS Lab

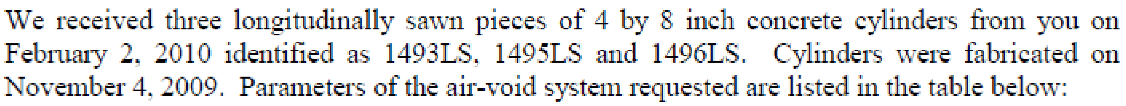
Date	1F1A			1F2A			1F3A		
	Foam Index (Drops AEA)	**LOI** (%)	**≥ 325 Mesh** (%)	**Foam Index** (Drops AEA)	**LOI** (%)	**≥ 325 Mesh** (%)	**Foam Index** (Drops AEA)	**LOI** (%)	**325 Mesh** (%)
Baseline									
6/18/2007	4	0.10	23.4	4	0.11	18.42	4	0.14	20.9
6/22/2007	5	-	-	5	-	-	4	-	-
Long Term									
6/25/2007	14	0.66	25.9	12	0.46	25.45	13	0.74	33.1
7/9/2007	12	0.42	29.9	11	0.37	26.17	15	0.21	83.7
7/20/2007	8	0.25	27.0	12	0.36	19.12	-	-	-
7/25/2007	14	0.47	23.8	13	0.46	24.54	7	0.19	52.9
7/27/2007	10	0.44	29.3	11	0.41	26.43	-	-	-
7/31/2007	9	0.24	34.3	10	0.28	30.67	-	-	-
8/3/2007	19	1.03	20.9	19	0.85	19.92	10	0.77	33.0
8/7/2007	11	0.47	32.8	9	0.44	26.38	8	0.43	36.8
8/10/2007	15	0.41	27.0	14	0.47	26.75	10	0.36	42.7
8/13/2007	10	0.37	43.8	10	0.43	37.39	12	0.50	38.9
8/17/2007	12	0.40	21.5	12	0.59	24.72	8	0.37	48.1

Table I-3. First Field Long Term Concrete LMS Data Unit 1 B-Side (Untreated Duct).

Date	1F1B			1F2B			1F3B		
	Foam Index (Drops AEA)	**LOI** (%)	**325 Mesh** (%)	**Foam Index** (Drops AEA)	**LOI** (%)	**325 Mesh** (%)	**Foam Index** (Drops AEA)	**LOI** (%)	**325 Mesh** (%)
Long Term									
7/2/2007	4	0.27	28.12	4	0.21	22.12	4	0.23	30.35
7/9/2007	4	0.19	30.93	4	0.18	30.86	3	0.12	27.26
7/20/2007	4	0.05	21.13	4	0.07	19.16	3	0.09	19.45
7/27/2007	4	0.12	25.54	5	0.18	21.8	4	0.08	21.99
8/3/2007	6	0.31	26.15	7	0.27	19.13	6	0.1	21.08
8/10/2007	4	0.15	21.8	4	0.15	19.6	4	0.1	24.64
8/17/2007	5	0.09	21.71	4	0.15	21.5	4	0.16	19.62

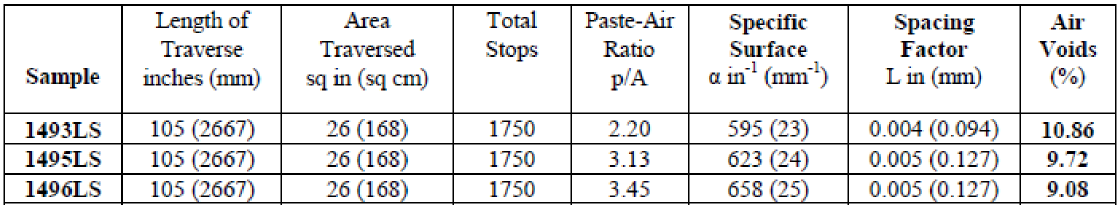
Petrographic Analysis Report

Per agreement with the subcontractor, Domnion Consulting, the entire report from the sub-contractor is included below. URS has included the note the sample 1493LS represents 1.89 lb/Macf, 1495LS represents 0.99 lb/Macf, and 1496LS represents 1.00 lb/Macf.



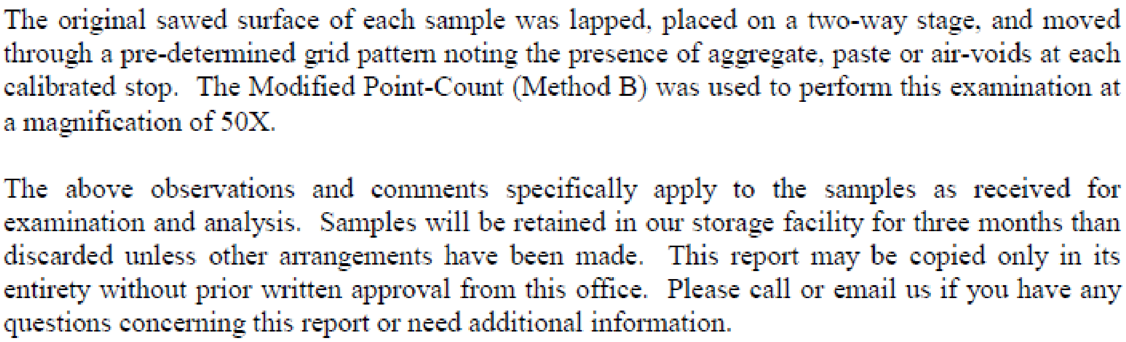
We received three longitudinally sawn pieces of 4 by 8 inch concrete cylinders from you on February 2, 2010 identified as 1493LS, 1495LS and 1496LS. Cylinders were fabricated on November 4, 2009. Parameters of the air-void system requested are listed in the table below:

Table I-4. Petrographic Analysis of Concrete Samples with ACI



Sample	Length of Traverse inches (mm)	Area Traversed sq in (sq cm)	Total Stops	Paste-Air Ratio p/A	**Specific Surface** α in^{-1} (mm^{-1})	**Spacing Factor** L in (mm)	**Air Voids** (%)
1493LS	105 (2667)	26 (168)	1750	2.20	595 (23)	0.004 (0.094)	**10.86**
1495LS	105 (2667)	26 (168)	1750	3.13	623 (24)	0.005 (0.127)	**9.72**
1496LS	105 (2667)	26 (168)	1750	3.45	658 (25)	0.005 (0.127)	**9.08**

***1493LS- 1.89 lb/MAcf, 1495LS 0.99 lb/Macf, 1496LS 1.00 lb/Macf**



The original sawed surface of each sample was lapped, placed on a two-way stage, and moved through a pre-determined grid pattern noting the presence of aggregate, paste or air-voids at each calibrated stop. The Modified Point-Count (Method B) was used to perform this examination at a magnification of 50X.

The above observations and comments specifically apply to the samples as received for examination and analysis. Samples will be retained in our storage facility for three months than discarded unless other arrangements have been made. This report may be copied only in its entirety without prior written approval from this office. Please call or email us if you have any questions concerning this report or need additional information.

APPENDIX J PROCESS PARAMETERS FOR UNIT 2

Table J-1. Parametric Phase IV Unit 2 Hourly Average Process Data

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/11/2009 0:00	6/11/2009 1:00	879.7	8080.5	3.0	2.2	592.2	1.1	766.1	757.4	312.9	307.8	2280.2	10.4	1.5	0.4	28.4	11.0	12.7
6/11/2009 1:00	6/11/2009 2:00	820.9	8056.6	3.0	2.3	550.5	1.1	748.2	740.3	311.9	307.7	2145.2	9.7	1.6	0.4	25.4	10.6	12.3
6/11/2009 2:00	6/11/2009 3:00	790.3	8061.5	3.0	2.4	534.5	1.1	730.7	722.4	302.3	299.1	2067.6	8.7	1.5	0.4	13.4	10.2	11.8
6/11/2009 3:00	6/11/2009 4:00	788.9	8066.6	2.9	2.3	537.6	1.1	733.5	726.0	299.0	295.7	2055.0	8.7	1.5	0.4	10.8	10.2	11.8
6/11/2009 4:00	6/11/2009 5:00	782.7	8069.1	2.9	2.4	530.3	1.1	735.9	727.7	299.0	295.8	2030.1	8.6	1.5	0.4	10.4	#N/A	#N/A
6/11/2009 5:00	6/11/2009 6:00	764.5	8069.1	3.0	2.4	524.8	1.1	732.1	722.8	297.9	293.6	2072.2	7.6	1.5	0.4	7.3	#N/A	#N/A
6/11/2009 6:00	6/11/2009 7:00	875.2	8069.1	3.0	2.4	590.7	1.1	764.0	754.2	294.8	293.4	2332.8	8.7	1.5	0.4	23.4	#N/A	#N/A
6/11/2009 7:00	6/11/2009 8:00	905.3	8069.1	2.9	2.4	613.0	1.1	779.6	765.9	300.1	300.2	2376.7	8.7	1.5	0.4	30.8	11.6	13.2
6/11/2009 8:00	6/11/2009 9:00	869.2	8069.1	2.9	2.3	589.7	1.1	776.9	763.5	305.7	304.2	2112.3	8.1	1.5	0.4	28.6	11.9	13.4
6/11/2009 9:00	6/11/2009 10:00	786.0	8069.1	2.9	2.3	534.3	1.1	754.8	739.8	312.8	310.8	2051.7	7.2	1.5	0.4	11.8	11.9	14.1
6/11/2009 10:00	6/11/2009 11:00	751.6	8069.1	3.0	2.3	509.1	1.1	743.4	727.6	309.2	305.7	2017.8	6.9	1.5	0.5	7.8	9.7	13.4
6/11/2009 11:00	6/11/2009 12:00	690.2	8069.1	3.2	2.5	470.2	1.1	727.5	713.2	305.7	296.9	1918.9	6.8	1.5	0.4	5.1	9.5	12.7
6/11/2009 12:00	6/11/2009 13:00	722.8	8069.1	3.1	2.3	503.1	1.1	726.6	718.6	307.2	299.3	2001.4	7.2	1.5	0.4	6.4	9.9	12.4
6/11/2009 13:00	6/11/2009 14:00	644.4	8069.1	3.7	3.0	429.7	1.1	699.8	693.6	302.5	297.5	1855.0	6.5	1.5	0.4	6.1	9.0	11.6
6/11/2009 14:00	6/11/2009 15:00	545.4	8069.1	3.8	3.1	386.8	1.1	659.2	651.2	296.4	295.1	1626.4	6.0	1.5	0.4	6.0	7.9	10.9
6/11/2009 15:00	6/11/2009 16:00	627.4	8069.1	3.5	2.5	436.9	1.1	687.7	686.2	293.6	290.3	1775.3	6.3	1.5	0.4	5.4	8.4	11.3
6/11/2009 16:00	6/11/2009 17:00	591.3	8069.1	3.7	2.7	418.5	1.1	676.7	677.7	292.5	287.3	1722.9	6.0	1.5	0.4	4.7	8.8	11.5
6/11/2009 17:00	6/11/2009 18:00	687.2	8069.1	3.4	2.1	479.1	1.1	707.2	709.7	295.8	293.7	1902.6	6.9	1.5	0.4	5.4	10.6	12.8

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/11/2009 18:00	6/11/2009 19:00	574.1	8069.1	4.0	3.0	390.8	1.1	684.1	681.9	294.2	290.5	1697.5	6.6	1.5	0.4	4.2	9.8	11.7
6/11/2009 19:00	6/11/2009 20:00	546.0	8069.1	3.8	3.0	378.6	1.1	669.4	665.7	288.6	282.6	1617.2	6.5	1.5	0.4	4.1	8.9	11.3
6/11/2009 20:00	6/11/2009 21:00	528.2	8069.1	4.0	3.3	368.4	1.1	665.4	661.8	289.3	283.0	1589.9	6.5	1.4	0.4	4.6	8.3	11.0
6/11/2009 21:00	6/11/2009 22:00	541.0	8069.1	3.7	3.1	384.5	1.1	657.7	651.1	285.7	278.6	1598.3	6.4	1.4	0.4	4.7	7.9	10.7
6/11/2009 22:00	6/11/2009 23:00	677.4	8069.1	3.3	2.3	468.7	1.1	705.9	694.6	291.8	285.4	1884.2	7.2	1.4	0.4	5.7	9.6	12.0
6/11/2009 23:00	6/12/2009 0:00	742.9	8069.1	3.3	2.3	510.2	1.1	739.1	727.7	302.8	294.9	2044.6	7.5	1.4	0.4	6.5	10.9	12.8
6/12/2009 0:00	6/12/2009 1:00	773.0	8069.1	3.2	2.3	525.2	1.1	744.3	732.1	308.3	301.1	2071.4	7.7	1.5	0.4	7.4	11.7	13.5
6/12/2009 1:00	6/12/2009 2:00	619.7	8069.1	3.8	2.9	419.5	1.1	701.1	689.8	301.2	293.4	1775.5	7.1	1.5	0.4	4.8	10.5	12.2
6/12/2009 2:00	6/12/2009 3:00	571.3	8069.1	3.6	3.0	397.7	1.1	683.7	672.8	300.9	286.6	1678.6	6.6	1.5	0.4	5.0	10.0	11.6
6/12/2009 3:00	6/12/2009 4:00	613.2	8069.1	3.4	2.8	431.6	1.1	695.8	685.7	300.0	284.9	1760.8	6.9	1.5	0.4	4.8	10.4	12.1
6/12/2009 4:00	6/12/2009 5:00	703.5	8069.1	3.2	2.4	492.2	1.1	728.3	722.5	304.3	292.2	1953.2	7.5	1.6	0.4	4.8	11.7	13.4
6/12/2009 5:00	6/12/2009 6:00	721.4	8069.1	3.2	2.4	505.4	1.1	726.8	722.2	306.7	294.8	2005.3	8.2	1.7	0.4	5.4	#N/A	#N/A
6/12/2009 6:00	6/12/2009 7:00	837.3	8069.1	3.1	2.4	583.0	1.1	757.1	747.7	308.3	299.6	2249.6	9.2	1.7	0.4	10.5	#N/A	#N/A
6/12/2009 7:00	6/12/2009 8:00	909.2	8069.1	2.9	2.4	626.7	1.1	783.4	772.9	314.4	309.8	2376.4	9.6	1.7	0.4	11.2	14.4	15.6
6/12/2009 8:00	6/12/2009 9:00	909.0	8069.1	3.0	2.3	624.6	1.1	779.2	769.3	316.4	311.9	2375.9	9.7	1.7	0.4	9.8	14.6	15.7
6/12/2009 9:00	6/12/2009 10:00	910.8	8069.1	2.9	2.4	625.6	1.1	775.3	762.9	316.0	310.5	2370.5	9.2	1.8	0.4	11.1	14.7	15.8
6/12/2009 10:00	6/12/2009 11:00	911.3	8069.1	2.9	2.3	620.3	1.1	777.1	777.7	315.4	310.4	2370.2	9.0	1.8	0.5	9.9	14.7	15.9
6/12/2009 11:00	6/12/2009 12:00	909.1	8069.1	2.9	2.3	617.9	1.1	780.8	785.9	317.7	312.9	2352.7	9.0	1.8	0.4	9.2	14.7	16.0
6/12/2009 12:00	6/12/2009 13:00	910.1	8069.1	2.9	2.3	617.8	1.1	786.8	791.4	322.1	317.2	2354.3	9.2	1.8	0.5	12.0	14.8	16.1
6/12/2009	6/12/2009	909.0	8069.1	3.0	2.3	617.2	1.1	780.8	787.0	323.4	318.9	2357.1	9.2	1.8	0.5	12.3	14.6	16.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
13:00	14:00																	
6/12/2009 14:00	6/12/2009 15:00	909.7	8069.1	2.9	2.3	618.7	1.1	778.7	783.2	323.7	318.9	2355.7	8.8	1.8	0.5	8.5	14.6	16.4
6/12/2009 15:00	6/12/2009 16:00	910.6	8069.1	2.9	2.3	619.0	1.1	777.0	782.9	323.2	318.7	2365.0	8.7	1.7	0.5	9.6	14.6	16.5
6/12/2009 16:00	6/12/2009 17:00	909.5	8069.1	2.8	2.4	617.9	1.1	773.9	783.2	323.5	319.1	2353.9	8.5	1.7	0.5	9.0	14.5	16.8
6/12/2009 17:00	6/12/2009 18:00	911.6	8069.1	2.7	2.4	616.1	1.1	779.2	786.2	324.5	319.2	2346.4	8.5	1.7	0.5	10.7	13.7	16.5
6/12/2009 18:00	6/12/2009 19:00	912.1	8069.1	2.7	2.4	610.8	1.1	780.1	786.9	325.8	320.5	2343.8	8.5	1.6	0.4	9.0	14.3	16.4
6/12/2009 19:00	6/12/2009 20:00	911.5	8069.1	2.7	2.4	605.3	1.1	780.6	788.6	325.0	320.1	2312.7	8.5	1.5	0.4	9.1	14.4	16.3
6/12/2009 20:00	6/12/2009 21:00	909.4	8069.1	2.7	2.5	604.5	1.1	778.2	784.1	324.6	319.6	2323.9	9.0	1.5	0.4	8.3	14.0	16.0
6/12/2009 21:00	6/12/2009 22:00	908.7	8069.1	2.7	2.4	604.8	1.1	778.9	784.2	322.7	317.9	2307.7	10.3	1.5	0.4	8.5	13.7	15.9
6/12/2009 22:00	6/12/2009 23:00	907.8	8069.1	2.7	2.4	608.7	1.1	779.1	785.1	322.3	317.3	2330.6	10.5	1.5	0.4	9.3	13.6	15.9
6/12/2009 23:00	6/13/2009 0:00	911.4	8069.1	2.7	2.4	613.6	1.1	782.4	787.9	322.6	317.1	2336.9	10.3	1.6	0.4	12.7	13.7	15.9
6/13/2009 0:00	6/13/2009 1:00	910.3	8069.1	2.7	2.4	615.4	1.1	784.6	789.7	321.7	315.8	2349.7	10.6	1.6	0.4	19.7	13.8	15.6
6/13/2009 1:00	6/13/2009 2:00	898.4	8069.1	2.7	2.4	601.1	1.1	786.1	787.2	320.8	314.1	2314.8	10.9	1.6	0.4	16.7	#N/A	#N/A
6/13/2009 2:00	6/13/2009 3:00	837.6	8069.1	2.9	2.1	559.9	1.1	772.0	764.3	317.6	307.5	2176.3	10.3	1.6	0.4	7.7	#N/A	#N/A
6/13/2009 3:00	6/13/2009 4:00	749.5	8069.1	3.1	2.1	505.5	1.1	748.4	745.7	311.7	302.5	2022.5	9.3	1.6	0.4	6.2	13.1	15.1
6/13/2009 4:00	6/13/2009 5:00	710.8	8069.1	3.1	2.4	482.8	1.1	733.2	731.4	306.7	297.5	1976.8	8.9	1.6	0.4	5.5	#N/A	#N/A
6/13/2009 5:00	6/13/2009 6:00	710.2	8069.1	3.2	2.4	484.8	1.1	718.4	723.3	302.5	293.7	1995.7	8.2	1.6	0.4	5.4	#N/A	#N/A
6/13/2009 6:00	6/13/2009 7:00	762.2	8069.1	3.1	2.4	526.4	1.1	721.6	727.6	300.0	292.7	2125.0	8.5	1.7	0.4	7.1	#N/A	#N/A
6/13/2009 7:00	6/13/2009 8:00	899.6	8069.1	2.9	2.4	615.3	1.1	762.3	767.8	304.7	298.6	2369.3	8.8	1.8	0.4	9.9	15.0	16.5
6/13/2009 8:00	6/13/2009 9:00	911.0	8069.1	2.9	2.3	621.6	1.1	773.8	784.1	310.5	304.4	2375.2	9.2	1.8	0.4	13.0	16.2	17.5

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/13/2009 9:00	6/13/2009 10:00	911.1	8069.1	2.9	2.4	622.9	1.1	773.0	783.2	313.9	307.3	2365.5	9.0	1.9	0.5	15.5	16.1	17.5
6/13/2009 10:00	6/13/2009 11:00	913.0	8069.1	2.9	2.3	625.8	1.1	773.4	781.3	314.8	308.4	2348.2	8.9	2.0	0.5	15.5	9.5	10.9
6/13/2009 11:00	6/13/2009 12:00	914.0	8069.1	2.9	2.3	626.6	1.1	769.9	779.2	316.0	310.1	2344.6	9.2	2.1	0.5	14.3	6.4	7.3
6/13/2009 12:00	6/13/2009 13:00	913.4	8069.1	2.9	2.3	626.1	1.1	769.4	780.2	317.0	312.1	2354.6	8.9	2.2	0.6	12.7	6.6	7.5
6/13/2009 13:00	6/13/2009 14:00	911.7	8069.1	3.0	2.2	630.4	1.1	766.8	778.5	317.9	313.5	2363.5	8.7	2.2	0.6	14.9	6.1	7.0
6/13/2009 14:00	6/13/2009 15:00	913.7	8069.1	2.9	2.2	631.5	1.1	765.4	778.1	318.9	314.6	2349.3	8.6	2.2	0.6	15.7	5.5	6.3
6/13/2009 15:00	6/13/2009 16:00	912.7	8069.1	2.8	2.3	626.0	1.1	763.6	778.3	320.7	316.7	2346.0	8.8	2.3	0.6	17.6	5.1	5.9
6/13/2009 16:00	6/13/2009 17:00	910.4	8069.1	2.7	2.4	627.1	1.1	760.6	778.2	319.9	317.2	2349.5	8.8	2.3	0.6	13.8	5.2	6.0
6/13/2009 17:00	6/13/2009 18:00	911.2	8069.1	2.8	2.4	630.3	1.1	764.7	779.2	320.7	317.3	2361.1	9.2	2.4	0.6	12.5	5.4	6.3
6/13/2009 18:00	6/13/2009 19:00	910.4	8069.1	2.8	2.4	632.0	1.1	766.8	779.8	320.6	316.9	2335.4	9.7	2.4	0.6	11.1	5.8	6.6
6/13/2009 19:00	6/13/2009 20:00	910.9	8069.1	2.8	2.3	633.7	1.1	768.7	781.0	320.3	316.3	2346.0	9.6	2.4	0.6	11.9	5.5	6.3
6/13/2009 20:00	6/13/2009 21:00	911.0	8069.1	2.9	2.3	634.4	1.1	770.1	781.7	320.3	316.4	2337.7	9.8	2.4	0.6	11.7	5.5	6.3
6/13/2009 21:00	6/13/2009 22:00	898.0	8069.1	2.9	2.2	623.8	1.1	768.5	777.8	320.0	314.8	2321.4	11.0	2.5	0.6	10.1	5.5	6.2
6/13/2009 22:00	6/13/2009 23:00	903.6	8069.1	2.8	2.3	624.5	1.1	772.3	779.4	319.2	313.4	2340.4	11.7	2.4	0.6	11.0	5.4	6.0
6/13/2009 23:00	6/14/2009 0:00	904.3	8069.1	2.8	2.4	618.5	1.1	775.1	780.6	319.1	312.9	2337.1	12.2	2.5	0.5	11.9	5.2	5.7
6/14/2009 0:00	6/14/2009 1:00	904.8	8069.1	2.8	2.4	614.3	1.1	771.4	777.5	319.1	312.3	2340.6	10.2	2.4	0.6	10.9	5.2	5.9
6/14/2009 1:00	6/14/2009 2:00	902.0	8069.1	2.8	2.3	605.3	1.1	766.3	776.9	315.3	309.5	2318.9	10.1	2.3	0.6	9.7	#N/A	6.0
6/14/2009 2:00	6/14/2009 3:00	874.6	8069.1	2.9	2.2	582.0	1.1	760.5	772.5	313.1	307.2	2259.6	9.9	2.2	0.6	9.5	#N/A	#N/A
6/14/2009 3:00	6/14/2009 4:00	807.7	8069.1	3.0	2.2	535.8	1.1	746.3	759.8	309.5	302.2	2098.7	8.8	2.1	0.6	7.0	#N/A	4.3
6/14/2009	6/14/2009	740.6	8069.1	3.1	2.3	494.4	1.1	727.8	739.8	310.5	297.5	1991.1	7.7	2.0	0.6	10.1	2.8	3.5

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
4:00	5:00																	
6/14/2009 5:00	6/14/2009 6:00	773.3	8069.1	3.0	2.4	522.5	1.1	736.2	746.1	304.7	293.8	2088.5	7.4	1.9	0.6	12.3	#N/A	#N/A
6/14/2009 6:00	6/14/2009 7:00	896.0	8069.1	2.9	2.3	599.9	1.1	774.7	786.5	311.5	305.7	2318.3	10.3	1.8	0.4	16.0	#N/A	#N/A
6/14/2009 7:00	6/14/2009 8:00	913.5	8069.1	2.9	2.2	609.9	1.1	784.3	798.1	317.3	312.4	2349.0	9.8	1.9	0.4	12.6	3.4	4.0
6/14/2009 8:00	6/14/2009 9:00	911.2	8069.1	2.9	2.3	610.1	1.1	774.0	788.4	316.1	310.8	2363.6	8.1	1.9	0.5	14.5	3.6	4.2
6/14/2009 9:00	6/14/2009 10:00	912.5	8069.1	2.8	2.3	609.7	1.1	775.1	788.6	314.9	309.7	2354.0	8.6	2.1	0.5	13.3	3.6	4.2
6/14/2009 10:00	6/14/2009 11:00	911.6	8069.1	2.8	2.4	616.2	1.1	776.9	791.4	315.3	310.8	2353.5	10.0	2.2	0.5	11.0	3.8	4.3
6/14/2009 11:00	6/14/2009 12:00	913.9	8069.1	2.7	2.4	618.8	1.1	770.4	781.9	316.2	311.6	2358.8	10.2	2.3	0.5	11.9	3.9	4.4
6/14/2009 12:00	6/14/2009 13:00	913.0	8069.1	2.7	2.4	618.9	1.1	771.8	780.6	316.3	311.6	2329.9	10.5	2.4	0.6	13.4	4.1	4.5
6/14/2009 13:00	6/14/2009 14:00	912.4	8069.1	2.7	2.4	621.5	1.1	771.8	778.7	318.7	314.1	2334.4	10.8	2.4	0.5	15.7	4.3	4.8
6/14/2009 14:00	6/14/2009 15:00	914.2	8069.1	2.7	2.5	619.4	1.1	769.5	774.1	319.5	314.1	2326.6	10.4	2.3	0.5	17.1	4.4	4.9
6/14/2009 15:00	6/14/2009 16:00	911.4	8069.1	2.7	2.5	620.9	1.1	770.1	775.7	320.5	315.6	2326.6	9.6	2.2	0.5	18.5	4.3	4.9
6/14/2009 16:00	6/14/2009 17:00	910.0	8069.1	2.7	2.5	623.0	1.1	772.3	777.7	322.5	317.4	2324.2	9.0	2.2	0.5	17.9	4.4	5.1
6/14/2009 17:00	6/14/2009 18:00	911.0	8069.1	2.7	2.4	625.3	1.1	776.5	782.7	323.9	319.3	2325.9	9.0	2.2	0.6	17.8	4.5	5.1
6/14/2009 18:00	6/14/2009 19:00	912.3	8069.1	2.7	2.4	633.8	1.1	780.2	786.2	325.3	320.8	2337.5	9.1	2.2	0.5	13.4	4.5	5.2
6/14/2009 19:00	6/14/2009 20:00	911.6	8069.1	2.7	2.4	638.6	1.1	778.6	785.5	325.5	320.5	2344.9	9.0	2.2	0.5	15.7	4.7	5.3
6/14/2009 20:00	6/14/2009 21:00	913.6	8069.1	2.7	2.4	639.4	1.1	777.5	783.7	324.0	319.9	2344.3	9.3	2.2	0.6	16.1	4.8	5.5
6/14/2009 21:00	6/14/2009 22:00	912.6	8069.1	2.7	2.4	640.5	1.1	771.9	779.0	321.9	318.2	2339.0	10.4	2.2	0.6	11.8	4.7	5.5
6/14/2009 22:00	6/14/2009 23:00	914.2	8069.1	2.8	2.3	641.5	1.1	771.2	780.0	319.1	315.6	2341.5	10.7	2.2	0.6	12.2	4.8	5.6
6/14/2009 23:00	6/15/2009 0:00	913.7	8069.1	2.8	2.4	639.7	1.1	774.9	783.6	318.3	314.6	2351.5	10.6	2.2	0.5	11.5	4.6	5.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/15/2009 0:00	6/15/2009 1:00	909.8	8069.1	2.8	2.4	647.2	1.1	775.9	783.8	318.1	313.6	2358.6	10.3	2.1	0.5	10.8	4.6	5.3
6/15/2009 1:00	6/15/2009 2:00	914.1	8069.1	2.8	2.3	647.7	1.1	775.3	781.9	318.2	312.8	2363.8	10.2	2.1	0.6	11.5	4.9	5.7
6/15/2009 2:00	6/15/2009 3:00	903.0	8069.1	2.8	2.4	630.5	1.1	762.8	768.1	314.3	307.2	2350.3	9.9	2.2	0.5	10.9	5.4	6.4
6/15/2009 3:00	6/15/2009 4:00	878.0	8069.1	2.9	2.4	611.8	1.1	758.2	762.0	308.6	301.3	2293.4	9.7	2.2	0.6	9.7	5.5	6.6
6/15/2009 4:00	6/15/2009 5:00	835.7	8069.1	3.0	2.4	587.7	1.1	749.5	753.9	306.5	297.5	2215.0	9.7	2.2	0.5	8.8	#N/A	#N/A
6/15/2009 5:00	6/15/2009 6:00	896.9	8069.1	3.0	2.5	627.2	1.1	761.8	767.0	306.9	300.7	2348.8	8.9	2.2	0.6	9.4	#N/A	#N/A
6/15/2009 6:00	6/15/2009 7:00	902.0	8069.1	2.9	2.4	634.0	1.1	764.9	766.1	308.1	300.7	2358.2	8.9	2.2	0.6	10.1	#N/A	#N/A
6/15/2009 7:00	6/15/2009 8:00	903.7	8029.9	2.9	2.5	640.5	1.1	766.4	767.2	308.7	301.1	2366.5	9.0	2.2	0.6	10.5	6.1	7.3
6/15/2009 8:00	6/15/2009 9:00	908.7	8038.2	2.8	2.5	640.3	1.1	771.0	770.0	310.5	302.8	2370.9	8.9	2.2	0.6	10.2	6.2	7.3
6/15/2009 9:00	6/15/2009 10:00	908.0	8051.1	2.7	2.6	634.5	1.1	773.2	766.7	313.1	304.0	2366.0	9.7	2.4	0.6	11.0	6.6	7.7
6/15/2009 10:00	6/15/2009 11:00	906.5	8015.7	2.7	2.6	629.9	1.1	773.2	762.9	314.3	303.6	2365.2	11.6	2.6	0.6	11.2	7.0	7.9
6/15/2009 11:00	6/15/2009 12:00	906.1	8003.5	2.7	2.6	631.8	1.1	772.5	763.3	315.5	305.4	2360.4	12.1	2.8	0.6	10.8	7.4	8.2
6/15/2009 12:00	6/15/2009 13:00	907.2	8003.5	3.0	2.4	633.4	1.1	771.9	763.0	316.4	308.0	2429.1	13.0	2.9	0.6	11.9	7.6	8.3
6/15/2009 13:00	6/15/2009 14:00	910.4	8003.5	3.1	2.3	637.0	1.1	769.3	751.4	318.1	311.6	2588.0	12.7	2.8	0.6	11.3	7.1	7.8
6/15/2009 14:00	6/15/2009 15:00	911.7	8003.5	3.0	2.3	638.0	1.1	771.8	755.5	318.6	312.2	2598.7	9.5	2.7	0.6	11.1	7.1	7.9
6/15/2009 15:00	6/15/2009 16:00	911.4	8003.5	3.0	2.3	640.2	1.1	774.1	760.6	320.8	314.7	2568.3	8.2	2.5	0.5	11.8	7.0	7.8
6/15/2009 16:00	6/15/2009 17:00	911.2	8023.9	3.0	2.3	641.2	1.1	771.0	758.9	322.7	317.0	2392.3	7.1	2.3	0.5	12.6	7.3	8.3
6/15/2009 17:00	6/15/2009 18:00	910.3	8026.5	3.0	2.3	646.3	1.1	773.7	760.3	322.3	316.5	2366.7	6.0	2.0	0.5	11.4	7.2	8.5
6/15/2009 18:00	6/15/2009 19:00	910.1	8078.5	3.0	2.3	651.5	1.1	771.0	758.6	322.4	317.2	2363.9	5.2	2.0	0.6	11.0	7.2	8.8
6/15/2009	6/15/2009	914.7	8030.0	2.9	2.3	647.2	1.1	772.3	758.4	320.7	315.1	2358.1	5.0	1.9	0.6	13.7	7.0	8.8

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
19:00	20:00																	
6/15/2009 20:00	6/15/2009 21:00	912.1	8035.2	3.0	2.3	645.5	1.1	774.2	761.6	320.1	315.0	2360.9	4.9	1.9	0.5	10.3	6.9	8.6
6/15/2009 21:00	6/15/2009 22:00	912.1	8031.0	3.0	2.3	640.7	1.1	776.3	763.7	319.5	314.2	2362.3	5.0	2.0	0.5	10.4	6.8	8.5
6/15/2009 22:00	6/15/2009 23:00	911.2	8012.4	2.9	2.4	639.7	1.1	776.9	763.7	318.9	312.9	2360.3	5.5	2.0	0.5	11.4	6.9	8.5
6/15/2009 23:00	6/16/2009 0:00	912.1	7999.6	2.9	2.4	642.4	1.1	778.5	765.4	318.3	311.7	2361.8	5.4	2.0	0.5	11.7	6.8	8.2
6/16/2009 0:00	6/16/2009 1:00	906.6	8052.3	2.9	2.5	634.0	1.1	769.1	757.2	317.2	310.9	2359.9	5.4	2.0	0.5	12.0	6.6	7.9
6/16/2009 1:00	6/16/2009 2:00	902.1	8011.1	2.8	2.5	623.8	1.1	765.9	752.9	313.2	306.1	2363.6	5.8	2.1	0.5	14.8	6.5	7.7
6/16/2009 2:00	6/16/2009 3:00	901.6	7965.2	2.9	2.5	616.0	1.1	770.8	753.9	312.9	305.1	2335.4	6.4	2.1	0.5	14.5	6.5	7.6
6/16/2009 3:00	6/16/2009 4:00	901.9	7933.5	2.9	2.4	619.9	1.1	774.3	758.9	313.5	305.5	2322.0	6.3	2.1	0.5	13.4	6.4	7.6
6/16/2009 4:00	6/16/2009 5:00	893.1	7965.0	2.9	2.4	616.6	1.1	774.6	759.8	313.9	306.1	2311.2	5.6	2.0	0.5	11.6	6.4	7.7
6/16/2009 5:00	6/16/2009 6:00	893.2	7958.3	2.9	2.4	622.5	1.1	776.1	762.4	314.0	305.6	2326.1	4.9	2.0	0.5	10.2	#N/A	#N/A
6/16/2009 6:00	6/16/2009 7:00	901.8	7960.2	2.9	2.4	625.0	1.1	780.3	767.0	314.4	307.5	2352.9	4.9	1.9	0.5	13.8	#N/A	#N/A
6/16/2009 7:00	6/16/2009 8:00	905.8	8005.0	2.9	2.5	628.6	1.1	781.1	767.7	316.4	309.1	2364.1	4.6	1.8	0.5	11.1	5.9	7.6
6/16/2009 8:00	6/16/2009 9:00	909.8	8026.6	2.9	2.5	635.7	1.1	772.1	759.6	315.3	308.2	2370.2	4.6	1.7	0.5	11.8	5.2	7.4
6/16/2009 9:00	6/16/2009 10:00	912.1	7984.7	2.9	2.4	634.5	1.1	776.7	762.7	314.3	307.4	2363.1	4.7	1.7	0.5	13.3	5.0	7.1
6/16/2009 10:00	6/16/2009 11:00	912.2	8015.0	2.8	2.4	628.9	1.1	772.8	760.4	317.1	309.9	2366.0	5.1	1.6	0.4	12.0	5.3	6.6
6/16/2009 11:00	6/16/2009 12:00	909.8	8017.2	2.8	2.5	624.4	1.1	767.5	756.8	316.9	310.3	2367.5	5.3	1.7	0.4	10.6	5.2	6.3
6/16/2009 12:00	6/16/2009 13:00	911.0	8014.9	2.8	2.5	628.8	1.1	773.0	763.1	319.0	313.5	2365.0	5.8	1.8	0.4	12.3	5.5	6.5
6/16/2009 13:00	6/16/2009 14:00	911.5	8004.4	2.8	2.5	628.5	1.1	777.0	767.5	322.3	316.6	2342.0	6.3	1.8	0.4	11.9	5.5	6.5
6/16/2009 14:00	6/16/2009 15:00	910.4	8026.8	2.9	2.4	631.8	1.1	775.4	766.4	321.3	316.7	2338.1	5.9	1.8	0.4	9.6	5.3	6.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/16/2009 15:00	6/16/2009 16:00	913.7	7994.3	2.9	2.3	630.6	1.1	768.0	760.0	322.8	319.8	2336.9	5.8	1.9	0.4	9.2	5.4	6.3
6/16/2009 16:00	6/16/2009 17:00	890.9	8070.5	2.9	2.2	619.5	1.1	763.2	756.9	324.4	321.4	2290.5	5.3	1.9	0.4	25.4	5.3	6.3
6/16/2009 17:00	6/16/2009 18:00	845.0	8033.1	2.8	2.2	591.2	1.1	750.2	742.5	322.7	318.2	2179.1	5.0	1.8	0.4	20.8	5.0	6.0
6/16/2009 18:00	6/16/2009 19:00	890.8	8008.4	2.9	2.4	630.2	1.1	763.0	754.3	319.3	313.7	2297.3	5.0	1.8	0.4	13.4	5.1	6.2
6/16/2009 19:00	6/16/2009 20:00	911.9	8001.9	2.9	2.3	650.5	1.1	776.4	768.6	321.6	317.0	2347.9	4.9	1.8	0.5	9.1	5.3	6.7
6/16/2009 20:00	6/16/2009 21:00	913.0	8013.3	2.9	2.3	652.1	1.0	778.2	770.1	322.8	318.0	2355.3	5.8	1.8	0.5	9.1	5.5	7.0
6/16/2009 21:00	6/16/2009 22:00	915.2	8012.8	2.8	2.3	653.2	1.0	773.7	766.1	322.0	317.3	2368.2	8.2	1.9	0.5	10.6	5.7	7.1
6/16/2009 22:00	6/16/2009 23:00	913.4	8028.9	2.8	2.4	643.6	1.0	767.6	758.6	318.5	313.6	2343.1	7.8	1.9	0.5	10.4	5.6	7.0
6/16/2009 23:00	6/17/2009 0:00	910.8	8016.2	2.9	2.3	634.2	1.1	773.4	765.4	317.3	312.8	2325.1	8.0	1.8	0.5	9.9	5.3	6.7
6/17/2009 0:00	6/17/2009 1:00	909.4	8020.1	2.9	2.3	632.4	1.1	777.6	768.1	317.8	313.0	2346.0	8.4	1.8	0.5	9.1	4.4	5.8
6/17/2009 1:00	6/17/2009 2:00	892.9	8047.8	2.8	2.2	611.3	1.1	771.0	760.5	316.8	310.7	2302.3	8.1	1.7	0.5	10.3	3.9	5.2
6/17/2009 2:00	6/17/2009 3:00	823.7	7971.5	2.9	2.1	553.9	1.1	749.8	740.3	311.1	301.6	2132.1	6.7	1.8	0.5	9.9	3.4	4.6
6/17/2009 3:00	6/17/2009 4:00	767.6	7967.2	2.9	2.2	525.9	1.1	723.4	715.2	304.3	294.0	2060.2	5.8	1.9	0.5	8.3	3.4	4.5
6/17/2009 4:00	6/17/2009 5:00	776.5	7826.3	2.7	2.2	531.1	1.1	729.1	718.7	300.2	289.4	2075.9	5.7	1.9	0.5	9.0	#N/A	#N/A
6/17/2009 5:00	6/17/2009 6:00	801.7	7861.6	2.8	2.2	550.0	1.1	739.0	728.7	299.7	293.6	2168.3	7.9	1.9	0.5	11.4	#N/A	#N/A
6/17/2009 6:00	6/17/2009 7:00	811.8	7906.8	2.7	2.1	544.7	1.1	750.6	740.7	302.3	300.3	2116.9	6.5	1.9	0.5	12.5	#N/A	#N/A
6/17/2009 7:00	6/17/2009 8:00	801.3	7879.4	2.9	2.1	536.4	1.1	750.1	740.2	304.6	301.6	2093.4	6.8	1.7	0.5	9.1	3.1	4.7
6/17/2009 8:00	6/17/2009 9:00	812.4	7905.6	2.9	2.1	550.5	1.1	755.4	744.9	309.2	303.4	2126.2	4.4	1.6	0.5	8.9	2.8	4.4
6/17/2009 9:00	6/17/2009 10:00	874.4	7962.4	2.8	2.3	593.6	1.1	762.8	751.2	313.2	306.6	2255.6	5.8	1.7	0.5	14.1	3.6	5.1
6/17/2009	6/17/2009	900.9	7943.0	2.6	2.3	601.3	1.1	764.9	751.5	311.1	304.3	2304.5	6.2	1.8	0.5	22.0	4.0	5.1

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
10:00	11:00																	
6/17/2009 11:00	6/17/2009 12:00	903.3	7949.6	2.6	2.4	598.6	1.1	763.0	751.9	307.4	301.2	2304.0	6.0	1.7	0.5	16.1	3.8	4.8
6/17/2009 12:00	6/17/2009 13:00	893.1	8016.0	2.7	2.3	593.8	1.1	763.1	752.3	307.9	302.5	2282.7	6.1	1.8	0.5	11.9	4.1	5.1
6/17/2009 13:00	6/17/2009 14:00	909.1	8023.3	2.7	2.2	609.8	1.1	767.2	756.6	310.9	306.2	2304.7	6.6	1.9	0.5	14.0	4.4	5.2
6/17/2009 14:00	6/17/2009 15:00	912.6	7986.0	2.8	2.1	608.7	1.1	772.1	759.2	314.5	310.3	2300.8	6.9	1.9	0.5	15.5	4.6	5.4
6/17/2009 15:00	6/17/2009 16:00	914.6	7992.8	2.8	2.1	603.6	1.1	774.5	760.9	317.4	312.9	2305.4	6.5	1.8	0.5	18.2	4.3	5.1
6/17/2009 16:00	6/17/2009 17:00	912.2	8035.3	2.8	2.1	601.3	1.1	773.9	763.8	319.7	315.3	2307.8	6.0	1.8	0.5	14.6	4.0	4.8
6/17/2009 17:00	6/17/2009 18:00	910.8	8018.3	2.8	2.1	601.1	1.1	761.3	760.1	317.1	314.0	2302.6	5.6	1.7	0.5	13.6	3.8	4.7
6/17/2009 18:00	6/17/2009 19:00	910.7	7984.9	2.8	2.1	606.5	1.1	766.9	763.4	315.8	313.4	2317.7	5.5	1.8	0.5	14.7	4.2	5.0
6/17/2009 19:00	6/17/2009 20:00	913.8	7996.8	2.8	2.1	605.7	1.1	770.8	767.4	316.7	314.0	2309.5	5.9	1.9	0.5	13.4	4.5	5.3
6/17/2009 20:00	6/17/2009 21:00	915.3	8004.8	2.8	2.0	601.6	1.1	774.0	770.5	317.3	314.3	2299.9	5.8	1.9	0.5	13.3	4.4	5.1
6/17/2009 21:00	6/17/2009 22:00	914.4	7984.9	2.7	2.1	596.6	1.1	774.3	770.0	317.7	314.5	2301.8	5.3	1.8	0.5	12.3	4.1	4.8
6/17/2009 22:00	6/17/2009 23:00	911.7	7939.5	2.7	2.1	590.1	1.1	763.4	760.0	313.6	310.5	2283.5	5.1	1.7	0.5	12.1	3.7	4.6
6/17/2009 23:00	6/18/2009 0:00	906.0	8014.2	2.7	2.1	589.5	1.1	759.1	756.2	310.3	306.9	2268.9	5.2	1.7	0.4	14.2	3.7	4.6
6/18/2009 0:00	6/18/2009 1:00	909.9	8001.4	2.7	2.1	602.7	1.1	764.7	759.5	309.4	306.0	2277.6	4.9	1.7	0.4	22.8	3.8	4.7
6/18/2009 1:00	6/18/2009 2:00	911.2	8009.4	2.7	2.0	606.6	1.1	770.2	763.4	310.2	306.7	2297.2	5.0	1.8	0.5	23.6	4.2	5.0
6/18/2009 2:00	6/18/2009 3:00	911.3	8000.5	2.7	2.0	603.4	1.1	772.6	767.0	310.3	306.6	2290.8	5.2	1.9	0.5	23.5	4.6	5.4
6/18/2009 3:00	6/18/2009 4:00	823.3	7983.1	2.7	2.0	543.9	1.1	753.5	750.0	308.2	302.7	2098.7	5.0	1.8	0.5	16.7	3.9	4.7
6/18/2009 4:00	6/18/2009 5:00	735.8	7981.0	2.9	2.1	502.0	1.1	715.6	709.9	299.4	292.4	1997.1	4.6	1.9	0.5	8.5	3.5	4.4
6/18/2009 5:00	6/18/2009 6:00	869.9	7751.3	2.7	2.1	596.7	1.1	753.6	744.7	301.4	295.8	2297.7	5.3	1.8	0.5	17.1	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/18/2009 6:00	6/18/2009 7:00	909.6	7883.9	2.6	2.2	617.9	1.1	762.4	754.1	306.1	300.8	2332.4	6.9	1.8	0.5	12.8	#N/A	#N/A
6/18/2009 7:00	6/18/2009 8:00	913.4	7978.9	4.1	3.8	619.5	1.1	761.2	755.9	305.2	301.2	2345.7	7.0	1.9	0.5	13.9	4.9	6.0
6/18/2009 8:00	6/18/2009 9:00	911.5	8011.9	2.8	2.1	618.8	1.1	752.6	755.9	304.0	301.4	2340.8	7.4	1.8	0.5	14.9	5.0	6.0
6/18/2009 9:00	6/18/2009 10:00	913.5	8020.3	2.6	2.1	619.5	1.1	754.7	755.3	304.4	302.0	2319.9	7.5	1.9	0.5	13.6	4.7	5.9
6/18/2009 10:00	6/18/2009 11:00	912.5	8020.8	2.6	2.1	619.2	1.1	757.2	755.2	305.3	301.9	2303.4	7.2	2.3	0.5	15.7	4.6	5.6
6/18/2009 11:00	6/18/2009 12:00	912.7	7994.9	2.6	2.0	620.6	1.1	761.7	759.9	308.2	305.0	2312.0	7.3	2.0	0.5	19.5	4.7	5.7
6/18/2009 12:00	6/18/2009 13:00	912.8	8016.5	2.6	2.1	623.7	1.1	766.2	762.9	312.0	309.3	2302.0	6.7	1.7	0.5	17.3	4.6	5.7
6/18/2009 13:00	6/18/2009 14:00	911.5	8049.8	2.5	2.2	625.6	1.1	769.3	753.8	314.9	309.5	2293.8	6.4	1.7	0.5	16.6	4.7	6.0
6/18/2009 14:00	6/18/2009 15:00	914.3	8025.3	2.5	2.1	626.3	1.1	770.7	752.2	316.3	309.7	2307.0	6.3	1.7	0.5	15.3	5.0	6.3
6/18/2009 15:00	6/18/2009 16:00	914.9	8000.4	2.5	2.1	626.4	1.1	773.4	752.6	317.9	310.4	2296.4	5.9	1.7	0.5	14.4	5.0	6.4
6/18/2009 16:00	6/18/2009 17:00	913.4	8029.9	2.4	2.2	624.4	1.1	773.8	751.9	320.1	311.9	2294.6	6.4	1.7	0.5	15.4	4.9	6.5
6/18/2009 17:00	6/18/2009 18:00	914.1	8017.1	2.5	2.2	623.5	1.1	774.8	755.9	321.2	313.4	2302.1	6.5	1.6	0.4	15.7	5.1	6.4
6/18/2009 18:00	6/18/2009 19:00	914.3	8026.2	2.5	2.2	619.8	1.1	778.2	762.2	322.4	315.3	2302.3	6.2	1.6	0.4	15.9	5.1	6.3
6/18/2009 19:00	6/18/2009 20:00	913.2	8001.9	2.4	2.2	614.9	1.1	779.7	766.9	323.1	316.4	2291.5	5.9	1.5	0.4	16.2	4.7	6.0
6/18/2009 20:00	6/18/2009 21:00	913.8	8030.1	2.5	2.1	615.5	1.1	765.4	759.9	319.4	315.0	2288.6	5.7	1.5	0.4	17.0	4.5	5.9
6/18/2009 21:00	6/18/2009 22:00	915.5	8014.4	2.3	2.2	609.1	1.1	764.7	758.2	315.7	311.4	2276.2	5.5	1.5	0.4	26.0	3.9	5.4
6/18/2009 22:00	6/18/2009 23:00	912.1	8039.8	2.3	2.1	605.1	1.1	757.7	754.3	313.4	309.1	2290.9	5.8	1.5	0.4	20.3	5.4	7.2
6/18/2009 23:00	6/19/2009 0:00	915.1	7994.0	2.3	2.2	607.5	1.1	761.3	758.4	311.4	306.9	2274.1	5.9	1.4	0.4	25.1	6.4	8.7
6/19/2009 0:00	6/19/2009 1:00	901.9	8022.0	2.3	2.3	599.5	1.1	764.7	759.3	311.7	305.6	2272.5	6.2	1.5	0.4	43.5	6.9	9.2
6/19/2009	6/19/2009	906.0	8036.1	2.3	2.3	601.9	1.1	771.2	764.7	312.2	305.9	2282.3	6.3	1.5	0.4	33.2	7.4	9.5

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
1:00	2:00																	
6/19/2009 2:00	6/19/2009 3:00	912.3	8034.1	2.4	2.2	606.5	1.1	769.6	759.9	312.1	305.3	2304.9	6.6	1.5	0.4	19.1	7.7	9.8
6/19/2009 3:00	6/19/2009 4:00	915.3	7938.5	2.6	2.0	602.3	1.1	770.2	766.6	308.8	304.3	2307.3	6.7	1.5	0.4	15.5	7.6	9.7
6/19/2009 4:00	6/19/2009 5:00	913.5	7998.6	2.6	1.9	598.5	1.1	774.1	771.8	310.3	306.0	2283.6	6.8	1.5	0.4	16.7	#N/A	#N/A
6/19/2009 5:00	6/19/2009 6:00	911.4	8009.3	2.6	1.9	599.7	1.1	775.8	773.1	311.6	306.9	2292.6	7.1	1.5	0.4	17.8	#N/A	#N/A
6/19/2009 6:00	6/19/2009 7:00	910.0	7987.1	2.6	2.1	609.5	1.1	775.0	770.4	311.1	305.2	2320.2	7.9	1.5	0.4	16.7	#N/A	#N/A
6/19/2009 7:00	6/19/2009 8:00	904.2	8003.6	2.7	2.4	614.1	1.1	778.8	773.1	309.1	303.2	2347.6	9.4	1.6	0.4	10.8	7.1	8.6
6/19/2009 8:00	6/19/2009 9:00	902.1	7986.9	2.8	2.3	619.8	1.1	781.0	775.5	309.9	304.3	2344.3	9.1	1.6	0.4	9.5	8.2	9.7
6/19/2009 9:00	6/19/2009 10:00	905.8	8037.7	2.7	2.4	623.6	1.1	781.0	775.2	312.0	306.1	2351.4	8.4	1.6	0.4	8.7	9.2	11.0
6/19/2009 10:00	6/19/2009 11:00	905.3	8043.3	2.8	2.4	615.8	1.1	772.0	765.1	310.6	305.0	2337.5	8.0	1.6	0.4	8.8	9.7	11.7
6/19/2009 11:00	6/19/2009 12:00	901.6	8007.7	2.8	2.4	616.2	1.1	774.1	768.5	310.9	305.6	2336.1	8.0	1.6	0.4	8.0	9.9	12.1
6/19/2009 12:00	6/19/2009 13:00	901.9	8029.4	2.8	2.4	625.5	1.1	776.4	771.2	313.6	308.9	2333.5	8.0	1.6	0.4	8.5	10.3	12.6
6/19/2009 13:00	6/19/2009 14:00	905.0	8046.4	2.8	2.4	618.1	1.1	777.0	771.0	317.0	311.6	2334.5	7.5	1.6	0.4	8.9	10.5	12.8
6/19/2009 14:00	6/19/2009 15:00	901.9	8040.6	2.7	2.5	620.1	1.1	765.4	760.1	316.2	310.7	2335.2	7.2	1.6	0.4	9.1	10.4	12.6
6/19/2009 15:00	6/19/2009 16:00	903.2	7960.4	2.7	2.6	622.1	1.1	771.6	764.6	316.3	310.6	2338.2	7.2	1.6	0.4	9.4	10.6	12.7
6/19/2009 16:00	6/19/2009 17:00	901.9	8017.3	2.7	2.5	623.0	1.1	774.3	767.3	318.4	312.6	2339.7	7.3	1.7	0.4	8.3	11.3	13.2
6/19/2009 17:00	6/19/2009 18:00	904.3	8018.8	2.7	2.5	623.5	1.1	776.8	767.6	319.2	312.9	2314.9	7.5	1.7	0.4	8.1	11.8	13.7
6/19/2009 18:00	6/19/2009 19:00	905.0	8015.0	2.7	2.5	624.2	1.1	779.3	768.1	319.5	313.0	2328.3	7.3	1.8	0.4	8.3	12.1	13.8
6/19/2009 19:00	6/19/2009 20:00	904.3	8023.3	2.7	2.4	617.0	1.1	781.4	769.5	319.2	312.9	2314.0	7.2	1.8	0.4	9.0	12.0	13.7
6/19/2009 20:00	6/19/2009 21:00	890.7	7988.3	2.7	2.5	607.0	1.1	779.9	767.1	318.8	312.0	2291.8	8.0	1.8	0.4	8.9	11.7	13.5

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/19/2009 21:00	6/19/2009 22:00	891.2	8027.8	2.7	2.5	601.9	1.1	767.1	757.5	316.3	309.8	2295.4	10.1	1.8	0.4	8.5	11.3	13.1
6/19/2009 22:00	6/19/2009 23:00	881.3	8026.1	2.8	2.4	590.7	1.1	758.8	751.0	310.3	303.8	2268.6	9.4	1.7	0.4	8.3	10.8	12.6
6/19/2009 23:00	6/20/2009 0:00	899.1	8030.2	2.8	2.4	603.7	1.1	769.0	762.0	309.7	304.6	2313.0	9.8	1.7	0.4	9.1	11.0	12.6
6/20/2009 0:00	6/20/2009 1:00	832.1	7976.2	2.9	2.2	559.4	1.1	758.5	751.6	309.0	302.0	2161.8	8.8	1.7	0.4	9.1	10.5	12.5
6/20/2009 1:00	6/20/2009 2:00	784.8	7936.3	3.0	2.3	535.3	1.1	741.5	736.2	304.6	296.1	2060.7	8.0	1.7	0.4	10.2	#N/A	#N/A
6/20/2009 2:00	6/20/2009 3:00	878.7	7965.3	2.8	2.5	595.6	1.1	769.8	762.0	306.0	299.9	2271.1	9.2	1.6	0.4	11.0	#N/A	#N/A
6/20/2009 3:00	6/20/2009 4:00	857.0	7963.1	2.8	2.3	573.5	1.1	773.8	764.8	307.8	300.9	2212.1	9.2	1.6	0.4	10.6	9.9	12.5
6/20/2009 4:00	6/20/2009 5:00	786.7	7968.9	3.0	2.2	531.3	1.1	753.7	747.8	304.6	296.5	2063.5	7.9	1.5	0.4	8.4	8.9	11.7
6/20/2009 5:00	6/20/2009 6:00	786.8	7919.8	3.0	2.3	531.8	1.1	751.9	745.5	302.2	293.9	2099.2	7.8	1.5	0.4	8.8	#N/A	#N/A
6/20/2009 6:00	6/20/2009 7:00	843.7	7905.9	2.9	2.5	569.2	1.1	772.7	763.9	305.3	297.9	2193.1	8.2	1.4	0.4	10.4	#N/A	#N/A
6/20/2009 7:00	6/20/2009 8:00	885.4	7955.1	2.9	2.4	606.4	1.1	787.8	780.7	309.5	304.0	2296.2	7.4	1.4	0.4	9.1	9.5	12.3
6/20/2009 8:00	6/20/2009 9:00	896.6	8023.6	2.8	2.4	625.2	1.1	785.1	778.3	312.9	307.4	2331.5	6.6	1.4	0.4	9.6	10.3	13.1
6/20/2009 9:00	6/20/2009 10:00	894.3	7985.1	2.8	2.4	627.7	1.1	781.1	770.4	310.9	304.3	2323.6	6.4	1.5	0.4	13.3	10.7	13.4
6/20/2009 10:00	6/20/2009 11:00	883.7	7981.1	2.8	2.4	620.1	1.1	781.1	767.7	311.0	303.6	2295.2	6.4	1.5	0.4	12.9	10.8	13.4
6/20/2009 11:00	6/20/2009 12:00	900.3	8016.9	2.7	2.5	640.7	1.1	784.8	771.4	314.2	307.6	2323.5	6.5	1.5	0.4	10.3	11.3	14.0
6/20/2009 12:00	6/20/2009 13:00	905.0	8073.7	2.7	2.6	640.3	1.1	781.6	767.4	316.7	309.7	2339.9	6.7	1.5	0.4	11.4	11.3	13.9
6/20/2009 13:00	6/20/2009 14:00	905.4	8052.2	2.6	2.7	639.3	1.1	775.7	759.8	315.3	308.5	2336.7	6.5	1.5	0.4	15.5	10.9	13.6
6/20/2009 14:00	6/20/2009 15:00	906.1	8043.0	2.6	2.7	632.4	1.1	776.4	754.8	318.0	310.1	2331.6	6.6	1.5	0.4	18.7	11.0	13.6
6/20/2009 15:00	6/20/2009 16:00	907.3	8038.5	2.7	2.6	621.6	1.1	777.9	751.6	317.5	307.9	2340.3	6.4	1.5	0.4	17.8	10.9	13.6
6/20/2009	6/20/2009	905.2	8095.0	2.9	2.4	612.5	1.1	775.8	755.2	318.3	310.7	2341.7	6.4	1.4	0.4	13.8	10.7	13.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
16:00	17:00																	
6/20/2009 17:00	6/20/2009 18:00	905.2	8053.7	2.9	2.4	602.7	1.1	777.5	757.9	317.9	310.3	2311.0	6.6	1.4	0.4	14.7	10.3	13.1
6/20/2009 18:00	6/20/2009 19:00	903.6	8001.8	2.7	2.6	600.8	1.1	785.0	765.1	319.9	312.1	2313.9	6.7	1.4	0.4	14.7	10.3	13.2
6/20/2009 19:00	6/20/2009 20:00	904.4	8026.4	2.6	2.7	602.3	1.1	789.3	769.3	321.5	312.9	2320.7	6.8	1.4	0.4	12.8	10.2	13.2
6/20/2009 20:00	6/20/2009 21:00	906.3	8033.5	2.7	2.6	597.6	1.1	777.0	761.9	318.4	312.1	2330.1	7.9	1.4	0.4	9.8	10.2	13.0
6/20/2009 21:00	6/20/2009 22:00	905.9	8026.0	2.8	2.5	596.1	1.1	774.7	763.3	313.4	308.5	2318.5	10.2	1.4	0.4	8.6	10.2	13.0
6/20/2009 22:00	6/20/2009 23:00	900.1	8032.8	2.7	2.6	584.6	1.1	783.3	764.5	314.2	307.6	2299.6	9.9	1.4	0.4	9.8	9.9	12.9
6/20/2009 23:00	6/21/2009 0:00	881.9	8013.6	2.8	2.5	574.6	1.1	781.7	766.2	313.6	306.4	2257.0	10.3	1.4	0.4	8.9	9.7	12.7
6/21/2009 0:00	6/21/2009 1:00	900.1	8014.4	2.8	2.5	595.9	1.1	788.6	775.3	314.5	308.8	2320.2	10.9	1.4	0.4	8.6	10.1	13.1
6/21/2009 1:00	6/21/2009 2:00	904.5	8047.2	2.7	2.6	599.0	1.1	793.8	780.1	315.0	309.6	2333.5	10.5	1.4	0.4	9.2	#N/A	13.4
6/21/2009 2:00	6/21/2009 3:00	892.1	8029.1	2.7	2.5	586.6	1.1	793.9	780.0	314.3	308.5	2306.4	10.6	1.4	0.4	9.2	#N/A	#N/A
6/21/2009 3:00	6/21/2009 4:00	815.7	8008.7	2.9	2.4	544.5	1.1	774.0	761.3	310.6	303.5	2142.1	9.1	1.5	0.4	8.5	#N/A	13.2
6/21/2009 4:00	6/21/2009 5:00	797.9	7996.8	3.0	2.3	535.5	1.1	764.7	753.8	306.8	299.6	2109.7	8.7	1.5	0.4	8.5	#N/A	#N/A
6/21/2009 5:00	6/21/2009 6:00	770.6	7917.7	2.9	2.3	528.5	1.1	756.0	746.8	305.1	296.8	2086.1	7.5	1.5	0.4	13.4	#N/A	#N/A
6/21/2009 6:00	6/21/2009 7:00	822.4	7907.3	2.9	2.6	567.8	1.1	768.8	758.3	304.7	296.4	2210.5	8.0	1.5	0.4	9.8	#N/A	#N/A
6/21/2009 7:00	6/21/2009 8:00	896.5	7959.7	2.8	2.6	621.4	1.1	791.7	779.7	310.0	303.3	2341.4	7.3	1.5	0.4	10.2	12.1	14.1
6/21/2009 8:00	6/21/2009 9:00	908.4	7979.1	2.7	2.6	631.9	1.1	800.4	782.8	314.5	306.8	2369.8	6.9	1.5	0.4	12.5	12.4	14.4
6/21/2009 9:00	6/21/2009 10:00	908.6	7998.6	2.8	2.5	634.9	1.1	797.2	776.7	316.4	307.9	2370.3	7.0	1.5	0.4	15.7	12.1	14.1
6/21/2009 10:00	6/21/2009 11:00	908.9	7972.8	2.7	2.6	635.1	1.1	789.1	767.6	315.5	306.4	2359.1	6.9	1.5	0.4	14.4	12.2	14.1
6/21/2009 11:00	6/21/2009 12:00	907.2	8003.1	2.7	2.6	640.6	1.1	787.2	767.6	314.3	306.3	2363.8	6.9	1.5	0.4	10.6	12.4	14.4

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/21/2009 12:00	6/21/2009 13:00	911.6	8066.1	2.7	2.6	640.4	1.1	787.8	770.0	316.0	308.6	2367.6	6.8	1.5	0.4	11.1	12.8	14.8
6/21/2009 13:00	6/21/2009 14:00	912.6	8051.5	2.7	2.5	630.9	1.1	790.8	771.7	318.4	310.8	2351.6	7.0	1.4	0.4	11.6	12.6	14.8
6/21/2009 14:00	6/21/2009 15:00	911.5	8032.2	2.8	2.5	621.7	1.1	792.6	770.4	320.9	312.5	2344.6	7.0	1.4	0.4	10.8	12.1	14.4
6/21/2009 15:00	6/21/2009 16:00	908.5	8023.2	2.8	2.5	617.4	1.1	793.8	776.3	322.2	314.9	2331.9	7.0	1.4	0.4	8.8	11.5	14.2
6/21/2009 16:00	6/21/2009 17:00	908.0	8051.6	2.8	2.5	617.5	1.1	794.3	781.0	324.0	317.5	2335.4	7.4	1.4	0.4	8.6	11.1	14.1
6/21/2009 17:00	6/21/2009 18:00	908.2	8051.5	2.8	2.5	613.4	1.1	796.7	784.4	324.1	318.6	2337.7	7.5	1.4	0.4	8.5	11.4	14.4
6/21/2009 18:00	6/21/2009 19:00	908.1	8039.9	2.8	2.5	615.5	1.1	798.9	786.4	324.7	319.2	2338.3	7.5	1.4	0.4	8.2	11.8	14.6
6/21/2009 19:00	6/21/2009 20:00	909.3	8047.8	2.8	2.5	610.5	1.1	793.0	778.1	324.7	318.8	2350.1	7.6	1.4	0.4	8.7	11.8	14.5
6/21/2009 20:00	6/21/2009 21:00	909.6	8021.9	2.7	2.6	608.6	1.1	788.6	765.2	322.0	313.6	2330.7	8.0	1.4	0.4	9.8	11.7	14.4
6/21/2009 21:00	6/21/2009 22:00	904.0	8010.4	2.7	2.5	605.9	1.1	785.8	770.2	319.3	312.6	2308.5	10.4	1.5	0.4	8.9	12.6	14.8
6/21/2009 22:00	6/21/2009 23:00	898.5	8016.0	2.8	2.5	604.3	1.1	787.1	774.6	318.2	312.3	2312.7	10.5	1.5	0.4	8.8	13.1	15.0
6/21/2009 23:00	6/22/2009 0:00	899.3	7988.9	2.7	2.5	607.0	1.1	790.1	778.9	318.1	311.8	2325.3	10.7	1.5	0.4	9.3	12.8	15.0
6/22/2009 0:00	6/22/2009 1:00	896.7	8053.8	2.8	2.5	606.4	1.1	792.4	781.8	318.1	312.7	2313.4	10.7	1.5	0.4	9.9	13.1	15.5
6/22/2009 1:00	6/22/2009 2:00	897.3	8029.3	2.8	2.5	605.9	1.1	794.6	782.3	317.9	311.5	2324.3	10.5	1.5	0.4	9.5	13.1	15.4
6/22/2009 2:00	6/22/2009 3:00	897.9	8062.3	2.8	2.5	609.8	1.1	785.5	768.6	316.2	308.0	2334.2	10.7	1.5	0.4	9.6	12.8	15.1
6/22/2009 3:00	6/22/2009 4:00	834.1	7946.9	2.6	2.5	557.3	1.1	756.8	742.3	307.7	297.7	2190.1	9.9	1.5	0.4	9.7	12.1	14.4
6/22/2009 4:00	6/22/2009 5:00	803.4	7857.4	2.9	2.6	546.5	1.1	745.5	732.8	301.8	292.3	2161.6	8.9	1.5	0.4	8.7	11.5	13.7
6/22/2009 5:00	6/22/2009 6:00	896.9	7967.7	2.7	2.4	607.2	1.1	774.6	763.3	304.1	297.8	2328.1	7.1	1.4	0.4	10.5	#N/A	#N/A
6/22/2009 6:00	6/22/2009 7:00	907.0	7995.4	2.6	2.2	606.4	1.1	783.4	772.3	306.8	300.9	2330.9	6.2	1.4	0.4	13.7	#N/A	#N/A
6/22/2009	6/22/2009	908.3	8003.3	2.7	2.2	612.5	1.1	788.6	778.0	307.9	301.6	2335.6	6.2	1.4	0.4	15.5	11.6	14.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7:00	8:00																	
6/22/2009 8:00	6/22/2009 9:00	907.9	8034.7	2.7	2.2	616.1	1.1	791.6	779.3	309.5	303.7	2333.1	6.4	1.4	0.4	16.5	12.0	14.5
6/22/2009 9:00	6/22/2009 10:00	911.0	8061.3	2.7	2.2	619.7	1.1	782.9	771.8	310.3	304.8	2340.1	6.8	1.4	0.4	16.9	12.4	14.6
6/22/2009 10:00	6/22/2009 11:00	910.8	8041.1	2.8	2.0	618.6	1.1	770.1	767.2	308.1	305.0	2318.3	7.5	1.4	0.4	14.8	12.4	14.7
6/22/2009 11:00	6/22/2009 12:00	914.5	8032.8	2.8	2.0	617.1	1.1	768.1	763.1	309.0	305.0	2313.3	7.4	1.4	0.4	18.5	8.7	10.3
6/22/2009 12:00	6/22/2009 13:00	912.8	8047.1	2.7	2.0	613.1	1.1	770.5	767.8	310.4	307.2	2316.0	7.5	1.4	0.4	18.9	6.8	8.3
6/22/2009 13:00	6/22/2009 14:00	912.7	8033.3	2.7	2.0	611.4	1.1	769.4	766.1	312.4	309.9	2307.0	7.8	1.4	0.4	16.7	6.3	7.7
6/22/2009 14:00	6/22/2009 15:00	914.4	7956.0	2.8	1.9	608.8	1.1	771.1	768.3	312.4	310.4	2292.6	7.6	1.4	0.4	16.3	6.1	7.5
6/22/2009 15:00	6/22/2009 16:00	910.5	8011.4	2.8	1.9	609.1	1.1	772.9	771.2	315.0	313.1	2284.8	7.7	1.4	0.4	14.6	6.0	7.3
6/22/2009 16:00	6/22/2009 17:00	910.5	8026.5	2.8	1.9	619.0	1.1	771.5	765.4	316.0	313.6	2290.5	7.7	1.4	0.4	15.6	6.3	7.6
6/22/2009 17:00	6/22/2009 18:00	911.3	7994.6	2.8	1.9	627.5	1.1	777.2	769.3	317.3	314.4	2294.2	8.0	1.5	0.4	17.1	7.1	8.3
6/22/2009 18:00	6/22/2009 19:00	916.4	7982.9	2.7	1.8	631.1	1.1	780.8	773.9	318.3	315.6	2307.4	8.1	1.5	0.4	27.7	7.4	8.6
6/22/2009 19:00	6/22/2009 20:00	913.6	8016.5	2.8	1.9	628.6	1.1	777.1	771.9	318.4	316.1	2306.3	8.0	1.5	0.4	36.6	7.1	8.3
6/22/2009 20:00	6/22/2009 21:00	912.7	7998.6	2.8	1.9	631.3	1.1	767.5	761.3	315.5	313.7	2315.8	8.4	1.5	0.4	29.2	7.1	8.3
6/22/2009 21:00	6/22/2009 22:00	913.5	7964.7	2.8	1.9	626.7	1.1	770.2	764.0	313.3	311.8	2321.8	9.8	1.4	0.4	32.0	6.9	8.2
6/22/2009 22:00	6/22/2009 23:00	904.5	7967.0	2.8	1.9	626.1	1.1	771.0	765.4	311.5	310.3	2301.6	9.8	1.4	0.4	49.4	8.1	9.8
6/22/2009 23:00	6/23/2009 0:00	903.0	7972.4	2.7	1.9	622.4	1.1	775.1	768.4	311.3	309.9	2298.4	9.9	1.4	0.4	37.3	9.4	11.5
6/23/2009 0:00	6/23/2009 1:00	899.5	7971.5	2.8	1.9	620.2	1.1	776.2	769.2	310.4	308.0	2290.9	9.8	1.4	0.4	34.2	9.7	11.8
6/23/2009 1:00	6/23/2009 2:00	906.0	7992.4	2.7	1.9	624.5	1.1	779.4	773.0	310.2	307.9	2303.3	10.0	1.4	0.4	26.2	9.9	12.1
6/23/2009 2:00	6/23/2009 3:00	905.1	8030.7	2.7	2.0	620.2	1.1	775.9	765.1	310.2	306.2	2305.2	10.2	1.4	0.4	20.7	9.8	12.1

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/23/2009 3:00	6/23/2009 4:00	894.9	7910.5	2.6	2.0	615.9	1.1	763.7	752.2	305.1	299.5	2299.3	9.7	1.4	0.4	27.9	9.6	11.8
6/23/2009 4:00	6/23/2009 5:00	905.6	7948.6	2.7	1.9	622.0	1.1	768.4	757.3	304.0	298.6	2320.2	9.3	1.4	0.4	22.4	#N/A	#N/A
6/23/2009 5:00	6/23/2009 6:00	905.6	8023.2	2.8	1.8	613.8	1.1	769.7	761.3	303.9	299.4	2314.4	7.4	1.3	0.4	13.4	#N/A	#N/A
6/23/2009 6:00	6/23/2009 7:00	913.2	8005.9	2.8	1.9	618.2	1.1	768.7	758.5	303.8	298.7	2330.4	7.5	1.3	0.4	18.9	#N/A	#N/A
6/23/2009 7:00	6/23/2009 8:00	914.1	7990.5	3.4	2.5	615.9	1.1	771.5	759.6	303.8	298.8	2334.7	7.7	1.3	0.4	17.5	8.9	11.1
6/23/2009 8:00	6/23/2009 9:00	912.9	7993.7	4.4	2.9	616.0	1.1	765.2	757.0	304.0	300.0	2320.1	7.7	1.3	0.4	9.1	9.7	12.4
6/23/2009 9:00	6/23/2009 10:00	914.0	8020.8	2.7	1.9	609.3	1.1	768.7	762.1	305.2	302.1	2282.2	7.6	1.3	0.4	6.7	10.0	13.1
6/23/2009 10:00	6/23/2009 11:00	912.6	8013.3	2.7	1.9	608.2	1.1	772.0	763.9	308.5	305.3	2289.0	7.7	1.3	0.4	6.4	7.6	10.1
6/23/2009 11:00	6/23/2009 12:00	912.6	8008.3	2.7	1.8	608.6	1.1	773.1	766.2	310.1	307.4	2276.1	7.1	1.3	0.4	7.7	4.5	5.9
6/23/2009 12:00	6/23/2009 13:00	911.2	8009.2	2.6	1.8	612.8	1.1	777.1	767.5	313.0	309.9	2270.4	7.2	1.3	0.4	8.8	4.3	5.3
6/23/2009 13:00	6/23/2009 14:00	912.9	7992.3	2.7	1.7	615.6	1.1	777.1	761.5	315.6	311.7	2299.8	7.8	1.4	0.3	8.8	4.6	5.5
6/23/2009 14:00	6/23/2009 15:00	915.0	7987.5	2.7	1.7	614.2	1.1	772.3	761.7	315.3	311.6	2298.0	7.4	1.3	0.3	9.3	4.4	5.2
6/23/2009 15:00	6/23/2009 16:00	913.3	8008.7	2.6	1.8	610.1	1.1	777.7	768.3	316.5	312.7	2280.1	7.2	1.3	0.4	8.2	3.9	4.9
6/23/2009 16:00	6/23/2009 17:00	909.2	7993.6	2.7	1.7	607.9	1.1	782.4	774.8	318.5	315.0	2267.0	7.3	1.3	0.4	8.8	3.6	4.7
6/23/2009 17:00	6/23/2009 18:00	911.2	8012.8	2.7	1.7	613.3	1.1	787.8	780.8	320.0	317.1	2278.9	7.3	1.2	0.4	14.5	3.4	4.7
6/23/2009 18:00	6/23/2009 19:00	912.0	8016.3	2.7	1.8	620.3	1.1	787.5	780.4	320.8	318.5	2278.7	7.7	1.3	0.4	13.8	3.4	4.8
6/23/2009 19:00	6/23/2009 20:00	912.5	8009.4	2.7	1.9	625.2	1.1	788.1	781.2	320.9	317.5	2300.5	7.7	1.3	0.4	16.7	4.2	5.5
6/23/2009 20:00	6/23/2009 21:00	914.1	8029.0	3.1	2.3	628.1	1.1	788.7	782.8	320.5	317.4	2369.0	9.1	1.3	0.4	4.1	7.6	9.9
6/23/2009 21:00	6/23/2009 22:00	916.2	8009.2	3.0	2.3	621.4	1.1	780.0	772.8	315.9	312.8	2357.0	10.2	1.3	0.4	5.4	9.3	11.8
6/23/2009	6/23/2009	915.0	7979.2	3.1	2.3	615.6	1.1	784.8	778.2	314.8	312.4	2359.1	10.5	1.3	0.4	3.7	9.8	12.6

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O_2	B Econ O_2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO_2 In	SO_2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
22:00	23:00																	
6/23/2009 23:00	6/24/2009 0:00	907.3	7998.6	3.1	2.3	606.8	1.1	782.5	779.7	315.3	314.0	2327.5	10.2	1.3	0.4	2.8	9.9	12.9
6/24/2009 0:00	6/24/2009 1:00	905.7	8025.2	3.2	2.3	610.2	1.1	771.1	775.0	311.3	310.7	2342.0	10.3	1.3	0.4	3.1	10.3	13.3
6/24/2009 1:00	6/24/2009 2:00	906.2	8013.2	3.1	2.3	609.2	1.1	776.3	777.8	310.0	309.3	2339.5	10.3	1.3	0.4	3.2	11.0	13.7
6/24/2009 2:00	6/24/2009 3:00	900.7	7991.2	3.1	2.3	611.0	1.1	778.6	778.2	310.1	307.8	2332.7	10.9	1.3	0.4	3.5	11.4	14.0
6/24/2009 3:00	6/24/2009 4:00	904.1	8016.7	3.0	2.4	616.2	1.1	782.2	779.8	310.2	308.3	2346.2	10.7	1.3	0.4	4.3	11.6	14.4
6/24/2009 4:00	6/24/2009 5:00	907.7	8018.4	3.0	2.4	626.1	1.1	780.9	776.2	310.5	307.8	2364.2	10.3	1.3	0.4	6.2	11.5	14.6
6/24/2009 5:00	6/24/2009 6:00	911.1	7983.8	2.8	2.1	626.6	1.1	774.9	769.0	309.4	306.3	2334.7	9.7	1.3	0.4	11.2	#N/A	#N/A
6/24/2009 6:00	6/24/2009 7:00	910.9	8021.2	2.7	2.1	625.4	1.1	767.8	762.5	307.5	304.2	2339.1	10.5	1.3	0.4	13.4	#N/A	#N/A
6/24/2009 7:00	6/24/2009 8:00	914.6	7989.8	2.9	2.1	626.2	1.1	763.1	758.6	304.9	301.2	2356.5	10.0	1.3	0.3	8.3	11.7	14.0
6/24/2009 8:00	6/24/2009 9:00	912.7	8011.1	3.0	2.0	627.2	1.1	765.4	759.6	304.1	301.8	2339.0	10.3	1.3	0.4	4.8	12.1	14.3
6/24/2009 9:00	6/24/2009 10:00	912.8	8018.2	2.9	2.1	627.7	1.1	763.6	754.4	306.2	303.3	2327.4	10.7	1.4	0.4	7.7	12.2	14.4
6/24/2009 10:00	6/24/2009 11:00	914.5	7967.0	2.8	2.1	626.4	1.1	768.9	755.4	307.8	303.5	2319.5	11.1	1.3	0.4	12.6	8.8	10.3
6/24/2009 11:00	6/24/2009 12:00	913.9	7984.8	2.8	2.2	620.9	1.1	773.7	756.8	312.0	306.6	2317.1	11.1	1.4	0.4	11.1	7.2	8.5
6/24/2009 12:00	6/24/2009 13:00	912.9	8022.9	2.8	2.1	622.9	1.1	774.2	758.9	316.7	310.4	2311.3	11.2	1.4	0.4	7.7	6.2	7.5
6/24/2009 13:00	6/24/2009 14:00	913.6	8012.5	2.8	2.1	621.5	1.1	766.0	763.7	314.7	313.0	2319.9	10.5	1.4	0.4	10.5	5.3	6.8
6/24/2009 14:00	6/24/2009 15:00	915.2	8002.4	3.0	1.9	614.5	1.1	764.2	761.6	314.4	314.1	2317.2	10.8	1.4	0.4	13.0	5.2	6.9
6/24/2009 15:00	6/24/2009 16:00	880.0	7979.1	3.0	1.9	593.9	1.1	755.9	754.8	312.5	311.6	2238.8	10.2	1.4	0.4	7.8	5.1	6.7
6/24/2009 16:00	6/24/2009 17:00	909.9	7991.4	3.0	2.0	615.4	1.1	767.0	765.3	313.9	313.9	2325.0	11.2	1.4	0.4	7.7	5.1	6.7
6/24/2009 17:00	6/24/2009 18:00	913.9	8016.2	2.9	2.1	603.7	1.1	777.5	773.2	317.1	316.1	2324.2	10.9	1.3	0.4	10.9	4.7	6.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/24/2009 18:00	6/24/2009 19:00	903.9	7989.4	3.0	2.2	584.0	1.1	782.6	778.7	318.2	316.5	2296.8	10.5	1.3	0.4	11.7	4.2	5.8
6/24/2009 19:00	6/24/2009 20:00	899.2	8006.3	3.1	2.2	573.3	1.1	784.5	782.4	318.4	316.6	2301.0	10.7	1.2	0.3	10.5	5.5	7.6
6/24/2009 20:00	6/24/2009 21:00	900.0	8030.8	3.2	2.2	566.6	1.1	787.2	785.9	318.3	316.5	2302.7	10.6	1.1	0.3	9.9	6.4	9.2
6/24/2009 21:00	6/24/2009 22:00	909.0	8002.3	3.1	2.3	565.1	1.2	779.7	779.3	316.5	314.1	2320.5	10.4	1.0	0.2	9.7	8.0	9.8
6/24/2009 22:00	6/24/2009 23:00	896.5	8039.9	3.1	2.2	549.4	1.2	780.0	779.7	315.1	312.6	2283.3	9.8	1.0	0.2	11.0	8.7	10.6
6/24/2009 23:00	6/25/2009 0:00	895.0	8064.5	3.2	2.3	555.2	1.2	787.0	786.1	315.5	313.4	2280.5	9.9	1.0	0.2	18.0	7.9	10.4
6/25/2009 0:00	6/25/2009 1:00	903.1	8074.5	3.1	2.3	559.1	1.2	791.6	786.8	316.2	313.1	2328.4	11.6	0.9	0.2	15.9	9.4	10.6
6/25/2009 1:00	6/25/2009 2:00	909.7	8033.7	3.1	2.3	557.4	1.2	796.3	794.3	317.6	314.7	2310.0	11.5	0.9	0.2	8.6	10.1	11.4
6/25/2009 2:00	6/25/2009 3:00	909.5	8061.0	3.1	2.3	552.6	1.2	779.9	786.1	315.4	315.2	2320.2	10.5	0.9	0.2	5.3	10.0	11.6
6/25/2009 3:00	6/25/2009 4:00	908.6	7983.6	3.1	2.3	549.3	1.2	783.9	787.2	312.3	312.2	2316.9	9.9	0.9	0.2	4.9	9.8	11.3
6/25/2009 4:00	6/25/2009 5:00	910.8	7964.8	3.1	2.3	555.6	1.2	799.8	803.1	316.9	316.7	2324.0	10.1	0.9	0.2	4.5	#N/A	#N/A
6/25/2009 5:00	6/25/2009 6:00	912.3	7985.5	3.0	2.3	556.6	1.2	801.7	806.8	318.8	318.7	2313.6	10.2	0.9	0.2	3.7	#N/A	#N/A
6/25/2009 6:00	6/25/2009 7:00	910.0	7995.8	2.8	2.1	558.4	1.2	790.7	794.1	315.4	314.7	2290.6	9.4	0.9	0.2	4.7	#N/A	#N/A
6/25/2009 7:00	6/25/2009 8:00	910.8	8023.0	2.7	2.0	561.5	1.2	791.4	791.5	315.5	314.1	2285.8	9.2	0.9	0.2	7.0	10.0	11.7
6/25/2009 8:00	6/25/2009 9:00	912.3	8002.0	2.7	2.0	566.8	1.2	794.9	793.9	316.8	314.6	2294.4	9.3	1.0	0.3	6.9	9.8	12.1
6/25/2009 9:00	6/25/2009 10:00	909.2	8008.2	2.8	1.9	580.5	1.2	795.6	796.3	318.3	317.0	2278.7	9.3	1.0	0.3	9.6	10.4	13.0
6/25/2009 10:00	6/25/2009 11:00	911.2	8029.2	2.8	2.0	595.7	1.2	800.0	797.2	322.0	321.4	2288.3	9.6	1.1	0.3	11.3	11.9	14.1
6/25/2009 11:00	6/25/2009 12:00	913.4	8018.6	2.8	2.0	607.0	1.2	789.9	789.4	321.7	322.1	2305.4	9.9	1.2	0.3	17.2	12.2	14.3
6/25/2009 12:00	6/25/2009 13:00	904.3	8033.7	2.9	2.0	607.5	1.1	779.0	783.9	318.3	320.1	2293.5	9.8	1.2	0.3	20.7	12.0	14.2
6/25/2009	6/25/2009	844.9	8036.1	3.0	2.0	573.7	1.1	765.9	767.3	316.5	316.6	2176.8	9.0	1.3	0.3	15.0	11.9	14.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
13:00	14:00																	
6/25/2009 14:00	6/25/2009 15:00	885.8	8013.8	3.0	2.3	612.3	1.1	779.1	776.2	319.8	318.2	2286.9	9.4	1.3	0.3	13.5	7.8	9.0
6/25/2009 15:00	6/25/2009 16:00	891.3	8013.6	2.9	2.2	620.8	1.1	787.8	785.7	322.9	321.6	2292.3	9.0	1.3	0.3	8.9	6.1	7.0
6/25/2009 16:00	6/25/2009 17:00	809.6	8071.2	3.0	2.0	567.6	1.1	763.0	762.3	319.0	317.0	2090.3	7.6	1.4	0.4	7.2	5.3	6.3
6/25/2009 17:00	6/25/2009 18:00	775.6	8057.8	3.2	2.0	549.5	1.1	750.3	751.2	314.7	312.4	2032.2	6.9	1.4	0.4	7.7	4.9	5.9
6/25/2009 18:00	6/25/2009 19:00	843.0	7965.5	3.1	2.3	607.5	1.1	770.6	766.1	318.7	316.3	2233.7	8.2	1.4	0.4	9.8	5.3	6.4
6/25/2009 19:00	6/25/2009 20:00	912.9	8041.3	2.8	2.3	643.1	1.1	793.5	783.7	326.5	322.1	2339.2	8.7	1.4	0.4	14.0	5.9	7.1
6/25/2009 20:00	6/25/2009 21:00	912.7	8004.0	3.0	2.2	632.5	1.1	785.1	777.9	322.3	318.9	2320.8	8.8	1.4	0.4	6.4	5.5	6.5
6/25/2009 21:00	6/25/2009 22:00	909.4	7969.7	3.0	2.2	625.5	1.1	785.2	778.7	318.2	315.2	2326.4	8.9	1.4	0.4	5.7	5.1	6.0
6/25/2009 22:00	6/25/2009 23:00	909.0	7963.4	3.0	2.2	620.5	1.1	788.1	782.6	317.4	315.1	2323.6	9.2	1.4	0.4	6.2	5.5	6.7
6/25/2009 23:00	6/26/2009 0:00	903.2	7992.5	3.0	2.2	617.8	1.1	789.7	784.2	316.6	315.1	2310.8	9.2	1.4	0.4	10.1	8.3	10.1
6/26/2009 0:00	6/26/2009 1:00	898.7	8013.4	3.0	2.2	619.5	1.1	782.5	775.2	317.0	315.6	2323.2	9.5	1.4	0.4	8.2	10.1	12.1
6/26/2009 1:00	6/26/2009 2:00	912.6	7948.1	2.9	2.4	627.9	1.1	772.3	760.1	313.1	309.9	2343.9	9.6	1.4	0.4	10.1	11.1	13.1
6/26/2009 2:00	6/26/2009 3:00	883.3	7950.3	2.8	2.3	602.7	1.1	759.4	748.2	307.9	304.4	2266.4	10.7	1.4	0.4	9.9	11.6	13.7
6/26/2009 3:00	6/26/2009 4:00	825.3	7883.5	3.0	2.2	562.9	1.1	746.9	737.0	301.2	297.6	2130.4	10.3	1.4	0.4	7.9	11.5	13.6
6/26/2009 4:00	6/26/2009 5:00	832.8	7828.7	3.1	2.1	558.3	1.1	750.5	742.2	299.6	297.0	2134.7	10.0	1.3	0.3	10.6	11.1	13.3
6/26/2009 5:00	6/26/2009 6:00	827.2	7834.3	3.2	2.2	550.1	1.1	754.0	746.7	299.6	296.6	2124.3	9.2	1.3	0.3	7.9	#N/A	#N/A
6/26/2009 6:00	6/26/2009 7:00	893.9	7888.6	3.0	2.4	599.4	1.1	775.1	765.1	303.8	300.9	2285.9	10.6	1.2	0.4	7.8	#N/A	#N/A
6/26/2009 7:00	6/26/2009 8:00	910.9	7958.6	2.9	2.4	605.4	1.1	784.4	773.8	307.7	304.1	2307.0	10.9	1.2	0.4	12.2	11.0	14.0
6/26/2009 8:00	6/26/2009 9:00	912.5	7995.4	2.9	2.3	602.9	1.1	788.2	777.6	311.3	307.4	2313.3	10.8	1.2	0.4	13.7	10.8	14.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/26/2009 9:00	6/26/2009 10:00	912.7	8013.1	2.9	2.3	600.3	1.1	785.8	777.0	314.9	311.5	2313.1	10.2	1.2	0.4	11.9	10.6	13.9
6/26/2009 10:00	6/26/2009 11:00	913.3	8028.5	2.9	2.3	591.5	1.1	773.9	765.0	313.9	310.7	2316.7	10.1	1.2	0.3	12.1	10.0	13.4
6/26/2009 11:00	6/26/2009 12:00	913.4	8020.3	2.9	2.3	588.1	1.1	775.4	766.6	314.4	311.3	2303.1	9.9	1.1	0.4	12.9	9.9	13.3
6/26/2009 12:00	6/26/2009 13:00	913.6	8001.9	2.9	2.3	586.7	1.1	780.9	771.7	316.4	313.9	2294.3	9.2	1.1	0.4	11.6	9.8	13.1
6/26/2009 13:00	6/26/2009 14:00	899.8	7993.0	2.9	2.3	576.5	1.2	783.4	774.2	318.5	315.4	2259.4	9.3	1.1	0.4	9.1	9.9	13.1
6/26/2009 14:00	6/26/2009 15:00	895.7	8001.6	2.9	2.3	570.2	1.2	785.7	777.5	321.4	317.9	2255.3	9.0	1.1	0.4	6.3	10.0	13.1
6/26/2009 15:00	6/26/2009 16:00	887.1	8020.4	2.9	2.3	561.8	1.2	785.5	779.5	322.9	319.6	2245.8	8.9	1.1	0.4	4.4	9.9	12.9
6/26/2009 16:00	6/26/2009 17:00	896.1	8005.1	2.8	2.4	573.4	1.2	793.3	785.6	325.4	322.2	2270.7	8.8	1.1	0.4	6.2	10.0	13.1
6/26/2009 17:00	6/26/2009 18:00	898.9	8003.0	2.8	2.4	584.2	1.2	798.2	788.6	327.6	323.4	2297.9	12.4	1.1	0.3	8.6	10.4	12.9
6/26/2009 18:00	6/26/2009 19:00	895.4	7963.2	2.8	2.4	602.5	1.1	789.3	781.5	327.3	322.4	2287.4	10.4	1.1	0.3	18.2	10.6	12.8
6/26/2009 19:00	6/26/2009 20:00	869.3	8064.2	3.1	2.5	569.8	1.1	764.3	758.0	320.3	319.2	2244.9	7.6	1.2	0.3	48.7	10.2	12.1
6/26/2009 20:00	6/26/2009 21:00	881.9	8103.6	3.5	3.1	578.9	1.2	771.4	761.1	312.5	312.3	2355.3	8.5	1.2	0.3	6.7	10.3	12.0
6/26/2009 21:00	6/26/2009 22:00	909.1	8084.5	3.3	3.0	583.1	1.2	779.3	767.5	313.9	313.7	2389.9	8.6	1.2	0.3	11.4	10.6	12.3
6/26/2009 22:00	6/26/2009 23:00	875.8	8090.6	3.4	2.8	553.3	1.2	778.2	766.6	314.8	315.1	2299.4	9.2	1.2	0.3	10.1	10.8	12.6
6/26/2009 23:00	6/27/2009 0:00	862.3	8038.5	3.6	2.9	553.8	1.2	776.9	767.7	323.2	326.6	2294.1	8.1	1.1	0.3	5.7	10.7	12.5
6/27/2009 0:00	6/27/2009 1:00	898.2	8059.3	3.3	2.8	574.1	1.2	790.3	780.4	320.4	323.1	2353.6	8.7	1.1	0.3	12.4	10.4	12.3
6/27/2009 1:00	6/27/2009 2:00	905.2	8032.6	2.5	1.9	575.0	1.2	787.4	777.8	316.7	318.0	2235.9	9.1	1.1	0.3	53.1	#N/A	#N/A
6/27/2009 2:00	6/27/2009 3:00	904.5	8015.8	2.5	1.9	578.4	1.2	779.8	770.1	314.8	315.2	2261.2	9.6	1.1	0.3	52.2	#N/A	#N/A
6/27/2009 3:00	6/27/2009 4:00	905.7	8040.4	2.6	1.9	577.1	1.2	779.2	769.2	313.0	313.0	2278.5	9.6	1.1	0.3	42.3	9.5	11.3
6/27/2009	6/27/2009	902.2	8056.4	2.7	1.9	572.3	1.2	778.6	768.5	309.6	310.5	2280.6	8.1	1.1	0.3	36.4	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
4:00	5:00																	
6/27/2009 5:00	6/27/2009 6:00	837.9	7984.0	2.7	1.9	530.7	1.2	763.9	756.4	305.3	305.5	2106.6	5.9	1.1	0.3	30.2	#N/A	#N/A
6/27/2009 6:00	6/27/2009 7:00	819.3	8028.8	3.0	2.2	519.4	1.2	761.4	753.6	302.2	300.8	2081.0	5.7	1.1	0.3	16.7	#N/A	#N/A
6/27/2009 7:00	6/27/2009 8:00	811.4	7982.2	3.1	2.2	515.9	1.2	759.2	751.6	301.2	299.9	2081.4	5.5	1.1	0.3	12.7	8.8	10.6
6/27/2009 8:00	6/27/2009 9:00	869.3	7970.3	3.0	2.3	553.7	1.2	764.3	752.4	304.1	302.7	2230.2	6.1	1.1	0.3	29.7	8.5	10.3
6/27/2009 9:00	6/27/2009 10:00	897.6	8046.5	3.1	2.3	571.4	1.2	765.0	753.6	304.1	303.5	2291.8	6.5	1.1	0.3	32.2	8.2	9.9
6/27/2009 10:00	6/27/2009 11:00	897.2	8079.4	3.0	2.1	569.7	1.2	771.5	761.9	307.7	308.8	2288.5	6.8	1.1	0.3	28.4	8.1	9.7
6/27/2009 11:00	6/27/2009 12:00	890.8	8035.6	3.1	2.1	567.3	1.2	777.8	770.3	317.2	320.3	2269.7	7.4	1.1	0.3	28.8	6.5	7.7
6/27/2009 12:00	6/27/2009 13:00	904.1	8044.5	3.1	2.1	583.7	1.2	783.4	776.1	317.6	320.6	2292.1	8.2	1.1	0.3	28.9	3.7	4.4
6/27/2009 13:00	6/27/2009 14:00	910.8	8031.0	3.1	2.1	594.1	1.2	785.0	777.3	326.8	330.2	2315.3	8.7	1.1	0.3	35.9	3.3	3.9
6/27/2009 14:00	6/27/2009 15:00	901.2	8001.8	3.0	2.2	590.9	1.2	787.3	778.6	323.6	324.1	2290.2	8.0	1.1	0.3	34.9	3.0	3.6
6/27/2009 15:00	6/27/2009 16:00	860.9	7983.9	3.0	2.1	551.0	1.2	776.7	771.6	321.3	324.1	2208.4	7.7	1.1	0.3	67.5	2.7	3.3
6/27/2009 16:00	6/27/2009 17:00	828.2	8017.6	3.2	2.3	528.1	1.2	767.7	763.9	318.4	322.7	2147.5	7.3	1.2	0.3	31.8	2.8	3.3
6/27/2009 17:00	6/27/2009 18:00	870.8	7989.9	3.1	2.2	563.8	1.2	781.4	777.3	319.0	322.5	2238.6	7.6	1.2	0.3	14.4	3.1	3.6
6/27/2009 18:00	6/27/2009 19:00	908.1	8028.6	3.0	2.3	584.9	1.2	786.0	780.4	320.8	323.8	2321.6	8.1	1.2	0.3	20.6	3.3	3.8
6/27/2009 19:00	6/27/2009 20:00	913.6	8022.1	3.0	2.3	588.2	1.2	780.8	775.0	318.5	320.9	2316.7	7.9	1.2	0.3	21.9	3.1	3.7
6/27/2009 20:00	6/27/2009 21:00	911.9	8005.8	3.0	2.3	588.4	1.2	781.6	775.1	317.9	320.6	2324.7	7.6	1.2	0.3	24.1	3.0	#N/A
6/27/2009 21:00	6/27/2009 22:00	912.7	8022.4	2.9	2.3	590.0	1.2	781.7	772.9	317.4	319.7	2324.7	7.4	1.3	0.3	23.9	3.2	#N/A
6/27/2009 22:00	6/27/2009 23:00	913.1	8021.8	2.9	2.3	592.7	1.2	785.1	775.1	317.0	319.2	2331.6	7.3	1.3	0.3	31.7	3.3	3.8
6/27/2009 23:00	6/28/2009 0:00	914.4	8012.0	2.8	2.3	594.9	1.2	785.4	775.2	316.2	318.5	2334.5	7.1	1.3	0.3	37.4	3.4	3.9

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/28/2009 0:00	6/28/2009 1:00	910.6	8010.6	2.9	2.3	589.8	1.1	784.2	776.2	314.8	316.3	2330.9	6.9	1.4	0.3	37.8	3.5	4.1
6/28/2009 1:00	6/28/2009 2:00	904.2	8062.5	2.9	2.3	592.4	1.1	772.3	762.3	311.3	311.8	2342.3	6.7	1.4	0.3	30.4	#N/A	4.3
6/28/2009 2:00	6/28/2009 3:00	907.1	8044.8	2.9	2.3	594.1	1.2	773.2	764.4	306.3	306.8	2340.1	6.5	1.4	0.3	30.3	#N/A	#N/A
6/28/2009 3:00	6/28/2009 4:00	906.2	8042.2	2.9	2.3	595.2	1.1	778.3	768.7	305.4	305.9	2323.3	6.4	1.4	0.3	37.0	#N/A	4.4
6/28/2009 4:00	6/28/2009 5:00	902.2	8049.5	2.9	2.2	591.5	1.1	780.2	770.3	305.4	306.0	2324.2	6.3	1.5	0.3	39.3	3.8	4.4
6/28/2009 5:00	6/28/2009 6:00	893.8	8072.4	2.9	2.3	587.9	1.2	780.6	771.2	305.3	306.2	2312.2	6.1	1.5	0.3	39.6	#N/A	#N/A
6/28/2009 6:00	6/28/2009 7:00	826.1	8064.5	3.0	2.2	541.8	1.2	761.0	756.0	302.0	302.7	2124.2	5.4	1.5	0.3	19.2	#N/A	#N/A
6/28/2009 7:00	6/28/2009 8:00	806.6	8035.2	3.1	2.2	532.2	1.1	752.2	749.4	299.1	299.9	2075.8	5.1	1.4	0.3	12.1	3.0	3.4
6/28/2009 8:00	6/28/2009 9:00	881.0	8029.0	3.1	2.3	588.1	1.1	777.9	771.8	304.3	305.9	2283.8	6.0	1.5	0.4	20.9	3.4	4.0
6/28/2009 9:00	6/28/2009 10:00	898.5	8108.1	3.0	2.3	599.2	1.1	776.2	769.6	307.5	310.4	2324.6	7.1	1.6	0.4	29.8	3.8	4.4
6/28/2009 10:00	6/28/2009 11:00	893.7	8100.5	2.9	2.3	587.5	1.1	765.7	756.8	305.4	308.2	2294.0	6.8	1.6	0.3	33.6	3.0	3.5
6/28/2009 11:00	6/28/2009 12:00	878.6	8079.1	2.9	2.3	577.9	1.1	768.8	760.7	312.3	315.6	2248.8	6.3	1.5	0.3	36.1	2.5	3.0
6/28/2009 12:00	6/28/2009 13:00	899.8	8057.2	3.0	2.2	593.4	1.1	777.4	769.8	317.8	318.8	2304.9	6.4	1.4	0.3	31.5	2.3	2.7
6/28/2009 13:00	6/28/2009 14:00	914.2	8063.3	3.0	2.2	598.2	1.1	783.3	775.5	320.2	321.2	2349.6	6.6	1.5	0.3	32.3	2.5	2.9
6/28/2009 14:00	6/28/2009 15:00	913.4	8055.7	3.0	2.2	595.2	1.2	786.6	778.1	322.1	322.7	2342.1	7.1	1.5	0.4	28.4	2.4	2.8
6/28/2009 15:00	6/28/2009 16:00	911.7	8053.5	3.0	2.2	592.9	1.2	787.8	780.1	323.8	324.7	2346.8	7.3	1.5	0.3	24.4	2.3	2.7
6/28/2009 16:00	6/28/2009 17:00	909.2	8077.3	3.0	2.2	588.1	1.2	787.3	781.7	326.0	326.4	2344.5	7.1	1.5	0.3	22.6	2.3	2.8
6/28/2009 17:00	6/28/2009 18:00	910.4	8072.9	3.0	2.2	585.9	1.2	785.3	780.5	327.3	327.8	2336.0	6.3	1.5	0.4	19.5	3.8	4.3
6/28/2009 18:00	6/28/2009 19:00	909.9	8042.1	3.0	2.2	582.8	1.2	776.2	771.0	325.0	325.0	2322.4	5.9	1.5	0.4	17.0	5.0	6.2
6/28/2009	6/28/2009	908.6	8043.1	3.0	2.2	582.5	1.2	781.4	774.7	324.6	323.8	2318.2	5.7	1.5	0.4	17.8	6.0	7.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
19:00	20:00																	
6/28/2009 20:00	6/28/2009 21:00	908.6	8056.3	3.1	2.2	582.3	1.2	777.0	770.5	324.3	323.0	2314.6	5.7	1.4	0.4	16.2	6.8	8.1
6/28/2009 21:00	6/28/2009 22:00	905.2	8057.0	3.1	2.2	587.5	1.2	774.8	767.1	320.7	319.1	2318.1	5.6	1.5	0.4	18.4	7.4	8.8
6/28/2009 22:00	6/28/2009 23:00	909.7	8010.1	3.1	2.1	594.4	1.2	778.3	770.0	320.0	319.5	2316.1	6.0	1.5	0.4	19.5	8.4	9.8
6/28/2009 23:00	6/29/2009 0:00	913.2	7991.4	3.1	2.1	591.8	1.1	781.0	775.0	319.6	319.3	2337.3	5.8	1.5	0.4	11.9	8.4	9.8
6/29/2009 0:00	6/29/2009 1:00	905.3	8026.6	3.1	2.2	595.0	1.1	783.6	773.5	319.3	318.0	2348.4	5.7	1.4	0.4	8.9	8.2	9.7
6/29/2009 1:00	6/29/2009 2:00	897.0	7965.1	3.1	2.1	591.5	1.1	772.6	760.6	320.2	314.0	2321.1	5.8	1.5	0.4	10.9	8.9	10.3
6/29/2009 2:00	6/29/2009 3:00	903.1	7910.9	3.1	2.2	602.4	1.1	772.7	763.5	313.1	307.4	2331.5	6.3	1.6	0.4	6.0	9.4	10.7
6/29/2009 3:00	6/29/2009 4:00	905.3	7995.5	3.1	2.1	614.6	1.1	778.2	768.6	309.8	304.7	2337.3	6.7	1.7	0.4	6.5	9.5	10.8
6/29/2009 4:00	6/29/2009 5:00	900.1	8005.6	3.1	2.1	620.1	1.1	777.8	768.7	309.9	305.0	2328.9	6.9	1.8	0.4	6.2	#N/A	#N/A
6/29/2009 5:00	6/29/2009 6:00	904.2	8038.9	3.0	2.2	630.4	1.1	775.0	765.2	310.2	305.7	2349.3	7.1	1.8	0.4	6.5	#N/A	#N/A
6/29/2009 6:00	6/29/2009 7:00	907.9	8042.4	3.0	2.2	633.8	1.1	764.6	754.3	307.3	303.3	2374.0	7.6	1.9	0.4	6.8	#N/A	#N/A
6/29/2009 7:00	6/29/2009 8:00	906.0	8048.3	3.1	2.1	632.5	1.1	760.0	749.9	305.1	301.7	2369.7	7.9	1.9	0.4	6.8	10.7	11.5
6/29/2009 8:00	6/29/2009 9:00	907.5	8067.3	3.1	2.1	632.1	1.1	764.2	752.5	306.2	302.4	2377.7	7.4	1.9	0.4	7.3	10.8	11.8
6/29/2009 9:00	6/29/2009 10:00	910.3	8115.2	3.1	2.2	634.0	1.1	762.4	749.9	308.0	304.2	2374.1	7.0	1.8	0.4	7.1	11.2	12.3
6/29/2009 10:00	6/29/2009 11:00	896.4	8094.2	3.1	2.1	621.9	1.1	759.2	748.4	307.9	304.7	2331.6	6.4	1.7	0.4	6.6	11.4	12.6
6/29/2009 11:00	6/29/2009 12:00	898.7	8066.4	3.1	2.1	625.7	1.1	762.5	752.2	309.3	306.4	2324.6	6.3	1.7	0.4	6.6	11.5	12.8
6/29/2009 12:00	6/29/2009 13:00	853.9	8079.9	3.1	2.1	596.5	1.1	750.1	743.0	310.5	307.2	2218.0	6.3	1.7	0.4	19.4	11.0	12.4
6/29/2009 13:00	6/29/2009 14:00	853.9	8027.1	3.3	1.9	591.2	1.1	739.6	736.5	306.6	304.3	2218.0	6.1	1.7	0.4	47.9	10.6	11.9
6/29/2009 14:00	6/29/2009 15:00	729.6	8104.8	3.3	2.1	506.9	1.1	710.1	707.8	312.6	303.9	1978.1	5.7	1.8	0.4	40.2	9.5	10.7

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
6/29/2009 15:00	6/29/2009 16:00	741.1	7998.4	3.4	2.2	527.3	1.1	704.4	701.4	310.5	303.8	2057.7	5.9	1.8	0.4	9.7	9.8	11.1
6/29/2009 16:00	6/29/2009 17:00	889.7	8074.2	3.1	2.2	623.3	1.1	749.9	743.4	306.9	304.9	2347.9	6.1	1.7	0.4	11.0	10.6	11.9
6/29/2009 17:00	6/29/2009 18:00	894.4	8135.9	3.0	2.2	617.6	1.1	756.7	750.5	308.1	305.0	2335.8	5.8	1.7	0.4	7.4	10.7	11.9
6/29/2009 18:00	6/29/2009 19:00	895.9	8102.1	3.0	2.2	610.7	1.1	756.0	749.9	306.9	303.7	2331.1	5.7	1.7	0.4	7.0	10.7	11.9
6/29/2009 19:00	6/29/2009 20:00	877.6	8080.0	2.9	2.2	591.5	1.1	749.1	743.5	303.3	300.5	2277.8	5.6	1.7	0.4	12.0	10.7	11.8
6/29/2009 20:00	6/29/2009 21:00	826.0	8033.2	2.9	2.2	553.1	1.1	735.4	729.1	300.4	299.7	2145.6	5.6	1.7	0.4	26.3	10.4	11.6
6/29/2009 21:00	6/29/2009 22:00	895.6	8019.9	3.1	2.3	604.3	1.1	754.3	747.8	303.0	300.6	2335.6	5.9	1.7	0.4	8.4	10.9	12.2
6/29/2009 22:00	6/29/2009 23:00	902.0	8041.5	3.1	2.2	606.2	1.1	760.9	753.7	302.5	300.3	2341.1	6.1	1.7	0.4	9.4	11.2	12.4
6/29/2009 23:00	6/30/2009 0:00	902.0	8026.5	3.0	2.2	602.0	1.1	764.5	756.8	303.2	300.6	2329.9	6.2	1.7	0.4	9.4	11.3	12.6
6/30/2009 0:00	6/30/2009 1:00	901.8	8040.5	3.1	2.1	601.2	1.1	768.1	760.7	303.8	301.1	2335.7	6.1	1.7	0.4	9.2	11.4	12.7
6/30/2009 1:00	6/30/2009 2:00	893.3	8004.2	3.1	2.1	594.2	1.1	769.6	761.9	303.3	300.8	2304.6	6.1	1.7	0.4	8.8	11.6	12.8
6/30/2009 2:00	6/30/2009 3:00	893.3	7947.6	3.1	2.2	593.1	1.1	773.0	764.7	303.4	300.4	2298.6	6.0	1.7	0.4	8.5	11.7	13.0
6/30/2009 3:00	6/30/2009 4:00	894.4	7992.9	3.1	2.2	591.8	1.1	775.4	767.9	303.6	300.4	2310.9	5.9	1.7	0.4	6.8	11.8	13.2
6/30/2009 4:00	6/30/2009 5:00	901.0	7982.2	3.1	2.2	602.0	1.1	778.3	771.7	304.2	301.0	2330.8	6.0	1.8	0.4	4.7	12.1	13.4
6/30/2009 5:00	6/30/2009 6:00	911.8	8000.5	3.0	2.2	613.3	1.1	775.7	765.5	305.2	301.5	2368.5	6.6	1.9	0.4	6.1	#N/A	#N/A
6/30/2009 6:00	6/30/2009 7:00	912.5	7957.9	3.1	2.2	620.5	1.1	763.0	754.1	301.4	298.3	2366.4	6.9	1.9	0.4	7.9	#N/A	#N/A
6/30/2009 7:00	6/30/2009 8:00	902.7	7976.1	3.0	2.2	623.7	1.1	763.1	754.4	299.2	296.4	2360.3	8.2	2.0	0.4	9.9	12.9	14.0
6/30/2009 8:00	6/30/2009 9:00	906.9	7995.3	3.0	2.2	627.0	1.1	770.5	761.0	302.6	299.6	2362.9	9.3	2.1	0.4	11.2	13.4	14.2
6/30/2009 9:00	6/30/2009 10:00	910.3	7980.1	3.0	2.2	631.1	1.1	775.8	766.0	304.4	301.4	2370.2	9.0	2.1	0.5	12.1	13.6	14.4
6/30/2009	6/30/2009	901.7	7950.7	3.0	2.2	638.5	1.1	777.7	767.2	303.3	297.8	2371.4	7.5	2.1	0.5	11.0	13.8	14.9

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
10:00	11:00																	
6/30/2009 11:00	6/30/2009 12:00	898.4	7932.7	3.0	2.2	642.9	1.1	773.5	762.8	304.1	298.0	2361.8	6.5	2.2	0.6	10.3	13.8	15.0
6/30/2009 12:00	6/30/2009 13:00	907.6	7958.1	4.3	3.7	646.7	1.1	772.0	760.4	303.8	298.2	2376.4	6.9	2.2	0.5	11.7	13.6	14.7
6/30/2009 13:00	6/30/2009 14:00	907.7	8024.5	3.2	2.3	640.7	1.1	773.8	762.8	305.4	300.4	2369.3	6.2	2.2	0.5	12.8	13.5	14.5
6/30/2009 14:00	6/30/2009 15:00	901.6	7953.8	2.9	2.3	641.7	1.1	775.1	762.8	305.8	300.5	2364.1	5.8	2.2	0.5	11.2	13.0	14.1
6/30/2009 15:00	6/30/2009 16:00	912.1	8012.7	2.9	2.3	648.2	1.1	780.0	767.0	306.4	301.3	2390.9	5.6	2.1	0.5	11.2	13.2	14.4
6/30/2009 16:00	6/30/2009 17:00	914.8	8066.6	2.9	2.3	640.7	1.1	772.3	761.3	307.6	303.1	2386.4	5.6	2.0	0.5	10.9	13.0	14.3
6/30/2009 17:00	6/30/2009 18:00	912.8	8034.0	2.9	2.3	630.9	1.1	766.4	757.1	305.4	300.9	2370.7	5.7	2.0	0.6	18.1	12.6	14.0
6/30/2009 18:00	6/30/2009 19:00	907.0	7990.8	3.0	2.3	626.5	1.1	767.6	758.7	304.4	299.9	2359.9	5.2	1.9	0.5	19.1	12.6	14.0
6/30/2009 19:00	6/30/2009 20:00	902.8	8007.5	3.0	2.2	621.3	1.1	772.4	763.7	305.2	301.0	2324.5	4.5	1.9	0.5	20.4	12.0	15.3
6/30/2009 20:00	6/30/2009 21:00	899.8	8010.8	3.0	2.2	624.2	1.1	774.2	766.7	304.8	301.6	2341.1	5.3	1.8	0.6	9.6	11.5	15.2
6/30/2009 21:00	6/30/2009 22:00	866.9	7952.6	3.1	2.2	598.8	1.1	767.2	760.9	303.4	299.9	2265.1	6.6	1.7	0.5	5.1	11.5	13.8
6/30/2009 22:00	6/30/2009 23:00	901.4	7999.6	3.0	2.2	627.0	1.1	778.2	770.9	305.2	302.7	2359.0	7.5	1.6	0.5	4.6	10.9	13.8
6/30/2009 23:00	7/1/2009 0:00	901.3	7984.5	3.0	2.2	628.4	1.1	783.5	774.4	307.5	303.8	2355.4	8.4	1.6	0.5	5.1	11.1	13.9
7/1/2009 0:00	7/1/2009 1:00	902.3	8015.2	3.0	2.2	627.7	1.1	784.4	772.1	309.6	304.9	2371.3	9.5	1.5	0.3	5.4	12.1	13.5
7/1/2009 1:00	7/1/2009 2:00	882.9	7959.4	3.0	2.2	614.0	1.1	771.9	757.5	308.2	302.3	2315.7	8.8	1.5	0.3	6.7	11.9	13.2
7/1/2009 2:00	7/1/2009 3:00	824.5	7784.8	3.1	2.2	577.2	1.1	749.8	739.7	301.0	295.7	2173.2	7.7	1.6	0.4	7.1	11.8	12.9
7/1/2009 3:00	7/1/2009 4:00	801.2	7808.0	3.1	2.1	562.6	1.1	744.5	734.7	297.4	291.8	2113.3	7.3	1.6	0.4	6.1	11.8	12.9
7/1/2009 4:00	7/1/2009 5:00	801.5	7806.1	3.1	2.2	567.4	1.1	748.9	739.4	296.8	292.2	2125.3	7.4	1.7	0.4	6.7	#N/A	13.2
7/1/2009 5:00	7/1/2009 6:00	859.0	7839.9	3.2	2.2	611.2	1.1	760.5	752.4	299.9	296.8	2273.9	6.8	1.8	0.4	6.3	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/1/2009 6:00	7/1/2009 7:00	841.8	7915.2	3.2	2.1	597.8	1.0	757.0	749.5	299.1	295.9	2218.6	6.8	1.9	0.5	9.3	#N/A	#N/A
7/1/2009 7:00	7/1/2009 8:00	893.4	7925.0	3.1	2.1	635.9	1.0	770.7	762.3	301.5	299.0	2344.7	6.8	1.8	0.5	8.5	12.4	13.8
7/1/2009 8:00	7/1/2009 9:00	900.0	7979.6	3.0	2.1	621.0	1.1	771.6	762.1	305.1	301.5	2346.5	6.0	1.7	0.5	9.3	12.2	13.5
7/1/2009 9:00	7/1/2009 10:00	913.0	8015.7	3.0	2.2	607.9	1.1	771.1	765.1	303.8	300.9	2351.3	5.5	1.5	0.4	7.0	#N/A	#N/A
7/1/2009 10:00	7/1/2009 11:00	897.4	7970.4	3.1	2.4	613.6	1.1	774.1	766.0	306.4	303.7	2347.8	5.3	1.4	0.4	7.2	11.2	12.5
7/1/2009 11:00	7/1/2009 12:00	903.2	7890.6	3.1	2.3	646.4	1.1	766.8	755.9	309.1	305.7	2352.0	5.2	1.6	0.4	6.4	12.5	13.9
7/1/2009 12:00	7/1/2009 13:00	915.7	7983.1	3.0	2.1	652.5	1.1	760.0	751.3	308.7	306.1	2356.3	5.1	1.6	0.5	8.3	13.2	14.8
7/1/2009 13:00	7/1/2009 14:00	913.8	8047.7	3.0	2.1	645.5	1.1	761.8	753.0	308.2	305.8	2352.1	5.3	1.5	0.4	10.6	12.9	14.5
7/1/2009 14:00	7/1/2009 15:00	907.1	8022.6	3.0	2.1	630.3	1.1	766.5	759.3	310.0	307.6	2329.4	5.2	1.4	0.3	8.5	12.5	14.0
7/1/2009 15:00	7/1/2009 16:00	895.5	7992.7	3.1	2.2	618.1	1.1	766.3	758.0	310.9	307.8	2325.3	5.2	1.4	0.3	6.8	12.3	13.7
7/1/2009 16:00	7/1/2009 17:00	903.8	8039.9	3.0	2.2	612.6	1.1	771.2	762.8	312.3	308.3	2345.4	5.3	1.4	0.4	7.3	12.2	13.7
7/1/2009 17:00	7/1/2009 18:00	896.1	8035.0	3.0	2.2	608.2	1.1	773.4	764.0	312.6	307.8	2323.4	5.1	1.4	0.4	6.9	12.0	13.5
7/1/2009 18:00	7/1/2009 19:00	890.6	7973.6	3.0	2.2	609.6	1.1	763.2	754.3	310.4	306.4	2320.0	5.3	1.5	0.4	6.1	12.2	13.7
7/1/2009 19:00	7/1/2009 20:00	895.9	7996.3	3.0	2.2	615.6	1.1	763.7	754.9	309.5	306.7	2325.5	5.3	1.6	0.4	5.3	12.5	14.1
7/1/2009 20:00	7/1/2009 21:00	900.9	8027.3	3.1	2.1	619.4	1.1	763.4	755.7	308.7	306.5	2330.0	5.7	1.6	0.4	5.3	12.5	14.1
7/1/2009 21:00	7/1/2009 22:00	901.7	7986.3	3.2	2.0	617.3	1.1	766.1	761.4	307.5	306.5	2322.1	7.8	1.6	0.4	5.2	12.6	14.2
7/1/2009 22:00	7/1/2009 23:00	886.9	7994.0	3.1	1.9	597.8	1.1	768.2	763.0	307.1	306.2	2273.4	8.1	1.5	0.4	6.4	12.4	13.9
7/1/2009 23:00	7/2/2009 0:00	869.9	7970.2	3.1	2.2	581.0	1.1	765.2	758.7	305.8	304.1	2246.6	8.0	1.5	0.4	6.3	11.8	13.2
7/2/2009 0:00	7/2/2009 1:00	904.5	8039.6	3.1	2.2	597.1	1.1	779.1	772.5	308.7	306.8	2329.1	8.3	1.4	0.4	7.0	11.7	13.2
7/2/2009	7/2/2009	911.0	8035.1	3.0	2.2	590.8	1.1	786.7	778.2	310.6	309.0	2343.7	8.6	1.3	0.3	7.8	11.6	13.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
1:00	2:00																	
7/2/2009 2:00	7/2/2009 3:00	905.6	8000.8	3.0	2.3	585.2	1.1	789.2	780.0	312.6	310.4	2308.2	8.6	1.3	0.3	8.9	11.6	12.9
7/2/2009 3:00	7/2/2009 4:00	899.2	8004.4	3.1	2.2	590.4	1.1	787.6	780.9	313.0	310.9	2313.8	8.8	1.4	0.4	7.6	11.7	13.1
7/2/2009 4:00	7/2/2009 5:00	909.2	8022.4	3.1	2.1	606.5	1.1	791.5	785.2	313.0	312.1	2337.1	9.2	1.4	0.4	6.7	12.3	13.6
7/2/2009 5:00	7/2/2009 6:00	909.1	8003.1	3.2	2.1	614.0	1.1	791.3	786.1	312.1	311.2	2343.7	8.8	1.4	0.4	6.1	#N/A	#N/A
7/2/2009 6:00	7/2/2009 7:00	899.3	8011.8	3.1	2.1	619.2	1.1	785.9	779.7	311.5	309.8	2336.3	9.3	1.5	0.4	7.0	#N/A	#N/A
7/2/2009 7:00	7/2/2009 8:00	895.5	7988.6	3.2	2.0	635.3	1.1	770.2	760.0	307.3	306.1	2343.1	9.3	1.5	0.4	7.3	11.9	15.0
7/2/2009 8:00	7/2/2009 9:00	910.1	7973.0	3.2	2.0	647.7	1.1	764.1	755.3	305.5	304.0	2378.4	8.5	1.5	0.4	7.6	11.8	14.8
7/2/2009 9:00	7/2/2009 10:00	906.4	8015.6	3.2	2.0	642.9	1.1	757.2	751.9	306.5	304.8	2347.2	8.7	1.5	0.4	9.7	12.6	14.0
7/2/2009 10:00	7/2/2009 11:00	911.3	8013.8	3.2	2.1	635.0	1.1	753.3	751.3	304.9	304.6	2355.8	8.5	1.4	0.4	6.2	12.0	13.5
7/2/2009 11:00	7/2/2009 12:00	908.3	8031.6	3.2	2.1	638.1	1.1	754.4	752.7	307.3	306.8	2348.9	8.6	1.4	0.4	4.6	11.5	13.0
7/2/2009 12:00	7/2/2009 13:00	733.3	8248.0	4.0	3.2	518.0	1.1	710.9	708.4	314.2	305.9	2079.2	8.0	1.4	0.3	15.8	7.0	8.5
7/2/2009 13:00	7/2/2009 14:00	720.9	8202.8	3.4	2.1	528.9	1.1	680.2	677.9	297.4	294.7	2004.3	6.4	1.4	0.3	9.7	5.3	6.8
7/2/2009 14:00	7/2/2009 15:00	880.4	8053.1	3.1	2.0	613.9	1.1	744.6	739.2	305.3	305.6	2300.8	8.4	1.4	0.3	5.0	8.4	10.2
7/2/2009 15:00	7/2/2009 16:00	897.6	8003.4	3.1	2.2	615.5	1.1	765.2	758.3	314.2	312.1	2320.7	9.1	1.4	0.4	6.0	10.0	12.0
7/2/2009 16:00	7/2/2009 17:00	899.9	7949.8	3.1	2.3	624.8	1.1	772.8	766.4	317.3	315.3	2339.1	9.3	1.4	0.4	7.4	11.4	13.5
7/2/2009 17:00	7/2/2009 18:00	912.8	8009.0	3.1	2.1	617.5	1.1	768.4	765.7	317.4	316.6	2346.6	9.3	1.4	0.4	3.1	12.3	14.5
7/2/2009 18:00	7/2/2009 19:00	910.1	7994.0	3.1	2.2	595.9	1.1	767.8	766.7	314.7	314.0	2319.0	9.5	1.3	0.3	1.6	11.6	13.7
7/2/2009 19:00	7/2/2009 20:00	900.9	7995.8	3.1	2.2	581.0	1.1	774.3	772.6	315.2	314.6	2297.2	10.1	1.2	0.3	1.1	10.7	12.5
7/2/2009 20:00	7/2/2009 21:00	897.1	8021.1	3.2	2.2	579.0	1.1	780.0	777.8	316.3	317.1	2301.7	9.7	1.3	0.3	1.9	10.6	12.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/2/2009 21:00	7/2/2009 22:00	897.5	8023.3	3.1	2.3	578.8	1.1	782.9	779.3	316.6	316.2	2309.1	11.2	1.4	0.4	1.9	11.1	12.8
7/2/2009 22:00	7/2/2009 23:00	903.8	8028.6	3.1	2.2	584.3	1.1	782.3	778.2	316.9	316.6	2318.1	10.5	1.4	0.4	1.3	11.3	12.9
7/2/2009 23:00	7/3/2009 0:00	898.8	8016.4	3.1	2.2	571.6	1.2	777.7	772.0	313.9	312.9	2305.2	11.0	1.4	0.3	1.5	10.9	12.5
7/3/2009 0:00	7/3/2009 1:00	899.4	8024.8	3.1	2.4	579.0	1.2	783.2	775.8	313.8	311.9	2312.0	11.2	1.4	0.3	1.1	11.0	12.7
7/3/2009 1:00	7/3/2009 2:00	903.0	8014.6	3.1	2.2	590.0	1.2	787.7	782.5	314.0	312.6	2319.8	10.9	1.5	0.4	1.0	11.6	13.3
7/3/2009 2:00	7/3/2009 3:00	899.6	7981.1	3.0	2.2	591.1	1.1	789.7	784.2	313.5	311.9	2302.6	10.9	1.5	0.4	1.1	12.2	14.0
7/3/2009 3:00	7/3/2009 4:00	862.3	8040.2	3.0	2.2	576.5	1.1	770.5	765.0	310.0	306.8	2231.6	10.5	1.6	0.4	2.9	12.5	14.3
7/3/2009 4:00	7/3/2009 5:00	804.9	8083.8	3.2	2.1	552.7	1.1	738.8	734.4	300.6	296.3	2102.8	9.2	1.6	0.4	1.1	#N/A	#N/A
7/3/2009 5:00	7/3/2009 6:00	827.8	8007.9	3.2	2.2	576.3	1.1	741.6	737.4	296.4	292.7	2169.0	7.5	1.6	0.4	1.7	#N/A	#N/A
7/3/2009 6:00	7/3/2009 7:00	866.7	7992.6	3.1	2.3	603.4	1.1	763.0	757.5	301.3	298.1	2262.9	6.1	1.7	0.5	4.3	#N/A	#N/A
7/3/2009 7:00	7/3/2009 8:00	885.0	7986.3	3.1	2.2	628.3	1.1	771.1	765.3	304.5	302.0	2303.3	5.6	1.9	0.5	6.1	13.9	16.0
7/3/2009 8:00	7/3/2009 9:00	899.3	8042.3	3.1	2.2	642.8	1.1	768.8	763.9	307.1	305.1	2342.7	5.5	2.0	0.6	3.2	14.4	16.2
7/3/2009 9:00	7/3/2009 10:00	916.8	8054.8	3.0	2.2	642.4	1.1	767.9	761.3	306.6	304.3	2369.2	5.5	2.0	0.6	2.5	14.3	16.1
7/3/2009 10:00	7/3/2009 11:00	916.9	8032.9	3.1	2.2	632.5	1.1	776.1	770.2	308.6	307.2	2361.3	5.7	1.9	0.5	1.8	14.8	16.7
7/3/2009 11:00	7/3/2009 12:00	911.7	8029.8	3.1	2.2	629.7	1.1	776.8	772.9	311.7	311.4	2340.3	5.9	1.9	0.5	1.6	15.1	16.9
7/3/2009 12:00	7/3/2009 13:00	909.9	8031.2	3.1	2.2	626.4	1.1	779.6	776.9	315.0	315.4	2347.2	6.1	1.8	0.5	2.3	15.3	17.1
7/3/2009 13:00	7/3/2009 14:00	910.9	8029.5	3.1	2.2	622.6	1.1	780.6	776.2	317.8	317.9	2357.6	6.2	1.7	0.4	3.6	15.2	17.1
7/3/2009 14:00	7/3/2009 15:00	909.3	8013.3	3.1	2.2	622.1	1.1	780.2	777.0	319.1	318.8	2348.4	6.1	1.6	0.4	4.7	15.0	16.8
7/3/2009 15:00	7/3/2009 16:00	910.3	8018.9	3.1	2.2	620.0	1.1	784.8	783.8	326.6	327.3	2338.0	6.3	1.5	0.4	3.7	15.0	16.8
7/3/2009	7/3/2009	911.1	8028.2	3.1	2.2	620.7	1.1	789.7	789.0	330.7	332.0	2355.7	6.3	1.5	0.4	2.5	14.9	16.8

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
16:00	17:00																	
7/3/2009 17:00	7/3/2009 18:00	909.6	8024.5	3.1	2.2	619.9	1.1	794.8	793.1	332.5	333.4	2338.7	6.3	1.4	0.3	1.7	14.7	16.7
7/3/2009 18:00	7/3/2009 19:00	909.7	8043.9	3.0	2.1	616.3	1.1	786.4	782.4	332.5	332.5	2338.3	6.4	1.3	0.3	4.1	14.5	16.6
7/3/2009 19:00	7/3/2009 20:00	909.6	8012.6	3.0	1.9	617.1	1.1	784.0	779.2	329.7	329.3	2316.9	6.1	1.3	0.3	8.0	14.5	16.3
7/3/2009 20:00	7/3/2009 21:00	909.5	8048.9	3.0	1.9	618.9	1.1	789.8	785.9	330.0	330.5	2320.6	6.6	1.3	0.3	7.8	14.7	16.7
7/3/2009 21:00	7/3/2009 22:00	911.7	8040.3	2.9	1.7	617.5	1.1	793.8	787.0	330.9	332.1	2321.6	8.1	1.3	0.3	16.6	14.8	16.6
7/3/2009 22:00	7/3/2009 23:00	911.1	8072.4	2.9	1.7	613.4	1.1	779.9	769.7	328.8	327.5	2314.9	8.3	1.3	0.3	9.9	14.3	16.2
7/3/2009 23:00	7/4/2009 0:00	910.9	8005.4	2.8	1.9	614.0	1.1	768.6	763.3	321.9	320.5	2288.8	8.5	1.3	0.3	3.6	14.2	16.0
7/4/2009 0:00	7/4/2009 1:00	908.9	8043.9	2.7	1.8	621.2	1.1	773.7	766.0	321.6	318.9	2305.5	9.9	1.3	0.3	8.3	14.2	16.0
7/4/2009 1:00	7/4/2009 2:00	910.4	8057.1	2.6	1.6	620.2	1.1	776.2	771.0	322.1	319.9	2304.3	10.1	1.3	0.3	22.5	#N/A	#N/A
7/4/2009 2:00	7/4/2009 3:00	909.3	8050.9	2.6	1.7	620.1	1.1	780.9	775.0	322.5	320.5	2314.9	8.7	1.3	0.3	21.0	#N/A	#N/A
7/4/2009 3:00	7/4/2009 4:00	904.4	8030.5	2.5	1.7	611.2	1.1	785.3	777.9	323.7	320.2	2287.3	5.3	1.3	0.3	14.3	13.5	15.5
7/4/2009 4:00	7/4/2009 5:00	818.8	8063.6	2.5	1.7	553.4	1.1	763.8	756.1	321.3	316.0	2076.4	4.6	1.3	0.3	17.9	12.2	14.0
7/4/2009 5:00	7/4/2009 6:00	805.0	8051.3	2.6	1.7	551.4	1.1	756.1	748.8	316.0	310.9	2054.4	4.5	1.3	0.3	32.3	#N/A	#N/A
7/4/2009 6:00	7/4/2009 7:00	841.1	8048.4	2.7	1.6	567.5	1.1	767.8	761.0	314.9	310.8	2148.1	4.5	1.4	0.3	39.9	#N/A	#N/A
7/4/2009 7:00	7/4/2009 8:00	871.0	8036.9	2.6	1.7	588.9	1.1	776.3	768.7	317.7	314.2	2224.9	4.8	1.3	0.3	12.7	11.2	13.0
7/4/2009 8:00	7/4/2009 9:00	907.3	8074.1	2.6	1.7	601.9	1.1	772.7	766.7	319.0	315.4	2306.2	5.1	1.3	0.3	8.0	11.7	13.2
7/4/2009 9:00	7/4/2009 10:00	902.1	8064.0	2.6	1.7	604.3	1.1	774.2	767.4	317.9	313.9	2287.5	5.2	1.3	0.3	5.6	12.0	13.5
7/4/2009 10:00	7/4/2009 11:00	901.9	8081.3	2.6	1.7	611.9	1.1	779.0	772.8	321.1	317.7	2298.2	5.1	1.3	0.3	7.4	12.4	14.0
7/4/2009 11:00	7/4/2009 12:00	904.6	8077.1	2.6	1.6	617.6	1.1	780.1	774.0	322.7	320.2	2291.3	5.2	1.3	0.3	16.1	12.8	14.4

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/4/2009 12:00	7/4/2009 13:00	904.3	8067.7	2.6	1.6	619.8	1.1	782.4	778.2	324.4	323.2	2279.1	5.1	1.3	0.3	18.9	12.8	14.4
7/4/2009 13:00	7/4/2009 14:00	904.6	8061.6	2.6	1.6	622.7	1.1	783.4	777.1	327.4	325.8	2280.4	5.4	1.3	0.3	16.4	13.4	15.2
7/4/2009 14:00	7/4/2009 15:00	908.2	8062.5	2.6	1.6	617.9	1.1	784.2	775.6	327.9	325.8	2280.6	5.4	1.4	0.3	17.7	13.5	15.2
7/4/2009 15:00	7/4/2009 16:00	907.6	8064.1	2.6	1.7	610.1	1.1	788.2	780.5	330.0	327.9	2281.5	5.6	1.4	0.4	12.1	13.3	15.1
7/4/2009 16:00	7/4/2009 17:00	905.8	8087.6	2.5	1.7	602.8	1.1	782.0	775.6	331.9	330.2	2275.0	5.7	1.4	0.3	10.4	13.0	14.8
7/4/2009 17:00	7/4/2009 18:00	904.5	8055.7	2.5	1.7	598.9	1.1	780.1	773.7	330.9	328.8	2276.4	5.7	1.3	0.3	8.1	12.8	14.5
7/4/2009 18:00	7/4/2009 19:00	901.8	8038.5	2.6	1.7	593.6	1.1	785.7	779.4	332.7	331.1	2264.5	5.9	1.3	0.3	9.4	13.1	14.8
7/4/2009 19:00	7/4/2009 20:00	887.4	8063.5	2.6	1.7	584.9	1.1	775.0	768.2	331.7	329.3	2232.0	5.8	1.3	0.3	20.9	12.7	14.5
7/4/2009 20:00	7/4/2009 21:00	907.5	8037.2	2.6	1.7	603.7	1.1	782.1	775.2	330.5	329.0	2282.1	6.3	1.3	0.3	23.3	12.8	14.5
7/4/2009 21:00	7/4/2009 22:00	910.0	8051.3	2.6	1.7	605.9	1.1	771.4	764.2	328.3	327.1	2281.7	6.5	1.3	0.3	23.1	13.0	14.6
7/4/2009 22:00	7/4/2009 23:00	909.5	8056.0	2.6	1.7	605.3	1.1	770.9	761.2	324.2	322.1	2287.2	6.4	1.3	0.3	15.4	12.9	14.5
7/4/2009 23:00	7/5/2009 0:00	910.0	8050.3	2.6	1.6	607.9	1.1	775.0	767.2	324.5	322.3	2286.4	6.1	1.3	0.3	20.2	13.1	14.6
7/5/2009 0:00	7/5/2009 1:00	909.4	8081.2	2.7	1.7	612.3	1.1	776.0	764.1	324.9	321.8	2303.1	6.1	1.4	0.3	39.7	12.6	14.1
7/5/2009 1:00	7/5/2009 2:00	907.8	8068.4	2.8	1.9	609.2	1.1	771.0	756.2	320.6	315.2	2313.8	6.1	1.4	0.3	13.2	#N/A	13.9
7/5/2009 2:00	7/5/2009 3:00	903.9	8024.5	2.7	1.9	611.4	1.1	774.0	762.6	317.6	313.2	2309.0	5.9	1.4	0.3	7.2	#N/A	#N/A
7/5/2009 3:00	7/5/2009 4:00	903.5	8047.6	2.6	1.7	613.3	1.1	769.1	760.5	317.8	313.5	2294.2	5.6	1.3	0.3	18.4	#N/A	14.8
7/5/2009 4:00	7/5/2009 5:00	904.2	8061.2	2.6	1.6	610.4	1.1	767.6	760.5	316.0	311.9	2297.6	5.5	1.3	0.3	13.2	#N/A	#N/A
7/5/2009 5:00	7/5/2009 6:00	904.9	8038.8	2.5	1.7	608.2	1.1	773.0	766.9	316.6	312.9	2291.9	5.6	1.3	0.3	8.2	#N/A	#N/A
7/5/2009 6:00	7/5/2009 7:00	903.8	8053.4	2.5	1.8	604.9	1.1	769.0	761.4	317.6	313.3	2295.5	5.5	1.3	0.3	6.7	#N/A	#N/A
7/5/2009	7/5/2009	903.7	8018.3	2.5	1.7	601.2	1.1	765.6	757.5	316.0	311.4	2292.2	5.4	1.3	0.3	7.3	13.3	14.9

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7:00	8:00																	
7/5/2009 8:00	7/5/2009 9:00	902.5	8073.2	2.5	1.7	599.4	1.1	760.3	753.7	315.6	311.3	2296.0	5.4	1.3	0.3	6.4	13.2	14.7
7/5/2009 9:00	7/5/2009 10:00	903.0	8070.3	2.6	1.7	597.6	1.1	758.9	751.7	312.5	308.3	2291.4	5.5	1.3	0.3	8.7	13.0	14.5
7/5/2009 10:00	7/5/2009 11:00	902.3	8077.8	2.5	1.8	599.5	1.1	765.1	756.9	314.8	310.4	2271.2	5.7	1.3	0.3	11.8	13.0	14.6
7/5/2009 11:00	7/5/2009 12:00	901.5	8053.9	2.6	1.7	601.2	1.1	767.9	760.9	316.7	313.2	2252.0	5.7	1.3	0.3	15.7	13.0	14.5
7/5/2009 12:00	7/5/2009 13:00	901.6	8085.2	2.6	1.7	604.2	1.1	766.4	759.5	319.8	316.9	2283.6	5.8	1.3	0.3	13.7	13.0	14.6
7/5/2009 13:00	7/5/2009 14:00	903.4	8057.0	2.5	1.7	607.0	1.1	767.0	756.7	320.3	317.3	2283.6	6.0	1.3	0.3	14.0	13.1	14.6
7/5/2009 14:00	7/5/2009 15:00	903.5	8079.7	2.5	1.8	612.3	1.1	763.6	753.9	322.0	318.9	2270.7	6.1	1.3	0.3	24.1	12.8	14.4
7/5/2009 15:00	7/5/2009 16:00	903.1	8064.6	2.6	1.7	614.8	1.1	763.8	757.4	320.6	318.4	2272.5	6.0	1.3	0.3	28.0	12.9	14.4
7/5/2009 16:00	7/5/2009 17:00	903.4	8077.4	2.5	1.7	615.6	1.1	770.3	764.5	323.1	321.4	2281.5	6.0	1.3	0.3	26.5	12.8	14.3
7/5/2009 17:00	7/5/2009 18:00	905.2	8056.1	2.5	1.8	613.8	1.1	776.7	771.4	318.9	316.6	2299.3	5.5	1.3	0.3	20.3	13.2	14.7
7/5/2009 18:00	7/5/2009 19:00	902.7	8052.1	2.6	1.8	616.2	1.1	773.9	769.3	317.1	314.2	2295.3	9.2	1.3	0.3	15.4	13.5	15.1
7/5/2009 19:00	7/5/2009 20:00	903.8	8051.4	2.6	1.8	617.3	1.1	767.6	762.6	316.0	311.4	2306.1	10.4	1.3	0.3	19.4	13.6	15.1
7/5/2009 20:00	7/5/2009 21:00	905.7	8046.1	2.6	1.9	614.8	1.1	773.4	768.0	316.7	312.4	2297.1	7.2	1.3	0.3	18.9	13.8	15.3
7/5/2009 21:00	7/5/2009 22:00	904.7	8033.9	2.7	1.8	611.1	1.1	775.5	771.8	317.9	313.7	2297.5	5.6	1.3	0.3	13.6	13.8	15.3
7/5/2009 22:00	7/5/2009 23:00	904.8	8051.4	2.7	1.8	605.0	1.1	774.5	771.5	317.3	312.9	2303.9	5.4	1.3	0.3	9.0	13.5	15.0
7/5/2009 23:00	7/6/2009 0:00	902.2	8028.7	2.7	1.8	604.0	1.1	777.8	773.5	317.3	313.0	2298.3	5.4	1.3	0.3	7.5	13.3	14.7
7/6/2009 0:00	7/6/2009 1:00	903.5	8008.5	2.7	1.8	605.6	1.1	781.8	778.3	319.2	315.0	2298.6	5.5	1.3	0.3	9.0	13.2	14.6
7/6/2009 1:00	7/6/2009 2:00	905.2	8021.1	2.6	1.7	605.9	1.1	771.6	767.2	318.6	313.0	2283.4	5.4	1.4	0.3	8.3	13.0	14.4
7/6/2009 2:00	7/6/2009 3:00	904.0	8036.5	2.7	1.7	614.2	1.1	761.0	756.1	313.1	307.1	2291.7	5.3	1.3	0.3	12.1	12.8	14.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/6/2009 3:00	7/6/2009 4:00	908.1	8025.2	2.6	1.7	625.8	1.1	770.0	761.3	312.5	307.3	2310.1	5.2	1.3	0.3	11.7	13.1	14.5
7/6/2009 4:00	7/6/2009 5:00	892.0	8062.7	2.6	1.7	612.7	1.1	769.9	757.9	314.9	309.2	2301.8	6.1	1.4	0.3	11.1	13.9	15.3
7/6/2009 5:00	7/6/2009 6:00	823.3	8056.6	2.5	1.9	567.5	1.1	741.2	732.6	311.0	305.2	2141.0	5.8	1.4	0.3	3.5	#N/A	#N/A
7/6/2009 6:00	7/6/2009 7:00	884.1	8015.4	2.6	2.0	609.1	1.1	756.0	748.5	300.7	298.4	2281.2	5.5	1.4	0.3	20.9	#N/A	#N/A
7/6/2009 7:00	7/6/2009 8:00	912.5	8017.5	2.6	1.9	624.4	1.1	774.6	765.0	305.0	303.6	2343.1	5.2	1.4	0.3	55.6	13.1	14.7
7/6/2009 8:00	7/6/2009 9:00	875.7	8054.5	2.6	1.8	596.6	1.1	768.1	761.0	307.4	303.3	2254.9	5.1	1.4	0.3	53.0	13.0	14.3
7/6/2009 9:00	7/6/2009 10:00	880.8	8021.8	2.7	2.0	599.5	1.1	765.8	758.9	306.1	302.2	2265.6	5.1	1.4	0.3	22.3	13.3	14.6
7/6/2009 10:00	7/6/2009 11:00	896.2	8002.7	2.6	1.9	605.2	1.1	776.3	768.7	304.9	304.2	2295.9	5.1	1.4	0.4	37.5	13.3	14.8
7/6/2009 11:00	7/6/2009 12:00	907.9	8006.1	2.6	2.0	609.1	1.1	783.2	774.9	308.9	308.2	2316.2	5.2	1.4	0.3	48.6	13.0	14.4
7/6/2009 12:00	7/6/2009 13:00	909.2	8016.1	2.6	2.0	606.4	1.1	787.9	778.9	313.3	312.0	2324.9	5.1	1.4	0.3	53.1	12.6	14.0
7/6/2009 13:00	7/6/2009 14:00	909.3	8018.6	2.6	2.0	609.4	1.1	785.9	776.7	315.8	314.5	2300.4	5.3	1.4	0.3	47.4	12.8	14.2
7/6/2009 14:00	7/6/2009 15:00	907.0	8036.9	2.6	1.9	615.9	1.1	782.1	774.2	315.5	315.1	2324.3	5.1	1.4	0.3	34.2	13.1	14.4
7/6/2009 15:00	7/6/2009 16:00	909.7	8034.4	2.7	2.0	616.3	1.1	780.7	772.8	314.4	313.8	2355.8	5.2	1.4	0.4	28.5	13.2	14.6
7/6/2009 16:00	7/6/2009 17:00	911.2	8087.2	2.7	2.1	618.8	1.1	780.1	772.2	315.8	314.9	2351.7	5.2	1.4	0.4	30.1	13.5	14.9
7/6/2009 17:00	7/6/2009 18:00	910.9	8079.1	2.7	2.0	614.9	1.1	774.8	764.6	314.9	314.3	2353.3	5.1	1.4	0.4	57.4	12.8	14.3
7/6/2009 18:00	7/6/2009 19:00	910.7	8087.3	2.8	2.3	608.5	1.1	771.8	757.9	311.1	309.2	2396.9	5.1	1.4	0.3	79.3	11.7	13.1
7/6/2009 19:00	7/6/2009 20:00	909.8	8071.9	2.9	2.5	607.5	1.1	770.5	755.5	309.1	305.9	2388.1	5.2	1.3	0.3	48.1	11.7	13.2
7/6/2009 20:00	7/6/2009 21:00	909.0	8064.8	3.0	2.6	612.5	1.1	778.5	761.8	309.9	306.5	2394.8	5.2	1.3	0.3	54.6	11.6	13.1
7/6/2009 21:00	7/6/2009 22:00	910.5	8067.3	3.0	2.6	607.1	1.1	786.2	765.7	312.9	309.3	2391.5	5.2	1.3	0.3	56.8	12.0	13.4
7/6/2009	7/6/2009	908.9	8071.9	3.0	2.6	606.9	1.1	791.8	764.0	314.6	309.2	2391.1	5.2	1.3	0.3	64.3	11.9	13.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
22:00	23:00																	
7/6/2009 23:00	7/7/2009 0:00	909.9	8055.2	3.0	2.5	608.9	1.1	795.7	767.5	315.6	310.5	2400.3	5.3	1.3	0.3	57.7	11.9	13.3
7/7/2009 0:00	7/7/2009 1:00	909.5	8072.4	2.9	2.6	610.2	1.1	799.4	772.2	317.1	311.7	2399.3	5.4	1.3	0.3	63.7	12.1	13.4
7/7/2009 1:00	7/7/2009 2:00	908.6	8106.0	3.0	2.6	607.8	1.1	786.3	762.1	314.3	309.5	2413.3	5.2	1.3	0.3	46.3	11.8	13.2
7/7/2009 2:00	7/7/2009 3:00	909.1	8079.8	3.1	2.5	609.2	1.1	782.4	764.5	309.0	307.3	2413.8	5.0	1.3	0.3	31.6	11.9	13.3
7/7/2009 3:00	7/7/2009 4:00	907.8	8075.0	3.1	2.5	610.1	1.1	786.0	769.0	309.9	309.1	2404.1	5.2	1.3	0.3	24.5	12.3	13.7
7/7/2009 4:00	7/7/2009 5:00	906.3	8063.7	3.1	2.4	611.5	1.1	783.8	767.7	309.4	308.6	2392.2	5.1	1.3	0.3	20.0	#N/A	#N/A
7/7/2009 5:00	7/7/2009 6:00	907.5	8027.3	3.1	2.4	609.0	1.1	787.0	770.5	309.1	307.3	2388.7	4.8	1.3	0.4	21.0	#N/A	#N/A
7/7/2009 6:00	7/7/2009 7:00	905.8	8036.1	3.2	2.4	609.6	1.1	790.1	773.8	309.6	308.1	2391.6	4.7	1.3	0.4	27.7	#N/A	#N/A
7/7/2009 7:00	7/7/2009 8:00	906.1	8031.3	3.2	2.4	610.0	1.1	793.0	776.6	310.7	309.5	2393.5	4.7	1.3	0.4	23.8	12.8	14.9
7/7/2009 8:00	7/7/2009 9:00	905.7	8029.7	3.1	2.4	615.3	1.1	796.2	779.5	313.5	312.2	2396.3	4.8	1.3	0.4	26.5	12.7	14.7
7/7/2009 9:00	7/7/2009 10:00	906.4	8063.0	3.2	2.4	611.4	1.1	794.9	779.4	316.9	315.3	2377.1	5.1	1.3	0.4	26.6	12.4	14.3
7/7/2009 10:00	7/7/2009 11:00	905.1	8113.2	3.2	2.4	608.1	1.1	778.5	762.8	313.8	312.8	2367.5	5.1	1.3	0.4	24.1	11.7	13.5
7/7/2009 11:00	7/7/2009 12:00	896.7	8068.2	3.2	2.4	604.4	1.1	772.9	757.8	310.8	309.8	2356.0	4.9	1.3	0.4	20.9	11.3	13.1
7/7/2009 12:00	7/7/2009 13:00	903.9	8041.7	3.2	2.4	612.7	1.1	773.9	760.0	310.9	310.8	2369.8	5.1	1.3	0.4	21.1	11.1	12.9
7/7/2009 13:00	7/7/2009 14:00	906.5	8016.7	3.2	2.3	612.6	1.1	780.7	766.3	312.7	312.9	2366.0	5.3	1.3	0.4	26.1	11.3	13.2
7/7/2009 14:00	7/7/2009 15:00	905.3	8047.1	3.2	2.4	613.9	1.1	783.6	768.7	315.5	315.4	2352.1	5.4	1.3	0.4	26.6	11.6	13.5
7/7/2009 15:00	7/7/2009 16:00	904.0	8026.4	3.2	2.3	620.8	1.1	787.5	772.4	317.9	317.8	2363.4	5.5	1.3	0.4	28.5	12.1	14.0
7/7/2009 16:00	7/7/2009 17:00	903.8	8069.3	3.2	2.4	627.6	1.1	790.0	773.9	319.4	319.2	2375.8	5.5	1.3	0.4	33.9	12.4	14.5
7/7/2009 17:00	7/7/2009 18:00	904.3	8069.2	3.2	2.4	632.9	1.1	790.7	775.1	320.5	320.1	2379.7	5.6	1.4	0.4	30.5	13.0	15.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/7/2009 18:00	7/7/2009 19:00	906.6	8041.1	3.2	2.4	636.6	1.1	789.5	775.1	320.6	320.7	2382.2	5.6	1.4	0.4	37.5	13.3	15.5
7/7/2009 19:00	7/7/2009 20:00	907.0	8068.0	3.2	2.4	634.3	1.1	788.4	775.5	319.9	319.6	2391.2	5.5	1.4	0.4	47.2	12.8	15.1
7/7/2009 20:00	7/7/2009 21:00	897.3	8076.9	3.2	2.4	627.2	1.1	786.4	774.0	318.8	318.7	2384.6	5.2	1.4	0.4	38.5	12.6	14.8
7/7/2009 21:00	7/7/2009 22:00	898.9	8065.5	3.2	2.5	625.4	1.1	779.6	769.1	315.5	316.5	2392.7	5.2	1.4	0.4	30.3	12.5	14.6
7/7/2009 22:00	7/7/2009 23:00	901.3	8052.4	3.2	2.4	623.0	1.1	782.5	771.7	313.7	315.1	2397.0	5.4	1.4	0.4	30.6	12.3	14.3
7/7/2009 23:00	7/8/2009 0:00	901.9	8075.6	3.2	2.4	618.5	1.1	786.5	776.2	313.7	315.1	2382.1	5.3	1.4	0.4	36.2	12.0	13.9
7/8/2009 0:00	7/8/2009 1:00	895.3	8087.1	3.3	2.3	611.9	1.1	787.9	778.3	314.2	315.2	2379.2	5.2	1.3	0.4	35.9	11.5	13.3
7/8/2009 1:00	7/8/2009 2:00	897.4	8093.8	3.3	2.3	606.3	1.1	782.2	779.6	314.0	315.8	2393.4	5.2	1.3	0.4	37.9	11.0	12.9
7/8/2009 2:00	7/8/2009 3:00	853.1	8070.5	3.3	2.2	572.2	1.1	774.1	771.0	311.7	313.0	2272.7	4.7	1.3	0.4	26.1	10.7	12.5
7/8/2009 3:00	7/8/2009 4:00	776.3	8082.1	3.3	2.3	522.8	1.1	751.4	740.4	311.9	307.2	2073.7	4.2	1.3	0.3	7.1	10.4	12.2
7/8/2009 4:00	7/8/2009 5:00	770.2	8079.5	3.3	2.4	522.3	1.1	737.6	722.8	301.4	295.5	2059.6	4.2	1.3	0.3	14.0	9.9	11.8
7/8/2009 5:00	7/8/2009 6:00	780.7	8045.3	3.3	2.4	535.6	1.1	730.4	719.7	294.8	290.4	2088.1	4.3	1.3	0.3	19.0	#N/A	#N/A
7/8/2009 6:00	7/8/2009 7:00	854.8	8022.7	3.3	2.5	588.9	1.1	755.0	745.0	300.5	297.0	2271.0	4.8	1.3	0.4	61.0	#N/A	#N/A
7/8/2009 7:00	7/8/2009 8:00	905.3	8056.0	3.2	2.5	625.4	1.1	774.4	763.1	308.3	302.6	2401.3	5.2	1.3	0.4	77.8	10.2	12.1
7/8/2009 8:00	7/8/2009 9:00	905.3	8084.9	3.4	2.6	632.1	1.1	776.9	762.3	310.9	304.9	2419.4	5.3	1.3	0.4	51.2	11.0	12.8
7/8/2009 9:00	7/8/2009 10:00	902.6	8105.0	3.4	2.6	626.7	1.1	777.1	761.6	313.2	306.7	2400.4	5.4	1.4	0.4	42.3	11.7	13.6
7/8/2009 10:00	7/8/2009 11:00	901.3	8079.9	3.4	2.6	622.4	1.1	775.4	761.4	314.5	308.7	2385.9	5.3	1.4	0.4	67.0	11.8	13.8
7/8/2009 11:00	7/8/2009 12:00	900.7	8080.6	3.3	2.7	621.4	1.1	774.2	763.9	315.8	311.8	2388.1	5.6	1.4	0.4	57.4	9.4	11.2
7/8/2009 12:00	7/8/2009 13:00	899.6	8100.0	3.3	2.7	618.2	1.1	778.7	766.6	317.7	314.0	2392.1	5.8	1.4	0.4	43.3	8.5	9.9
7/8/2009	7/8/2009	899.8	8086.4	3.3	2.7	614.3	1.1	780.1	768.9	319.7	315.7	2390.7	5.9	1.4	0.4	40.1	8.2	9.6

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
13:00	14:00																	
7/8/2009 14:00	7/8/2009 15:00	900.0	8097.4	3.3	2.7	611.5	1.1	782.8	771.5	321.5	317.2	2379.4	5.9	1.3	0.4	37.1	7.5	8.9
7/8/2009 15:00	7/8/2009 16:00	899.5	8105.7	3.2	2.6	607.4	1.1	785.3	773.2	324.2	319.4	2371.0	5.9	1.3	0.3	39.5	5.9	7.0
7/8/2009 16:00	7/8/2009 17:00	896.7	8101.8	3.2	2.7	605.4	1.1	787.4	772.3	326.8	320.6	2365.8	5.7	1.2	0.3	33.4	4.3	5.1
7/8/2009 17:00	7/8/2009 18:00	898.0	8076.9	3.2	2.7	610.7	1.1	789.3	775.3	327.7	321.8	2393.5	5.7	1.2	0.3	35.2	4.6	5.3
7/8/2009 18:00	7/8/2009 19:00	908.9	8078.0	3.2	2.7	620.4	1.1	794.7	781.0	328.5	323.3	2427.2	5.7	1.2	0.3	38.1	6.3	7.4
7/8/2009 19:00	7/8/2009 20:00	900.7	8113.1	3.2	2.6	611.3	1.1	794.1	780.4	327.9	322.2	2395.8	5.5	1.2	0.3	34.4	7.2	8.9
7/8/2009 20:00	7/8/2009 21:00	901.2	8101.9	3.3	2.7	610.4	1.1	789.8	777.7	323.4	317.9	2409.7	5.6	1.2	0.3	28.8	7.7	9.5
7/8/2009 21:00	7/8/2009 22:00	901.6	8091.2	3.3	2.7	608.1	1.1	786.5	775.4	319.9	314.5	2387.0	5.7	1.3	0.3	37.1	8.3	10.0
7/8/2009 22:00	7/8/2009 23:00	901.3	8058.9	3.3	2.7	605.6	1.1	781.4	775.1	316.8	313.0	2381.9	5.7	1.3	0.3	34.4	8.8	10.5
7/8/2009 23:00	7/9/2009 0:00	901.1	8078.9	3.3	2.7	607.5	1.1	778.1	771.0	314.4	310.6	2385.5	5.6	1.3	0.3	33.0	9.2	11.0
7/9/2009 0:00	7/9/2009 1:00	899.9	8085.0	3.3	2.7	605.6	1.1	779.4	768.0	313.4	308.4	2393.4	5.3	1.3	0.3	29.8	9.7	11.5
7/9/2009 1:00	7/9/2009 2:00	893.2	8107.5	3.2	2.7	594.5	1.1	774.7	761.8	312.2	305.6	2376.7	5.2	1.3	0.4	26.6	9.9	11.8
7/9/2009 2:00	7/9/2009 3:00	803.6	8107.0	3.4	2.5	532.9	1.1	746.2	737.4	306.3	299.1	2179.5	4.5	1.3	0.3	6.6	9.7	11.7
7/9/2009 3:00	7/9/2009 4:00	798.2	8072.2	3.5	2.5	536.9	1.1	739.8	730.7	298.4	292.6	2179.6	4.5	1.4	0.4	2.9	9.9	11.9
7/9/2009 4:00	7/9/2009 5:00	797.3	8073.8	3.5	2.5	539.3	1.1	740.8	733.7	298.5	292.7	2156.5	4.3	1.4	0.4	3.0	#N/A	#N/A
7/9/2009 5:00	7/9/2009 6:00	802.9	8043.7	3.6	2.5	547.2	1.1	739.5	732.7	297.1	290.8	2168.3	4.4	1.4	0.4	3.5	#N/A	#N/A
7/9/2009 6:00	7/9/2009 7:00	848.6	8044.4	3.4	2.7	576.5	1.1	754.3	745.9	299.2	293.6	2264.9	4.8	1.4	0.4	11.6	#N/A	#N/A
7/9/2009 7:00	7/9/2009 8:00	871.2	8062.5	5.6	4.7	594.1	1.1	766.0	755.6	302.5	297.2	2339.0	5.1	1.5	0.4	17.1	12.3	14.4
7/9/2009 8:00	7/9/2009 9:00	898.0	8108.8	3.3	2.8	613.3	1.1	775.9	762.1	306.5	300.3	2410.7	5.4	1.5	0.4	23.2	12.4	14.5

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/9/2009 9:00	7/9/2009 10:00	892.6	8133.2	3.2	2.7	610.4	1.1	777.3	760.7	309.5	302.1	2381.0	5.4	1.5	0.4	19.8	12.4	14.4
7/9/2009 10:00	7/9/2009 11:00	886.7	8111.4	3.1	2.4	604.4	1.1	776.0	761.2	311.6	305.4	2322.8	5.4	1.5	0.4	25.1	12.5	14.6
7/9/2009 11:00	7/9/2009 12:00	887.2	8102.1	3.1	2.3	600.7	1.1	777.3	763.6	315.3	308.9	2297.7	5.6	1.4	0.4	35.1	5.8	7.5
7/9/2009 12:00	7/9/2009 13:00	888.0	8106.9	3.1	2.3	594.6	1.1	773.5	763.7	317.5	312.2	2304.4	6.0	1.4	0.4	36.0	2.9	4.5
7/9/2009 13:00	7/9/2009 14:00	886.7	8085.2	3.1	2.3	588.8	1.1	767.9	757.6	317.1	312.1	2303.5	5.9	1.3	0.4	31.0	2.9	4.6
7/9/2009 14:00	7/9/2009 15:00	885.1	8074.1	3.1	2.2	587.6	1.1	759.8	750.0	315.5	310.7	2297.4	5.8	1.3	0.3	37.4	2.3	4.0
7/9/2009 15:00	7/9/2009 16:00	894.0	8073.0	3.1	2.2	595.5	1.1	762.3	753.6	316.9	312.4	2313.0	6.0	1.3	0.3	40.1	2.2	3.9
7/9/2009 16:00	7/9/2009 17:00	899.8	8059.6	3.1	2.2	598.8	1.1	767.7	760.2	318.7	314.4	2335.5	6.1	1.2	0.3	46.3	2.5	4.3
7/9/2009 17:00	7/9/2009 18:00	907.7	8064.3	3.1	2.3	605.1	1.1	777.7	768.8	322.3	317.3	2349.2	6.6	1.3	0.3	42.7	2.6	4.4
7/9/2009 18:00	7/9/2009 19:00	909.7	8067.8	3.1	2.3	600.6	1.1	780.8	772.9	323.4	318.9	2345.8	6.6	1.2	0.3	48.2	2.9	4.8
7/9/2009 19:00	7/9/2009 20:00	903.6	8077.2	3.1	2.3	597.0	1.1	779.0	773.2	322.8	318.8	2348.7	6.4	1.2	0.3	40.9	3.4	5.5
7/9/2009 20:00	7/9/2009 21:00	905.1	8052.5	3.1	2.3	598.1	1.1	777.8	775.1	321.5	317.7	2336.9	6.3	1.3	0.3	44.1	3.7	6.0
7/9/2009 21:00	7/9/2009 22:00	904.1	8031.4	3.1	2.3	599.4	1.1	782.7	779.4	321.3	317.9	2329.0	6.3	1.3	0.3	49.3	3.8	6.1
7/9/2009 22:00	7/9/2009 23:00	906.0	8029.0	3.2	2.5	609.6	1.1	780.9	776.9	320.0	316.4	2354.8	6.4	1.4	0.4	41.4	3.9	6.1
7/9/2009 23:00	7/10/2009 0:00	904.9	8028.1	3.2	2.6	614.6	1.1	779.3	775.3	317.6	313.7	2371.6	6.4	1.4	0.4	31.0	4.2	6.3
7/10/2009 0:00	7/10/2009 1:00	899.7	8047.8	3.2	2.6	610.1	1.1	783.7	772.0	317.3	311.8	2368.5	6.0	1.5	0.4	32.6	4.3	6.6
7/10/2009 1:00	7/10/2009 2:00	848.2	8070.5	3.3	2.5	577.8	1.1	766.5	752.0	314.6	306.7	2239.2	5.3	1.5	0.4	18.6	4.3	6.5
7/10/2009 2:00	7/10/2009 3:00	887.8	8037.9	3.2	2.7	607.1	1.1	775.3	759.8	312.8	305.4	2343.7	5.6	1.5	0.4	35.5	4.3	6.5
7/10/2009 3:00	7/10/2009 4:00	829.4	8064.0	3.2	2.5	563.7	1.1	752.8	745.0	308.9	301.7	2211.3	5.0	1.5	0.4	16.4	4.3	6.5
7/10/2009	7/10/2009	774.8	7990.9	3.4	2.4	531.1	1.1	734.3	727.9	302.9	293.7	2093.1	4.6	1.5	0.4	3.0	4.4	6.6

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
4:00	5:00																	
7/10/2009 5:00	7/10/2009 6:00	810.3	7970.9	3.4	2.7	558.8	1.1	740.0	732.4	302.1	293.5	2191.5	5.0	1.5	0.4	8.2	#N/A	#N/A
7/10/2009 6:00	7/10/2009 7:00	891.2	8029.1	3.1	2.8	600.6	1.1	764.3	752.0	303.7	296.1	2363.6	5.3	1.5	0.4	38.4	#N/A	#N/A
7/10/2009 7:00	7/10/2009 8:00	892.4	8066.2	3.1	2.8	600.5	1.1	772.8	759.8	305.5	297.6	2375.2	5.3	1.5	0.4	42.8	4.6	6.5
7/10/2009 8:00	7/10/2009 9:00	892.2	8104.2	3.1	2.7	599.2	1.1	774.8	763.4	308.0	300.4	2376.6	5.3	1.5	0.4	42.8	4.3	6.3
7/10/2009 9:00	7/10/2009 10:00	888.1	8122.3	3.2	2.7	593.0	1.1	769.5	759.8	308.4	301.4	2361.6	5.3	1.5	0.4	42.9	4.2	6.1
7/10/2009 10:00	7/10/2009 11:00	884.3	8101.4	3.2	2.7	593.1	1.1	770.3	761.7	308.8	302.7	2343.3	5.4	1.5	0.4	38.2	4.2	6.2
7/10/2009 11:00	7/10/2009 12:00	891.4	8112.3	3.2	2.7	600.0	1.1	775.6	766.4	312.0	306.5	2353.2	5.6	1.4	0.4	33.1	4.2	6.3
7/10/2009 12:00	7/10/2009 13:00	893.8	8116.6	3.1	2.7	602.4	1.1	775.0	769.8	314.8	310.3	2352.1	5.9	1.3	0.4	37.7	3.7	5.8
7/10/2009 13:00	7/10/2009 14:00	893.7	8103.7	3.1	2.7	600.5	1.1	775.9	771.1	316.5	312.2	2347.5	5.9	1.3	0.4	40.2	3.0	4.6
7/10/2009 14:00	7/10/2009 15:00	889.5	8098.6	3.0	2.8	597.9	1.1	778.2	772.2	318.9	314.4	2343.7	5.9	1.3	0.3	32.7	2.6	4.1
7/10/2009 15:00	7/10/2009 16:00	893.5	8093.6	2.9	2.9	597.7	1.1	783.9	775.2	322.4	316.6	2347.6	6.0	1.3	0.3	35.3	2.5	3.9
7/10/2009 16:00	7/10/2009 17:00	894.1	8115.0	2.9	2.9	595.7	1.1	787.6	777.3	325.1	318.8	2348.8	6.2	1.3	0.3	33.9	2.5	3.8
7/10/2009 17:00	7/10/2009 18:00	894.7	8108.3	2.9	2.9	593.5	1.1	789.8	777.6	326.7	320.4	2352.1	6.8	1.3	0.3	35.2	1.8	2.9
7/10/2009 18:00	7/10/2009 19:00	895.1	8110.4	2.9	2.9	592.2	1.2	786.4	771.7	327.0	320.0	2350.7	6.7	1.3	0.4	34.1	1.7	2.6
7/10/2009 19:00	7/10/2009 20:00	899.2	8083.7	2.8	3.0	595.3	1.2	775.5	763.7	323.4	317.3	2353.8	6.6	1.4	0.4	32.3	1.9	2.9
7/10/2009 20:00	7/10/2009 21:00	904.0	8100.9	2.7	3.1	600.3	1.2	769.5	757.9	318.6	312.7	2357.0	6.1	1.4	0.4	30.3	2.0	3.3
7/10/2009 21:00	7/10/2009 22:00	904.7	8087.7	2.7	3.2	604.0	1.2	771.1	751.5	316.4	307.9	2359.6	6.2	1.4	0.4	30.3	2.3	3.8
7/10/2009 22:00	7/10/2009 23:00	905.8	8100.2	2.9	2.9	600.5	1.2	776.0	754.5	316.0	306.6	2363.4	5.9	1.4	0.4	39.6	2.4	3.9
7/10/2009 23:00	7/11/2009 0:00	903.5	8087.8	3.0	2.8	594.1	1.2	778.9	760.5	315.9	307.7	2366.5	5.6	1.4	0.4	39.7	2.5	4.1

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/11/2009 0:00	7/11/2009 1:00	898.5	8113.4	3.1	2.8	590.9	1.2	781.1	764.7	315.9	307.9	2368.5	5.4	1.4	0.4	37.7	2.5	4.2
7/11/2009 1:00	7/11/2009 2:00	897.2	8114.1	3.1	2.7	592.1	1.2	777.7	762.9	315.6	307.4	2370.3	5.4	1.4	0.4	31.8	#N/A	#N/A
7/11/2009 2:00	7/11/2009 3:00	894.1	8120.5	3.1	2.6	586.8	1.2	767.3	753.8	309.8	301.6	2371.1	5.3	1.4	0.4	34.8	#N/A	#N/A
7/11/2009 3:00	7/11/2009 4:00	807.6	8156.5	3.1	2.4	531.6	1.2	737.2	728.0	299.8	291.0	2140.3	4.9	1.4	0.4	14.6	2.9	4.5
7/11/2009 4:00	7/11/2009 5:00	707.3	8173.1	3.2	2.6	475.0	1.2	706.6	698.4	291.7	281.8	1985.0	4.7	1.5	0.4	4.3	#N/A	#N/A
7/11/2009 5:00	7/11/2009 6:00	708.8	8067.7	3.2	2.7	481.1	1.1	704.4	696.8	289.1	278.2	1986.8	4.7	1.5	0.4	4.0	#N/A	#N/A
7/11/2009 6:00	7/11/2009 7:00	846.0	8036.6	3.2	2.8	574.6	1.1	745.0	736.1	293.8	285.9	2284.3	5.3	1.4	0.4	21.8	#N/A	#N/A
7/11/2009 7:00	7/11/2009 8:00	886.1	8084.3	3.0	2.7	605.0	1.1	765.2	755.1	300.8	293.0	2328.8	5.1	1.5	0.4	32.0	3.4	5.0
7/11/2009 8:00	7/11/2009 9:00	895.4	8121.4	3.0	2.7	606.8	1.1	769.3	758.2	303.1	295.9	2370.6	5.1	1.5	0.4	30.4	3.6	5.5
7/11/2009 9:00	7/11/2009 10:00	895.0	8142.9	3.1	2.6	606.1	1.1	768.1	756.5	304.2	297.3	2353.9	5.3	1.5	0.4	27.9	3.7	5.9
7/11/2009 10:00	7/11/2009 11:00	890.9	8132.9	3.1	2.6	602.7	1.1	768.9	758.7	305.6	299.5	2333.7	5.4	1.5	0.4	27.8	3.8	6.1
7/11/2009 11:00	7/11/2009 12:00	886.0	8139.6	3.1	2.5	600.3	1.1	764.5	754.5	307.2	301.3	2337.9	5.5	1.5	0.4	29.2	3.7	6.2
7/11/2009 12:00	7/11/2009 13:00	895.0	8102.0	3.1	2.5	602.5	1.1	760.9	751.3	307.4	302.4	2340.5	5.7	1.4	0.4	29.0	4.0	6.7
7/11/2009 13:00	7/11/2009 14:00	901.0	8131.0	3.2	2.6	602.9	1.1	760.0	750.2	309.2	304.0	2358.7	5.8	1.4	0.4	25.7	3.3	5.7
7/11/2009 14:00	7/11/2009 15:00	898.5	8146.7	3.1	2.6	594.4	1.1	751.9	745.6	309.2	303.8	2342.5	5.8	1.3	0.4	27.1	2.3	4.3
7/11/2009 15:00	7/11/2009 16:00	884.9	8120.2	3.1	2.5	581.1	1.2	751.9	746.9	308.0	304.0	2302.6	5.6	1.3	0.3	24.4	1.8	3.3
7/11/2009 16:00	7/11/2009 17:00	879.8	8088.5	3.2	2.6	581.0	1.2	758.5	752.7	310.3	306.1	2294.7	5.4	1.3	0.3	23.4	1.6	2.9
7/11/2009 17:00	7/11/2009 18:00	887.9	8075.1	3.2	2.5	593.0	1.2	765.0	759.1	312.6	308.5	2318.3	5.4	1.3	0.4	27.8	1.8	3.1
7/11/2009 18:00	7/11/2009 19:00	890.5	8083.4	3.2	2.5	600.9	1.1	768.7	763.5	314.1	310.1	2331.8	5.3	1.3	0.4	30.6	2.9	4.6
7/11/2009	7/11/2009	895.8	8077.6	3.2	2.4	601.4	1.1	771.5	766.5	314.5	310.8	2333.9	5.5	1.3	0.4	32.5	4.0	6.4

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
19:00	20:00																	
7/11/2009 20:00	7/11/2009 21:00	893.9	8098.1	3.1	2.4	597.6	1.1	773.5	768.0	314.4	311.2	2313.2	5.4	1.3	0.4	32.3	4.8	7.4
7/11/2009 21:00	7/11/2009 22:00	892.9	8082.3	3.0	2.4	590.9	1.1	765.1	759.0	312.9	308.6	2304.5	5.2	1.3	0.4	30.8	5.1	7.9
7/11/2009 22:00	7/11/2009 23:00	891.5	8070.1	3.0	2.4	592.9	1.1	758.6	751.5	309.7	304.8	2302.2	5.0	1.3	0.4	38.1	5.1	7.8
7/11/2009 23:00	7/12/2009 0:00	893.5	8066.9	2.9	2.3	594.8	1.1	762.7	755.3	309.3	303.4	2296.9	5.0	1.4	0.4	52.8	5.1	7.7
7/12/2009 0:00	7/12/2009 1:00	893.5	8077.5	2.9	2.2	595.7	1.1	760.3	752.7	308.1	301.7	2298.9	5.2	1.4	0.4	55.1	5.1	7.5
7/12/2009 1:00	7/12/2009 2:00	894.8	8060.7	3.0	2.2	601.0	1.1	761.4	753.8	305.6	299.5	2295.8	5.7	1.4	0.4	53.1	#N/A	7.3
7/12/2009 2:00	7/12/2009 3:00	892.6	8056.1	3.0	2.2	595.7	1.1	768.3	760.2	305.8	299.9	2307.6	5.6	1.4	0.4	47.2	#N/A	#N/A
7/12/2009 3:00	7/12/2009 4:00	797.2	8059.6	3.0	2.1	536.5	1.1	746.3	741.0	303.6	294.7	2069.7	5.9	1.4	0.4	15.3	#N/A	7.2
7/12/2009 4:00	7/12/2009 5:00	719.5	7991.0	3.1	2.3	486.7	1.1	724.2	719.4	300.5	289.1	1950.8	6.3	1.4	0.4	5.2	4.4	6.3
7/12/2009 5:00	7/12/2009 6:00	709.7	7941.2	3.2	2.4	489.9	1.1	712.7	703.8	296.4	284.5	1984.3	6.2	1.4	0.4	4.6	#N/A	#N/A
7/12/2009 6:00	7/12/2009 7:00	793.1	7912.7	3.1	2.4	540.4	1.1	736.0	724.5	295.7	285.2	2119.0	7.2	1.4	0.4	11.9	#N/A	#N/A
7/12/2009 7:00	7/12/2009 8:00	795.1	7938.4	3.2	2.5	542.2	1.1	741.2	730.2	298.3	287.6	2090.7	7.4	1.5	0.4	6.7	3.4	4.7
7/12/2009 8:00	7/12/2009 9:00	854.1	8046.9	3.1	2.7	581.4	1.1	752.2	740.2	302.0	292.7	2240.9	7.8	1.5	0.4	19.1	3.0	4.2
7/12/2009 9:00	7/12/2009 10:00	887.3	8067.3	3.0	2.6	599.8	1.1	767.0	754.2	304.8	297.4	2302.6	6.9	1.5	0.4	26.3	2.8	4.1
7/12/2009 10:00	7/12/2009 11:00	890.6	8084.8	3.1	2.6	602.7	1.1	772.9	760.2	307.2	300.5	2318.1	6.5	1.5	0.4	22.4	2.7	4.1
7/12/2009 11:00	7/12/2009 12:00	891.0	8070.7	3.0	2.6	602.7	1.1	776.3	763.8	310.4	303.7	2327.6	5.9	1.5	0.4	21.9	2.7	4.2
7/12/2009 12:00	7/12/2009 13:00	892.3	8083.3	3.0	2.6	607.1	1.1	779.7	766.8	313.5	307.2	2334.2	6.0	1.5	0.4	22.5	2.7	4.3
7/12/2009 13:00	7/12/2009 14:00	894.5	8061.5	3.1	2.5	604.3	1.1	782.6	769.6	316.0	310.2	2321.7	6.0	1.5	0.4	22.6	2.6	4.2
7/12/2009 14:00	7/12/2009 15:00	893.7	8072.7	3.1	2.5	603.0	1.1	783.9	772.8	318.5	313.0	2316.5	6.1	1.5	0.4	20.7	2.5	4.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/12/2009 15:00	7/12/2009 16:00	894.9	8065.7	3.1	2.5	602.6	1.1	786.1	776.6	321.3	315.8	2333.1	6.1	1.4	0.4	16.7	2.5	4.2
7/12/2009 16:00	7/12/2009 17:00	901.4	8078.3	3.1	2.6	608.2	1.1	790.0	780.8	323.2	318.4	2351.9	6.3	1.4	0.4	18.3	2.5	4.0
7/12/2009 17:00	7/12/2009 18:00	902.1	8085.0	3.0	2.5	606.7	1.1	792.0	783.2	324.6	319.4	2329.4	6.1	1.4	0.4	27.4	3.0	4.7
7/12/2009 18:00	7/12/2009 19:00	901.5	8064.9	2.8	2.3	602.9	1.1	792.6	783.0	324.8	319.3	2309.8	5.9	1.4	0.4	43.9	3.8	5.9
7/12/2009 19:00	7/12/2009 20:00	900.9	8077.0	2.8	2.4	598.7	1.1	783.1	773.5	324.3	319.3	2311.2	6.0	1.4	0.4	38.7	3.5	5.7
7/12/2009 20:00	7/12/2009 21:00	900.4	8078.5	2.9	2.3	598.1	1.1	769.8	761.0	318.6	313.9	2317.3	7.0	1.4	0.4	39.9	3.5	5.6
7/12/2009 21:00	7/12/2009 22:00	902.6	8038.3	2.8	2.2	598.6	1.1	766.7	759.2	315.2	310.2	2302.5	9.5	1.4	0.4	37.3	7.2	10.2
7/12/2009 22:00	7/12/2009 23:00	904.6	8013.9	2.7	2.0	600.5	1.1	771.3	764.9	314.0	309.4	2284.1	9.5	1.4	0.4	42.3	9.2	12.6
7/12/2009 23:00	7/13/2009 0:00	904.7	8028.8	2.8	2.0	605.2	1.1	774.4	769.9	314.9	311.0	2277.4	10.0	1.4	0.4	45.9	9.6	12.9
7/13/2009 0:00	7/13/2009 1:00	905.2	8023.5	2.7	2.0	606.2	1.1	773.0	767.8	313.6	308.7	2292.7	10.2	1.4	0.4	42.8	9.7	12.9
7/13/2009 1:00	7/13/2009 2:00	905.6	8042.3	2.8	2.0	605.7	1.1	776.4	771.9	313.1	307.6	2298.2	10.5	1.4	0.4	39.5	10.0	13.0
7/13/2009 2:00	7/13/2009 3:00	883.0	8076.4	2.8	1.9	588.8	1.1	773.3	768.6	311.9	305.7	2245.7	10.1	1.4	0.4	31.0	10.1	13.0
7/13/2009 3:00	7/13/2009 4:00	739.5	8095.5	2.9	2.0	494.3	1.1	737.3	730.9	307.5	298.2	1960.6	8.1	1.4	0.4	8.4	9.5	12.0
7/13/2009 4:00	7/13/2009 5:00	714.5	7996.4	3.0	2.0	486.1	1.1	726.6	719.3	301.7	293.5	1951.0	7.8	1.4	0.4	5.1	#N/A	#N/A
7/13/2009 5:00	7/13/2009 6:00	773.5	7954.5	3.0	1.9	528.4	1.1	746.0	737.6	303.0	296.1	2078.0	8.0	1.5	0.4	7.4	#N/A	#N/A
7/13/2009 6:00	7/13/2009 7:00	887.2	8009.8	2.9	2.0	599.8	1.1	782.3	771.9	308.2	302.3	2290.5	9.5	1.5	0.4	28.0	#N/A	#N/A
7/13/2009 7:00	7/13/2009 8:00	905.0	8034.0	2.8	2.0	609.4	1.1	788.0	780.0	312.5	306.2	2304.3	8.2	1.5	0.4	42.9	10.9	13.4
7/13/2009 8:00	7/13/2009 9:00	907.9	8034.7	2.8	2.0	615.1	1.1	785.3	779.5	312.6	307.2	2312.3	7.5	1.5	0.4	56.3	10.8	13.3
7/13/2009 9:00	7/13/2009 10:00	909.0	8060.5	2.8	2.0	613.0	1.1	781.7	776.2	313.4	309.1	2330.8	7.2	1.5	0.4	59.0	10.6	13.2
7/13/2009	7/13/2009	910.9	8048.6	2.8	2.2	613.7	1.1	779.6	773.1	313.3	307.9	2307.6	7.0	1.5	0.4	57.9	10.7	13.3

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
10:00	11:00																	
7/13/2009 11:00	7/13/2009 12:00	910.7	8055.3	2.9	2.2	609.1	1.1	783.5	777.3	315.7	311.2	2312.7	6.9	1.5	0.4	65.2	10.5	13.2
7/13/2009 12:00	7/13/2009 13:00	912.8	8066.6	2.9	2.2	602.3	1.1	784.3	779.7	317.9	314.4	2325.8	6.4	1.4	0.4	56.7	10.2	12.9
7/13/2009 13:00	7/13/2009 14:00	911.9	8065.2	2.9	2.2	596.4	1.1	777.0	771.2	318.7	315.0	2308.4	6.3	1.4	0.4	48.3	10.3	12.8
7/13/2009 14:00	7/13/2009 15:00	909.0	8045.9	2.9	2.1	594.0	1.1	764.9	759.0	317.1	312.8	2295.8	6.1	1.4	0.4	39.6	10.1	12.4
7/13/2009 15:00	7/13/2009 16:00	906.8	8063.7	2.9	2.0	597.5	1.1	765.5	761.3	316.8	313.4	2288.7	6.4	1.4	0.4	38.9	10.4	12.8
7/13/2009 16:00	7/13/2009 17:00	908.7	8030.8	2.8	2.0	605.2	1.1	763.8	758.7	316.8	313.4	2303.3	6.2	1.5	0.4	42.1	11.1	13.6
7/13/2009 17:00	7/13/2009 18:00	910.0	8054.2	2.8	2.1	615.6	1.1	771.6	765.4	318.0	314.6	2310.5	6.3	1.4	0.4	38.7	11.8	14.4
7/13/2009 18:00	7/13/2009 19:00	911.0	8049.6	2.8	2.1	617.7	1.1	777.2	770.2	319.3	315.8	2313.0	6.3	1.4	0.4	52.0	12.4	14.9
7/13/2009 19:00	7/13/2009 20:00	912.5	8032.9	2.7	2.1	614.3	1.1	781.4	774.6	320.8	316.9	2314.1	6.3	1.4	0.4	61.5	12.5	15.0
7/13/2009 20:00	7/13/2009 21:00	909.6	8063.8	2.7	2.2	611.0	1.1	773.4	764.4	319.8	314.7	2312.4	7.4	1.5	0.4	45.8	12.4	15.0
7/13/2009 21:00	7/13/2009 22:00	911.1	8056.7	2.6	2.3	614.9	1.1	771.0	762.8	316.4	310.7	2309.9	10.7	1.5	0.4	41.0	12.4	15.0
7/13/2009 22:00	7/13/2009 23:00	910.0	8049.8	2.6	2.3	611.3	1.1	775.4	767.8	315.7	310.6	2307.2	10.9	1.5	0.4	39.6	12.5	15.1
7/13/2009 23:00	7/14/2009 0:00	908.7	8034.6	2.6	2.3	608.2	1.1	773.1	766.0	315.0	309.8	2310.0	10.3	1.5	0.4	37.8	12.7	15.2
7/14/2009 0:00	7/14/2009 1:00	909.8	8039.0	2.6	2.2	610.4	1.1	770.8	763.7	313.0	308.0	2322.1	10.4	1.5	0.4	49.8	12.7	15.1
7/14/2009 1:00	7/14/2009 2:00	910.8	8055.3	2.6	2.2	610.0	1.1	768.4	760.5	310.8	304.7	2323.7	10.8	1.5	0.4	51.2	12.5	15.1
7/14/2009 2:00	7/14/2009 3:00	901.5	8035.9	2.7	2.1	599.2	1.1	768.8	761.1	309.3	302.4	2294.7	10.6	1.5	0.4	49.7	12.6	15.1
7/14/2009 3:00	7/14/2009 4:00	883.4	8038.2	2.8	2.1	598.2	1.1	768.2	760.2	311.9	308.9	2275.2	10.6	1.6	0.4	16.6	13.3	15.8
7/14/2009 4:00	7/14/2009 5:00	904.1	8071.2	2.7	2.2	612.8	1.1	778.1	766.5	306.1	305.2	2319.5	10.7	1.5	0.4	25.7	13.2	15.6
7/14/2009 5:00	7/14/2009 6:00	910.4	8062.3	2.7	2.0	618.2	1.1	776.6	765.8	305.0	304.5	2327.1	9.8	1.5	0.4	26.4	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/14/2009 6:00	7/14/2009 7:00	911.6	8045.5	2.7	2.0	618.2	1.1	770.3	760.5	301.8	301.5	2330.0	10.3	1.6	0.4	28.2	#N/A	#N/A
7/14/2009 7:00	7/14/2009 8:00	910.3	8046.0	2.8	2.0	618.9	1.1	767.4	757.6	301.0	300.9	2337.2	9.9	1.6	0.4	50.6	8.1	9.6
7/14/2009 8:00	7/14/2009 9:00	909.3	8055.3	2.8	2.0	622.9	1.1	768.0	756.1	301.1	300.8	2340.0	10.2	1.6	0.4	38.9	7.3	9.2
7/14/2009 9:00	7/14/2009 10:00	909.5	8064.0	3.1	2.8	626.0	1.1	769.1	756.6	302.9	302.8	2316.3	10.0	1.6	0.4	38.8	5.8	7.1
7/14/2009 10:00	7/14/2009 11:00	910.4	8071.6	2.8	1.9	629.7	1.1	771.6	758.9	305.0	305.7	2320.5	10.3	1.6	0.4	37.4	5.5	6.5
7/14/2009 11:00	7/14/2009 12:00	911.3	8087.8	2.7	2.0	629.7	1.1	770.2	757.9	307.2	307.9	2328.3	10.7	1.6	0.5	41.5	5.6	6.7
7/14/2009 12:00	7/14/2009 13:00	912.8	8056.7	2.7	2.0	626.3	1.1	767.3	754.8	308.0	308.7	2303.2	10.9	1.6	0.5	49.1	6.6	7.6
7/14/2009 13:00	7/14/2009 14:00	911.0	8031.0	2.7	2.0	622.1	1.1	772.3	759.2	310.1	311.3	2300.9	10.9	1.7	0.5	52.2	5.7	6.8
7/14/2009 14:00	7/14/2009 15:00	908.5	8056.4	2.8	2.0	624.8	1.1	773.1	761.5	312.6	315.0	2299.4	8.8	1.7	0.5	47.5	5.5	6.4
7/14/2009 15:00	7/14/2009 16:00	908.9	8040.2	2.8	1.9	626.8	1.1	774.3	763.9	314.1	316.9	2315.4	7.1	1.8	0.5	53.0	5.7	6.8
7/14/2009 16:00	7/14/2009 17:00	911.1	8041.8	2.7	2.0	627.3	1.1	773.4	763.4	315.5	318.3	2328.3	6.7	1.9	0.5	41.6	5.9	7.1
7/14/2009 17:00	7/14/2009 18:00	910.7	8060.4	2.8	2.0	619.4	1.1	773.4	763.4	315.4	318.2	2324.2	6.4	1.9	0.5	39.7	7.3	8.5
7/14/2009 18:00	7/14/2009 19:00	909.3	8066.8	2.8	2.1	616.1	1.1	777.5	765.6	316.9	319.6	2325.8	6.8	2.0	0.5	50.1	10.3	11.8
7/14/2009 19:00	7/14/2009 20:00	905.4	8060.7	2.9	2.1	615.1	1.1	779.6	768.8	324.2	322.7	2336.9	7.2	1.9	0.5	47.8	11.7	13.4
7/14/2009 20:00	7/14/2009 21:00	909.7	8043.4	2.9	2.2	619.0	1.1	782.3	773.4	324.0	319.1	2350.7	6.9	1.9	0.5	49.0	12.5	14.2
7/14/2009 21:00	7/14/2009 22:00	908.2	8056.1	2.9	2.2	618.4	1.1	774.5	762.4	323.9	318.0	2340.7	6.7	2.0	0.5	37.8	13.2	15.0
7/14/2009 22:00	7/14/2009 23:00	909.0	8066.9	2.9	2.2	623.8	1.1	763.0	751.7	318.3	312.3	2330.2	6.6	2.0	0.5	41.5	13.4	15.1
7/14/2009 23:00	7/15/2009 0:00	908.3	8081.3	2.9	2.2	624.3	1.1	762.4	753.1	314.0	309.3	2350.4	6.4	2.0	0.5	58.8	13.6	15.3
7/15/2009 0:00	7/15/2009 1:00	892.8	8095.8	2.9	2.1	615.4	1.1	763.4	755.0	313.4	307.8	2315.1	6.2	2.0	0.5	51.5	13.6	15.6
7/15/2009	7/15/2009	882.8	8079.5	3.0	1.9	608.7	1.1	763.4	755.2	315.9	308.5	2307.3	6.2	2.0	0.5	31.1	13.8	15.6

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
1:00	2:00																	
7/15/2009 2:00	7/15/2009 3:00	843.5	8080.3	3.1	2.0	582.2	1.1	755.0	746.0	314.5	304.9	2228.2	6.0	2.0	0.5	15.7	13.8	15.6
7/15/2009 3:00	7/15/2009 4:00	861.0	8081.8	3.1	2.0	595.2	1.1	744.0	736.5	304.2	296.6	2273.1	6.1	2.0	0.5	17.4	13.9	15.5
7/15/2009 4:00	7/15/2009 5:00	844.8	8131.9	3.1	1.9	576.8	1.1	737.2	730.9	298.5	291.8	2238.7	6.1	2.0	0.5	16.3	#N/A	#N/A
7/15/2009 5:00	7/15/2009 6:00	770.7	8113.3	3.1	1.9	524.3	1.1	718.6	714.0	294.3	286.0	2057.0	6.1	2.0	0.5	9.6	#N/A	#N/A
7/15/2009 6:00	7/15/2009 7:00	869.0	8022.6	2.9	1.9	592.4	1.1	746.0	739.5	295.8	289.2	2303.3	7.6	2.0	0.5	34.2	#N/A	#N/A
7/15/2009 7:00	7/15/2009 8:00	893.9	8099.0	2.8	2.0	597.3	1.1	759.5	751.4	298.6	292.4	2320.4	7.6	2.0	0.5	40.7	13.1	14.6
7/15/2009 8:00	7/15/2009 9:00	886.2	8139.4	2.9	2.0	586.7	1.1	753.5	746.4	298.8	292.7	2304.5	7.8	1.9	0.5	36.3	12.3	13.7
7/15/2009 9:00	7/15/2009 10:00	886.4	8142.2	2.9	1.9	577.9	1.1	747.0	741.9	297.7	291.9	2277.3	7.8	1.8	0.4	28.0	10.1	11.4
7/15/2009 10:00	7/15/2009 11:00	881.7	8114.0	2.9	1.8	577.8	1.2	750.9	746.3	299.8	294.2	2249.0	7.7	1.8	0.4	29.5	8.0	9.1
7/15/2009 11:00	7/15/2009 12:00	885.7	8103.6	2.8	1.9	586.4	1.2	756.5	751.7	304.6	298.7	2256.8	8.0	1.8	0.5	25.7	7.9	8.9
7/15/2009 12:00	7/15/2009 13:00	888.2	8098.7	2.7	1.9	594.4	1.2	759.6	753.0	308.7	302.9	2262.5	8.2	2.0	0.5	26.6	8.3	9.3
7/15/2009 13:00	7/15/2009 14:00	894.3	8061.1	2.7	1.9	600.4	1.1	758.7	752.9	310.2	304.9	2265.2	7.6	2.0	0.5	30.8	7.9	8.8
7/15/2009 14:00	7/15/2009 15:00	902.1	8071.4	2.8	1.9	610.5	1.1	762.2	756.3	312.1	307.9	2295.4	6.8	2.0	0.5	32.8	6.8	7.8
7/15/2009 15:00	7/15/2009 16:00	906.6	8096.3	2.8	1.8	608.5	1.1	762.4	758.0	315.0	311.1	2303.2	6.9	2.0	0.5	31.3	6.1	7.1
7/15/2009 16:00	7/15/2009 17:00	901.3	8097.5	2.8	1.9	605.7	1.1	757.2	751.4	314.5	310.5	2289.5	6.7	2.0	0.5	29.3	7.5	8.6
7/15/2009 17:00	7/15/2009 18:00	901.9	8078.0	2.9	2.0	609.5	1.1	764.3	757.1	315.1	311.6	2304.2	6.8	1.9	0.5	24.0	9.9	11.0
7/15/2009 18:00	7/15/2009 19:00	900.6	8073.9	2.9	2.0	608.4	1.1	767.5	759.3	317.3	313.7	2301.3	6.8	1.9	0.5	20.8	10.9	12.3
7/15/2009 19:00	7/15/2009 20:00	900.4	8069.8	2.9	2.0	607.0	1.1	767.8	761.7	318.0	314.4	2306.0	6.7	1.9	0.4	20.8	11.5	12.9
7/15/2009 20:00	7/15/2009 21:00	900.0	8070.6	2.9	2.0	608.4	1.1	768.6	763.6	318.0	314.5	2312.2	6.6	1.8	0.4	19.8	12.0	13.4

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/15/2009 21:00	7/15/2009 22:00	902.4	8089.3	2.9	2.0	609.2	1.1	771.4	766.1	317.2	313.6	2323.8	9.2	1.7	0.4	20.5	12.2	13.6
7/15/2009 22:00	7/15/2009 23:00	900.7	8100.2	2.9	2.1	607.3	1.1	771.8	767.3	317.0	313.1	2306.3	10.4	1.6	0.4	19.9	12.2	13.5
7/15/2009 23:00	7/16/2009 0:00	899.1	8117.1	2.8	2.0	597.4	1.1	772.0	767.2	316.6	312.2	2303.2	10.3	1.6	0.3	27.0	11.8	13.1
7/16/2009 0:00	7/16/2009 1:00	878.6	8100.9	2.9	1.9	590.0	1.1	768.0	763.8	323.7	316.6	2294.5	10.5	1.6	0.3	22.3	12.3	13.6
7/16/2009 1:00	7/16/2009 2:00	892.5	8053.9	3.0	1.9	596.4	1.1	766.8	762.1	316.6	310.5	2299.1	10.5	1.6	0.3	24.3	12.3	13.6
7/16/2009 2:00	7/16/2009 3:00	897.3	8018.1	3.0	1.9	594.4	1.1	771.9	768.4	313.3	308.5	2298.5	10.3	1.6	0.3	25.2	12.1	13.4
7/16/2009 3:00	7/16/2009 4:00	875.4	8006.4	3.0	1.9	585.5	1.1	769.3	765.1	311.8	306.0	2251.3	10.0	1.6	0.4	21.6	12.1	13.4
7/16/2009 4:00	7/16/2009 5:00	898.9	8024.1	3.0	1.9	598.2	1.1	777.8	773.0	312.5	307.1	2301.6	10.2	1.7	0.4	22.1	12.4	13.7
7/16/2009 5:00	7/16/2009 6:00	899.7	8030.9	3.0	1.9	592.9	1.1	780.3	775.4	312.7	307.0	2307.8	7.4	1.8	0.4	21.6	#N/A	#N/A
7/16/2009 6:00	7/16/2009 7:00	902.4	8039.8	2.9	1.8	601.6	1.1	780.2	774.9	312.7	307.0	2319.1	7.3	2.0	0.4	23.2	#N/A	#N/A
7/16/2009 7:00	7/16/2009 8:00	906.1	8034.9	2.9	1.8	600.8	1.1	778.5	773.4	312.3	306.7	2325.1	7.6	2.1	0.4	26.0	12.6	13.9
7/16/2009 8:00	7/16/2009 9:00	904.0	8048.3	2.9	1.8	600.7	1.1	774.8	773.4	312.3	307.0	2317.6	7.5	2.0	0.5	26.7	12.8	14.0
7/16/2009 9:00	7/16/2009 10:00	903.7	8064.2	2.9	1.8	602.7	1.1	769.1	772.9	310.5	307.1	2307.6	7.2	2.3	0.5	30.2	10.7	11.9
7/16/2009 10:00	7/16/2009 11:00	903.7	8055.4	3.0	1.9	601.3	1.1	769.7	766.4	308.8	303.7	2293.4	7.7	2.2	0.5	35.8	8.9	9.9
7/16/2009 11:00	7/16/2009 12:00	905.3	8052.7	2.9	1.8	597.4	1.1	772.8	767.5	311.2	306.3	2287.8	8.7	2.2	0.5	43.2	3.6	4.3
7/16/2009 12:00	7/16/2009 13:00	903.6	8073.7	2.9	1.8	597.7	1.1	767.1	759.7	312.2	306.9	2304.4	8.6	2.2	0.5	39.3	2.1	2.6
7/16/2009 13:00	7/16/2009 14:00	904.7	8058.7	2.9	1.9	601.4	1.1	769.0	762.5	312.8	308.0	2305.4	8.8	2.2	0.5	40.5	1.6	2.0
7/16/2009 14:00	7/16/2009 15:00	904.5	8061.0	2.9	1.9	600.9	1.1	772.7	766.2	315.7	311.0	2300.2	8.8	2.2	0.5	42.0	1.6	1.9
7/16/2009 15:00	7/16/2009 16:00	906.9	8051.2	2.9	1.8	602.4	1.1	773.2	768.1	317.3	312.6	2300.2	8.1	2.2	0.5	38.5	1.9	2.4
7/16/2009	7/16/2009	906.8	8034.8	2.9	1.8	602.2	1.1	766.9	762.9	317.5	312.4	2310.1	7.4	2.2	0.5	32.6	2.1	2.6

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
16:00	17:00																	
7/16/2009 17:00	7/16/2009 18:00	905.8	7989.3	2.9	1.9	599.5	1.1	765.7	761.2	316.6	311.6	2291.4	6.6	2.2	0.5	30.4	3.9	4.4
7/16/2009 18:00	7/16/2009 19:00	904.2	8031.5	2.8	1.9	600.2	1.1	771.2	766.4	319.3	314.0	2296.6	6.4	2.1	0.5	29.1	4.7	5.1
7/16/2009 19:00	7/16/2009 20:00	906.5	8040.2	2.8	1.9	605.1	1.1	771.9	766.9	320.7	315.8	2304.2	6.4	1.9	0.5	30.3	4.8	5.2
7/16/2009 20:00	7/16/2009 21:00	909.5	8044.3	2.9	1.9	608.0	1.1	766.4	760.0	318.6	313.7	2312.2	7.2	1.9	0.5	31.8	5.5	5.9
7/16/2009 21:00	7/16/2009 22:00	909.2	8011.4	2.8	1.9	615.7	1.1	769.1	761.5	317.6	312.1	2303.8	9.2	1.8	0.5	37.3	7.5	8.0
7/16/2009 22:00	7/16/2009 23:00	909.3	8023.7	2.8	1.9	622.2	1.1	772.8	766.0	317.0	311.5	2309.6	9.7	1.8	0.5	30.7	8.8	9.7
7/16/2009 23:00	7/17/2009 0:00	911.6	8032.0	2.9	1.8	621.7	1.1	776.9	771.0	316.7	311.5	2332.3	9.7	1.8	0.4	26.8	9.8	10.7
7/17/2009 0:00	7/17/2009 1:00	907.0	8053.4	3.0	2.0	615.3	1.1	776.4	767.5	317.4	311.4	2337.8	9.7	1.7	0.4	23.0	10.4	11.5
7/17/2009 1:00	7/17/2009 2:00	872.4	7942.8	3.0	1.9	592.4	1.1	764.2	751.6	313.2	303.4	2244.6	9.2	1.7	0.4	22.3	10.2	11.4
7/17/2009 2:00	7/17/2009 3:00	840.1	7915.8	2.8	1.9	567.5	1.1	754.5	743.8	310.7	300.5	2155.9	8.7	1.7	0.4	27.8	10.0	11.3
7/17/2009 3:00	7/17/2009 4:00	745.0	7947.3	2.9	1.9	501.5	1.1	720.5	712.2	304.9	294.2	1971.1	8.0	1.7	0.4	11.6	9.5	10.7
7/17/2009 4:00	7/17/2009 5:00	744.2	7798.1	3.0	1.9	510.3	1.1	716.4	709.5	299.2	289.6	2014.3	7.9	1.6	0.4	12.9	#N/A	#N/A
7/17/2009 5:00	7/17/2009 6:00	882.6	7895.4	2.8	1.9	591.4	1.1	757.8	749.4	304.4	296.9	2262.3	7.6	1.6	0.4	23.2	#N/A	#N/A
7/17/2009 6:00	7/17/2009 7:00	908.4	8019.5	2.8	1.9	605.5	1.1	771.9	762.2	307.2	300.8	2305.6	7.8	1.6	0.4	24.2	#N/A	#N/A
7/17/2009 7:00	7/17/2009 8:00	908.3	8049.0	2.9	2.0	606.8	1.1	765.1	753.7	306.7	299.5	2345.5	7.8	1.6	0.4	19.3	10.1	11.4
7/17/2009 8:00	7/17/2009 9:00	906.7	8075.3	2.9	2.0	605.9	1.1	757.1	747.4	302.5	296.1	2362.3	7.8	1.6	0.4	16.9	10.1	11.3
7/17/2009 9:00	7/17/2009 10:00	911.1	8053.3	2.9	1.9	604.2	1.1	757.5	746.8	300.2	294.2	2351.9	7.9	1.6	0.4	22.5	9.9	11.3
7/17/2009 10:00	7/17/2009 11:00	912.3	8021.6	2.9	1.9	601.3	1.1	762.7	751.3	300.5	294.5	2340.4	7.8	1.5	0.4	25.8	9.1	10.4
7/17/2009 11:00	7/17/2009 12:00	908.8	7995.0	2.9	2.0	599.0	1.1	765.3	754.0	302.6	296.2	2320.8	7.6	1.5	0.4	26.6	8.7	9.9

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/17/2009 12:00	7/17/2009 13:00	904.8	8013.8	2.9	2.0	611.1	1.1	767.5	757.1	305.0	298.3	2308.6	8.2	1.5	0.4	23.7	9.5	10.9
7/17/2009 13:00	7/17/2009 14:00	907.7	8031.2	2.9	1.9	624.4	1.1	761.5	752.4	305.4	299.7	2315.6	8.4	1.6	0.4	27.3	10.6	11.9
7/17/2009 14:00	7/17/2009 15:00	913.8	8046.7	2.9	1.9	623.0	1.1	757.0	750.4	306.4	301.5	2316.1	8.5	1.6	0.4	31.8	11.0	12.3
7/17/2009 15:00	7/17/2009 16:00	912.1	8052.3	2.9	1.9	615.1	1.1	753.4	750.2	305.9	302.1	2315.9	7.9	1.5	0.4	35.6	10.3	11.5
7/17/2009 16:00	7/17/2009 17:00	908.2	8051.8	2.9	1.9	619.2	1.1	757.7	753.6	308.6	304.7	2320.1	7.4	1.5	0.4	35.3	10.2	11.5
7/17/2009 17:00	7/17/2009 18:00	909.5	8049.1	2.9	1.9	625.9	1.1	760.5	755.4	310.1	305.1	2313.3	7.4	1.6	0.4	32.9	10.9	12.2
7/17/2009 18:00	7/17/2009 19:00	912.7	8066.9	2.9	1.9	630.1	1.1	763.0	757.0	310.7	305.3	2318.4	7.5	1.6	0.4	25.0	12.0	13.0
7/17/2009 19:00	7/17/2009 20:00	911.1	8077.5	2.9	1.9	625.7	1.1	757.1	751.2	308.9	303.7	2326.2	7.6	1.6	0.4	27.6	12.3	13.4
7/17/2009 20:00	7/17/2009 21:00	911.0	8063.8	2.9	1.9	619.5	1.1	759.5	753.7	307.7	302.2	2335.7	7.6	1.6	0.4	33.6	12.1	13.3
7/17/2009 21:00	7/17/2009 22:00	911.8	8056.8	2.9	1.9	616.7	1.1	765.0	757.9	307.8	302.3	2335.8	8.3	1.7	0.4	31.8	12.5	13.7
7/17/2009 22:00	7/17/2009 23:00	897.7	8080.3	2.8	1.9	602.2	1.1	767.2	760.4	308.5	303.7	2296.3	9.2	1.8	0.4	29.5	12.7	13.9
7/17/2009 23:00	7/18/2009 0:00	861.9	8004.7	2.9	1.9	579.3	1.1	755.4	747.9	311.1	304.5	2221.5	8.4	1.7	0.4	31.2	12.0	13.2
7/18/2009 0:00	7/18/2009 1:00	893.9	8014.3	2.9	1.9	601.2	1.1	761.3	751.4	311.1	303.9	2302.9	7.5	1.7	0.5	35.8	11.6	12.7
7/18/2009 1:00	7/18/2009 2:00	901.3	8009.0	2.9	1.9	607.1	1.1	756.1	749.6	307.9	302.4	2311.3	7.9	1.7	0.4	32.4	#N/A	#N/A
7/18/2009 2:00	7/18/2009 3:00	892.1	8001.7	3.0	1.9	595.3	1.1	758.6	753.0	307.9	301.9	2274.9	8.2	1.7	0.4	29.0	#N/A	#N/A
7/18/2009 3:00	7/18/2009 4:00	796.1	8031.5	3.0	2.1	528.7	1.1	734.5	729.2	300.5	292.5	2080.8	7.6	1.7	0.4	13.1	11.1	12.6
7/18/2009 4:00	7/18/2009 5:00	795.2	8001.6	2.9	2.0	529.6	1.1	725.8	719.4	298.6	289.2	2030.5	6.9	1.6	0.4	13.8	10.8	12.1
7/18/2009 5:00	7/18/2009 6:00	778.8	8011.5	3.0	1.9	510.4	1.1	723.6	717.2	297.0	286.9	1979.0	6.0	1.6	0.4	13.0	#N/A	#N/A
7/18/2009 6:00	7/18/2009 7:00	710.7	8014.6	3.1	2.1	470.4	1.1	708.3	703.3	291.8	281.5	1903.4	5.6	1.5	0.4	10.3	#N/A	#N/A
7/18/2009	7/18/2009	703.6	7877.2	3.0	2.2	470.9	1.1	709.1	703.9	290.1	279.4	1920.7	5.6	1.5	0.4	9.1	9.8	11.4

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7:00	8:00																	
7/18/2009 8:00	7/18/2009 9:00	850.4	7838.4	2.9	2.1	569.7	1.1	755.6	749.2	300.7	292.6	2226.3	7.5	1.5	0.4	19.3	11.1	12.7
7/18/2009 9:00	7/18/2009 10:00	905.6	8017.6	2.9	2.0	603.8	1.1	781.2	775.5	311.7	305.1	2289.4	8.4	1.5	0.4	35.4	11.4	12.7
7/18/2009 10:00	7/18/2009 11:00	906.0	8038.3	3.0	1.9	613.7	1.1	784.2	779.3	314.4	308.9	2305.2	8.7	1.6	0.4	41.1	11.3	12.6
7/18/2009 11:00	7/18/2009 12:00	909.0	8058.5	3.1	2.0	618.1	1.1	773.4	770.7	315.1	310.4	2313.9	8.4	1.6	0.4	42.5	11.2	12.5
7/18/2009 12:00	7/18/2009 13:00	910.9	8040.9	3.0	2.1	617.9	1.1	766.7	760.3	313.4	307.4	2310.8	8.3	1.6	0.4	31.9	11.1	12.2
7/18/2009 13:00	7/18/2009 14:00	909.9	8044.1	3.0	2.1	621.7	1.1	770.6	763.5	314.3	308.1	2317.4	8.6	1.7	0.4	23.1	11.4	12.6
7/18/2009 14:00	7/18/2009 15:00	909.9	8051.0	3.0	2.1	623.0	1.1	770.3	764.2	315.1	309.4	2325.2	9.0	1.8	0.4	37.1	12.0	13.2
7/18/2009 15:00	7/18/2009 16:00	909.1	8061.1	3.1	2.5	628.7	1.1	777.0	770.1	314.5	309.8	2372.8	9.1	1.8	0.4	13.7	12.2	13.5
7/18/2009 16:00	7/18/2009 17:00	912.5	8059.4	3.2	2.4	635.0	1.1	780.5	775.4	316.8	311.6	2391.5	7.6	1.8	0.4	12.1	12.2	13.4
7/18/2009 17:00	7/18/2009 18:00	910.4	8063.2	3.3	2.4	627.6	1.1	779.5	777.2	315.7	311.3	2385.6	7.2	1.7	0.4	11.9	12.1	13.1
7/18/2009 18:00	7/18/2009 19:00	905.1	8055.0	3.3	2.4	621.3	1.1	782.0	779.3	315.1	310.7	2381.6	7.4	1.7	0.4	10.3	12.4	13.4
7/18/2009 19:00	7/18/2009 20:00	890.0	8073.0	3.2	2.3	610.6	1.1	782.5	777.5	314.8	310.3	2345.2	7.3	1.7	0.4	10.9	13.0	13.9
7/18/2009 20:00	7/18/2009 21:00	769.3	8082.1	3.4	2.3	527.1	1.1	750.6	745.6	311.1	305.1	2072.2	7.2	1.7	0.4	9.9	12.2	13.2
7/18/2009 21:00	7/18/2009 22:00	698.1	7985.6	3.5	2.6	486.6	1.1	725.9	720.1	305.6	297.8	1968.8	7.1	1.6	0.4	6.2	11.5	12.5
7/18/2009 22:00	7/18/2009 23:00	755.6	7832.0	3.4	2.5	528.0	1.1	739.8	733.6	302.7	296.0	2108.4	7.4	1.6	0.4	7.3	12.0	13.1
7/18/2009 23:00	7/19/2009 0:00	893.8	7958.8	3.2	2.5	611.5	1.1	784.0	776.8	307.1	302.2	2383.2	7.8	1.6	0.4	11.5	13.5	14.5
7/19/2009 0:00	7/19/2009 1:00	911.1	8015.7	3.1	2.2	611.8	1.1	790.5	784.1	311.2	306.2	2375.0	7.9	1.6	0.4	15.6	14.0	15.0
7/19/2009 1:00	7/19/2009 2:00	903.2	8052.0	3.1	2.2	609.4	1.1	769.7	762.1	307.7	302.8	2355.5	8.4	1.7	0.4	18.7	#N/A	14.9
7/19/2009 2:00	7/19/2009 3:00	839.7	8070.1	3.1	2.2	568.1	1.1	746.3	737.1	301.2	293.8	2211.8	8.4	1.9	0.5	20.2	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/19/2009 3:00	7/19/2009 4:00	748.1	8094.2	3.2	2.2	513.1	1.1	711.5	703.1	292.9	283.7	2027.7	6.1	2.0	0.5	9.5	#N/A	14.8
7/19/2009 4:00	7/19/2009 5:00	710.8	8047.7	3.3	2.2	496.7	1.1	701.0	691.3	292.1	281.7	1970.3	5.6	1.8	0.5	9.2	#N/A	#N/A
7/19/2009 5:00	7/19/2009 6:00	768.7	7990.2	3.1	2.1	535.1	1.1	716.1	706.2	296.2	284.5	2087.9	5.0	1.7	0.5	14.4	#N/A	#N/A
7/19/2009 6:00	7/19/2009 7:00	745.5	8013.6	3.2	2.2	504.7	1.1	711.9	701.9	288.9	278.6	2048.4	4.4	1.6	0.5	10.0	#N/A	#N/A
7/19/2009 7:00	7/19/2009 8:00	741.0	8035.0	3.2	2.3	495.8	1.1	709.8	699.7	288.7	278.3	2061.9	4.3	1.5	0.4	8.2	11.0	12.6
7/19/2009 8:00	7/19/2009 9:00	844.9	7990.6	3.0	2.4	562.7	1.1	740.2	730.1	294.6	285.8	2265.6	4.9	1.4	0.4	12.7	11.2	12.6
7/19/2009 9:00	7/19/2009 10:00	905.0	8049.9	2.8	2.5	596.6	1.1	767.0	755.5	306.3	297.5	2328.5	5.1	1.4	0.4	23.4	10.4	11.9
7/19/2009 10:00	7/19/2009 11:00	905.5	8049.1	2.8	2.5	603.9	1.1	769.7	757.6	308.9	300.3	2331.3	4.9	1.4	0.4	29.4	9.7	11.1
7/19/2009 11:00	7/19/2009 12:00	908.9	8088.8	2.8	2.4	607.0	1.1	772.1	759.3	311.9	303.6	2338.4	5.3	1.4	0.4	35.0	10.0	11.4
7/19/2009 12:00	7/19/2009 13:00	908.9	8059.0	2.8	2.4	613.1	1.1	772.0	759.6	313.5	305.9	2331.3	6.0	1.5	0.4	40.0	10.6	12.0
7/19/2009 13:00	7/19/2009 14:00	911.4	8068.8	2.7	2.3	616.7	1.1	769.3	757.6	315.4	307.7	2351.3	7.0	1.7	0.4	47.6	12.4	13.6
7/19/2009 14:00	7/19/2009 15:00	910.4	8070.7	2.7	2.2	612.7	1.1	766.4	756.3	315.0	307.8	2339.7	8.6	1.8	0.4	44.6	12.4	13.6
7/19/2009 15:00	7/19/2009 16:00	910.6	8051.8	2.7	2.2	612.8	1.1	766.6	756.8	315.5	308.6	2334.1	9.3	1.8	0.4	42.3	11.9	12.9
7/19/2009 16:00	7/19/2009 17:00	909.9	8068.6	2.7	2.2	615.6	1.1	771.5	761.8	313.4	306.8	2340.1	6.3	1.7	0.4	35.7	11.6	12.5
7/19/2009 17:00	7/19/2009 18:00	911.7	8027.4	2.7	2.2	614.7	1.1	771.3	762.6	313.3	307.8	2329.8	5.3	1.6	0.5	38.6	11.0	12.0
7/19/2009 18:00	7/19/2009 19:00	911.8	8005.4	2.7	2.1	612.9	1.1	774.5	766.4	313.7	308.3	2333.5	5.5	1.7	0.5	36.7	11.5	12.7
7/19/2009 19:00	7/19/2009 20:00	912.2	8028.1	2.8	2.1	609.3	1.1	777.6	771.0	314.4	309.3	2334.5	6.1	1.8	0.5	38.5	11.9	13.2
7/19/2009 20:00	7/19/2009 21:00	910.5	8047.6	2.7	2.2	603.2	1.1	779.5	772.6	314.8	309.3	2328.1	7.9	2.0	0.5	40.4	12.7	13.9
7/19/2009 21:00	7/19/2009 22:00	910.5	8056.9	2.7	2.2	608.6	1.1	778.3	771.3	314.5	308.4	2339.8	9.6	2.1	0.5	39.3	13.4	14.4
7/19/2009	7/19/2009	911.2	8025.4	2.7	2.2	603.8	1.1	776.6	769.1	312.7	305.7	2338.3	9.7	2.1	0.5	37.8	13.9	14.8

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
22:00	23:00																	
7/19/2009 23:00	7/20/2009 0:00	903.9	8007.8	2.7	2.2	597.2	1.1	776.2	769.2	312.0	304.3	2314.4	9.8	2.1	0.5	41.2	14.1	15.1
7/20/2009 0:00	7/20/2009 1:00	899.3	8018.6	2.7	2.2	597.6	1.1	777.0	770.8	311.9	304.7	2312.8	9.9	2.1	0.5	39.9	14.6	15.4
7/20/2009 1:00	7/20/2009 2:00	904.4	8007.9	2.7	2.2	599.0	1.1	779.8	773.6	312.1	304.9	2333.1	10.0	2.1	0.5	37.7	14.7	15.5
7/20/2009 2:00	7/20/2009 3:00	827.7	8029.6	2.7	2.1	548.0	1.1	754.5	748.4	310.9	301.6	2169.0	9.6	2.2	0.5	19.9	14.1	14.8
7/20/2009 3:00	7/20/2009 4:00	733.5	7937.0	2.8	2.3	492.1	1.1	715.3	708.3	300.2	290.9	2022.7	9.1	2.1	0.5	8.6	12.6	13.3
7/20/2009 4:00	7/20/2009 5:00	720.4	7900.0	2.7	2.4	490.2	1.1	712.1	704.5	295.5	288.0	2015.4	6.8	2.0	0.5	9.2	11.9	12.7
7/20/2009 5:00	7/20/2009 6:00	818.4	7888.2	2.5	2.6	551.9	1.1	735.5	726.2	298.4	291.1	2224.3	6.0	1.8	0.5	17.3	#N/A	#N/A
7/20/2009 6:00	7/20/2009 7:00	889.9	8044.0	2.5	2.5	584.6	1.1	761.0	750.5	302.8	294.6	2294.3	5.8	1.8	0.5	24.9	#N/A	#N/A
7/20/2009 7:00	7/20/2009 8:00	896.6	7985.0	2.6	2.4	584.0	1.1	766.6	757.5	305.2	297.3	2309.2	6.4	1.9	0.5	33.0	13.0	14.0
7/20/2009 8:00	7/20/2009 9:00	901.4	7907.7	2.6	2.4	588.3	1.1	769.9	760.2	306.5	299.1	2338.3	6.9	2.0	0.5	40.1	13.2	14.1
7/20/2009 9:00	7/20/2009 10:00	908.7	8044.9	2.6	2.4	592.5	1.2	779.8	763.9	310.7	303.3	2355.1	9.1	2.1	0.5	47.6	13.7	14.5
7/20/2009 10:00	7/20/2009 11:00	891.1	8089.3	2.6	2.3	580.8	1.2	777.2	761.5	312.4	303.1	2317.2	8.9	2.2	0.6	47.3	6.9	7.9
7/20/2009 11:00	7/20/2009 12:00	887.9	8027.3	2.6	2.3	581.9	1.2	770.0	755.6	311.6	302.2	2298.9	8.9	2.3	0.6	46.5	4.9	5.9
7/20/2009 12:00	7/20/2009 13:00	895.6	8027.0	2.6	2.3	582.6	1.2	777.2	763.0	313.2	304.8	2309.9	9.1	2.3	0.6	54.4	4.8	5.9
7/20/2009 13:00	7/20/2009 14:00	901.3	7994.4	2.6	2.3	590.4	1.1	778.9	766.2	312.2	303.8	2339.5	9.4	2.3	0.6	54.2	5.1	6.1
7/20/2009 14:00	7/20/2009 15:00	903.2	8011.0	2.6	2.4	592.3	1.1	782.3	770.0	310.2	301.3	2338.8	9.2	2.4	0.6	52.4	5.3	6.3
7/20/2009 15:00	7/20/2009 16:00	838.6	7974.9	2.6	2.3	557.8	1.1	755.2	745.3	307.8	298.1	2178.5	7.4	2.4	0.6	24.5	4.9	5.9
7/20/2009 16:00	7/20/2009 17:00	875.8	7911.9	2.7	2.4	581.6	1.1	755.7	746.3	307.1	297.7	2292.0	6.2	2.2	0.6	34.8	4.8	5.7
7/20/2009 17:00	7/20/2009 18:00	906.7	8064.2	2.6	2.3	596.5	1.1	767.8	762.7	309.7	302.4	2351.5	5.4	2.0	0.5	54.8	8.0	8.9

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/20/2009 18:00	7/20/2009 19:00	886.3	8053.8	2.6	2.3	576.6	1.1	768.1	766.3	311.2	303.1	2286.9	4.7	1.8	0.5	40.0	9.1	10.3
7/20/2009 19:00	7/20/2009 20:00	889.7	8018.3	2.8	2.3	586.0	1.1	768.8	770.0	312.0	303.5	2308.5	4.7	1.7	0.5	43.0	8.8	10.5
7/20/2009 20:00	7/20/2009 21:00	901.8	8060.4	2.7	2.3	598.0	1.1	776.5	775.2	314.5	307.9	2340.4	5.1	1.6	0.5	43.7	9.5	11.2
7/20/2009 21:00	7/20/2009 22:00	899.2	8034.3	2.6	2.4	594.2	1.1	766.7	760.6	314.0	305.1	2322.7	5.2	1.6	0.4	30.9	9.5	11.0
7/20/2009 22:00	7/20/2009 23:00	900.6	7992.9	2.7	2.3	595.1	1.1	771.8	764.4	311.6	301.2	2313.6	5.1	1.6	0.4	38.1	9.6	11.1
7/20/2009 23:00	7/21/2009 0:00	900.4	8003.1	2.8	2.2	596.6	1.1	773.4	769.5	312.1	302.7	2311.7	5.1	1.7	0.5	41.9	10.1	11.6
7/21/2009 0:00	7/21/2009 1:00	883.8	8017.4	2.8	2.2	588.4	1.1	771.2	769.2	312.2	303.0	2279.0	5.1	1.7	0.5	36.4	10.1	11.7
7/21/2009 1:00	7/21/2009 2:00	886.3	8050.3	2.7	2.3	596.4	1.1	767.2	759.5	312.6	302.6	2309.0	5.0	1.7	0.5	30.5	10.1	11.6
7/21/2009 2:00	7/21/2009 3:00	885.0	7975.9	2.5	2.3	589.9	1.1	763.1	754.1	308.8	298.4	2310.5	5.0	1.6	0.4	26.9	9.9	11.5
7/21/2009 3:00	7/21/2009 4:00	758.4	7994.3	2.8	2.2	510.3	1.1	732.5	724.0	303.8	291.8	2060.4	4.7	1.6	0.4	10.9	9.0	10.5
7/21/2009 4:00	7/21/2009 5:00	844.4	7972.3	2.8	2.2	571.6	1.1	750.3	741.4	303.5	294.8	2259.7	5.1	1.6	0.4	33.4	#N/A	#N/A
7/21/2009 5:00	7/21/2009 6:00	880.2	8046.6	2.7	2.2	588.1	1.1	759.6	750.7	305.9	296.2	2293.9	6.6	1.6	0.4	32.3	#N/A	#N/A
7/21/2009 6:00	7/21/2009 7:00	906.4	8021.2	2.6	2.3	604.4	1.1	773.0	761.7	307.8	298.7	2364.2	8.3	1.5	0.4	35.9	#N/A	#N/A
7/21/2009 7:00	7/21/2009 8:00	907.5	8049.5	2.6	2.3	602.1	1.1	774.9	761.7	310.0	299.4	2372.9	8.9	1.6	0.4	35.1	9.9	11.3
7/21/2009 8:00	7/21/2009 9:00	906.4	8089.4	2.8	2.2	600.8	1.1	773.5	761.6	309.1	298.7	2364.7	9.4	1.6	0.4	45.4	10.4	11.6
7/21/2009 9:00	7/21/2009 10:00	909.1	8053.5	2.8	2.2	597.7	1.1	782.0	768.5	310.5	300.7	2364.0	8.6	1.7	0.4	51.4	10.8	11.9
7/21/2009 10:00	7/21/2009 11:00	908.9	8040.3	2.8	2.1	597.1	1.1	785.3	772.9	312.8	302.7	2368.6	6.5	1.7	0.5	57.7	11.2	12.3
7/21/2009 11:00	7/21/2009 12:00	910.6	8044.9	2.8	2.2	596.2	1.1	789.4	776.7	315.7	304.8	2373.9	6.4	1.7	0.4	51.8	11.0	12.0
7/21/2009 12:00	7/21/2009 13:00	910.3	8073.3	2.8	2.2	595.1	1.1	788.9	776.8	318.1	307.7	2370.1	6.5	1.7	0.4	50.1	11.1	12.1
7/21/2009	7/21/2009	910.0	8036.4	2.8	2.2	595.6	1.1	790.4	778.6	319.4	309.4	2346.6	6.7	1.7	0.4	47.2	11.1	12.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
13:00	14:00																	
7/21/2009 14:00	7/21/2009 15:00	909.4	8037.5	2.8	2.2	595.0	1.1	793.4	781.8	322.2	312.4	2349.4	6.9	1.7	0.4	48.0	11.1	12.0
7/21/2009 15:00	7/21/2009 16:00	908.3	8093.9	2.8	2.2	594.0	1.1	779.1	770.4	321.3	313.2	2357.2	7.1	1.8	0.5	39.9	11.0	11.9
7/21/2009 16:00	7/21/2009 17:00	909.2	8063.5	2.8	2.2	598.7	1.1	776.4	766.6	318.7	310.9	2352.0	7.0	1.8	0.5	46.8	10.6	11.4
7/21/2009 17:00	7/21/2009 18:00	911.2	8064.2	2.8	2.1	598.8	1.1	782.2	772.8	320.6	313.6	2348.0	7.1	1.8	0.5	52.9	10.2	11.1
7/21/2009 18:00	7/21/2009 19:00	910.7	8073.1	2.8	2.1	599.8	1.1	774.4	761.1	321.0	312.6	2345.4	7.0	1.8	0.5	38.2	10.2	11.0
7/21/2009 19:00	7/21/2009 20:00	907.9	8092.5	2.8	2.2	601.3	1.1	763.2	751.7	315.9	308.0	2358.5	6.9	1.9	0.5	34.9	11.2	12.1
7/21/2009 20:00	7/21/2009 21:00	909.3	8094.5	2.7	2.2	600.6	1.1	764.1	751.8	313.1	305.8	2342.7	7.0	1.9	0.5	37.1	11.7	12.6
7/21/2009 21:00	7/21/2009 22:00	910.4	8044.5	2.8	2.1	606.0	1.1	764.8	753.4	311.7	304.9	2342.3	7.0	2.0	0.5	39.6	12.6	13.6
7/21/2009 22:00	7/21/2009 23:00	904.1	8051.1	2.8	2.1	605.4	1.1	763.5	751.8	310.0	302.7	2325.9	8.3	2.1	0.5	35.8	14.0	15.1
7/21/2009 23:00	7/22/2009 0:00	909.0	8025.5	2.8	2.2	610.6	1.1	769.6	758.4	309.9	301.7	2345.5	9.0	2.2	0.5	36.1	14.8	15.7
7/22/2009 0:00	7/22/2009 1:00	910.1	8025.7	2.7	2.2	610.9	1.1	775.3	762.6	310.9	302.2	2359.9	7.6	2.2	0.6	42.7	14.9	15.8
7/22/2009 1:00	7/22/2009 2:00	909.5	8061.1	2.7	2.2	606.3	1.1	775.3	760.8	311.9	302.8	2370.0	7.9	2.1	0.5	35.3	14.5	15.4
7/22/2009 2:00	7/22/2009 3:00	910.1	8070.9	2.7	2.3	602.2	1.1	766.9	752.0	310.1	300.7	2368.4	7.7	2.1	0.5	30.5	14.0	14.9
7/22/2009 3:00	7/22/2009 4:00	907.6	8078.9	2.7	2.2	602.4	1.1	761.3	750.6	306.9	298.6	2366.3	7.7	2.1	0.5	36.4	13.7	14.6
7/22/2009 4:00	7/22/2009 5:00	910.3	8054.8	2.7	2.2	602.8	1.1	767.5	757.4	306.5	298.8	2378.3	7.3	2.1	0.5	48.1	13.5	14.4
7/22/2009 5:00	7/22/2009 6:00	910.3	8053.0	2.8	2.2	601.6	1.1	774.7	764.7	307.2	299.3	2366.4	6.9	2.0	0.5	46.6	#N/A	#N/A
7/22/2009 6:00	7/22/2009 7:00	905.5	8030.4	2.8	2.2	594.7	1.1	775.7	769.6	307.7	299.1	2347.5	6.8	2.0	0.5	57.0	#N/A	#N/A
7/22/2009 7:00	7/22/2009 8:00	900.3	7990.4	5.6	4.6	597.0	1.1	771.2	771.7	307.6	300.4	2328.8	8.6	2.0	0.6	47.2	14.3	15.4
7/22/2009 8:00	7/22/2009 9:00	901.0	7984.0	3.7	2.5	601.3	1.1	776.8	775.4	309.6	303.2	2328.5	9.5	2.0	0.5	68.1	14.8	15.8

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/22/2009 9:00	7/22/2009 10:00	903.0	7982.7	3.1	2.1	602.9	1.1	776.2	774.8	310.4	304.9	2332.8	7.4	2.0	0.5	73.2	14.8	16.0
7/22/2009 10:00	7/22/2009 11:00	899.7	7989.8	3.1	2.2	598.9	1.1	775.0	774.0	310.0	303.8	2319.4	6.7	2.1	0.5	51.9	14.4	15.6
7/22/2009 11:00	7/22/2009 12:00	893.0	8001.5	3.1	2.3	598.1	1.1	774.7	773.8	311.5	305.0	2318.6	6.7	2.1	0.5	46.3	14.2	15.4
7/22/2009 12:00	7/22/2009 13:00	907.8	8026.0	3.1	2.3	605.7	1.1	782.7	780.7	314.4	308.3	2359.0	6.8	2.1	0.6	47.3	14.2	15.2
7/22/2009 13:00	7/22/2009 14:00	906.6	8044.1	3.1	2.3	609.9	1.1	783.9	781.3	317.2	311.0	2362.7	6.9	2.1	0.6	49.2	14.5	15.5
7/22/2009 14:00	7/22/2009 15:00	907.7	8056.0	3.1	2.3	610.9	1.1	772.6	769.1	316.9	310.6	2362.4	7.0	2.2	0.6	61.8	14.5	15.6
7/22/2009 15:00	7/22/2009 16:00	908.3	8022.8	3.0	2.3	610.0	1.1	773.4	767.9	314.7	308.2	2350.2	7.0	2.2	0.6	59.4	14.5	15.5
7/22/2009 16:00	7/22/2009 17:00	908.4	8023.9	3.1	2.3	608.0	1.1	777.8	774.2	316.6	310.3	2335.1	6.9	2.2	0.5	37.5	14.6	15.5
7/22/2009 17:00	7/22/2009 18:00	909.3	8031.3	3.1	2.3	602.8	1.1	782.1	777.4	317.7	311.4	2339.7	6.9	2.2	0.5	38.1	14.6	15.6
7/22/2009 18:00	7/22/2009 19:00	908.6	8034.7	3.0	2.4	598.1	1.1	785.8	780.4	318.3	311.6	2352.4	6.8	2.1	0.5	39.7	14.7	15.7
7/22/2009 19:00	7/22/2009 20:00	907.8	8030.0	2.9	2.3	596.8	1.1	783.8	779.3	317.8	310.8	2338.8	6.7	2.1	0.5	46.5	14.4	15.5
7/22/2009 20:00	7/22/2009 21:00	907.7	8009.7	2.9	2.2	598.3	1.1	786.3	781.0	317.7	310.5	2339.7	6.7	2.1	0.5	53.0	14.5	15.6
7/22/2009 21:00	7/22/2009 22:00	909.8	8001.8	2.9	2.3	604.4	1.1	789.8	784.0	317.5	309.9	2344.7	6.8	2.1	0.5	62.4	14.7	15.7
7/22/2009 22:00	7/22/2009 23:00	913.1	8009.6	2.9	2.3	607.7	1.1	793.1	787.2	317.5	309.8	2361.8	6.8	2.1	0.5	58.0	14.8	15.8
7/22/2009 23:00	7/23/2009 0:00	908.6	8015.5	2.9	2.3	603.2	1.1	783.9	778.0	316.0	307.8	2357.1	6.7	2.1	0.5	46.7	14.8	15.8
7/23/2009 0:00	7/23/2009 1:00	903.0	8010.5	3.0	2.3	599.5	1.1	772.2	766.4	311.6	303.4	2339.7	6.6	2.1	0.5	53.7	14.6	15.5
7/23/2009 1:00	7/23/2009 2:00	912.9	7996.8	3.0	2.3	603.6	1.1	780.1	772.4	310.8	303.1	2349.1	6.7	2.0	0.5	71.5	14.4	15.3
7/23/2009 2:00	7/23/2009 3:00	892.6	8008.9	3.0	2.3	592.0	1.1	778.0	770.6	311.4	302.9	2300.1	6.7	2.0	0.5	56.6	14.6	15.5
7/23/2009 3:00	7/23/2009 4:00	854.7	7903.0	3.1	2.3	569.4	1.1	760.9	754.8	307.5	297.0	2212.7	6.6	2.0	0.5	29.9	14.4	15.2
7/23/2009	7/23/2009	913.2	7978.3	3.0	2.3	607.5	1.1	781.6	774.1	308.3	300.4	2367.2	6.8	2.0	0.5	47.3	#N/A	#N/A

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
4:00	5:00																	
7/23/2009 5:00	7/23/2009 6:00	913.0	8013.3	3.0	2.3	609.6	1.1	784.3	776.9	309.2	302.2	2371.9	6.6	2.0	0.5	40.0	#N/A	#N/A
7/23/2009 6:00	7/23/2009 7:00	912.8	8007.9	3.0	2.3	610.4	1.1	773.5	768.5	306.7	300.2	2385.4	6.5	2.0	0.5	42.1	#N/A	#N/A
7/23/2009 7:00	7/23/2009 8:00	912.8	7983.2	3.0	2.3	609.8	1.1	775.4	769.0	306.1	299.6	2368.9	6.6	2.0	0.5	43.2	15.0	16.0
7/23/2009 8:00	7/23/2009 9:00	910.0	8032.6	3.0	2.3	611.2	1.1	764.6	757.1	306.3	299.1	2357.7	6.6	2.0	0.5	44.9	15.1	16.2
7/23/2009 9:00	7/23/2009 10:00	903.0	8025.8	3.0	2.3	613.3	1.1	762.5	754.7	305.7	297.9	2355.0	6.5	2.0	0.5	49.6	15.0	16.0
7/23/2009 10:00	7/23/2009 11:00	907.8	8012.8	3.0	2.3	613.9	1.1	767.4	759.7	306.5	298.8	2355.4	6.5	2.0	0.5	52.4	14.8	15.8
7/23/2009 11:00	7/23/2009 12:00	909.6	8024.8	3.0	2.3	613.0	1.1	772.6	765.4	309.1	301.5	2349.2	6.6	2.0	0.5	55.1	14.3	15.3
7/23/2009 12:00	7/23/2009 13:00	906.2	8044.9	3.0	2.3	619.3	1.1	771.5	769.4	311.7	305.0	2356.9	6.7	2.0	0.5	47.6	14.4	15.3
7/23/2009 13:00	7/23/2009 14:00	912.4	8047.7	3.0	2.3	627.1	1.1	773.7	771.6	313.6	307.0	2357.8	6.9	2.0	0.5	43.3	14.7	15.6
7/23/2009 14:00	7/23/2009 15:00	911.5	8071.8	3.0	2.3	621.6	1.1	774.8	771.5	314.8	308.8	2375.6	7.0	1.9	0.5	42.5	13.7	14.3
7/23/2009 15:00	7/23/2009 16:00	899.3	8083.9	3.0	2.3	621.3	1.1	769.0	761.0	315.5	308.7	2354.9	6.9	1.8	0.4	30.9	13.4	13.2
7/23/2009 16:00	7/23/2009 17:00	902.2	8060.0	3.0	2.2	631.8	1.1	766.3	758.4	313.9	306.4	2347.9	6.8	1.8	0.5	31.6	13.1	13.0
7/23/2009 17:00	7/23/2009 18:00	910.5	8087.1	2.9	2.2	644.0	1.1	769.6	761.5	313.4	306.5	2384.0	6.8	1.8	0.5	28.6	13.6	14.4
7/23/2009 18:00	7/23/2009 19:00	911.0	8125.9	2.9	2.3	643.1	1.1	763.8	756.6	312.0	305.0	2386.1	6.8	1.8	0.5	34.6	13.6	14.4
7/23/2009 19:00	7/23/2009 20:00	909.1	8094.8	2.9	2.2	644.7	1.1	760.5	753.1	310.8	303.6	2370.0	6.6	1.7	0.4	43.6	13.1	14.0
7/23/2009 20:00	7/23/2009 21:00	908.8	8124.7	2.9	2.2	648.1	1.1	757.2	748.7	309.7	302.2	2376.5	6.5	1.8	0.5	48.7	13.3	14.3
7/23/2009 21:00	7/23/2009 22:00	909.4	8132.8	2.9	2.2	645.0	1.1	759.7	750.6	308.7	300.8	2368.5	6.4	1.8	0.5	56.0	13.7	14.7
7/23/2009 22:00	7/23/2009 23:00	892.3	8130.1	2.9	2.2	625.9	1.1	758.5	750.1	307.3	299.2	2301.9	6.3	1.8	0.5	39.8	13.9	14.8
7/23/2009 23:00	7/24/2009 0:00	858.8	8092.2	3.0	2.1	612.6	1.1	750.5	743.0	305.5	295.5	2247.8	6.2	1.9	0.5	15.6	14.1	15.1

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/24/2009 0:00	7/24/2009 1:00	898.7	8111.2	2.9	2.2	637.6	1.1	761.3	753.1	306.7	298.1	2337.0	6.4	1.9	0.5	40.9	14.7	15.8
7/24/2009 1:00	7/24/2009 2:00	881.5	8103.3	2.9	2.2	616.6	1.1	761.1	752.4	306.6	297.2	2305.9	6.5	1.9	0.5	24.3	14.3	15.3
7/24/2009 2:00	7/24/2009 3:00	877.0	8079.0	2.8	1.9	609.6	1.1	761.2	751.9	306.8	296.8	2272.1	6.4	1.8	0.5	27.7	14.2	15.2
7/24/2009 3:00	7/24/2009 4:00	862.3	8054.1	2.7	1.8	601.9	1.1	758.0	750.7	307.3	297.9	2228.5	6.3	1.8	0.5	28.6	14.6	15.5
7/24/2009 4:00	7/24/2009 5:00	863.9	8022.1	2.7	1.8	608.5	1.1	759.0	752.2	307.0	297.4	2219.3	6.3	1.9	0.5	29.7	14.7	15.7
7/24/2009 5:00	7/24/2009 6:00	880.0	8031.3	2.6	1.8	623.2	1.1	764.7	757.1	307.9	298.1	2271.6	6.4	1.9	0.5	31.8	#N/A	#N/A
7/24/2009 6:00	7/24/2009 7:00	882.5	8053.0	2.7	1.8	625.1	1.1	765.3	758.5	308.1	298.4	2273.0	6.5	1.8	0.5	30.3	#N/A	#N/A
7/24/2009 7:00	7/24/2009 8:00	883.5	8059.8	2.7	1.8	624.1	1.1	756.9	749.8	308.5	298.8	2279.6	6.5	1.8	0.5	29.5	14.0	15.1
7/24/2009 8:00	7/24/2009 9:00	881.7	8061.8	2.7	1.8	624.2	1.1	750.1	742.1	304.5	294.3	2272.6	6.4	1.8	0.5	31.4	13.6	14.7
7/24/2009 9:00	7/24/2009 10:00	883.9	8074.1	2.6	1.8	617.6	1.1	751.0	742.3	304.1	294.0	2267.3	6.2	1.7	0.4	33.9	13.4	14.3
7/24/2009 10:00	7/24/2009 11:00	873.1	8042.4	2.7	1.8	612.3	1.1	747.3	739.6	302.2	292.1	2242.3	6.6	1.7	0.4	28.3	12.8	13.7
7/24/2009 11:00	7/24/2009 12:00	887.7	8055.9	2.7	1.8	621.6	1.1	752.3	744.3	305.7	296.0	2275.1	6.4	1.7	0.4	40.6	12.6	13.6
7/24/2009 12:00	7/24/2009 13:00	886.2	8082.0	2.7	1.9	626.7	1.1	748.7	740.9	308.5	299.1	2283.5	6.5	1.6	0.4	33.6	12.5	13.4
7/24/2009 13:00	7/24/2009 14:00	893.6	8067.8	2.6	1.8	638.8	1.1	752.4	746.2	309.7	301.1	2292.4	6.5	1.7	0.4	40.8	12.6	13.5
7/24/2009 14:00	7/24/2009 15:00	896.5	8082.6	2.6	1.8	636.5	1.1	756.4	749.4	312.1	304.0	2299.6	6.6	1.7	0.4	44.1	13.1	14.1
7/24/2009 15:00	7/24/2009 16:00	896.6	8084.6	2.6	1.9	631.3	1.1	760.3	752.1	314.4	305.6	2270.9	6.6	1.6	0.4	48.2	12.0	13.0
7/24/2009 16:00	7/24/2009 17:00	894.9	8115.1	2.6	1.9	618.7	1.1	763.2	754.4	315.4	307.0	2285.3	6.7	1.5	0.4	50.5	10.4	11.3
7/24/2009 17:00	7/24/2009 18:00	891.6	8139.6	2.6	1.9	596.3	1.1	759.6	750.4	314.7	306.2	2271.3	6.9	1.3	0.3	44.1	9.0	9.7
7/24/2009 18:00	7/24/2009 19:00	887.2	8102.5	2.6	1.9	577.7	1.1	760.7	751.5	313.9	304.9	2241.1	5.8	1.1	0.3	38.0	7.9	8.7
7/24/2009	7/24/2009	892.2	8058.1	2.6	1.9	567.0	1.2	769.7	760.1	316.0	306.3	2249.5	6.0	0.9	0.2	45.0	7.0	8.0

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
19:00	20:00																	
7/24/2009 20:00	7/24/2009 21:00	886.6	8076.2	2.6	1.9	554.8	1.2	765.6	757.3	316.0	307.1	2224.1	5.5	0.9	0.2	36.1	6.1	7.3
7/24/2009 21:00	7/24/2009 22:00	852.0	8090.2	2.7	1.9	527.5	1.2	756.0	745.3	312.5	303.0	2157.7	5.4	0.8	0.2	19.1	5.9	7.4
7/24/2009 22:00	7/24/2009 23:00	788.5	8061.2	2.8	1.9	484.3	1.2	736.3	727.2	308.5	296.6	2018.7	5.1	0.8	0.2	2.0	5.3	6.7
7/24/2009 23:00	7/25/2009 0:00	838.7	7972.4	2.9	1.9	513.5	1.2	753.8	745.6	308.4	297.4	2120.3	5.7	0.7	0.2	10.0	5.2	6.4
7/25/2009 0:00	7/25/2009 1:00	892.3	8011.0	2.7	1.9	538.2	1.2	782.0	771.9	316.0	305.2	2223.9	6.7	0.7	0.2	34.3	5.1	6.4
7/25/2009 1:00	7/25/2009 2:00	855.8	7972.1	2.8	1.8	514.4	1.2	779.7	770.6	318.4	306.8	2153.9	6.7	0.7	0.2	22.6	4.8	6.2
7/25/2009 2:00	7/25/2009 3:00	789.8	7882.2	2.9	1.8	473.7	1.2	762.8	755.4	317.9	304.0	2011.1	6.0	0.7	0.2	5.4	4.8	6.2
7/25/2009 3:00	7/25/2009 4:00	779.1	7836.5	2.9	1.8	473.3	1.2	764.3	756.6	315.5	301.8	1990.4	6.1	0.7	0.2	2.6	4.8	6.2
7/25/2009 4:00	7/25/2009 5:00	765.2	7800.4	3.0	1.8	469.4	1.2	767.6	760.1	321.9	305.6	1992.0	6.3	0.7	0.2	4.2	4.8	6.2
7/25/2009 5:00	7/25/2009 6:00	810.6	7854.5	2.9	1.9	503.9	1.2	782.5	772.6	317.4	302.4	2118.0	6.8	0.8	0.2	21.6	4.8	6.2
7/25/2009 6:00	7/25/2009 7:00	868.6	7918.8	2.8	1.9	543.0	1.2	807.2	796.8	327.0	312.3	2219.2	8.2	0.9	0.2	23.3	4.8	6.2
7/25/2009 7:00	7/25/2009 8:00	896.6	7979.1	2.8	1.9	558.1	1.2	803.0	798.3	329.1	317.9	2294.9	9.9	1.0	0.2	40.5	4.8	6.2
7/25/2009 8:00	7/25/2009 9:00	906.3	8024.3	2.7	1.9	565.1	1.2	788.8	788.1	322.1	312.9	2303.5	8.7	1.0	0.2	51.1	4.8	6.2
7/25/2009 9:00	7/25/2009 10:00	905.8	7985.5	2.8	2.0	575.9	1.2	795.7	794.0	322.2	313.9	2308.0	8.8	1.1	0.3	47.7	4.8	6.2
7/25/2009 10:00	7/25/2009 11:00	907.9	8013.2	2.8	2.0	589.1	1.2	795.6	792.9	324.9	317.2	2333.0	9.9	1.3	0.3	28.5	4.8	6.2
7/25/2009 11:00	7/25/2009 12:00	912.9	8060.9	2.8	2.0	592.7	1.2	777.7	773.9	321.7	314.1	2327.1	9.8	1.3	0.3	20.8	4.8	6.2
7/25/2009 12:00	7/25/2009 13:00	908.0	8046.5	2.9	2.0	596.7	1.2	780.9	776.3	321.7	314.0	2314.4	9.5	1.4	0.3	26.1	4.8	6.2
7/25/2009 13:00	7/25/2009 14:00	908.0	8050.3	2.9	2.0	603.8	1.1	784.5	778.8	324.7	317.1	2319.3	11.4	1.6	0.3	19.0	4.8	6.2
7/25/2009 14:00	7/25/2009 15:00	910.7	8036.1	2.8	2.1	609.4	1.1	778.1	772.8	324.0	317.7	2331.5	12.6	1.7	0.4	28.9	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/25/2009 15:00	7/25/2009 16:00	910.8	7990.8	2.9	2.0	615.6	1.1	774.0	770.0	322.7	316.6	2314.5	9.9	1.7	0.4	29.7	4.8	6.2
7/25/2009 16:00	7/25/2009 17:00	911.0	8016.8	2.8	2.0	620.5	1.1	771.7	767.9	323.5	317.9	2329.1	9.1	1.7	0.4	35.9	4.8	6.2
7/25/2009 17:00	7/25/2009 18:00	910.9	8043.0	2.9	2.0	623.3	1.1	773.2	769.1	322.9	317.6	2344.4	8.8	1.6	0.4	44.0	4.8	6.2
7/25/2009 18:00	7/25/2009 19:00	912.4	8006.3	2.9	2.1	625.7	1.1	777.7	772.2	323.4	318.1	2363.4	8.4	1.6	0.4	34.6	4.8	6.2
7/25/2009 19:00	7/25/2009 20:00	912.1	8014.4	2.9	2.2	623.5	1.1	773.6	768.0	322.1	316.9	2358.8	8.1	1.6	0.4	26.0	4.8	6.2
7/25/2009 20:00	7/25/2009 21:00	908.5	8031.2	2.9	2.2	628.8	1.1	769.6	763.6	318.3	313.3	2368.3	7.9	1.6	0.4	18.0	4.8	6.2
7/25/2009 21:00	7/25/2009 22:00	910.2	8018.3	2.9	2.2	625.4	1.1	769.3	762.2	313.4	308.4	2375.3	7.9	1.6	0.4	14.8	4.8	6.2
7/25/2009 22:00	7/25/2009 23:00	896.0	7997.1	2.9	2.2	615.5	1.1	765.9	757.9	312.9	306.4	2331.2	7.6	1.6	0.4	12.3	4.8	6.2
7/25/2009 23:00	7/26/2009 0:00	870.7	8091.4	2.9	2.2	601.1	1.1	752.8	740.9	309.7	300.5	2278.4	7.0	1.5	0.4	6.8	4.8	6.2
7/26/2009 0:00	7/26/2009 1:00	889.5	8108.2	2.9	2.3	619.7	1.1	750.0	741.9	306.4	298.6	2318.8	7.1	1.5	0.4	11.5	4.8	6.2
7/26/2009 1:00	7/26/2009 2:00	891.9	8103.6	2.8	2.3	623.4	1.1	751.7	742.7	305.7	297.4	2349.1	7.1	1.5	0.4	11.9	4.8	6.2
7/26/2009 2:00	7/26/2009 3:00	902.2	8103.9	2.8	2.3	626.6	1.1	753.2	743.9	304.8	296.5	2365.3	6.9	1.5	0.4	16.3	4.8	6.2
7/26/2009 3:00	7/26/2009 4:00	884.6	8101.9	2.9	2.2	613.8	1.1	750.3	741.9	303.1	293.8	2322.7	6.5	1.4	0.4	8.8	4.8	6.2
7/26/2009 4:00	7/26/2009 5:00	884.0	8121.0	2.9	2.1	610.1	1.1	752.5	744.9	302.3	293.8	2329.1	6.4	1.3	0.4	8.3	4.8	6.2
7/26/2009 5:00	7/26/2009 6:00	888.5	8127.9	2.7	2.0	600.7	1.1	755.1	746.6	302.8	294.0	2299.0	5.9	1.2	0.3	23.5	4.8	6.2
7/26/2009 6:00	7/26/2009 7:00	884.7	8112.7	2.7	2.0	586.9	1.1	758.5	748.9	304.2	294.1	2289.9	5.6	1.2	0.3	20.1	4.8	6.2
7/26/2009 7:00	7/26/2009 8:00	887.7	8122.5	2.7	2.0	590.5	1.1	761.2	752.8	305.3	294.9	2288.4	5.5	1.1	0.3	29.1	4.8	6.2
7/26/2009 8:00	7/26/2009 9:00	874.9	8139.2	2.7	1.9	584.1	1.2	761.5	754.0	307.2	297.1	2258.0	5.4	1.1	0.3	33.9	4.8	6.2
7/26/2009 9:00	7/26/2009 10:00	866.5	8144.8	2.7	1.9	583.3	1.1	757.8	751.0	309.4	299.0	2236.8	5.5	1.1	0.3	27.7	4.8	6.2
7/26/2009	7/26/2009	884.7	8155.0	2.7	1.9	596.8	1.1	757.2	748.7	310.8	300.7	2273.4	5.7	1.1	0.3	34.8	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
10:00	11:00																	
7/26/2009 11:00	7/26/2009 12:00	887.5	8136.6	2.7	2.0	600.5	1.2	757.3	748.0	311.7	302.0	2265.5	5.9	1.2	0.3	39.9	4.8	6.2
7/26/2009 12:00	7/26/2009 13:00	889.6	8145.8	2.7	1.9	598.0	1.2	750.2	742.5	313.0	304.3	2263.4	6.1	1.2	0.3	41.8	4.8	6.2
7/26/2009 13:00	7/26/2009 14:00	891.5	8114.6	2.7	1.9	594.0	1.2	748.1	741.6	312.4	304.2	2257.5	6.0	1.1	0.3	44.9	4.8	6.2
7/26/2009 14:00	7/26/2009 15:00	888.1	8110.0	2.8	1.9	587.9	1.2	754.2	747.8	314.9	306.8	2236.1	6.1	1.1	0.3	41.3	4.8	6.2
7/26/2009 15:00	7/26/2009 16:00	884.6	8106.0	2.8	1.9	588.1	1.2	758.3	753.2	317.9	310.2	2229.8	6.1	1.1	0.3	37.6	4.8	6.2
7/26/2009 16:00	7/26/2009 17:00	885.0	8111.4	2.8	1.9	589.9	1.2	761.5	756.7	320.9	313.2	2246.5	6.1	1.1	0.3	41.2	4.8	6.2
7/26/2009 17:00	7/26/2009 18:00	888.4	8124.4	2.7	1.9	590.6	1.2	757.7	752.7	318.2	310.2	2257.0	5.9	1.1	0.3	42.5	4.8	6.2
7/26/2009 18:00	7/26/2009 19:00	888.7	8098.9	2.7	1.9	587.0	1.2	753.1	746.4	315.1	306.6	2258.3	5.9	1.1	0.3	39.8	4.8	6.2
7/26/2009 19:00	7/26/2009 20:00	885.9	8079.8	2.7	1.9	581.8	1.2	754.5	746.3	313.8	304.8	2254.6	5.9	1.1	0.3	41.8	4.8	6.2
7/26/2009 20:00	7/26/2009 21:00	889.7	8084.1	2.7	2.0	587.0	1.2	755.7	747.5	312.4	304.2	2268.0	6.0	1.1	0.3	48.2	4.8	6.2
7/26/2009 21:00	7/26/2009 22:00	892.7	8066.4	2.8	2.1	588.0	1.2	763.7	754.3	313.1	304.8	2292.8	6.1	1.1	0.3	40.2	4.8	6.2
7/26/2009 22:00	7/26/2009 23:00	892.0	8099.5	2.9	2.1	587.5	1.2	767.8	758.8	313.9	305.2	2295.2	6.1	1.1	0.3	37.3	4.8	6.2
7/26/2009 23:00	7/27/2009 0:00	890.3	8100.4	2.9	2.1	586.0	1.2	766.7	758.2	313.9	304.7	2290.7	6.1	1.1	0.3	42.1	4.8	6.2
7/27/2009 0:00	7/27/2009 1:00	871.4	8104.6	2.9	2.1	573.0	1.2	765.2	752.8	316.2	306.1	2255.0	5.8	1.1	0.3	30.1	4.8	6.2
7/27/2009 1:00	7/27/2009 2:00	888.6	8082.5	2.9	2.2	582.1	1.2	764.3	747.4	316.4	309.6	2317.0	6.3	1.1	0.3	13.5	4.8	6.2
7/27/2009 2:00	7/27/2009 3:00	893.0	8119.3	2.8	2.2	579.2	1.2	763.3	747.7	307.8	303.4	2326.7	6.3	1.2	0.3	16.7	4.8	6.2
7/27/2009 3:00	7/27/2009 4:00	891.9	8094.3	2.8	2.2	574.0	1.2	768.5	753.2	307.4	302.9	2317.1	6.3	1.2	0.3	23.2	4.8	6.2
7/27/2009 4:00	7/27/2009 5:00	885.9	8129.3	2.8	2.2	569.3	1.2	772.0	756.8	309.6	304.7	2306.7	6.1	1.1	0.3	19.5	4.8	6.2
7/27/2009 5:00	7/27/2009 6:00	774.7	8196.7	2.9	2.3	496.0	1.2	747.9	735.0	316.8	304.1	2064.4	5.7	1.1	0.3	6.1	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/27/2009 6:00	7/27/2009 7:00	675.0	7959.6	3.2	2.4	438.1	1.2	713.4	704.1	313.6	292.9	1886.6	5.1	1.1	0.3	21.5	4.8	6.2
7/27/2009 7:00	7/27/2009 8:00	764.4	7936.2	3.1	2.3	504.6	1.2	737.2	726.8	306.4	293.5	2091.3	5.5	1.1	0.3	16.1	4.8	6.2
7/27/2009 8:00	7/27/2009 9:00	894.4	8029.7	3.0	2.1	590.8	1.2	777.1	763.0	310.9	302.6	2346.7	6.2	1.1	0.3	12.1	4.8	6.2
7/27/2009 9:00	7/27/2009 10:00	899.5	8067.8	3.0	1.9	595.5	1.1	772.5	760.6	311.8	303.1	2309.7	6.3	1.2	0.3	24.5	4.8	6.2
7/27/2009 10:00	7/27/2009 11:00	898.6	8043.3	3.1	1.9	600.8	1.1	777.5	764.9	314.3	306.0	2321.0	6.6	1.2	0.3	27.4	4.8	6.2
7/27/2009 11:00	7/27/2009 12:00	903.0	8042.9	3.1	1.9	608.6	1.1	776.6	765.6	315.8	307.8	2351.7	7.0	1.2	0.3	19.3	4.8	6.2
7/27/2009 12:00	7/27/2009 13:00	906.4	8059.6	3.1	1.9	612.8	1.1	779.4	762.7	317.7	309.4	2345.1	7.4	1.3	0.3	17.6	4.8	6.2
7/27/2009 13:00	7/27/2009 14:00	909.1	8042.4	3.2	1.9	617.0	1.1	783.5	762.3	318.6	309.1	2339.8	7.4	1.3	0.3	21.3	4.8	6.2
7/27/2009 14:00	7/27/2009 15:00	909.7	8027.8	3.2	1.8	617.8	1.1	782.7	766.5	320.3	311.9	2333.2	7.2	1.3	0.3	22.5	4.8	6.2
7/27/2009 15:00	7/27/2009 16:00	910.2	8024.3	3.0	1.7	615.9	1.1	780.6	768.8	320.8	313.8	2315.6	7.3	1.3	0.3	35.6	4.8	6.2
7/27/2009 16:00	7/27/2009 17:00	907.2	8022.7	2.6	1.5	621.8	1.1	772.6	763.1	321.5	314.3	2274.6	7.0	1.3	0.3	58.7	4.8	6.2
7/27/2009 17:00	7/27/2009 18:00	909.9	8028.0	2.8	1.7	631.7	1.1	774.5	765.0	318.9	312.1	2312.8	7.1	1.3	0.3	48.5	4.8	6.2
7/27/2009 18:00	7/27/2009 19:00	895.5	8092.4	3.0	1.9	623.4	1.1	764.9	756.7	313.5	306.5	2343.2	6.7	1.3	0.3	16.5	4.8	6.2
7/27/2009 19:00	7/27/2009 20:00	889.1	8042.9	3.0	1.9	618.5	1.1	763.7	753.5	309.3	302.6	2327.2	6.6	1.3	0.3	16.9	4.8	6.2
7/27/2009 20:00	7/27/2009 21:00	900.3	8037.8	3.0	1.9	621.4	1.1	767.9	757.5	309.1	302.8	2352.3	6.8	1.3	0.3	26.9	4.8	6.2
7/27/2009 21:00	7/27/2009 22:00	903.6	8039.5	3.1	1.9	621.0	1.1	770.5	760.4	308.0	302.9	2368.2	7.1	1.4	0.3	26.2	4.8	6.2
7/27/2009 22:00	7/27/2009 23:00	905.7	8045.0	3.1	1.9	619.0	1.1	771.2	761.1	307.3	302.8	2373.8	7.1	1.4	0.3	18.1	4.8	6.2
7/27/2009 23:00	7/28/2009 0:00	903.6	8065.5	3.1	2.0	615.6	1.1	771.4	759.7	306.4	301.6	2357.5	7.3	1.4	0.3	17.8	4.8	6.2
7/28/2009 0:00	7/28/2009 1:00	892.3	8097.8	3.0	1.9	603.4	1.1	763.6	748.0	307.7	299.5	2327.3	7.2	1.4	0.3	17.8	4.8	6.2
7/28/2009	7/28/2009	886.1	8085.8	3.1	2.0	596.9	1.1	754.6	748.5	305.1	296.6	2319.9	6.7	1.3	0.3	13.5	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
1:00	2:00																	
7/28/2009 2:00	7/28/2009 3:00	893.0	8051.8	3.1	1.9	601.3	1.1	761.9	755.9	304.7	296.9	2327.0	6.5	1.3	0.3	16.0	4.8	6.2
7/28/2009 3:00	7/28/2009 4:00	898.2	8032.7	3.1	1.9	605.9	1.1	768.3	761.8	305.5	298.0	2342.4	6.4	1.3	0.3	18.7	4.8	6.2
7/28/2009 4:00	7/28/2009 5:00	894.9	8027.8	3.1	1.9	610.7	1.1	773.6	765.7	307.1	299.6	2347.6	6.8	1.4	0.3	13.6	4.8	6.2
7/28/2009 5:00	7/28/2009 6:00	902.8	8022.3	2.9	1.6	621.9	1.1	768.7	762.7	309.1	301.4	2349.0	7.4	1.4	0.3	36.5	4.8	6.2
7/28/2009 6:00	7/28/2009 7:00	911.4	8021.2	2.8	1.6	626.0	1.1	762.9	759.4	306.1	299.6	2360.7	7.8	1.5	0.3	50.7	4.8	6.2
7/28/2009 7:00	7/28/2009 8:00	911.8	8006.5	5.1	2.7	625.6	1.1	769.4	764.5	306.9	300.4	2363.9	9.3	1.5	0.3	46.5	4.8	6.2
7/28/2009 8:00	7/28/2009 9:00	907.7	8006.0	4.4	2.0	631.7	1.1	764.6	759.8	307.0	300.4	2373.8	11.0	1.6	0.4	31.2	4.8	6.2
7/28/2009 9:00	7/28/2009 10:00	909.3	8002.7	2.9	1.5	637.7	1.1	755.7	751.1	304.2	298.1	2361.4	10.0	1.7	0.4	34.2	4.8	6.2
7/28/2009 10:00	7/28/2009 11:00	909.9	8041.8	2.8	1.7	641.0	1.1	757.1	751.1	305.1	298.8	2354.7	7.9	1.7	0.4	36.2	4.8	6.2
7/28/2009 11:00	7/28/2009 12:00	910.7	8050.5	2.8	1.6	643.9	1.1	754.3	747.7	305.7	298.9	2363.6	7.2	1.7	0.4	28.6	4.8	6.2
7/28/2009 12:00	7/28/2009 13:00	914.6	8043.7	2.8	1.5	635.8	1.1	757.8	752.2	307.4	301.3	2349.8	6.9	1.6	0.4	35.4	4.8	6.2
7/28/2009 13:00	7/28/2009 14:00	909.7	8031.7	2.8	1.4	626.1	1.1	762.0	756.7	309.4	303.4	2326.3	6.5	1.4	0.4	47.6	4.8	6.2
7/28/2009 14:00	7/28/2009 15:00	909.8	8031.9	2.8	1.4	631.3	1.1	762.0	757.8	311.3	305.2	2329.0	6.5	1.4	0.4	54.1	4.8	6.2
7/28/2009 15:00	7/28/2009 16:00	912.1	8013.2	2.8	1.4	634.9	1.1	761.0	756.4	311.6	305.6	2319.1	6.5	1.4	0.4	55.4	4.8	6.2
7/28/2009 16:00	7/28/2009 17:00	912.5	8027.2	2.8	1.4	636.8	1.1	765.2	758.4	313.3	307.5	2328.2	6.7	1.4	0.4	53.9	4.8	6.2
7/28/2009 17:00	7/28/2009 18:00	914.5	8011.6	2.8	1.4	627.6	1.1	767.2	761.5	314.3	308.6	2321.8	6.9	1.4	0.4	59.6	4.8	6.2
7/28/2009 18:00	7/28/2009 19:00	913.0	8002.8	2.8	1.4	617.6	1.1	772.2	766.9	315.0	310.3	2303.9	6.6	1.3	0.4	59.9	4.8	6.2
7/28/2009 19:00	7/28/2009 20:00	911.2	7989.8	2.8	1.4	617.5	1.1	777.3	771.9	316.2	312.1	2293.9	6.3	1.3	0.4	57.7	4.8	6.2
7/28/2009 20:00	7/28/2009 21:00	911.0	8019.5	2.8	1.4	611.4	1.1	771.2	767.6	316.7	312.7	2288.5	6.2	1.3	0.4	42.6	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/28/2009 21:00	7/28/2009 22:00	909.2	8012.8	2.8	1.5	609.5	1.1	764.2	759.0	312.3	307.1	2283.9	6.0	1.3	0.4	32.7	4.8	6.2
7/28/2009 22:00	7/28/2009 23:00	910.5	8005.7	2.7	1.5	610.0	1.1	772.9	767.4	312.6	307.1	2289.6	6.0	1.3	0.4	31.8	4.8	6.2
7/28/2009 23:00	7/29/2009 0:00	911.6	8010.4	2.7	1.5	608.4	1.1	780.3	774.4	313.9	307.8	2304.6	6.0	1.3	0.4	30.0	4.8	6.2
7/29/2009 0:00	7/29/2009 1:00	911.4	8011.7	2.7	1.5	607.0	1.1	775.0	769.3	314.2	307.4	2314.1	5.9	1.3	0.4	22.5	4.8	6.2
7/29/2009 1:00	7/29/2009 2:00	910.9	8006.9	2.7	1.5	601.7	1.1	768.1	760.9	309.5	302.1	2297.5	5.8	1.2	0.4	22.0	4.8	6.2
7/29/2009 2:00	7/29/2009 3:00	900.4	7986.7	2.7	1.6	591.9	1.1	774.7	755.0	309.6	299.2	2269.6	5.7	1.2	0.4	21.8	4.8	6.2
7/29/2009 3:00	7/29/2009 4:00	896.8	7990.6	3.0	1.9	600.5	1.1	773.8	761.5	308.9	299.6	2333.1	5.7	1.2	0.4	10.9	4.8	6.2
7/29/2009 4:00	7/29/2009 5:00	907.6	8041.7	3.1	2.1	603.5	1.1	770.5	762.2	307.2	299.7	2382.7	6.0	1.2	0.4	4.2	4.8	6.2
7/29/2009 5:00	7/29/2009 6:00	910.5	8041.3	3.1	2.1	606.4	1.1	773.8	763.8	305.0	296.9	2394.5	6.2	1.2	0.3	6.7	4.8	6.2
7/29/2009 6:00	7/29/2009 7:00	910.7	8041.3	3.1	2.1	608.0	1.1	783.2	772.2	308.7	299.0	2398.5	8.5	1.2	0.3	6.5	4.8	6.2
7/29/2009 7:00	7/29/2009 8:00	909.9	8041.3	3.1	2.0	605.4	1.1	777.0	765.6	308.0	299.8	2390.1	11.1	1.2	0.3	6.6	4.8	6.2
7/29/2009 8:00	7/29/2009 9:00	909.0	8041.3	3.2	2.0	609.8	1.1	780.8	769.1	307.8	299.7	2392.0	11.3	1.2	0.3	10.1	4.8	6.2
7/29/2009 9:00	7/29/2009 10:00	910.7	8041.3	3.2	2.0	614.4	1.1	786.6	774.9	310.1	302.4	2381.1	11.3	1.2	0.3	7.8	4.8	6.2
7/29/2009 10:00	7/29/2009 11:00	913.6	8041.3	3.2	2.0	615.8	1.1	790.8	779.1	312.6	304.8	2398.8	11.3	1.2	0.3	6.0	4.8	6.2
7/29/2009 11:00	7/29/2009 12:00	915.1	8041.3	3.1	2.0	614.6	1.1	794.4	783.5	314.8	307.1	2385.0	11.0	1.3	0.3	7.0	4.8	6.2
7/29/2009 12:00	7/29/2009 13:00	913.3	8041.3	3.1	2.1	612.3	1.1	797.1	786.5	316.9	309.4	2378.8	10.9	1.2	0.3	8.1	4.8	6.2
7/29/2009 13:00	7/29/2009 14:00	914.0	8041.3	3.1	2.1	609.5	1.1	799.7	789.0	318.5	311.7	2367.6	10.6	1.2	0.3	11.0	4.8	6.2
7/29/2009 14:00	7/29/2009 15:00	912.1	8041.3	3.1	2.1	609.2	1.1	799.0	788.6	320.7	314.0	2370.8	9.8	1.2	0.3	11.1	4.8	6.2
7/29/2009 15:00	7/29/2009 16:00	912.8	8041.3	3.1	2.1	608.4	1.1	788.4	777.7	320.0	313.3	2367.5	8.5	1.2	0.3	11.3	4.8	6.2
7/29/2009	7/29/2009	914.3	8041.3	3.2	2.0	605.4	1.1	777.7	767.9	318.0	311.7	2364.3	8.3	1.2	0.3	8.5	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
16:00	17:00																	
7/29/2009 17:00	7/29/2009 18:00	912.1	8041.3	3.1	2.1	606.0	1.1	774.3	764.3	316.2	309.8	2349.8	8.2	1.2	0.3	8.5	4.8	6.2
7/29/2009 18:00	7/29/2009 19:00	911.9	8041.3	3.1	2.1	608.9	1.1	774.4	765.4	315.8	309.7	2334.7	8.2	1.2	0.3	7.1	4.8	6.2
7/29/2009 19:00	7/29/2009 20:00	911.8	8041.3	3.1	2.1	611.9	1.1	775.7	766.2	316.2	309.9	2326.2	7.9	1.2	0.3	6.8	4.8	6.2
7/29/2009 20:00	7/29/2009 21:00	913.2	8041.3	3.1	2.0	613.5	1.1	779.1	769.9	313.3	307.5	2342.0	7.7	1.2	0.3	9.1	4.8	6.2
7/29/2009 21:00	7/29/2009 22:00	914.0	8041.3	3.1	2.0	612.7	1.1	779.3	772.4	306.5	299.6	2375.9	8.4	1.2	0.3	8.8	4.8	6.2
7/29/2009 22:00	7/29/2009 23:00	913.6	8041.3	3.2	2.0	612.7	1.1	782.6	774.6	306.4	299.2	2373.7	7.3	1.2	0.3	10.6	4.8	6.2
7/29/2009 23:00	7/30/2009 0:00	915.1	8041.3	3.1	2.0	617.3	1.1	786.0	777.5	308.3	301.8	2374.4	7.3	1.1	0.3	10.6	4.8	6.2
7/30/2009 0:00	7/30/2009 1:00	906.2	8041.3	3.1	2.0	607.2	1.1	787.1	778.1	310.5	303.5	2363.9	7.2	1.1	0.3	11.9	4.8	6.2
7/30/2009 1:00	7/30/2009 2:00	907.6	8041.3	3.1	2.0	605.4	1.1	790.0	781.1	312.2	304.9	2360.9	7.3	1.1	0.3	10.2	4.8	6.2
7/30/2009 2:00	7/30/2009 3:00	903.8	8041.3	3.1	2.0	597.5	1.1	790.7	782.8	312.3	305.1	2361.7	7.1	1.1	0.3	9.0	4.8	6.2
7/30/2009 3:00	7/30/2009 4:00	901.4	8041.3	3.1	2.1	598.4	1.1	792.7	785.1	312.6	305.5	2363.4	7.2	1.1	0.3	8.6	4.8	6.2
7/30/2009 4:00	7/30/2009 5:00	901.7	8041.3	3.1	2.1	599.3	1.1	796.3	788.0	313.9	306.9	2376.0	7.4	1.1	0.3	9.0	4.8	6.2
7/30/2009 5:00	7/30/2009 6:00	908.4	8041.3	3.0	1.9	599.2	1.1	790.9	782.8	314.7	307.1	2371.5	7.8	1.1	0.3	14.2	4.8	6.2
7/30/2009 6:00	7/30/2009 7:00	910.8	8041.3	3.0	1.9	600.1	1.1	777.6	769.1	310.0	302.5	2365.8	8.0	1.2	0.3	19.5	4.8	6.2
7/30/2009 7:00	7/30/2009 8:00	913.5	8041.3	2.9	1.8	599.7	1.1	775.5	765.9	305.6	298.0	2367.3	8.5	1.2	0.3	26.8	4.8	6.2
7/30/2009 8:00	7/30/2009 9:00	911.2	8041.3	2.9	1.8	595.1	1.1	774.1	766.3	302.6	293.3	2351.7	7.6	1.2	0.3	28.5	4.8	6.2
7/30/2009 9:00	7/30/2009 10:00	909.9	8041.3	2.7	1.7	598.7	1.1	776.4	767.4	303.3	292.3	2338.2	7.6	1.2	0.3	38.0	4.8	6.2
7/30/2009 10:00	7/30/2009 11:00	912.3	8041.3	2.8	1.6	599.8	1.1	778.5	769.1	303.1	293.4	2344.3	7.7	1.2	0.3	49.1	4.8	6.2
7/30/2009 11:00	7/30/2009 12:00	911.2	8041.3	2.9	1.7	604.6	1.1	784.8	775.3	304.9	296.4	2344.3	7.8	1.2	0.3	49.7	4.8	6.2

Start Date/ Time	End Date/ Time	Gross Load	Gross HR	A Econ O2	B Econ O2	Fuel Flow	BTU Gain	A APH In	B APH In	A APH Out	B APH Out	Stack Flow	Opacity	SO2 In	SO2 Out	CO	Stack SCEM Elemental Hg	Stack SCEM Total Hg
		MW	Btu/kWh	%	%	Ton/hr		DEGF	DEGF	DEGF	DEGF	KSCF	%	lb/MMB	lb/MMb	PPM	(µg/dNm3) @ 3%O2	(µg/dNm3) @ 3%O2
7/30/2009 12:00	7/30/2009 13:00	912.9	8041.3	2.9	1.7	607.1	1.1	790.3	780.9	309.6	301.2	2345.2	8.9	1.3	0.3	45.1	4.8	6.2
7/30/2009 13:00	7/30/2009 14:00	913.7	8041.3	2.7	1.7	609.5	1.1	780.5	771.3	310.8	302.6	2330.7	9.7	1.3	0.3	38.3	4.8	6.2
7/30/2009 14:00	7/30/2009 15:00	910.3	8041.3	2.7	1.8	609.5	1.1	772.1	762.3	309.6	301.1	2341.7	9.8	1.4	0.3	33.3	4.8	6.2
7/30/2009 15:00	7/30/2009 16:00	910.8	8041.3	2.8	2.0	611.1	1.1	782.3	771.2	312.7	304.0	2342.3	9.8	1.3	0.3	19.0	4.8	6.2
7/30/2009 16:00	7/30/2009 17:00	909.5	8041.3	2.6	1.7	612.5	1.1	779.1	769.8	314.7	306.4	2315.9	9.7	1.4	0.3	40.5	4.8	6.2
7/30/2009 17:00	7/30/2009 18:00	910.9	8041.3	2.8	1.7	622.5	1.1	777.5	768.6	313.0	305.7	2333.9	10.0	1.4	0.3	44.2	4.8	6.2
7/30/2009 18:00	7/30/2009 19:00	911.7	8041.3	2.7	1.7	630.9	1.1	782.5	773.7	313.8	306.8	2338.3	10.5	1.5	0.3	42.3	4.8	6.2
7/30/2009 19:00	7/30/2009 20:00	915.5	8041.3	2.7	1.6	631.3	1.1	785.3	777.9	315.1	308.1	2354.6	11.0	1.5	0.3	44.8	4.8	6.2
7/30/2009 20:00	7/30/2009 21:00	915.2	8041.3	2.7	1.6	623.2	1.1	782.3	774.1	315.3	307.9	2354.6	10.5	1.5	0.3	42.1	4.8	6.2
7/30/2009 21:00	7/30/2009 22:00	849.6	8041.3	2.7	1.9	576.0	1.1	752.6	744.1	310.0	303.1	2193.5	7.7	1.5	0.4	26.1	4.8	6.2
7/30/2009 22:00	7/30/2009 23:00	855.6	8041.3	2.6	1.7	581.5	1.1	754.7	745.4	306.7	299.4	2197.9	7.2	1.5	0.4	31.5	4.8	6.2
7/30/2009 23:00	7/31/2009 0:00	906.1	8041.3	2.6	1.8	610.7	1.1	777.4	767.8	308.8	300.3	2314.2	7.5	1.4	0.4	44.3	4.8	6.2

APPENDIX K DAILY SCEM PLOTS

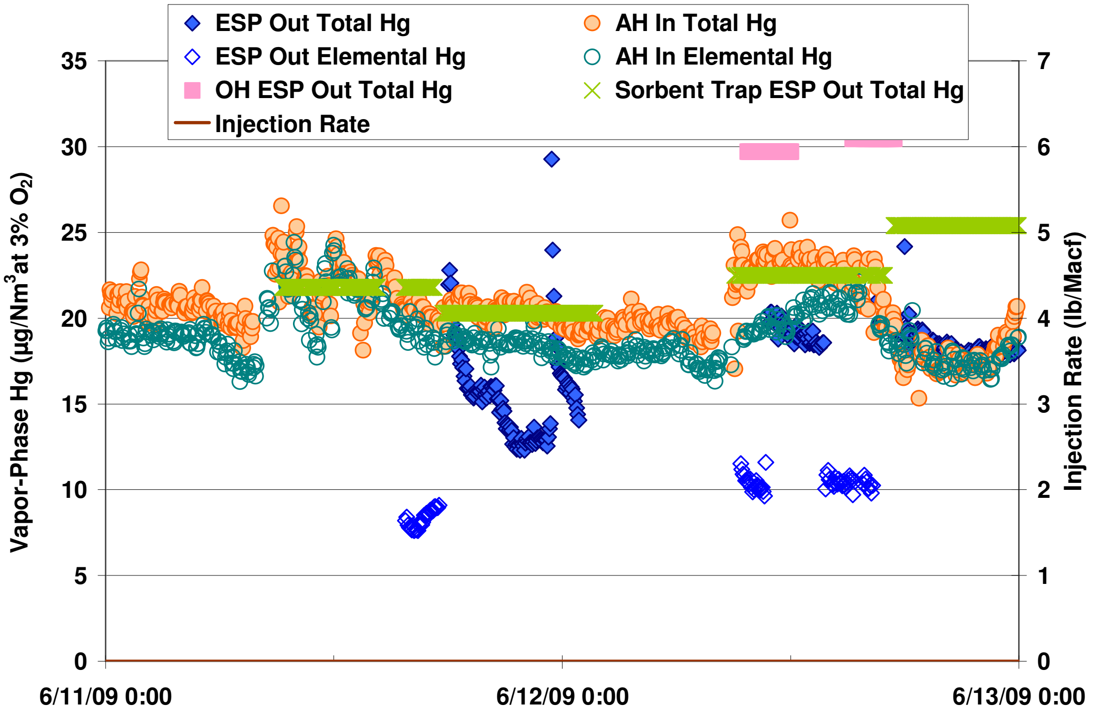


Figure K-1. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/11-6/13

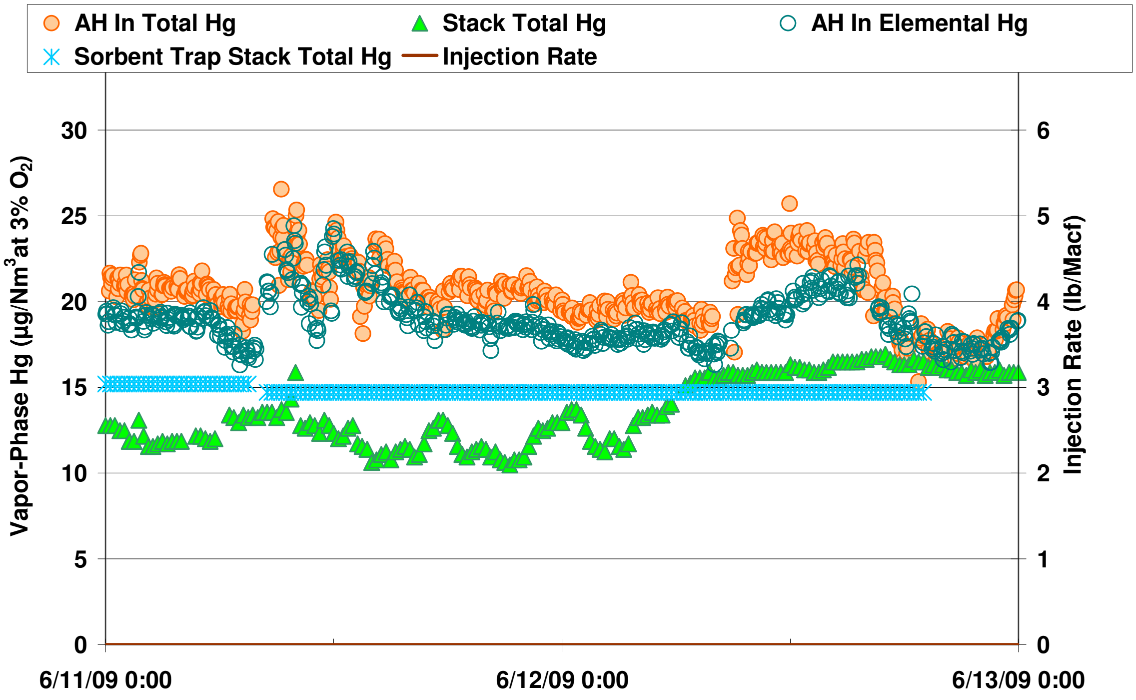


Figure K-2. Flue Gas Hg Concentrations for AH Inlet and Stack 6/11-6/13

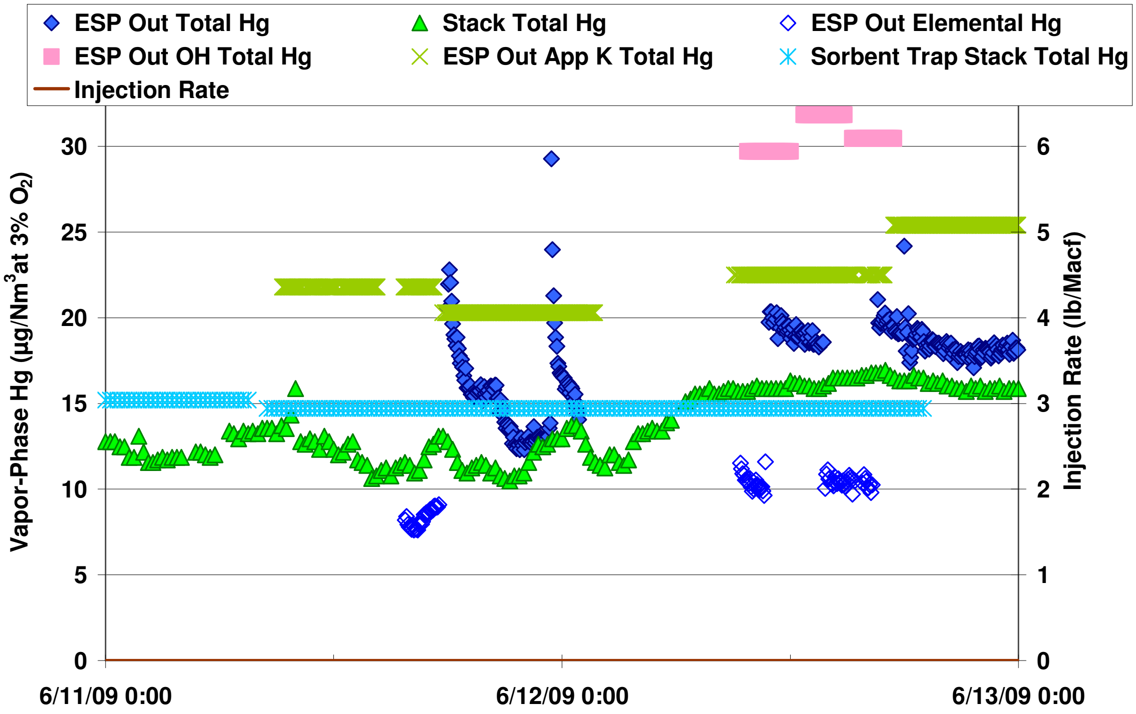


Figure K-3. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/11-6/13

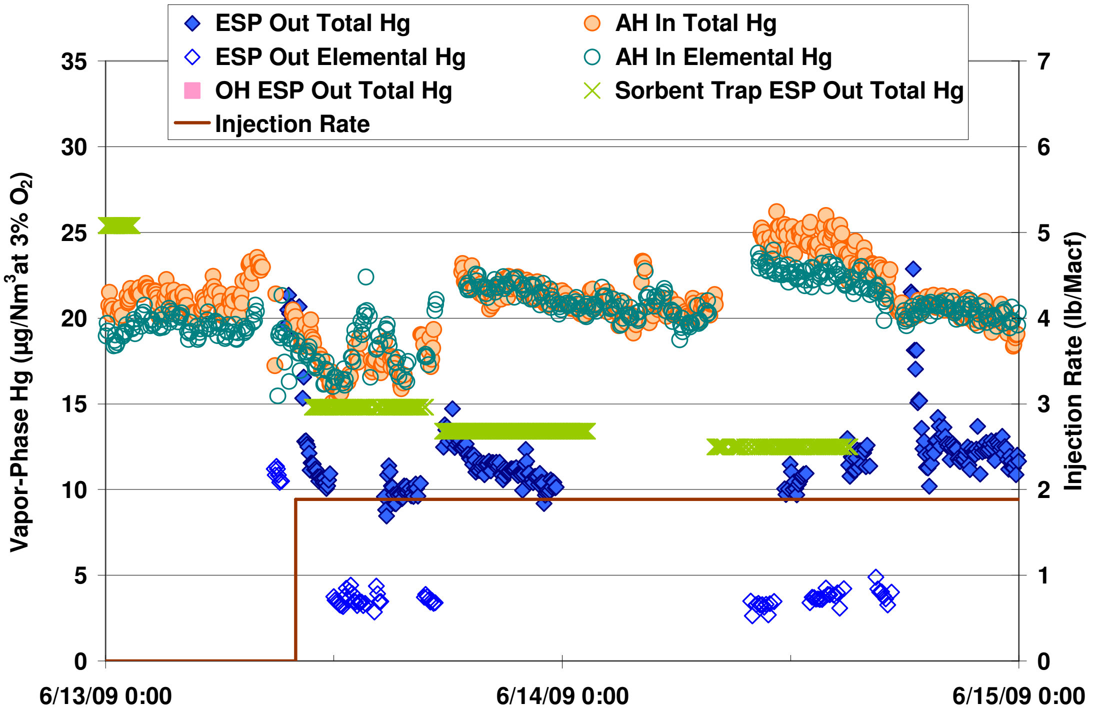


Figure K-4. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/13-6/15

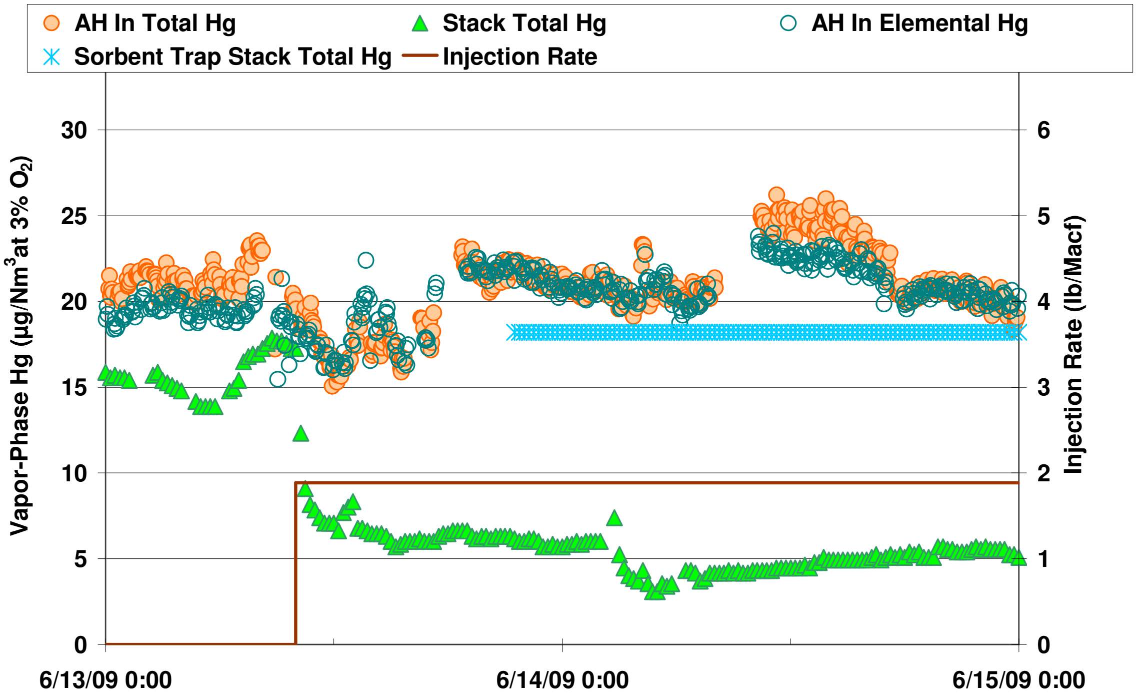


Figure K-5. Flue Gas Hg Concentrations for AH Inlet and Stack 6/13-6/15

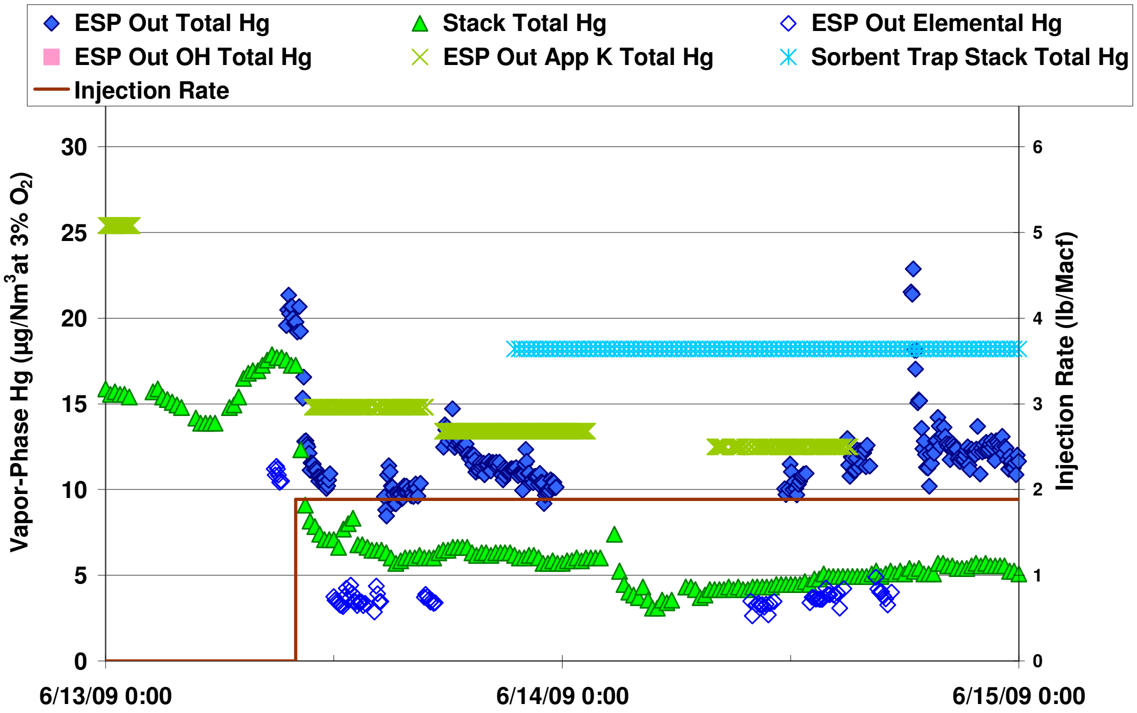


Figure K-6. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/13-6/15

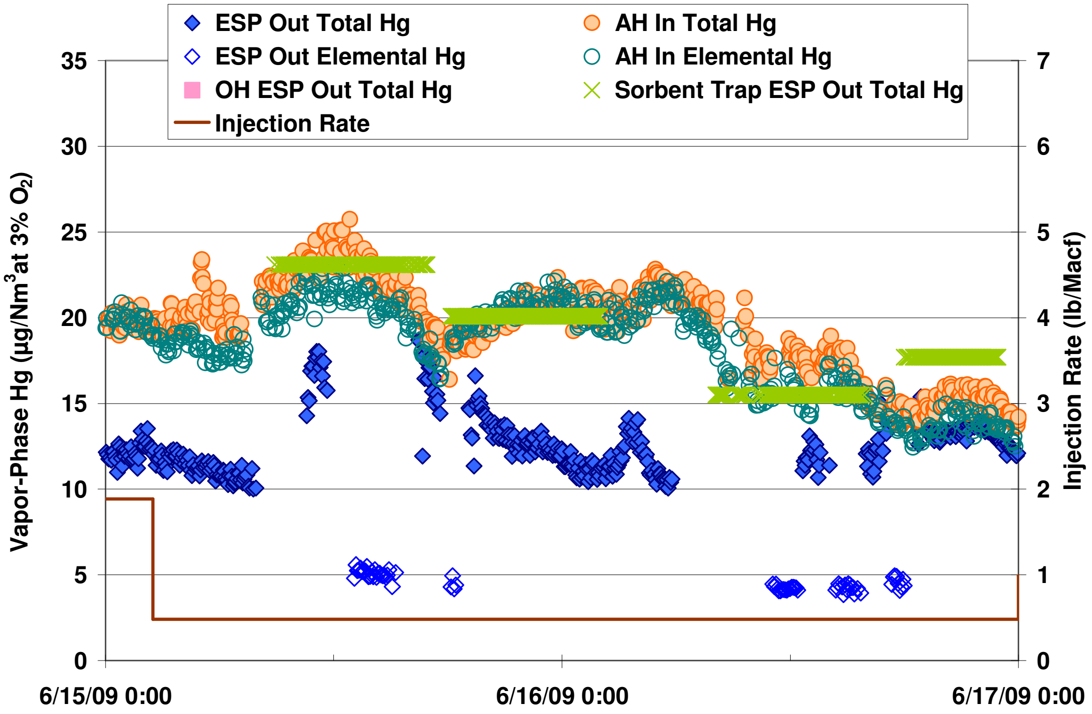


Figure K-7. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/15-6/17

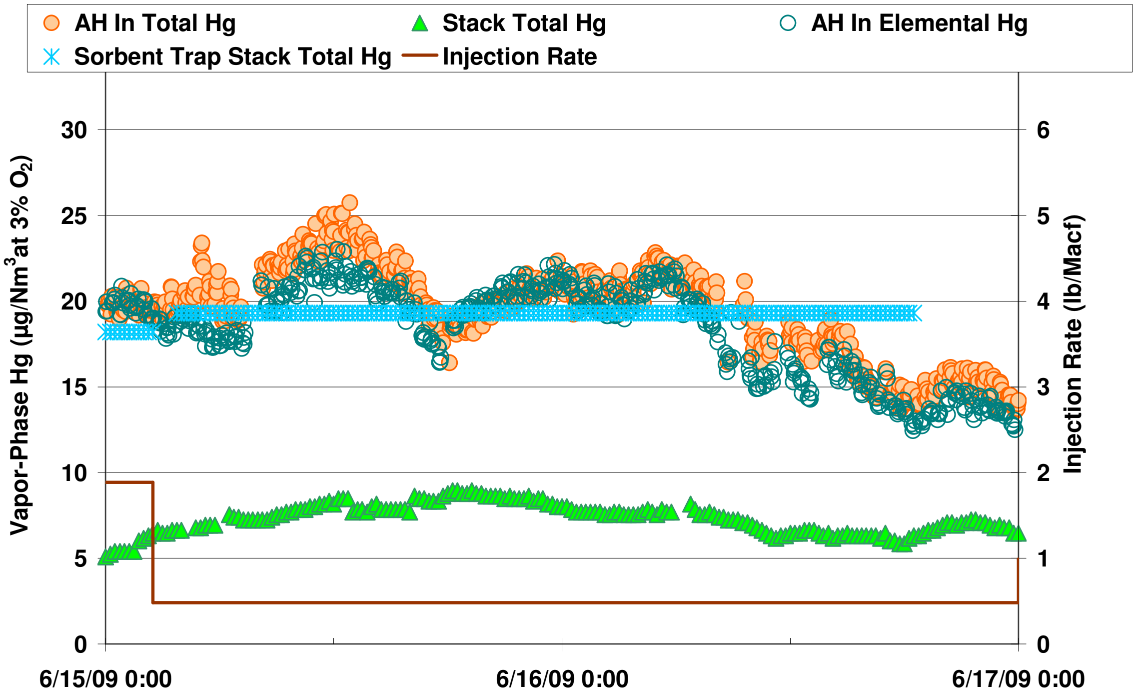


Figure K-8. Flue Gas Hg Concentrations for AH Inlet and Stack 6/15-6/17

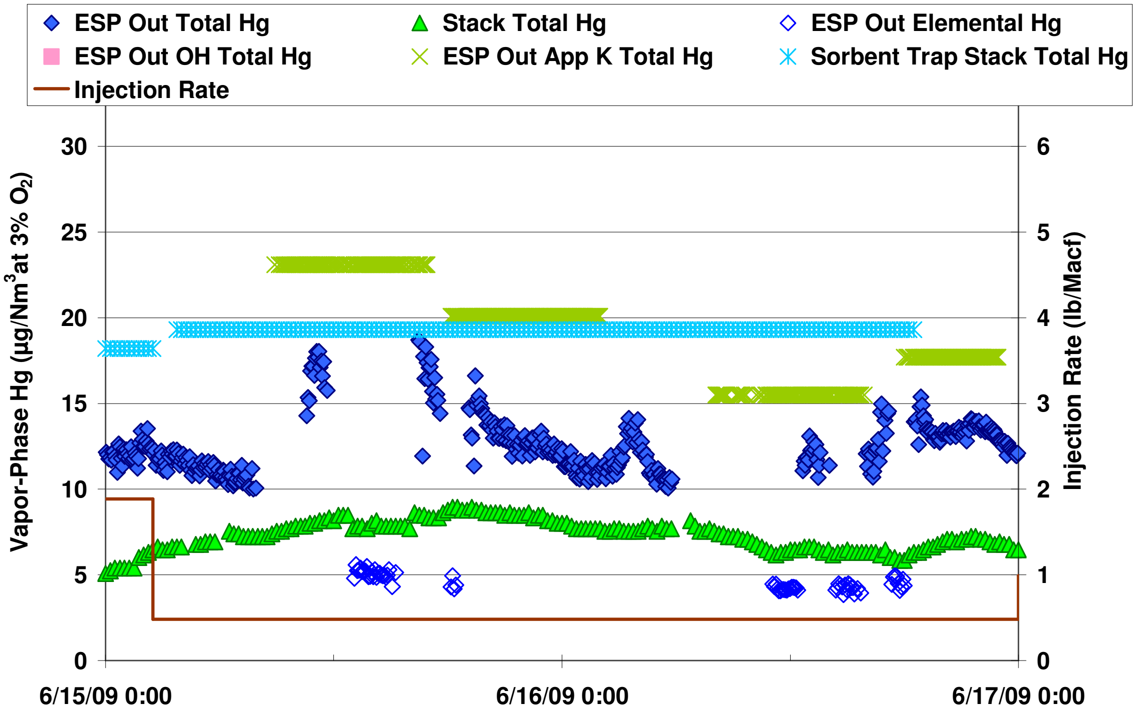


Figure K-9. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/15-6/17

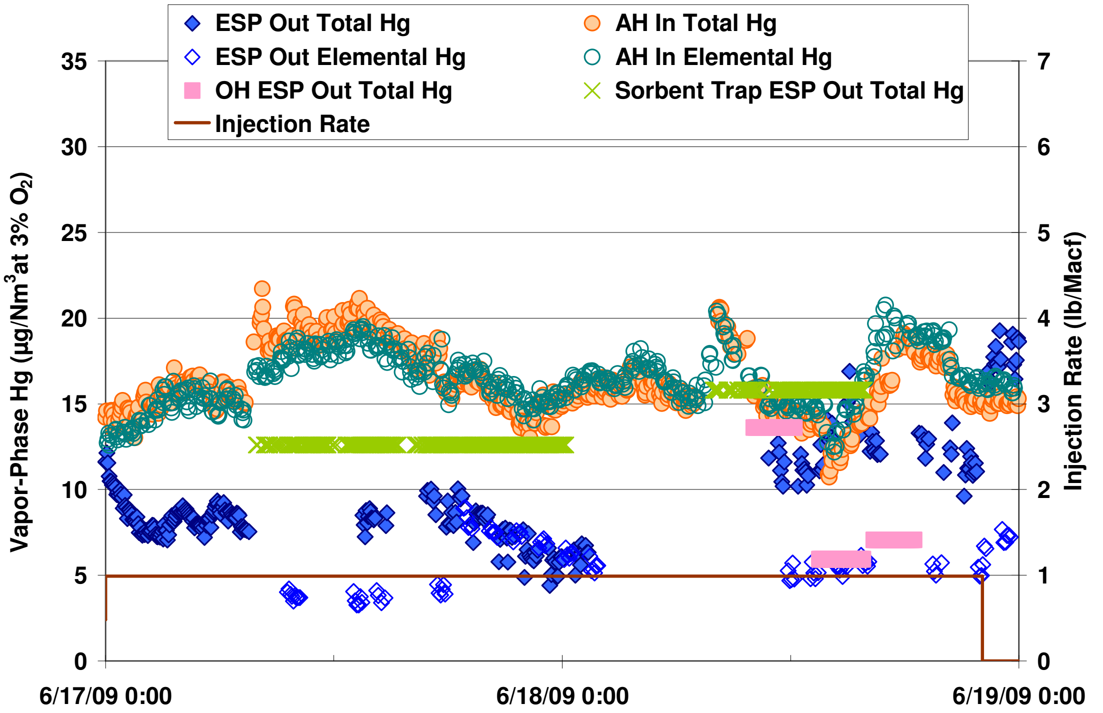


Figure K-10. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/17-6/19

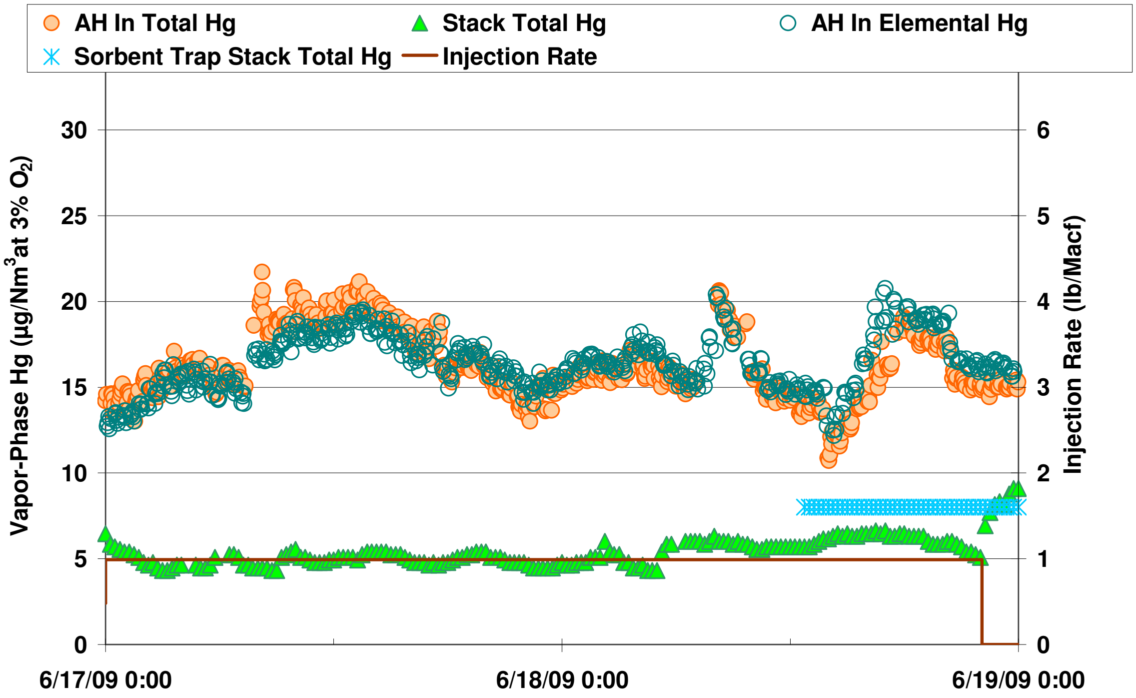


Figure K-11. Flue Gas Hg Concentrations for AH Inlet and Stack 6/17-6/19

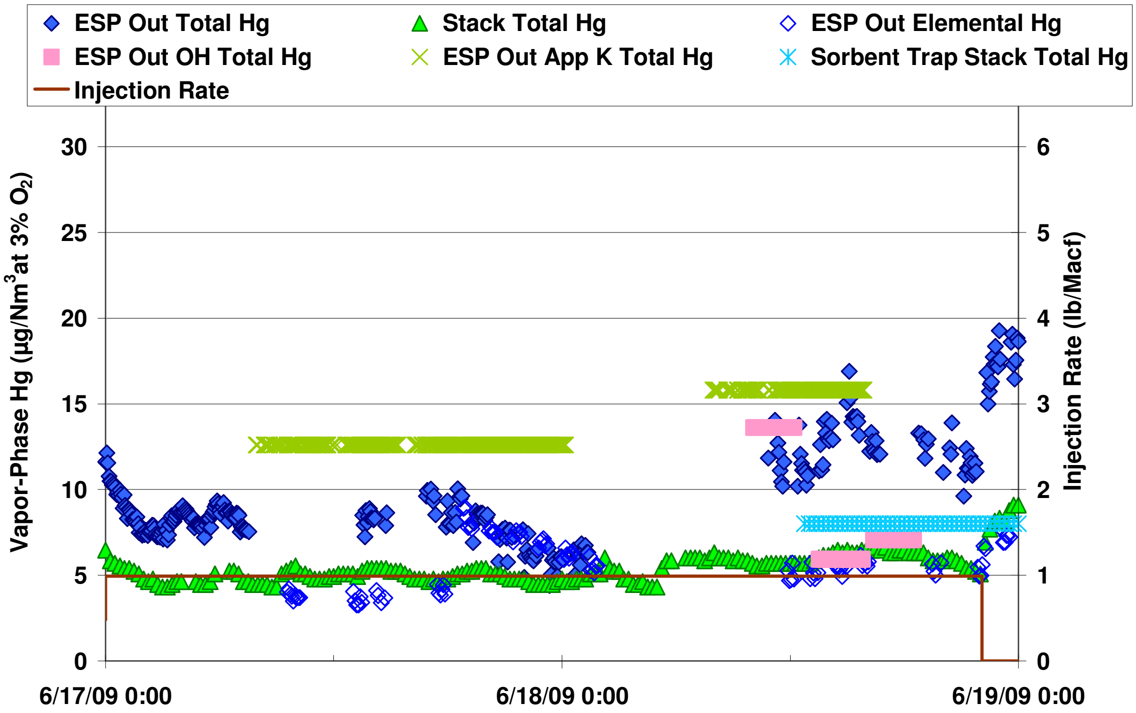


Figure K-12. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/17-6/19

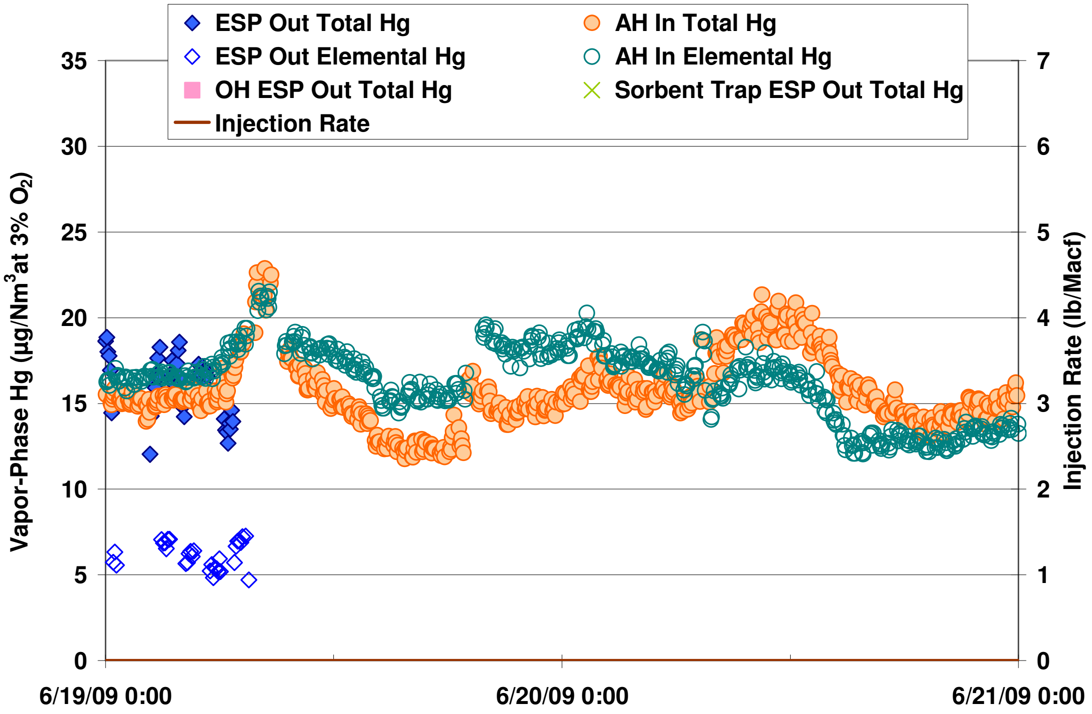


Figure K-13. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/19-6/21

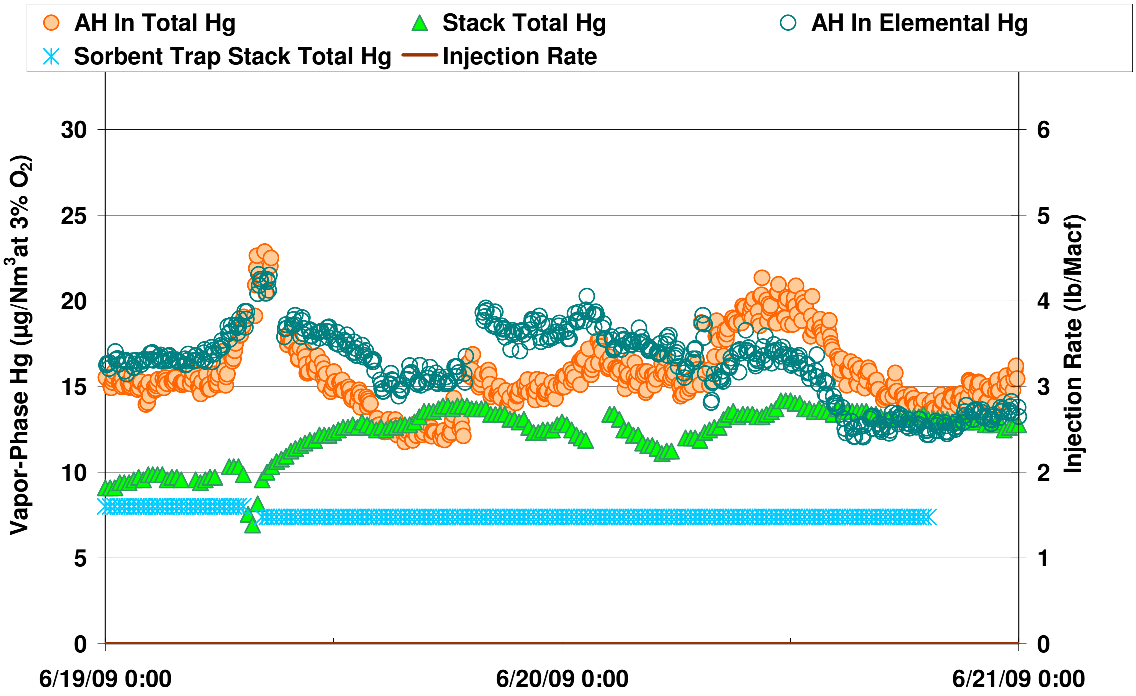


Figure K-14. Flue Gas Hg Concentrations for AH Inlet and Stack 6/19-6/21

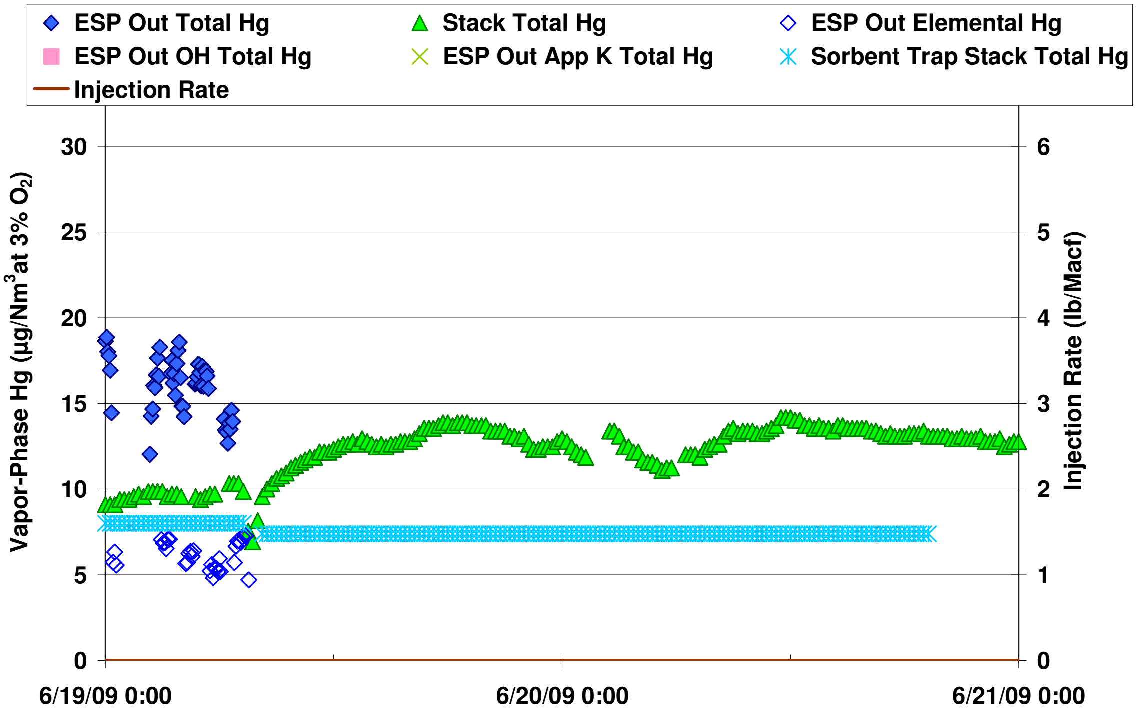


Figure K-15. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/19-6/21

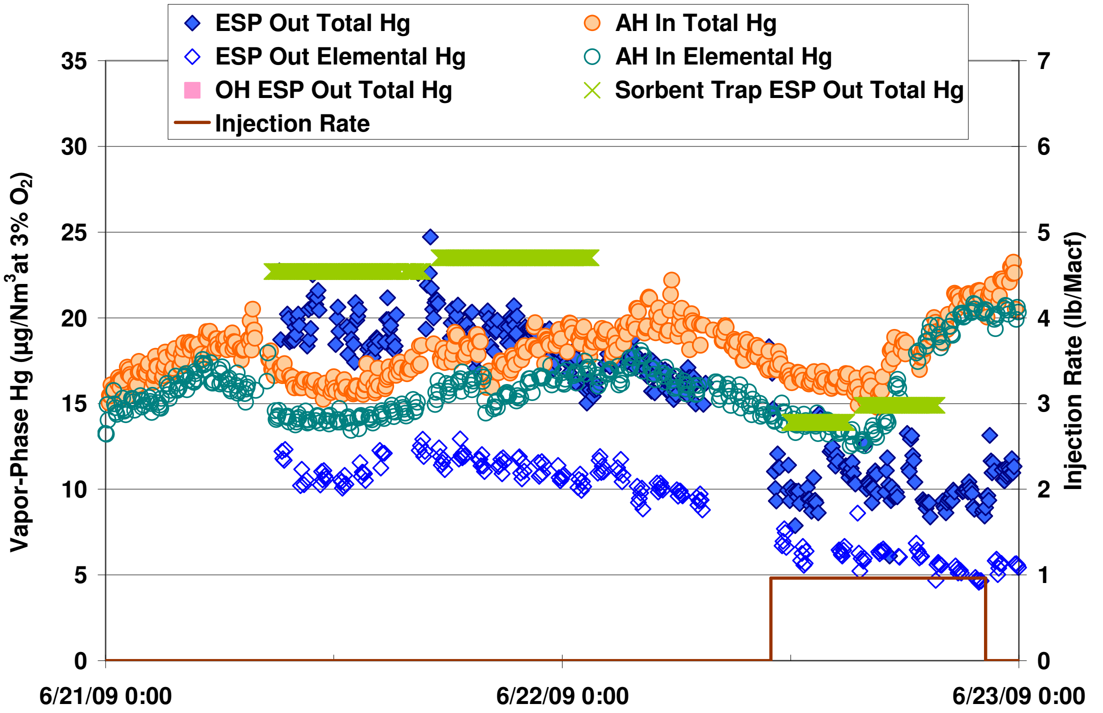


Figure K-16. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/21-6/23

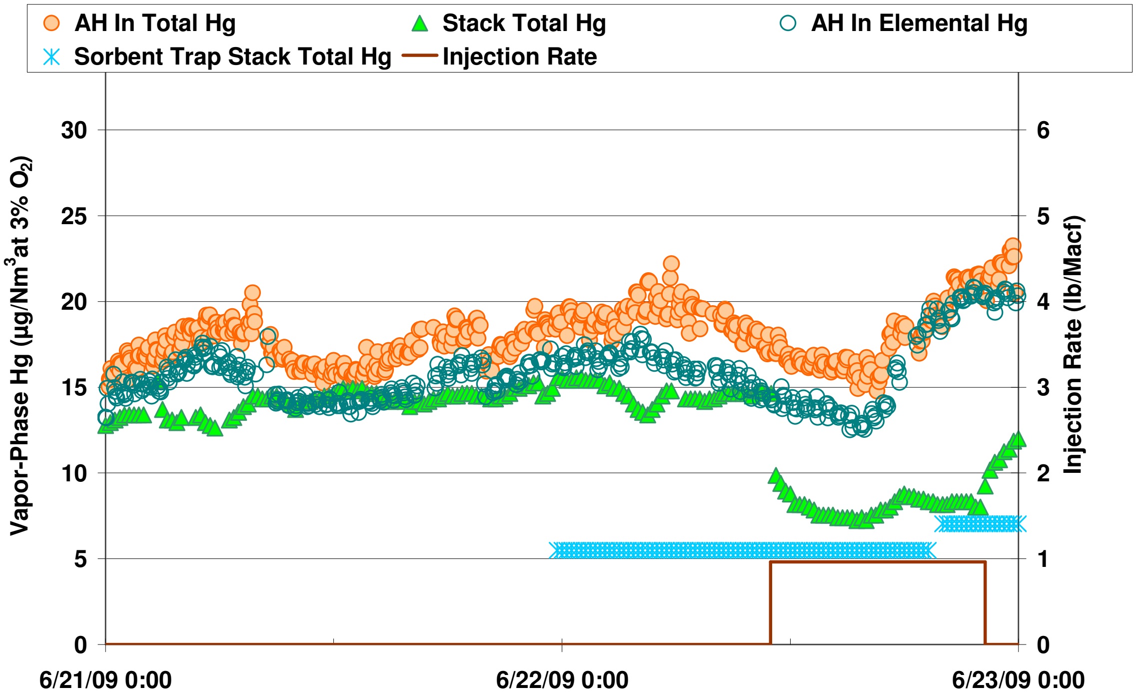


Figure K-17. Flue Gas Hg Concentrations for AH Inlet and Stack 6/21-6/23

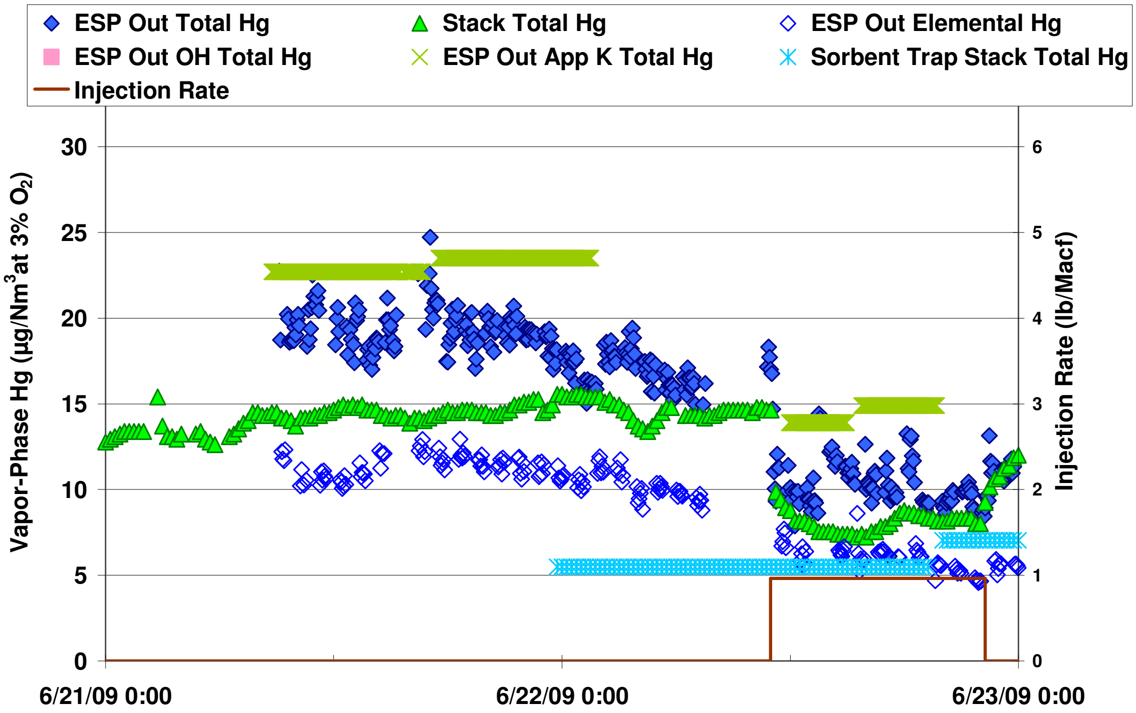


Figure K-18. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/21-6/23

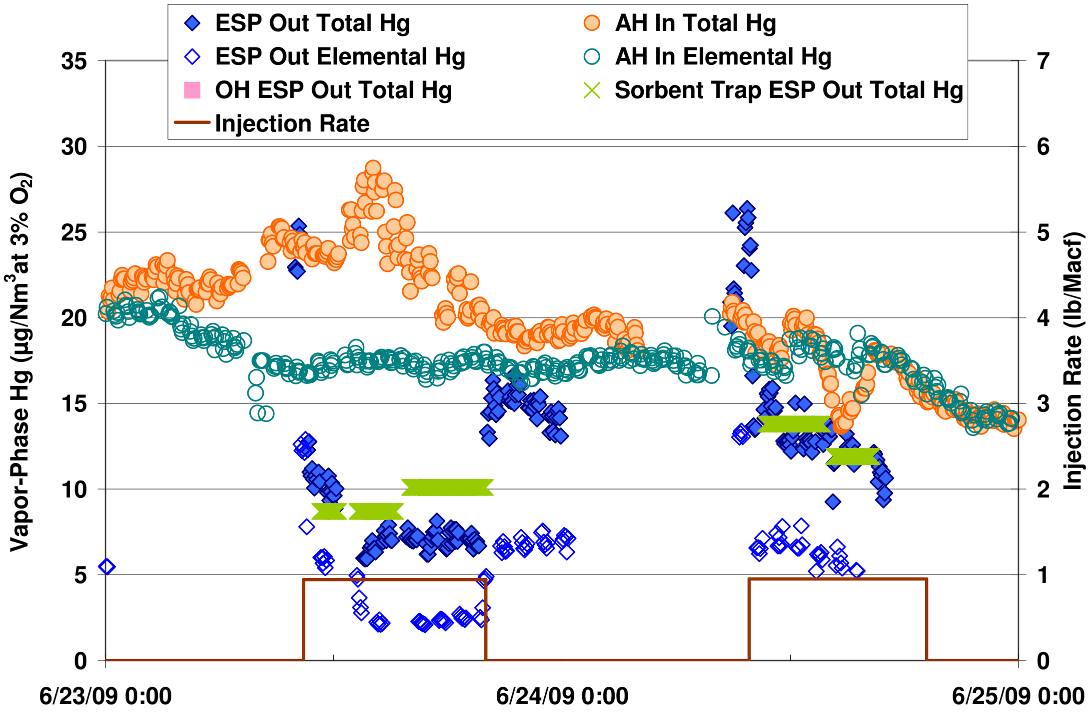


Figure K-19. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/23-6/25

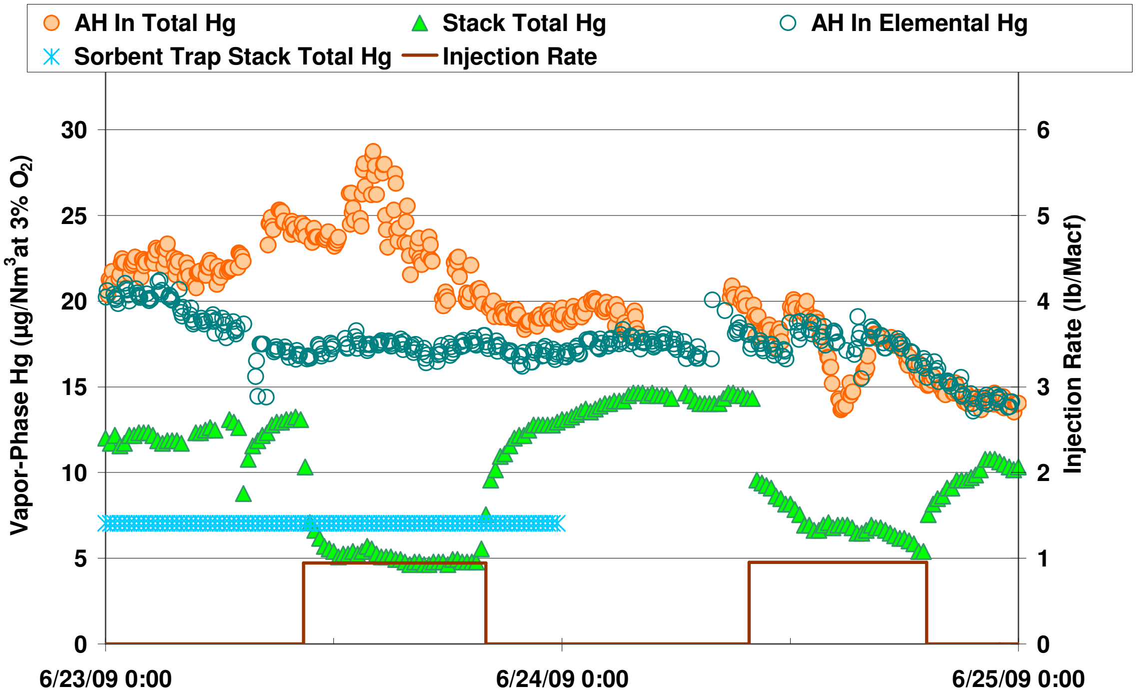


Figure K-20. Flue Gas Hg Concentrations for AH Inlet and Stack 6/23-6/25

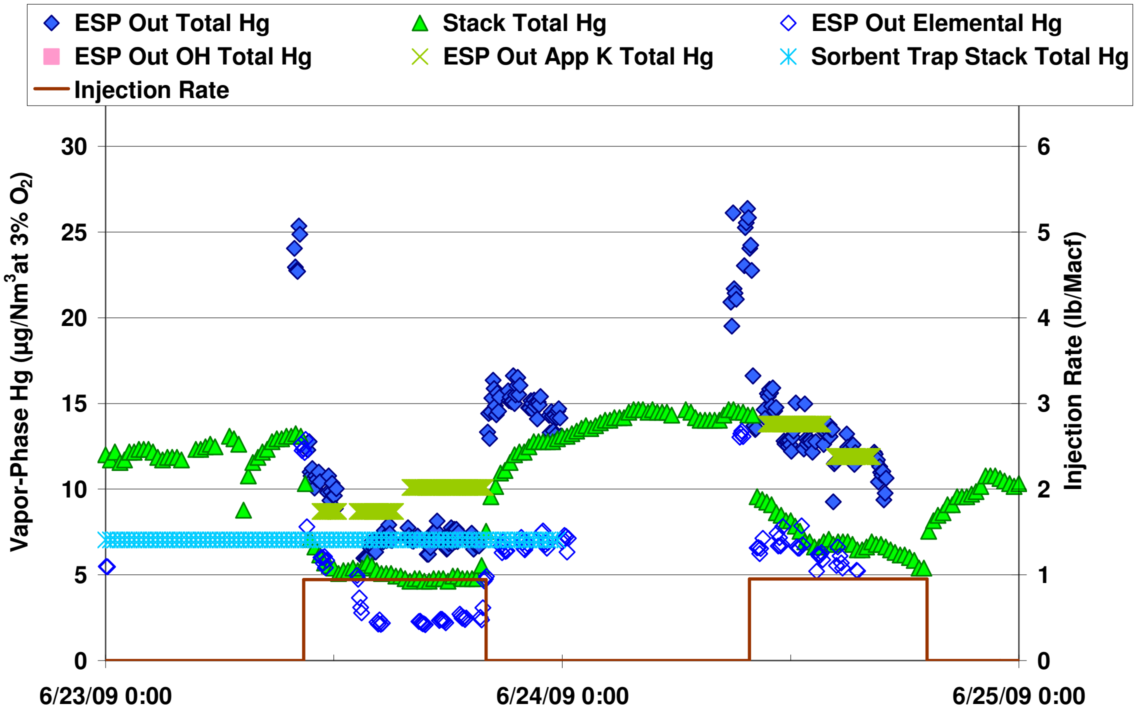


Figure K-21. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/23-6/25

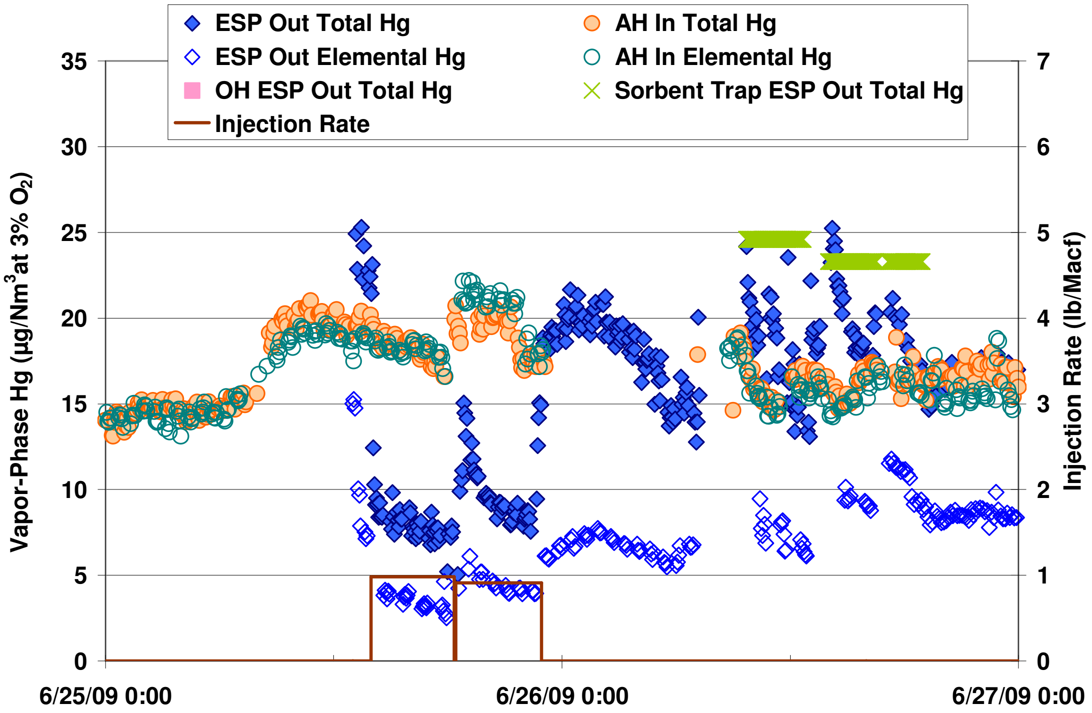


Figure K-22. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/25-6/27

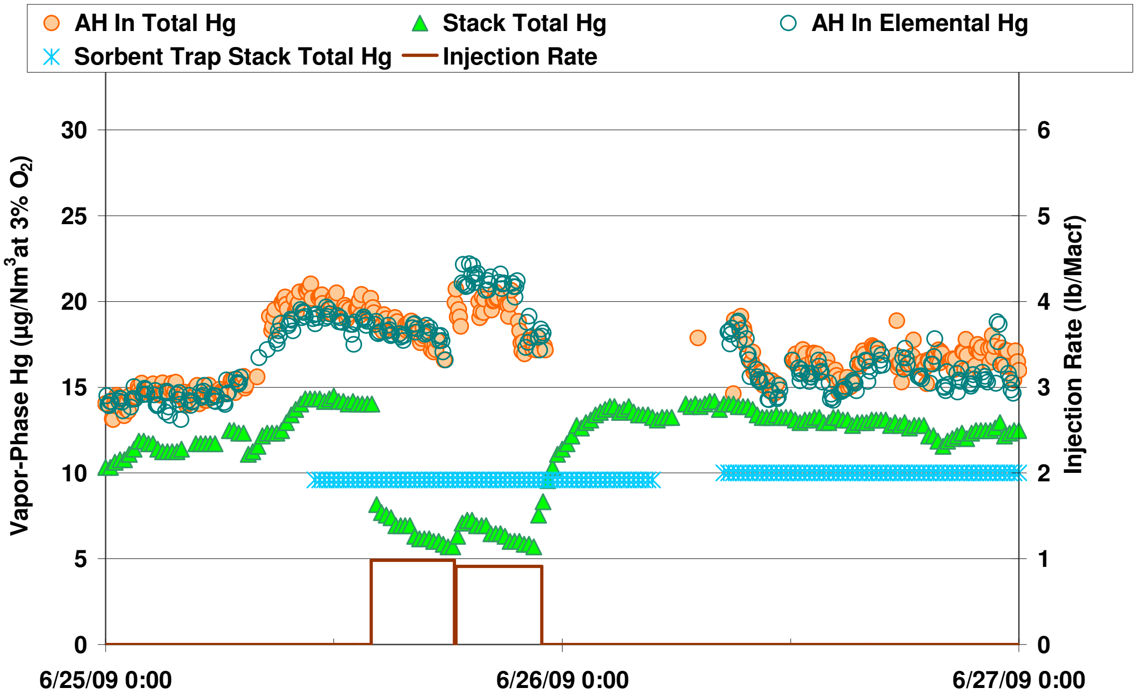


Figure K-23. Flue Gas Hg Concentrations for AH Inlet and Stack 6/25-6/27

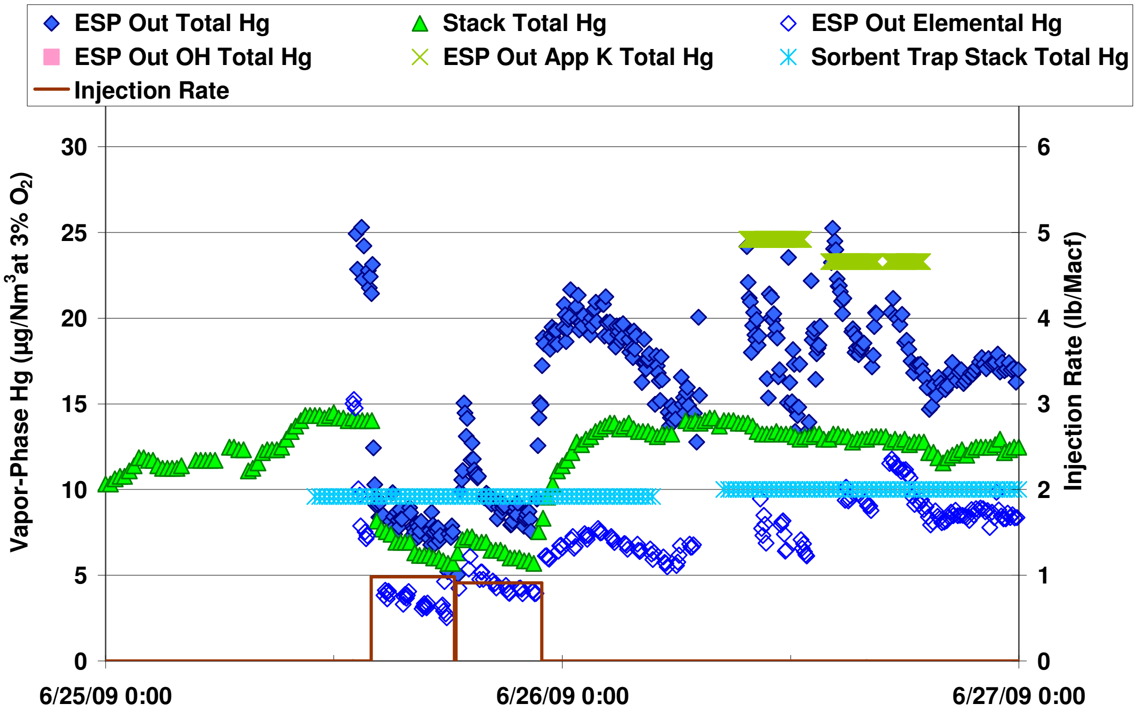


Figure K-24. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/25-6/27

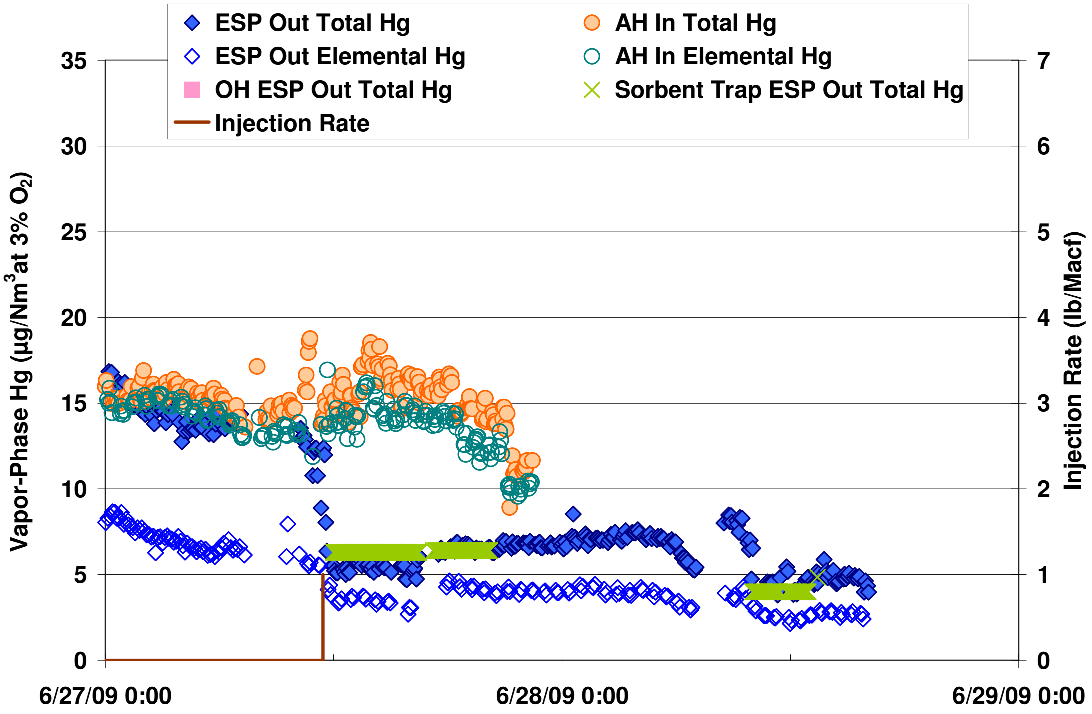


Figure K-25. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 6/27-6/29

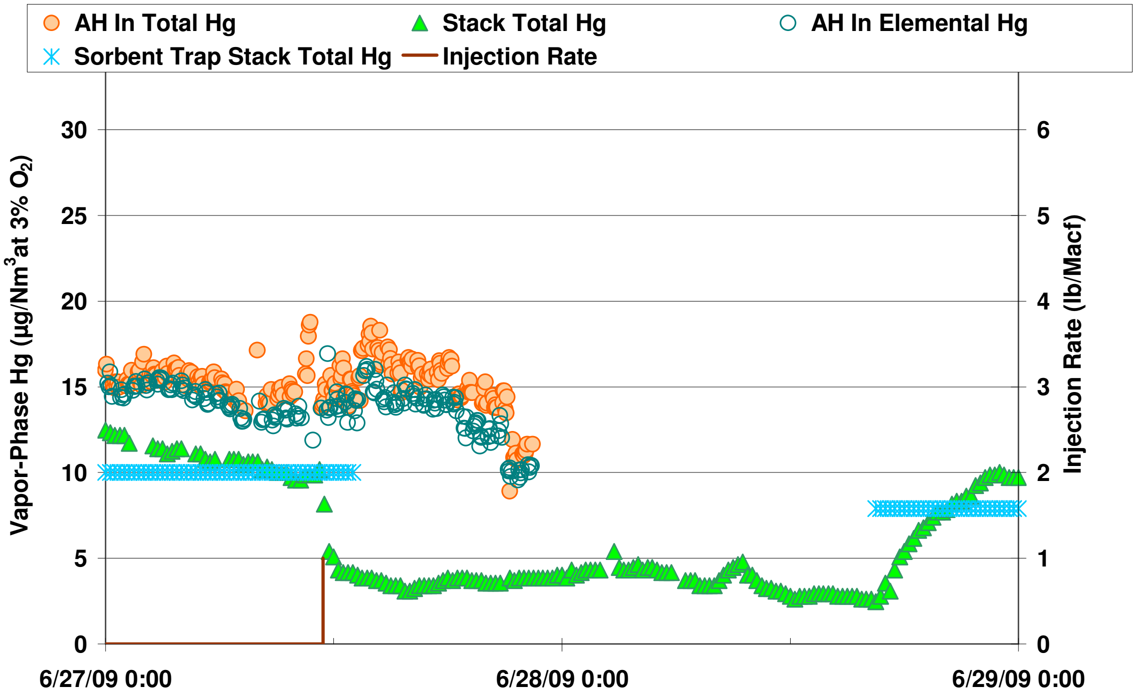


Figure K-26. Flue Gas Hg Concentrations for AH Inlet and Stack 6/27-6/29

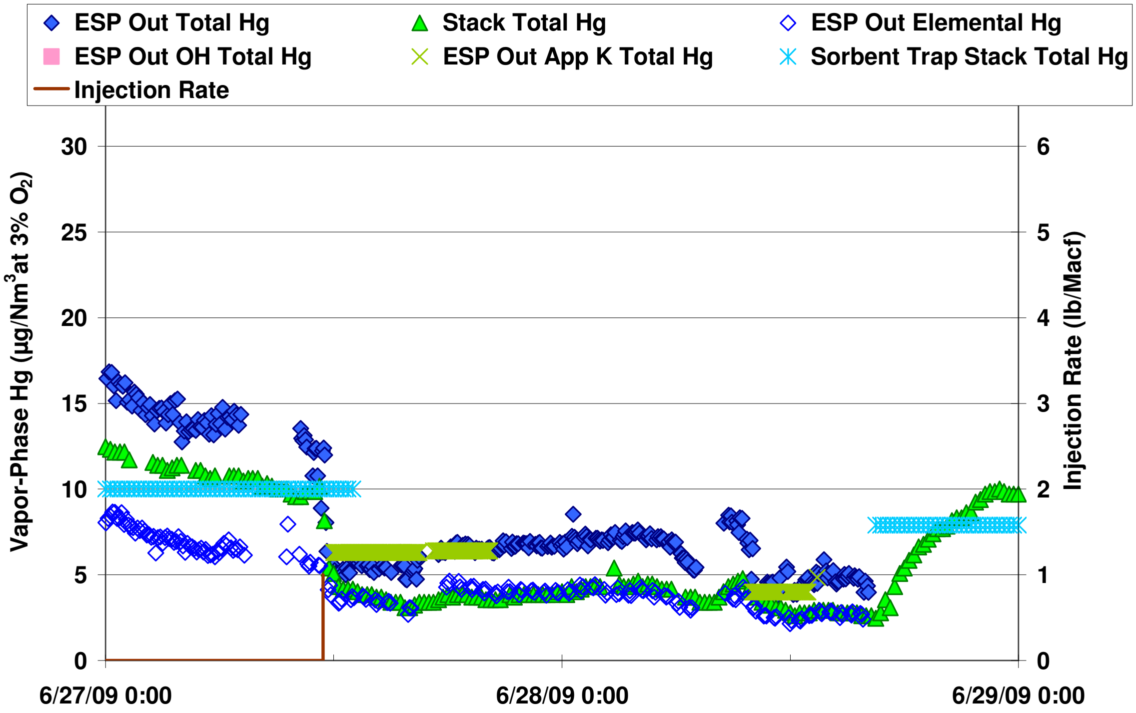


Figure K-27. Flue Gas Hg Concentrations for ESP Outlet and Stack 6/27-6/29

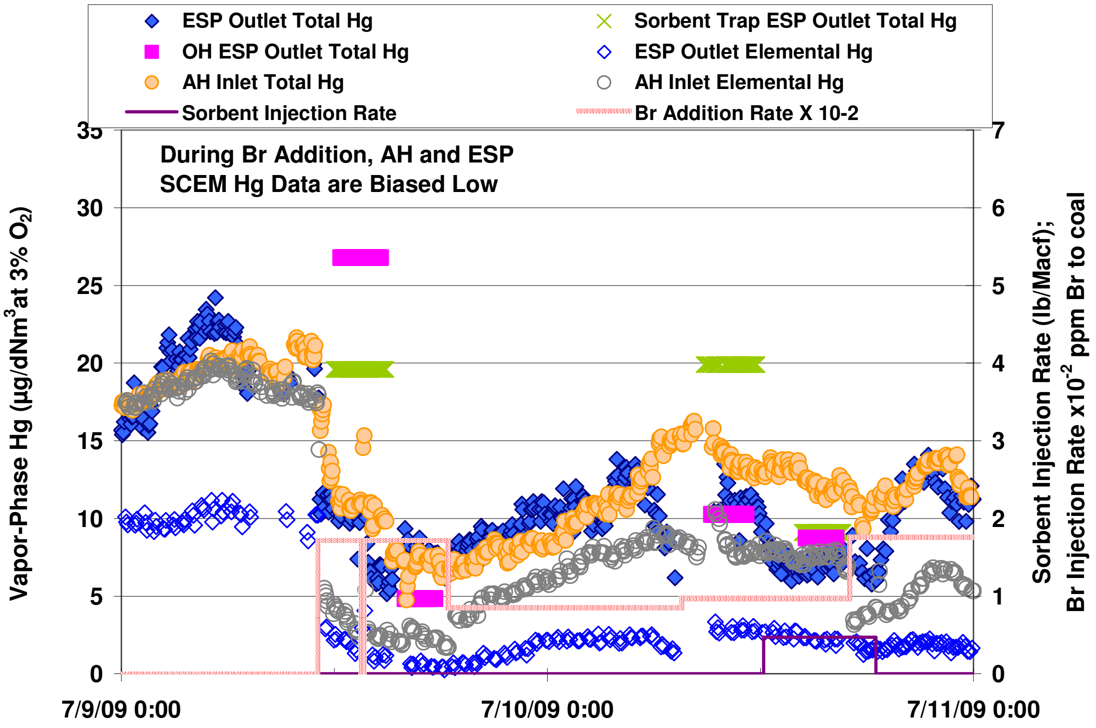


Figure K-28. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/9-7/11

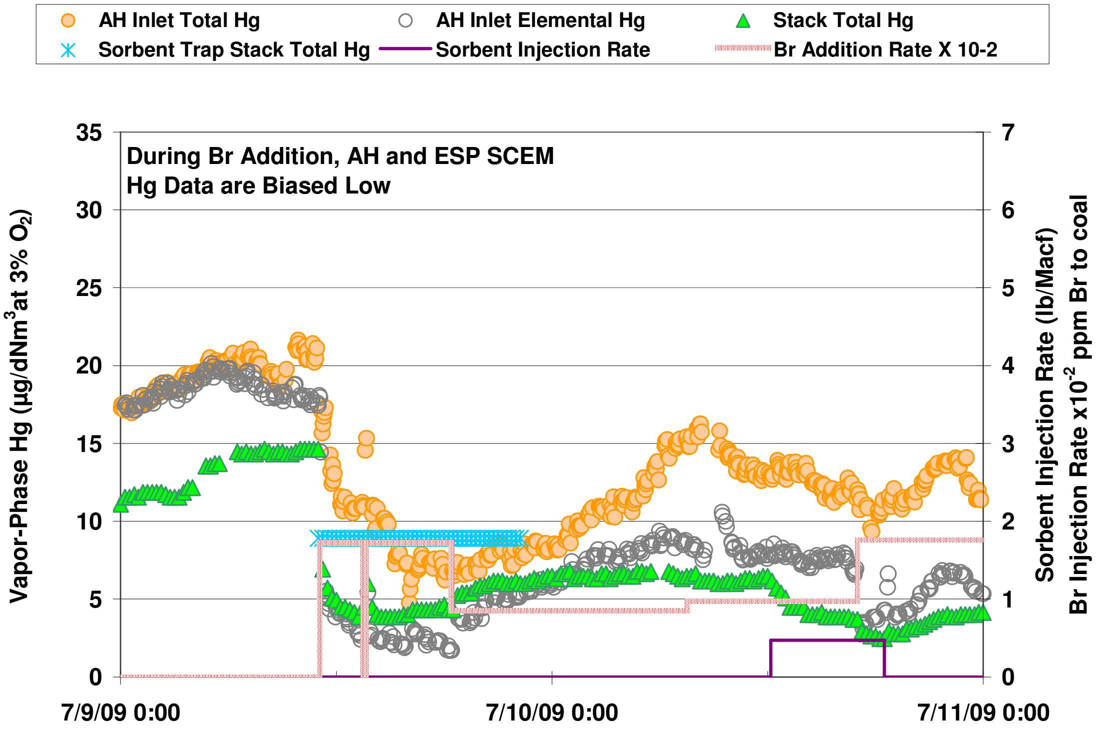


Figure K-29. Flue Gas Hg Concentrations for AH Inlet and Stack 7/9-7/11

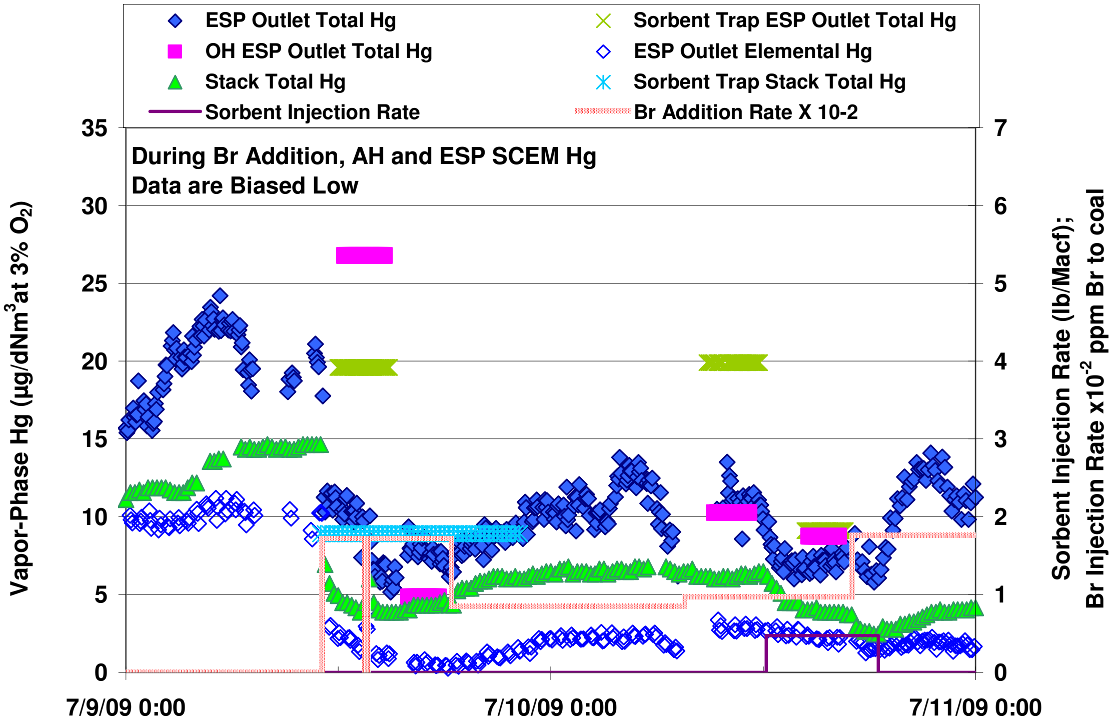


Figure K-30. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/9-7/11

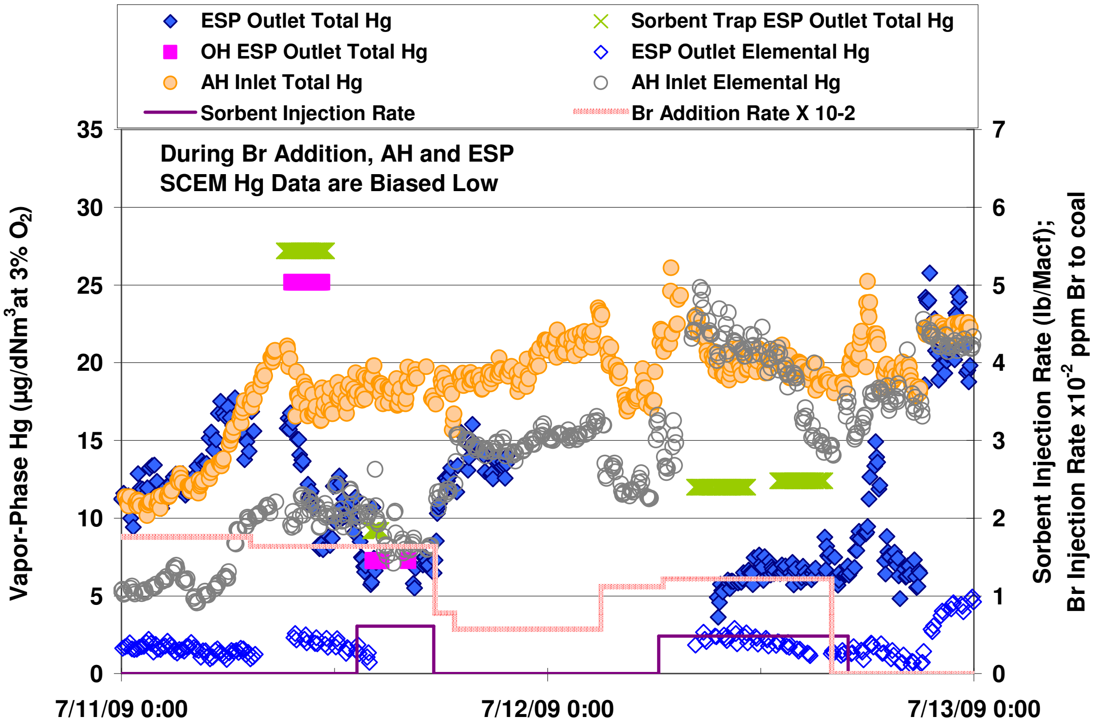


Figure K-31. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/11-7/13

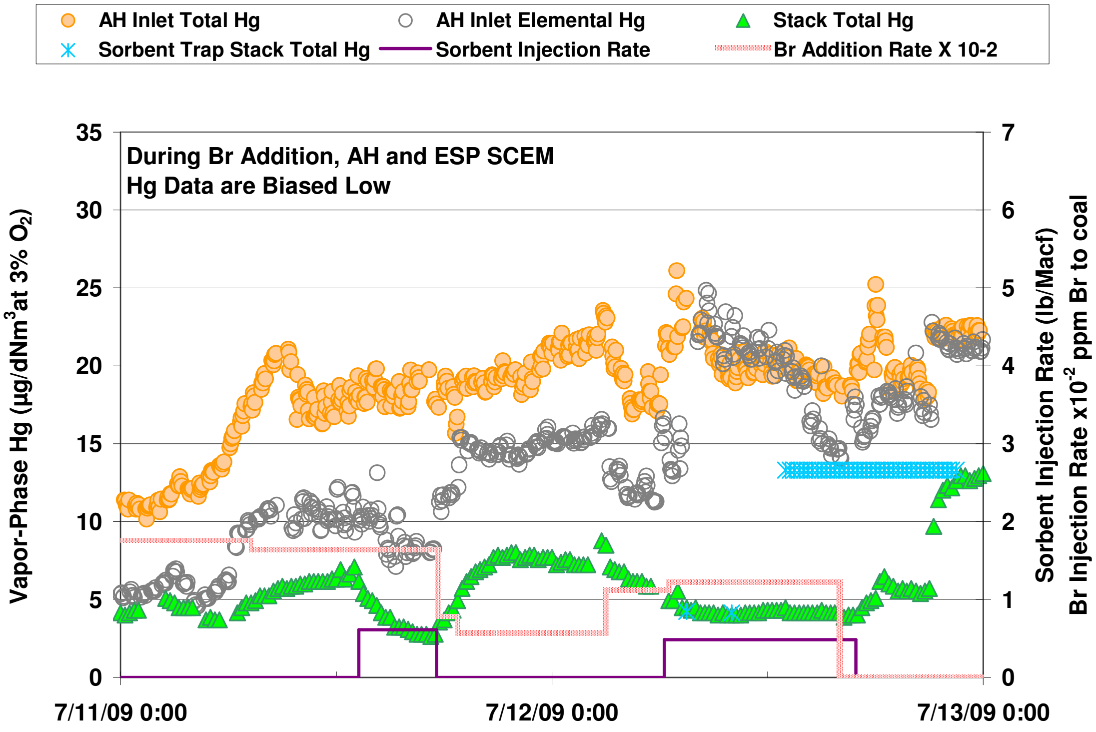


Figure K-32. Flue Gas Hg Concentrations for AH Inlet and Stack 7/11-7/13

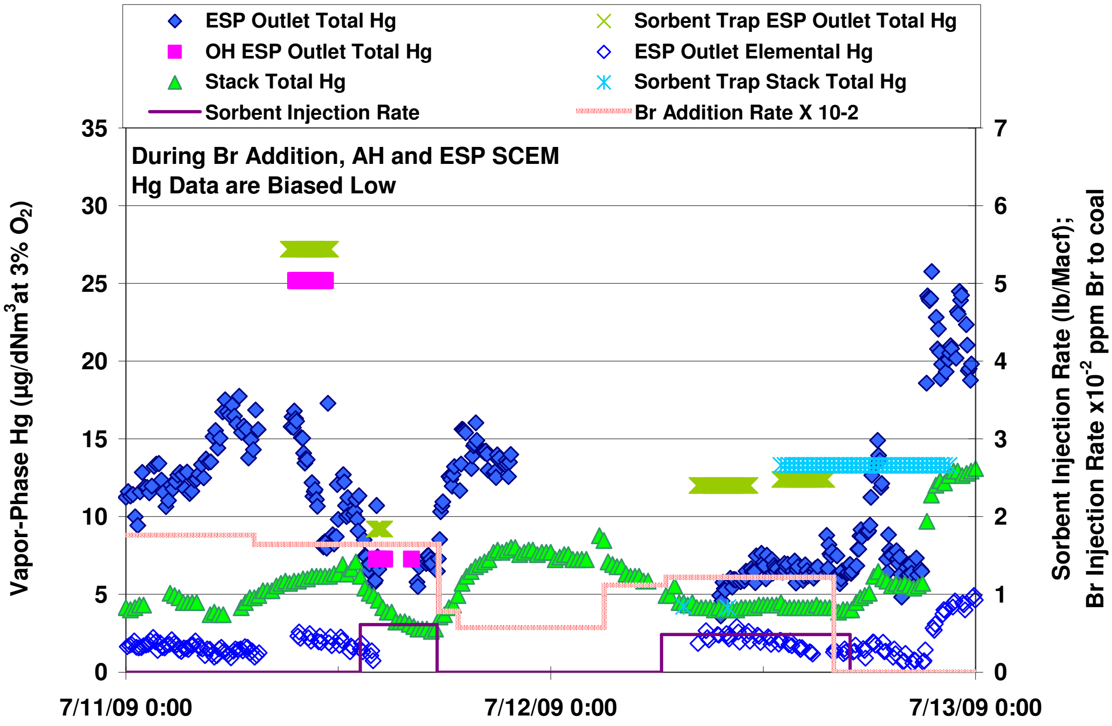


Figure K-33. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/11-7/13

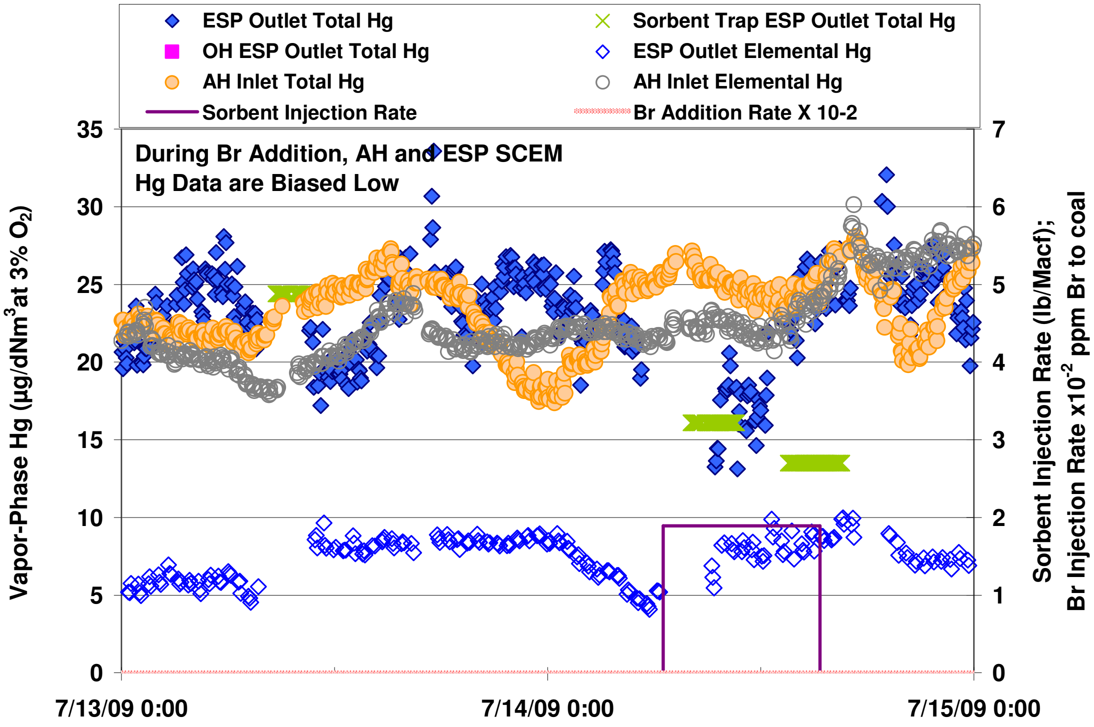


Figure K-34. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/13-7/15

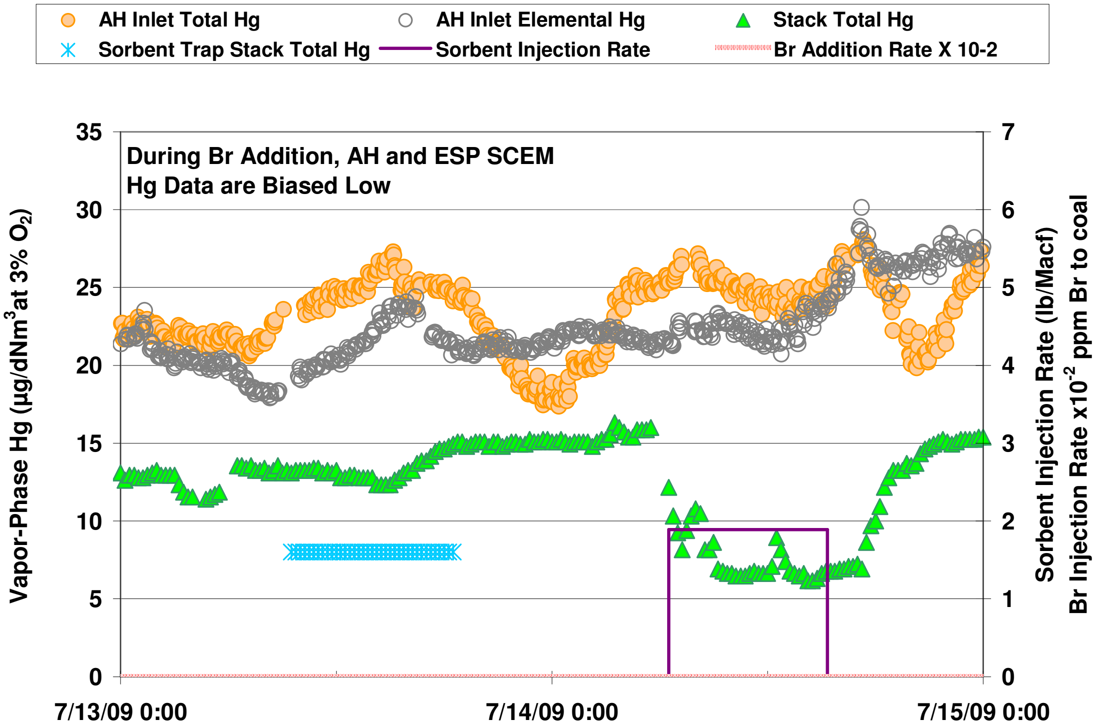


Figure K-35. Flue Gas Hg Concentrations for AH Inlet and Stack 7/13-7/15

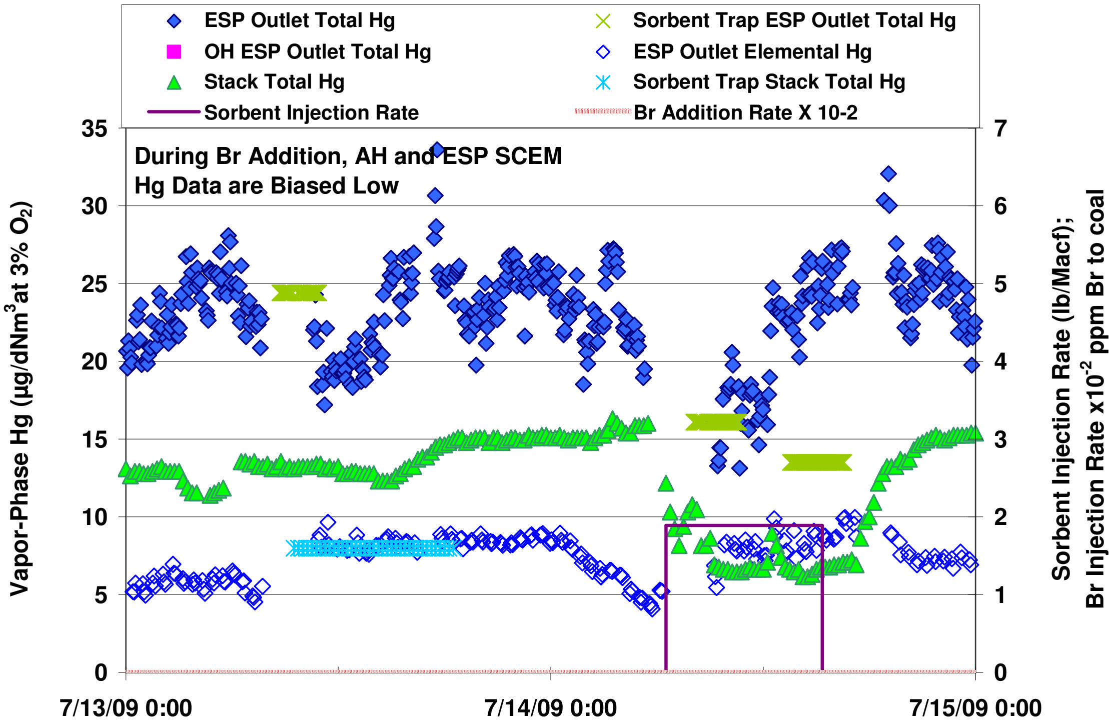


Figure K-36. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/13-7/15

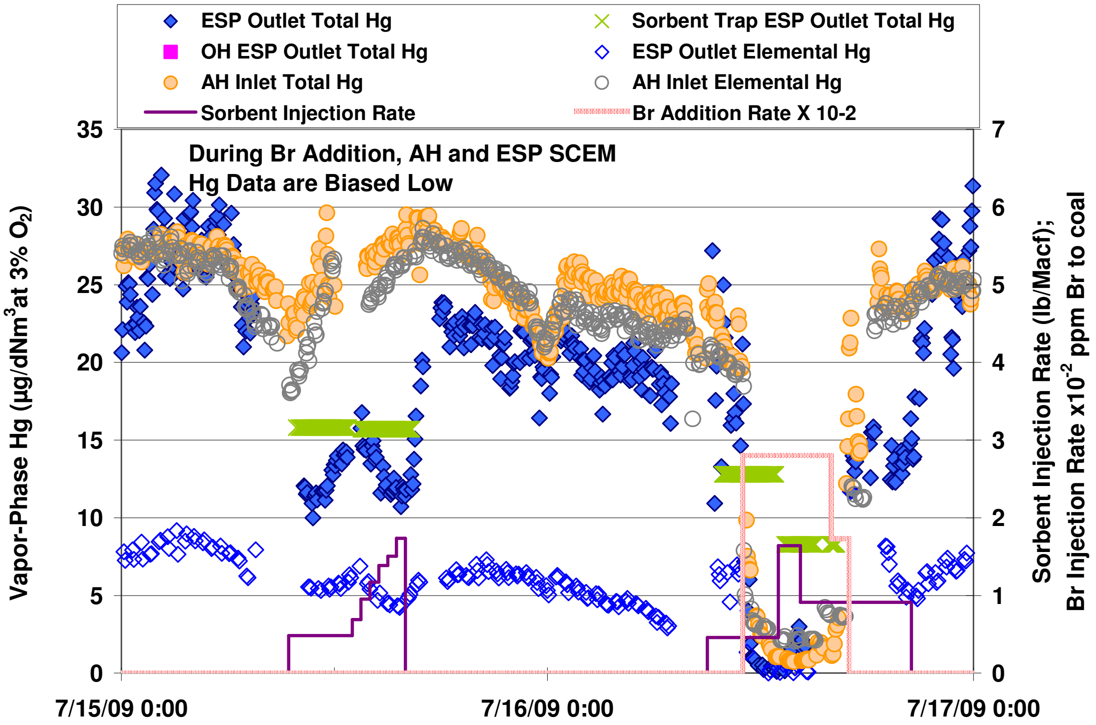


Figure K-37. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/15-7/17

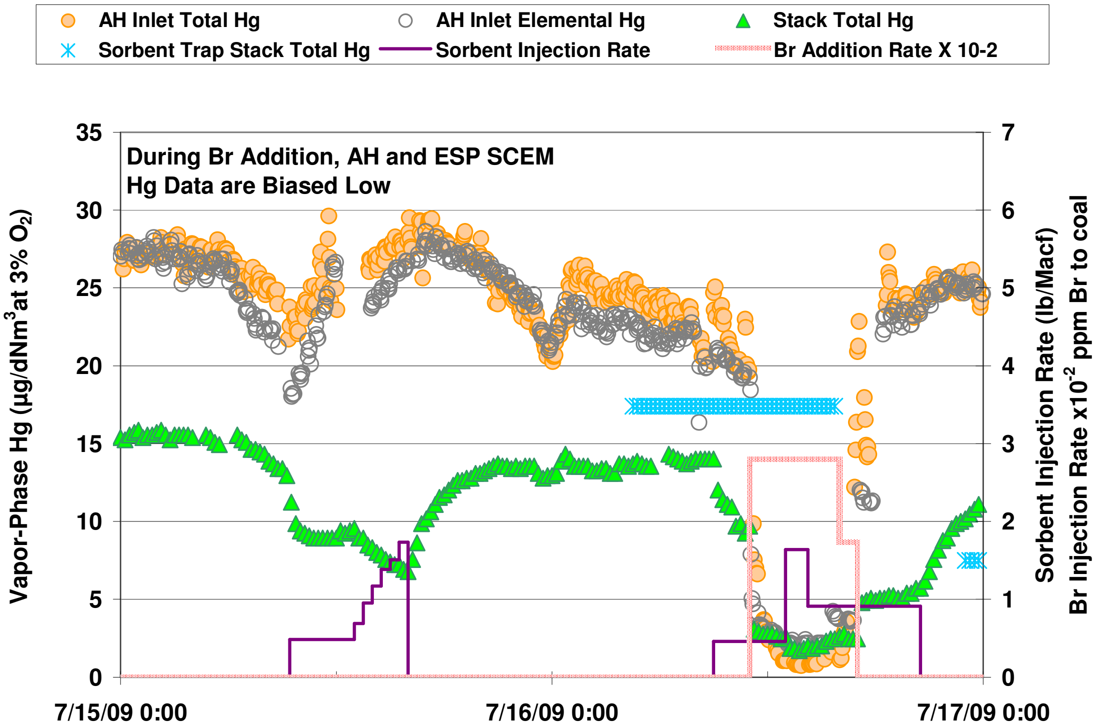


Figure K-38. Flue Gas Hg Concentrations for AH Inlet and Stack 7/15-7/17

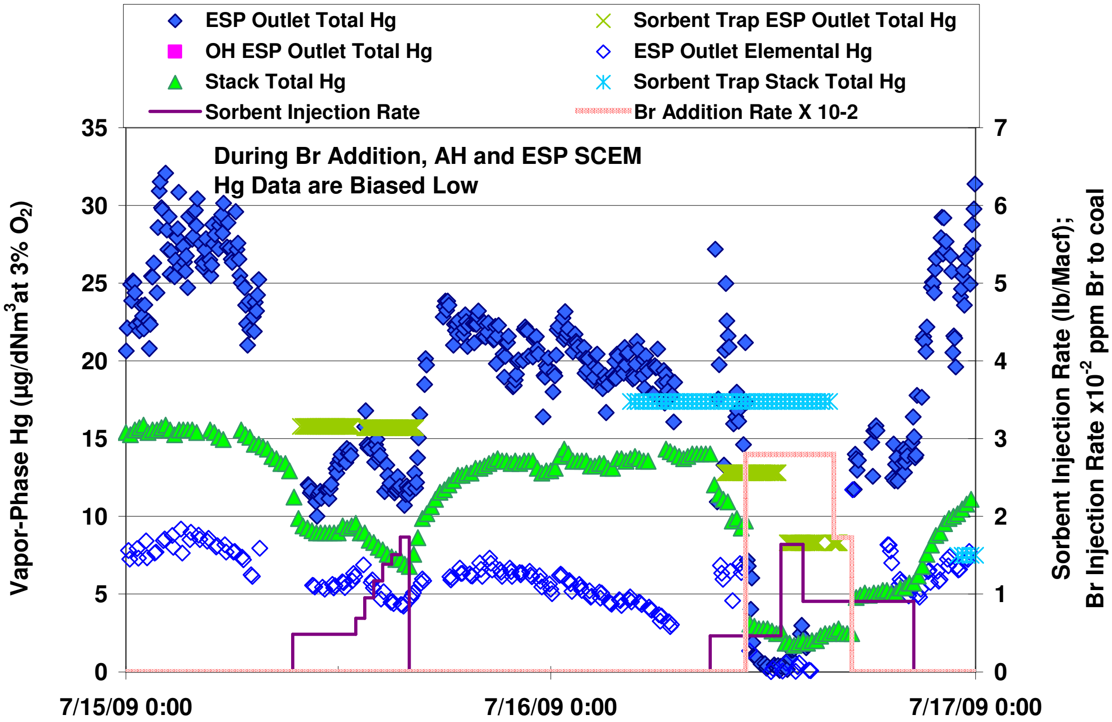


Figure K-39. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/15-7/17

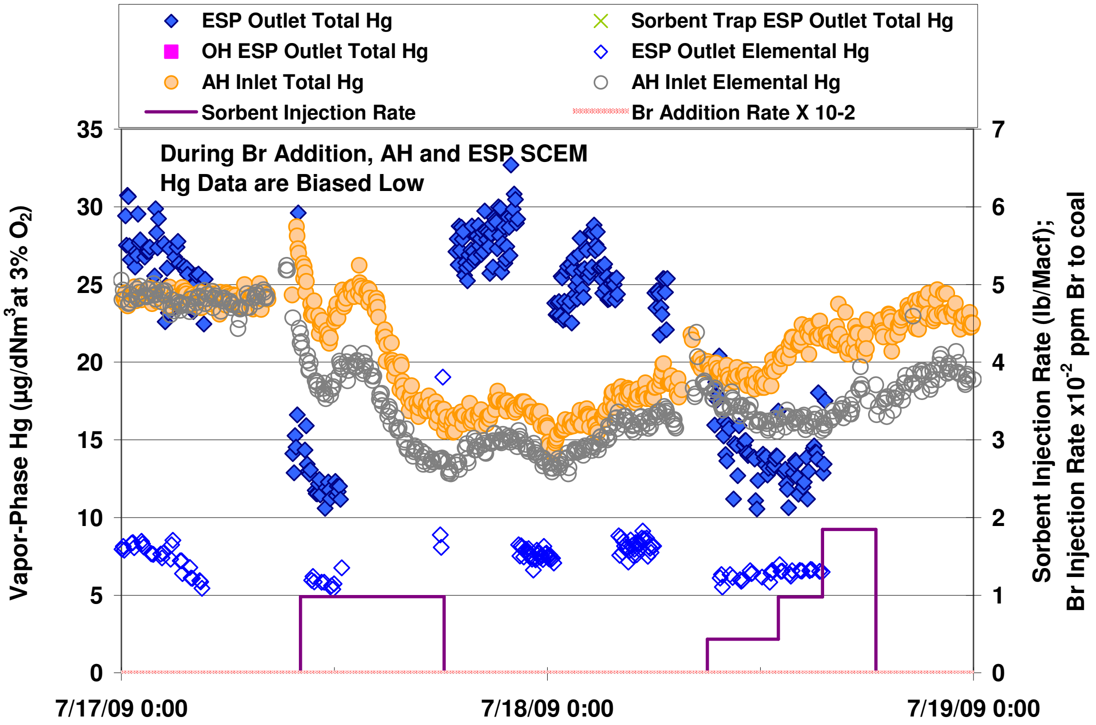


Figure K-40. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/17-7/19

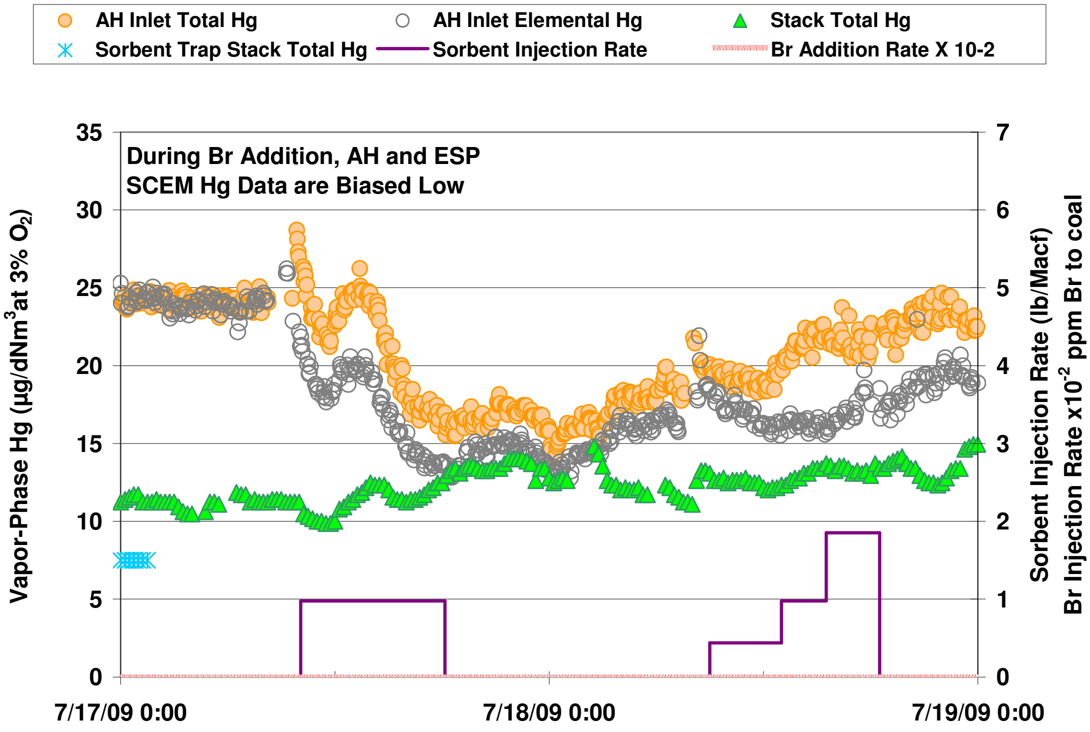


Figure K-41. Flue Gas Hg Concentrations for AH Inlet and Stack 7/17-7/19

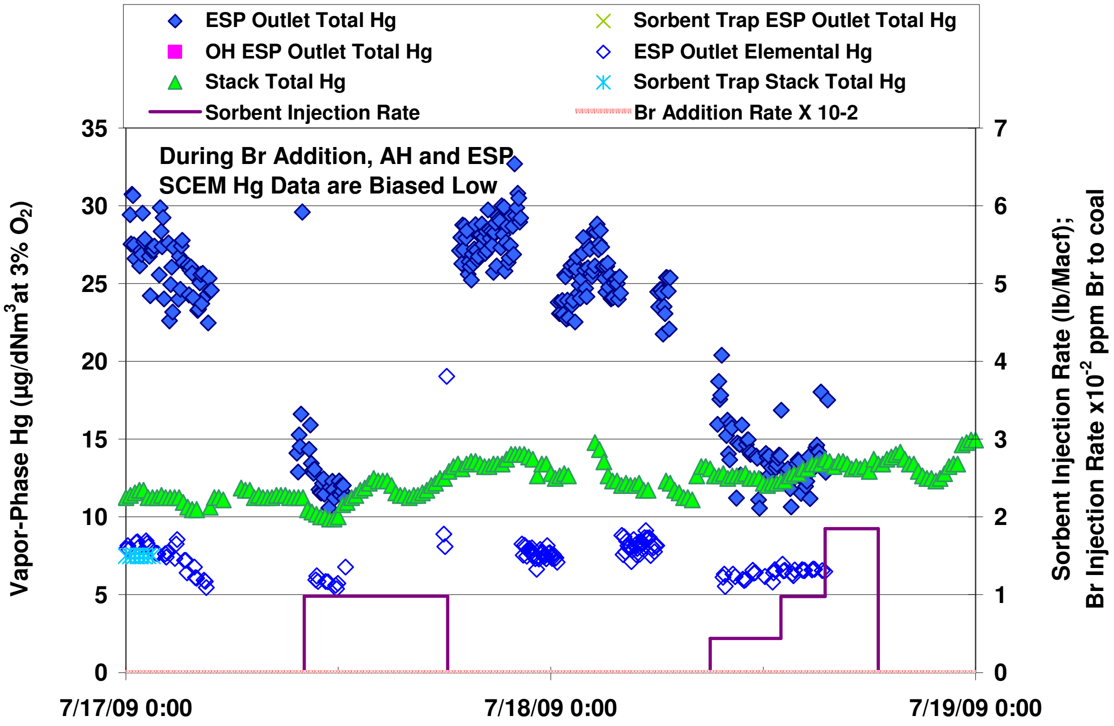


Figure K-42. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/17-7/19

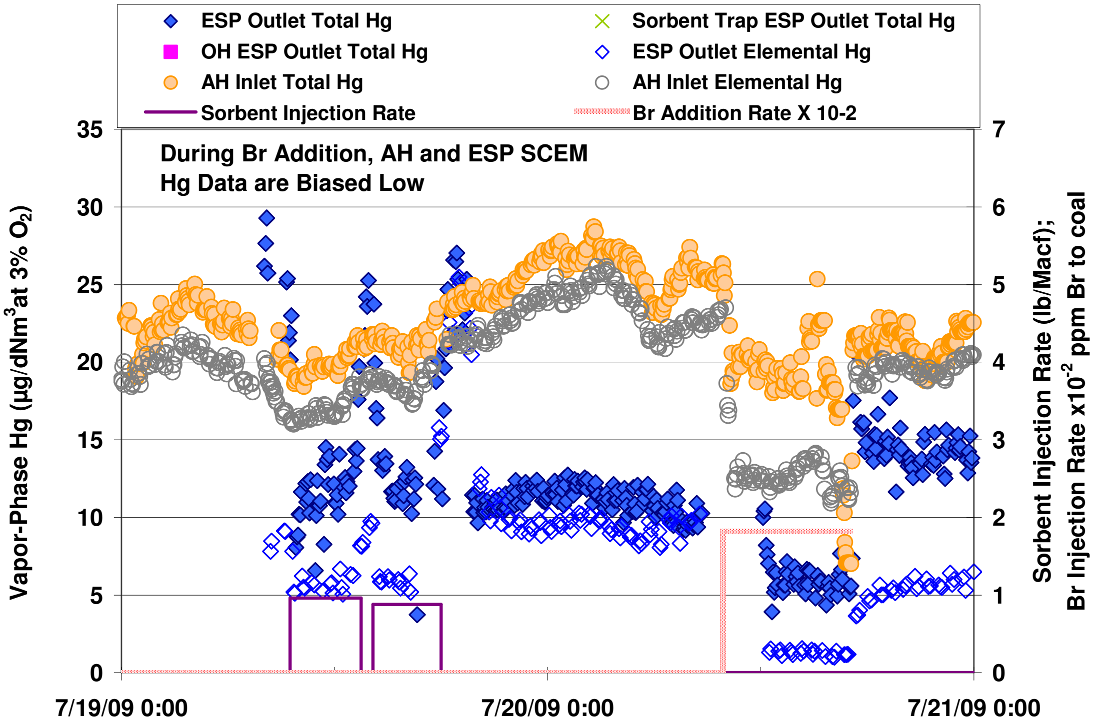


Figure K-43. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/19-7/21

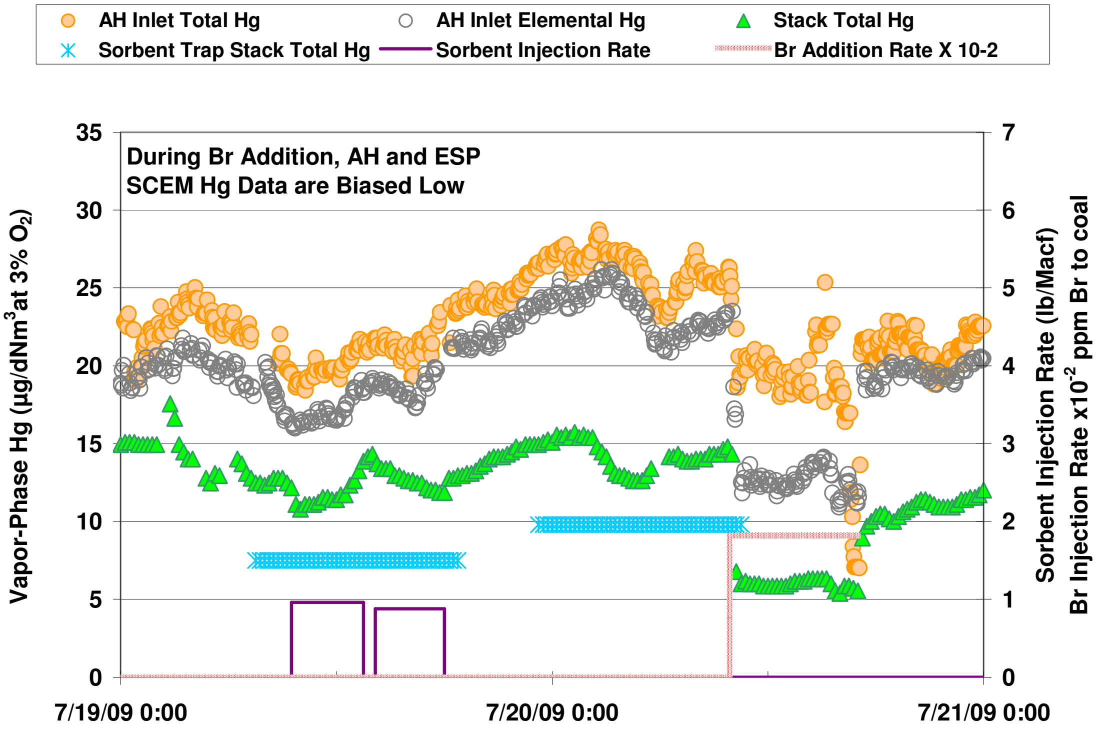


Figure K-44. Flue Gas Hg Concentrations for AH Inlet and Stack 7/19-7/21

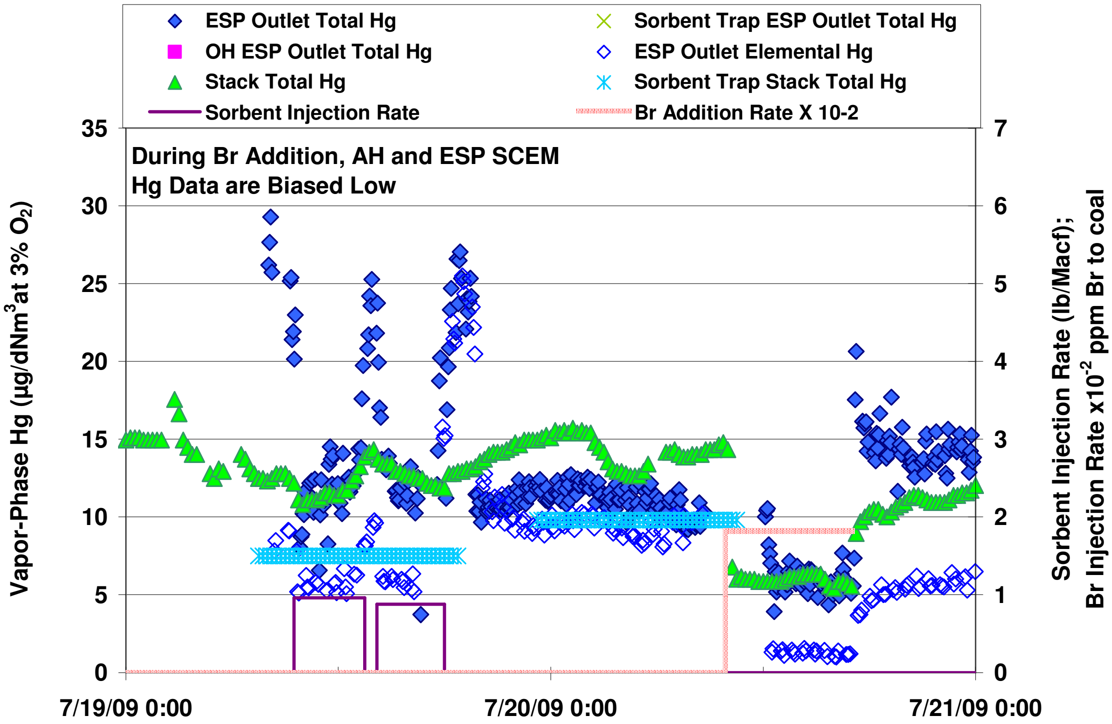


Figure K-45. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/19-7/21

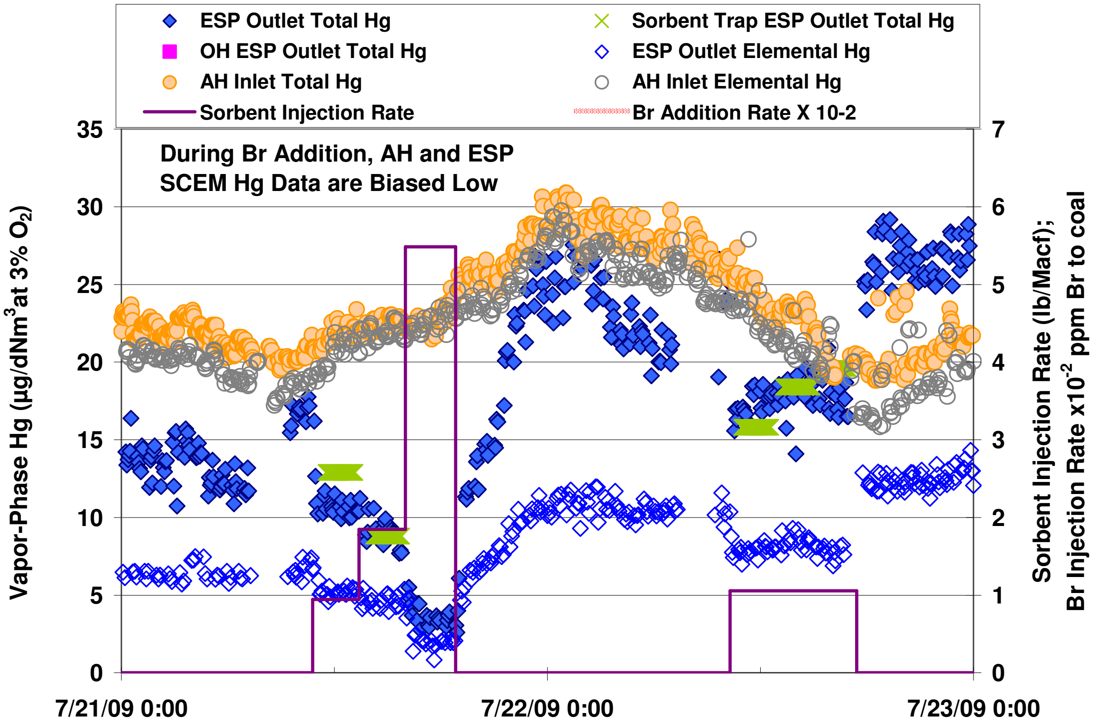


Figure K-46. Flue Gas Hg Concentrations for AH Inlet and ESP Outlet 7/21-7/23

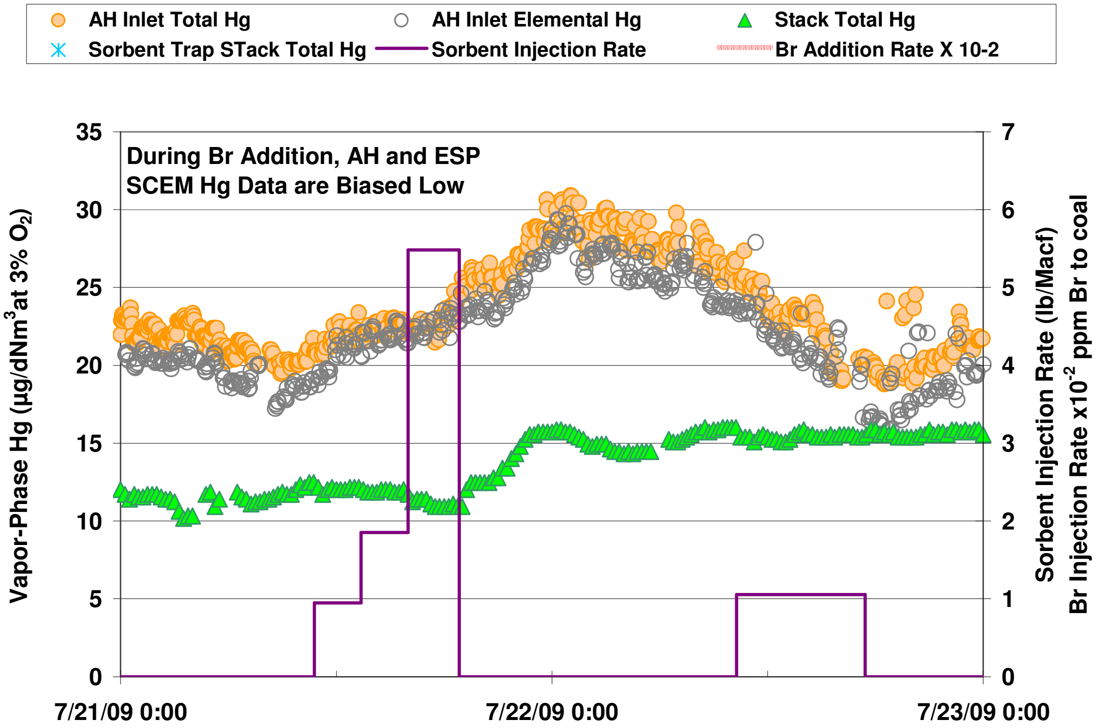


Figure K-47. Flue Gas Hg Concentrations for AH Inlet and Stack 7/21-7/23

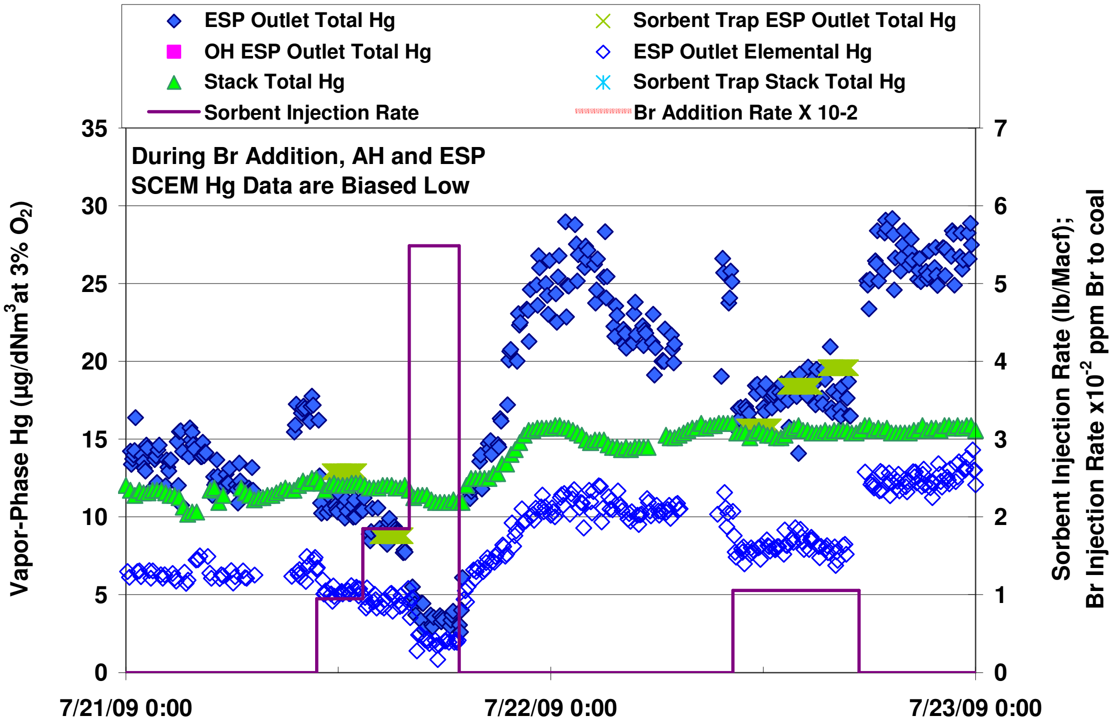


Figure K-48. Flue Gas Hg Concentrations for ESP Outlet and Stack 7/21-7/23

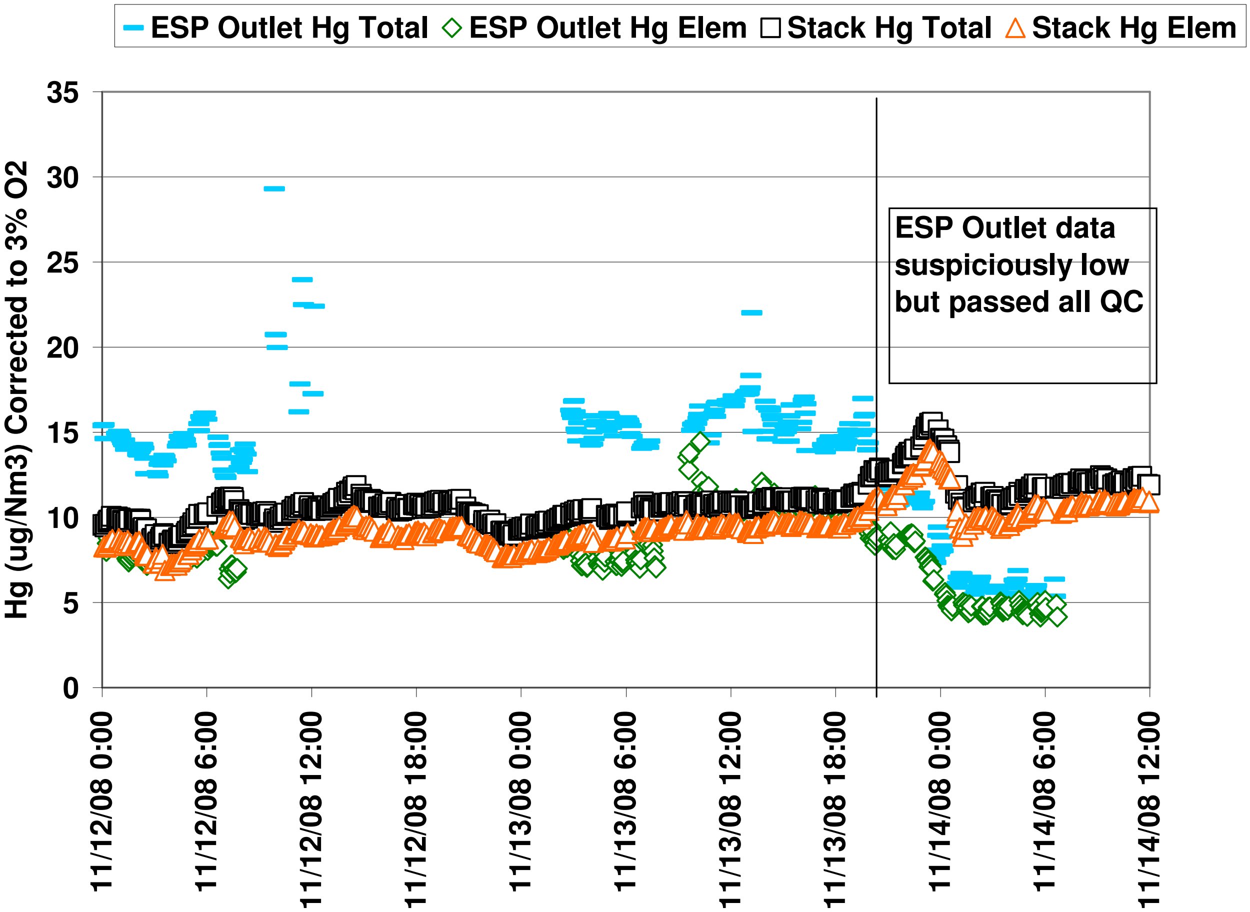


Figure K-49. Baseline Flue Gas Hg Concentrations with FGD in Inhibited Oxidation Mode

APPENDIX L M29 RUN DATA

Table L-1. Summary of Method 29 ESP Outlet Data for TRI Metals (ug/Nm^3, dry, 3% O$_2$)

Date/Run number	**As** particulate	**As** gas	**As** gas+part	**Be** gas+part	**Cd** gas+part	**Co** gas+part	**Cr** gas+part	**Mn** gas+part	**Ni** gas+part	**Pb** gas+part	**Sb** gas+part	**Se** gas+part
7/12/09-1	<0.038	<0.838	<0.876	0.07	<0.115	0.77	5.56	15.62	5.40	7.30	<0.58	815.91
7/12/09-2	<0.038	<0.878	<0.915	0.03	<0.111	0.30	4.33	22.37	7.07	<1.88	<0.52	931.07
7/12/09-3	<0.039	<0.851	<0.890	0.03	<0.101	0.32	<5.31	29.10	<4.37	<1.70	<0.50	859.34
7/13/09-1	0.500	<0.834	<1.334	0.17	<0.157	1.81	5.87	43.74	<5.05	8.68	<0.78	883.21
7/13/09-2	<0.039	<0.886	<0.925	0.06	<0.114	0.97	<5.63	72.11	<4.39	1.80	<0.57	865.13
7/13/09-3	<0.037	<0.908	<0.945	0.04	<0.121	0.62	<5.71	17.33	<4.21	1.84	<0.55	368.28
7/14/09-1	1.07	<0.955	<2.024	0.23	<0.168	3.25	9.93	144.68	<6.64	7.32	<1.11	876.06
7/14/09-2	1.40	<0.920	<2.309	0.25	<0.249	3.61	9.82	63.39	<6.46	7.34	<1.14	852.77
7/14/09-3	1.14	<0.938	<2.081	0.20	<0.175	3.37	9.16	113.35	<6.30	6.39	<1.05	734.88

Table L-2. Summary of Method 29 ESP Outlet Data for Mercury (ug/Nm^3, dry, 3% O$_2$)

Date/Run number	**Hg** particulate.	**Hg** gas	**Hg** gas+part
7/12/09-1	0.01	14.77	14.78
7/12/09-2	0.05	14.05	14.10
7/12/09-3	0.09	13.17	13.26
7/13/09-1	0.01	18.24	18.25
7/13/09-2	0.01	26.99	27.00
7/13/09-3	0.00	33.74	33.75
7/14/09-1	0.10	15.61	15.72
7/14/09-2	0.14	11.52	11.66
7/14/09-3	0.04	15.64	15.68

Table L-3. Summary of Method 29 ESP Outlet Data for Other Metals (ug/Nm^3, dry, 3% O$_2$)

Date/Run number	**Al** gas+part	**Ag** gas+part	**Ba** gas+part	**Cu** gas+part	**Fe** gas+part	**Mo** gas+part	**Sn** gas+part	**Sr** gas+part	**Ti** gas+part	**Tl** gas+part	**V** gas+part	**Zn** gas+part
7/12/09-1	2046.1	<0.36	76.81	4.10	732.7	5.62	<6.98	64.31	131.05	<0.126	7.54	20.99
7/12/09-2	902.7	<0.34	38.87	4.09	274.1	4.95	<6.00	29.24	59.70	<0.106	3.57	15.31
7/12/09-3	809.0	<0.31	38.95	2.41	394.8	6.15	7.13	28.06	53.08	<0.101	3.06	8.44
7/13/09-1	5553.7	<0.53	243.39	6.56	1327.9	6.11	5.97	193.62	340.71	<0.170	19.45	17.22
7/13/09-2	1681.8	<0.41	87.81	3.51	824.0	6.66	<2.60	71.81	100.24	<0.116	6.16	13.65
7/13/09-3	1309.0	<0.35	57.01	2.97	558.1	5.49	<2.65	48.10	82.71	<0.112	4.96	18.26
7/14/09-1	9136.4	0.66	336.51	10.30	2016.5	7.34	<3.43	330.39	574.49	<0.236	30.85	18.94
7/14/09-2	9707.4	0.62	344.39	9.89	2352.1	7.41	<3.55	329.90	594.76	<0.252	31.68	20.99
7/14/09-3	7394.3	0.59	281.48	8.89	2003.4	7.12	<3.22	277.69	484.34	<0.222	26.48	21.81

Table L-4. Summary of Method 29 Stack data for TRI metals (ug/Nm^3, dry, 3% O_2)

Date/Run number	**As** particulate	**As** gas	**As** gas+part	**Be** gas+part	**Cd** gas+part	**Co** gas+part	**Cr** gas+part	**Mn** gas+part	**Ni** gas+part	**Pb** gas+part	**Sb** gas+part	**Se** gas+part
7/12/09-1	<0.038	<0.946	<0.984	<0.01	<0.150	0.24	<4.45	29.1	<3.74	<2.42	<0.56	117.59
7/12/09-2	<0.038	<0.942	<0.980	<0.01	<0.162	0.19	<4.61	20.3	<3.42	<2.12	<0.55	108.05
7/12/09-3	<0.038	<1.009	<1.047	<0.02	0.439	0.20	<5.32	19.0	<4.41	<2.45	<0.58	138.15
7/13/09-1	<0.040	<0.975	<1.015	<0.01	<0.126	0.23	<4.48	59.5	5.60	<1.92	<0.57	100.70
7/13/09-2	<0.039	<0.995	<1.034	<0.02	<0.118	0.22	<4.68	82.6	<4.00	<1.88	<0.58	89.15
7/13/09-3	<0.039	<0.983	<1.022	<0.01	<0.123	<0.26	<3.80	76.3	<3.57	<1.70	<0.57	92.85
7/14/09-1	<0.037	<1.025	<1.062	0.02	<0.139	0.55	43.47	130.1	9.14	<2.53	<0.66	87.01
7/14/09-2	<0.038	<0.998	<1.036	0.02	<0.126	0.48	5.34	65.3	<5.57	<2.33	<0.64	83.37
7/14/09-3	<0.037	<0.972	<1.009	<0.01	<0.112	0.35	<5.07	62.7	<4.42	2.34	<0.58	91.03

Table L-5. Summary of Method 29 Stack data for Mercury (ug/Nm^3, dry, 3% O_2)

Date/Run number	**Hg** particulate.	**Hg** gas	**Hg** gas+part
7/12/09-1	0.53	7.11	7.64
7/12/09-2	0.39	7.87	8.25
7/12/09-3	0.35	7.41	7.76
7/13/09-1	0.24	15.28	15.52
7/13/09-2	0.14	14.02	14.17
7/13/09-3	0.28	21.11	21.39
7/14/09-1	0.13	9.45	9.58
7/14/09-2	0.24	6.91	7.15
7/14/09-3	0.18	8.54	8.72

Table L-6. Summary of Method 29 Stack data for other trace metals (ug/Nm^3, dry, 3% O_2)

Date/Run number	**Al** gas+part	**Ag** gas+part	**Ba** gas+part	**Cu** gas+part	**Fe** gas+part	**Mo** gas+part	**Sn** gas+part	**Sr** gas+part	**Ti** gas+part	**Tl** gas+part	**V** gas+part	**Zn** gas+part
7/12/09-1	684.10	<0.47	30.39	2.15	180.81	5.3	<2.75	21.04	43.76	<0.11	2.81	15.96
7/12/09-2	572.45	<0.35	25.74	1.70	164.16	5.2	<2.73	17.42	35.08	<0.11	2.19	15.91
7/12/09-3	574.22	<0.41	28.13	2.18	295.33	5.8	<2.90	17.77	36.39	<0.12	2.27	21.23
7/13/09-1	816.29	<0.34	41.79	1.84	207.03	5.5	<2.85	24.51	48.45	<0.11	3.12	8.60
7/13/09-2	720.37	<0.33	34.03	2.03	185.24	5.3	<2.88	21.77	42.32	<0.12	2.73	12.31
7/13/09-3	540.48	<0.32	25.98	1.62	152.38	5.5	<2.85	18.41	32.30	<0.11	2.04	9.52
7/14/09-1	1521.75	<0.34	64.20	2.89	573.23	7.7	<2.93	53.37	94.36	<0.13	6.29	12.70
7/14/09-2	1507.44	<0.33	64.08	3.26	360.03	5.8	<2.87	48.04	94.55	<0.13	6.46	10.54
7/14/09-3	1019.34	<0.32	43.99	2.72	261.07	5.5	<2.94	32.27	66.32	<0.11	4.34	7.04

Table L-7. Comparison Summary of ESP Outlet XFM and Method 29 Results for TRI Metals (ug/Nm^3, dry, 3% O_2)

Date	Hg		As		Cd		Co		Cr		Mn		Ni		Pb		Sb		Se	
Method	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29
7/12/09	12.3	14.0	<0.7	<0.9	<1.0	<0.1	1.6	0.5	6.4	5.1	14.5	22.4	8.1	5.6	3.4	3.6	<0.7	<0.5	372.7	868.8
7/13/09	25.7	26.3	<0.3	<1.1	<0.6	<0.1	0.8	1.1	6.9	<5.7	16.2	44.4	15.7	<4.5	2.8	4.1	<2.8	<0.6	684.4	705.5
7/14/09	13.7	9.9	0.6	<2.1	<1.1	<0.2	0.5	3.4	6.3	9.6	20.3	107.1	4.9	<6.5	4.1	7.0	<6.4	<1.1	684.2	821.2

Table L-8. Comparison Summary of ESP Outlet XFM and Method 29 Results for Other Trace Metals (ug/Nm^3, dry, 3% O_2)

Date	Ag		Ba		Cu		Fe		Mo		Sn		Sr		Ti		V		Zn	
Method	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29
7/12/09	<1.5	<0.3	<68.1	51.5	2.3	3.5	512.4	467.2	<0.7	5.6	<2.5	<6.7								
7/13/09	<1.0	<0.4	95.0	129.4	2.3	4.3	557.0	903.3	<1.0	6.1	<3.7	<3.7								
7/14/09	<0.7	0.6	121.9	320.8	3.1	9.7	705.3	2124.0	1.3	7.3	<2.8	<3.4								

Table L-9. Comparison Summary of Stack XFM and Method 29 Results for TRI Metals (ug/Nm^3, dry, 3% O_2)

Date	Hg		As		Cd		Co		Cr		Mn		Ni		Pb		Sb		Se	
Method	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29
7/12/09	10.6	7.9	N/A	<1.0	<1.0	<0.3	<0.2	0.5	<1.1	<4.8	15.8	22.8	0.5	<3.9	<1.5	<2.3	<2.8	<0.6	83.6	121.3
7/13/09	17.9	17.0	N/A	<1.0	<0.4	<0.1	0.4	0.2	<1.3	<4.3	16.9	72.8	0.8	<4.4	1.5	<1.8	<1.7	<0.6	80.6	94.2
7/14/09	9.9	8.5	N/A	<1.0	<0.8	<0.1	0.4	0.2	1.8	<5.2	18.4	86.0	0.7	<6.4	1.1	<2.4	<2.7	<0.6	88.3	87.1

Table L-10.

Date	Ag		Ba		Cu		Fe		Mo		Sn		Sr		Ti		V		Zn	
Method	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29	XFM	M29
7/12/09	<1.1	<0.4	<17.4	28.1	0.5	2.0	106.6	213.4	<0.1	5.5	<3.7	<2.8	13.4	18.7	30.7	38.4	<2.1	2.4	2.1	17.7
7/13/09	<0.7	<0.3	<25.6	33.9	0.7	1.8	128.0	181.6	<0.6	5.4	<2.4	<2.9	17.5	21.6	37.1	41.0	<2.5	2.6	3.9	10.1
7/14/09	<2.2	<0.3	57.1	57.4	1.1	3.0	229.4	398.1	1.1	6.3	<1.0	<2.9	29.6	44.6	67.2	85.1	<4.7	5.7	3.1	10.1

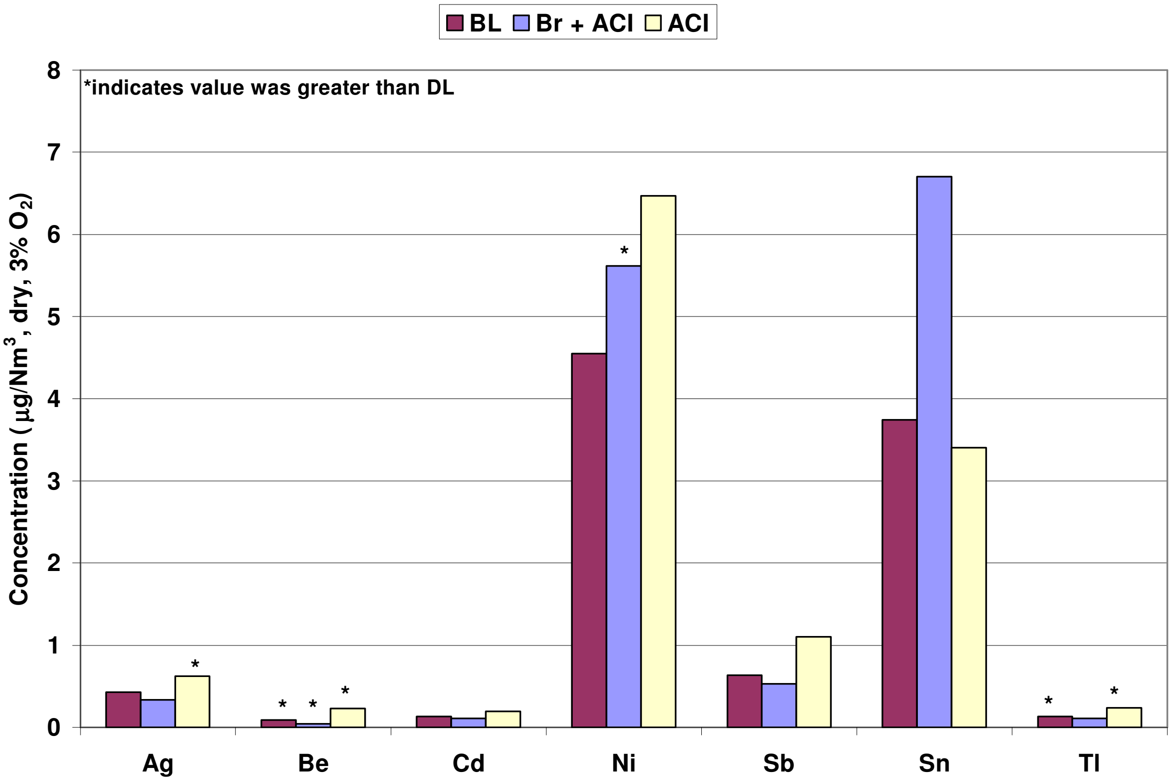


Figure L-1. Method 29 ESP Outlet Metals Below Detection Limit

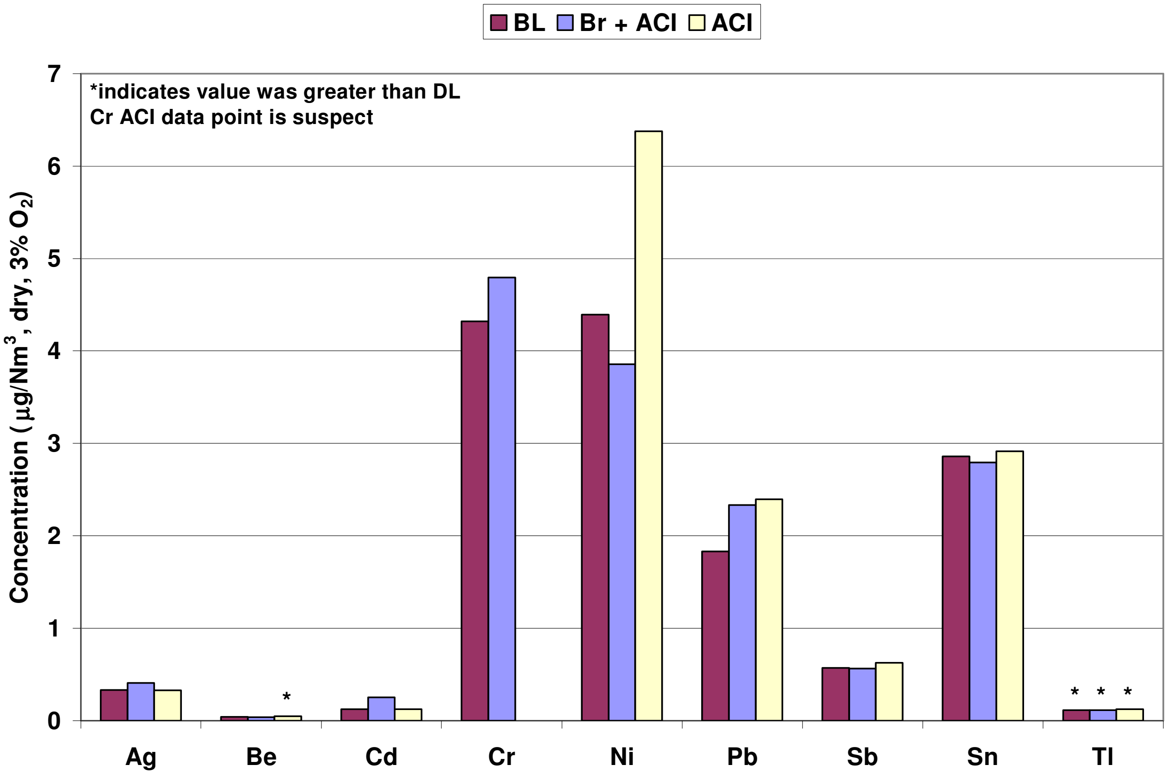


Figure L-2. Method 29 Stack Metals Below Detection Limit

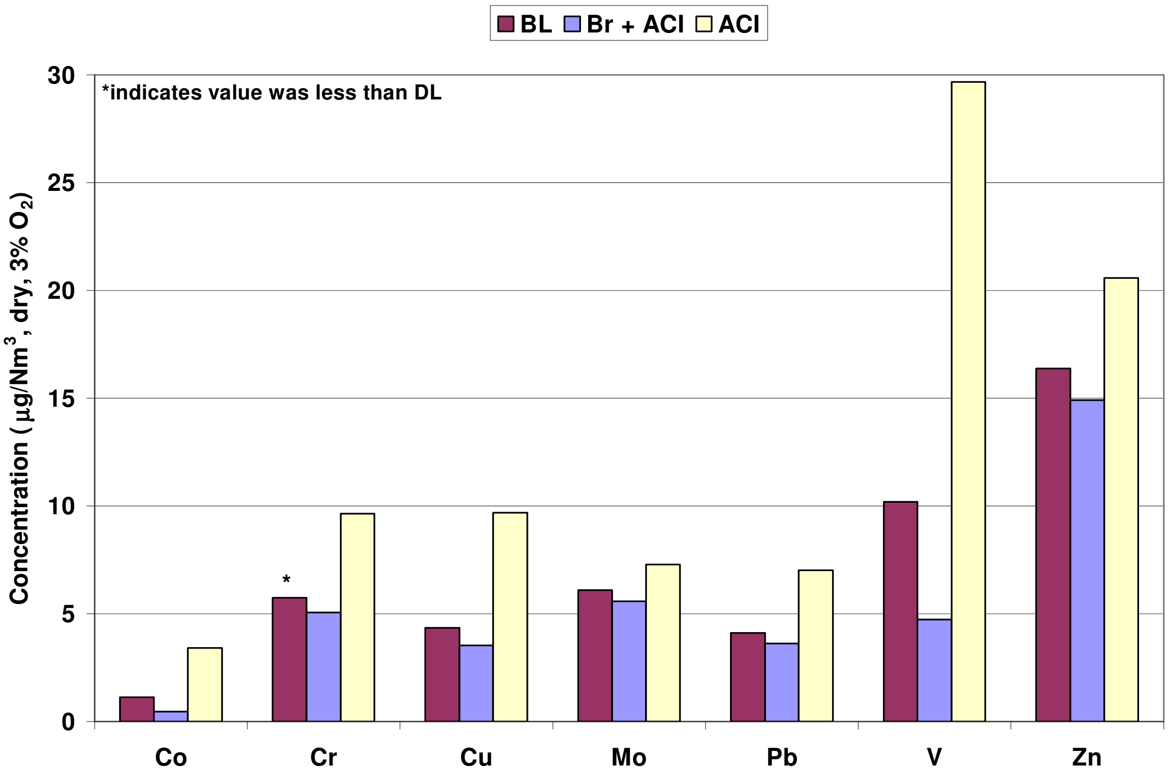


Figure L-3. Method 29 ESP Outlet Metals Near Detection Limit

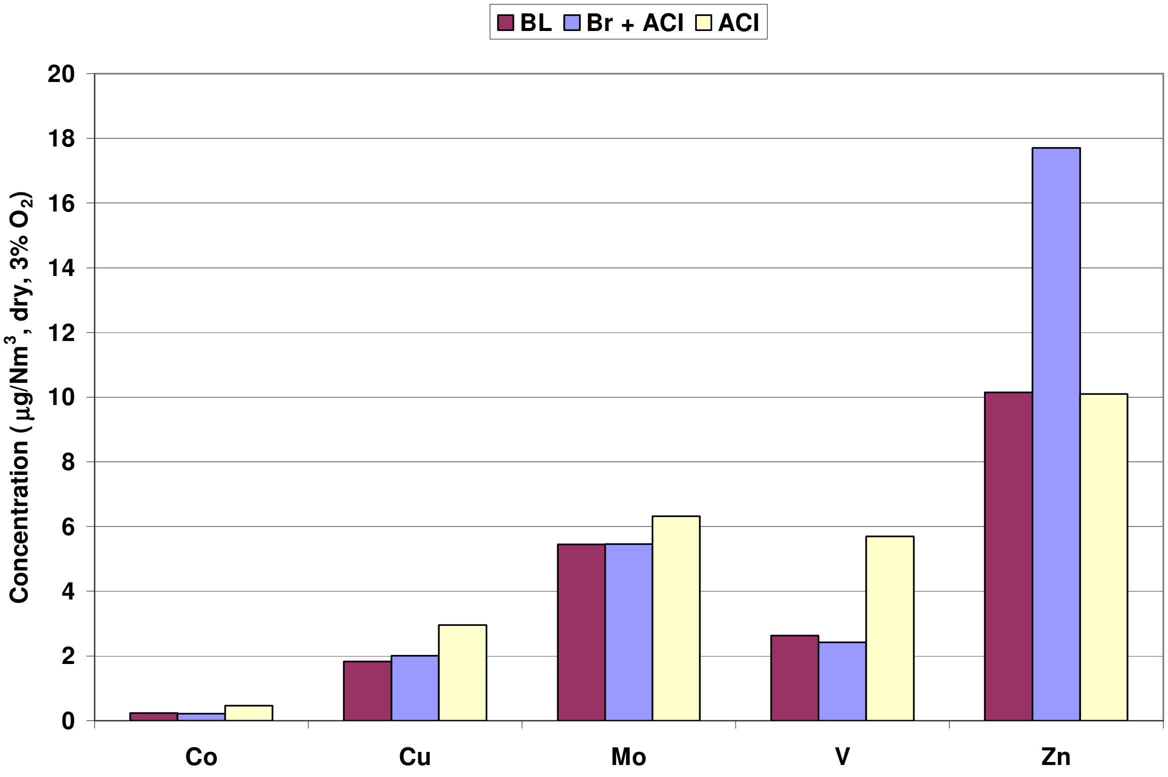


Figure L-4. Method 29 Stack Metals Near Detection Limit

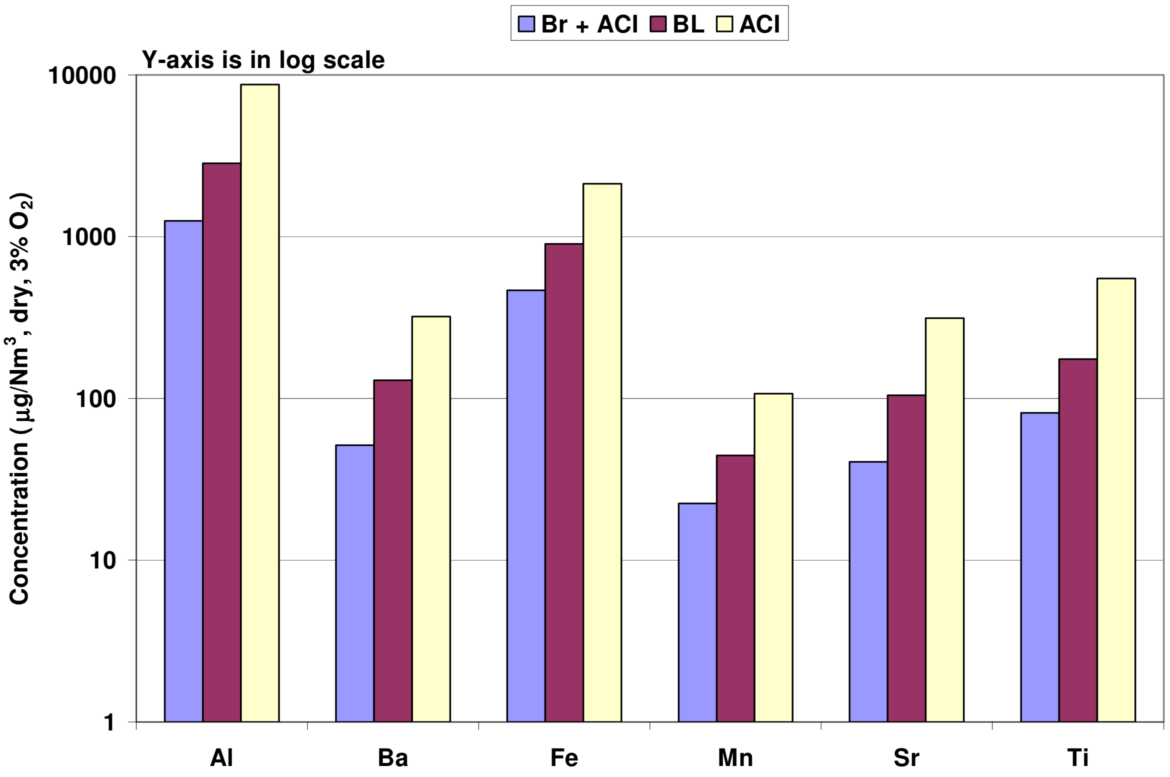


Figure L-5. Method 29 ESP Outlet Metals Greater than Detection Limit

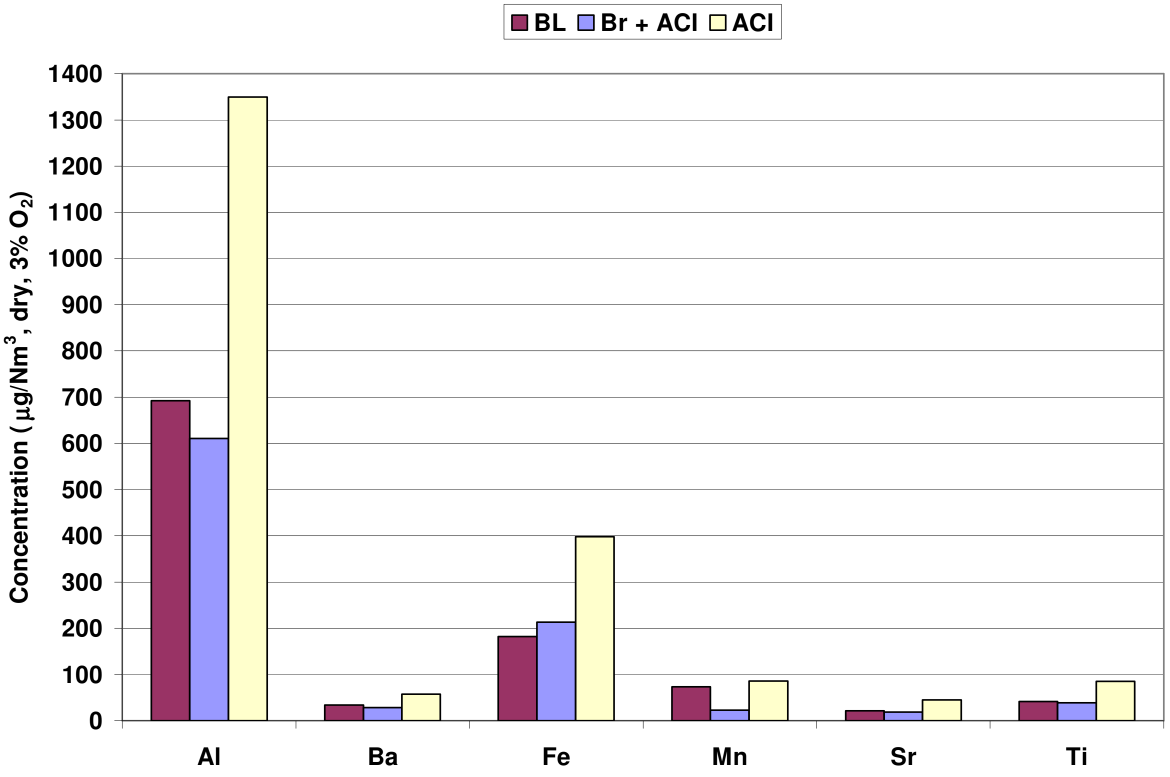


Figure L-6. Method 29 Stack Metals Greater than Detection Limit

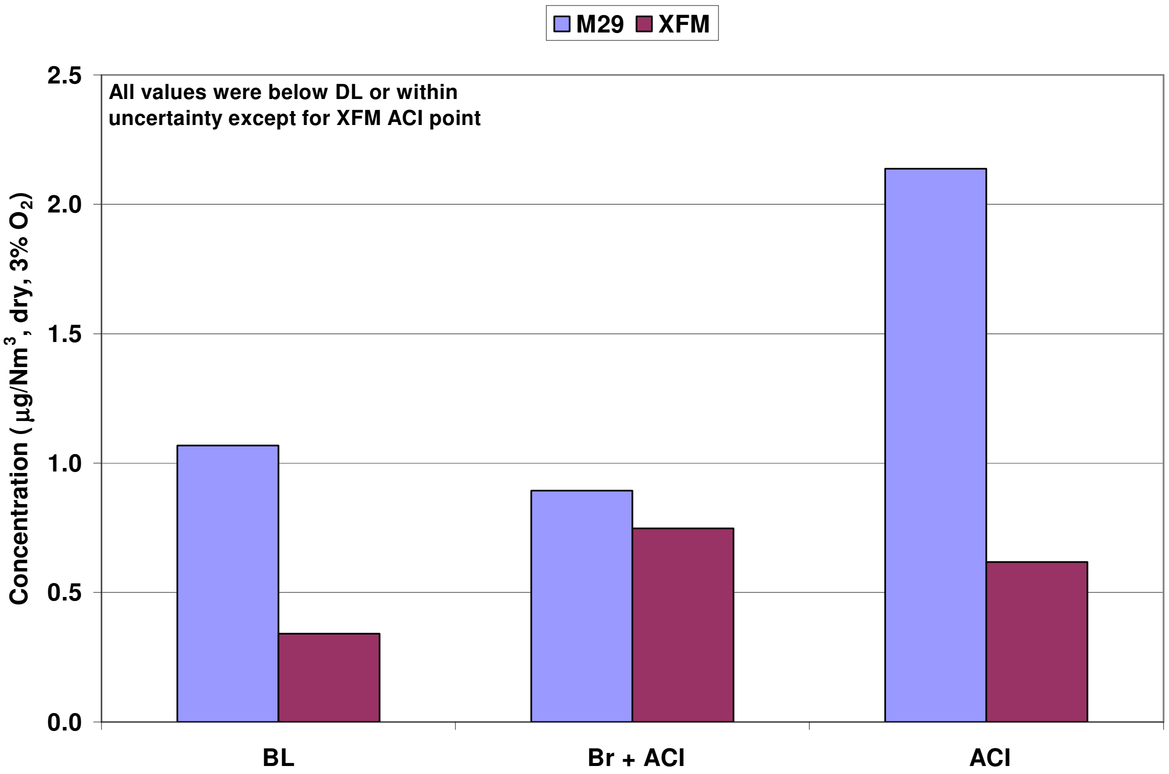


Figure L-7. Arsenic ESP Outlet Data

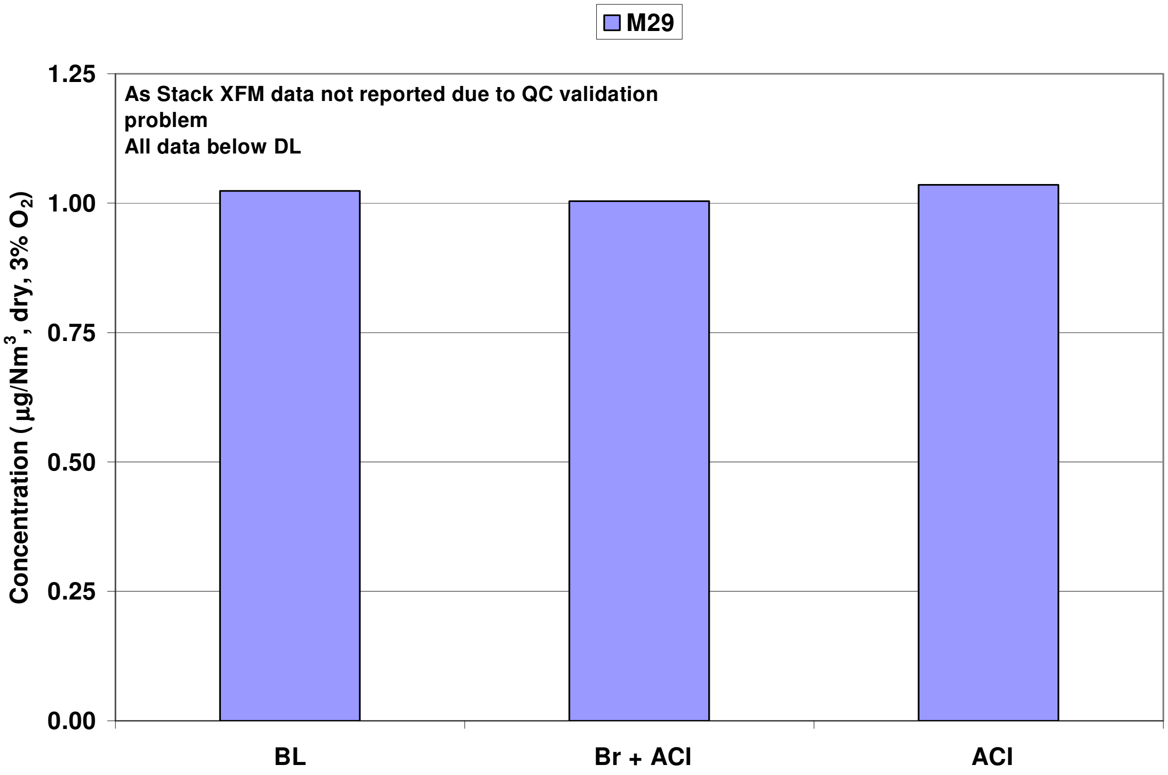


Figure L-8. Arsenic Stack Data

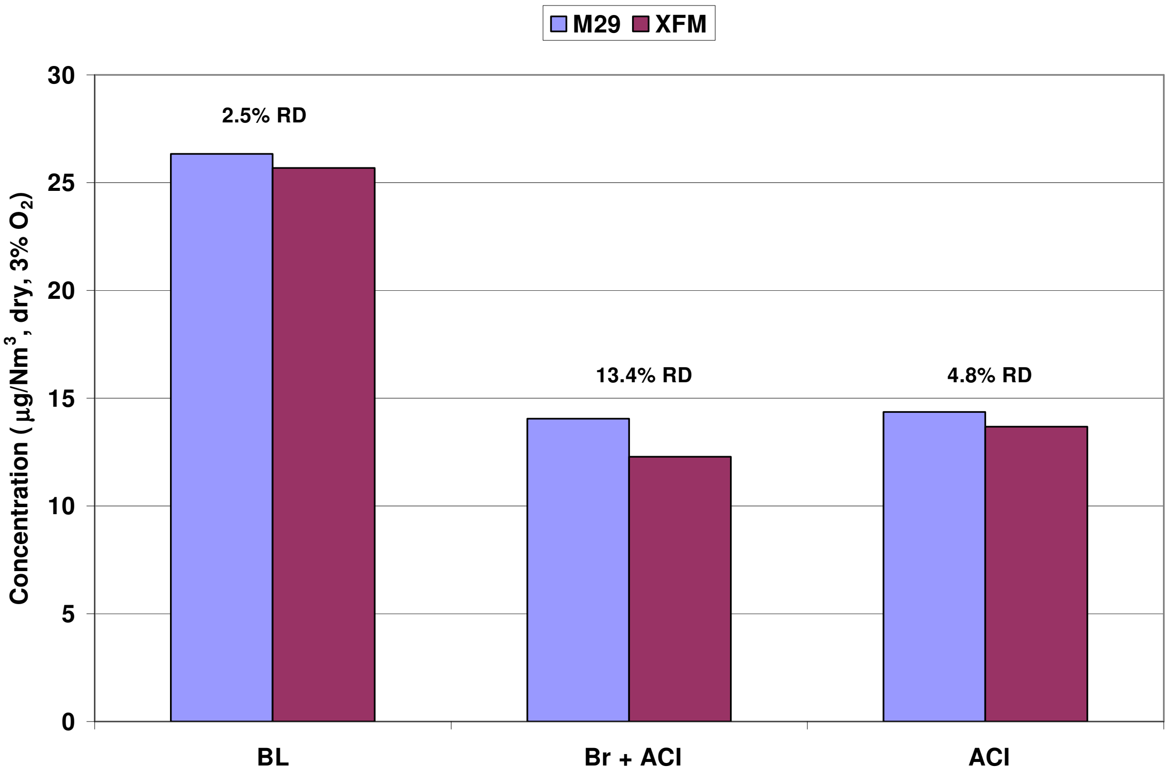


Figure L-9. Mercury ESP Outlet Data

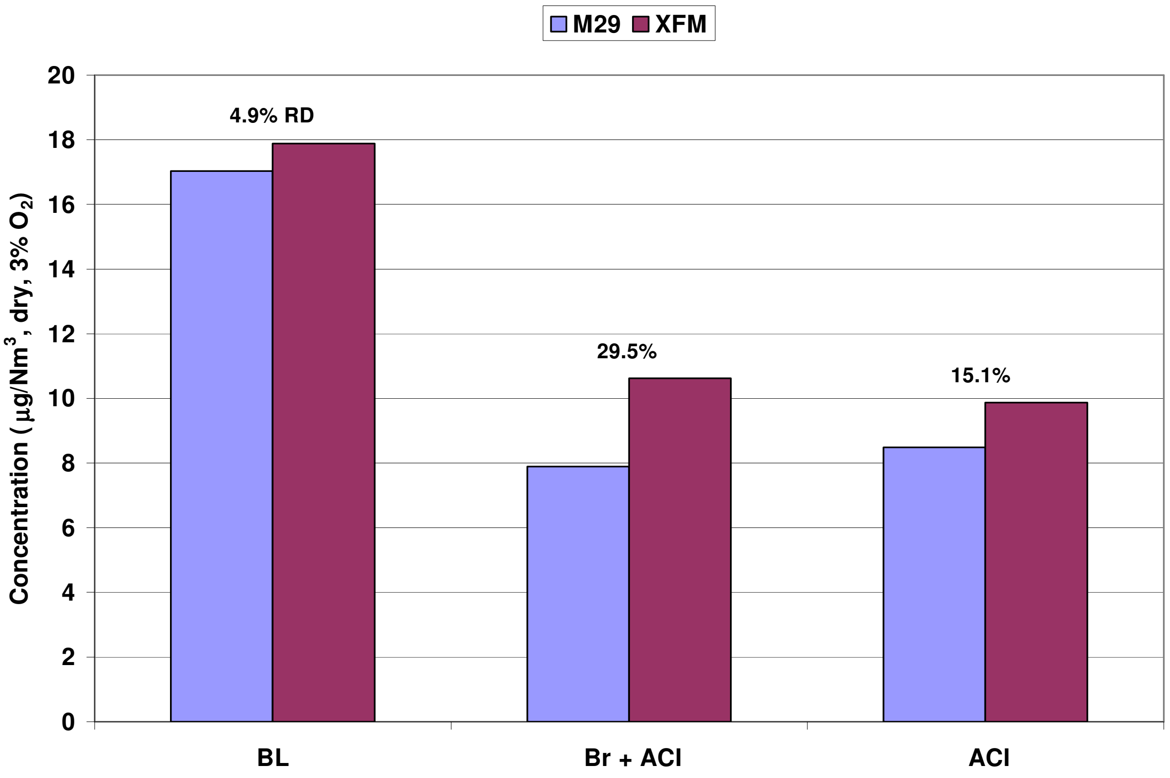


Figure L-10. Mercury Stack Data

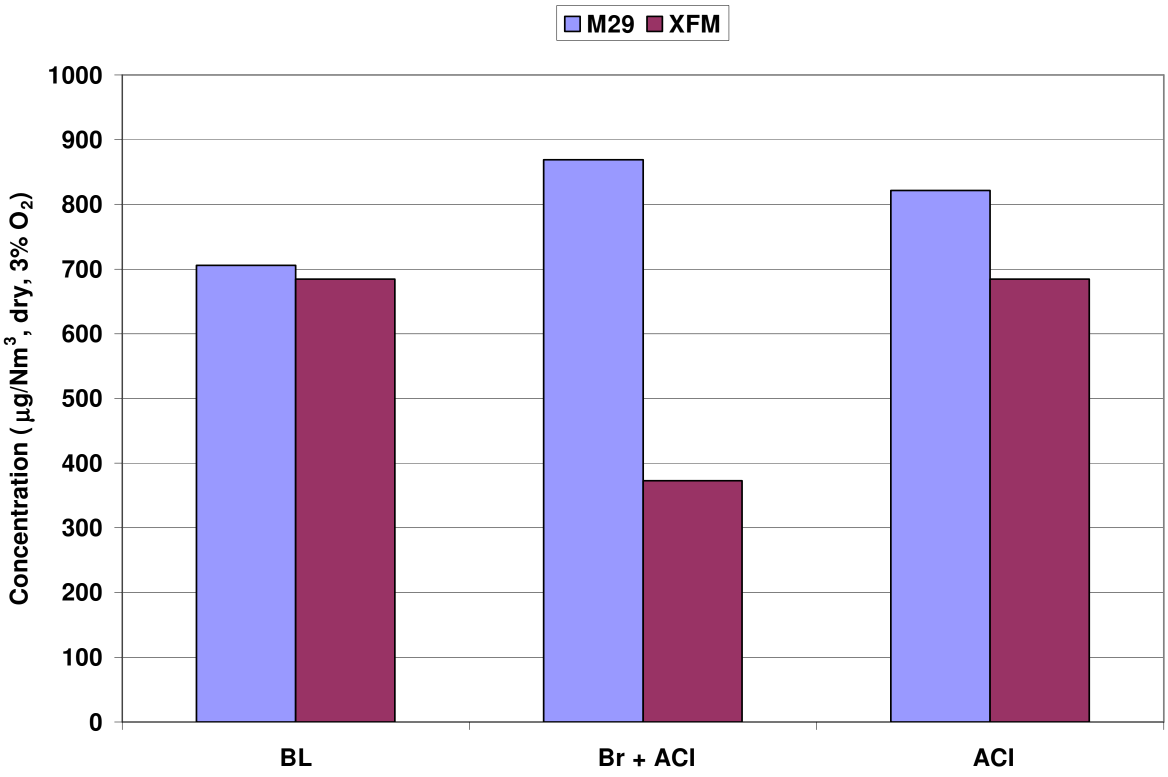


Figure L-11. Selenium ESP Outlet Data

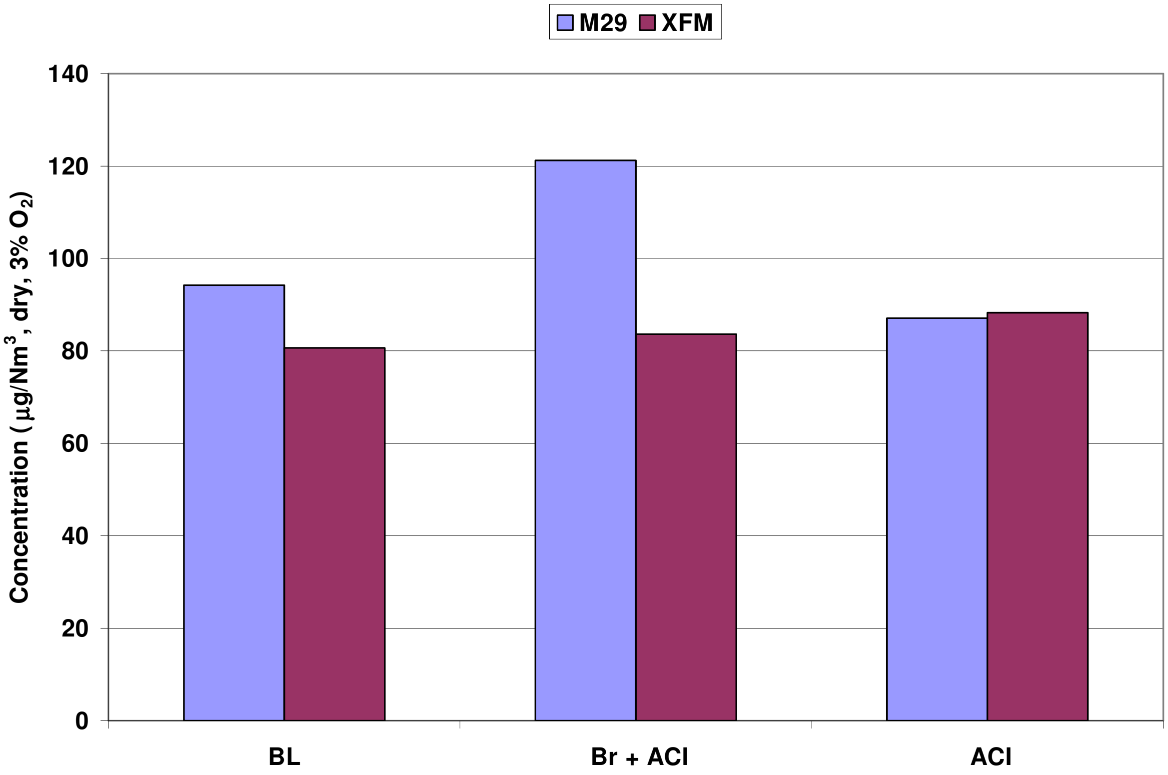


Figure L-12. Selenium Stack Data

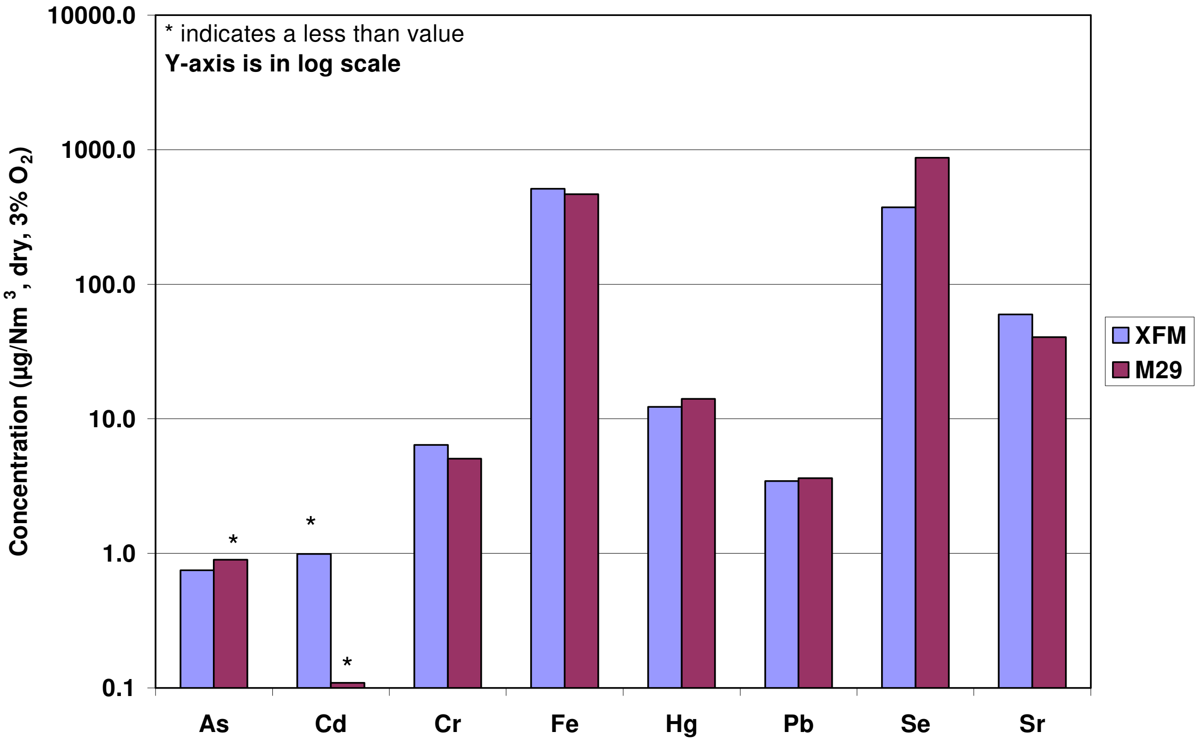


Figure L-13. Comparison of Averages from XFM and M29 for ESP Outlet 7/12/09 ($CaBr_2$ + 0.48 lb/MMacf ACI)

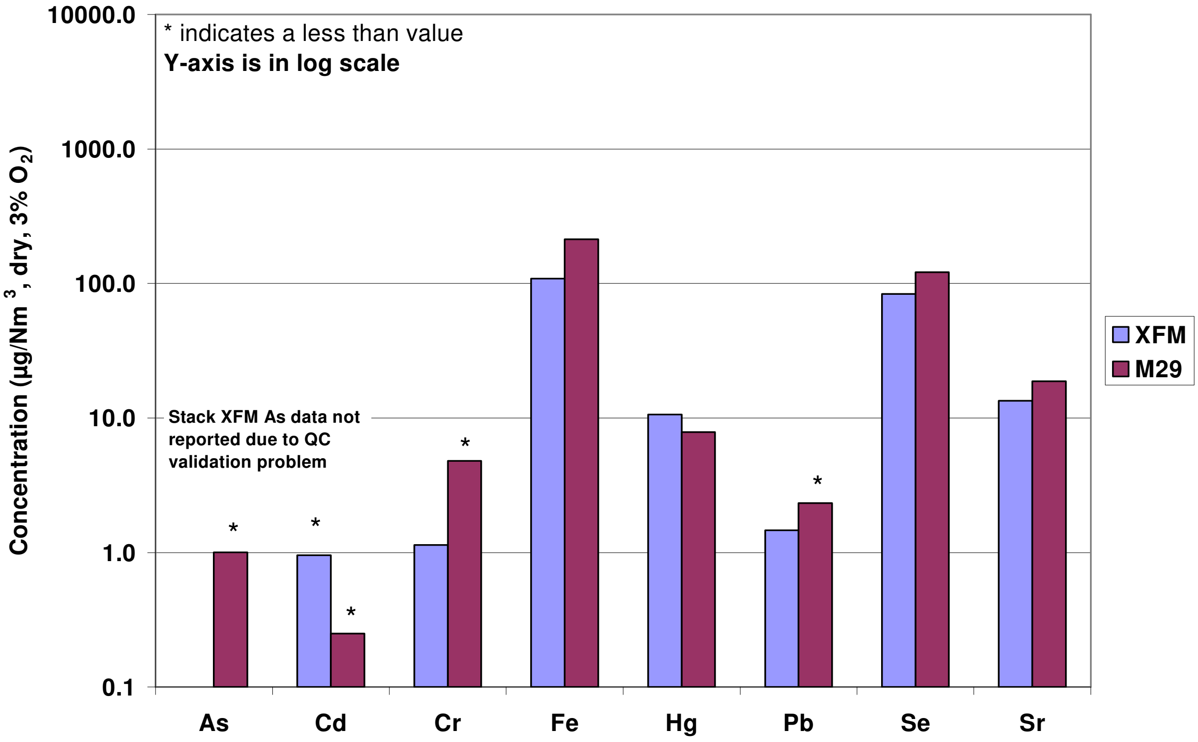


Figure L-14. Comparison of Averages from XFM and M29 for Stack 7/12/09 ($CaBr_2$ + 0.48 lb/MMacf ACI)

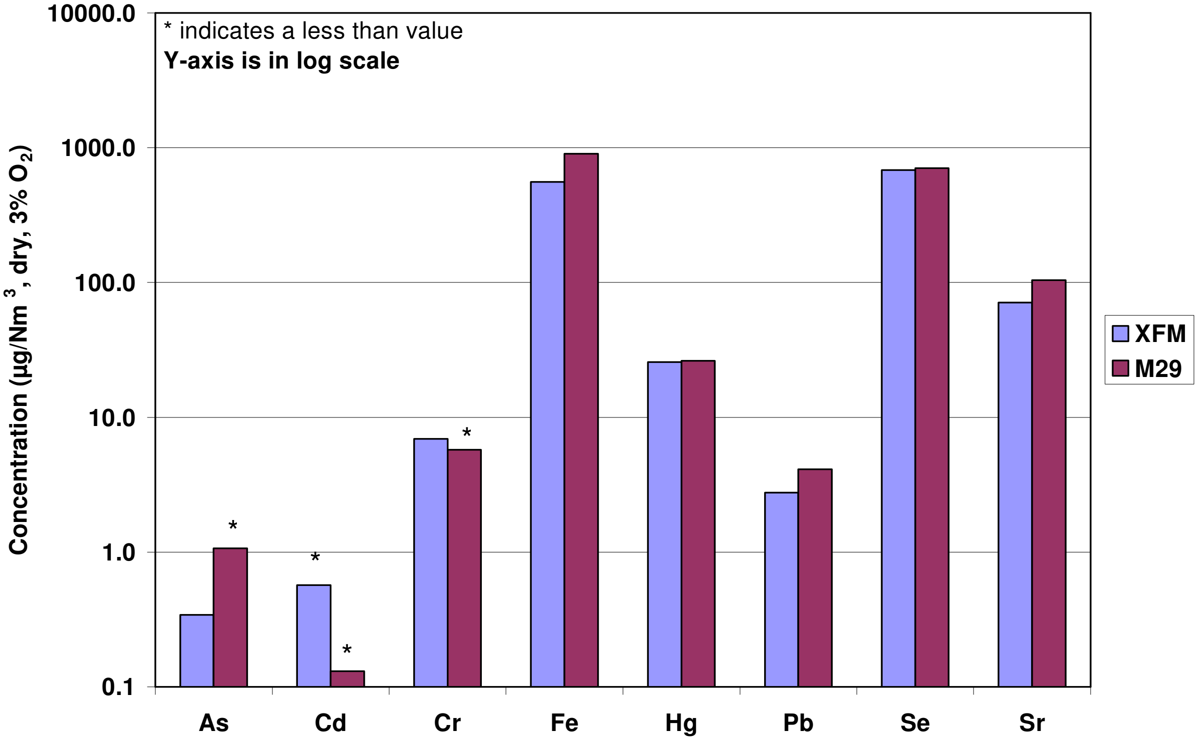


Figure L-15. Comparison of Averages from XFM and M29 for ESP Outlet 7/13/09 (Baseline Conditions)

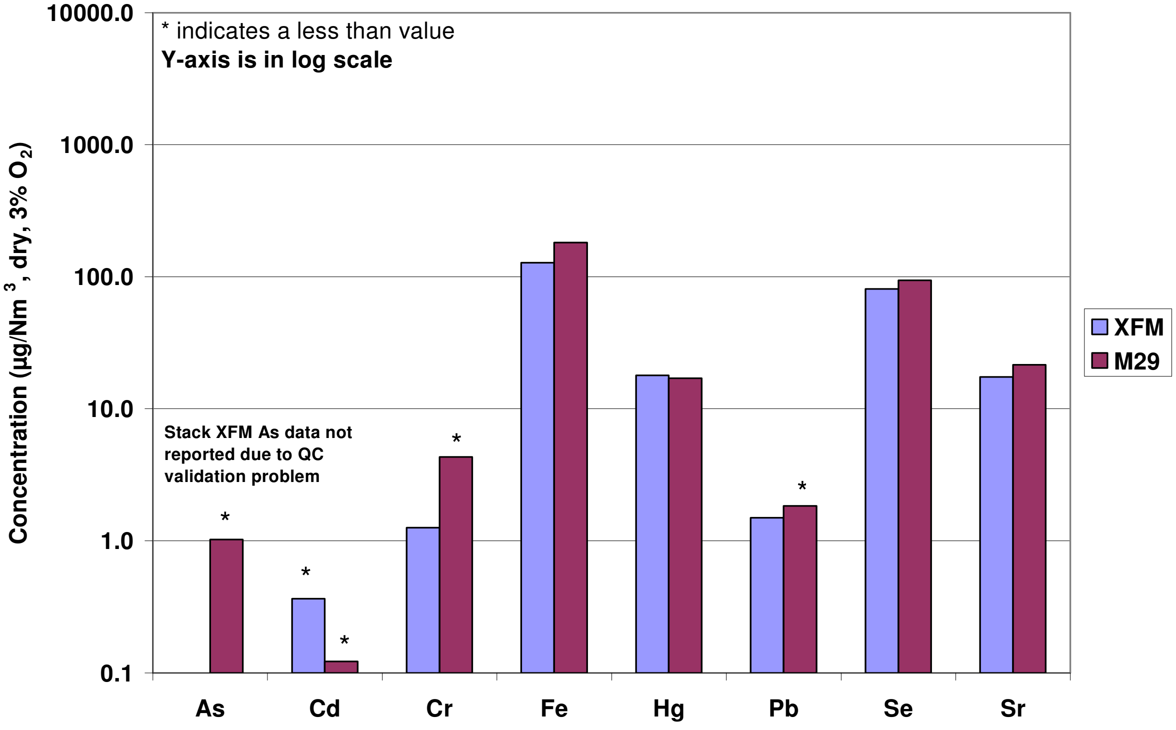


Figure L-16. Comparison of Averages from XFM and M29 for Stack 7/13/09 (Baseline Conditions)

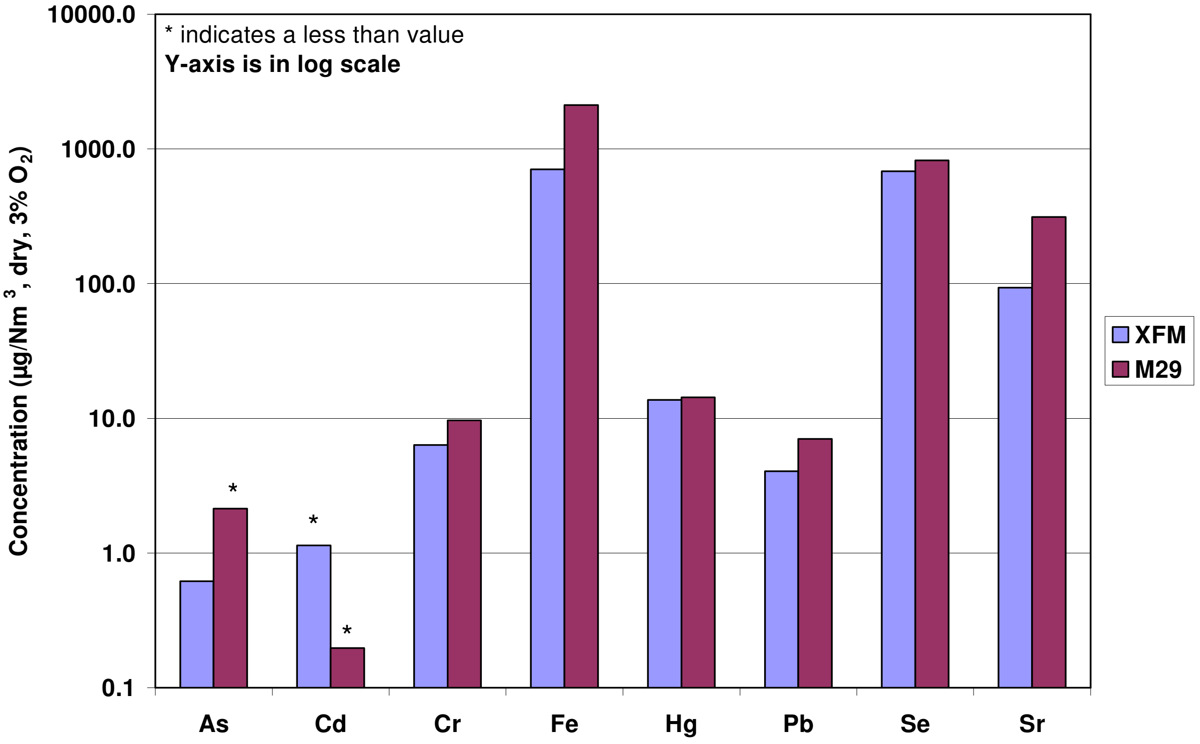


Figure L-17. Comparison of Averages from XFM and M29 for ESP Outlet 7/14/09 (1.9 lb/MMacf ACI)

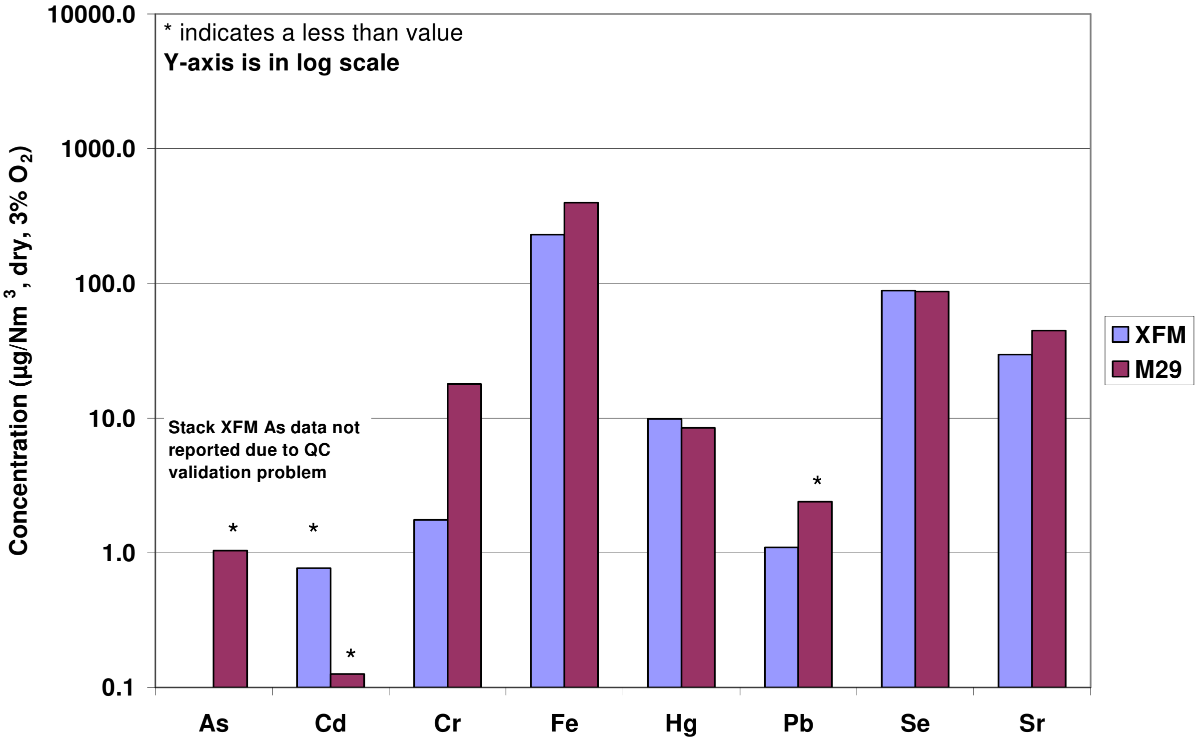


Figure L-18. Comparison of Averages from XFM and M29 for Stack 7/14/09 (1.9 lb/MMacf ACI)

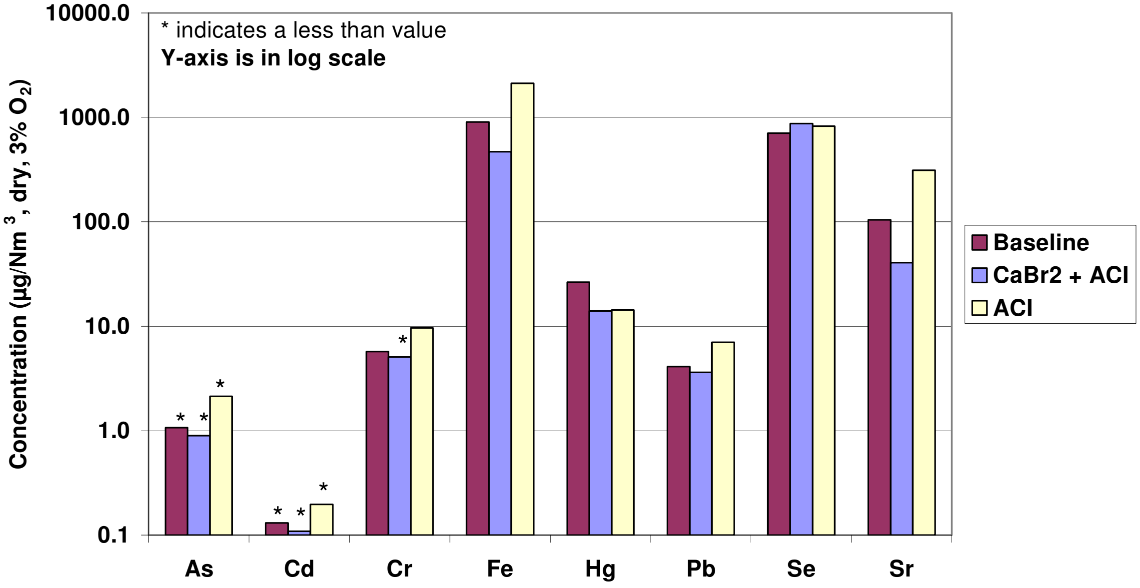


Figure L-19. Method 29 ESP Outlet Data for all Three Conditions

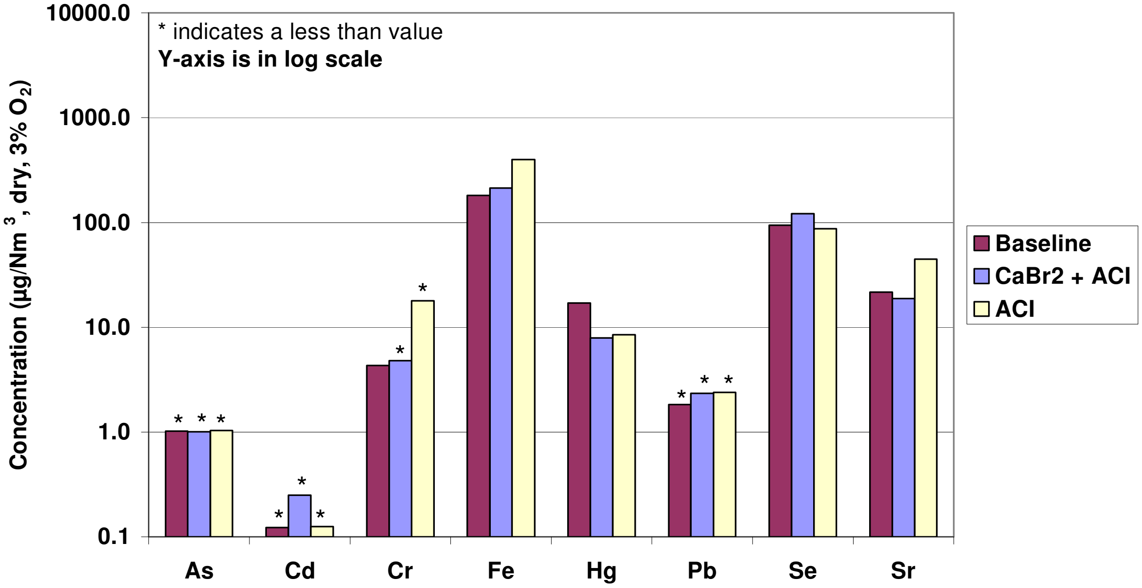


Figure L-20. Method 29 Stack Data for all Three Conditions

Table L-11Aluminum Comparison Summary for Br + ACI Conditions

Metal	**Al**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	2046.1	N/A	N/A	684.1
2	N/A	N/A	902.7	N/A	N/A	572.4
3	N/A	N/A	809.0	N/A	N/A	574.2
Average	N/A	N/A	1252.6	N/A	N/A	610.3
RPD	N/A			N/A		

Table L-12. Aluminum Comparison Summary for Baseline Conditions

Metal	**Al**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	5553.7	N/A	N/A	816.3
2	N/A	N/A	1681.8	N/A	N/A	720.4
3	N/A	N/A	1309.0	N/A	N/A	540.5
Average	N/A	N/A	2848.2	N/A	N/A	692.4
RPD	N/A			N/A		

Table L-13. Aluminum Comparison Summary for ACI Conditions

Metal	**Al**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	9136.4	N/A	N/A	1521.8
2	N/A	N/A	9707.4	N/A	N/A	1507.4
3	N/A	N/A	7394.3	N/A	N/A	1019.3
Average	N/A	N/A	8746.0	N/A	N/A	1349.5
RPD	N/A			N/A		

Table L-14. Silver Comparison Summary for Br + ACI Conditions

Metal	**Ag**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.9	3.1	< 0.4	0.0	2.4	< 0.5
2	3.6	8.6	< 0.3	1.5	2.6	< 0.4
3	0.1	2.8	< 0.3	1.7	2.5	< 0.4
Average	1.5	4.8	< 0.3	1.1	2.5	< 0.4
RPD	N/A			N/A		

Table L-15. Silver Comparison Summary for Baseline Conditions

Metal	**Ag**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.2	3.8	< 0.5	0.4	2.6	< 0.3
2	1.6	3.6	< 0.4	1.4	2.6	< 0.3
3	1.4	3.7	< 0.3	0.2	2.5	< 0.3
Average	1.0	3.7	< 0.4	0.7	2.5	< 0.3
RPD	N/A			N/A		

Table L-16. Silver Comparison Summary for ACI Conditions

Metal	**Ag**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.2	2.9	0.7	2.4	3.0	< 0.3
2	0.1	2.9	0.6	2.3	2.3	< 0.3
3	1.8	2.7	0.6	1.9	2.3	< 0.3
Average	0.7	2.8	0.6	2.2	2.5	< 0.3
RPD	11.8			N/A		

Table L-17. Arsenic Comparison Summary for Br + ACI Conditions

Metal	**As**			Cooper Units: $\mu g/Nm^3$ dry, 3% O_2		
Date	**7/12/2009**			M29 Units: $\mu g/Nm^3$ dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1.6	0.5	< 0.9	104.9	1.0	< 1.0
2	0.5	1.4	< 0.9	116.2	1.2	< 1.0
3	0.1	0.4	< 0.9	70.5	0.8	< 1.0
Average	0.7	0.8	< 0.9	97.2	1.0	< 1.0
RPD	N/A			N/A		

Table L-18. Arsenic Comparison Summary for Baseline Conditions

Metal	**As**			Cooper Units: $\mu g/Nm^3$ dry, 3% O_2		
Date	**7/13/2009**			M29 Units: $\mu g/Nm^3$ dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.5	0.8	< 1.3	46.5	0.7	< 1.0
2	0.2	0.5	< 0.9	35.2	0.6	< 1.0
3	0.3	0.5	< 0.9	28.9	0.6	< 1.0
Average	0.3	0.6	< 1.1	36.8	0.6	< 1.0
RPD	N/A			N/A		

Table L-19. Arsenic Comparison Summary for ACI Conditions

Metal	**As**			Cooper Units: $\mu g/Nm^3$ dry, 3% O_2		
Date	**7/14/2009**			M29 Units: $\mu g/Nm^3$ dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.8	0.4	< 2.0	36.4	0.8	< 1.1
2	0.8	0.4	< 2.3	32.1	0.6	< 1.0
3	0.2	0.4	< 2.1	23.8	0.5	< 1.0
Average	0.6	0.4	< 2.1	30.8	0.6	< 1.0
RPD	N/A			N/A		

Table L-20. Barium Comparison Summary for Br + ACI Conditions

Metal	**Ba**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	116.2	59.6	76.8	24.1	47.2	30.4
2	49.4	165.9	38.9	12.5	49.5	25.7
3	38.8	53.9	39.0	15.7	48.1	28.1
Average	68.1	93.1	51.5	17.4	48.3	28.1
RPD	N/A			N/A		

Table L-21. Barium Comparison Summary for Baseline Conditions

Metal	**Ba**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	139.2	73.3	243.4	30.4	49.3	41.8
2	77.4	69.2	87.8	28.5	50.3	34.0
3	68.3	71.9	57.0	17.9	47.6	26.0
Average	95.0	71.5	129.4	25.6	49.1	33.9
RPD	30.7			N/A		

Table L-22. Barium Comparison Summary for ACI Conditions

Metal	**Ba**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	160.6	55.6	336.5	47.9	48.0	64.2
2	149.7	56.0	344.4	45.9	45.3	64.1
3	55.6	52.7	281.5	77.6	45.3	44.0
Average	121.9	54.7	320.8	57.1	46.2	57.4
RPD	89.8			0.5		

Table L-23. Beryllium Comparison Summary for Br + ACI Conditions

Metal	**Be**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	0.07	N/A	N/A	< 0.04
2	N/A	N/A	0.03	N/A	N/A	< 0.04
3	N/A	N/A	0.03	N/A	N/A	< 0.04
Average	N/A	N/A	0.04	N/A	N/A	< 0.04
RPD	N/A			N/A		

Table L-24. Beryllium Comparison Summary for Baseline Conditions

Metal	**Be**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	0.2	N/A	N/A	< 0.04
2	N/A	N/A	0.1	N/A	N/A	< 0.04
3	N/A	N/A	0.0	N/A	N/A	< 0.03
Average	N/A	N/A	0.1	N/A	N/A	< 0.04
RPD	N/A			N/A		

Table L-25. Beryllium Comparison Summary for ACI Conditions

Metal	**Be**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	N/A	N/A	0.2	N/A	N/A	0.06
2	N/A	N/A	0.3	N/A	N/A	0.05
3	N/A	N/A	0.2	N/A	N/A	< 0.03
Average	N/A	N/A	0.2	N/A	N/A	0.05
RPD	N/A			N/A		

Table L-26. Cadmium Comparison Summary for Br + ACI Conditions

Metal	**Cd**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.1	4.2	< 0.1	2.5	3.3	< 0.2
2	2.3	11.6	< 0.1	0.0	3.5	< 0.2
3	0.5	3.8	< 0.1	0.3	3.4	0.4
Average	1.0	6.5	< 0.1	1.0	3.4	< 0.3
RPD	N/A			N/A		

Table L-27. Cadmium Comparison Summary for Baseline Conditions

Metal	**Cd**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.2	5.1	< 0.2	0.5	3.5	< 0.1
2	0.4	4.8	< 0.1	0.4	3.5	< 0.1
3	1.1	5.0	< 0.1	0.2	3.3	< 0.1
Average	0.6	5.0	< 0.1	0.4	3.4	< 0.1
RPD	N/A			N/A		

Table L-28. Cadmium Comparison Summary for ACI Conditions

Metal	**Cd**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.05	3.9	< 0.2	1.9	3.6	< 0.1
2	3.0	3.9	< 0.2	0.0	3.2	< 0.1
3	0.3	3.7	< 0.2	0.4	3.2	< 0.1
Average	1.1	3.8	< 0.2	0.8	3.3	< 0.1
RPD	N/A			N/A		

Table L-29. Cobalt Comparison Summary for Br + ACI Conditions

Metal	**Co**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1.7	0.6	0.8	0.4	0.3	0.2
2	2.0	1.1	0.3	0.4	0.3	0.2
3	1.0	0.4	0.3	0.4	0.3	0.2
Average	1.6	0.7	0.5	0.4	0.3	0.2
RPD	108.9			62.8		

Table L-30. Cobalt Comparison Summary for Baseline Conditions

Metal	**Co**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1.4	0.6	1.8	0.8	0.3	0.2
2	1.0	0.6	1.0	0.3	0.3	0.2
3	0.2	0.5	0.6	0.1	0.3	< 0.3
Average	0.8	0.5	1.1	0.4	0.3	0.2
RPD	29.0			56.5		

Table L-31. Cobalt Comparison Summary for ACI Conditions

Metal	**Co**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.3	0.4	3.3	0.2	0.3	0.6
2	0.5	0.4	3.6	0.0	0.3	0.5
3	0.7	0.4	3.4	0.3	0.3	0.4
Average	0.5	0.4	3.4	0.2	0.3	0.5
RPD	148.6			N/A		

Table L-32. Chromium Comparison Summary for Br + ACI Conditions

Metal	**Cr**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	9.7	2.0	5.6	1.9	1.6	< 4.5
2	6.9	5.6	4.3	0.5	1.7	< 4.6
3	2.7	1.8	< 5.3	1.0	1.6	< 5.3
Average	6.4	3.1	5.1	1.1	1.6	< 4.8
RPD	23.5			N/A		

Table L-33. Chromium Comparison Summary for Baseline Conditions

Metal	**Cr**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	8.6	4.7	5.9	2.1	1.7	< 4.5
2	10.0	2.3	< 5.6	0.8	1.7	< 4.7
3	2.1	2.4	< 5.7	0.9	1.6	< 3.8
Average	6.9	3.1	< 5.7	1.3	1.7	< 4.3
RPD	N/A			N/A		

Table L-34. Chromium Comparison Summary for ACI Conditions

Metal	**Cr**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	10.9	1.9	9.9	1.9	1.6	-
2	5.2	1.9	9.8	2.3	1.5	5.3
3	2.9	1.8	9.2	1.1	1.5	< 5.1
Average	6.3	1.8	9.6	1.8	1.6	< 5.2
RPD	41.5			N/A ??		

Table L-35. Copper Comparison Summary for Br + ACI Conditions

Metal	**Cu**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	3.5	0.5	4.1	0.6	0.4	2.1
2	2.1	1.3	4.1	0.2	0.4	1.7
3	1.3	0.4	2.4	0.5	0.4	2.2
Average	2.3	0.8	3.5	0.5	0.4	2.0
RPD	43.7			124.7		

Table L-36. Copper Comparison Summary for Baseline Conditions

Metal	**Cu**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	3.2	0.6	6.6	1.0	0.4	1.8
2	1.8	0.6	3.5	0.7	0.4	2.0
3	1.9	0.6	3.0	0.3	0.4	1.6
Average	2.3	0.6	4.3	0.7	0.4	1.8
RPD	61.4			93.8		

Table L-37. Copper Comparison Summary for ACI Conditions

Metal	**Cu**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	4.9	0.5	10.3	1.5	0.4	2.9
2	2.6	0.5	9.9	1.0	0.4	3.3
3	1.6	0.4	8.9	0.8	0.4	2.7
Average	3.1	0.4	9.7	1.1	0.4	3.0
RPD	104.2			92.2		

Table L-38. Iron Comparison Summary for Br + ACI Conditions

Metal	Fe			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	803.2	1.7	732.7	140.4	0.6	180.8
2	453.0	2.7	274.1	89.3	0.4	164.2
3	281.1	0.8	394.8	96.2	0.4	295.3
Average	512.4	1.7	467.2	108.6	0.5	213.4
RPD	9.2			65.1		

Table L-39. Iron Comparison Summary for Baseline Conditions

Metal	Fe			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	774.6	9.7	1327.9	169.5	0.7	207.0
2	484.2	1.7	824.0	122.6	0.5	185.2
3	412.2	1.5	558.1	92.0	0.5	152.4
Average	557.0	4.3	903.3	128.0	0.6	181.6
RPD	47.4			34.6		

Table L-40. Iron Comparison Summary for ACI Conditions

Metal	Fe			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1085.4	2.5	2016.5	254.2	0.9	573.2
2	629.8	1.6	2352.1	255.9	0.8	360.0
3	400.6	1.2	2003.4	178.0	0.7	261.1
Average	705.3	1.8	2124.0	229.4	0.8	398.1
RPD	100.3			53.8		

Table L-41. Mercury Comparison Summary for Br + ACI Conditions

Metal	**Hg**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	12.6	1.2	14.8	12.6	0.9	7.6
2	12.7	2.9	14.1	11.2	0.9	8.3
3	11.5	1.0	13.3	8.0	0.8	7.8
Average	12.3	1.7	14.0	10.6	0.9	7.9
RPD	13.4			29.5		

Table L-42. Mercury Comparison Summary for Baseline Conditions

Metal	**Hg**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	27.0	1.8	18.2	18.4	0.8	15.5
2	25.6	1.2	27.0	17.3	0.8	14.2
3	24.4	1.2	33.7	18.0	0.8	21.4
Average	25.7	1.4	26.3	17.9	0.8	17.0
RPD	2.5			4.9		

Table L-43. Mercury Comparison Summary for ACI Conditions

Metal	**Hg**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	17.4	1.0	15.7	11.0	1.1	9.6
2	11.0	0.9	11.7	9.4	0.7	7.1
3	12.6	0.9	15.7	9.2	0.7	8.7
Average	13.7	0.9	14.4	9.9	0.9	8.5
RPD	4.8			15.1		

Table L-44. Molybdenum Comparison Summary for Br + ACI Conditions

Metal	**Mo**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.6	1.2	5.6	0.1	0.9	5.3
2	0.6	3.3	4.9	0.1	1.0	5.2
3	0.9	1.1	6.1	0.0	1.0	5.8
Average	0.7	1.8	5.6	0.1	1.0	5.5
RPD	N/A			N/A		

Table L-45. Molybdenum Comparison Summary for Baseline Conditions

Metal	**Mo**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	2.0	1.7	6.1	0.7	1.0	5.5
2	0.9	1.4	6.7	0.7	1.0	5.3
3	0.2	1.4	5.5	0.4	0.9	5.5
Average	1.0	1.5	6.1	0.6	1.0	5.4
RPD	N/A			N/A		

Table L-46. Molybdenum Comparison Summary for ACI Conditions

Metal	**Mo**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	2.4	1.1	7.3	1.5	1.2	7.7
2	1.1	1.1	7.4	0.9	0.9	5.8
3	0.4	1.0	7.1	0.8	0.9	5.5
Average	1.3	1.1	7.3	1.1	1.0	6.3
RPD	138.7			142.0		

Table L-47. Manganese Comparison Summary for Br + ACI Conditions

Metal	**Mn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	21.8	1.6	15.6	16.3	1.3	29.1
2	13.8	4.5	22.4	14.7	1.3	20.3
3	7.9	1.5	29.1	16.4	1.3	19.0
Average	14.5	2.5	22.4	15.8	1.3	22.8
RPD	42.8			36.2		

Table L-48. Manganese Comparison Summary for Baseline Conditions

Metal	**Mn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	21.7	3.3	43.7	18.1	1.3	59.5
2	13.8	1.9	72.1	17.2	1.4	82.6
3	13.0	1.9	17.3	15.3	1.3	76.3
Average	16.2	2.4	44.4	16.9	1.3	72.8
RPD	93.2			124.7		

Table L-49. Manganese Comparison Summary for ACI Conditions

Metal	**Mn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	31.6	1.5	144.7	20.4	1.3	130.1
2	18.5	1.5	63.4	19.6	1.2	65.3
3	10.8	1.4	113.3	15.4	1.2	62.7
Average	20.3	1.5	107.1	18.4	1.3	86.0
RPD	136.3			129.4		

Table L-50. Nickel Comparison Summary for Br + ACI Conditions

Metal	**Ni**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	7.3	0.5	5.4	0.6	0.3	< 3.7
2	9.6	1.1	7.1	0.3	0.3	< 3.4
3	7.3	0.4	< 4.4	0.6	0.3	< 4.4
Average	8.1	0.7	5.6	0.5	0.3	< 3.9
RPD	35.9			N/A		

Table L-51. Nickel Comparison Summary for Baseline Conditions

Metal	**Ni**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	11.3	9.6	< 5.0	1.6	0.3	5.6
2	33.2	0.8	< 4.4	0.3	0.3	< 4.0
3	2.5	0.4	< 4.2	0.4	0.3	< 3.6
Average	15.7	3.6	< 4.5	0.8	0.3	< 4.4
RPD	N/A			N/A		

Table L-52. Nickel Comparison Summary for ACI Conditions

Metal	**Ni**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	8.9	0.4	< 6.6	1.1	0.3	9.1
2	2.9	0.3	< 6.5	0.5	0.3	< 5.6
3	2.9	0.3	< 6.3	0.5	0.3	< 4.4
Average	4.9	0.4	< 6.5	0.7	0.3	< 6.4
RPD	N/A			N/A		

Table L-53. Lead Comparison Summary for Br + ACI Conditions

Metal	**Pb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	4.2	1.0	7.3	2.3	1.7	< 2.4
2	4.2	2.6	< 1.9	1.1	2.3	< 2.1
3	2.0	0.9	< 1.7	1.0	1.7	< 2.5
Average	3.4	1.5	3.6	1.5	1.9	< 2.3
RPD	5.0			N/A		

Table L-54. Lead Comparison Summary for Baseline Conditions

Metal	**Pb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	3.5	1.2	8.7	2.0	0.8	< 1.9
2	2.1	1.1	1.8	1.5	1.2	< 1.9
3	2.7	1.1	1.8	1.1	0.8	< 1.7
Average	2.8	1.1	4.1	1.5	0.9	< 1.8
RPD	39.4			N/A		

Table L-55. Lead Comparison Summary for ACI Conditions

Metal	**Pb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	6.0	0.9	7.3	1.2	0.8	< 2.5
2	3.2	0.9	7.3	1.4	1.2	< 2.3
3	2.9	0.8	6.4	0.7	0.7	2.3
Average	4.1	0.9	7.0	1.1	0.9	< 2.4
RPD	53.6			N/A		

Table L-56. Antimony Comparison Summary for Br + ACI Conditions

Metal	**Sb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1.9	7.9	< 0.6	2.3	6.3	< 0.6
2	0.1	22.1	< 0.5	2.8	6.6	< 0.5
3	0.2	7.2	< 0.5	3.2	6.4	< 0.6
Average	0.7	12.4	< 0.5	2.8	6.4	< 0.6
RPD	N/A			N/A		

Table L-57. Antimony Comparison Summary for Baseline Conditions

Metal	**Sb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	0.5	9.8	< 0.8	3.9	6.6	< 0.6
2	3.4	9.2	< 0.6	0.1	6.7	< 0.6
3	4.6	9.6	< 0.6	1.0	6.3	< 0.6
Average	2.8	9.5	< 0.6	1.7	6.5	< 0.6
RPD	N/A			N/A		

Table L-58. Antimony Comparison Summary for ACI Conditions

Metal	**Sb**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	8.2	7.4	< 1.1	1.4	6.4	< 0.7
2	5.1	7.5	< 1.1	4.2	6.0	< 0.6
3	5.9	7.0	< 1.1	2.6	6.0	< 0.6
Average	6.4	7.3	< 1.1	2.7	6.1	< 0.6
RPD	N/A			N/A		

Table L-59. Selenium Comparison Summary for Br + ACI Conditions

Metal	**Se**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	243.2	1.9	815.9	81.0	0.6	117.6
2	548.1	5.0	931.1	81.3	0.8	108.1
3	326.9	2.1	859.3	88.6	0.7	138.1
Average	372.7	3.0	868.8	83.6	0.7	121.3
RPD	79.9			36.7		

Table L-60. Selenium Comparison Summary for Baseline Conditions

Metal	**Se**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	654.7	4.3	883.2	85.9	0.6	100.7
2	718.2	3.3	865.1	81.9	0.6	89.1
3	680.4	3.3	368.3	74.2	0.6	92.9
Average	684.4	3.6	705.5	80.6	0.6	94.2
RPD	3.0			15.5		

Table L-61. Selenium Comparison Summary for ACI Conditions

Metal	**Se**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	643.1	2.5	876.1	93.5	0.7	87.0
2	709.1	2.7	852.8	92.7	0.5	83.4
3	700.3	2.6	734.9	78.6	0.6	91.0
Average	684.2	2.6	821.2	88.3	0.6	87.1
RPD	18.2			1.3		

Table L-62. Tin Comparison Summary for Br + ACI Conditions

Metal	**Sn**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	1.5	5.5	< 7.0	1.6	4.4	< 2.8
2	2.7	15.3	< 6.0	6.7	4.6	< 2.7
3	3.4	5.0	7.1	2.8	4.4	< 2.9
Average	2.5	8.6	< 6.7	3.7	4.5	< 2.8
RPD	N/A			N/A		

Table L-63. Tin Comparison Summary for Baseline Conditions

Metal	**Sn**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	5.3	6.8	6.0	2.1	4.5	< 2.8
2	0.6	6.4	< 2.6	2.1	4.6	< 2.9
3	5.1	6.6	< 2.7	3.1	4.4	< 2.8
Average	3.7	6.6	< 3.7	2.4	4.5	< 2.9
RPD	N/A			N/A		

Table L-64. Tin Comparison Summary for ACI Conditions

Metal	**Sn**			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	3.8	5.1	< 3.4	1.9	4.4	< 2.9
2	1.1	5.2	< 3.6	0.0	4.2	< 2.9
3	3.6	4.9	< 3.2	1.1	4.2	< 2.9
Average	2.8	5.0	< 3.4	1.0	4.3	< 2.9
RPD	N/A			N/A		

Table L-65. Strontium Comparison Summary for Br + ACI Conditions

Metal	**Sr**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	96.0	0.8	64.3	17.3	0.6	21.0
2	49.5	2.2	29.2	10.9	0.7	17.4
3	33.2	0.7	28.1	12.2	0.6	17.8
Average	59.6	1.2	40.5	13.4	0.6	18.7
RPD	38.0			32.9		

Table L-66. Strontium Comparison Summary for Baseline Conditions

Metal	**Sr**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	96.0	1.0	193.6	21.1	0.7	24.5
2	59.1	0.9	71.8	16.9	0.7	21.8
3	57.7	1.0	48.1	14.3	0.6	18.4
Average	71.0	1.0	104.5	17.5	0.7	21.6
RPD	38.2			20.9		

Table L-67. Strontium Comparison Summary for ACI Conditions

Metal	**Sr**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	153.5	0.8	330.4	33.8	0.6	53.4
2	79.9	0.7	329.9	33.3	0.6	48.0
3	47.0	0.7	277.7	21.8	0.6	32.3
Average	93.5	0.7	312.7	29.6	0.6	44.6
RPD	108.0			40.2		

Table L-68. Titanium Comparison Summary for Br + ACI Conditions

Metal	Ti			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	7/12/2009			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	203.8	22.1	131.1	41.4	17.5	43.8
2	116.6	61.5	59.7	25.0	18.4	35.1
3	76.6	20.0	53.1	25.7	17.8	36.4
Average	132.3	34.5	81.3	30.7	17.9	38.4
RPD	47.8			22.4		

Table L-69. Titanium Comparison Summary for Baseline Conditions

Metal	Ti			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	7/13/2009			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	201.1	27.2	340.7	47.2	18.3	48.4
2	124.6	25.7	100.2	34.7	18.7	42.3
3	114.6	26.7	82.7	29.4	17.6	32.3
Average	146.8	26.5	174.6	37.1	18.2	41.0
RPD	17.3			10.0		

Table L-70. Titanium Comparison Summary for ACI Conditions

Metal	Ti			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	7/14/2009			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	268.9	20.6	574.5	74.9	17.8	94.4
2	172.0	20.8	594.8	76.6	16.8	94.5
3	108.2	19.5	484.3	50.1	16.8	66.3
Average	183.0	20.3	551.2	67.2	17.1	85.1
RPD	100.3			23.5		

Table L-71. Thallium Comparison Summary for Br + ACI Conditions

Metal	Tl			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	7/12/2009			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	N/A	N/A	< 0.1	N/A	N/A	0.1
2	N/A	N/A	< 0.1	N/A	N/A	0.1
3	N/A	N/A	< 0.1	N/A	N/A	0.1
Average	N/A	N/A	< 0.1	N/A	N/A	0.1
RPD	N/A			N/A		

Table L-72. Thallium Comparison Summary for Baseline Conditions

Metal	Tl			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	7/13/2009			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	N/A	N/A	< 0.2	N/A	N/A	0.1
2	N/A	N/A	0.1	N/A	N/A	0.1
3	N/A	N/A	0.1	N/A	N/A	0.1
Average	N/A	N/A	0.1	N/A	N/A	0.1
RPD	N/A			N/A		

Table L-73. Thallium Comparison Summary for ACI Conditions

Metal	Tl			Cooper Units: µg/Nm^3 dry, 3% O_2		
Date	7/14/2009			M29 Units: µg/Nm^3 dry, 3% O_2		
Location	ESPO			Stack		
Run	Cooper Total	Cooper Unc	M29 Total	Cooper Total	Cooper Unc	M29 Total
1	N/A	N/A	0.2	N/A	N/A	0.1
2	N/A	N/A	0.3	N/A	N/A	0.1
3	N/A	N/A	0.2	N/A	N/A	0.1
Average	N/A	N/A	0.2	N/A	N/A	0.1
RPD	N/A			N/A		

Table L-74. Vandium Comparison Summary for Br + ACI Conditions

Metal	**V**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	12.0	11.0	7.5	2.7	8.7	2.8
2	7.1	30.6	3.6	1.8	9.1	2.2
3	5.1	10.0	3.1	1.9	8.9	2.3
Average	8.0	17.2	4.7	2.1	8.9	2.4
RPD	N/A			N/A		

Table L-75. Vandium Comparison Summary for Baseline Conditions

Metal	**V**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	12.6	13.5	19.5	2.9	9.1	3.1
2	7.8	12.8	6.2	2.7	9.3	2.7
3	7.1	13.3	5.0	1.9	8.8	2.0
Average	9.2	13.2	10.2	2.5	9.1	2.6
RPD	N/A			N/A		

Table L-76. Vandium Comparison Summary for ACI Conditions

Metal	**V**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	18.8	10.3	30.8	5.2	8.9	6.3
2	11.0	10.3	31.7	5.3	8.4	6.5
3	6.5	9.7	26.5	3.6	8.4	4.3
Average	12.1	10.1	29.7	4.7	8.5	5.7
RPD	84.0			N/A		

Table L-77. Zinc Comparison Summary for Br + ACI Conditions

Metal	**Zn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/12/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	5.5	0.6	21.0	1.1	0.5	16.0
2	3.3	1.6	15.3	2.4	0.5	15.9
3	2.7	0.5	8.4	2.8	0.5	21.2
Average	3.8	0.9	14.9	2.1	0.5	17.7
RPD	118.2			157.7		

Table L-78. Zinc Comparison Summary for Baseline Conditions

Metal	**Zn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/13/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	5.5	1.5	17.2	7.0	0.5	8.6
2	5.9	0.7	13.7	3.4	0.5	12.3
3	5.4	0.7	18.3	1.1	0.5	9.5
Average	5.6	0.9	16.4	3.9	0.5	10.1
RPD	97.7			89.8		

Table L-79. Zinc Comparison Summary for ACI Conditions

Metal	**Zn**			Cooper Units: µg/Nm^3 dry, 3% O$_2$		
Date	**7/14/2009**			M29 Units: µg/Nm^3 dry, 3% O$_2$		
Location	**ESPO**			**Stack**		
Run	**Cooper Total**	**Cooper Unc**	**M29 Total**	**Cooper Total**	**Cooper Unc**	**M29 Total**
1	8.6	0.5	18.9	3.4	0.5	12.7
2	6.2	0.5	21.0	2.5	0.4	10.5
3	5.0	0.5	21.8	3.4	0.4	7.0
Average	6.6	0.5	20.6	3.1	0.4	10.1
RPD	103.2			106.0		

APPENDIX M - ASH TRACE ELEMENT DATA

Table M-2 below shows the trace element concentrations for the collected fly ash by field. To calculate an average trace metal concentration of the fly ash, a weighted average of the individual field concentrations was used. Table M-1 shows the fraction of the fly ash captured by field. Since data for only fields 1 and 4 and 5 were available, new weighted fractions had to be calculated. The equation below shows how the new weighted averages of fly action fraction captured by field were calculated.

Table M-1. Fraction of Fly Ash Captured by Field

Field	Fraction of Fly Ash Captured
1	0.94
2	0.042
3	0.01
4&5	0.004
6&7	0.002

$$Field1New = 0.94/0.944 = 0.996$$

$$Field4\,\&\,5New = \frac{0.004}{0.944} = 0.004$$

To calculate the average trace metal concentration the concentration for each field was multiplied by the fraction of captured fly ash from that field. The equation below shows this calculation.

$$Avg = 0.996 * Field1Concentration + 0.004 * Field4\,\&\,5Concentration$$

Table M-2. Trace Element Concentration in the Fly Ash by ESP Field

Date	6/11/2009		6/12/2009		7/12/2009		7/14/2009	
Element	Field 1	Field 4&5	Field 1	Field 4&5	Field 1	Field 4&5	Field 1	Field 4&5
Ag	1.2	1.4	1.2	1.4	1.1	1.4	1.2	1.5
As	16.7	41.8	20.4	40.2	13.9	39.3	15.1	39.0
Ba	2480	2970	2750	3010	1880	3350	1770	3300
Be	5.5	6.1	5.8	6.1	4.4	5.9	4.6	5.9
Cd	0.7	1.7	0.8	1.7	0.7	1.9	0.8	1.9
Co	23.8	31.4	24.8	31.8	21.1	32.5	21.7	30.8
Cr	94.4	120	96.5	125	89.4	131	89.4	128
Cu	100	203	120	165	108	170	110	153
Hg	0.04	0.04	0.05	0.04	0.71	0.59	0.63	0.65
Mn	380	667	402	617	561	575	530	574
Ni	70.2	85.6	70.7	83.6	61.5	91.6	63.3	85.7
Pb	37.7	68.9	42.5	64.5	38.2	70.5	41.7	66.7
Sb	3.4	7.4	3.5	7.1	3.4	7.6	3.6	7.7
Se	21.4	192	16.4	213	15.2	176	20.2	188
Tl	1.0	1.8	1.3	1.8	0.6	2.0	0.9	1.9
V	199	330	206	340	199	379	201	381
Zn	83.5	203	91.9	176	87.2	186	83.0	178

Table M-3. Fly Ash Trace Element Concentrations

	Ash Trace Element Concentration (lb/TBTU)		
Date	**6/12/09**	**7/14/09**	**7/12/09**
Condition	**Baseline**	**ACI**	**ACI + Br**
Ag	17.3	18.2	15.9
As	300	225	198
Ba	40278	26274	26676
Be	85.5	68.3	62.2
Cd	11.9	12.4	9.9
Co	364	322	299
Cr	1414	1325	1266
Cu	1764	1627	1538
Hg	0.5	8.8	11.7
Mn	5894	7836	7931
Ni	1036	937	871
Pb	623	619	542
Sb	51.3	54.2	48.3
Se	253	309	225
Tl	19.1	12.8	8.9
V	3020	2984	2819
Zn	1350	1234	1239

APPENDIX N - XFM RUN DATA

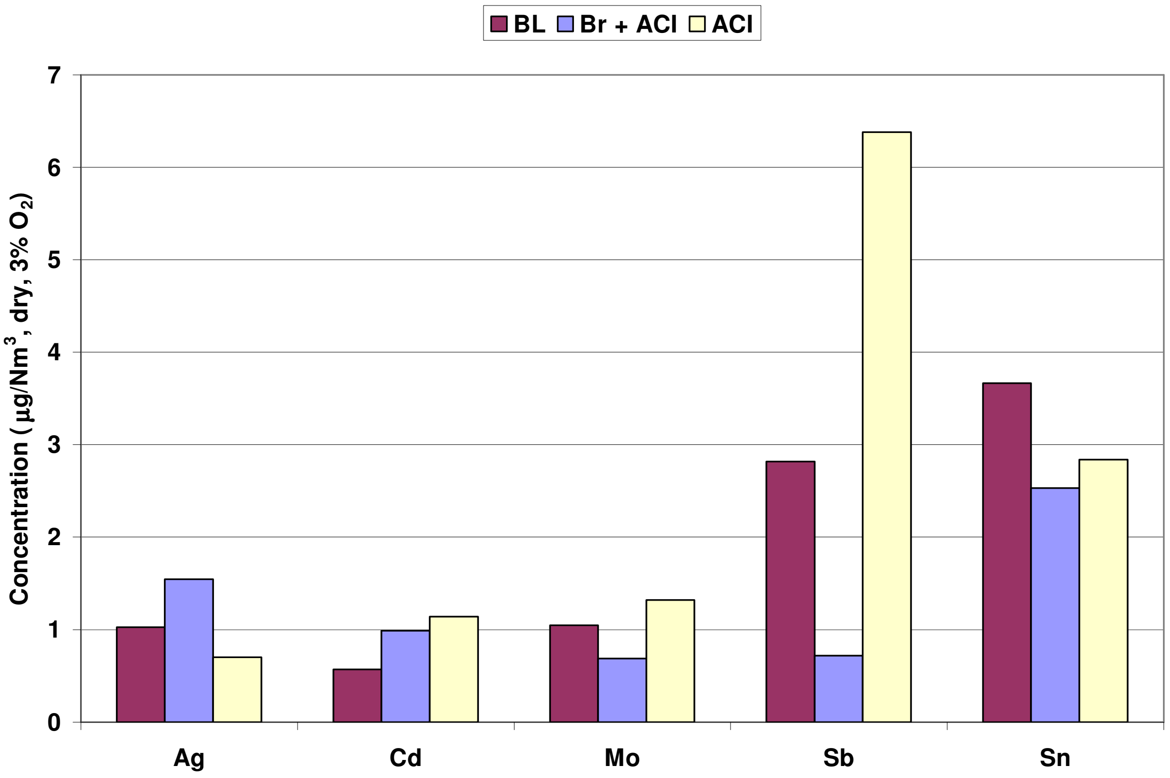


Figure N-1. XFM ESP Outlet Metals within Uncertainty

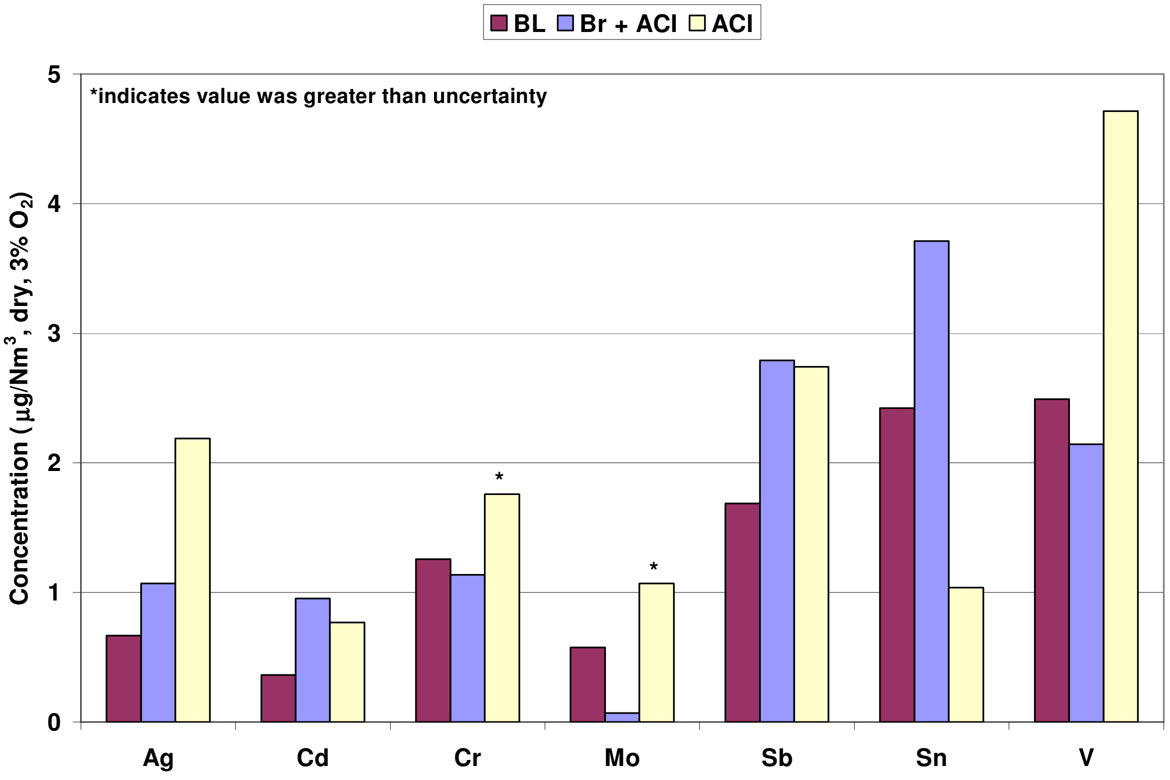


Figure N-2. XFM Stack Metals within Uncertainty

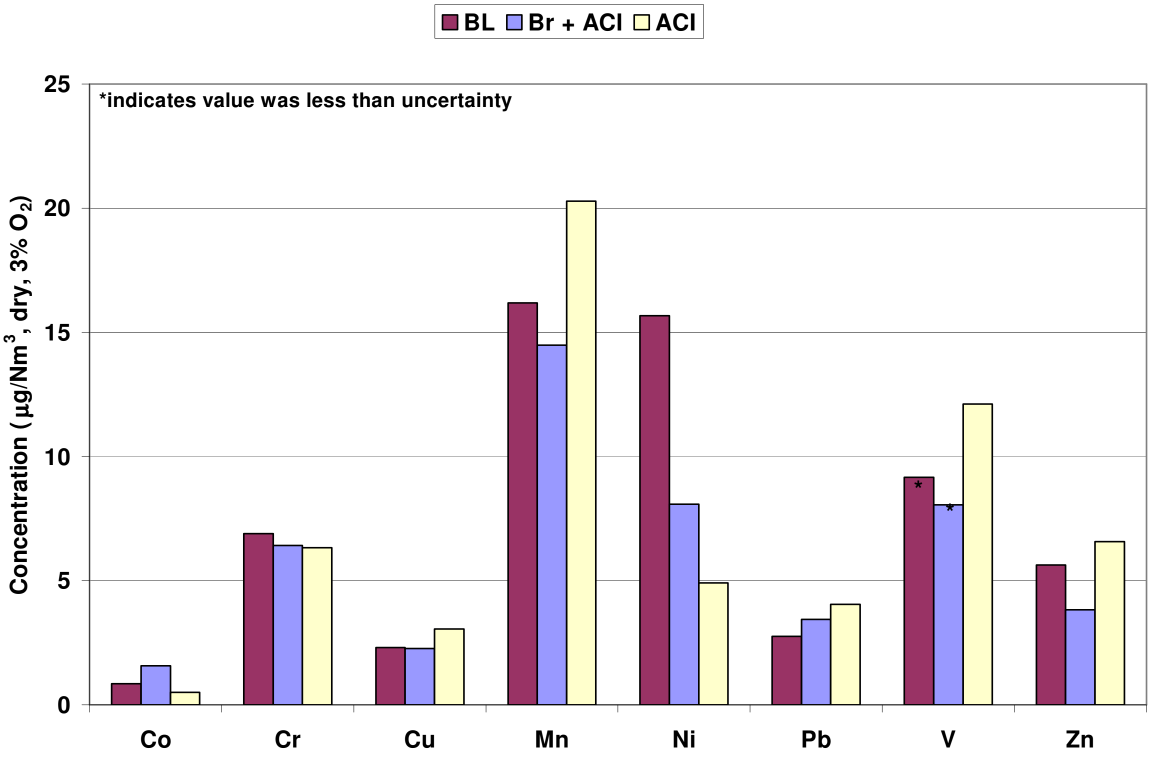


Figure N-3. XFM ESP Outlet Metals near Uncertainty

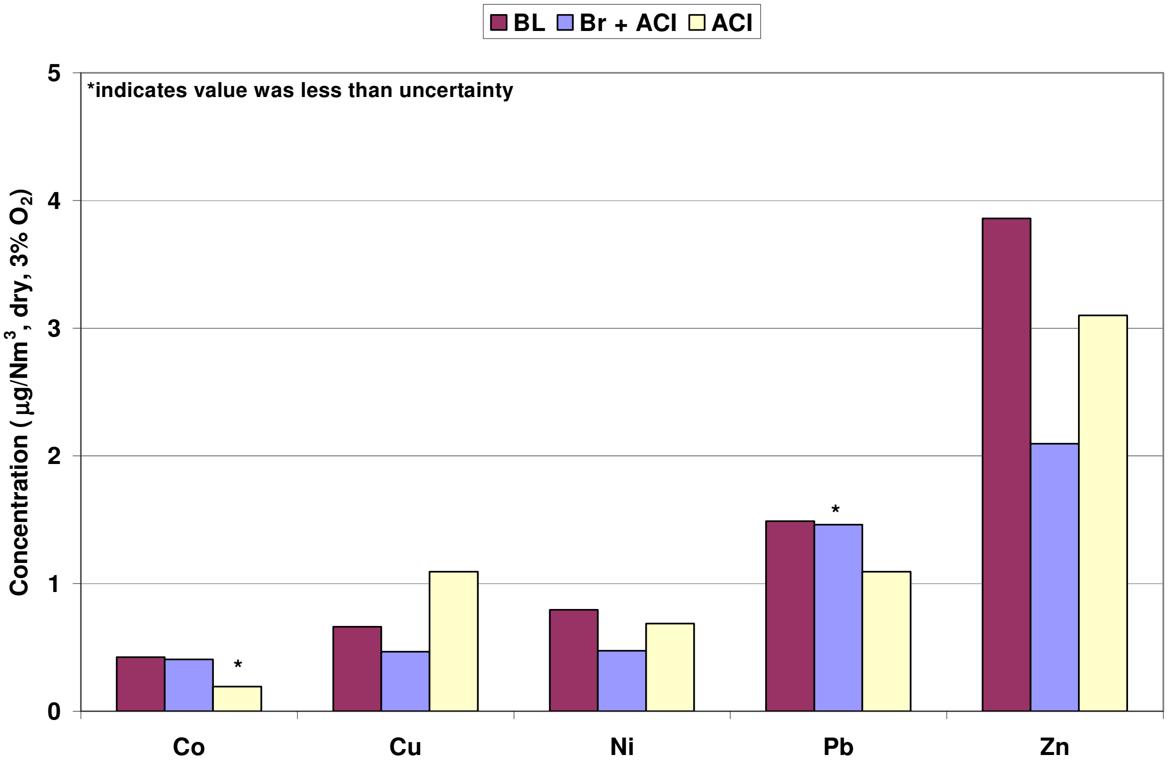


Figure N-4. XFM Stack Metals near Uncertainty

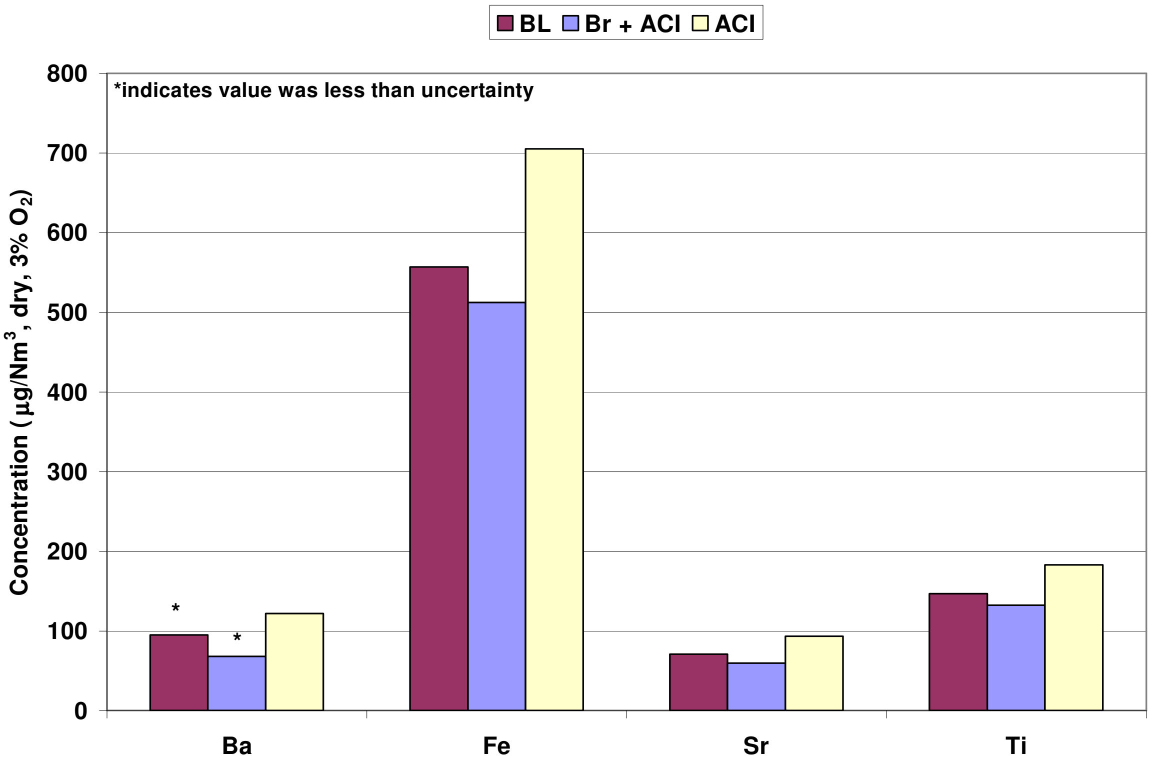


Figure N-5. XFM ESP Outlet Metals Greater than Uncertainty

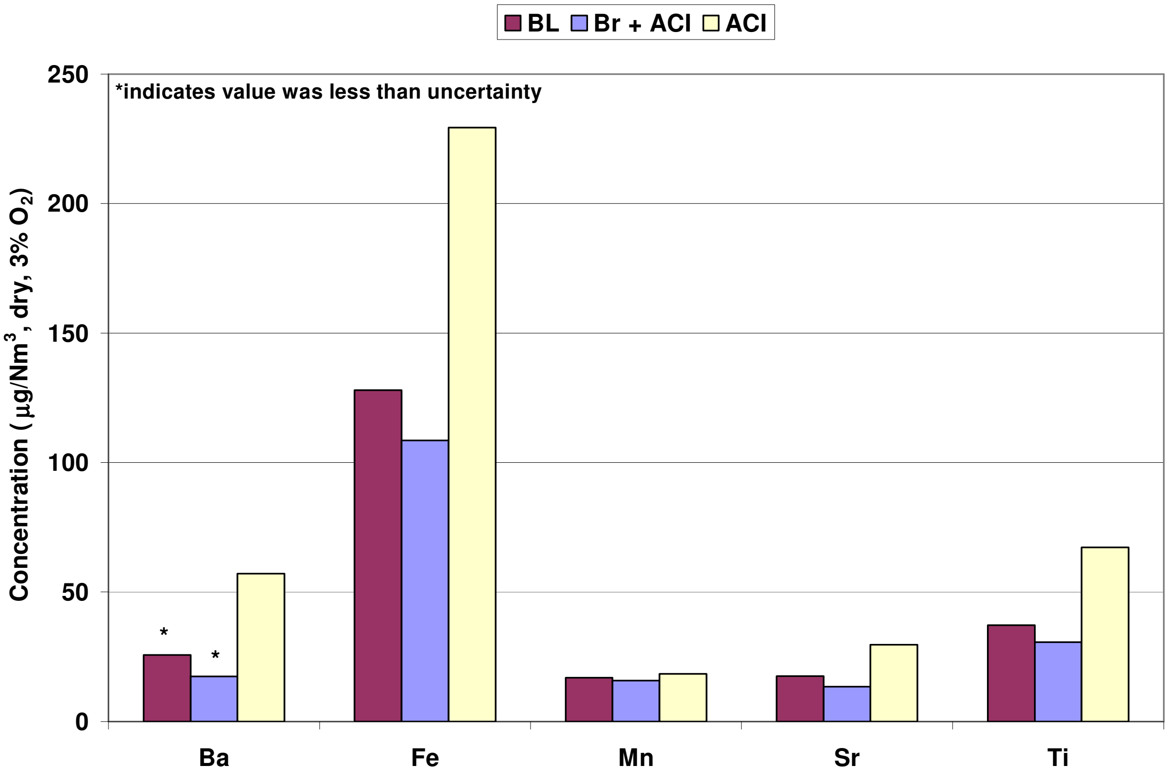


Figure N-6. XFM Stack Metals Greater than Uncertainty

APPENDIX O - M5 AND M17 RESULTS

Table O-1. Outlet Particulate Loading Measurements for $CaBr_2$ Injection (Method 5)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
7/12/2009	8:01	10:01	3.99	8.45
7/12/2009	10:45	12:45	1.44	3.04
7/12/2009	13:35	15:35	1.81	3.84
Average			**2.41**	**5.11**
Std Dev			**1.38**	**2.92**

Table O-2. Baseline Outlet Particulate Loading Measurements (Method 5)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
7/13/2009	7:44	9:44	11.80	25.00
7/13/2009	10:32	12:32	3.91	8.28
7/13/2009	13:04	15:04	2.57	5.44
Average			**6.09**	**12.91**
Std Dev			**4.99**	**10.57**

Table O-3. Outlet Particulate Loading Measurements for Sorbent Injected at 1.9 lb/MMacf (Method 5)

Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
7/14/2009	7:30	9:30	20.99	44.46
7/14/2009	10:05	12:05	20.90	44.26
7/14/2009	13:27	15:27	15.86	33.59
Average			**19.25**	**40.77**
Std Dev			**2.94**	**6.22**

Table O-4. Comparison of Average Baseline and Sorbent Injection Particulate Loading Measurements (Method 5)

	Baseline	$CaBr_2$ injection	ACI 1.9 lb/MMacf
Ave. Outlet (milligrain/dscf at 7% O_2)	6.09	2.41	19.25
Ave. Outlet (10^{-3} lb/MMBtu)	12.94	5.11	40.77

Table O-5. Comparison of Method 5 and Method 17 Average Particulate Loading Measurements at the ESPO

	Date (2009)	Condition	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Method 17	6/10-6/11	Baseline	3.01	6.38
Method 5	7/13	Baseline	6.09	12.91
Method 17	6/13-6/15	ACI	1.93	4.10
Method 5	7/14	ACI	19.25	40.77

Table O-6. Baseline Particulate Loading Measurements at ESP Inlet

Run #	Port #	Date	Start Time	End Time	Inlet Particulate Loading (milligrain/dscf at 7% O_2)	Inlet Particulate Loading (10^{-3} lb/MMBtu)
1	2D2-2	6/10/2009	9:08	9:33	4357	9227
2	2D2-5	6/10/2009	10:25	10:50	5853	12396
3	2D2-9	6/10/2009	11:09	11:34	4458	9443
4	2D2-11	6/10/2009	12:11	12:36	4593	9728
5	2D2-11	6/10/2009	14:11	14:36	6589	13956
6	2D2-9	6/10/2009	14:54	15:19	3944	8353
7	2D2-5	6/10/2009	15:42	16:07	4841	10254
8	2D2-2	6/10/2009	17:11	17:36	3188	6752
9	2D2-2	6/11/2009	8:18	8:43	3919	8300
10	2D2-5	6/11/2009	9:27	9:52	4180	8852
11	2D2-9	6/11/2009	10:11	10:36	3628	7684
12	2D2-11	6/11/2009	11:00	11:25	3920	8301
13	2D2-11	6/11/2009	13:43	14:08	3945	8354
14	2D2-9	6/11/2009	14:23	14:48	4758	10076
15	2D2-5	6/11/2009	14:58	15:23	4669	9888
16	2D2-2	6/11/2009	15:35	16:00	4386	9289
Average					**4452**	**9428**
Std Dev					**948**	**1754**

Table O-7. Inlet Particulate Loading Measurements during Sorbent Injection Test at 0.5 lb/MMacf (Method 17)

Run #	Port #	Date	Start Time	End Time	Inlet Particulate Loading (milligrain/dscf at 7% O_2)	Inlet Particulate Loading (10^{-3} lb/MMBtu)
1	2D2-11	6/16/2009	09:01	09:26	4153	8796
2	2D2-9	6/16/2009	10:23	10:48	5380	11394
3	2D2-5	6/16/2009	11:38	12:03	4105	8693
4	2D2-2	6/16/2009	12:18	12:43	3793	8033
5	2D2-11	6/16/2009	14:10	14:35	5140	10887
6	2D2-9	6/16/2009	14:49	15:14	4954	10491
7	2D2-5	6/16/2009	15:29	15:54	5425	11491
8	2D2-2	6/16/2009	16:10	16:35	5336	11301
Average					**4786**	**10136**
Std Dev					**662**	**1402**

Table O-8. Outlet Particulate Loading Measurements for Sorbent Injection Test at 0.5 lb/MMacf

Top or Bottom Half Traverse of Duct?	Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Bottom	6/16/2009	08:55	13:16	3.69	7.82
Top	6/16/2009	14:10	18:00	1.22	2.58
Average				**2.53**	**5.37**

Table O-9. Outlet Particulate Loading Measurements for Sorbent Injection Test at 1.0 lb/MMacf

Top or Bottom Half Traverse of Duct?	Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O_2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Bottom	6/17/2009	08:30	12:20	1.69	3.58
Top	6/17/2009	13:10	17:00	1.59	3.37
Average				**1.64**	**3.48**

Table O-10. Outlet Particulate Loading Measurements for Sorbent Injection Test at 1.9 lb/MMacf

Top or Bottom Half Traverse of Duct?	Date	Start Time	End Time	Outlet Particulate Loading (milligrain/dscf at 7% O2)	Outlet Particulate Loading (10^{-3} lb/MMBtu)
Bottom	6/13/2009	10:50	14:00	2.31	4.90
Top	6/13/2009	14:22	17:00	1.34	2.85
Bottom	6/14/2009	07:40	11:20	1.35	2.86
Top	6/14/2009	11:42	15:21	0.76	1.60
Bottom	6/15/2009	08:05	11:43	4.73	10.02
Top	6/15/2009	12:42	16:19	0.80	1.68
Average				**1.93**	**4.10**
Std Dev				**1.37**	**2.91**

Table O-11. Comparison of Average Baseline and Sorbent Injection Particulate Loading Measurements (Method 17)

	Baseline	0.5 lb/MMacf	1.0 lb/MMacf	1.9 lb/MMacf
Ave. Inlet (milligrain/dscf at 7% O_2)	4452	4786	3986	N/A
Ave. Outlet (milligrain/dscf at 7% O_2)	3.01	2.53	1.64	1.93
% Removal	99.93	99.95	99.96	N/A
Ave. Inlet (10^{-3} lb/MMBtu at 7% O_2)	9428	10136	8442	N/A
Ave. Outlet (10^{-3} lb/MMBtu at 7% O_2)	6.38	5.37	3.48	4.10

N/A = not available; no inlet data