EVALUATION OF MERCURY EMISSIONS FROM COAL-FIRED FACILITIES WITH SCR AND FGD SYSTEMS

Topical Report No. 8 (Plant 6)

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ABSTRACT

CONSOL Energy Inc., Research & Development (CONSOL), with support from the U.S. Department of Energy, National Energy Technology Laboratory (DOE) and the Electric Power Research Institute (EPRI), is evaluating the effects of selective catalytic reduction (SCR) on mercury (Hg) capture in coal-fired plants equipped with an electrostatic precipitator (ESP) - wet flue gas desulfurization (FGD) combination or a spray dyer absorber – fabric filter (SDA-FF) combination. In this program CONSOL is determining mercury speciation and removal at 10 coal-fired facilities. The objectives are 1) to evaluate the effect of SCR on mercury capture in the ESP-FGD and SDA-FF combinations at coal-fired power plants, 2) evaluate the effect of catalyst degradation on mercury capture; 3) evaluate the effect of low load operation on mercury capture in an SCR-FGD system, and 4) collect data that could provide the basis for fundamental scientific insights into the nature of mercury chemistry in flue gas, the catalytic effect of SCR systems on mercury speciation and the efficacy of different FGD technologies for mercury capture.

This document, the eighth in a series of topical reports, describes the results and analysis of mercury sampling performed on Unit 4 at Plant 6, a 544 MW unit burning a bituminous coal containing 3.7% sulfur. The unit is equipped with a SCR, ESP, and wet FGD to control NO_x, particulate, and SO_2 emissions, respectively. Four sampling tests were performed in August 2004 during ozone season with the SCR operating; flue gas mercury speciation and concentrations were determined at the SCR inlet, SCR outlet, air heater outlet (ESP inlet), ESP outlet (FGD inlet), and at the stack (FGD outlet) using the Ontario Hydro method. Four sampling tests were performed in November 2004 during non-ozone season with the SCR bypassed; flue gas mercury speciation and concentrations were determined at the ESP outlet (FGD inlet), and at the stack (FGD outlet). Process samples for material balances were collected with the flue gas measurements.

The results show that the SCR increased the oxidation of the mercury. At the point where the flue gas enters the FGD, a greater percentage of the mercury was in the oxidized form when the SCR was operating compared to when the SCR was bypassed (98% vs 87%). This higher level of oxidation resulted in higher mercury removals in the scrubber because the scrubber removed 89-90% of the oxidized mercury in both cases. Total mercury removal was 83% with the SCR operating, and 75% with the SCR bypassed. The average mercury mass balance closure was 107% during the ozone season tests and 87% during the non-ozone season tests.

The principal purpose of this work is to develop a better understanding of the potential mercury removal "co-benefits" achieved by NOx, and SO_2 control technologies. It is expected that this data will provide the basis for fundamental scientific insights into the nature of mercury chemistry in flue gas, the catalytic effect of SCR systems on mercury speciation and the efficacy of different FGD technologies for mercury capture. Ultimately, this insight could help to design and operate SCR and FGD systems to maximize mercury removal.

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LIST OF ABBREVIATIONS

acfm	-	actual cubic feet per minute (wet)
am	-	morning
Btu	-	heating value in British Thermal Units
Ca/S	-	calcium-sulfur ratio
cfm	-	cubic feet per minute
CO_2	-	carbon dioxide
CONSOL R&D	-	CONSOL Energy Inc., Research and Development
CVAA	-	cold vapor atomic absorption
DI	-	deionized water
DOE	-	U.S. Department of Energy
dscf	-	dry standard cubic feet
dscfm	-	dry standard cubic feet per minute
EPA	-	U.S. Environmental Protection Agency
EPRI	-	Electric Power Research Institute
ESP	-	electrostatic precipitator
FGD	-	flue gas desulphurization
ft	-	feet
ft^2	-	square feet
ft^3	-	cubic feet
gm	-	grams
gpm	-	gallons per minute
gr	-	grains
HCl	-	hydrochloric acid
Hg	-	mercury
Hg^{part}	-	mercury in particulate form
Hg^{total}	-	total mercury in particulate, oxidized, and elemental forms
Hg^{++}	-	mercury in oxidized form
Hg^{o}	-	mercury in elemental form
HNO_3	-	nitric acid
HCOF	-	hydroclone overflow
HCUF	-	hydroclone underflow
H_2O	-	water
H_2O_2	-	hydrogen peroxide
hr	-	hour
ICP-AES	-	inductively coupled plasma-atomic emission spectrometer
in	-	inch
KCl	-	potassium chloride
$KMnO_4$	-	potassium permanganate
L	-	liter
lb	-	pound
m	-	meter
m^3	-	cubic meter
ME	-	mist eliminator
mg	-	milligram, 10^{-3} gram

LIST OF ABBREVIATIONS (continued)

min	-	minute
mL	-	milliliter
M	-	molar, mol/L
MM	-	million
mol	-	mole
ng	-	nanogram, 10^{-9} gram
N_2	-	molecular nitrogen
NIST	-	National Institute of Standards and Technology
NO	-	nitric oxide
NO_2	-	nitrogen dioxide
O_2	-	molecular oxygen
O_3	-	ozone
pm	-	afternoon
PM	-	particulate matter
ppb	-	parts per billion (10^9)
ppm	-	parts per million
ppmv	-	parts per million by volume
PRSD	-	percent relative standard deviation
QA	-	quality assurance
QC	-	quality control
rpm	-	revolutions per minute
scf	-	standard cubic feet (68EF and 29.92"Hg)
scfm	-	standard cubic feet per minute
SRM	-	Standard Reference Material
temp	-	temperature
tph	-	tons per hour
TBtu	-	trillion (10^{12}) British thermal unit
wt	-	weight
v	-	volts
vs	-	versus
° F	-	temperature in degrees Fahrenheit
<	-	less than
>	-	more than
µg	-	microgram, 10^{-6} gram

INTRODUCTION

CONSOL Energy Inc. Research and Development (CONSOL R&D) is determining mercury speciation and removal at 10 coal-fired facilities with SCR/FGD combinations (Table 1). CONSOL R&D conducted two series of flue gas mercury (Hg), measurements on Unit 4 at Plant 6 in 2004. During "ozone season," tests were conducted August 12-13 with the plant's selective catalytic reduction (SCR) unit operating. During "non-ozone season," tests were conducted November 2-3 with the SCR bypassed. The tests were performed under U. S. Department of Energy (DOE) Cooperative Agreement No. DE-FC26-02NT41589, and the Electric Power Research Institute (EPRI) Agreement No. EP-P13687/C6820. The ozone season test program consisted of four sets of measurements across the combustion emission control system that consists of the SCR unit, electrostatic precipitator (ESP), and flue gas desulfurization (FGD) system. The non-ozone season test program consisted of four sets of measurements at the FGD inlet and the stack.

The mercury measurements were made using the Ontario-Hydro Flue Gas Hg Speciation Method. The testing conducted by CONSOL R&D is documented in this report.

Table 1. Coal-fired facilities in program

Site #	MW	Air Pollution Control Devices	Coal	Ozone Unit
1	330	SCR / Spray Dryer / Baghouse	Bit	year round
2	245	SCR / Spray Dryer / Baghouse	Bit	year round
3	560	SCR / ESP/ Limestone FGD, inhibited oxidation	Bit	Yes
4 Unit 1	468	ESP/ Limestone FGD, natural oxidation	Bit	(1)
4 Unit 2	468	SCR / ESP/ Limestone FGD, natural oxidation	Bit	year round
5 Unit 1	1,300	SCR / ESP/ Limestone FGD, in-situ oxidation	Bit	Yes
5 Unit 2	1,300	ESP/ Limestone FGD, in-situ oxidation	Bit	(1)
6 (2)	544	SCR / ESP/ Limestone FGD, ex-situ oxidation	Bit	Yes
7 (2)	566	SCR / ESP/ Limestone FGD, ex-situ oxidation	Bit	Yes
8	684	SCR / ESP / Lime FGD, ex-situ oxidation	Bit	Yes
9	640	SCR / ESP/ Lime FGD, inhibited oxidation	Bit	Yes
10	1,300	SCR / ESP/ Lime FGD, inhibited oxidation	Bit	Yes

(1) SCR was not installed when tests were conducted.
(2) Tests were also conducted during non-ozone seasons while flue gas bypassed SCR.

HOST UTILITY DESCRIPTION

Plant 6 is a 1,719 MW pulverized bituminous coal-fired generation facility operating four units. The plant typically burns bituminous coal containing approximately 4% sulfur. All four units are equipped with ESP and limestone-based wet FGD to control the emissions of particulate matter and sulfur dioxide (SO_2). The FGDs were designed for

90% SO_2 reduction[1]. Units 3 and 4 are also equipped with SCR units. Anhydrous ammonia is injected in front of the plate-type SCR catalyst (provided by Hitachi) beds to react with NOx. The SCR units are operated only during the ozone season.

Mercury measurements and speciation tests were conducted at Unit 4, a 544 MW dry-bottom wall-fired boiler with a nominal design heat input of 5,025 MM Btu per hour.[2] Particulate matter is removed by ESPs arranged in two blocks. Each block has 16 ash hoppers arranged in four rows of four hoppers each. The limestone-based wet FGD system has four scrubber modules and all the combustion flue gas is scrubbed. The calcium sulfite rich scrubber sludge is oxidized in two external vessels (ex-situ oxidation). The calcium sulfate (or gypsum) slurry formed in the oxidizers is pumped into a hydroclone bank. The hydroclone underflow (HCUF) stream containing larger gypsum crystals is further dewatered by drum filters inside the gypsum building. The gypsum is currently sold to a wallboard manufacturer. The hydroclone overflow (HCOF) stream flows back to the scrubber modules for volume makeup. The scrubbed flue gas exits through a 600 foot stack.

MERCURY SAMPLING RESULTS

I. Test Matrix

Each set of mercury measurements consisted of a total of four tests over two days. The test matrix is shown in Table 2. A total of 20 flue gas mercury measurements were conducted at five locations (SCR inlet, SCR outlet, air heater outlet, FGD inlet, and stack) during the August test program; a total of 8 flue gas mercury measurements were conducted at two locations (FGD inlet and stack) during the November test program. The Ontario Hydro Method (ASTM Method D-6784-02) was used to perform the measurements. Mercury measurements were performed with a maximum duration of 160 minutes. Details of sampling conditions are provided later in this report.

To calculate the material balance, CONSOL R&D and plant personnel obtained process samples (coal, bottom ash, ESP ash, limestone slurry, FGD slurry, FGD makeup water, hydroclone overflow slurry, hydroclone underflow slurry, mist eliminator wash water, and gypsum) simultaneously during the gas sampling periods. CONSOL R&D performed all the laboratory analyses and no sample was subcontracted out. Detailed results of analyses are included in this report.

[1] U.S. Department of Energy, Energy Information Administration, F767 database for year 2003.
[2] Per facility's Title V permit.

Table 2. Sampling test matrix

Date	Activity	Flue Gas Sampling					Process Sampling								
		SCR Inlet	SCR Outlet	Air Heater Outlet	FGD Inlet	Stack	Coal	Bottom Ash	ESP Ash	Limestone Slurry	FGD Slurry	FGD Makeup Water	Hydroclone Overflow Slurry	Hydroclone Underflow Slurry	ME Wash Water
11-Aug	Setup	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12-Aug	Test 1	X	X	X	X	X	X	X	X	X	X	X	---	---	---
	Test 2	X	X	X	X	X	X	X	X	X	X	X	---	---	---
13-Aug	Test 3	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Test 4	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14-Aug	Pack, Demobilize	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1-Nov	Setup	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Nov	Test 1	---	---	---	X	X	X	---	---	X	X	X	X	X	X
3-Nov	Test 2	---	---	---	X	X	X	---	---	X	X	X	X	X	X
	Test 3	---	---	---	X	X	X	---	---	X	X	X	X	X	X
	Test 4	---	---	---	X	X	X	---	---	X	X	X	X	X	X
4-Nov	Pack, Demobilize	---	---	---	---	---	---	---	---	---	---	---	---	---	---

II. Flue Gas Mercury Sampling Results

Figures 1 and 2 show the mercury speciation for the four tests conducted at each location in August 2004 and November 2004, respectively. All tests were conducted isokinetically. A complete listing of mercury analyses is in Appendix C. The results at each location are discussed in the following sections. The associated tables list the measured Ontario Hydro sampling train concentrations and the mercury throughput for the respective location with the concentrations applied to the stack flow rate corrected to the locations' oxygen concentration. Adjusting the mercury throughput to the stack flow rate is more accurate as this is the only location where flow could be measured accurately.

A. SCR inlet

Four mercury measurements were conducted at the SCR inlet in August 2004. Table 3 summarizes the mercury measurements at the SCR inlet. The results show that more than 99% of the mercury was in the gas phase and less than 1% of the mercury was in the particulate form (Hg^{part}). The high percentage of gas phase mercury is expected due to the gas temperature (696°F) at this location. Fifty percent of the total mercury was in the oxidized form (Hg^{++}). The average concentrations of the gas phase oxidized and elemental mercury (Hg^{0}) were 3.36 and 3.31 µg/m^3, respectively. The concentration of the total mercury ranged from 5.47 to 7.59 µg/m^3 and the average was 6.72 µg/m^3. The mass flow rate of the total mercury ranged from 2.65 to 3.61 mg/sec and the average was 3.18 mg/sec.

Table 3. Flue gas mercury speciation at the SCR inlet

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
8/12	1	0.06	3.52	2.79	6.37	0.03	1.71	1.35	3.09
8/12	2	0.07	3.53	3.87	7.47	0.03	1.60	1.75	3.38
8/13	3	0.05	3.73	3.80	7.59	0.03	1.77	1.81	3.61
8/13	4	0.05	2.65	2.77	5.47	0.02	1.28	1.35	2.65
Average		0.06	3.36	3.31	6.72	0.03	1.59	1.56	3.18
Standard Deviation		0.01	0.48	0.61	1.00	0.00	0.22	0.25	0.41
PRSD		16.5	14.4	18.4	14.8	14.0	13.7	16.0	13.0

B. SCR outlet

Four mercury measurements were conducted at the SCR outlet location in August 2004. Table 4 summarizes the mercury measurements at this location. Most (92%) of the mercury was vapor-phase Hg^{++}. The average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.04, 11.1, and 0.88 µg/m^3, respectively, and the average concentration of the total mercury was 12.0 µg/m^3. The mass flow rate of the total mercury ranged from 4.49 to 6.33 mg/sec and the average was 5.47 mg/sec.

Table 4. Flue gas mercury speciation at the SCR outlet

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
8/12	1	0.04	8.07	1.12	9.23	0.02	3.93	0.55	4.49
8/12	2	0.05	11.4	1.07	12.6	0.02	5.32	0.05	5.84
8/13	3	0.04	12.5	0.66	13.2	0.02	5.96	0.31	6.29
8/13	4	0.05	12.3	0.65	13.0	0.02	5.99	0.32	6.33
Average		0.04	11.1	0.88	12.0	0.02	5.30	0.42	5.74
Standard Deviation		0.004	2.05	0.26	1.86	0.002	0.96	0.12	0.86
PRSD		9.3	18.5	29.2	15.5	8.3	18.2	28.8	15.0

C. Air heater outlet

Four mercury measurements were conducted at the air heater outlet location in August

2004. Table 5 summarizes the mercury measurements at this location. The majority (92%) of the mercury was vapor-phase Hg^{++}. The average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.71, 12.4, and 0.31 µg/m^3, respectively. The concentration of the total mercury ranged from 11.6 to 15.8 µg/m^3 and the average was 13.4 µg/m^3. The mass flow rate of the total mercury ranged from 6.03 to 8.41 mg/sec and the average was 7.01 mg/sec.

Table 5. Flue gas mercury speciation at the air heater outlet

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
8/12	1	0.96	14.7	0.14	15.8	0.51	7.83	0.07	8.41
8/12	2	0.70	11.4	0.83	12.9	0.35	5.65	0.41	6.41
8/13	3	0.52	11.0	0.14	11.6	0.27	5.69	0.07	6.03
8/13	4	0.66	12.5	0.14	13.4	0.35	6.74	0.08	7.18
Average		0.71	12.4	0.31	13.4	0.37	6.48	0.16	7.01
Standard Deviation		0.18	1.70	0.34	1.76	0.10	1.03	0.17	1.05
PRSD		25.7	13.7	109.5	13.2	27.0	16.0	105.8	15.0

D. FGD inlet

Four mercury measurements were conducted at the FGD inlet location in August 2004 and again in November 2004. Tables 6a and 6b summarize the mercury measurements. In both sets of tests, nearly 100% of the flue gas mercury was in the gaseous phase. With the SCR in operation (Table 6a), 98% of the total mercury was Hg^{++}; with the SCR bypassed (Table 6b), only 87% of the total mercury was Hg^{++}. With the SCR operating, the average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.02, 12.4, and 0.24 µg/m^3, respectively. The concentration of the total mercury ranged from 10.0 to 16.3 µg/m^3 and the average was 12.6 µg/m^3. The mass flow rate of the total mercury ranged from 5.2 to 9.0 mg/sec and the average was 6.66 mg/sec. Without the SCR in operation, the average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.03, 8.4, and 1.0 µg/m^3, respectively. The concentration of the total mercury ranged from 6.6 to 15.2 µg/m^3 and the average was 9.4 µg/m^3. The mass flow rate of the total mercury ranged from 4.3 to 10.4 mg/sec and the average was 6.56 mg/sec.

Table 6a. Flue gas mercury speciation at the FGD inlet (SCR in operation)

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
8/12	1	(a)	16.1	0.22	16.3	(a)	8.84	0.12	8.96
8/12	2	1.32×10^{-4}	13.2	0.33	13.5	6.59×10^{-5}	6.56	0.17	6.72
8/13	3	6.07×10^{-4}	9.82	0.19	10.0	3.15×10^{-4}	5.10	0.10	5.20
8/13	4	0.07	10.4	0.23	10.7	0.04	5.60	0.13	5.76
Average		0.02	12.4	0.24	12.6	0.01	6.53	0.13	6.66
Standard Deviation		0.04	2.88	0.06	2.88	0.02	1.66	0.03	1.66
PRSD		174%	23%	26%	23%	197%	25%	22%	25%

(a) In-stack filter holder detached from probe and was lost in the duct, no Hg^{part} value available for this test.

Table 6b. Flue gas mercury speciation at the FGD inlet (SCR is bypassed)

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
11/02	1	6.53×10^{-2}	14.2	0.93	15.2	4.49×10^{-2}	9.74	0.64	10.4
11/03	2	4.52×10^{-3}	6.70	0.68	7.39	3.42×10^{-3}	5.07	0.52	5.59
11/03	3	3.00×10^{-3}	7.98	0.50	8.49	2.10×10^{-3}	5.59	0.35	5.95
11/03	4	4.39×10^{-2}	4.66	1.88	6.59	2.85×10^{-2}	3.02	1.22	4.28
Average		0.029	8.38	1.00	9.41	0.020	5.86	0.68	6.56
Standard Deviation		0.031	4.10	0.61	3.92	0.021	2.82	0.38	2.68
PRSD		105%	49%	61%	42%	105%	48%	55%	41%

E. Stack

Four mercury measurements were conducted at the stack in August 2004 and again in November 2004. Tables 7a and 7b summarize the mercury measurements. With the SCR in operation (Table 7a), 60% of the total mercury was Hg^{++}; with the SCR bypassed (Table 7b), only 39% of the total mercury was Hg^{++}. With the SCR operating, the average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.004, 1.3, and 0.8 µg/m^3, respectively. The concentration of the total mercury ranged from 1.7 to 2.7 µg/m^3 and the average was 2.10 µg/m^3. The mass flow rate of the total

mercury ranged from 0.9 to 1.5 mg/sec and the average was 1.15 mg/sec. Without the SCR in operation, the average concentrations of the Hg^{part}, Hg^{++}, and Hg^{0} measured at this location were 0.003, 1.1, and 1.8 µg/m^3, respectively. The concentration of the total mercury ranged from 2.5 to 3.9 µg/m^3 and the average was 2.94 µg/m^3. The mass flow rate of the total mercury ranged from 1.4 to 2.2 mg/sec and the average was 1.62 mg/sec.

With the SCR operating, elemental mercury increased by 0.32 mg/sec, from 0.13 mg/sec at the FGD inlet to 0.43 mg/sec at the stack. With the SCR bypassed, the increase was essentially the same absolute amount, 0.33 mg/sec (0.68 mg/sec at the FGD inlet and 1.01 mg/sec at the stack). An increase of Hg^{0} across wet scrubbers has been observed by CONSOL R&D at other plants.[3,4]

Table 7a. Flue gas mercury speciation at the stack (SCR in operation)

Date	Test No.	Hg Concentration, µg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
8/12	1	2.52×10^{-3}	2.55	0.10	2.66	1.39×10^{-3}	1.41	0.06	1.47
8/12	2	8.34×10^{-3}	1.18	0.48	1.66	4.60×10^{-3}	0.65	0.26	0.92
8/13	3	2.97×10^{-3}	0.80	1.26	2.07	1.59×10^{-3}	0.43	0.67	1.11
8/13	4	3.61×10^{-3}	0.70	1.32	2.03	1.97×10^{-3}	0.38	0.72	1.10
	Average	4.36×10^{-3}	1.31	0.79	2.10	2.39×10^{-3}	0.72	0.43	1.15
	Standard Deviation	2.69×10^{-3}	0.86	0.60	0.41	1.49×10^{-3}	0.48	0.32	0.23
	PRSD	62%	65%	76%	20%	63%	66%	75%	20%

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[3] DeVito, M. S., Withum, J. A., and Statnick, R. M., "Flue Gas Measurements from Coal-Fired Boilers Equipped with Wet Scrubbers," Int. J. of Environ. Pollution 17 (1/2), 2002, p. 126-142

[4] Evaluation of Mercury Emissions from Coal-Fired Facilities with SCR and FGD Systems - Topical Report Nos. 1 and 4, U.S. DOE Cooperative Agreement DE-FC26-02NT41589

Table 7b. Flue gas mercury speciation at the stack (SCR is bypassed)

Date	Test No.	Hg Concentration, μg/m^3 (dry std conditions)				Hg Flow, mg/sec			
		Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}	Hg^{part}	Hg^{++}	Hg^{0}	Hg^{total}
11/02	1	4.89×10^{-3}	1.04	1.77	2.81	2.66×10^{-3}	0.57	0.96	1.53
11/03	2	2.09×10^{-3}	1.15	1.34	2.49	1.15×10^{-3}	0.63	0.74	1.37
11/03	3	2.07×10^{-3}	1.13	1.43	2.56	1.14×10^{-3}	0.62	0.79	1.41
11/03	4	2.07×10^{-3}	1.11	2.79	3.90	1.14×10^{-3}	0.61	1.54	2.15
Average		2.78×10^{-3}	1.11	1.83	2.94	1.52×10^{-3}	0.61	1.01	1.62
Standard Deviation		1.52×10^{-3}	0.05	0.66	0.66	7.61×10^{-4}	0.03	0.37	0.36
PRSD		51%	4%	36%	22%	50%	5%	37%	22%

III. SCR/FGD System Hg Removal

Tables 8a and 8b summarize the flue gas mercury removal for the two test periods. With the SCR operating (Table 8a), the air heater outlet-to-stack mercury removal ranged from 82 to 86% and the average was 83.6%. The coal-to-stack mercury removal ranged from 82 to 87% and the average coal-to-stack mercury removal was 83.5%. With the SCR bypassed (Table 8b), the FGD inlet-to-stack mercury removal ranged from 50 to 85% and the average was 71.8%. The coal-to-stack mercury removal ranged from 67 to 78% and the average coal-to-stack mercury removal was 74.2%. The flue gas measurements at the air heater outlet (Table 8a) and the FGD inlet (Table 8b) are comparable because the only difference would be the particulate mercury removed in the ESP, which is only about 5% of the total mercury.

Table 8a. Flue gas mercury removal (with SCR in operation)

Date	Test No.	System Mercury Reduction					
		Based on Ontario Hydro Measurements at the Air Heater Outlet and Stack, mg Hg^{total} /sec			Based on Mercury in the Coal Feed and Ontario Hydro Measurements at the Stack, mg Hg^{total} /sec		
		Air Heater Outlet	Stack Emissions	% Reduction	Coal Feed	Stack Emissions	% Reduction
8/12	1	8.41	1.47	83	8.03	1.47	82
8/12	2	6.41	0.92	86	7.30	0.92	87
8/13	3	6.03	1.11	82	6.52	1.11	83
8/13	4	7.18	1.10	85	6.15	1.10	82
Average		7.01	1.15	83.6	7.00	1.15	83.5
Standard Deviation		1.05	0.23	1.9	0.84	0.23	2.7
PRSD		15%	20%	2%	12%	20%	3%

Table 8b. Flue gas mercury removal (SCR bypassed)

Date	Test No.	System Mercury Reduction					
		Based on Ontario Hydro Measurements at the FGD Inlet and Stack, mg Hg^{total} /sec			Based on Mercury in the Coal Feed and Ontario Hydro Measurements at the Stack, mg Hg^{total} /sec		
		FGD Inlet	Stack Emissions	% Reduction	Coal Feed	Stack Emissions	% Reduction
11/02	1	10.4	1.53	85	7.09	1.53	78
11/03	2	5.59	1.37	75	5.84	1.37	77
11/03	3	5.95	1.41	76	5.59	1.41	75
11/03	4	4.28	2.15	50	6.50	2.15	67
Average		6.56	1.62	71.8	6.26	1.62	74.2
Standard Deviation		2.68	0.36	15.3	0.68	0.36	5.0
PRSD		41%	22%	21%	11%	22%	7%

IV. Mercury Material Balance

An important criterion to gauge the overall quality of the tests is to conduct a mass balance to account for the mercury entering and leaving the plant during the tests. The mercury material balance closure is the total mercury output from the plant divided by

the total mercury input (expressed as %). The total mercury input is the sum of the amounts of mercury entering the system from coal, limestone slurry, hydroclone overflow, ME wash water, and make-up water. The total mercury output is the sum of the amounts of mercury leaving the system via bottom ash, ESP hopper ash, FGD slurry, and stack flue gas.

Tables 9a and 9b summarize the mercury material balance closure for the tests conducted at this unit. The mercury material balance closures ranged from 90% to 129% in the August tests and between 77 and 102% in the November tests. The material balance closures for mercury for all individual tests are within the QA/QC criterion of 70-130% for a single test. The average material balance closure is 107% for the August tests and 87% for the November tests, which are within the QA/QC criterion of 80-120% for multiple tests. The measurements, calculations, and assumptions for calculating the material balances are described later in this report.

Table 9a. Mercury material balance closure (with SCR in operation)

Test No.	**1**	**2**	**3**	**4**
Total Hg Input (mg/sec)	10.43	9.79	8.24	9.96
Total Hg Output (mg/sec)	9.37	9.76	10.63	10.76
Hg Material Balance Closure (output / input)	90%	100%	129%	108%
Average Hg Material Balance Closure (%)	**107 %**			

Table 9b. Mercury material balance closure (SCR bypassed)

Test No.	**1**	**2**	**3**	**4**
Total Hg Input (mg/sec)	8.37	6.90	8.14	7.04
Total Hg Output (mg/sec)	6.86	5.90	6.23	7.19
Hg Material Balance Closure (output / input)	82%	86%	77%	102%
Average Hg Material Balance Closure (%)	**87 %**			

SCR/Non-SCR Test Comparison

The results show that the SCR does indeed increase the oxidation of the mercury. At the point where the flue gas enters the FGD, a greater percentage of the mercury is in the oxidized form when the SCR is operating compared to when the SCR is bypassed. Table 10 shows the average mercury speciation of the flue gas in the FGD inlet duct for both test periods. Because this location is downstream of the plant's ESP, there is very little particulate mercury.

Table 10. Comparison of Average Flue Gas Mercury Speciation at the FGD Inlet

	Ozone Season Tests (with SCR)	Non-Ozone Season Tests (without SCR)
Hg^{part}	0.2%	0.3%
Hg^{++}	97.9%	87.2%
Hg^{0}	2.0%	12.5%

This higher level of oxidation resulted in higher mercury removals in the scrubber. Table 11 shows that total mercury removal was 83% with the SCR, but only 75% without the SCR; the removal of oxidized mercury in the scrubber was about the same (89-90%) in both cases. The difference was due to a greater percentage of oxidized mercury at the scrubber inlet during the tests with SCR; oxidized mercury is more easily captured in wet scrubbers than elemental mercury.

Table 11. Comparison of Average Mercury Reductions Across the FGD Scrubber

	Ozone Season Tests (with SCR)			Non-ozone Season Tests (without SCR)		
	FGD Inlet, mg Hg/sec	Stack, mg Hg/sec	Reduction	FGD Inlet, mg Hg/sec	Stack, mg Hg/sec	Reduction
Hg^{part}	0.009	0.002	73%	0.029	0.002	92%
Hg^{++}	6.53	0.72	89%	5.86	0.61	90%
Hg^{0}	0.13	0.43	-237%	0.68	1.01	-47%
Total Hg	6.66	1.15	83%	6.56	1.62	75%

EXPERIMENTAL AND SAMPLING METHODS

CONSOL R&D performed flue gas mercury determinations using the Ontario-Hydro sampling method. As a quality assurance/quality control (QA/QC) measure, samples of the coal, bottom ash, FGD slurry, limestone slurry, and ESP ash, were taken to determine a mercury balance across the system.

I. Flue Gas Sampling Locations and Sampling Points

Five sampling locations, the SCR inlet, SCR outlet, air heater outlet (upstream of the ESP), FGD inlet, and stack outlet, were tested. Figure 3 is a flow schematic indicating the sampling locations at this unit.

Flue gas exits the economizer through two ducts (designated Ducts A and B) and passes through the SCR, air heater, ESP, and FGD, before it combines to form a single flue tube at the stack. All sampling at points leading to the stack was conducted in Duct A. Individual sampling locations are detailed in the following sections.

A. SCR inlet

The SCR inlet consists of two vertical, rectangular ducts, measuring 13 feet deep by 28 feet, 6 inches wide at the sampling plane. Three sample ports are spaced across the face of each duct.

Only Duct A was sampled in this program. Preliminary pitot surveys conducted on August 11, 2004, indicated that the gas flow was straight, not cyclonic or swirling. The flue gas was sampled through the middle test port at a single point for the full duration of the test. Parametric readings were recorded every ten minutes. Total test duration was 120 minutes. Mercury measurements were conducted with the sampling nozzle oriented parallel to and directly into the flow.

Four mercury measurements were performed isokinetically at the SCR inlet. The sample train was prepared in EPA Method 17 configuration using an in-stack 19 mm x 90 mm quartz-fiber thimble filter. The filter apparatus was attached to a heated probe that was connected to the impinger train with a flexible heated Teflon sample line. Figure 4 is a photograph of the mercury sampling train at the SCR inlet.

B. SCR outlet

The SCR outlet consists of two vertical, rectangular ducts, each measuring 25 feet, 11 inches deep by 55 feet wide. Eight sample ports are spaced across the face of each duct.

Only Duct A was sampled in this program. Preliminary pitot surveys conducted on August 11, 2004, indicated that the gas flow was straight, not cyclonic or swirling. The flue gas was sampled through four test ports, each at a single point for 30 minutes, with parametric readings every ten minutes. Mercury measurements were conducted with the sampling nozzle oriented parallel to and directly into the flow for a period of 120 minutes.

Four mercury measurements were performed isokinetically at the SCR outlet. The sample train was prepared in EPA Method 17 configuration using an in-stack 19 mm x 90 mm quartz-fiber thimble filter. The filter apparatus was attached to a heated probe that was connected to the impinger train with a flexible heated Teflon sample line. Figure 5 is a photograph of the mercury sampling train at the SCR outlet.

C. Air heater outlet

The air heater outlet duct consists of two horizontal ducts, each approximately 9 feet deep and 34 feet wide. Eight test ports are located across the top of each duct. Preliminary pitot surveys conducted on August 11, 2004, indicated that the gas flow was parallel to the duct walls.

The flue gas was sampled through two test ports. Ideally three points would have been sampled in each port for 20 minutes each; however, the port length prevented the probe from reaching the deepest point. As a result the middle point was sampled twice for a total of 40 minutes. Total test durations were 120 minutes with parametric readings recorded every ten minutes. Mercury measurements were conducted with the sampling nozzle oriented parallel to and directly into the flow.

Four mercury measurements were performed isokinetically at the air heater outlet. The sample train was prepared in EPA Method 17 configuration using an in-stack 19 mm x 90 mm quartz-fiber thimble filter. The filter apparatus was attached to a heated probe that was connected to the impinger train with a flexible heated Teflon sample line. Figure 6 is a photograph of the mercury sampling train and a blank train (for QA/QC purposes) at the air heater outlet location.

D. FGD inlet

The FGD inlet consists of two ducts leading to two pair of FGD modules. A single test port was available in the A duct, downstream of the induced draft fan. A single point, near the center of the duct was sampled. A preliminary pitot survey conducted on August 11, 2004, indicated that the gas flow was parallel to the duct walls at this point.

Parametric readings were recorded every ten minutes over the test periods, which varied from 120 minutes to 160 minutes. Mercury measurements were conducted isokinetically with the sampling nozzle oriented parallel to and directly into the flow.

Four mercury measurements were performed at the FGD inlet in August and four in November. The sample train was prepared in EPA Method 17 configuration using an in-stack 47-mm quartz-fiber disc filter. The filter apparatus was attached to a heated probe that was connected to the impinger train with a flexible heated Teflon sample line. Figure 7 is a photograph of the mercury sampling train on the FGD inlet location.

E. Stack

The stack is approximately 19.5 feet in diameter. Three points were sampled in each of four sample access ports for a total of 12 traverse points. Each point was sampled for a period of 10 minutes resulting in 120 minute tests.

Preliminary pitot surveys conducted on August 11, 2004, indicated that the gas flow was axial. Mercury measurements were conducted with the nozzle oriented horizontally, directly into the flow. Four measurements were performed isokinetically at this location in August and four in November. A standard EPA Method 5 sample train configuration was utilized for this location. Figure 8 is a photograph of the mercury sampling train on the stack location.

II. Flue Gas Mercury Measurements

Flue gas mercury measurements were conducted using the Ontario-Hydro mercury speciation train. A schematic of the sampling train is shown in Figure 9.

The flue gas was extracted from the duct and pulled through a heated glass-lined probe and quartz filter. Total particulate matter mass loading was calculated from the solids collected prior to and on the filter. Probe temperatures were set at 325 ± 25 °F at the SCR inlet and outlet, the air heater outlet and the FGD inlet. Probe and filter temperatures were maintained at 250 ± 25 °F at the stack. Where particle loading is high, the probe and filter are maintained as close as practical to the flue gas temperature.

Mercury collected prior to and on the filter is assumed to be Hg^{part}. The flue gas exits the quartz filter and passes through a series of chilled impingers. The first three impingers are filled with 100 mL of a 1M-potassium chloride (KCl) solution. It is assumed that these impingers capture Hg^{++} in the flue gas. The next impinger is filled with 100 mL of a 5% nitric acid and 10% hydrogen peroxide (H_2O_2) solution. The purpose of this impinger is to remove SO_2 from the flue gas to preserve the oxidizing strength of the two downstream impingers with acidic potassium permanganate ($KMnO_4$) solution. Mercury collected in this impinger is assumed to be Hg^0. The next two impingers are filled with 100 mL of an acidic $KMnO_4$ solution. It is assumed that these impingers capture Hg^0. The next impinger is blank to catch any excess moisture. The gas exits the impinger train through a silica gel-filled impinger that removes the moisture from the flue gas. The mercury species collected by the Ontario-Hydro sampling train component are listed in Table 12.

Table 12. Mercury speciation by train component

Train Component	Species Measured
Probe & Nozzle Rinse	Hg^{part}
Quartz Filter	Hg^{part}
KCl Impingers	Hg^{++}
HNO_3/H_2O_2 Impinger	Hg^0
$KMnO_4$ Impingers	Hg^0
HCl Rinse of $KMnO_4$ Impingers	Hg^0

The absorbing solutions were made fresh daily. The impingers were charged and the sampling components were transported to the required locations. The sampling trains were assembled, pre-heated, and checked for pitot and sample line leaks as detailed in EPA Methods 2 and 5, respectively. After passing the leak-check procedure, the sampling probes were inserted into their respective ducts, in-stack filters were allowed to heat to stack temperature, and sampling was initiated. Leak checks were also performed during port changes.

Oxygen readings were monitored at the outlet of the sampling train using a Teledyne Model Max 5 portable analyzer (electrochemical O_2 sensor). At the completion of the sampling period, the sample trains were checked for leaks, purged for 10 min, and then disassembled. The components were transported back to the lab trailer for recovery. The mercury concentration of the individual impinger solutions was determined by cold vapor atomic absorption (CVAA) as specified in the methodology. The concentration of mercury on the solids was determined by acid digestion followed by CVAA.

The amount of mercury collected in the impinger solutions was determined as outlined in EPA Method 29 and the Ontario-Hydro Draft Method. An aliquot of the impinger solution was acidified and the mercury is determined using cold vapor-atomic absorption spectroscopy. The atomic absorption spectrometer was calibrated with commercial mercury standard. The calibration was verified using NIST Standard Reference Materials (SRM) 1641D and 1633b. The calibration was reassessed periodically by analyzing a quality control standard. The instrument was recalibrated as required. Each sample matrix was analyzed as a set and an individual calibration curve was used for each set. Depending on sample type, selected samples were spiked with 2, 5, 10, or 15 ng/ml (ppb) of mercury and reanalyzed. Spike recovery must be within ±30% or the sample is diluted and reanalyzed. Selected samples were analyzed in duplicate. The duplicates must be within ±30% or the analyses are repeated.

Where sufficient solids were collected, particulate mercury was analyzed using a 0.5-1.0 gm ash sample with the direct combustion method (ASTM Method D6722). In cases where the particulate catch was low (primarily stack filters), the entire filter sample was digested with aqua-regia in pressure vessels prior to analysis by CVAA.

III. Coal Sampling and Analysis

A. Coal samples

Plant personnel collected coal samples from coal feed bins in service. In the August test program,two 5-gallon coal samples were taken during each test, one at the start of the test and the second near the end of the test. The coal properties did not vary substantially from one sample to the next; therefore, in the November test program only one sample was taken during each test. Listed in Table 13 are the coal samples collected.

Table 13. List of coal samples

Ozone Season Test No.	1		2		3		4	
Sample Date	8/12/2004		8/12/2004		8/13/2004		8/13/2004	
Sample I.D.	Coal-1-1 Start of Test	Coal-1-2 End of Test	Coal-2-1 Start of Test	Coal-2-2 End of Test	Coal-3-1 Start of Test	Coal-3-2 End of Test	Coal-4-1 Start of Test	Coal-4-2 End of Test
Non-Ozone Season Test No.	1		2		3		4	
Sample Date	11/02/2004		11/02/2004		11/03/2004		11/03/2004	
Sample I.D.	Coal-1		Coal-2		Coal-3		Coal-4	

B. Results of analyses of coal samples

Coal samples were analyzed using a direct mercury analyzer following the procedures prescribed in ASTM Method D6722. Detailed analyses of the coal samples collected in each test are presented in Appendix D and the results are summarized in Tables 14 and 15. The mercury measured in the August coal samples ranged from 0.105 to 0.157 ppm and in the November coal samples ranged from 0.099 to 0.122 ppm.

Table 14. Coal sample analyses – ozone season samples

Sample ID	Coal Test 1-1 Start of Test	Coal Test 1-2 End of Test	Coal Test 2-1 Start of Test	Coal Test 2-2 End of Test	Coal Test 3-1 Start of Test	Coal Test 3-2 End of Test	Coal Test 4-1 Start of Test	Coal Test 4-2 End of Test
Sample Date	8/12/2004		8/12/2004		8/13/2004		8/13/2004	
Test No.	1		2		3		4	
Ananlytical No.	20044300	20044301	20044302	20044303	20044304	20044305	20044306	20044307
Moisture (%)	5.87	5.13	5.12	6.10	5.36	4.62	5.69	6.07
VM (%, dry)	37.78	38.12	37.45	37.16	38.05	38.36	38.86	39.26
Ash (%, dry)	15.40	14.06	13.83	15.15	13.66	12.38	12.24	11.72
Carbon (%, dry)	67.46	69.48	68.97	68.06	70.16	71.53	70.42	70.49
Hydrogen (%, dry)	4.43	4.67	4.35	4.31	4.55	4.81	4.44	4.50
Nitrogen (%, dry)	1.89	1.75	1.81	1.85	1.90	1.81	1.87	1.92
Total Sulfur (%, dry)	3.61	3.55	3.71	3.73	3.52	3.69	3.96	3.79
HHV (Btu/lb, dry)	12,209	12,495	12,438	12,247	12,456	12,847	12,659	12,795
Chlorine (%, dry)	0.112	0.142	0.138	0.095	0.11	0.14	0.07	0.05
Hg (ppm, as det'd)	0.133	0.157	0.134	0.130	0.116	0.123	0.122	0.105
Major Ash Elements (%, dry)								
SiO_2	47.69	48.62	47.31	46.86	47.38	45.30	43.75	43.08
Al_2O_3	18.89	18.93	18.37	18.79	19.23	18.29	19.29	20.50
TiO_2	0.88	0.89	0.88	0.89	0.90	0.85	0.88	0.90
Fe_2O_3	19.25	18.75	19.87	18.87	17.73	20.44	23.49	24.48
CaO	4.45	4.67	4.71	4.70	4.61	4.84	3.95	3.69
MgO	1.07	1.11	1.09	1.09	1.09	1.00	0.91	0.88
Na_2O	0.67	0.62	0.63	0.66	0.60	0.48	0.53	0.53
K_2O	2.69	2.71	2.60	2.60	2.81	2.42	2.37	2.26
P_2O_5	0.22	0.27	0.21	0.18	0.29	0.25	0.19	0.14
SO_3	3.45	2.71	2.99	3.71	3.60	4.05	2.73	2.90

Table 15. Coal sample analyses – non-ozone season samples

Sample Date	Coal-1	Coal-2	Coal-3	Coal-4
Test No.	1	2	3	4
Sample Date	11/2/2004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045551	20045552	20045553	20045554
Total Moisture (%)	11.13	11.49	10.89	12.43
Moisture (%)	4.79	5.03	4.00	4.59
VM (%, dry)	37.86	39.03	39.46	39.09
Ash (%, dry)	13.09	12.64	12.31	12.94
Carbon (%, dry)	70.36	70.64	70.98	70.30
Fixed Carbon (%, dry)	49.05	48.33	48.23	47.97
Hydrogen (%, dry)	4.43	4.84	4.53	4.78
Nitrogen (%, dry)	1.60	1.57	1.56	1.56
Total Sulfur (%, dry)	3.59	3.60	3.79	3.68
Oxygen (%, dry), by diff.	6.81	6.66	6.79	6.69
HHV (Btu/lb, dry)	12,552	12,650	12,697	12,566
HHV (Btu/lb, MAF)	14,443	14,480	14,479	14,434
Chlorine (%, dry)	0.116	0.051	0.044	0.049
Hg (ppm, as det'd)	0.122	0.103	0.099	0.113
Major Ash Elements (%, dry)				
SiO_2	45.99	45.41	43.74	46.22
Al_2O_3	20.80	18.16	18.42	19.62
TiO_2	0.97	0.88	0.91	0.97
Fe_2O_3	17.94	19.18	19.76	17.83
CaO	5.08	6.95	7.51	6.14
MgO	1.03	0.94	0.86	0.96
Na_2O	0.71	0.50	0.45	0.58
K_2O	2.98	2.40	2.32	2.72
P_2O_5	0.29	0.18	0.20	0.21
SO_3	4.02	3.56	4.72	4.32

IV. Process Sample Collection and Analysis

CONSOL R&D and plant personnel collected samples of bottom ash, ESP hopper ash, limestone slurry, FGD slurry, HCOF slurry, HCUF slurry, ME wash water, and FGD makeup water. CONSOL R&D completed comprehensive analyses using a direct mercury analyzer and following prescribed in the procedures of ASTM Method D6722. Detailed results of the analyses of those process samples are presented in Appendix D.

A. Bottom ash

Plant operators collected two bottom ash samples during the August testing. One sample was collected at the end of each test date. No bottom ash samples were obtained during the November testing. Listed in Table 16 are the results of analyses of the bottom ash samples collected. The mercury in these samples was below the detection limit of 0.004 ppm.

Table 16. Results of analyses of bottom ash samples

Sample Description	Bottom Ash - 1&2	Bottom Ash - 3&4
Sample Date	8/12/2004	8/13/2004
Test No.	1 & 2	3 & 4
Analytical No.	20044586	20044587
Moisture (%)	0.16	0.22
Ash (%, dry)	98.66	99.91
Carbon (%, dry)	1.38	0.19
Hg (ppm, as det'd)	< 0.004	< 0.004
Major Ash Elements (%, dry)		
SiO_2	48.93	48.24
Al_2O_3	18.99	19.70
TiO_2	0.93	0.95
Fe_2O_3	21.94	22.93
CaO	4.76	4.28
MgO	1.15	1.1
Na_2O	0.63	0.55
K_2O	3.00	2.66
P_2O_5	0.30	0.27
SO_3	0.28	0.18

B. Limestone slurry

CONSOL R&D personnel collected a slurry sample of approximately 500 mL from each of the two limestone slurry storage tanks during each test in August. In the November test program, CONSOL R&D personnel collected a slurry sample of approximately 500 mL from the discharge side of Pump #B1 during each test since this was the only limestone stream running during these tests. Upon arrival at CONSOL R&D's analytical labs, the limestone slurry samples were filtered to generate a filtrate and a solid residue (i.e., filter cake). The air-dried solids and the filtrates were analyzed separately. Listed in Table 17 and 18 are the results of analyses of the limestone slurry solids samples. The mercury content of the solids of the limestone slurry samples collected in August was below the detection limit of 0.004 ppm; in the samples collected in November, the mercury content ranged from 0.008 to 0.011 ppm. Listed in Table 19 and 20 are the results of analyses of the limestone slurry filtrate samples. The mercury in all of the limestone filtrate samples was below the detection limit of 0.1 μg/L (0.1 ppb).

Table 17. Results of analyses of limestone slurry solids samples – ozone season tests

Sample Description	Limestone Slurry Solids Test 1A	Limestone Slurry Solids Test 1B	Limestone Slurry Solids Test 2A	Limestone Slurry Solids Test 2B	Limestone Slurry Solids Test 3A	Limestone Slurry Solids Test 3B	Limestone Slurry Solids Test 4A	Limestone Slurry Solids Test 4B
Sample Date	8/12/2004		8/12/2004		8/13/2004		8/13/2004	
Analytical No.	20044308	20044309	20044310	20044311	20044312	20044313	20044314	20044315
% solids in Original Sample	34.3	34.8	34.6	34.9	34.7	34.5	35.0	34.2
Specific Gravity	1.015	1.020	1.020	1.052	1.125	1.018	1.013	1.011
Moisture (%)	0.04	0.04	0.07	0.09	0.07	0.05	0.03	0.07
Ash (%, dry)	58.3	59.5	59.2	58.3	58.3	58.3	58.3	58.4
Carbon (%, dry)	11.4	11.3	11.3	11.5	11.0	11.2	11.2	11.3
Hg (ppm, as det'd)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Major Ash Elements (%, dry)								
SiO_2	4.78	4.53	4.62	4.55	4.30	4.33	4.33	4.16
Al_2O_3	0.25	0.24	0.23	0.24	0.26	0.25	0.25	0.25
TiO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fe_2O_3	0.14	0.13	0.13	0.12	0.13	0.13	0.13	0.13
CaO	55.5	54.7	55.3	54.9	54.0	54.8	54.4	54.4
MgO	0.77	0.75	0.77	0.75	0.78	0.78	0.79	0.77
Na_2O	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02
K_2O	0.06	0.05	0.05	0.05	0.07	0.06	0.06	0.06
P_2O_5	0.06	0.06	0.06	0.06	0.05	0.06	0.05	0.05
SO_3	0.08	0.09	0.10	0.10	0.10	0.09	0.11	0.12

Table 18. Results of analyses of limestone slurry solids samples – non-ozone season tests

Sample ID	Limestone Slurry Solids Test 1	Limestone Slurry Solids Test 2	Limestone Slurry Solids Test 3	Limestone Slurry Solids Test 4
Sample Date	11/2/2004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045581	20045582	20045583	20045584
Solids in original sample (%)	33.2	37.8	37.8	38.8
Density of original sample (g/mL)	1.09	1.13	1.07	1.11
Residual moisture (%)	0.18	0.10	0.14	0.14
Ash (%, dry)	57.8	57.8	57.8	57.8
Carbon (%, dry)	11.5	11.5	11.4	11.4
Hg (ppm, as det'd)	0.011	0.008	0.009	0.008
Major Ash Elements (%, dry)				
SiO_2	3.43	3.34	3.35	3.31
Al_2O_3	0.58	0.58	0.57	0.57
TiO_2	0.02	0.02	0.02	0.02
Fe_2O_3	0.29	0.29	0.30	0.31
CaO	53.1	52.8	53.9	53.3
MgO	1.31	1.36	1.37	1.38
Na_2O	0.01	0.02	0.01	0.01
K_2O	0.13	0.12	0.13	0.13
P_2O_5	0.02	0.02	0.02	0.03
SO_3	0.19	0.18	0.22	0.19

Table 19. Results of analyses of limestone slurry filtrate samples – ozone season tests

Sample ID	Limestone Slurry Liquid Test 1 Tank A (12:00)	Limestone Slurry Liquid Test 1 Tank B (12:05)	Limestone Slurry Liquid Test 2 Tank A (17:10)	Limestone Slurry Liquid Test 2 Tank B (17:10)	Limestone Slurry Liquid Test 3 Tank A (10:30)	Limestone Slurry Liquid Test 3 Tank B (10:35)	Limestone Slurry Liquid Test 4 Tank A (14:35)	Limestone Slurry Liquid Test 4 Tank B (14:40)
Test No.	1		2		3		4	
Sample Date	8/12/2004		8/12/2004		8/13/2004		8/13/2004	
Analytical No.	20044361	20044362	20044363	20044364	20044365	20044366	20044367	20044368
Ca (µg/mL)	79.1	82.5	82.6	81.9	75.2	82.2	83.6	85.6
Total Iron (µg/mL)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Mg (µg/mL)	19.3	21.2	19.4	19.9	19.3	19.9	19.5	19.9
K (µg/mL)	8.15	8.69	8.14	8.66	8.34	8.54	8.24	8.43
Na (µg/mL)	58.0	63.7	60.1	63.9	61.8	62.9	61.0	61.9
Ammonia as NH_3 (µg/mL)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cl (µg/mL)	90	80	85	85	75	90	90	75
NO_3 as N (µg/mL)	INT	< 10	<10	<10	<10	<10	<10	<10
SO_4 (µg/mL)	185	191	188	191	191	194	191	196
Hg (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Table 20. Results of analyses of limestone slurry filtrate samples – non-ozone season tests

Sample ID	Limestone Slurry Filtrate Test 1	Limestone Slurry Filtrate Test 2	Limestone Slurry Filtrate Test 3	Limestone Slurry Filtrate Test 4
Sample Date	11/2/2004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045506	20045507	20045508	20045509
Ca (µg/mL)	133	96	92	86
Al (µg/mL)	< 0.53	< 0.53	< 0.53	< 0.53
SiO_2 (µg/mL)	3.48	3.50	3.37	3.31
Total Iron (µg/mL)	< 0.53	< 0.53	< 0.53	< 0.53
Mg (µg/mL)	22.1	23.9	23.5	23.8
K (µg/mL)	9.6	10.8	10.2	10.8
Na (µg/mL)	34.5	34.3	34.2	34.9
Ammonia as NH_3 (µg/mL)	< 10	< 10	< 10	< 10
Cl (µg/mL)	38	40	39	39
Nitrate as N (µg/mL)	1.76	1.77	1.76	1.67
SO_4 (µg/mL)	206	218	211	214
Hg (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0

C. ESP hopper ash

There are two ESP boxes (A and B) for Unit 4. Each box is divided into four fields and there are four ash hoppers in each field. A schematic of the layout of the ESP hoppers is shown in Figure 10. One of the ESP hoppers sampled is shown in Figure 11. About 1-2 lb of ash was collected using an ash sampling "thief" which consisted of two concentric tubes with openings cut through both tubes. A photograph of this ash sampling device is shown in Figure 12. After removing the screw caps of the rod-out ports, the thief was inserted into the ash hoppers through the ports. The inner tube was rotated to allow the ash to drop into the tube. The inner tube was then rotated to close the openings and the thief was then pulled out of the hopper. The thief was then tilted to allow the ash to fall into a one-gallon sized plastic bag through the opening at the end of the thief. Listed in Tables 21-24 are the results of analyses of the ESP ash samples collected during the August tests. The mercury measured in the samples ranged from 0.020 to 0.088 ppm. Because the November sampling was focused on the FGD scrubber inlet and outlet, ESP ash was not sampled in the non-ozone season tests.

In tests conducted at other plants, CONSOL R&D has observed that the mercury content in the ESP ash samples tend to correlate with the carbon content in the samples. In the tests at this plant, however, the correlation is not very strong. Figure 13 shows an R^2 of only 0.20 for the linear regression line between ESP ash carbon concentration and mercury concentration. This is due to the low carbon content (<3 wt %) of the ESP ash combined with the relatively high ESP gas temperature (330 °F) compared with the other plants. Low carbon content tends to reduce the amount of mercury captured in the ESP ash, and high ESP gas temperature tends to reduce the amount of mercury captured by the carbon in the ash.

Table 21. Results of analyses of ESP hopper ash samples collected in Test 1

Sample ID	ESP Hopper Ash #1-A2	ESP Hopper Ash #1-B2	ESP Hopper Ash #1-A6	ESP Hopper Ash #1-B6	ESP Hopper Ash #1-A12	ESP Hopper Ash #1-B12	ESP Hopper Ash #1-A16	ESP Hopper Ash #1-B16
Hopper I.D.	A2	B2	A6	B6	A12	B12	A16	B16
ESP Electric Field	Fourth Field		Third Field		Second Field		First Field	
Sample Date	8/12/2004		8/12/2004		8/12/2004		8/12/2004	
Analytical No.	20044321	20044322	20044323	20044324	20044325	20044326	20044327	20044328
Moisture (%)	1.06	0.00	0.30	0.20	0.15	0.20	0.10	0.09
Ash (%, dry)	95.42	0.00	95.85	96.32	97.59	97.99	98.24	98.59
Carbon (%, dry)	2.00	2.79	1.61	2.95	1.86	1.48	1.29	1.12
Hg (ppm, as det'd)	0.20	0.14	0.09	0.06	0.06	0.08	0.04	0.05
Major Ash Elements (%, dry)								
SiO_2	45.39	39.57	46.72	46.44	49.84	49.51	49.41	49.07
Al_2O_3	19.95	17.06	19.56	19.02	20.28	20.12	20.14	20.21
TiO_2	1.01	1.11	0.99	0.94	1.00	1.01	1.02	1.03
Fe_2O_3	18.18	20.11	19.41	20.70	18.08	18.27	19.18	17.84
CaO	4.30	4.73	4.54	5.50	4.68	4.68	4.38	4.40
MgO	1.15	1.27	1.14	1.14	1.20	1.19	1.16	1.19
Na_2O	0.67	0.63	0.67	0.64	0.71	0.68	0.70	0.65
K_2O	3.03	2.71	3.07	3.12	3.36	3.24	3.10	3.14
P_2O_5	0.61	0.65	0.49	0.40	0.37	0.35	0.24	0.30
SO_3	3.06	4.24	2.62	1.41	1.30	1.22	1.06	0.88

Table 22. Results of analyses of ESP hopper ash samples collected in Test 2

Sample ID	ESP Hopper Ash #2-A2	ESP Hopper Ash #2-B2	ESP Hopper Ash #2-A6	ESP Hopper Ash #2-B6	ESP Hopper Ash #2-A12	ESP Hopper Ash #2-B12	ESP Hopper Ash #2-A16	ESP Hopper Ash #2-B16
Hopper I.D.	A2	B2	A6	B6	A12	B12	A16	B16
ESP Electric Field	Fourth Field		Third Field		Second Field		First Field	
Sample Date	8/12/2004		8/12/2004		8/12/2004		8/12/2004	
Analytical No.	20044329	20044330	20044331	20044332	20044333	20044334	20044335	20044336
Moisture (%)	0.73	0.58	0.38	0.15	0.14	0.10	0.13	0.08
Ash (%, dry)	97.41	96.88	95.02	96.52	97.42	98.25	98.37	98.64
Carbon (%, dry)	1.01	1.40	1.71	2.63	1.92	1.22	1.27	1.09
Hg (ppm, as det'd)	0.10	0.09	0.10	0.06	0.06	0.07	0.03	0.05
Major Ash Elements (%, dry)								
SiO_2	46.27	46.49	44.88	45.56	49.38	49.14	49.03	50.44
Al_2O_3	20.02	20.10	18.85	18.53	19.80	19.62	19.67	19.80
TiO_2	1.06	1.06	0.97	0.96	1.02	1.02	1.02	1.03
Fe_2O_3	19.62	18.34	19.80	20.24	17.62	17.94	19.50	17.50
CaO	4.05	4.30	4.94	5.51	4.81	4.70	4.23	4.41
MgO	1.17	1.19	1.15	1.15	1.20	1.19	1.12	1.17
Na_2O	0.69	0.69	0.61	0.57	0.65	0.64	0.61	0.62
K_2O	3.11	3.12	2.86	2.70	3.09	3.00	2.79	2.96
P_2O_5	0.50	0.52	0.57	0.46	0.41	0.37	0.25	0.29
SO_3	2.36	2.40	3.12	1.54	1.34	1.25	1.01	0.85

Table 23. Results of analyses of ESP hopper ash samples collected in Test 3

Sample ID	ESP Hopper Ash #3-A2	ESP Hopper Ash #3-B2	ESP Hopper Ash #3-A6	ESP Hopper Ash #3-B6	ESP Hopper Ash #3-A12	ESP Hopper Ash #3-B12	ESP Hopper Ash #3-A16	ESP Hopper Ash #3-B16
Hopper I.D.	A2	B2	A6	B6	A12	B12	A16	B16
ESP Electric Field	Fourth Field		Third Field		Second Field		First Field	
Sample Date	8/13/2004		8/13/2004		8/13/2004		8/13/2004	
Analytical No.	20044337	20044338	20044339	20044340	20044341	20044342	20044343	20044344
Moisture (%)	0.25	0.38	0.18	0.21	0.15	0.14	0.14	0.16
Ash (%, dry)	95.67	96.86	97.78	97.27	97.43	98.24	98.33	98.59
Carbon (%, dry)	2.54	1.08	1.76	1.86	1.93	1.29	1.43	1.20
Hg (ppm, as det'd)	0.12	0.04	0.07	0.04	0.06	0.07	0.03	0.04
Major Ash Elements (%, dry)								
SiO_2	44.29	44.48	46.11	47.03	48.96	49.03	49.49	49.40
Al_2O_3	19.98	20.90	19.19	19.90	19.52	19.98	20.05	20.36
TiO_2	1.04	1.16	0.98	1.03	1.02	1.04	1.04	1.05
Fe_2O_3	19.55	16.35	20.96	19.64	17.34	18.52	18.36	18.93
CaO	4.25	4.40	4.85	4.33	4.83	4.39	4.21	3.89
MgO	1.13	1.26	1.11	1.13	1.19	1.16	1.15	1.11
Na_2O	0.61	0.70	0.57	0.59	0.63	0.63	0.58	0.57
K_2O	2.80	3.08	2.77	2.85	2.95	3.04	2.94	2.77
P_2O_5	0.59	0.93	0.42	0.39	0.39	0.33	0.29	0.26
SO_3	2.57	3.91	1.39	1.53	1.32	1.29	0.92	0.92

Table 24. Results of analyses of ESP hopper ash samples collected in Test 4

Sample ID	ESP Hopper Ash #4A2	ESP Hopper Ash #4B2	ESP Hopper Ash #4A6	ESP Hopper Ash #4B6	ESP Hopper Ash #4A12	ESP Hopper Ash #4B12	ESP Hopper Ash #4A16	ESP Hopper Ash #4B16	ESP Hopper Ash #4A2R	ESP Hopper Ash #4B2R
Hopper I.D.	A2	B2	A6	B6	A12	B12	A16	B16	A2	B2
ESP Electric Field	Fourth Field		Third Field		Second Field		First Field		Fourth Field	
Sample Date	8/13/2004		8/13/2004		8/13/2004		8/13/2004		8/14/2004	
Analytical No.	20044347	20044348	20044349	20044350	20044351	20044352	20044353	20044354	20044355	20044356
Moisture (%)	0.41	0.72	0.13	0.13	0.19	0.15	0.09	0.08	0.62	0.53
Ash (%, dry)	96.11	96.52	97.60	97.17	97.49	98.27	98.41	98.83	95.21	96.50
Carbon (%, dry)	1.97	1.50	1.94	1.80	1.94	1.32	1.26	0.83	1.64	0.99
Hg (ppm, as det'd)	0.088	0.052	0.071	0.031	0.061	0.059	0.032	0.034	0.06	0.02
Major Ash Elements (%, dry)										
SiO_2	46.87	45.95	47.04	46.74	49.72	48.96	49.56	50.67	44.78	43.67
Al_2O_3	21.64	20.90	20.41	20.52	20.21	21.22	20.46	21.06	22.05	22.01
TiO_2	1.08	1.06	0.99	1.02	1.00	1.04	1.00	1.02	1.17	1.20
Fe_2O_3	17.58	16.79	20.99	20.83	17.26	20.39	18.59	18.22	16.18	15.24
CaO	3.67	3.92	4.40	4.25	4.78	3.48	4.11	3.66	3.41	3.98
MgO	1.16	1.17	1.09	1.12	1.17	1.08	1.12	1.11	1.18	1.25
Na_2O	0.73	0.71	0.63	0.65	0.70	0.66	0.62	0.66	0.77	0.83
K_2O	3.32	3.21	3.04	3.03	3.33	3.04	3.14	3.21	3.49	3.59
P_2O_5	0.59	0.64	0.36	0.45	0.41	0.22	0.28	0.25	0.87	1.19
SO_3	2.65	2.73	1.33	1.81	1.32	1.05	1.01	1.00	4.08	4.94

D. FGD slurry

This unit has four scrubber modules and two recycle tanks, where limestone slurry is added to neutralize the acidic liquor from the scrubbers. The spent liquor from two modules is gravity fed into one recycle tank. A bleed stream of the liquor is pumped from each recycle tank into an oxidizer, where the calcium sulfite rich liquor is oxidized into gypsum that is sold to a wallboard manufacturing plant. The layout of the FGD modules is shown in Figure 14.

The FGD slurry samples were collected from the transfer pipes connecting the recycle tanks to the oxidizers. The slurry sample was allowed to discharge from the pipe into a sink for about 20 seconds before a 500 mL of slurry sample was collected. Figure 15 is a picture of a transfer pipe and its corresponding sink.

Upon arrival at CONSOL R&D's analytical lab, each slurry sample was filtered to generate a filtrate and a solid residue (i.e., filter cake) samples. The air-dried solids and the filtrates were analyzed separately. Listed in Tables 25 and 26 are the results of analyses of the FGD slurry solids samples. The mercury content in these solids samples ranged from 0.31 to 0.43 ppm in the August tests and 0.34 to 0.65 in the November tests. Listed in Tables 27 and 28 are the results of analyses of the limestone slurry filtrate samples. The concentration of mercury measured in the filtrate samples ranged from 33.4 to 61.6 μg/L in the August tests and 1.5 to 7.1μg/L in the November tests.

Table 25. Results of analyses of FGD slurry solids samples – ozone season tests

Sample Description	FGD Slurry Solids Test 1	FGD Slurry Solids Test 2	FGD Slurry Solids Test 3	FGD Slurry Solids Test 4
Sample Date	8/12/2004	8/12/2004	8/13/2004	8/13/2004
Analytical No.	20044316	20044317	20044318	20044319
% solids in Original Sample	10.76	11.73	11.11	11.93
Specific Gravity	1.019	1.012	1.012	1.013
Moisture (%)	9.19	8.51	8.44	11.43
Ash (%, dry)	88.01	88.98	89.69	86.51
Carbon (%, dry)	0.51	0.45	0.40	0.24
Chlorine (%, dry)	0.006	0.009	0.002	0.002
Hg (ppm, as det'd)	0.37	0.43	0.34	0.31
Major Ash Elements (%, dry)				
SiO_2	3.68	3.44	3.76	3.64
Al_2O_3	0.32	0.27	0.32	0.30
TiO_2	0.01	0.01	0.01	0.01
Fe_2O_3	0.16	0.13	0.16	0.15
CaO	36.88	37.43	37.17	36.52
MgO	0.21	0.21	0.19	0.20
Na_2O	0.01	0.00	0.01	0.01
K_2O	0.07	0.07	0.07	0.07
P_2O_5	0.00	0.00	0.00	0.00
SO_3	46.34	47.53	48.19	46.52

Table 26. Results of analyses of FGD slurry solids samples – non-ozone season tests

Sample ID	FGDS-1-A	FGDS-1-B	FGDS-2-A	FGDS-2-B	FGDS-3-A	FGDS-3-B	FGDS-4-A	FGDS-4-B
Sample Date	11/2/2004		11/3/2004		11/3/2004		11/3/2004	
Test No.	1		2		3		4	
Analytical No.	20045584	20045585	20045586	20045587	20045588	20045589	20045588	20045589
Solids in original sample (%)	11.1	11.8	10.1	10.9	12.0	12.1	13.4	14.8
Density of original sample (g/mL)	1.02	1.02	1.01	1.01	1.02	1.01	1.01	1.01
Moisture (%)	0.00	2.08	0.00	1.98	8.69	12.26	12.43	17.07
Ash (%, dry)	95.64	97.78	95.44	97.51	97.66	97.82	97.31	97.50
Carbon (%, dry)	0.21	0.27	0.31	0.31	0.37	0.32	0.39	0.35
Chlorine (%, dry)	0.01	0.02	0.02	0.02	0.02	0.04	0.02	0.02
Hg (ppm, as det'd)	0.65	0.44	0.47	0.45	0.43	0.42	0.44	0.34
Major Ash Elements (%, dry)								
SiO_2	3.37	3.14	3.30	3.05	3.68	3.00	2.92	2.50
Al_2O_3	0.74	0.68	0.76	0.65	0.88	0.69	0.67	0.54
TiO_2	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02
Fe_2O_3	0.37	0.34	0.36	0.34	0.43	0.34	0.33	0.28
CaO	39.59	39.08	37.88	39.82	37.13	35.02	35.52	34.27
MgO	0.40	0.41	0.49	0.38	0.54	0.41	0.47	0.36
Na_2O	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
K_2O	0.18	0.15	0.16	0.15	0.19	0.15	0.16	0.13
P_2O_5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO_3	53.44	52.87	52.59	52.83	49.43	48.12	48.05	45.99

Table 27. Results of analyses of FGD slurry filtrate samples – ozone season tests

Sample ID	FGD Slurry Filtrate Test 1 (13:35 PM)	FGD Slurry Filtrate Test 2 (18:25 PM)	FGD Slurry Filtrate Test 3 (11:35 AM)	FGD Slurry Filtrate Test 4 (16:00 PM)
Test No.	1	2	3	4
Sample Date	8/12/2004	8/12/2004	8/13/2004	8/13/2004
Analytical No.	20044369	20044370	20044371	20044372
Ca (µg/mL)	900	988	963	941
Total Iron (µg/mL)	< 0.05	< 0.05	< 0.05	< 0.05
Mg (µg/mL)	602	656	674	654
K (µg/mL)	12.5	11.6	12.4	11.6
Na (µg/mL)	103.0	98.3	102	97.2
Ammonia as NH_3 (µg/mL)	< 10	< 10	< 10	< 10
Cl (µg/mL)	1,800	2,150	1,850	1,850
NO_3 as N (µg/mL)	12.6	11.1	11.1	10.10
SO_4 (µg/mL)	2,900	2,890	3,010	2,930
Hg (µg/L)	33.4	39.2	61.6	56.8

Table 28. Results of analyses of FGD slurry filtrate samples – ozone season tests

Sample ID	FGD Slurry Filtrate Test 1	FGD Slurry Filtrate Test 1	FGD Slurry Filtrate Test 2	FGD Slurry Filtrate Test 2	FGD Slurry Filtrate Test 3	FGD Slurry Filtrate Test 3	FGD Slurry Filtrate Test 4	FGD Slurry Filtrate Test 4
Sample No.	1-A	1-B	2-A	2-B	3-A	3-B	4-A	4-B
FGD Module ID	A	B	A	B	A	B	A	B
Sample Date	11/2/2004		11/3/2004		11/3/2004		11/3/2004	
Analytical No.	20045510	20045511	20045512	20045513	20045514	20045515	20045516	20045517
Ca (µg/mL)	648	664	622	637	653	650	640	639
Al (µg/mL)	3.03	1.46	3.98	2.78	3.50	4.33	3.57	2.84
SiO_2 (µg/mL)	27.7	23.44	28.08	25.10	29.86	27.66	28.96	26.43
Total Iron (µg/mL)	0.82	0.72	1.27	1.04	1.56	3.61	1.74	1.67
Mg (µg/mL)	1,035	974	964	985	1,074	954	1,003	970
K (µg/mL)	23.6	21.5	21.8	22.4	25.3	22.7	23.4	21.2
Na (µg/mL)	99.1	99.4	95.0	97.7	106.0	94.7	94.8	91.0
Ammonia as NH_3 (µg/mL)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cl (µg/mL)	1,450	1,370	1,310	1,200	1,370	1,210	1,420	1,290
Nitrate as N (µg/mL)	53.2	52.9	48.3	46.7	50.5	49.4	54.7	51.5
SO_4 (µg/mL)	4,088	4,136	3,582	4,043	4,154	3,921	3,951	3,920
Hg (µg/L)	5.1	4.2	5.4	2.8	3.4	1.5	7.1	2.9

E. FGD makeup water

CONSOL R&D personnel collected a FGD makeup water sample of about 250 mL at the same time the FGD slurry sample was collected (Figure. 15). Listed in Tables 29 and 30 are the results of analyses of the makeup water samples. The concentration of mercury detected in these samples was below the detection limit of 1.0 μg/L, except for one sample collected in November that contained 1.1μg/L.

Table 29. Results of analyses of FGD makeup water samples – ozone season tests

Sample ID	FGD Makeup Water Test 1 (13:45 PM)	FGD Makeup Water Test 2 (18:25 PM)	FGD Makeup Water Test 3 (11:35 AM)	FGD Makeup Water Test 4 (16:00 PM)
Test No.	1	2	3	4
Sample Date	8/12/2004	8/12/2004	8/13/2004	8/13/2004
Analytical No.	20044373	20044374	20044375	20044376
Ca (μg/mL)	60.5	61.9	58.1	61.1
Total Iron (μg/mL)	0.35	0.12	< 0.05	0.53
Mg (μg/mL)	15.4	15.7	15.1	15.5
K (μg/mL)	4.2	4.16	4.24	4.24
Na (μg/mL)	33.1	33.1	33.6	33.5
Ammonia as NH_3 (μg/mL)	< 10	< 10	< 10	< 10
Cl (μg/mL)	45.0	55.0	50.0	45.0
NO_3 as N (μg/mL)	0.93	0.72	1.31	1.16
SO_4 (μg/mL)	107	110	101	106
Hg (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0

Table 30 Results of analyses of FGD makeup water samples – non-ozone season tests

Sample ID	FGD Makeup Water Test 1	FGD Makeup Water Test 2	FGD Makeup Water Test 3
Test No.	1	2	3
Sample Date	11/02/2004	11/03/2004	11/03/2004
Analytical No.	20045536	20045537	20045538
Ca (μg/mL)	518	491	573
Total Iron (μg/mL)	< 0.53	< 0.53	< 0.53
Mg (μg/mL)	1220	1150	1160
K (μg/mL)	113	109	102
Na (μg/mL)	251	242	221
Ammonia as NH_3 (μg/mL)	< 10	< 10	< 10
Cl (μg/mL)	1720	1720	1720
NO_3 as N (μg/mL)	3.76	0.03	3.99
SO_4 (μg/mL)	4390	4150	4460
Hg (μg/L)	< 1.0	< 1.0	1.1

F. ME wash water samples

The ME wash water was collected from the ME wash water storage tank, which supplies water to all four units at this plant. The ME wash water samples were collected by CONSOL R&D personnel during Tests 3 and 4 in August and during all four tests in November. About 250 mL of sample was collected each time. Listed in Tables 31 and 32 are the results of analyses of the ME wash water samples. The concentration of mercury was below the detection limit of 1.0 μg/L for all of the samples.

Table 31. Results of analyses of ME wash water samples – ozone season tests.

Sample ID	ME Wash Water Test 3 (11:50 AM)	ME Wash Water Test 4 (16:15 PM)
Test No.	3	4
Sample Date	8/13/2004	8/13/2004
Analytical No.	20044377	20044378
Ca (µg/mL)	116	118
Total Iron (µg/mL)	< 0.05	0.92
Mg (µg/mL)	33.5	34.2
K (µg/mL)	6.23	6.12
Na (µg/mL)	50.1	47.9
Ammonia as NH_3 (µg/mL)	< 10	< 10
Cl (µg/mL)	90	90
NO_3 as N (µg/mL)	1.49	1.92
SO_4 (µg/mL)	246	250
Hg (µg/L)	< 1.0	< 1.0

Table 32. Results of analyses of ME wash water samples – non-ozone season tests.

Sample ID	ME Wash Water Test 1	ME Wash Water Test 2	ME Wash Water Test 3	ME Wash Water Test 4
Sample Date	11/2/3004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045518	20045519	20045520	20045521
Ca (g/mL)	90	90	93	89
Al (g/mL)	1.22	0.91	1.15	1.11
SiO_2 (g/mL)	6.09	5.61	6.07	5.75
Total Iron (g/mL)	2.57	1.88	2.42	2.33
Mg (g/mL)	23.6	23.3	23.6	23.0
K (g/mL)	6.9	6.6	9.4	6.2
Na (g/mL)	27.7	26.5	35.1	26.7
Ammonia as NH_3 (g/mL)	< 10	< 10	< 10	< 10
Cl (g/mL)	37	36	37	37
Nitrate as N (g/mL)	1.81	1.69	1.70	1.64
SO_4 (g/mL)	154	152	154	143
Hg (g/L)	< 1.0	< 1.0	< 1.0	< 1.0

G. Hydroclone underflow samples

The hydroclone underflow (HCUF) slurry samples were collected from a pipe teed into the HCUF slurry storage tank. Samples were collected by CONSOL R&D personnel during Tests 3 and 4 in August and during all four tests in November. About 500 mL of slurry were collected each time. Upon arrival at CONSOL R&D's analytical labs, each slurry sample was filtered to generate a filtrate and a solid residue (i.e., filter cake). The air-dried solids and filtrate samples were analyzed separately. Listed in Tables 33 and 34 are the results of analyses of the HCUF slurry solids samples. The mercury content in these solids samples ranged from 0.16 to 0.17 ppm in the August tests and 0.009 to 0.113 in the November tests. Listed in Tables 35 and 36 are the results of analyses of the HCUF filtrate samples. The concentration of mercury measured in the filtrate samples ranged from 79 to 81 μg/L in the August tests and <1.0 to 2.1μg/L in the November tests.

Table 33. Results of analyses of hydroclone underflow solids samples – ozone season tests

Sample Description	HCUF Solids Test 3 (12:20 PM)	HCUF Solids Test 4 (16:30 PM)
Sample ID	HU 3	HU 4
Sample Date	8/13/2004	8/13/2004
Analytical No.	20044359	20044360
% solids in Original Sample	40.05	41.33
Specific Gravity	1.042	1.057
Moisture (%)	19.23	19.88
Ash (%, dry)	97.50	97.53
Carbon (%, dry)	0.46	0.55
Chlorine (%, dry)	0.001	0.004
Hg (ppm, as det'd)	0.16	0.17
Major Ash Elements (%, dry)		
SiO_2	2.79	3.34
Al_2O_3	0.15	0.14
TiO_2	0.00	0.00
Fe_2O_3	0.09	0.07
CaO	43.11	43.31
MgO	0.15	0.15
Na_2O	0.00	0.01
K_2O	0.02	0.04
P_2O_5	0.00	0.00
SO_3	53.32	52.36

Table 34. Results of analyses of hydroclone underflow solids samples – non-ozone season tests

Sample ID	HCUF Solids 1	HCUF Solids 2	HCUF Solids 3	HCUF Solids 4
Sample Date	11/2/2004	11/3/2004	11/3/2004	11/3/2004
Test No.	1	2	3	4
Analytical No.	20045574	20045575	20045576	20045577
Solids in original sample (%)	37.14	37.71	37.12	37.57
Density of original sample (g/mL)	1.124	1.177	1.173	1.092
Moisture (%)	0.29	0.26	0.14	0.52
Ash (%, dry)	98.43	97.94	98.13	97.79
Carbon (%, dry)	0.19	0.27	0.25	0.27
Total Sulfur (%, dry)	22.97	22.47	22.40	22.47
Chlorine (%, dry)	0.011	0.012	0.014	0.016
Hg (ppm, as det'd)	0.111	0.113	0.099	0.009
Major Ash Elements (%, dry)				
SiO_2	2.00	1.94	1.97	1.95
Al_2O_3	0.22	0.24	0.24	0.24
TiO_2	0.01	0.01	0.01	0.01
Fe_2O_3	0.14	0.16	0.15	0.15
CaO	40.88	42.17	41.10	41.22
MgO	0.24	0.31	0.32	0.33
Na_2O	0.04	0.03	0.03	0.04
K_2O	0.07	0.06	0.06	0.06
P_2O_5	0.00	0.00	0.00	0.00
SO_3	57.42	56.17	56.00	56.18

Table 35. Results of analyses of hydroclone underflow filtrate samples – ozone season tests

Sample ID	HCUF Filtrate Test 3 (12:20 PM)	HCUF Filtrate Test 4 (16:30 PM)
Test No.	3	4
Sample Date	8/13/2004	8/13/2004
Analytical No.	20044381	20044382
Ca (µg/mL)	914	929
Total Iron (µg/mL)	< 0.05	< 0.05
Mg (µg/mL)	670	701
K (µg/mL)	13.3	13.5
Na (µg/mL)	110	112
Ammonia as NH_3 (µg/mL)	< 10	< 10
Cl (µg/mL)	2,050	2,050
NO_3 as N (µg/mL)	12.9	14.3
SO_4 (µg/mL)	3,100	3,160
Hg (µg/L)	80.8	78.9

Table 36. Results of analyses of hydroclone underflow filtrate samples – non-ozone season tests

Sample ID	Hydroclone Underflow Filtrate Test 1	Hydroclone Underflow Filtrate Test 2	Hydroclone Underflow Filtrate Test 3	Hydroclone Underflow Filtrate Test 4
Sample Date	11/2/3004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045526	20045527	20045528	20045529
Ca (μg/mL)	701	675	644	618
Al (μg/mL)	3.85	2.99	2.79	4.34
SiO_2 (μg/mL)	21.34	20.90	19.43	21.04
Total Iron (μg/mL)	7.06	5.19	4.76	7.36
Mg (μg/mL)	946	1,014	963	910
K (μg/mL)	21.9	23.6	22.7	21.2
Na (μg/mL)	88.8	98.9	93.9	87.8
Ammonia as NH_3 (μg/mL)	< 10	< 10	< 10	< 10
Cl (μg/mL)	1,320	1,250	1,260	1,260
Nitrate as N (μg/mL)	0.88	1.21	0.63	0.70
SO_4 (μg/mL)	4,185	4,206	3,972	3,740
Hg (μg/L)	2.9	< 1.0	< 1.0	< 1.0

H. Hydroclone overflow samples

During normal operation the hydroclone overflow (HCOF) slurry is returned to the FGD. The HCOF samples were collected from a bypass pipe of about 300 feet long, which ran from the hydroclone overflow surge tank to the FGD slurry sewage collecting system located near Unit 2. The FGD control room operator opened the bypass valve to allow the HCOF slurry reach the sampling point, which took five to ten minutes. Approximately 500 mL of HCOF slurry sample was collected during each test. The were collected by CONSOL R&D personnel during Tests 3 and 4 in August and during all four tests in November. Upon arrival at CONSOL R&D's analytical labs, each slurry sample was filtered to generate a filtrate and a solid residue (i.e., filter cake). The air-dried solids and filtrate samples were analyzed separately. Listed in Tables 37 and 38 are the results of analyses of the HCOF slurry solids samples. The mercury content in these solids samples ranged from 0.37 to 0.85 ppm in the August tests and 1.0 to 4.5 ppm in the November tests. Listed in Tables 39 and 40 are the results of analyses of the HCOF filtrate samples. The concentration of mercury measured in the filtrate samples ranged from 58 to 72 μg/L in the August tests and <1.0 to 5.6 μg/L in the November tests.

Table 37. Results of analyses of hydroclone overflow solids samples – ozone season tests

Sample Description	HCOF Solids Test 3 (11:55 AM)	HCOF Solids Test 4 (16:35 PM)
Sample Date	8/13/2004	8/13/2004
Analytical No.	20044357	20044358
% solids in Original Sample	8.11	4.43
Specific Gravity	1.020	1.016
Moisture (%)	7.80	6.49
Ash (%, dry)	96.84	96.41
Carbon (%, dry)	0.34	0.93
Chlorine (%, dry)	0.008	0.015
Hg (ppm, as det'd)	0.37	0.85
Major Ash Elements (%, dry)		
SiO_2	5.53	9.31
Al_2O_3	0.54	1.02
TiO_2	0.02	0.03
Fe_2O_3	0.27	0.50
CaO	39.91	39.10
MgO	0.31	0.56
Na_2O	0.01	0.02
K_2O	0.12	0.22
P_2O_5	0.01	0.09
SO_3	49.46	46.44

Table 38. Results of analyses of hydroclone overflow solids samples – non-ozone season tests

Sample ID	HCOF Solids 1	HCOF Solids 2	HCOF Solids 3	HCOF Solids 4
Sample Date	11/2/2004	11/3/2004	11/3/2004	11/3/2004
Test No.	1	2	3	4
Analytical No.	20045570	20045571	20045572	20045573
Solids in original sample (%)	2.27	2.60	1.61	4.81
Density of original sample (g/mL)	1.018	1.016	1.019	1.034
Moisture (%)	4.98	5.22	4.81	4.43
Ash (%, dry)	95.67	96.14	94.11	90.69
Carbon (%, dry)	0.86	0.66	1.22	2.29
Total Sulfur (%, dry)	16.38	17.84	12.89	15.08
Chlorine (%, dry)	0.092	0.032	0.062	0.030
Hg (ppm, as det'd)	2.51	2.48	4.51	1.03
Major Ash Elements (%, dry)				
SiO_2	14.39	11.75	22.04	6.89
Al_2O_3	4.42	3.65	7.39	1.95
TiO_2	0.15	0.13	0.24	0.06
Fe_2O_3	2.00	1.67	3.31	0.90
CaO	32.24	34.34	26.68	38.35
MgO	1.44	1.23	2.47	0.92
Na_2O	0.09	0.07	0.13	0.05
K_2O	1.00	0.80	1.62	0.43
P_2O_5	0.06	0.02	0.17	0.00
SO_3	40.96	44.59	32.22	37.69

Table 39. Results of analyses of hydroclone overflow filtrate samples – ozone season tests

Sample Description	HCOF Filtrate Test 3 (11:55 AM)	HCOF Filtrate Test 4 (16:35 PM)
Test No.	3	4
Sample Date	8/13/2004	8/13/2004
Analytical No.	20044379	20044380
Ca (µg/mL)	960	1,050
Total Iron (µg/mL)	< 0.05	< 0.05
Mg (µg/mL)	653	867
K (µg/mL)	11.5	13.4
Na (µg/mL)	96.4	116.0
Ammonia as NH_3 (µg/mL)	< 10	< 10
Cl (µg/mL)	1,800	2,450
NO_3 as N (µg/mL)	10.4	16.6
SO_4 (µg/mL)	2,960	3,560
Hg (µg/L)	57.9	72.3

Table 40. Results of analyses of hydroclone overflow filtrate samples – non-ozone season tests

Sample ID	Hydroclone Overflow Filtrate Test 1	Hydroclone Overflow Filtrate Test 2	Hydroclone Overflow Filtrate Test 3	Hydroclone Overflow Filtrate Test 4
Sample Date	11/2/3004	11/3/2004	11/3/2004	11/3/2004
Analytical No.	20045522	20045523	20045524	20045525
Ca (µg/mL)	713	589	640	610
Al (µg/mL)	4.65	4.48	4.88	1.58
SiO_2 (µg/mL)	30.55	27.17	31.35	23.72
Total Iron (µg/mL)	4.32	1.77	2.16	1.62
Mg (µg/mL)	966	860	974	971
K (µg/mL)	22.5	19.5	23.3	22.7
Na (µg/mL)	90.7	80.1	91.8	88.8
Ammonia as NH_3 (µg/mL)	< 10	< 10	< 10	< 10
Cl (µg/mL)	1,400	1,250	1,410	1,370
Nitrate as N (µg/mL)	1.19	1.87	1.67	1.5
SO_4 (µg/mL)	4,192	3,536	3,894	3,882
Hg (µg/L)	5.6	< 1.0	3.3	1.8

QUALITY ASSURANCE/QUALITY CONTROL

The sampling and analysis QA/QC procedures are described below.

- Personnel specifically trained and experienced in power plant sampling methods, including the Ontario-Hydro mercury sampling method, conducted all sampling,
- The sampling equipment was maintained and calibrated as required,
- Consistent sample preparation and recovery procedures were used,
- Samples were logged and tracked under the direction of sample team Group Leader,
- Individual calibration curves were developed for each sample matrix,
- NIST Standard Reference Material (SRM) and lab QC samples were analyzed to verify calibration curves,
- Duplicates of selected samples were analyzed to assure repeatability,
- Analyses of selected "spiked" samples were analyzed to assure sample recovery, and
- Interim data were reviewed to assure sample completeness.

All samples were obtained using the procedures described in EPA Method 5 and the Ontario-Hydro mercury speciation draft method. Data were recorded on standard forms, which are included in Appendix A. The field data were reduced using standard "in-house" spreadsheets. Copies of the summary sheets are included in Appendix A. To assure consistency, all of the Ontario-Hydro train components were prepared and recovered under the supervision of a senior technician experienced in the Ontario-Hydro mercury speciation lab techniques. Copies of the recovery sheets are included in Appendix C.

The Ontario-Hydro sampling train analysis consisted of eight sub-samples. Each sub-sample analysis consisted of developing a calibration curve (absorbance versus mercury concentration in solution), checks of field and lab blanks, calibration checks against SRM and lab standards, selected duplicates and selected sample spikes. The laboratory summaries for each of these runs are contained in Appendix C.

A total of 207 individual Ontario-Hydro mercury determinations were completed, including 14 blank samples, 30 NIST SRM or lab QC checks, 12 sample spikes, and 13 duplicate analyses.

I. Blank Samples

A total of 14 blank liquid samples were analyzed. The average blank value was <1.0 ng/mL (ppb in solution). The average blank value is much less than any individual Hg^{part}, Hg^{++}, or Hg^{0} determination in ng/mL and, more importantly, is much less than the mercury concentration detection limit (discussed later in this report). Consequently, in

this report, blank concentrations were not subtracted out from any mercury determination.

II. NIST Standard Reference Material Checks

Thirty NIST SRM checks were conducted throughout the mercury determinations. Two standards were used in the determinations as detailed in Table 41.

Table 41. NIST SRM analyses

NIST SRM	Standard Value (ng/mL)	Sample Fraction	Samples Analyzed	Average Result (ng/mL)	Percent of Standard	Standard Deviation (%)	Percent Relative Standard Deviation
1641D	8.0	Ontario Hydro Liquids	22	7.9	98.8	0.26	3.3
		Ontario Hydro Filters	3	8.0	100.0	0.00	0.00
1633b	149.0	Ontario Hydro Filters	5	144	96.6	13.4	9.3

III. Spike Sample Recoveries

A total of 12 samples were spiked with a 2 or 10 µg/L mercury standard and then re-analyzed to determine the percent spike recovery. The result of this QA/QC procedure was an average spike recovery of 86.1% recovery with a ±4.8% standard deviation.

IV. Duplicate Analyses

A total of 13 duplicate analyses were conducted periodically throughout the mercury determinations. The result of this QA/QC procedure was an average mercury determination that was within 3.0% of the original mercury determination, with a ±7.4% standard deviation. One duplicate was reported at 25% less than the original result (0.3 ng/mL) at 0.2 ng/mL; however, as this is the detection limit, it was considered acceptable.

V. Flue Gas Mercury Concentration Detection Limits

For liquid samples, the flue gas mercury concentration was calculated using the following equation:

$$Hg\left[\mu g / m^3\right] = \frac{\left(C_{imp}\ x V_{imp}\right)}{\left(V_{gas}\ x 1000\right)}$$

where: C_{imp} = Mercury concentration of impinger solution [ng/mL (ppb)]
V_{imp} = Liquid volume of impinger solution [mL]
V_{gas} = Flue gas sample volume [dry standard m^3]
1000= Conversion factor [1000 ng per µg]

The flue gas mercury detection limit is reduced when the flue gas sample volume is increased or liquid volume of impinger solution is decreased. The CVAA is calibrated between 0 and 20 ng/mL. Over this range, the calibration curve between absorbance and concentration is linear. The lowest concentration standard used to develop the calibration curve is 0.500 ng/mL. In addition, the detection limit of the liquid CVAA analysis was <1.0 ng/mL. The prescribed sampling and recovery procedures result in final liquid volumes varying between 49 and 861 mL. The volume of flue gas collected varied between 1.047 and 3.218 dscm. The sampling variables result in sample-specific flue gas detection limit. The flue gas mercury detection limit for each sample matrix is listed in Table 42. Depending on the matrix, the flue gas mercury detection limit ranged from 0.1 to 0.8 $\mu g/m^3$.

Table 42. Flue gas mercury detection limits

Matrix	Maximum Liquid Volume (mL)	Minimum Gas Volume (dscm)	Flue Gas Detection Limit ($\mu g/m^3$)
Probe Rinse	216	1.047	0.2
KCl Impinger	861	1.047	0.8
HNO_3/H_2O_2 Impingers	180	1.047	0.2
$KMnO_4$ Impingers	248	1.047	0.2
HCl Rinse	100	1.047	0.1

VI. Mercury Material Balance Closure

One important criterion to gauge the overall quality of the tests is to conduct a mass balance to account for the mercury entering and leaving the plant during the time of the tests. Mercury entered this unit from coal, limestone slurry, hydroclone overflow slurry, ME wash water, and FGD makeup water. Mercury left this unit via bottom ash, ESP hopper ash, FGD slurry, and stack flue gas. The calculation of the contribution from each of these streams to the mercury material balance is described in the following sections.

A. Mercury input from coal

The coal feed rates were recorded and provided by plant personnel during the August tests. The coal feed rates for the November tests were calculated using the carbon-based F-factor calculation. Summarized in Table 43 are the mercury inputs from coal. The coal mercury input ranged from 5.59 to 8.03 mg/sec.

Table 43. Mercury input from coal

Ozone Season Test No.	1	2	3	4
Coal feed rate (kpph)	440	439	431	428
Coal moisture content (%)	5.50	5.61	5.99	5.88
Coal hydrogen content (%, dry)	4.55	4.33	4.68	4.77
Coal mercury content (ppm, as det'd)	0.15	0.13	0.12	0.11
Mercury input from the coal (mg/sec)	**8.03**	**7.30**	**6.68**	**6.15**
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Coal feed rate (kpph)	462	450	448	457
Coal moisture content (%)	4.79	5.03	4.00	4.59
Coal hydrogen content (%, dry)	4.43	4.84	4.53	4.78
Coal mercury content (ppm, as det'd)	0.122	0.103	0.099	0.113
Mercury input from the coal (mg/sec)	**7.09**	**5.84**	**5.59**	**6.50**

B. Mercury input from limestone slurry

The limestone slurry feed rate into the FGD was determined by the amount of SO_2 removed by the FGD. The amount of SO_2 removed by the FGD was calculated from the measured sulfur content in the feed coal, bottom ash, and ESP ash, and the stack flue gas sulfur dioxide concentration. The limestone utilization was assumed to be 99% (i.e., the Ca/S ratio = 1.01), the design value. By applying the limestone slurry mercury concentrations in the solids and filtrate (Tables 17-20) to the calculated limestone slurry feed rate, the total mercury input from the limestone slurry was calculated and the results are summarized in Table 44. The mercury input from the limestone slurry ranged from 0.016 to 0.017 mg/sec in the August tests and 0.052 to 0.072 mg/sec in the November tests.

Table 44. Mercury input from limestone slurry

Ozone Season Test No.	1	2	3	4
Coal feed rate (kpph)	440	439	431	428
Coal moisture content (%)	5.50	5.61	5.99	5.88
Coal sulfur content, (%, dry)	3.57	3.72	3.61	3.88
FGD sulfur input (kpph)	14.7	15.2	14.6	15.5
Ca/S ratio	1.01			
Limestone slurry density (lb/gal)	11.2			
Limestone slurry required (kpph)	129	134	127	136
Limestone slurry mercury content (ppb)	1.02	1.02	1.02	1.02
Mercury input from limestone slurry (mg/sec)	**0.017**	**0.017**	**0.016**	**0.017**
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Coal feed rate (kpph)	462	450	448	457
Coal moisture content (%)	4.79	5.03	4.00	4.59
Coal sulfur content, (%, dry)	3.59	3.60	3.79	3.68
FGD sulfur input (kpph)	15.3	14.9	15.8	15.6
Ca/S ratio	1.01			
Limestone slurry density (lb/gal)	11.2			
Limestone slurry required (kpph)	144	123	126	124
Limestone slurry mercury content (ppb)	3.99	3.34	3.71	3.41
Mercury input from limestone slurry (mg/sec)	**0.072**	**0.052**	**0.059**	**0.053**

C. Mercury input from hydroclone overflow slurry

The FGD slurry leaving the recycle tanks was pumped into two oxidizers and the oxidized slurry was pumped to the hydroclone for primary dewatering. The HCOF slurry was returned back to the FGD as a portion of the volume makeup, while the thickened HCUF slurry was gravity-fed to a surge tank feeding the drum filters inside the gypsum building.

The mass flow rate of the HCOF slurry entering the FGD was calculated based on the FGD slurry blowdown rate and the properties of the HCUF (Tables 33-36) and HCOF (Tables 37-40) slurries. Summarized in Table 45 is the calculated mercury input from the HCOF slurry return back to the FGD. The mercury input from the HCOF slurry ranged from 1.47 to 3.73 mg/sec in the August tests and 0.95 to 2.40 mg/sec in the November tests.

Table 45. Mercury input from hydroclone overflow slurry

Ozone Season Test No.	**1**	**2**	**3**	**4**
HCOF slurry mass flow rate (kpph)	185	193	140	277
HCOF slurry solids mass flow rate (kpph)	11.6	12.1	11.4	12.3
HCOF slurry solids Hg content (ppm)	0.61	0.61	0.37	0.85
HCOF slurry liquid mass flow rate (kpph)	173	181	129	265
HCOF slurry filtrate Hg content (μg/L)	65.1	65.1	51.9	72.3
Hg input from HCOF slurry (mg/sec)	**2.31**	**2.41**	**1.47**	**3.73**
Non-ozone Season Test No	**1**	**2**	**3**	**4**
HCOF slurry mass flow rate (kpph)	146	116	251	61
HCOF slurry solids mass flow rate (kpph)	3.3	3.0	4.0	58
HCOF slurry solids Hg content (ppm)	2.51	2.48	4.51	1.03
HCOF slurry liquid mass flow rate (kpph)	143	113	247	3.0
HCOF slurry filtrate Hg content (μg/L)	5.6	<1.0	3.3	1.8
Hg input from HCOF slurry (mg/sec)	**1.15**	**0.95**	**2.40**	**0.40**

D. Mercury input from ME wash water

The ME wash water came from the service water used at the plant. Its volumetric flow rate was assumed to be 500 gpm, based on the design rate of 1.0 gpm/MW gross capacity. The mass flow rate was calculated to be 263 kpph.

The ME wash water samples all were below the detection limit for mercury. To perform

the mass balance, a value of ½ the detection limit was assumed for the concentration of mercury in the ME wash water. Summarized in Table 46 are the mercury inputs from the ME wash water entering the FGD. The mercury input from the ME wash water was 0.17 mg/sec.

Table 46. Mercury input from ME wash water (values are the same for ozone season and non-ozone season tests)

Test No.	1	2	3	4
ME wash water mass flow rate (gpm)	500	500	500	500
ME wash water mass flow rate (kpph)	263	263	263	263
ME wash water Hg content (μg/L)	0.5	0.5	0.5	0.5
Hg input from ME wash water (mg/sec)	**0.17**	**0.17**	**0.17**	**0.17**

E. Mercury input from FGD makeup water

The FGD makeup water is treated ash pond water that is pumped into the FGD to compensate for the loss of water in the FGD due to evaporation and water lost in the FGD blowdown. To calculate the mass flow rate of the makeup water, it is necessary to perform a water balance around the FGD. Water enters the FGD in the flue gas (due to the moisture and hydrogen content of the coal), limestone slurry, FGD makeup, HCOF slurry, and ME wash water. Water leaves the FGD via FGD slurry blowdown and the stack flue gas.

The mass (and volumetric) flow rate of water in the flue gas from coal was calculated based on the coal-firing rate provided by plant personnel and the coal properties (Tables 14-15). The flow rate of water from limestone slurry was calculated based on the limestone feed rate and the limestone slurry properties (Tables 17-20). The flow rate of water from HCOF slurry was calculated and the results were summarized in Table 45. The flow rate of ME wash water was assumed to be the design rate of 500 gpm. The sum of the volumetric flow rates of these four streams and the FGD makeup water is the water input to the FGD.

The water loss via the moisture-saturated flue gas leaving the stack was calculated based on the flue gas moisture content measured as part of the Ontario-Hydro method. The flow rate of FGD slurry was calculated based on the amount of SO_2 removed in the FGD and the slurry properties. The sum of the flow rates of these two streams is the water output from the FGD.

The FGD makeup water flow rate is the difference between the water output and the sum of the flow rates from flue gas, limestone slurry, ME wash water and HCOF slurry. The results of analyses of the makeup water samples were summarized previously in

Tables 29-30. Summarized in Table 47 are the mass flow rate and the mercury inputs from the FGD makeup water entering the FGD.

Table 47. Mercury input from FGD makeup water

Ozone Season Test No.	1	2	3	4
Mass flow rate of water from coal (kpph)	194	186	194	187
Volumetric flow rate of water from coal (gpm)	370	355	370	357
Volmetric flow rate of limestone slurry (gpm)	192	199	189	202
Volumetric flow rate of ME wash water (gpm)	500	500	500	500
Volumetric flow rate of HCOF slurry (gpm)	345	360	262	520
Volumetric flow rate of FGD slurry (gpm)	1,614	1,504	1,502	1,626
Stack water loss (gpm)	1,432	1,304	1,297	1,384
Volumetric flow rate of FGD makeup water (gpm)	1,639	1,395	1,477	1,432
Mass flow rate of FGD makeup water (kpph)	862	733	776	752
Hg content in FGD makeup water (μg/L)	<1.0	<1.0	<1.0	<1.0
Hg input from FGD makeup water (mg/sec)	**0.054**	**0.046**	**0.049**	**0.047**
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Mass flow rate of water from coal (kpph)	198	208	193	209
Volumetric flow rate of water from coal (gpm)	376	398	368	397
Volmetric flow rate of limestone slurry (gpm)	213	182	187	185
Volumetric flow rate of ME wash water (gpm)	500	500	500	500
Volumetric flow rate of HCOF slurry (gpm)	273	218	469	113
Volumetric flow rate of FGD slurry (gpm)	1132	1232	1275	1209
Stack water loss (gpm)	1328	1243	1290	1338
Volumetric flow rate of FGD makeup water (gpm)	1098	1177	1041	1351
Mass flow rate of FGD makeup water (kpph)	577	618	547	710
Hg content in FGD makeup water (μg/L)	<1.0	<1.0	1.1	<1.0
Hg input from FGD makeup water (mg/sec)	**0.036**	**0.039**	**0.076**	**0.063**

E. Mercury output via bottom ash

The rate of bottom ash leaving the plant was calculated based on the information provided by a plant engineer that 20 percent of the coal ash ended up as bottom ash. The results of analyses of the four bottom ash samples collected at the end of each test were previously summarized in Table 16. Since the concentration of the mercury found in the bottom ash samples was below the detection limit of 0.004 ppb, one half of the value of the detection limit was used to calculate the mass flow rate of mercury. For the November tests, the mercury content of the bottom ash was assumed to be less than 0.004 ppb. The mercury output via the bottom ash from each test was calculated and the results are summarized in Table 48. The mercury output via bottom ash was less than 0.0035 mg/sec.

Table 48. Mercury output via bottom ash

Ozone Season Test No.	**1**	**2**	**3**	**4**
Coal feed rate (kpph)	440	439	431	428
Coal moisture content (%)	5.5	5.61	5.99	5.88
Coal ash content (%, dry)	14.7	14.5	13.0	12.0
Bottom Ash/Coal Ash (wt/wt)	0.2[a]			
Bottom ash mass flow rate (kpph)	12.3	12.0	10.7	9.66
Bottom ash Hg content (ppm, as det'd)	< 0.004	< 0.004	< 0.004	< 0.004
Hg output via bottom ash (mg/sec)	**0.0031**	**0.0031**	**0.0027**	**0.0024**
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Coal feed rate (kpph)	462	450	448	457
Coal moisture content (%)	4.79	5.03	4.00	4.59
Coal ash content (%, dry)	13.1	12.64	12.3	12.9
Bottom Ash/Coal Ash (wt/wt)	0.2[a]			
Bottom ash mass flow rate (kpph)	11.5	10.8	10.6	11.3
Bottom ash Hg content (ppm, assumed)	< 0.004	< 0.004	< 0.004	< 0.004
Hg output via bottom ash (mg/sec)	**0.0029**	**0.0028**	**0.0027**	**0.0029**

[a] – value provided by a plant engineer

F. Mercury output via ESP ash

For material balance calculations, the average ESP ash mercury value was employed. The hoppers were arranged in a 4 x 4 pattern (four fields x 4 hoppers in each field). About 90% of the total ash from coal was collected in the hoppers in the first field hoppers and the balance (10% the ash) was collected from the remaining three fields. The average value was calculated according to the following formula provided by a plant engineer:

0.90 x (average value from samples collected from the four hoppers in the first field) + 0.10 x (average value from samples collected from hoppers in the other fields)

The mercury output via the ESP ash from the August tests were calculated and the results are summarized in Table 49. The mercury output via the ESP hopper ash ranged from 0.22 to 0.33 mg/sec. No ESP ash samples were collected in November.

Table 49. Mercury output via ESP ash.

Ozone Season Test No.	1	2	3	4
Coal feed rate (kpph)	440	439	431	428
Coal moisture content (%)	5.50	5.61	5.99	5.88
Coal ash content (%, dry)	14.7	14.5	13.0	12.0
Coal ash fraction going to ESP	0.80[a]			
ESP Ash mass flow rate (kpph)	49.66	48.7	43.34	39.09
ESP ash Hg content (ppm as det'd)	0.052	0.045	0.040	0.035
Hg output via ESP ash (mg/sec)	**0.33**	**0.27**	**0.22**	**0.17**

[a] – value provided by a plant engineer

G. Mercury output via FGD slurry

The mass flow rate of the FGD slurry was calculated based on the amount of SO_2 removed in the FGD. The amount of SO_2 removed in the FGD was the amount of SO_2 from coal minus the sum of the amounts of SO_2 in the bottom ash and ESP ash. The amount of limestone stoichiometrically required to neutralize the dissolved SO_2 in the scrubbing liquor was calculated based on the amount of SO_2 removed in FGD. Using the design limestone utilization rate of 99% (i.e., Ca/S ratio = 1.01), the actual limestone feed rate was calculated. Using CaO as a tracer element and the FGD slurry properties (Tables 25-28), the mass flow rate of the slurry leaving the FGD and the mercury output via the FGD slurry were calculated. The results are summarized in Table 50. The mercury output via FGD slurry ranged from 3.80 to 5.08 mg/sec.

Table 50. Mercury output via FGD slurry

Ozone Season Test No.	1	2	3	4
Coal feed rate (kpph)	440	439	431	428
Coal moisture content (%)	5.50	5.61	5.99	5.88
Coal sulfur content, (%, dry)	3.57	3.72	3.61	3.88
FGD sulfur input (kpph)	14.7	15.2	14.6	15.5
Ca/S ratio	1.01			
FGD slurry mass flow (blowdown) rate (kpph)	864	799	798	865
FGD slurry Hg content (ppb)	39.8	50.4	37.8	37.0
Hg output via FGD slurry (mg/sec)	**4.33**	**5.08**	**3.80**	**4.03**
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Coal feed rate (kpph)	462	450	448	457
Coal moisture content (%)	4.79	5.03	4.00	4.59
Coal sulfur content, (%, dry)	3.59	3.60	3.79	3.68
FGD sulfur input (kpph)	15.3	14.9	15.8	15.6
Ca/S ratio	1.01			
FGD slurry mass flow (blowdown) rate (kpph)	606	653	679	641
FGD slurry Hg content (ppb)	66.5	52.0	53.4	59.3
Hg output via FGD slurry (mg/sec)	**5.08**	**4.28**	**4.57**	**4.79**

H. Heat input-based mercury emission

The heat input based mercury emission rates were calculated by using the Ontario-Hydro data and the heat input to the boiler, and the results are summarized in Table 51. The mercury emissions ranged from 1.70 to 2.27 Ib/TBtu with an average emission rate of 1.77 Ib/TBtu during the ozone season tests. The mercury emissions ranged from 2.01 to 3.11 Ib/TBtu with an average emission rate of 2.34 Ib/TBtu during the ozone season tests.

Table 51. Heat input-based mercury emission

Ozone Season Test No.	1	2	3	4
Stack Total Hg [μg/m^3]	2.66	1.66	2.07	2.03
Stack Flow [DSCMM]	33,100	33,100	32,100	32,700
Stack Hg Flow [mg/sec]	1.47	0.92	1.11	1.10
Stack Hg Flow [lb/hr]	1.17×10^{-2}	7.26×10^{-3}	8.80×10^{-3}	8.73×10^{-3}
Heat Input (MM Btu/Hr)	5,132	5,116	5,184	5,127
Stack Hg Emissions (lb/TBtu)	2.27	1.42	1.70	1.70
Average Stack Hg Emissions (lb/TBtu)	**1.77**			
Non-ozone Season Test No.	**1**	**2**	**3**	**4**
Stack Total Hg [μg/m^3]	2.81	2.49	2.56	3.90
Stack Flow [DSCMM]	32,700	33,000	33,100	33,100
Stack Hg Flow [mg/sec]	1.53	1.37	1.41	2.15
Stack Hg Flow [lb/hr]	1.21×10^{-2}	1.09×10^{-2}	1.12×10^{-2}	1.71×10^{-2}
Heat Input (MM Btu/Hr)	5,521	5,406	5,461	5,479
Stack Hg Emissions (lb/TBtu)	2.20	2.01	2.05	3.11
Average Stack Hg Emissions (lb/TBtu)	**2.34**			

I. Mercury material balance closure

The mercury material balance closure (expressed in %) is the total mercury output from the unit divided by the total mercury input. The total mercury input is the sum of the mass flow rates of mercury entering the unit from coal, limestone slurry, hydroclone overflow slurry, ME wash water, and FGD makeup water. The total mercury output is the sum of the mass flow rates of mercury leaving the unit through bottom ash, ESP hopper ash, FGD slurry, and stack flue gas. Because no bottom ash or ESP ash samples were collected in November, the average values from the August tests were used to estimate the mercury balance for the November tests. Tables 52 and 53 summarize the results of the mercury material balance closure calculations. For the four tests conducted during ozone season, the calculated mercury material balance closures ranged from 90% to 129% with an average of 107%. For the four tests conducted during non-ozone season, the calculated mercury material balance closures ranged from 77% to 102% with an average of 87%. The mercury material balance closures for all individual tests are within the QA/QC criterion of 70-130% for a single

test. The average mercury material balance closures of 107% and 87% are within the QA/QC criterion of 80-120% for multiple tests.

Table 52. Summary of material balance closure for mercury, ozone season tests.

Test No.	1	2	3	4
Hg input from Coal (mg/sec)	8.03	7.30	6.68	6.15
Hg input limestone slurry (mg/sec)	0.017	0.017	0.016	0.017
Hg input from FGD makeup water (mg/sec)	0.054	0.046	0.049	0.047
Hg input from ME wash water (mg/sec)	0.017	0.017	0.017	0.017
Hg input from hydroclone overflow solids (mg/sec)	0.89	0.93	0.53	1.32
Hg input from hydroclone overflow filtrate (mg/sec)	1.42	1.48	0.94	2.41
Total Hg Input (mg/sec)	10.4	9.79	8.24	9.96
Hg output via Bottom Ash (mg/sec)	0.0031	0.0031	0.0027	0.0024
Hg output via ESP Hopper Ash (mg/sec)	0.33	0.27	0.22	0.17
Hg output via FGD Slurry Solids (mg/sec)	4.33	5.08	3.8	4.03
Hg output via FGD Slurry Filtrate *mg/sec)	3.24	3.48	5.5	5.45
Hg output via stack gas (mg/sec)	1.47	0.92	1.11	1.10
Total Hg Output (mg/sec)	9.37	9.76	10.6	10.8
Hg Material Balance Closure (output / input)	90%	100%	129%	108%
Average Hg Material Balance Closure (%)	**107 ± 17 %**			

Table 53. Summary of material balance closure for mercury, non-ozone season tests.

Test No.	1	2	3	4
Hg input from Coal (mg/sec)	7.09	5.84	5.59	6.50
Hg input limestone slurry (mg/sec)	0.072	0.052	0.059	0.053
Hg input from FGD makeup water (mg/sec)	0.036	0.039	0.076	0.063
Hg input from ME wash water (mg/sec)	0.017	0.017	0.017	0.017
Hg input from hydroclone overflow solids (mg/sec)	1.05	0.94	2.30	0.38
Hg input from hydroclone overflow filtrate (mg/sec)	0.100	0.007	0.103	0.013
Total Hg Input (mg/sec)	8.37	6.90	8.14	7.04
Hg output via Bottom Ash (mg/sec)	0.0029	0.0028	0.0027	0.0029
Estimated Hg output via ESP Hopper Ash (mg/sec)	0.25	0.25	0.25	0.25
Hg output via FGD Slurry Solids (mg/sec)	4.77	3.98	4.38	4.44
Hg output via FGD Slurry Filtrate *mg/sec)	0.32	0.30	0.18	0.35
Hg output via stack gas (mg/sec)	1.53	1.37	1.41	2.15
Total Hg Output (mg/sec)	6.86	5.90	6.23	7.19
Hg Material Balance Closure (output / input)	82%	86%	77%	102%
Average Hg Material Balance Closure (%)	**87 ± 11 %**			

J. Material balance closure for SiO_2, Al_2O_3 and CaO

The material balance closures for three major ash oxides, SiO_2, Al_2O_3, and CaO were calculated for the ozone season tests in the same manner as for the mercury balances. The same balance calculations could not be completed for the non-ozone season tests because of the absence of ESP ash samples during those tests. Summarized in Tables 54 to 56 are the results of the material balance closures for these three oxides. The material balance closures for SiO_2, Al_2O_3 and CaO ranged from 100% to 112%, 103% to 107%, and 101% to 102% respectively. The average values of the material balance closures for SiO_2, Al_2O_3 and CaO are 105%, 105% and 102% respectively. The material balance closures for SiO_2, Al_2O_3 and CaO are within the QA/QC criteria.

The fact that the material balance closures for mercury, SiO_2, CaO, and Al_2O_3 fall in the acceptable range of 80-120% indicate that the overall data quality is acceptable.

Table 54. Summary of material balance closure for SiO_2.

Test No.	1	2	3	4
SiO_2 input from coal (kpph)	29.5	28.3	24.7	21.0
SiO_2 input from limestone slurry (kpph)	1.97	2.02	1.83	1.92
SiO_2 input from hydroclone overflow soldis (kpph)	0.77	0.8	0.56	1.03
Total SiO_2 Input (kpph)	32.2	31.1	27.1	23.9
SiO_2 Output via bottom ash (kpph)	5.99	5.88	5.15	4.65
SiO_2 Output via ESP hopper ash (kpph)	23.5	23.7	20.9	19.1
SiO_2 output via FGD slurry (kpph)	2.73	2.63	2.74	2.88
Total SiO_2 Output (kpph)	32.2	32.12	28.8	26.7
SiO_2 Material Balance Closure (output / input)	100%	103%	106%	112%
Average SiO_2 Material Balance Closure (%)	**105 ± 5 %**			

Table 55. Summary of material balance closure for Al_2O_3.

Test No.	1	2	3	4
Al_2O_3 input from coal (kpph)	11.6	11.2	10.0	9.60
Al_2O_3 input from limestone slurry (kpph)	0.10	0.10	0.11	0.11
Al_2O_3 input from hydroclone overflow solids (kpph)	0.08	0.08	0.05	0.11
Total Al_2O_3 Input (kpph)	11.8	11.4	10.2	9.83
Al_2O_3 Output via bottom ash (kpph)	2.33	2.28	2.10	1.90
Al_2O_3 Output via ESP hopper ash (kpph)	9.63	9.43	8.58	7.99
Al_2O_3 output via FGD slurry (kpph)	0.24	0.21	0.23	0.24
Total Al_2O_3 Output (kpph)	12.2	11.9	10.9	10.1
Al_2O_3 Material Balance Closure (output / input)	104%	105%	107%	103%
Average Al_2O_3 Material Balance Closure (%)	**105 ± 2 %**			

Table 56. Summary of material balance closure for CaO.

Test No.	1	2	3	4
CaO input from coal (kpph)	2.79	2.83	2.52	1.84
CaO input from limestone slurry solids (kpph)	23.3	24.3	23.0	24.5
CaO input from limestone slurry filtrate (kpph)	0.01	0.01	0.01	0.01
CaO input from ME wash water (kpph)	0.04	0.04	0.04	0.04
CaO input from FGD makeup water (kpph)	0.07	0.06	0.06	0.06
CaO input from hydroclone overflow solids (kpph)	4.11	4.28	4.06	4.33
CaO input from hydroclone overflow filtrate (kpph)	0.24	0.25	0.17	0.39
Total CaO Input (kpph)	30.6	31.8	29.9	31.2
CaO output via bottom ash (kpph)	0.58	0.57	0.46	0.41
CaO output via ESP hopper ash (kpph)	2.12	2.09	1.74	1.5
CaO output via FGD slurry solids (kpph)	27.4	28.6	27.1	28.9
CaO output via FGD slurry filtrate (kpph)	0.97	0.98	0.96	1.0
Total CaO Output (kpph)	31.1	32.2	30.2	31.8
CaO Material Balance Closure (output / input)	102%	101%	101%	102%
Average CaO Material Balance Closure (%)	**102 ± 0 %**			

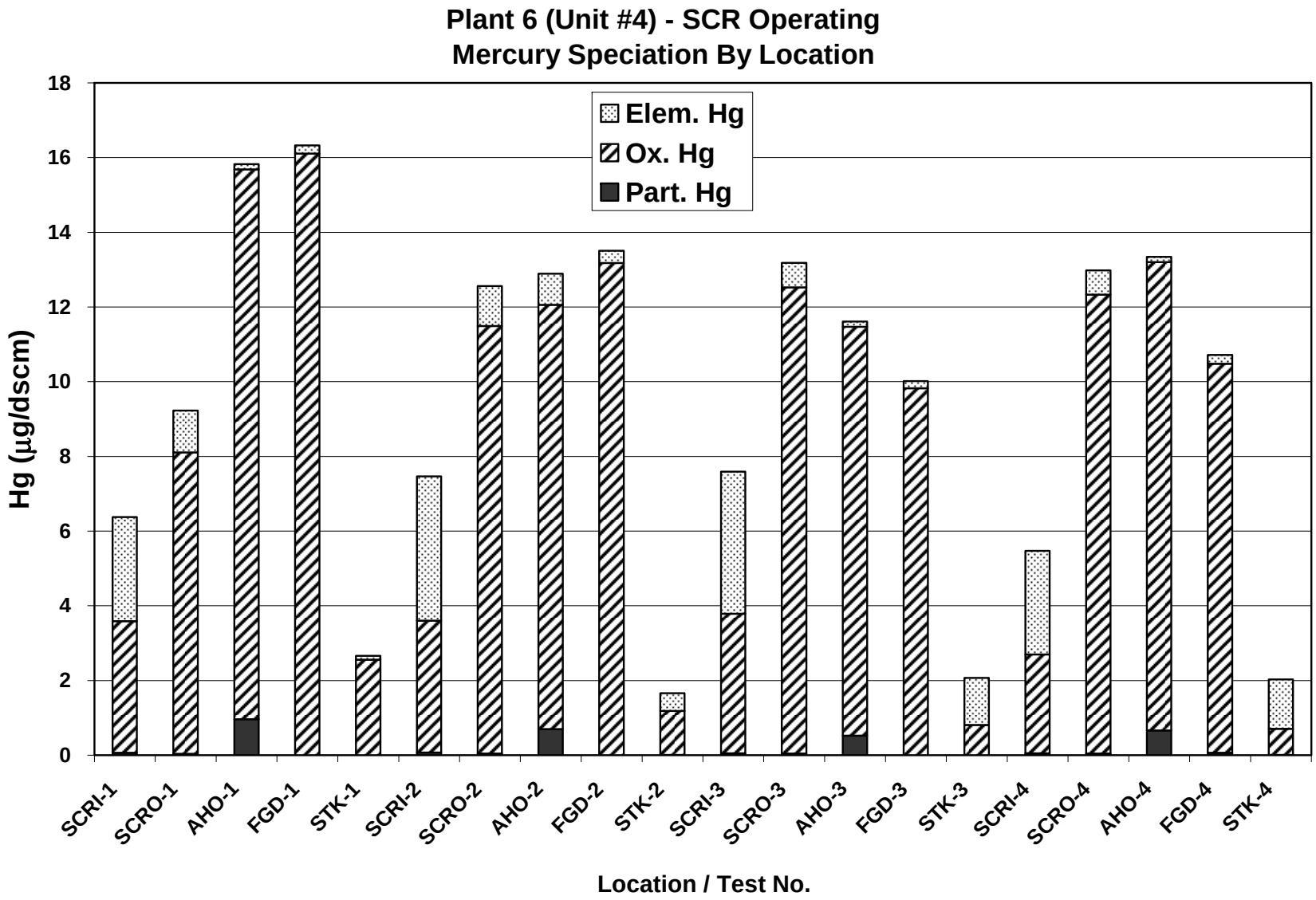


Figure 1. Mercury speciation by location, August 2004 tests (with SCR)

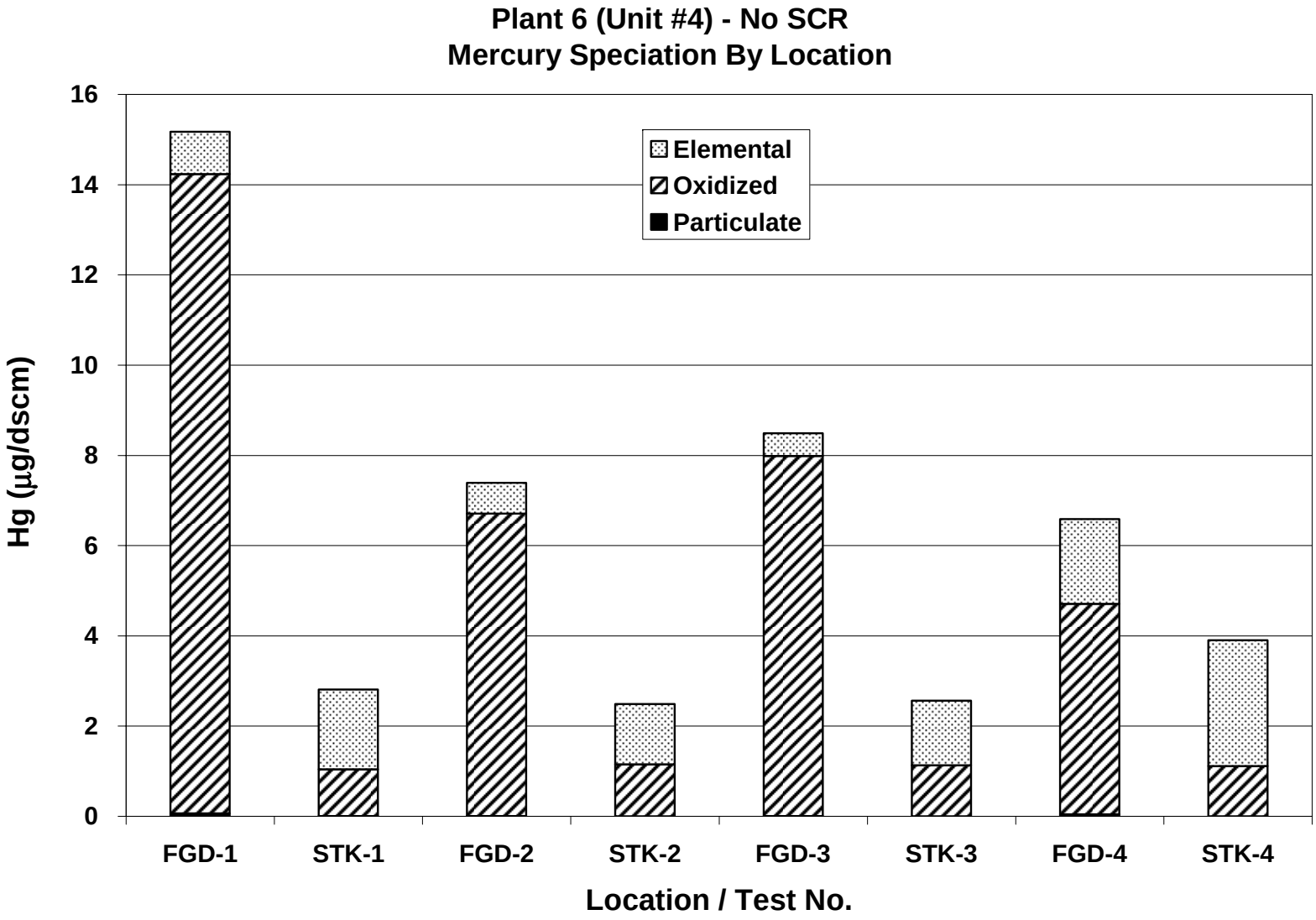


Figure 2. Mercury speciation by location, November 2004 tests (no SCR)

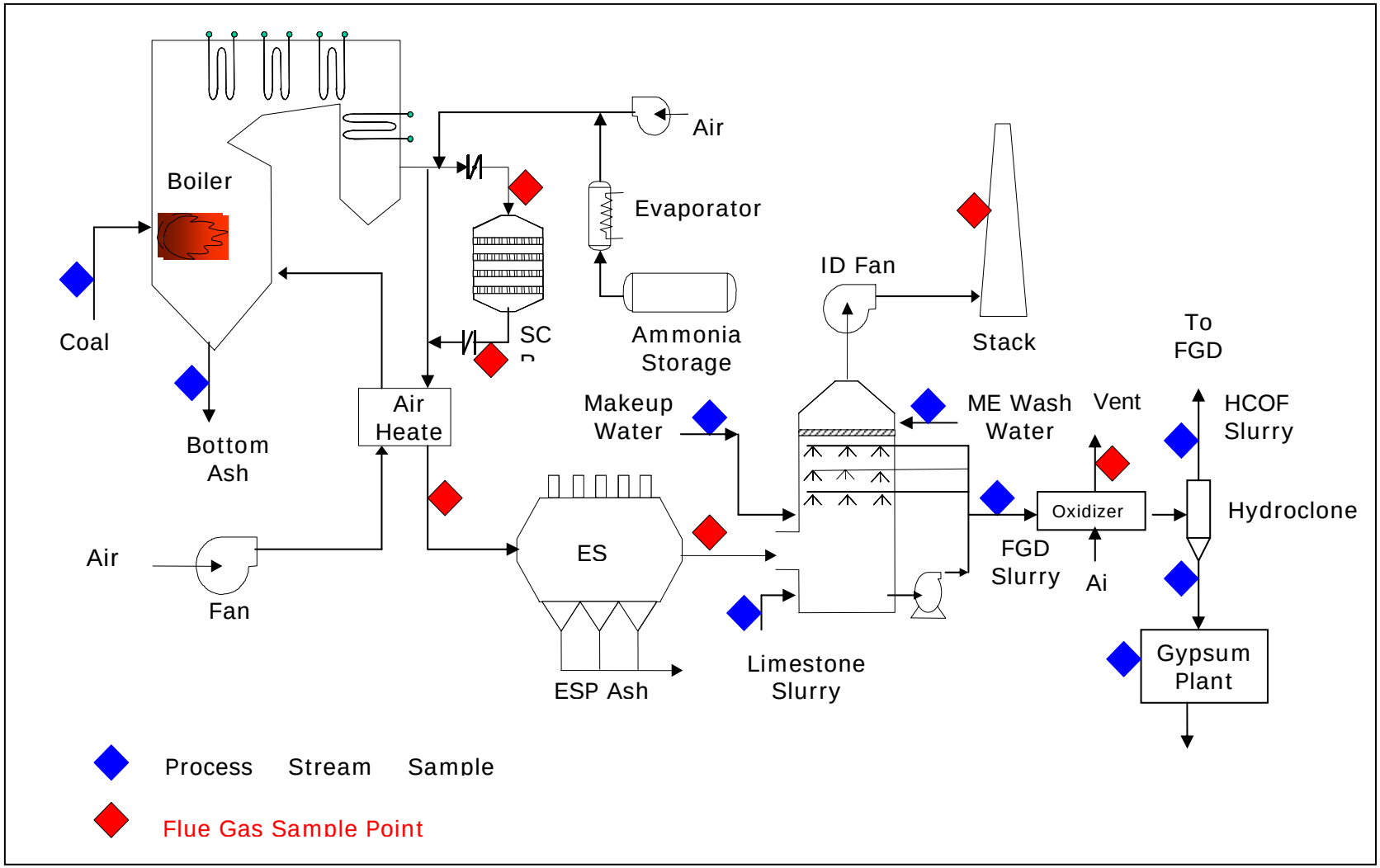


Figure 3. Process flow schematic and sampling locations

Figure 4. SCR inlet mercury sampling train

Figure 5. SCR outlet mercury sampling train

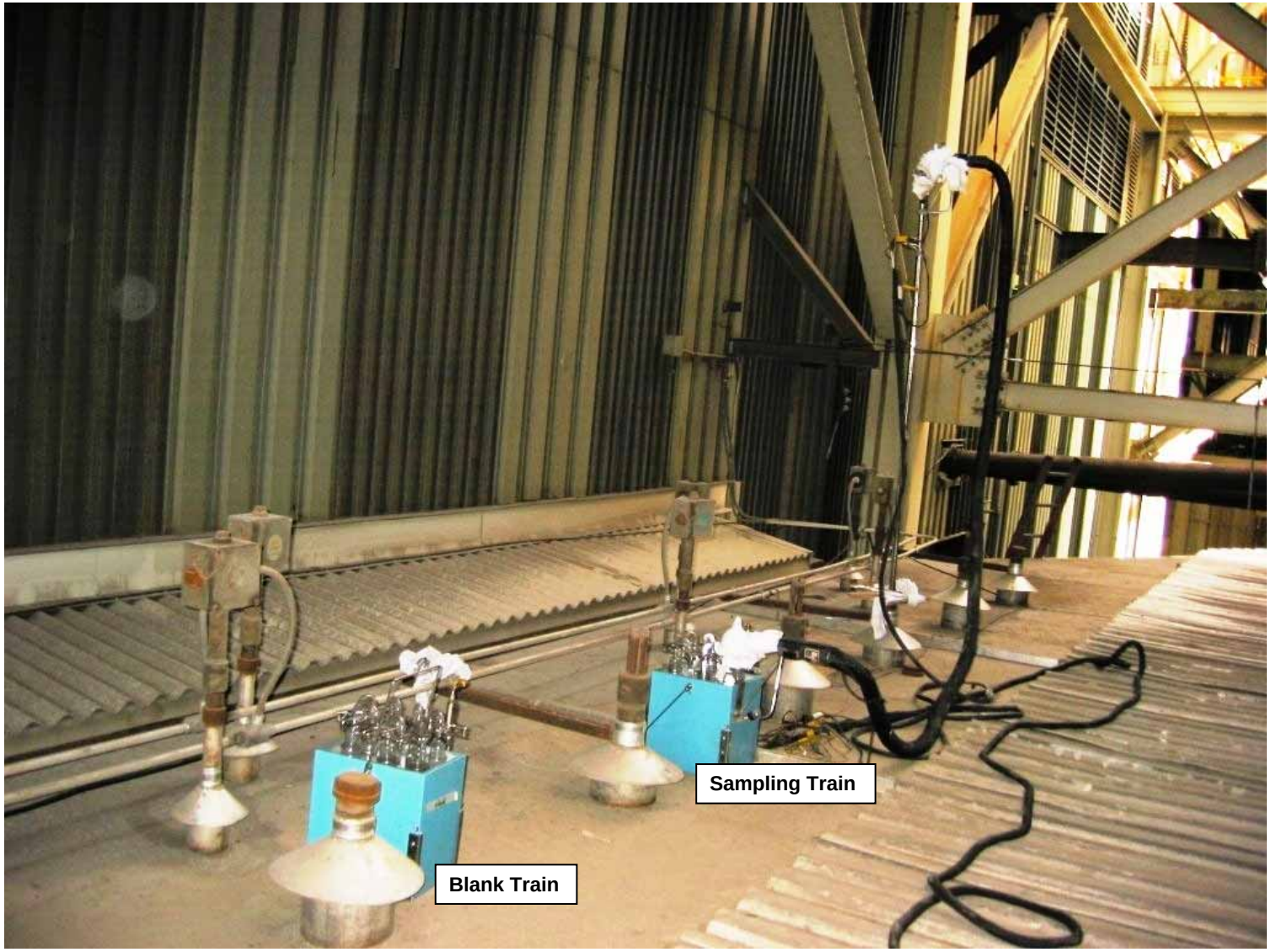


Figure 6. Air heater outlet mercury sampling train and blank train

Figure 7. FGD inlet mercury sampling train

Figure 8. Stack sampling location

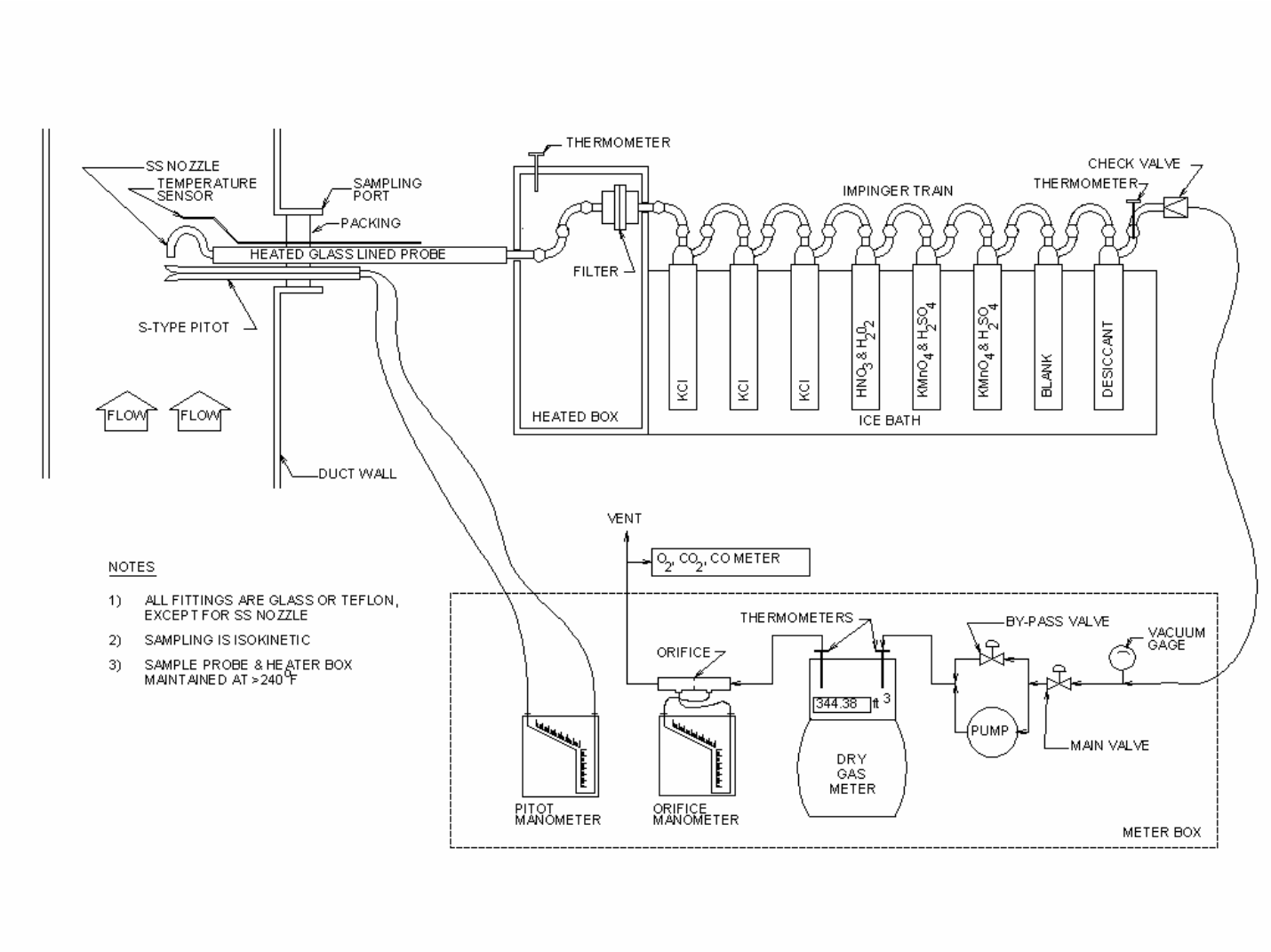


Figure 9. Ontario-Hydro sampling train schematic

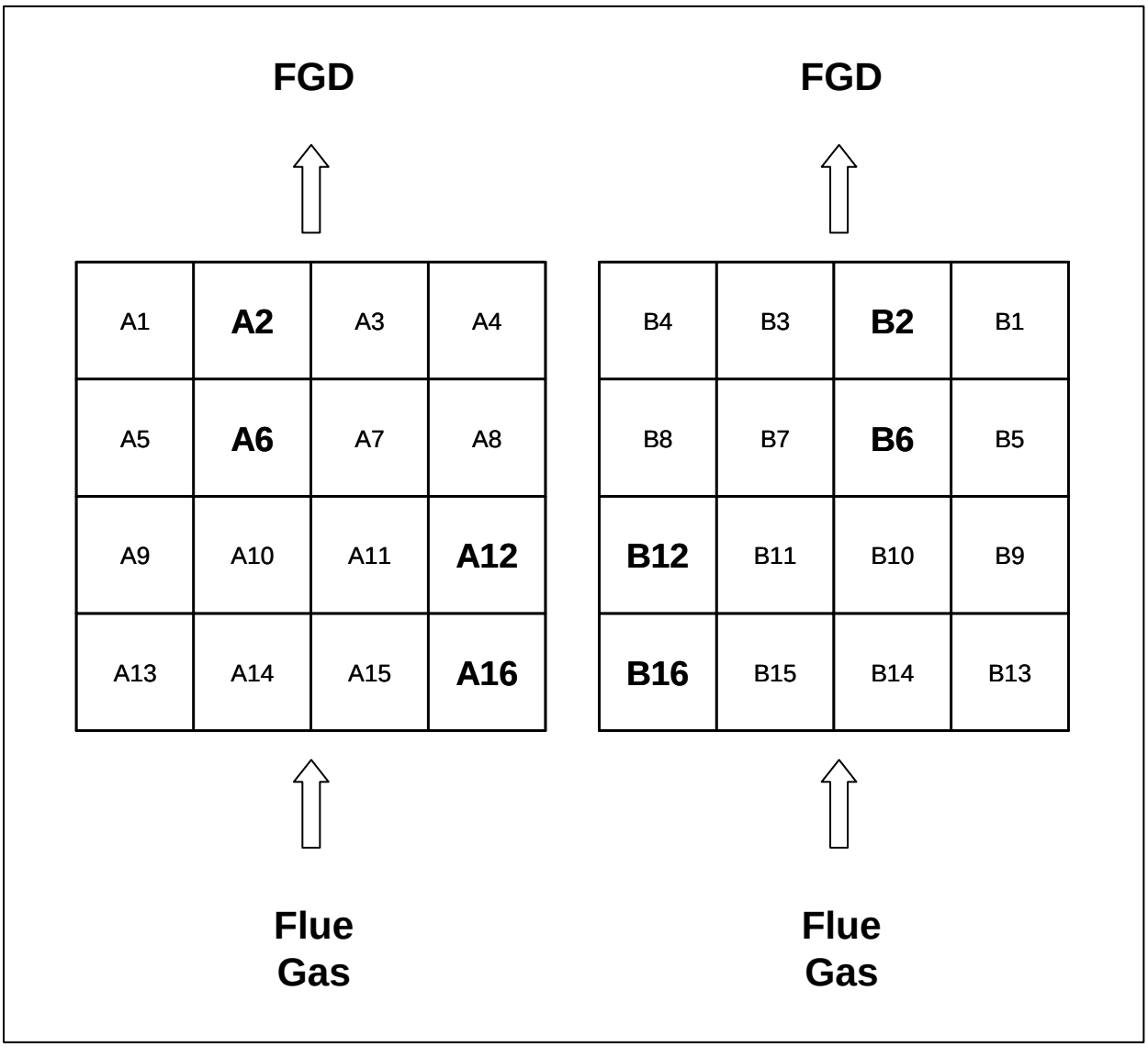


Figure 10. Layout of ESP hoppers

Figure 11. ESP ash hopper sampling

Figure 12. Ash sampling thief

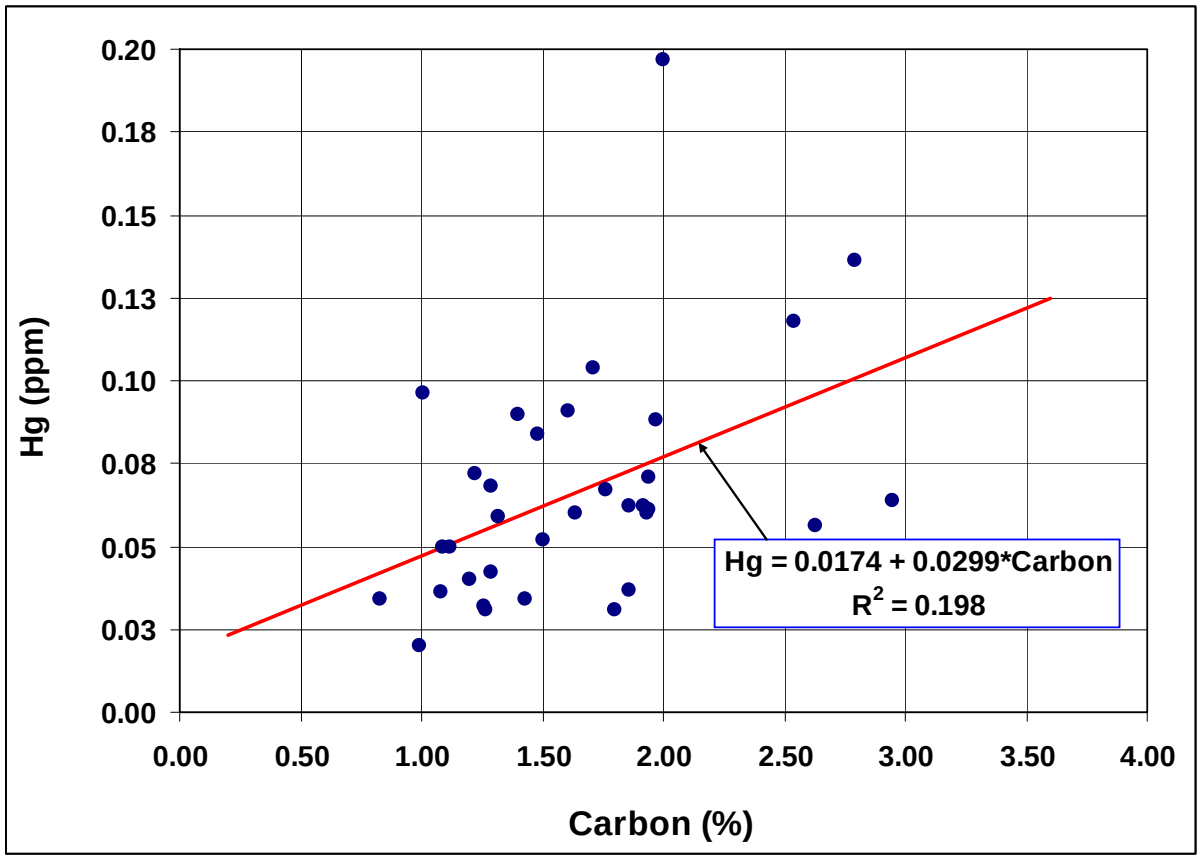


Figure 13. ESP ash mercury vs. carbon plot

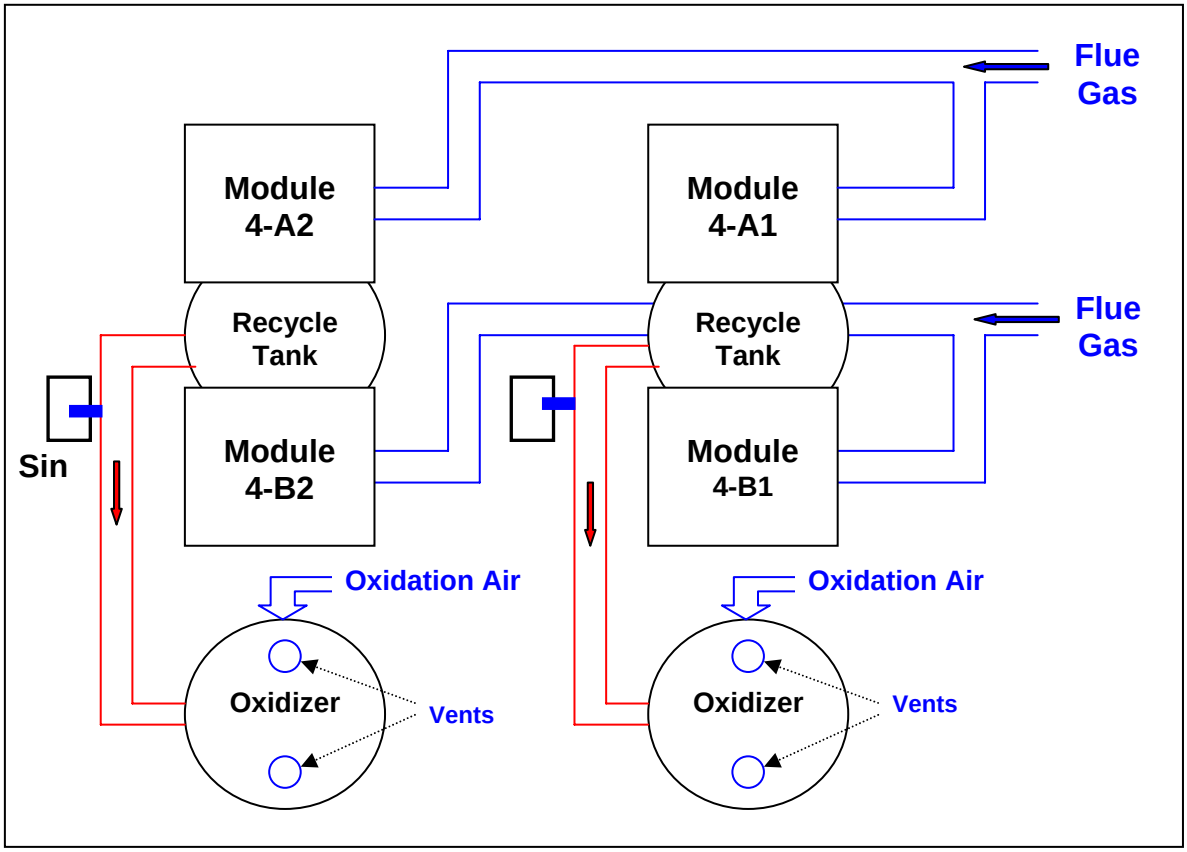


Figure 14. Layout of FGD modules

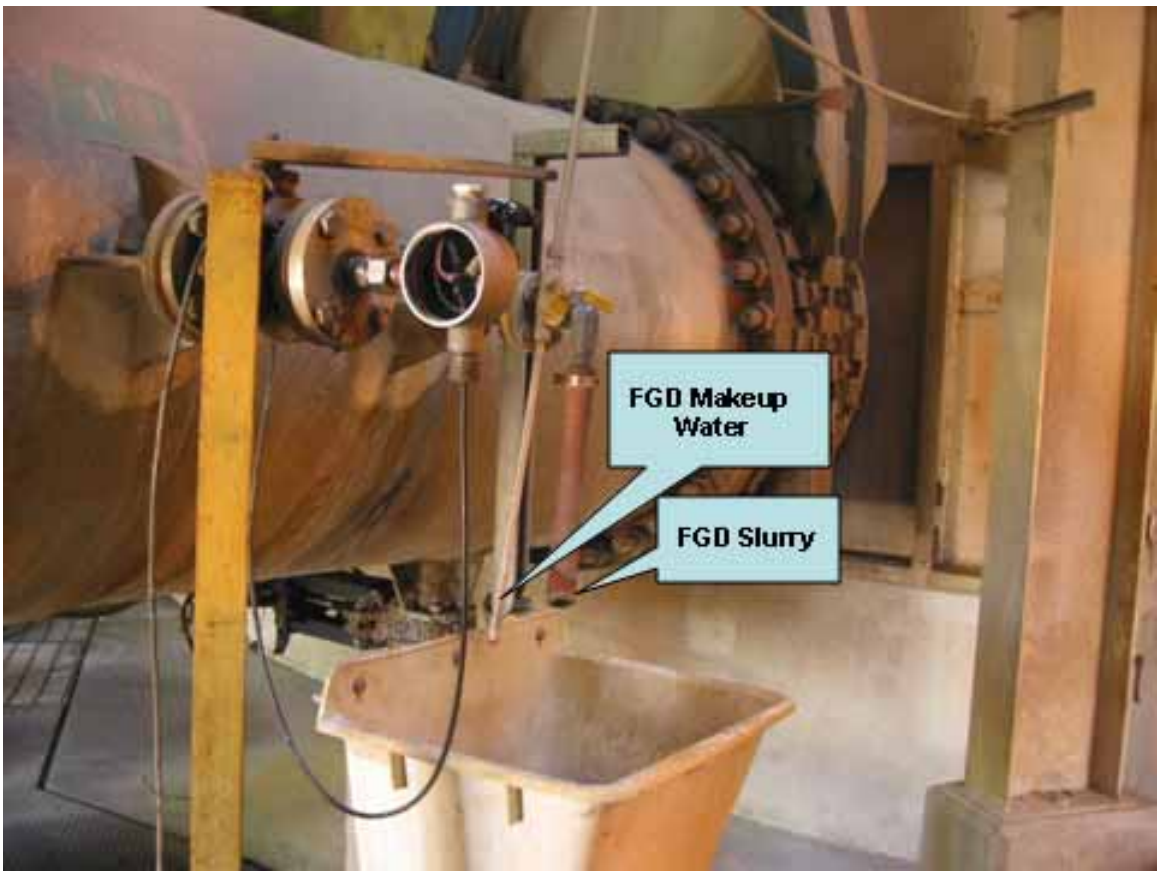


Figure 15. FGD slurry and makeup water sampling locations

APPENDIX A

Mercury Sampling Data

- Field Data Sheets
- Mercury Measurement Data Sheets

APPENDIX B

Plant Process Data

APPENDIX C

Flue Gas Mercury Data

- Summary of Ontario-Hydro Impinger Analyses Data Sheets
- Recovery Data Sheets

APPENDIX D

Process Material Data

- Coal Analysis Data Sheets
- Bottom Ash Analysis Data Sheets
- Limestone Slurry Solids Analysis Data Sheets
- Limestone Slurry Filtrate Analysis Data Sheets
- Ash Analysis Data Sheets
- FGD Slurry Solids Analysis Data Sheets
- FGD Slurry Filtrate Data Sheets
- FGD Makeup Water Analysis Data Sheets

APPENDIX A

Mercury Sampling Data

- Field Data Sheets
- Mercury Measurement Data Sheets

(#1)

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page _____ of _____

TEST ID	SCRI -	METER BOX	N-3	CAL. DATA: delta H	1.916	Comments:	Single Point in all three ports. Ten minute
PLANT	Plant 6	PITOT TUBE DESC	E-5	Y	1.038		Readings.
LOCATION	SCR INLET	PROBE LENGTH [ft]	8	C(p)	0.832		
DATE	8/12/04	NOZZLE ID [inch]	¼" E 0.243	FILTER BOX SETTING	NA		
OPERATOR(S)	LWK, RMO	%H_2O (Assumed)	6	PROBE HTR SETTING	325		
AMBIENT TEMP [°F]		FILTER ID	1,2,3	DUCT X-SECTION	circ ? (rect ?)	other:	
BAR. PRESS. [" Hg]	29.43	K FACTOR	1.803	DUCT DIMENSIONS		DUCT AREA	

ΔP ΔH (6) (7) (1) (2) (3)

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1130	0					[illegible]								
	1140	10	0.40	[illegible]	0.72	5.5	[illegible]	91	86	699	348	[illegible]	62	—	
B	1152	20		0.40	0.72	7	462.1 → 466.70	93	87	700	349	leak test	61	3.5	
6"	1202	30		0.40	0.72	10	471.08	94	88	699	360		61	3.5	
6"	1212	40		0.40	0.72	15	475.47	95	88	695	358		62	3.5	
-18"	1227						475.90					change filter			
nipple															
	1237	50		0.40	0.72	6	480.61	96	90	697	354		62	3.5	
B	1247	60		0.40	0.72	9	484.99	98	91	699	357		61	3.4	
1-18"	1257	70		0.40	0.72	12	489.45	98	92	699	359		61	3.5	
6"	1307	80		0.40	0.72	17	493.79	98	92	699	356		62	3.5	
nipple	1322						495.30					change filter			
	[illegible]	90		0.40	0.72	7	499.75	98	93	702	352		65	3.4	
2	1342	100		0.40	0.72	9	[illegible] 504.09	99	93	703	355		61	3.4	
1	1352	110	-6.60	0.40	0.72	14	508.47	99	93	703	355		60	3.5	
	1402	120		0.40	0.72	17	512.74	99	93	701	357		61	3.6	
												Purge 10 min after test			
AVERAGE		120	-6.6	0.40	0.72		53.65	93.5		700				3.48	

Sample Train Leak Checks: Pre Test <0.01 ft^3 @ 9 in. Hg; Post Test <0.01 ft^3 @ 12 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test OK @ 8 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	SCRO - ONE
PLANT	Plant 2 C
LOCATION	SCR OUTLET
DATE	8/12/04
OPERATOR(S)	JRW SCT
AMBIENT TEMP [°F]	65
BAR. PRESS. [" Hg]	29.43

METER BOX	N-2
PITOT TUBE DESC	E-15
PROBE LENGTH [ft]	8
NOZZLE ID [inch]	~~.384~~ 0.374
%H_2O (Assumed)	6
FILTER ID	5
K FACTOR	9.80

CAL. DATA: delta H	1.456		
Y	0.976		
C(p)	0.838		
FILTER BOX SETTING	NA		
PROBE HTR SETTING	325		
DUCT X-SECTION	circ ?	rect ?	other:
DUCT DIMENSIONS		DUCT AREA	

Comments: Single point in ports B, D, and F. Ten minute Readings. 1 and 11

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING 148.55 [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]	
	11:30	0					194.01									O_2 before & after leak check
~~B~~ -84"	11:40	10		0.03	0.28	3.0	201.97	71	71	662	302	NA	43	3.1	16.8	
	11:50	20	-10.0	0.03	0.28	3.5	204.87	70	71	677	292	NA	41	3.3	16.6	
	12:00	30		0.03	0.28	4.0	207.72	71	71	679	291	NA	41	3.3	16.6	
		~~40~~		leak check: lead stop @ -12"												
	12:09						~~208.21~~									
F	12:19	40		0.05	0.47	4.5	211.95	73	72	673	283	NA	41	3.2	16.7	20.9 OK
	12:29	50	-10.0	0.04	0.37	5.0	215.30	74	72	679	287	NA	41	3.5	16.5	
	12:39	60		0.04	0.37	6.5	218.59	73	72	679	281	NA	41	3.3	16.6	
		~~70~~		leak check: lead stop @ -12"												
~~D~~	12:49	~~80~~					219.50									
D	12:56	80		0.06	0.56	3.0	~~22~~3.55	74	73	671	284	NA	43	3.7	16.3	21.0
	13:06	80	-9.8	0.06	0.56	3.0	227.65	74	73	676	289	NA	41	3.7	16.3	OK
	13:16	~~90~~		0.06	0.56	3.0	231.77	75	73	677	295	NA	39	3.7	16.3	
~~B~~		~~100~~														
	13:24	~~110~~					232.70									
B	13:34	~~100~~		0.05	0.47	3.0	236.51	75	74	667	291	NA	40	3.9	16.1	21.0
	13:44	110	-9.9	0.05	0.47	3.0	240.28	76	74	672	288	NA	40	3.9	16.1	OK
	13:54	120		0.05	0.47	3.0	244.05	77	75	673	289	NA	41	3.9	16.1	
AVERAGE				Avg 0.045	0.428		43.71		73.1	673.8				3.54	16.42	

Sample Train Leak Checks: Pre Test lead stop ft³ @ -12 in. Hg; Post Test lead stop ft³ @ -10 in. Hg

Pitot Tube Leak Checks: PreTest OK @ -7" in. H_2O; Post Test _____ @ _____ in. H_2O

NOTE: Purge for 10 minutes at end of sampling.

CONSOLENERGY

Air purge for 10 min @ ΔH = 0.6

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page 1 of 1

TEST ID	AHO - 1	METER BOX	N-5	CAL. DATA: delta H	2.009	Comments: Single point in ports B, D, and E. Ten minute Readings. Two points in Ports C & F Ten minute readings			
PLANT	Plant 6	PITOT TUBE DESC	E-3	Y	1.006				
LOCATION	AIR HEATER OUTLET	PROBE LENGTH [ft]	12 10	C(p)	E 0.846				
DATE	8/12/04	NOZZLE ID [inch]	3/32 D 0.152	FILTER BOX SETTING	NA				
OPERATOR(S)	JL DO	%H_2O (Assumed)	6	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	9 & 10	DUCT X-SECTION	circ ?	rect ?	other:		
BAR. PRESS. [" Hg]	29.43	K FACTOR	0.386	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [°F] inlet	METER TEMP [°F] outlet	STACK TEMP [°F] 1	PROBE TEMP [°F] 2	FILTER BOX [°F]	LAST IMP TEMP [°F] 4	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	11:30	0					513.381								
C-75 -25	11:40	10		1.6	0.62	3.5	517.520	82	83	321	288	NA	61		
C-75 -25	11:50	20	-20.6	1.5	0.58	4.5	521.41	84	84	320	299		49	5.3	14.8
C-75 ~~13~~	12:00	30		1.6	0.58	6.0	525.372	87	85	320	297		52	5.4	14.7
C-75 -~~25~~	12:10	40	-20.1	1.5	0.58	9.5	529.262	88	86	321	308		52	5.4	14.7
C-25 -~~75~~	12:20	50		1.4	0.54	12.0	533.108	88	86	327	311		52		
C-25 ~~-75~~	12:30	60	-20.75	1.4	0.54	15.0	537.065	88	86	327	284		52	4.6	15.6
		~~60~~													
		~~60~~			Leak	Leak	OK @ 15"								
	12:38						537.258								
F-75 ~~-25~~	12:48	70		1.6	~~20.62~~ 3.0			86	85	333	326		60		
F-75 -~~25~~	12:58	80	-20.7	1.6	~~20.62~~ 4.5		545.480	89	86	332	321		54	4.9	15.2
F-75	13:08	90		1.6	0.62	5.5		90	87	338	326		54		
F-75	13:18	100	-20.8	1.6	0.62	8.0	553.593	90	87	340	320		55	4.8	15.3
F-~~25~~	13:28	110		1.6	0.62	10.0	557.678	90	87	339	313		55		
F-~~25~~	13:38	~~120~~ 100	-20.7	1.6	0.62	13.0	561.752	90	86	339	312		55	4.7	15.4
		~~110~~													
		~~120~~		EMS											
AVERAGE		120	-20.6	1.513	0.591		40.18	86.7		330.4				5.0	15.1

Sample Train Pre Test 0.005 ft^3 @ 12 in. Hg
Leak Checks: Post Test 0.012 ft^3 @ 15 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test ____ @ 7 in. H_2O

NOTE: Purge for 10 minutes at end of sampling.

CONSOLENERGY

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page _____ of _____

TEST ID	FGDI- 1	METER BOX	N-1	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.
PLANT	Plant 6	PITOT TUBE DESC	SP-5	Y	0.984		PROBE TC SUSPECT DUE to
LOCATION	FGD INLET	PROBE LENGTH [ft]	12	C(p)			SOLDER (BTWN 100°A)
DATE	8/12/04	NOZZLE ID [inch]	~~7/16 0.189~~ 3/16 A 0.189	FILTER BOX SETTING	NA		* BROKE SUPER PROBE - POST TEST
OPERATOR(S)	GLC/SAK	%H_2O (Assumed)		PROBE HTR SETTING	325		LEAK TESTED FROM HSL BACK - OK
AMBIENT TEMP [°F]	70	FILTER ID	1	DUCT X-SECTION	circ ?	rect ?	other:
BAR. PRESS. [" Hg]	29.43	K FACTOR	~~1.00~~ 0.90	DUCT DIMENSIONS		DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [°F] (6) inlet	METER TEMP [°F] (7) outlet	STACK TEMP [°F] (1)	PROBE TEMP [°F] (2)	FILTER BOX [°F]	LAST IMP TEMP [°F] (4)	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1130	0					647.50								
		10		1.0	0.90	3.0	652.69	78	77	345	325		48	5.6	14.5
		20		1.0	0.90	3.0	657.86	80	78	345	326		48	5.6	14.5
		30		1.0	0.90	3.0	663.00	83	79	345	325		51	5.8	14.3
		40		1.0	0.90	3.0	668.14	85	80	345	326		50	5.4	14.7
		50		1.0	0.90	3.5	673.36	86	81	345	326		50	5.2	14.9
		60		1.0	0.90	3.5	678.51	88	82	345	327		52	5.4	14.7
		70		1.0	0.90	4.0	683.73	89	83	345	326		51	—	—
		80		1.0	0.90	4.0	688.94	90	84	343	325		49	—	—
		90		1.0	0.90	4.0	694.09	90	85	343	326		50	—	—
		100		1.0	0.90	4.0	699.13	90	85	344	325		50	—	—
		110		0.98	0.88	4.5	704.31	91	86	343	325		50	—	—
		120		0.98	0.88	5.0	709.50	92	87	343	326		50		
AVERAGE		12		0.99	0.89		62.0	84.5		344.3				5.50	14.6

Sample Train Pre Test 0 ft^3 @ -10 in. Hg

Leak Checks: Post Test 0 ft^3 @ -10 in. Hg

Pitot Tube PreTest 0 @ 5 in. H_2O

Leak Checks: Post Test _____ @ _____ in. H_2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page _____ of _____

TEST ID	STK - 1	METER BOX	N-4	CAL. DATA: delta H	1.732	Comments:	Four ports, thre points each, 10 minute readings	
PLANT	PLANT 6	PITOT TUBE DESC	@E-2	Y	0.966			
LOCATION	UNIT 1 - STACK	PROBE LENGTH [ft]	6	C(p)	0.837			
DATE	8-12-04	NOZZLE ID [inch]	3/16 E 0.183	FILTER BOX SETTING	250			
OPERATOR(S)	D.C., B.S.	%H2O (Assumed)	12	PROBE HTR SETTING	250			
AMBIENT TEMP [°F]	~70°	FILTER ID	# 1	DUCT X-SECTION	circ ? (rect ?)	other:		
BAR. PRESS. [" Hg]	29.43	K FACTOR	0.954	DUCT DIMENSIONS	19'6"	DUCT AREA		

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H2O]	PITOT HEAD [" H2O]	METER DIFF PRESSURE [" H2O]	METER VACUUM [" Hg]	METER READING [ft3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O2 [% vol]	METER EXHAUST CO2 [% vol]
	1130	0					233.40								
-9.77	1140	10		2.50	2.38	7.0	241.85	71	69	133	247	252	50	10.8	
A -32.41	1150	20	-2.144	2.40	2.28	7.0	250.14	75	70	133	247	249	54	10.5	old O2 meter
-65.71	1200	30		2.20	2.10	6.5	258.03	78	71	133	247	250	57	10.0	BAD
	1214						258.30								
-9.77	[redacted] 1224	40		2.10	2.00	5.0	266.07	80	72	133	247	250	55	9.4	
B -32.41	[redacted] 1234	50	-2.550	2.30	2.20	6.0	274.27	83	74	133	248	255	59	5.5	14.5
-65.71	1244	60		2.10	2.00	5.5	282.05	85	75	133	248	250	54	↓	↓
	1303						282.20								
-9.77	1313	70		2.00	1.90	5.0	289.71	82	75	132	248	251	50	5.6	14.6
C -32.41	1323	80	-1.967	2.10	2.00	5.5	297.43	84	76	131	247	250	53	5.7	14.4
-65.71	1333	90		2.10	2.00	5.5	305.15	87	77	131	247	249	55	5.6	14.5
	1344						305.30								
-9.77	1354	100		2.30	2.20	6.0	313.52	86	78	131	247	247	54	5.5	14.7
D -32.41	1404	110	-2.736	2.40	2.28	6.5	321.96	88	78	133	247	250	57	5.6	14.5
-65.71	1414	120		2.10	2.00	6.0	329.76	89	79	132	248	249	60	5.7	14.4
AVERAGE		1.2	-2.2	2.24 Pitot	2.111		95.79	78.4		132.3				5.59	14.51

Sample Train Leak Checks: Pre Test OK ft³ @ 10 in. Hg; Post Test OK ft³ @ 10 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H2O; Post Test OK @ 7 in. H2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

#2

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page ____ of ____

TEST ID	SCRI -	METER BOX	3	CAL. DATA: delta H	1.916	Comments:	Single Point in all three ports. Ten minute
PLANT	Plant 6	PITOT TUBE DESC	E-5A	Y	1.038		Readings.
LOCATION	SCR INLET	PROBE LENGTH [ft]	8	C(p)	0.832		
DATE	8/12/04	NOZZLE ID [inch]	0.248	FILTER BOX SETTING	NA		
OPERATOR(S)	LWR, RLO	%H_2O (Assumed)		PROBE HTR SETTING	325		
AMBIENT TEMP [°F]		FILTER ID	4,12,13	DUCT X-SECTION	circ ? rect ?	other:	
BAR. PRESS. [" Hg]	29.41	K FACTOR	1.93	DUCT DIMENSIONS		DUCT AREA	

ΔP ΔH (6) (7) (1) (2) (3)

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1650	0					518.10								
X	1700	10		0.40	0.72	6	522.66	92	89	694	358	~~64~~	61	3.5	
BP out	1710	20		0.40	0.72	9	527.07	94	89	695	357		58	3.6	
in / B	1720	30		0.40	0.72	11.5	531.49	95	89	695	357		58	3.5	
6 - mpp	1730	40		0.40	0.72	15.5	535.95	95	90	693	355		59	3.5	
Filter #1															
↓	1740	50	-6.36	0.40	0.72	17.5	540.22	95	90	693	355		60	3.6	
	~~1755~~ 1800	60		0.40	0.72	6	~~540.50~~ 545.05	96	92	695	354		59	3.4	
↑	1815	70		0.40	0.72	9	549.48	98	92	695	352		56	3.1	
↑	1825	80		0.40	0.72	11.5	553.94	99	92	695	361		57	3.4	
Filter #2															
↓	1835	90		0.40	0.72	15	558.42	99	93	696	361		57	3.3	
↓	1845	100		0.40	0.72	18	562.75	98	93	695	355		58	3.5	
	~~1900~~ 1910	110		0.40	0.72	5.5	~~563.20~~ 567.61	97	93	696	359		61	3.6	
	1920	120		0.40	0.72	8	572.04	99	93	695	357		59	3.3	
Filter #3	1930	130		040	0.72	10.5	576.50	99	93	696	358		55	—	
														purged for 10 min	
AVERAGE		130	-6.4	0.40	0.72		57.67	94.0		694.8				3.44	

Sample Train Leak Checks: Pre Test <0.01 ft^3 @ 12 in. Hg; Post Test <0.01 ft^3 @ 10 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test OK @ 6 in. H_2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page ____ of ____

TEST ID	SCRO - TWO	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Single point in ports B, D, and F. Ten minute		
PLANT	Plant 6	PITOT TUBE DESC	E-15	Y	0.976		Readings. End it		
LOCATION	SCR OUTLET	PROBE LENGTH [ft]	8	C(p)	0.838				
DATE	8/12/04	NOZZLE ID [inch]	3/8A 0.374	FILTER BOX SETTING	NA				
OPERATOR(S)	JMW SCT	%H_2O (Assumed)	?	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	71	FILTER ID	687	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.41	K FACTOR	9.3	DUCT DIMENSIONS	50.50 x 25	DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST 3.5% O_2 [% vol]	METER EXHAUST 16.4% CO_2 [% vol]	
	16:47	0					250.50									O_2 meter calib check
B	16:57	10		0.050	0.47	4.0	254.28	73	72	665	302	NA	44	4.0	16.0	
	17:07	20	-9.66	0.048	0.45	5.0	257.96	74	73	667	315	NA	42	4.1	15.9	20.9 OK
	17:17	30		0.048	0.45	6.0	261.63	76	74	668	313	NA	42	4.0	16.0	
		~~40~~		leak check: lead up @ 0-12"												
	17:24						262.40									
D	17:34	40	-10.06	0.050	0.47	7.0	266.14	76	75	668	310	NA	44	4.9	15.1	
	17:44	50		0.052	0.48	9.0	269.92	77	75	671	313	NA	43	4.8	15.2	
	17:54	60		0.050	0.47	10.5	273.71	78	76	673	315	NA	44	4.9	15.1	
		~~70~~		leak check	lead stop @ -12"		279.00	changed filter 6 to filter 7								
	18:40	~~80~~					279.35									
F	18:50	~~80~~		0.044	0.41	3.0	282.80	76	76	664	308	NA	50	3.7	16.3	
	19:00	80	-9.92	0.049	0.46	5.0	286.51	78	76	676	308	NA	47	3.3	16.6	
	19:10	90		0.042	0.39	5.0	289.97	78	77	679	307	NA	48	3.3	16.7	
		~~100~~														
	19:18	~~110~~					290.61									
H	19:28	~~100~~		0.028	0.26	4.0	293.45	77	76	674	305	NA	50	3.3	16.6	21.0 OK
	19:38	110	-9.89	0.029	0.27	4.5	296.29	77	77	676	304	NA	49	3.1	16.8	
	19:48	120		0.028	0.26	5.0	299.14	76	76	676	301	NA	48	3.2	16.7	
				(avg)												
AVERAGE			-9.88	0.0426	0.403		41.66		75.8	671.4				3.88	16.08	

Sample Train Pre Test: lead stop ft^3 @ -15" in. Hg
Leak Checks: Post Test: lead stop ft^3 @ -12" in. Hg

Pitot Tube Leak Checks: PreTest OK @ -5 in. H_2O; Post Test _____ @ _____ in. H_2O

NOTE: Purge for 10 minutes at end of sampling.

CONSOLENERGY

Post test Air Purge for 10 min @ ΔH = 0.7

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	AHO - ~~B~~ 2	METER BOX	U-5	CAL. DATA: delta H	2.09	Comments:	Single point in ports B, D, and F. Ten minute		
PLANT	Plant 6	PITOT TUBE DESC	E-3	Y	1.006		Readings.		
LOCATION	AIR HEATER OUTLET	PROBE LENGTH [ft]	~~12~~ 10	C(p)	0.846				
DATE	8-12-04	NOZZLE ID [inch]	5/32" 0.152	FILTER BOX SETTING	NA				
OPERATOR(S)	JL DD	%H_2O (Assumed)	10	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	11	DUCT X-SECTION	circ ? (rect ?)	other:			
BAR. PRESS. [" Hg]	29.41	K FACTOR	0.386	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet 9	METER TEMP [oF] outlet 7	STACK TEMP [°F] 1	PROBE TEMP [°F] 2	FILTER BOX [°F]	LAST IMP TEMP [°F] 4	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1657	0					567.050								
E-75	1657	10		1.6	0.62	3.0	571.15	80	80	339	329	NA	67		
F-75	1707	20	-20.9	1.4	0.42	3.5	575.22	82	81	341	330		53	5.0	15.1
F-75	1717	30		1.6	0.62	5.0	579.27	84	83	338	326		52	5.0	15.2
F-75	1727	40	-20.7	1.6	0.42	6.1	583.28	84	84	339	327		55	4.9	15.1
E-25	1737	50		1.4	0.54	9.5	587.14	86	84	341	324		57	5.4	14.7
F-25	1747	~~40~~ 60	-20.8	1.4	0.54	10.5	591.14	88	86	333	298		57	4.8	15.3
		~~50~~													
		~~60~~													
				Leak check @ 12" Hg											
	1759						591.540				3				
C-75	1809	70		1.6	0.62	3.0	595.575	87	87	320	328		64	~~5.0~~	~~14.8~~
C-75	1819	80	-20.8	1.6	0.62	5.5	599.582	89	87	322	325		57	5.2	14.8
C-75	1829	90		1.5	0.58	8.0	603.71	90	88	322	318		58		
C-75		100	-20.6	1.5	0.58	10.5	607.41	91	88	322	320		58	5.3	14.8
F-25		110		~~1.40~~ OK	~~0.54~~ OK	~~17.0~~ OK	611.22	90	88	329	316		60		
F-25	Filter	~~change~~		leak check OK @ 12"				~~89~~	~~89~~	~~328~~	~~303~~		~~61~~		
F-25		120 ~~110~~		1.4	~~0.54~~	3.0	611.525	86	87	325	316		66	5.1	15.1
F-25		130 ~~120~~		1.4	0.59	4.0	615.41	89	86	327	306		61	4.4	15.6
F-25		140	-20.7	1.4	0.54	5.0	619.31	90	84	328	306		60	4.6	15.4
AVERAGE		140	-20.78	1.459	0.58		~~619.315~~	86.2		330.4				4.99	15.13

Sample Train Pre Test 0.000 ft³ @ 12 in. Hg. 623.21

Leak Checks: Post Test 0.000 ft³ @ 12 in. Hg 623.475

Pitot Tube PreTest OK @ 7 in. H_2O

Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI-2	METER BOX	N-1	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.
PLANT	Plant 6	PITOT TUBE DESC	E-GA	Y	0.984		
LOCATION	FGD INLET	PROBE LENGTH [ft]	X10'	C(p)			
DATE	8/12/04	NOZZLE ID [inch]	3/16"B-0.186"	FILTER BOX SETTING	NA		
OPERATOR(S)	GLC/SAK	%H_2O (Assumed)		PROBE HTR SETTING	325		
AMBIENT TEMP [°F]	75	FILTER ID	2	DUCT X-SECTION	circ ? (rect ?)	other:	
BAR. PRESS. [" Hg]	29.41	K FACTOR	0.92	DUCT DIMENSIONS		DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1650	0					715.80								
		10		1.10	1.0	3.0	721.26	81	80	341	321		55		
		20	12.26	1.10	1.0	3.0	726.72	83	80	340	323		55		
		30		1.10	1.0	3.5	732.18	86	81	340	322		58		
		40		1.10	1.0	4.0	737.63	88	82	342	326		55		
		50		1.10	1.0	4.0	743.12	90	84	342	325		54		
		60		1.10	1.0	4.5	748.62	91	85	341	323		54		
		70		1.10	1.0	4.5	754.12	91	86	341	324		53		
		80		1.10	1.0	5.0	759.65	91	86	341	323		53		
		90	11.35	1.10	1.0	5.0	765.17	90	86	341	322		54		
		100		1.10	1.0	5.0	770.75	90	85	341	324		55		
		110		1.10	1.0	5.5	776.21	90	85	342	325		55		
		120		1.10	1.0	5.5	781.71	90	85	342	326		56		
		130	10.60	1.10	1.0	6.0	787.22	90	86	342	326		56		
		140		1.10	1.0	6.0	792.73	91	86	340	326		51		
		150		1.10	1.0	6.0	798.26	91	86	342	326		51		
		160		1.10	1.0	6.5	803.76	92	87	341	324		51		
AVERAGE		160	11.4	1.10	1.0		87.96	84.7		341.2					

Sample Train Pre Test 0 ft^3 @ 10 in. Hg
Leak Checks: Post Test 0 ft^3 @ 10 in. Hg

Pitot Tube PreTest 0 @ 5 in. H_2O
Leak Checks: Post Test 0 @ 5 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	# 2	TEST STK - LOC.	METER BOX	2-4	CAL. DATA: delta H	1.932	Comments: Four ports, thre points each, 10 minute readings
PLANT		PLANT 6	PITOT TUBE DESC	E-2	Y	0.966	
LOCATION		UNIT 1 - STACK	PROBE LENGTH [ft]	6	C(p)	0.837	
DATE		8-12-04	NOZZLE ID [inch]	3/16 E 0.183	FILTER BOX SETTING	250	
OPERATOR(S)		D.C., B.S.	%H_2O (Assumed)		PROBE HTR SETTING	250	
AMBIENT TEMP [°F]		~ 75°	FILTER ID	# 2	DUCT X-SECTION	circ ? (rect ?)	other:
BAR. PRESS. [" Hg]		29.41	K FACTOR	0.954	DUCT DIMENSIONS	19'6"	DUCT AREA

1654 stopped 1715 started

out at 342.747 in at 345.528 (out of stack during this interval)

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1647	0					336.50								
-9.77	1718	10		2.30	2.20	11	347.69	78	75	131	243	252	60		
-32.41		20													
-65.71		30													
			* PROBLEMS WITH LAST IMPINGER AND STEM,												
-9.77		40													
-32.41		50		ALSO LEAK DEVELOPED IN THE 100' LINE.											
-65.71		60		CORRECTED IMPINGERS AND SWITCHED TO											
				A 50' LINE. RESTARTED TEST AT 10 MIN. MARK											
-9.77		70													
-32.41		80		1757 HRS. D.C. & B.S.											
-65.71		90													
-9.77		100													
-32.41		110													
-65.71		120													
AVERAGE															

(D) (C) (B) (A)

Sample Train Leak Checks: Pre Test OK ft^3 @ 10 in. Hg; Post Test _____ ft^3 @ _____ in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test _____ @ _____ in. H_2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	STK - 2	METER BOX		CAL. DATA: delta H		Comments:	Four ports, thre points each, 10 minute readings	
PLANT	PLANT 6	PITOT TUBE DESC		Y				
LOCATION	UNIT 1 - STACK	PROBE LENGTH [ft]	6	C(p)				
DATE		NOZZLE ID [inch]		FILTER BOX SETTING	250			
OPERATOR(S)		%H_2O (Assumed)		PROBE HTR SETTING	250			
AMBIENT TEMP [°F]		FILTER ID		DUCT X-SECTION	circ ?	rect ?	other:	
BAR. PRESS. [" Hg]		K FACTOR		DUCT DIMENSIONS		DUCT AREA		

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1757	0					353.00								
-9.77		10								~~132~~					
-32.41		20	2.30	~~2.20~~	2.20	9	361.40	83	78	132	246	246	57	6.0	14.1
-65.71		30	-2.028	2.20	2.10	8.5	369.38	87	79	132	245	249	55	6.0	14.1
		LEAK CHECK & RESTART					369.50							~~7.3~~	~~13.0~~
-9.77		40		2.10	2.00	7.5	377.37	88	80	132	236	248	61	7.3	13.0
-32.41		50		2.20	2.10	8	385.36	90	81	132	235	249	60	7.2	12.9
-65.71		60	-1.759	2.00	1.90	7.5	393.02	91	81	133	217	248	62	6.9	13.2
		LEAK CHECK & RESTART					393.20								
-9.77		70		2.00	1.90	7.5	400.77	87	81	131	227	249	63	7.1	13.1
-32.41		80		2.20	2.10	8	408.77	89	81	131	230	249	60	7.2	13.0
-65.71		90	-1.864	2.10	2.00	7.5	416.56	90	81	131	230	249	60	7.0	13.2
		LEAK CHECK & RESTART					416.70			~~131~~	~~204~~	~~243~~	~~58~~		
-9.77		100		2.20	2.10	10	~~424.61~~	84	80	131	201	243	58	5.8	14.3
-32.41		110		2.20	2.10	11	~~432.60~~	86	80	131	206	250	61	5.7	14.4
-65.71	2020	120	-1.967	2.10	2.00	11	~~440.44~~	86	79	131	208	249	63	5.9	14.2
AVERAGE		120	-1.90	2.14	2.05		95.43	83.1		131.5				6.55	13.58

Sample Train Pre Test _____ ft^3 @ _____ in. Hg

Leak Checks: Post Test OK ft^3 @ 10 in. Hg

Pitot Tube PreTest _____ @ _____ in. H_2O

Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

3

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page _____ of _____

TEST ID	SCRI - 3	METER BOX	3	CAL. DATA: delta H	1.916	Comments:	Single Point in all three ports. Ten minute
PLANT	Plant 6	PITOT TUBE DESC	E-SA	Y	1.038		Readings.
LOCATION	SCR INLET	PROBE LENGTH [ft]	8	C(p)	0.832		
DATE	8/13/04	NOZZLE ID [inch]	0.246 (1/4E)	FILTER BOX SETTING	NA		
OPERATOR(S)	LWR, RLO	%H_2O (Assumed)		PROBE HTR SETTING	325		
AMBIENT TEMP [°F]		FILTER ID	18, 19, 21	DUCT X-SECTION	circ ? / rect ?	other:	
BAR. PRESS. [" Hg]	29.52	K FACTOR	~~0.84~~ 1.75	DUCT DIMENSIONS		DUCT AREA	

ΔP ΔH (6) (7) (1) (2) (3)

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft³]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1000	0					581.40								
↑	1010	10		0.40	0.68	7.0	585.73	86	82	695	352		59	3.9	16.4
|	1020	20		0.40	0.68	9.0	~~590.08~~	88	83	695	360		58	~~3.8~~ 3.6	16.4
Filter #18	1030	30		0.40	0.68	10.5	594.43	90	83	696	360		60	3.8	16.2
	1040	40		0.40	0.68	14.0	598.77	90	84	699	357		60	3.6	16.4
			B-port 6" in 18 mm filter												
↓															
↓	1050	50	6	0.40	0.68	18.0	603.11	90	84	693	359		62	3.6	16.4
↑	1100 1110	60		0.40	0.68	7.0	603.30 607.61	92	86	695	358		63	3.8	16.2
|	1120	70	-6.65	0.40	0.68	9.0	612.00	94	87	695	358		61	3.6	16.4
Filter #19	1130	80		0.40	0.68	11.0	616.34	95	88	692	355		60	3.8	16.2
↓															
↓	1140	90		0.40	0.68	15.0	~~620.70~~	95	88	695	357		61	3.4	16.6
	1155 1205	100		0.40	0.68	6.5	620.90 625.28	94	90	695	358		62	3.8	16.2
Filter #21	1215	110		0.40	0.68	9.0	629.64	96	90	695	354		63	3.6	16.4
	1225	120		0.40	0.68	11.0	634.05	96	90	697	352		63	—	—
													Purged for 10 min		
AVERAGE		120	-6.65	0.40	0.68		32.26	89.3		695.2				3.68	16.32

Sample Train Leak Checks: Pre Test <0.01 ft³ @ 10 in. Hg; Post Test <0.01 ft³ @ 11 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

306.82

A B C D E F G H
~~0~~ ~~0~~ 0 ~~0~~ 0 ~~0~~ 0 ~~0~~

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	SCRO - THREE	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Single point in ports B, D, and F. Ten minute Readings. 4nd 1F		
PLANT	Plant 6	PITOT TUBE DESC	E-15	Y	0.976				
LOCATION	SCR OUTLET	PROBE LENGTH [ft]	8	C(p)	0.838				
DATE	8/13/04	NOZZLE ID [inch]	3/8 A 0.374	FILTER BOX SETTING	NA				
OPERATOR(S)	JAW SCT	%H_2O (Assumed)	9	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	65	FILTER ID	8	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.52	K FACTOR	8.9	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft³]	METER TEMP [°F] inlet	METER TEMP [°F] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]	
	10:00	0					305.52									O_2 meter calib check
H 72"	10:10	10		0.026	0.23	3.0	308.13	64	64	672	290	NA	46	3.6	16.4	
	10:20	20	-9.44	0.025	0.22	3.0	310.64	66	65	678	283	NA	45	3.3	16.6	20.7 Recal
	10:30	30		0.025	0.22	3.5	313.18	67	66	678	281	NA	45	3.2	16.7	
		~~40~~	leak check: lead clip @ -10"													
	10:37						313.52									
F 72"	10:47	40		0.045	0.40	4.5	316.96	69	67	674	291	NA	45	3.5	16.5	
	10:57	50	-9.75	0.045	0.40	6.0	320.38	71	69	679	292	NA	45	3.4	16.5	
	11:07	60		0.042	0.37	6.5	323.66	72	70	677	293	NA	46	3.5	16.5	
		~~70~~	leak check: lead slop @ -12"													
	11:13						324.15									
D 72"	11:23	70		0.053	0.47	5.0	327.88	72	71	667	300	NA	46	4.1	15.9	20.8 OK
	11:33	80	-9.77	0.052	0.46	6.5	331.54	73	71	672	303	NA	45	3.8	16.2	
	11:43	~~90~~		0.052	0.46	8.0	335.23	74	72	673	308	NA	46	3.9	16.1	
		~~100~~	leak check: lead slop @ -14"													
	11:50						336.10									
B 72"	12:00	~~120~~	-9.63	0.047	0.42	10.0	339.64	73	72	660	300	NA	47	4.2	15.8	
	12:10	110		0.046	0.41	12.0	343.14	74	72	666	298	NA	47	4.0	16.0	20.8 OK
	12:20	120		0.048	0.43	14.0	346.69	76	73	667	297	NA	48	4.3	15.7	
AVERAGE			-9.65	0.0415	0.374		39.47		70.1	671.9				3.73	16.24	

Sample Train Leak Checks: Pre Test lead slop ft³ @ -13 in. Hg; Post Test lead slop ft³ @ -15 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test _____ @ _____ in. H_2O

NOTE: Purge for 10 minutes at end of sampling.

CONSOLENERGY

Air Purge (post test) for 10 min @ Δh = 0.5

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	AHO - 3	METER BOX	W-5	CAL. DATA: delta H	2.009	Comments: ~~Single point in ports B, D, and F. Ten minute~~ ~~Readings.~~ Two points in ports C & E Ten minute readings	
PLANT	Plant 6	PITOT TUBE DESC		Y	1.006		
LOCATION	AIR HEATER OUTLET	PROBE LENGTH [ft]	~~12~~ 10	C(p)			
DATE	8-13-04	NOZZLE ID [inch]		FILTER BOX SETTING	NA		
OPERATOR(S)	JL DO	%H_2O (Assumed)	8	PROBE HTR SETTING	325		
AMBIENT TEMP [°F]	70	FILTER ID	16 & 17	DUCT X-SECTION	circ ? (rect ?)	other:	
BAR. PRESS. [" Hg]	29.52	K FACTOR	0.378	DUCT DIMENSIONS		DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] 6 inlet	METER TEMP [oF] 7 outlet	STACK TEMP [°F] 1	PROBE TEMP [°F] 2	FILTER BOX [°F]	LAST IMP TEMP [°F] 4	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	10:00	0					629.300								
C-75	10:10	10		1.4	0.53	3~~0~~.0	633.11	71	71	319	317	NA	63		
C-75		20	-19.5	1.4	0.53	3.5	636.94	71	72	319	314		52	5.4	14.7
C-75		30	-19.7	1.4	0.53	4.5	640.74	74	74	319	324		49	5.3	14.8
C-75		40		1.4	0.53	5.5	644.51	77	77	319	323		50	5.4	14.8
C-25		50	-20.5	1.4	0.53	8.0	648.27	80	79	327	323		51	4.8	15.2
C-25	1100	~~A06~~ 60	-20.2	1.4	0.53	10.0	652.067	81	80	328	310		50	4.9	15.2
		~~50~~													
		~~60~~			LK chk OK @		10" Hg								
							0								
	1107						652.450								
F-75	1117	70		1.5	0.56	3.0	656.350	81	81	335	305		54		
F-75	1127	80	-21.1	1.6	0.60	4.0	660.40	83	81	337	314		49	4.7	15.4
F-75		90		1.6	0.60	5.0	664.45	85	83	336	312		49	5.4	
F-75		100	-20.7	1.6	0.60	6.5	668.52	84	84	337	314		49	5.4	15.4
F-25		110		1.4	0.53	8.0	672.40	87	84	336	314		50	5.2	
F-25	1201	120 ~~130~~	-19.9	1.4	0.53	9.0	676.35	87	84	330	306		51	5.1	
		~~140~~													
		~~120~~		1.457 Rus											
AVERAGE			-20.2	~~1.457~~	0.55		46.867	79.7		328.5				5.13	15.07

Sample Train Pre Test 0.004 ft^3 @ 11 in. Hg
Leak Checks: Post Test 0.000 ft^3 @ 9 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 8 in. H_2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI-3	METER BOX	N-1	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.
PLANT	Plant 6	PITOT TUBE DESC	E-CA	Y	0.984		
LOCATION	FGD INLET	PROBE LENGTH [ft]	~~5~~ 10	C(p)			
DATE	8/13/04	NOZZLE ID [inch]	3/16 B-0.188"	FILTER BOX SETTING	NA		
OPERATOR(S)	GLC/SAK	%H_2O (Assumed)		PROBE HTR SETTING	325		
AMBIENT TEMP [°F]	68	FILTER ID	3	DUCT X-SECTION	circ ? (rect ?) other:		
BAR. PRESS. [" Hg]	29.52	K FACTOR	0.92	DUCT DIMENSIONS		DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK (1) TEMP [°F]	PROBE (2) TEMP [°F]	FILTER BOX [°F]	LAST IMP (4) TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1000	0					814.30								
	1010	10		1.1	1.0	3.0	819.76	73	72	338	312		51		
	1020	20		1.1	1.0	3.0	825.19	75	73	338	325		53		
	1030	30		1.1	1.0	3.5	830.64	77	73	338	323		56		
	1040	40	12.26	1.1	1.0	3.5	836.11	79	74	339	326		56		
	1050	50	~~12.26~~	1.1	1.0	4.0	841.55	81	75	339	325		57		
	1100	60		1.1	1.0	4.5	846.95	82	76	339	326		57		
	1110	70		1.1	1.0	4.5	852.39	83	77	338	325		54		
	1120	80		1.1	1.0	5.0	857.87	85	78	338	326		54		
		90		1.1	1.0	5.0	863.33	85	79	337	325		54		
		100		1.05	0.95	5.0	868.68	86	80	337	325		55		
		110	11.85	1.05	0.95	5.5	874.01	87	81	337	325		57		
		120		1.05	0.95	5.5	879.41	87	82	337	325		55		
		130		1.05	0.95	6.0	884.70	88	82	337	326		56		
		140		1.05	0.95	6.0	890.06	89	83	337	325		55		
Stop	1225	~~145~~					892.72								
				1.082											
				~~RDS~~											
AVERAGE		145	12.06	~~1.040~~	0.982		78.42	80.1		337.8					

Sample Train Pre Test 0 ft³ @ 10 in. Hg
Leak Checks: Post Test 0 ft³ @ 10 in. Hg

Pitot Tube PreTest 0 @ 5 in. H_2O
Leak Checks: Post Test 0 @ 5 in. H_2O

CONSOLENERGY

✓NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	# 3 STK - TEST	METER BOX	2-4	CAL. DATA: delta H	1.932	**Comments:** Four ports, thre points each, 10 minute readings	
PLANT	PLANT 6	PITOT TUBE DESC	E-2	Y	0.966		
LOCATION	UNIT 1 - STACK	PROBE LENGTH [ft]	~~8~~ 8'	C(p)	0.837		
DATE	8-13-04	NOZZLE ID [inch]	3/16 E 0.183	FILTER BOX SETTING	250		
OPERATOR(S)	D.S., B.S.	%H_2O (Assumed)		PROBE HTR SETTING	250		
AMBIENT TEMP [°F]	~65°0	FILTER ID	# 3	DUCT X-SECTION	circ ?	(rect ?)	other:
BAR. PRESS. [" Hg]	29.52	K FACTOR	~~0.854~~ 0.905	DUCT DIMENSIONS	19'6"	DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1000	0					446.70								
-9.77	1010	10		2.20	1.98	5.0	454.36	67	65	131	232	246	54	5.8	14.4
-32.41	1020	20	-1.939	2.20	1.98	5.0	461.99	71	65	131	242	249	60	5.5	14.7
-65.71	1030	30		2.10	1.87	5.0	469.47	75	66	131	233	248	60	5.6	14.5
	1039						469.60								
-9.77	1049	40		2.00	1.80	4.5	476.88	77	68	131	227	249	51	5.7	14.4
-32.41	1059	50	-2.070	2.20	1.98	5.0	484.55	81	70	131	248	249	51	5.7	14.4
-65.71	1109	60		2.00	1.80	5.0	491.92	82	71	133	249	250	52	5.5	14.6
	1117						492.10								
-9.77	1127	70		1.90	1.71	4.5	499.23	81	72	133	228	249	52	5.8	14.3
-32.41	1137	80	-1.906	2.00	1.80	5.0	506.60	84	74	132	246	250	55	5.6	14.5
-65.71	1147	90		1.90	1.71	5.0	513.77	85	74	133	241	251	56	5.6	14.5
	1155						513.90								
-9.77	1205	100		2.20	1.98	5.0	521.59	84	75	133	240	250	55	5.6	14.5
-32.41	1215	110	-1.927	2.20	1.98	5.0	529.26	46	75	131	248	251	58	5.5	14.6
-65.71	1225	120		2.00	1.80	5.0	536.65	46	76	131	234	249	59	5.5	14.6
				RNS											
AVERAGE		120	-1.96	2.073	1.866		89.51	~~75~~	75.4	131.8				5.6	14.5

Sample Train Pre Test OK ft^3 @ 10 in. Hg
Leak Checks: Post Test OK ft^3 @ 10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

X

(4)

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

Page _____ of _____

TEST ID	SCRI - 4	METER BOX	3	CAL. DATA: delta H	1.916	Comments:	Single Point in all three ports. Ten minute Readings.	
PLANT	Plant 6	PITOT TUBE DESC	E-5A	Y	1.038			
LOCATION	SCR INLET	PROBE LENGTH [ft]	8	C(p)	0.832			
DATE	9/13/04	NOZZLE ID [inch]	0.248 (1/4E)	FILTER BOX SETTING	NA			
OPERATOR(S)	WR, RW	%H_2O (Assumed)		PROBE HTR SETTING	325			
AMBIENT TEMP [°F]		FILTER ID	W, 25	DUCT X-SECTION	circ ? (rect ?)	other:		
BAR. PRESS. [" Hg]	29.53	K FACTOR		DUCT DIMENSIONS		DUCT AREA		

ΔP ΔH

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [°F] (6) inlet	METER TEMP [°F] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX [°F]	LAST IMP TEMP (3) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1410	0					639.00								
	1420	10		0.40	0.68	5.0	643.39	90	87	693	358		59	3.6	16.4
Filter #34	1430	20		0.40	0.68	7.0	647.78	92	88	695	360		57	3.6	16.4
	1440	30		0.40	0.68	9.0	652.18	93	88	691	358		58		
↓	1450	40		0.40	0.68	10.5	656.56	95	89	695	359		58	3.6	16.4
↓	1500	50	-6.51	0.40	0.68	14.0	660.95	96	89	695	358		60	3.8	16.2
	1510	60		0.40	0.68	17.0	665.32	96	90	695	354		61		
	1520 1530	70		0.40	0.68	5.0	665.60 670.03	97	92	695	358		63		
Filter #35	1540	80		0.40	0.68	7.0	674.40	99	92	696	358		58	3.6	16.4
	~~1550~~			~~0.40~~	~~0.68~~										
	1550	90		0.40	0.68	9.0	678.80	99	93	693	360		58		
	1600	100		0.40	0.68	10.5	683.19	100	94	695	350		58	3.5	16.5
	1610	110		0.40	0.68	13.5	687.57	100	94	692	348		60	3.4	16.6
1619.8	~~1620~~	~~120~~ 119.8		0.40	0.68	11.0	691.94	101	95	694	350		60		
	Blow	Filter													
												purge thru impingers	10 min		
							52.66								
AVERAGE			-6.51	0.40	0.68		~~43.87~~	93.7		694.1				3.6	16.4

Sample Train Leak Checks: Pre Test 20.01 ft^3 @ 11 in. Hg; Post Test <2.0 ft^3 @ 10 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 8 in. H_2O; Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	SCRO-FOUR	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Single point in ports B, D, and F. Ten minute Readings. and H		
PLANT	Plant 6	PITOT TUBE DESC	E-15	Y	0.976				
LOCATION	SCR OUTLET	PROBE LENGTH [ft]	8	C(p)	0.838				
DATE	8/13/04	NOZZLE ID [inch]	3/8A 0.374	FILTER BOX SETTING	NA				
OPERATOR(S)	JAW SCT	%H_2O (Assumed)	9	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	69	FILTER ID	22	DUCT X-SECTION	circ ? (rect ?)	other:			
BAR. PRESS. [" Hg]	29.53	K FACTOR	9.0	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft³]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]	O_2 meter cal's (clock
	14:10	0					352.64									
B 72"	14:20	10		0.048	0.43	3.0	356.26	73	71	656	301	NA	54	3.9	16.1	
	14:30	20		0.046	0.41	4.0	359.79	74	72	665	306	NA	47	4.2	15.8	20.7 record
	14:40	30	-9.69	0.046	0.41	4.5	363.31	76	73	665	307	NA	47	3.7	16.3	
		~~40~~		leak check: lead stop @ -16"												
	14:49						363.94									
D 72"	14:59	40		0.042	0.38	4.0	367.35	75	74	667	307	NA	49	3.7	16.2	
	15:09	50	-9.68	0.048	0.43	5.0	370.90	78	75	670	305	NA	49	4.2	15.8	20.9 OK
	15:19	~~60~~		0.054	0.49	6.0	374.74	77	75	672	311	NA	48	3.9	16.1	
		~~70~~		leak check: lead stop @ -10"												
	15:27	~~80~~					375.50									
F 72"	15:37	90		0.046	0.41	7.0	379.01	78	76	671	307	NA	51	3.9	16.1	
	15:47	80	-9.52	0.043	0.39	8.0	382.42	77	76	677	306	NA	49	3.6	16.4	20.9 OK
	15:57	90		0.042	0.38	9.5	385.80	79	77	676	310	NA	50	3.3	16.6	
		~~100~~		leak check: lead stop @ -13"												
	16:06	~~110~~					386.82									
H 72"	16:16	100		0.028	0.25	9.0	389.59	79	77	670	298	NA	56	3.3	16.6	
	16:26	110	-9.82	0.025	0.23	10.0	392.29	77	76	674	299	NA	53	3.2	16.7	
	16:36	120		0.028	0.25	11.0	395.01	78	77	674	299	NA	53	3.5	16.5	
				(RMS)												
AVERAGE			-9.68	0.0406	0.372		39.96		75.8	669.8				3.70	16.27	

Sample Train Leak Checks: Pre Test dead stop ft³ @ -10 in. Hg; Post Test dead stop ft³ @ -14 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 9" in. H_2O; Post Test _____ @ _____ in. H_2O

NOTE: Purge for 10 minutes at end of sampling.

CONSOLENERGY

Post-test air purge for 10 min @ ΔH = 0.5

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	AHO - 4	METER BOX	N-5	CAL. DATA: delta H	1.009	Comments:	Single point in ports B, D, and F. Ten minute		
PLANT	Plant 6	PITOT TUBE DESC		Y	1.006		Readings.		
LOCATION	AIR HEATER OUTLET	PROBE LENGTH [ft]	12	C(p)					
DATE	8-13-04	NOZZLE ID [inch]		FILTER BOX SETTING	NA				
OPERATOR(S)	JL DO	%H_2O (Assumed)	8	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	23	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.53	K FACTOR	0.378	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1410	0					684.370								
F-75	1420	10		1.6	0.60	3.0	688.51	79	81	336	307	NA	66		
F-75	1430	20	-20.4	1.6	0.60	3.5	692.61	83	81	338	304		57	5.0	15.0
F-75	1440	30		1.6	0.60	5.0	696.68	86	83	338	309		57	5.2	14.8
F-75	1450	40	-20.9	1.6	0.60	6.0 ~~5.5~~	700.71	86	84	337	316		58	4.9	15.2
F-25	1500	50		1.4	0.53	7.0	704.53	87	84	331	310		60	5.2	14.9
F-25	1510	~~60~~ 40	-19.4	1.4	0.53	8.5	708.58	87	84	331	305		60	5.7	14.~~8~~4
		~~60~~													
		~~60~~			CK check ok @ 10" Hg										
	1519						708.700								
C-75	1529	70		1.5	0.56	3.0	712.66	85	86	320	307		66		
C-75	1539	80	-19.9	1.5	0.54	3.5	716.67	86	87	321	307		57	5.6	14.5
C-75	1549	90		1.5	0.54	5.0	720.64	90	88	322	314		55	5.2	14.9
C-75	1559	100	-20.8	1.5	0.54	6.5	724.55	90	88	319	310		57	5.3	14.8
E-25	1609	110		1.5	0.54	7.5	728.44	90	88	320	297		58	5.7	14.4
C-25	1619	~~120~~ 100	-20.1	1.5	0.56	9.0	732.47	90	88	321	297		57	5.0	15.2
		~~110~~													
		~~120~~													
				RWS											
AVERAGE			-20.26	1.516	0.568		47.98	85.9		328				5.33	14.8

Sample Train Leak Checks: Pre Test 0.000 ft^3 @ 10.0 in. Hg; Post Test 0.000 ft^3 @ 10.0 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 7 in. H_2O; Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI-4	METER BOX	N-1	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.		
PLANT	Plant 6	PITOT TUBE DESC	E-GA	Y	0.984				
LOCATION	FGD INLET	PROBE LENGTH [ft]	~~12~~ 10	C(p)					
DATE	8/13/04	NOZZLE ID [inch]	3/4 B - 0.188	FILTER BOX SETTING	NA				
OPERATOR(S)	GLC/SAK	%H_2O (Assumed)		PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	76	FILTER ID	4	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]		K FACTOR	0.92	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (2) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (0) [°F]	PROBE TEMP (2) [°F]	FILTER BOX [°F]	LAST IMP (4) TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1410	0					899.10								
		10		1.05	0.95	4.0	904.58	83	82	337	325		58		
		20		1.05	0.95	4.0	909.93	86	83	338	325		57		
		30	12.10	1.0	0.92	4.5	915.24	88	84	337	326		59		
		40		1.0	0.92	4.5	920.54	90	85	336	324		58		
		50		1.05	0.95	5.0	925.86	91	86	336	325		58		
		60		1.05	0.95	5.0	931.20	92	86	337	325		57		
		70		1.0	0.92	5.0	936.51	93	87	337	325		55		
		80		1.0	0.92	5.0	941.83	94	88	336	324		55		
		90		1.0	0.92	5.5	947.14	94	89	337	324		56		
		100	11.56	1.05	0.95	6.0	952.50	94	89	338	324		56		
		110		1.0	0.92	6.0	957.78	95	90	338	324		56		
	1610	120					963.07								
AVERAGE			11.83	1.022	0.934		63.97	88	6	337					

Sample Train Leak Checks: Pre Test 0 ft^3 @ 10 in. Hg; Post Test 0 ft^3 @ 10 in. Hg

Pitot Tube Leak Checks: PreTest 0 @ 5 in. H_2O; Post Test 0 @ 5 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	# 4 STK - TEST	METER BOX	2 - 4	CAL. DATA: delta H	1.932	Comments:	Four ports, thre points each, 10 minute readings
PLANT	PLANT 6	PITOT TUBE DESC	E - 2	Y	0.966		
LOCATION	UNIT 1 - STACK	PROBE LENGTH [ft]	8'	C(p)	0.837		
DATE	8 - 13 - 04	NOZZLE ID [inch]	3/16E 0.183	FILTER BOX SETTING	250		
OPERATOR(S)	D.C. B.S.	%H_2O (Assumed)		PROBE HTR SETTING	250		
AMBIENT TEMP [°F]	~72°	FILTER ID	#4	DUCT X-SECTION	circ ? (rect ?) other:		
BAR. PRESS. [" Hg]	29.53	K FACTOR	0.905	DUCT DIMENSIONS	19'6'	DUCT AREA	

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1410	0					543.20								
-9.77		10		2.20	1.98	11	551.07	77	74	131	249	249	52	5.8	14.3
-32.41		20	-1.681	2.30	2.05	11	558.77	80	74	132	245	249	57	5.6	14.5
(5) -65.71		30		2.10	1.87	10.5	566.34	81	74	133	225	250	58	5.4	14.7
				L.C. "OK" RESTART			566.60								
-9.77		40		2.00	1.80	10	574.08	82	76	132	229	249	61	5.6	14.5
(C) -32.41		50	-1.681	2.10	1.87	10.5	581.59	84	76	131	247	250	63	5.3	14.8
-65.71		60		2.00	1.80	10	589.00	85	77	132	243	251	58	5.5	14.6
				L.C. "OK" RESTART			589.20								
-9.77		70		2.10	1.87	10.5	596.78	85	78	132	242	250	57	5.4	14.7
(B) -32.41		80	-2.095	2.30	2.05	11.5	604.61	87	78	132	251	251	57	5.7	14.4
-65.71		90		2.20	1.98	11.5	612.38	88	79	133	239	250	59	5.1	15.0
				L.C. "OK" RESTART			612.60								
-9.77		100		2.20	1.98	11.5	620.47	87	80	132	210	251	55	5.8	14.3
(A) -32.41		110		2.30	2.05	12	628.33	89	80	132	241	245	55	5.5	14.6
-65.71		120	-1.856	2.10	1.87	11	635.94	90	81	133	232	251	57	5.3	14.8
	1635			RLS											
AVERAGE			-1.83	~~1.69~~ 2.157	1.93		92.06	80.9		132.1				5.5	14.6

Sample Train Pre Test OK ft^3 @ 10 in. Hg
Leak Checks: Post Test OK ft^3 @ 10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOL ENERGY

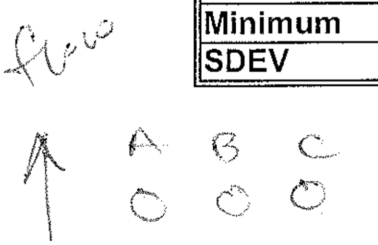
NOTE: Purge for 10 minutes at end of sampling.

SCR Inlet

Axial Flow Check

Location		Duct Ht, "		Barometric	29.40
Date	8/11/04	Duct ID,"		Static	
Time	1510-1520	Duct Area	ft^2	Dry Bulb	
Tube I.D.	S-53A	% O_2		Wet Bulb	
C-Factor		% CO_2		% H_20	
Operator(s)	LWR, RLO	% N_2		W.M.Wt	

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle	Statics
A	72-15	664	0.364		~0	-5.893
B	72-15	681	0.367		~0	-6.157
C		obstruction in-duct & out duct				
Average		681	0.367			
Maximum						
Minimum						
SDEV						



DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

106
615
E-15.886
1.936

Meter 3
ΔH = 1.916
Y = 1.038
15" nipple
E.S 0.832 Kel. 803
0.237 Ideal
0.243 Actual

Axial Flow Check

Location	SCR Out	Duct Ht, "		Barometric	29.40
Date	8/11/04	Duct ID,"		Static	-9.99
Time	14:50	Duct Area	1250 ft²	Dry Bulb	
Tube I.D.	S-53A	% O_2		Wet Bulb	
C-Factor	0.836	% CO_2		% H_2O	
Operator(s)	JMD SCT	% N_2		W.M.Wt	

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle	Static
A side						
2	5'	672	0.0665			
	6'	673	0.0708			
	7'	673	0.0570		0°	-10.12
4	5'	675	0.0655			
	6'	678	0.0657			
	7'	678	0.0645		0°	-9.850
6	5'	680	0.0612			
	6'	684	0.0540			
	7'	685	0.0580		0°	-10.03
8	5'	672	0.0446			
	6'	681	0.0381			
	7'	682	0.0380		0°	-9.963
Average						
Maximum						
Minimum						
SDEV						

DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

14" Nipple

Meter Box N-2

$\Delta H_@ = 1.956$

$Y = 0.976$

Pitot S-15

$C_p = 0.838$

3/8 A = 0.374

9.41

Axial Flow Check

Location AHO
Date
Time
Tube I.D.
C-Factor
Operator(s)

Duct Ht, "
Duct ID,"
Duct Area ft²
% O_2
% CO_2
% N_2

Barometric
Static -20.2
Dry Bulb
Wet Bulb
% H_2O
W.M.Wt

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle
A-1	25	333	1.60		~25°
A-2	75	335	~~0.76~~	1.85	
A-3	125	331	1.54		
C-1 1	25	327	1.45		
C-2 2	75	316	1.37		
C-3 3	125	313	1.25		~25
E-1	25				
E-2	75				
E-3	125				
G-1	25				
G-2	75				
G-3	125				
Average		325.8	1.51		
Maximum					
Minimum					
SDEV					

DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

N-5
1.006 Y
2.009 ΔHO
E-3 0.846
0.152 ideal
3/320 0.152
K=0.386

Axial Flow Check

Location ESP Outlet
Date 8/11/04
Time 1505
Tube I.D. S-54
C-Factor
Operator(s) GLC/SAK

Duct Ht, "
Duct ID,"
Duct Area ft²
% O_2
% CO_2
% N_2

Barometric
Static
Dry Bulb
Wet Bulb
% H_2O
W.M.Wt

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle
	~9'	349	1.24		
Average					
Maximum					
Minimum					
SDEV					

STATIC +12.4

DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

N-1
Y 0.984
ΔHa 1.981
SPI - 0.821
ideal = 0.218
7/32A = 0.214

Axial Flow Check

Location	Stack	Duct Ht, "		Barometric	29.40
Date	8-11-04	Duct ID,"	19'6"	Static	-2.09
Time	1611 - 1645	Duct Area	ft²	Dry Bulb	
Tube I.D.	S-19	% O_2		Wet Bulb	
C-Factor		% CO_2		% H_20	
Operator(s)	D.C., B.S.	% N_2		W.M.Wt	

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle
A-1	9.77	132.0		2.900	
A-2	32.41	131.7		2.874	
A-3	65.71	131.5		2.531	
B-1	9.77	131.8		2.248	
B-2	32.41	131.7		2.861	
B-3	65.71	131.8		2.393	
C-1	9.77	131.7		2.418	
C-2	32.41	131.6		2.683	
C-3	65.71	131.7		2.132	
D-1	9.77	132.4		2.868	
D-2	32.41	132.3		2.884	
D-3	65.71	132.2		2.456	
Average		132		2.60	
Maximum					
Minimum					
SDEV					

-2.066

-1.964

-2.117

-2.187

DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

N-4

Y = 0.966

H = 1.932

C_2 = 0.837

Ideal 0.172

3/16 E 0.183

K = 0954

Axial Flow Check

Location: Reactor Vent
Date: 8/11/04
Time: _____
Tube I.D.: S-54
C-Factor: _____
Operator(s): GLC/SAK

Duct Ht, " _____
Duct ID," _____
Duct Area _____ ft²
% O_2 _____
% CO_2 _____
% N_2 _____

Barometric _____
Static _____
Dry Bulb _____
Wet Bulb _____
% H_2O _____
W.M.Wt _____

PORT/ POINT	DISTANCE [" From Wall]	TEMP [°F]	DELTA P [" H_2O]	VELOCITY [Ft/Sec]	Null Angle
	~2"	132	0.35		
Average					
Maximum					
Minimum					
SDEV					

STATIC
0.20

DATA SUMMARY	
Velocity, [fps]	
acfm	
scfm	
dscfm	
Ex Air Free cfm	
Est. MM Btu/hr Heat Input	
Est. Firing Rate, lb/hr	

Y = 0.987
ΔH 1.7039
20/3
1 dem = 0.280
9/32 A = 0.275
K = 4.33
K-1 = 0.838

PLANT 6 Hg SAMPLING PROGRAM - ONTARIO HYDRO SAMPLING TRAIN DATA

Location			SCR Inlet Unit 4	SCR Out Unit 4	AirHtr Out Unit 4	FGD Inlet Unit 4	Stack Unit 4	SCR Inlet Unit 4	SCR Out Unit 4	AirHtr Out Unit 4	FGD Inlet Unit 4	Stack Unit 4	SCR Inlet Unit 4	SCR Out Unit 4	AirHtr Out Unit 4	FGD Inlet Unit 4	Stack Unit 4	SCR Inlet Unit 4	SCR Out Unit 4	AirHtr Out Unit 4	FGD Inlet Unit 4	Stack Unit 4
Data			08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/12/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04	08/13/04
Start Time			1130	1130	1130	1130	1130	1650	1647	1647	1650	1647	1000	1000	1000	1000	1000	1410	1410	1410	1410	1410
Stop Time			1402	1338	1354	1330	1414	1930	1948	1947	1910	2020	1225	1220	1207	1225	1225	1620	1636	1619	1610	1635
Test Number			SCRI-1	SCRO-1	AHO-1	FGD-1	STK-1	SCRI-2	SCRO-2	AHO-2	FGD-2	STK-2	SCRI-3	SCRO-3	AHO-3	FGD-3	STK-3	SCRI-4	SCRO-4	AHO-4	FGD-4	STK-4
Sample Type			OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg
Y factor of dry gas meter	-		1.038	0.976	1.006	0.984	0.966	1.038	0.976	1.006	0.984	0.966	1.038	0.976	1.006	0.984	0.966	1.038	0.976	1.006	0.984	0.966
Gas Volume	-	ft^3	53.65	42.71	48.18	62.00	95.79	57.67	41.66	55.48	87.96	95.43	52.26	39.47	46.87	78.42	89.51	52.66	39.96	47.98	83.97	92.06
Delta H of dry gas meter	-	" H_2O	0.72	4.28	0.60	0.90	2.11	0.72	0.40	0.58	1.00	2.06	0.68	0.37	0.55	0.98	1.87	0.68	0.37	0.57	0.93	1.93
Meter Temperature	-	°F	93.5	73.1	86.7	84.5	78.4	94.0	75.8	86.2	86.7	83.1	89.3	70.1	79.7	80.1	75.4	93.7	75.8	85.9	88.6	80.9
C Factor of pitot tube	-		0.832	0.838	0.846	0.821	0.837	0.832	0.838	0.846	0.835	0.837	0.832	0.838	0.846	0.835	0.837	0.832	0.838	0.846	0.835	0.837
Nozzle Diameter	-	inches	0.248	0.374	0.152	0.188	0.183	0.248	0.374	0.152	0.188	0.183	0.248	0.374	0.152	0.188	0.183	0.248	0.374	0.152	0.188	0.183
A n (area of nozzle)	-	ft^2	0.00034	0.00076	0.00013	0.00019	0.00018	0.00034	0.00076	0.00013	0.00019	0.00018	0.00034	0.00076	0.00013	0.00019	0.00018	0.00034	0.00076	0.00013	0.00019	0.00018
Area of Stack (Single of Dual)	-	ft^2	741.0	2,850.8	612.0	524.7	298.6	741.0	2,850.8	612.0	524.7	298.6	741.0	2,850.8	612.0	524.7	298.6	741.0	2,850.8	612.0	524.7	298.6
H_2O Weight	-	gm	108.9	87.2	88.1	103.2	379.8	118.5	84.1	104.4	160.8	343.7	114.3	90.8	90.0	148.4	357.9	113.9	92.7	94.7	124.0	372.0
Sample Time	-	minutes	120	120	120	120	120	130	120	140	160	120	120	120	120	145	120	120	120	120	120	120
Barometric Pressure	-	" Hg	29.43	29.43	29.43	29.43	29.43	29.41	29.41	29.41	29.41	29.41	29.52	29.52	29.52	29.52	29.52	29.53	29.53	29.53	29.53	29.53
Static Pressure	-	" H_2O	-6.60	-9.90	-20.60	12.00	-2.22	-6.40	-9.88	-20.78	12.00	-1.90	-6.65	-9.65	-20.20	12.06	-1.96	-6.51	-9.68	-20.25	11.83	-1.83
% Oxygen	-		3.5	3.5	5.0	5.5	5.6	3.4	3.9	5.0	5.0	6.6	3.7	3.7	5.1	5.1	5.6	3.6	3.7	5.3	5.3	5.5
% Carbon Dioxide	-		17.0	16.4	15.1	14.6	14.5	17.0	16.1	15.1	15.0	13.6	16.3	16.2	15.1	15.1	14.5	16.4	16.3	14.8	14.8	14.6
% N_2 + CO	-		79.5	80.0	79.9	79.9	79.9	79.6	80.0	79.9	80.0	79.9	80.0	80.0	79.8	79.8	79.9	80.0	80.0	79.9	79.9	79.9
Stack Temp (Dry Bulb)	-	°F	700	647	330	344	132	695	671	330	341	132	695	672	329	338	132	694	670	328	337	132
Stack Temp (Wet Bulb)	-	°F																				
"S" sample (rms vel head)	-	" H_2O	0.400	0.045	1.512	0.997	2.214	0.400	0.043	1.499	1.100	2.149	0.400	0.042	1.457	1.082	2.073	0.400	0.041	1.516	1.022	2.158
Dust Wt.	-	gm	23.2563	10.8834	20.5950		0.3137	28.6374	12.9940	22.9420	0.0193	0.2333	19.6134	11.8486	18.3009	0.0262	0.1379	18.2594	12.1590	17.9654	0.1419	0.1305
Sample Volume	-	DSCF	52.33	41.03	46.09	58.30	89.69	56.16	39.41	53.08	82.34	88.51	51.51	37.88	45.55	74.58	84.49	51.51	37.95	46.12	79.91	86.05
Sample Volume	-	dscm	1.482	1.162	1.305	1.651	2.540	1.590	1.116	1.503	2.332	2.507	1.459	1.073	1.290	2.112	2.393	1.459	1.075	1.306	1.697	2.437
ABS ST PRES	-	" Hg	28.94	28.70	27.92	30.31	29.27	28.94	28.68	27.88	30.29	29.27	29.03	28.81	28.03	30.41	29.38	29.05	28.82	28.04	30.40	29.40
ABS ST TEMP	-	°R	1,160	1,107	790	804	592	1,155	1,131	790	801	592	1,155	1,132	789	798	592	1,154	1,130	788	797	592
H_2O - % by Vol	-	vapor	8.9	9.1	8.3	7.7	16.6	9.0	9.1	8.5	8.4	15.5	9.5	10.1	8.5	8.6	16.6	9.4	10.3	8.8	8.9	16.9
Water Volume	-	std ft^3	5.13	4.11	4.15	4.86	17.89	5.58	3.96	4.92	7.57	16.19	5.38	4.28	4.24	6.99	16.86	5.36	4.37	4.46	5.84	17.52
Dry Molecular Weight	-	lb/lb-mole	30.86	30.77	30.62	30.56	30.55	30.86	30.73	30.62	30.60	30.44	30.76	30.75	30.62	30.62	30.54	30.77	30.75	30.58	30.58	30.56
Wet Molecular Weight	-	lb/lb-mole	29.71	29.61	29.57	29.59	28.46	29.70	29.57	29.55	29.54	28.51	29.55	29.45	29.54	29.54	28.46	29.56	29.44	29.47	29.46	28.43
% EXCESS AIR	-		19.9	20.1	31.1	35.3	36.1	19.6	22.5	31.0	31.0	45.1	21.1	21.4	32.2	32.2	36.1	20.5	21.2	33.6	33.6	35.3
Dry Mole Frac.	-		0.911	0.909	0.917	0.923	0.834	0.910	0.909	0.915	0.916	0.845	0.905	0.899	0.915	0.914	0.834	0.906	0.897	0.912	0.911	0.831
Wet Mole Frac.	-		0.089	0.091	0.083	0.077	0.166	0.090	0.091	0.085	0.084	0.155	0.095	0.101	0.085	0.086	0.166	0.094	0.103	0.088	0.089	0.169
Gas Velocity, Direct	-	ft/sec	52.25	17.35	87.00	66.36	89.78	52.15	17.08	86.73	70.84	88.31	52.20	16.86	85.18	69.99	86.68	52.15	16.70	86.96	68.07	88.47
ACFM	-		2,322,856	2,966,911	3,194,486	2,089,340	1,608,838	2,318,479	2,921,334	3,184,696	2,230,389	1,582,370	2,320,855	2,883,076	3,127,870	2,203,335	1,553,262	2,318,449	2,856,525	3,193,072	2,143,184	1,585,358
DSCFM	-		931,524	1,233,979	1,827,484	1,282,635	1,169,606	932,627	1,187,613	1,814,449	1,362,793	1,168,174	931,871	1,163,618	1,795,449	1,354,949	1,134,295	932,751	1,153,146	1,828,348	1,314,452	1,153,986
DSCFM (rounded)			931,500	1,234,000	1,827,500	1,282,600	1,169,600	932,600	1,187,600	1,814,400	1,362,800	1,168,200	931,900	1,163,600	1,795,400	1,354,900	1,134,300	932,800	1,153,100	1,828,300	1,314,500	1,154,000
DSCMM			26,381	34,946	51,754	36,324	33,123	26,412	33,633	51,385	38,594	33,083	26,391	32,954	50,847	38,372	32,123	26,416	32,657	51,779	37,225	32,681
Stack-based DSCFM			1,027,937	1,031,490	1,126,205	1,162,771	1,169,606	960,097	984,917	1,053,633	1,054,295	1,168,174	1,007,823	1,010,758	1,100,489	1,100,489	1,134,295	1,027,248	1,033,220	1,139,191	1,139,191	1,153,986
Stack-based DSCMM			29,111	29,212	31,894	32,930	33,123	27,190	27,893	29,839	29,858	33,083	28,542	28,625	31,166	31,166	32,123	29,092	29,261	32,262	32,262	32,681
Excess Air Free DSCFM	-		776,419	1,024,970	1,390,287	945,099	856,778	779,123	967,138	1,381,239	1,035,766	802,071	767,790	955,949	1,354,748	1,022,371	830,369	772,086	949,000	1,364,700	981,122	850,306
CALCULATED FIRING RATE:																						
Dry	-	lb/min	6,281	8,292	11,247	7,645	6,931	6,336	7,865	11,232	8,431	6,522	6,010	7,483	10,604	8,003	6,500	6,101	7,499	10,784	7,753	6,719
Wet	-	lb/min	6,646	8,774	11,901	8,090	7,334	6,712	8,332	11,900	8,932	6,910	6,326	7,876	11,161	8,423	6,841	6,482	7,967	11,457	8,237	7,139
Dry	-	lb/hr	376,852	497,492	674,806	458,725	415,856	380,142	471,876	673,921	505,849	391,339	360,595	448,965	636,262	480,160	389,986	366,056	449,933	647,022	465,163	403,141
Wet	-	lb/hr	398,785	526,447	714,081	485,423	440,060	402,736	499,922	713,975	535,914	414,598	379,534	472,545	669,679	505,378	410,468	388,924	478,042	687,443	494,223	428,326
CALCULATED FIRING RATE:																						
Dry	-	tons/hr	188.4	248.7	337.4	229.4	207.9	190.1	235.9	337.0	252.9	195.7	180.3	224.5	318.1	240.1	195.0	183.0	225.0	323.5	232.6	201.6
Wet	-	tons/hr	199.4	263.2	357.0	242.7	220.0	201.4	250.0	357.0	268.0	207.3	189.8	236.3	334.8	252.7	205.2	194.5	239.0	343.7	247.1	214.2
HEAT INPUT:																						
MM Btu/hr	-		4,655	6,145	8,335	5,666	5,137	4,692	5,824	8,318	6,244	4,830	4,562	5,680	8,050	6,075	4,934	4,659	5,726	8,235	5,920	5,131
PARTICULATE LOADING:																						
Grains/DSCF	-		6.86	4.09	6.89	0.00	0.05	7.87	5.09	6.67	0.0036	0.0407	5.8751	4.8267	6.1989	0.0054	0.0252	5.4696	4.9434	6.0101	0.0365	0.0234
lb/hr	-		54,775	43,309	108,029	0	541.20	62,920	51,807	103,746	42	407.38	46,945	48,158	95,430	63.0	244.94	43,747	48,877	94,219	411.9	231.53
lb/MM Btu	-		11.77	7.05	12.96	0.00	0.11	13.41	8.89	12.47	0.01	0.08	10.29	8.48	11.85	0.01	0.05	9.39	8.54	11.44	0.07	0.05
Ash Production		lb/hr	55,510	73,281	99,399	67570	61,256	55,083	68,375	97,651	73,298	56,705	46,950	58,455	82,841	62,517	50,776	43,853	53,902	77,513	55,726	48,296
ESP Hopper Ash			54,775	43,309	108,029	0	541	62,920	51,807	103,746	42	407.38	46,945	48,158	95,430	63	244.94	43,747	48,877	94,219	412	231.53
Bottom Ash			736	29,972	-8630	67570	60,714	-7,838	16,568	-6,095	73,255	56,298	5	10,297	-12,589	62,454	50,531	106	5,025	-16,706	55,315	48,065
Percent Fly Ash			98.7%	59.1%	108.7%	0.0%	0.9%	114.2%	75.8%	106.2%	0.1%	0.7%	100.0%	82.4%	115.2%	0.1%	0.5%	99.8%	90.7%	121.6%	0.7%	0.5%
% ISOKINETIC	-		103.5	103.6	102.2	102.1	104.6	102.4	103.4	101.6	102.9	103.4	101.9	101.5	102.8	103.4	101.6	101.9	102.6	102.2	103.5	101.7

Impingor Components Wts & Volumes	SCRI-1	SCRO-1	AHO-1	FGD-1	STK-1	SCRI-2	SCRO-2	AHO-2	FGD-2	STK-2	SCRI-3	SCRO-3	AHO-3	FGD-3	STK-3	SCRI-4	SCRO-4	AHO-4	FGD-4	STK-4
Filter Wt., g	23.2563	10.8834	20.5950	0.0000	0.3278	28.6374	12.9940	22.9420	0.0193	0.3375	19.6134	11.8486	18.3009	0.0262	0.3303	18.2594	12.1590	17.9654	0.1418	0.3297
ppb Hg	<4.0	<4.0	61	0	6.40	<4.0	<4.0	46	16	20.90	<4.0	<4.0	37	48.9	7.10	<4.0	<4.0	48	792	8.80
total ug	<0.09	<0.04	1.26	0.00	6.40E-03	<0.11	<0.05	1.06	3.09E-04	2.09E-02	<0.08	<0.05	0.68	1.28E-03	7.10E-03	<0.07	<0.05	0.86	1.12E-01	8.80E-03
ug/dscm	<0.06	<0.04	0.96	0.00	2.52E-03	<0.07	<0.05	0.70	1.32E-04	8.34E-03	<0.05	<0.04	0.52	6.07E-04	2.97E-03	<0.05	<0.05	0.66	6.62E-02	3.61E-03
Probe Rinse volume, ml	132	89	93	191	144	125	57	82	144	165	141	68	121	157	182	101	88	99	175	168
Analytical Hg, ng/ml	<1.0	<1.0	<1.0	5.2	12.2	<1.0	2.7	<1.0	1.5	8.4	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.6
ug/dscm	<0.09	<0.08	<0.07	0.60	0.69	<0.08	0.14	<0.05	0.09	0.55	<0.10	<0.06	<0.09	<0.07	0.08	<0.07	<0.08	<0.08	<0.10	0.11
Heated Umbilical Line Rinse volume, ml	87	152	104	101		119	45	168	88		114	73	140	118		140	71	135	64	
Analytical Hg, ng/ml	1.1	2.2	3.0	<1.0	NA	1.3	1.0	2.8	1.5	NA	2.2	2.3	1.2	1.0	NA	<1.0	2.8	<1.0	<1.0	NA
ug/dscm	0.06	0.29	0.24	<0.06		0.10	0.04	0.31	0.06		0.17	0.16	0.13	0.06		<0.10	0.18	<0.10	<0.04	
KCl volume, ml	555	536	533	552	816	561	535	547	604	782	555	537	532	585	792	557	536	533	564	799
Analytical Hg, ng/ml	9	16.7	35.3	46.2	5.8	9.5	23.5	30.2	50.3	2.0	9.1	24.5	26	35.0	2.2	6.5	24.1	30.3	30.9	1.8
ug/dscm	3.37	7.70	14.41	15.45	1.86	3.35	11.26	10.99	13.03	0.62	3.46	12.27	10.72	9.69	0.73	2.48	12.02	12.36	10.27	0.59
Nitric/Peroxide volume, ml	174	175	175	175	178	175	174	175	174	180	177	175	175	175	179	175	175	175	176	183
Analytical Hg, ng/ml	3.8	2.4	<0.2	1.2	<0.2	4.2	1.8	1.1	1.6	<0.20	3.5	1.2	<0.2	0.7	0.8	3.5	1.0	<0.2	1.4	0.7
ug/dscm	0.45	0.36	<0.03	0.13	<0.01	0.46	0.28	0.13	0.12	<0.01	0.42	0.20	<0.03	0.06	0.06	0.42	0.16	<0.03	0.15	0.05
KMnO4 volume, ml	244	245	245	242	241	246	244	245	242	240	249	247	249	249	245	247	250	252	247	250
Analytical Hg, ng/ml	13.8	3.2	<0.2	<0.2	0.5	21.6	3.2	3.9	1.6	4.4	19.4	1.6	<0.2	<0.7	11.3	13.5	1.7	<0.2	<0.2	12.0
ug/dscm	2.27	0.67	<0.04	<0.03	0.05	3.34	0.70	0.64	0.17	0.42	3.31	0.37	<0.04	<0.08	1.16	2.29	0.40	<0.04	<0.03	1.23
KMnO4-Acid Rinse volume, ml	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Analytical Hg, ng/ml	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ug/dscm	<0.07	<0.09	<0.08	<0.06	<0.04	<0.06	<0.09	<0.07	0.05	<0.04	<0.07	<0.09	<0.08	<0.05	<0.04	<0.07	<0.09	<0.08	<0.06	<0.04
Particulate, ug/m3	0.06	0.04	0.96	0.000	2.52E-03	0.07	0.05	0.70	1.32E-04	8.34E-03	0.05	0.04	0.52	6.07E-04	2.97E-03	0.05	0.05	0.66	0.07	3.61E-03
Particulate, mg/soc	0.03	0.02	0.51	0.000	1.39E-03	0.03	0.02	0.35	6.59E-05	4.60E-03	0.03	0.02	0.27	3.15E-04	1.59E-03	0.02	0.02	0.35	0.04	1.97E-03
Percent of Total	0.99	0.41	6.08	0.000	0.09	0.96	0.37	5.45	9.80E-04	0.50	0.71	0.34	4.52	6.06E-03	0.14	0.92	0.35	4.95	0.62	0.18
Oxidized Fraction, ug/m3	3.52	8.07	14.72	16.11	2.55	3.53	11.44	11.36	13.18	1.18	3.73	12.48	10.95	9.82	0.80	2.65	12.29	12.54	10.41	0.70
Oxidized Fraction, mg/soc	1.71	3.93	7.83	8.84	1.41	1.60	5.32	5.65	6.56	0.65	1.77	5.96	5.69	5.10	0.43	1.28	5.99	6.74	5.60	0.38
Percent of Total	55.30	87.43	93.03	98.67	96.11	47.25	91.11	88.11	97.54	70.86	49.16	94.68	94.25	98.12	38.93	48.38	94.63	93.99	97.20	34.53
Elemental Fraction, ug/m3	2.79	1.12	0.14	0.22	0.10	3.87	1.07	0.83	0.33	0.48	3.80	0.66	0.14	0.19	1.26	2.77	0.65	0.14	0.23	1.32
Elemental Fraction, mg/sec	1.35	0.55	0.07	0.12	0.06	1.75	0.50	0.41	0.17	0.26	1.81	0.31	0.07	0.10	0.67	1.35	0.32	0.08	0.13	0.72
Percent of Total	43.71	12.16	0.89	1.33	3.79	51.79	8.52	6.44	2.46	28.63	50.13	4.99	1.23	1.88	60.93	50.70	5.02	1.06	2.18	65.29
Total ug/m^3	6.37	9.23	15.83	16.33	2.66	7.47	12.56	12.89	13.51	1.66	7.59	13.19	11.61	10.01	2.07	5.47	12.98	13.35	10.71	2.03
Hg mg/sec, stack flow based	3.09	4.49	8.41	8.96	1.47	3.38	5.84	6.41	6.72	0.92	3.61	6.29	6.03	5.20	1.11	2.65	6.33	7.18	5.76	1.10

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	STK - 5NE	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Three Points per port per four ports
PLANT	Plant 6	PITOT TUBE DESC	E-2	Y	0.976		Ten minutes per point
LOCATION	Unit 4 Stack	PROBE LENGTH [ft]	8	C(p)	0.837		
DATE	11-2-09	NOZZLE ID [inch]	3/16 E 0.183	FILTER BOX SETTING	325		
OPERATOR(S)	DPC, BBS	%H_2O (Assumed)		PROBE HTR SETTING	325		
AMBIENT TEMP [°F]	70	FILTER ID	6	DUCT X-SECTION	circ ?	rect ?	other:
BAR. PRESS. [" Hg]	29.35	K FACTOR	0.89	DUCT DIMENSIONS	19.5 ft.	DUCT AREA	298.65 ft²

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft³]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	(1) STACK TEMP [°F]	(2) PROBE TEMP [°F]	(3) FILTER BOX [°F]	(4) LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1430	0					969.10								
D -65.7	1440	10		2.00	1.78	4.5	976.35	74	70	130	232	280	52	5.8	14.0
D -32.4	1450	20	-1.841	2.40	2.12	5.0	984.26	80	73	130	218	275	53	6.2	
D -9.8	1500	30		2.30	2.03	5.0	991.97	83	74	130	223	266	57	~~5.8~~ DPC	
	1510						992.10							~~Acc~~	~~Nc~~
C -65.70	1520	40		1.90	1.69	4.5	999.15	84	76	131	239	294	52	~~5.4~~	~~14.1~~
C -32.40	1530	50	-1.704	2.10	1.87	4.7	006.56	86	78	131	239	306	49	5.4	14.1
C -9.80	1540	60		2.00	1.78	4.7	013.80	88	79	129	256	302	50	5.9	14.2
	1550						013.95								
B -65.70	1600	70		2.00	1.78	4.5	021.19	87	80	130	248	317	51	5.6	14.5
B -32.40	1610	80	-1.871	2.20	1.96	5.2	028.81	89	81	130	247	319	53	5.5	14.6
B -9.80	1620	90		2.00	1.78	5.0	036.11	90	82	129	249	316	55	5.3	14.9
	1650						036.60								
A -65.70	1700	100		2.20	1.96	5.0	044.28	83	80	130	264	302	61	6.2	14.0
A -32.40	1710	110	-1.940	2.40	2.12	5.5	052.27	87	80	130	255	315	51	5.9	14.3
A -9.80	1720	120		2.30	2.03	5.3	060.00	88	81	130	262	323	55	5.4	14.8
AVERAGE			+1.84	2.147	1.90		40.13	81.4		130				5.7	14.4

Sample Train Pre Test 0.000 ft³ @ 10 in. Hg
Leak Checks: Post Test <0.02 ft³ @ 10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY.

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI- NE	METER BOX	N-1	CAL. DATA: delta H	1.931	Comments:	Single point in one port. Ten minute readings.		
PLANT	Plant 6	PITOT TUBE DESC	E-812	Y	0.994				
LOCATION	FGD INLET	PROBE LENGTH [ft]	~~8~~ 10	C(p)	0.835				
DATE	11-2-04	NOZZLE ID [inch]	3/16 B 0.188	FILTER BOX SETTING	NA				
OPERATOR(S)	JL DJ	%H_2O (Assumed)	8.5	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	1	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.×35	K FACTOR	0.89	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1425	0					456.790								
A-1	1435	10		0.92	0.81	2.5	461.86	79	78		281	NA	64		
		20	+11.75	0.97	0.81	2.5	466.80	80	79		282		56		
		30	12.23	1.00	0.81	2.5	471.73	85	80		290		54		
		40	12.39	1.00	0.81	3.0	476.63	86	81		309		56	7.2	
		50	12.35	1.00	0.81	3.0	481.61	90	83	335	314		56	7.1	10.3
		60	12.27	1.00	0.81	3.0	486.60	92	84	335	325		54	7.0	10.3
		70	11.71	0.99	0.81	3.5	491.57	92	85	334	320		56	6.9	10.3
		80	11.86	1.00	0.88	3.5	496.74	92	85	334	295		58	7.0	10.3
		90	12.23	1.00	0.88	4.0	501.90	92	84	334	273		58	7.1	10.3
		100	12.15	1.00	0.88	5.0	~~506.91~~ ?	93	84	334	294		57	7.4	10.1
		110	12.46	1.00	0.88	5.0	512.27	93	84	336	305		57	7.5	10.0
	1625	120	12.27	1.00	0.88	5.5	517.49	94	84	336	310		59	7.4	10.1
				Rms											
AVERAGE			+12.15	0.990	0.839		60.70	86.1		335				7.2	10.2

Sample Train Pre Test _____ ft^3 @ _____ in. Hg
Leak Checks: Post Test _____ ft^3 @ _____ in. Hg

Pitot Tube PreTest _____ @ _____ in. H_2O
Leak Checks: Post Test _____ @ _____ in. H_2O

CONSOL ENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI- 2	METER BOX	N-1	CAL. DATA: delta H	1.781	Comments:	Single point in one port. Ten minute readings.		
PLANT	Plant 6	PITOT TUBE DESC		Y	0.984				
LOCATION	FGD INLET	PROBE LENGTH [ft]	12	C(p)					
DATE	11-3-04	NOZZLE ID [inch]		FILTER BOX SETTING	NA				
OPERATOR(S)	JL DO	%H_2O (Assumed)	8.5	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	48	FILTER ID	2	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.55	K FACTOR	0.89	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	0920	0					525.16								
A-1	0930	10		1.1	0.97	3.5	530.62	69	68	328	263	NA	54		
1	0940	20	12.65	1.1	0.97	3.5	535.78	69	68	330	280		49	7.9	12.1
	0950	30	11.75	1.0	0.88	4.0	540.89	74	69	328	281		48	7.7	12.6
	1000	40	12.17	1.0	0.85	4.0	546.01	77	70	330	279		48	8.0	
	1010	50	11.73	1.0	0.88	4.0	551.14	79	71	330	280		49	8.1	12.0
	1020	60	11.98	1.0	0.88	4.0	556.28	80	72	329	306		49	8.1	12.0
	1030	70	12.20	1.0	0.88	4.0	561.39	81	73	330	316		49	8.2	12.0
	1040	80	12.29	1.0	0.88	4.5	566.53	81	74	330	318		49	8.2	12.0
	1050	90	12.04	1.0	0.88	5.0	— ?	82	75	331	322		49	8.0	12.0
	1100	100	12.85	1.1	0.97	5.0	577.07	82	75	331	324		48	8.7	11.6
	1110	110	12.37	1.1	0.97	6.0	582.45	85	77	332	325		49	8.7	
	1120	120		1.1	0.97	6.0	587.87	85	77	332	325		47	8.7	11.6
				RMS											
AVERAGE			12.20	1.041	0.918		62.71	75.5		330.1				8.2	12.0

Sample Train Leak Checks: Pre Test 0.015 ft^3 @ 10 in. Hg; Post Test 0.010 ft^3 @ 7 in. Hg

Pitot Tube Leak Checks: PreTest OK @ 8 in. H_2O; Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	STK - 2	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Three Points per port per four ports		
PLANT	Plant 6	PITOT TUBE DESC	E-2	Y	0.976		Ten minutes per point		
LOCATION	Unit 4 Stack	PROBE LENGTH [ft]	8	C(p)	0.837				
DATE	11-3-04	NOZZLE ID [inch]	3/16 E 0.137	FILTER BOX SETTING	325				
OPERATOR(S)	DPC, BPS	%H_2O (Assumed)		PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	57	FILTER ID	7	DUCT X-SECTION	circ ?	rect ?	other:		
BAR. PRESS. [" Hg]	~~29.45~~ 29.55	K FACTOR	0.89	DUCT DIMENSIONS	19.5 ft.	DUCT AREA	298.65 ft²		

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft³]	METER TEMP (6) (7) [oF] inlet	METER TEMP (6) (7) [oF] outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	0920	0					066.20								
A -65.7	0930	10		2.20	1.96	5.0	073.80	68	62	129	263	303	41		
A -32.4	0940	20	-2.140	2.40	2.14	5.5	081.64	74	64	129	244	307	45	6.0	14.1
A -9.8	0950	30		2.00	1.78	4.9	088.87	76	66	128	240	309	49	6.1	14.1
	1000						089.00								
B -65.70	1010	40		1.90	1.69	4.2	095.98	74	67	128	213	267	45	6.0	14.1
B -32.40	1020	50	-1.876	2.10	1.87	4.8	103.31	77	68	129	210	259	45	6.0	14.1
B -9.80	1030	60		2.00	1.76	4.5	110.42	78	69	128	237	271	47	5.7	14.3
	1038						110.55								
C -65.70	1048	70		2.00	1.78	4.5	117.76	77	70	129	232	278	46	6.0	14.1
C -32.40	1058	80	-2.004	2.10	1.87	4.9	125.14	79	71	128	239	289	48	5.9	14.2
C -9.80	1108	90		2.00	1.78	4.9	132.35	81	72	128	247	294	52	6.0	14.0
	1113						132.50								
D -65.70	1123	100		2.20	1.96	5.4	140.12	79	72	129	240	291	51	6.4	13.8
D -32.40	1133	110	-2.177	2.30	2.05	5.5	147.84	80	73	129	234	304	52	6.0	14.2
D -9.80	1143	120		2.40	2.14	5.8	155.76	81	73	129	240	320	56	6.0	14.1
AVERAGE			-2.05	2.130	1.90		89.15	72.9		128.6				6.0	14.1

Sample Train Pre Test 0.000 ft³ @ -10 in. Hg
Leak Checks: Post Test 0.000 ft³ @ -10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI-3	METER BOX	N-5	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.		
PLANT	Plant 6	PITOT TUBE DESC		Y	0.984				
LOCATION	FGD INLET	PROBE LENGTH [ft]	12	C(p)					
DATE	11-3-04	NOZZLE ID [inch]		FILTER BOX SETTING	NA				
OPERATOR(S)	JL DO	%H_2O (Assumed)	6.5	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	3	DUCT X-SECTION	circ ?	(rect ?)	other:		
BAR. PRESS. [" Hg]	29.54	K FACTOR	0.89	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1240	0					593.862								
A-1	1250	10		1.0	0.89	2.0	599.02	74	74	321	298	NA	56		
	1:00	20	12.07	1.0	0.89	2.0	604.14	76	74	328	302		48	7.3	
	1:10	30	12.41	1.0	0.89	2.5	609.26	78	75	328	311		49	7.4	13.0
	1:20	40	12.49	1.0	0.85	3.0	614.39	81	75	328	296		50	7.6	
	1:30	50	12.68	1.0	0.85	3.0	619.59	83	76	329	286		51	7.3	12.5
	1:40	60	12.52	1.0	0.89	3.5	624.73	84	77	330	283		53	7.4	
	1:50	70	12.90	1.0	0.89	3.5	629.84	84	77	329	303		51	7.5	
	2:00	80	12.95	1.0	0.89	3.5	634.99	85	78	330	312		50	7.7	12.5
	2:10	90	12.90	1.0	0.89	3.5	640.13	85	78	331	323		49	8.0	12.2
	2:20	100	12.69	1.0	0.89	4.5	645.28	85	78	331	319		50	8.1	12.2
	2:30	110	12.99	1.0	0.89	5.0	650.45	85	78	331	320		49	8.0	12.0
	2:40	120	13.09	1.0	0.89	5.5	655.41	85	79	331	315		49	8.2	12.0
				Rins											
AVERAGE			12.70	1.00	0.89		61.748	79.3		328.9				7.7	12.3

Sample Train Pre Test 0.000 ft^3 @ 10 in. Hg
Leak Checks: Post Test 0.000 ft^3 @ 5 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 8 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	STK - 3	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Three Points per port per four ports		
PLANT	Plant 6	PITOT TUBE DESC	E-2	Y	0.976		Ten minutes per point		
LOCATION	Unit 4 Stack	PROBE LENGTH [ft]	8	C(p)	0.837				
DATE	11-3-04	NOZZLE ID [inch]	3/16 E 0.137	FILTER BOX SETTING	325				
OPERATOR(S)	DPC, BPS	%H_2O (Assumed)		PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	54	FILTER ID	8	DUCT X-SECTION	(circ ?)	rect ?	other:		
BAR. PRESS. [" Hg]	29.54	K FACTOR	0.89	DUCT DIMENSIONS	19.5 ft.	DUCT AREA	298.65 ft^2		

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] (6) inlet	METER TEMP [oF] (7) outlet	STACK TEMP (1) [°F]	PROBE TEMP (2) [°F]	FILTER BOX (3) [°F]	LAST IMP TEMP (4) [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1240	0					161.60								
D -65.7	1250	10		2.10	1.87	4.1	168.97	70	67	128	225	294	46	6.3	13.8
D -32.4	1300	20	-2.275	2.30	2.05	4.7	176.60	75	68	128	228	300	44	6.3	13.8
D -9.8	1310	30		2.10	1.87	4.4	184.02	77	69	127	241	307	44	6.4	13.7
	1318						184.15								
C -65.70	1326	40		1.90	1.69	4.0	191.18	73	69	128	195	292	45	6.1	13.9
C -32.40	1338	50	-1.951	2.10	1.87	4.4	198.57	77	69	129	221	302	46	6.1	14.0
C -9.80	1348	60		2.00	1.78	4.3	205.77	79	70	128	223	305	48	6.4	13.7
	1358						205.92								
B -65.70	1406	70		2.10	1.87	4.8	213.35	78	71	129	207	310	48	6.1	14.0
B -32.40	1416	80	-1.695	2.30	2.05	5.1	221.04	79	71	128	226	310	50	6.0	14.0
B -9.80	1428	90		2.10	1.87	5.0	228.52	80	72	127	230	311	54	6.0	14.1
	1434						228.67								
A -65.70	1444	100		2.20	1.96	5.0	236.23	78	71	128	216	312	53	6.0	14.1
A -32.40	1454	110	-2.320	2.40	2.14	5.5	244.14	79	71	127	233	315	58	5.9	14.2
A -9.80	1504	120		2.30	2.05	5.3	251.92	79	72	127	244	316	64	5.9	14.2
				Rus											
AVERAGE			-2.06	2.156	1.92		89.89	73.5		127.8				6.1	14.0

Sample Train Pre Test 0.000 ft^3 @ -10 in. Hg
Leak Checks: Post Test 0.000 ft^3 @ -10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY.

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	FGDI-4	METER BOX	N-1	CAL. DATA: delta H	1.981	Comments:	Single point in one port. Ten minute readings.		
PLANT	Plant 6	PITOT TUBE DESC		Y	0.984				
LOCATION	FGD INLET	PROBE LENGTH [ft]	12	C(p)					
DATE	11-3-07	NOZZLE ID [inch]		FILTER BOX SETTING	NA				
OPERATOR(S)	JC DO	%H_2O (Assumed)	0.5	PROBE HTR SETTING	325				
AMBIENT TEMP [°F]		FILTER ID	4	DUCT X-SECTION	circ ? (rect ?)	other:			
BAR. PRESS. [" Hg]	29.47	K FACTOR	0.84	DUCT DIMENSIONS		DUCT AREA			

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	METER TEMP [oF] inlet	METER TEMP [oF] outlet	STACK TEMP [°F]	PROBE TEMP [°F]	FILTER BOX [°F]	LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1536	0					672.23								
A-1	1546	10	12.00	1.1	0.96	3.0	677.60	78	77	334	270	NA	60		
	1556	20	12.15	1.1	0.96	3.0	682.82	80	76	334	285		53	6.4	13.7
	1606	30	12.23	1.1	0.94	3.0	688.14	82	77	334	288		53	6.1	
	1616	40	12.70	1.1	0.94	4.0	693.50	84	77	336	291		53	6.1	13.9
	1626	50	12.76	1.1	0.94	4.0	698.83	84	77	337	291		53	6.2	
	1636	60	12.98	1.1	0.94	4.5	704.25	84	77	336	287		53	6.1	14.0
	1646	70	12.64	1.1	0.96	4.5	709.56	85	78	336	290		51	6.3	13.8
	1656	80	12.43	1.1	0.96	5.0	714.95	86	78	335	291		51	6.3	13.8
	1706	90	12.55	1.1	0.94	5.5	720.35	85	78	334	290		52	6.2	13.8
	1716	100	12.49	1.1	0.96	6.0	725.71	85	79	336	290		52	6.4	13.6
	1726	110	12.56	1.1	0.94	6.5	731.08	86	79	335	290		53	6.2	13.9
	1736	120	12.54	1.1	0.94	7.0	736.16	87	79	335	290		53		
AVERAGE			12.46	1.10	0.96		63.93	80.8		335.2				6.2	13.8

Sample Train Pre Test 0.000 ft^3 @ 10 in. Hg
Leak Checks: Post Test 0.010 ft^3 @ 10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 8 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

ONTARIO HYDRO Hg SAMPLING AND SPECIATION FIELD DATA SHEET

TEST ID	STK - 4	METER BOX	N-2	CAL. DATA: delta H	1.956	Comments:	Three Points per port per four ports		
PLANT	Plant 6	PITOT TUBE DESC	E-2	Y	0.976		Ten minutes per point		
LOCATION	Unit 4 Stack	PROBE LENGTH [ft]	8	C(p)	0.837				
DATE	11-3-09	NOZZLE ID [inch]	3/16 E 0.137	FILTER BOX SETTING	325				
OPERATOR(S)	DPC, DPS	%H_2O (Assumed)		PROBE HTR SETTING	325				
AMBIENT TEMP [°F]	55	FILTER ID	9	DUCT X-SECTION	circ ?	rect ?	other:		
BAR. PRESS. [" Hg]	29.47	K FACTOR	0.89	DUCT DIMENSIONS	19.5 ft.	DUCT AREA	298.65 ft^2		

TRAVERSE POINT [port-inch]	CLOCK TIME (24-hr)	SAMPLE TIME [minute]	STATIC PRES [" H_2O]	PITOT HEAD [" H_2O]	METER DIFF PRESSURE [" H_2O]	METER VACUUM [" Hg]	METER READING [ft^3]	(6) METER TEMP [oF] inlet	(7) METER TEMP [oF] outlet	(1) STACK TEMP [°F]	(2) PROBE TEMP [°F]	(3) FILTER BOX [°F]	(4) LAST IMP TEMP [°F]	METER EXHAUST O_2 [% vol]	METER EXHAUST CO_2 [% vol]
	1538	0					257.90								
A -65.7	1548	10		2.20	1.96	4.8	265.52	74	69	129	260	297	47	6.1	14.1
A -32.4	1558	20	-2.173	2.40	2.14	5.3	273.46	78	70	129	251	311	50	6.1	14.0
A -9.8	1608	30		2.20	1.96	5.0	280.96	79	70	128	255	315	50	6.1	14.0
	1616						281.10								
B -65.70	1626	40		2.10	1.87	4.8	288.50	77	70	130	242	307	49	5.8	14.3
B -32.40	1636	50	-2.228	2.20	1.96	5.0	296.01	79	71	129	244	309	51	5.9	14.2
B -9.80	1646	60		2.10	1.87	4.9	303.38	79	71	129	249	312	53	5.9	14.2
	1656						303.50								
C -65.70	1706	70		2.00	1.78	4.5	310.72	76	71	130	234	309	48	6.1	14.1
C -32.40	1716	80	-1.819	2.20	1.96	5.0	318.23	79	71	130	237	314	51	6.0	14.1
C -9.80	1726	90		1.90	1.69	4.7	325.26	80	72	129	237	315	56	6.0	14.0
	1732						325.40								
D -65.70	1742	100		2.20	1.96	5.1	332.91	78	72	130	244	316	52	6.1	14.0
D -32.40	1752	110	-2.048	2.50	2.23	5.9	341.04	80	72	129	251	321	53	6.3	13.8
D -9.80	1802	120		2.30	2.05	5.4	348.78	80	72	128	260	323	58	6.2	13.9
				RMS											
AVERAGE			-2.07	2.189	1.95		90.48	74.6		129.2				6.1	14.1

Sample Train Pre Test 0.000 ft^3 @ -10 in. Hg
Leak Checks: Post Test 0.000 ft^3 @ -10 in. Hg

Pitot Tube PreTest OK @ 7 in. H_2O
Leak Checks: Post Test OK @ 7 in. H_2O

CONSOLENERGY

NOTE: Purge for 10 minutes at end of sampling.

PLANT 6 Hg SAMPLING PROGRAM - ONTARIO HYDRO SAMPLING TRAIN DATA

Location			FGD Inlet Unit 4	Stack Unit 4	FGD Inlet Unit 4	Stack Unit 4	FGD Inlet Unit 4	Stack Unit 4	FGD Inlet Unit 4	Stack Unit 4
Date			11/02/04	11/02/04	11/03/04	11/03/04	11/03/04	11/03/04	11/03/04	11/03/04
Start Time			1425	1430	920	920	1240	1240	1536	1538
Stop Time			1625	1720	1120	1143	1440	1504	1736	1802
Test Number			FGD-1	STK-1	FGD-2	STK-2	FGD-3	STK-3	FGD-4	STK-4
Sample Type			OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg	OH-Hg
Y factor of dry gas meter	-		0.984	0.976	0.984	0.966	0.984	0.966	0.984	0.966
Gas Volume	-	ft^3	60.70	90.13	62.71	89.15	61.75	89.89	63.93	90.48
Delta H of dry gas meter	-	" H_2O	0.84	1.90	0.92	1.90	0.89	1.92	0.96	1.95
Meter Temperature	-	°F	86.1	81.4	75.5	72.9	79.3	73.5	80.8	74.6
C Factor of pitot tube	-		0.835	0.837	0.835	0.837	0.835	0.837	0.835	0.837
Nozzle Diameter	-	inches	0.189	0.183	0.188	0.183	0.188	0.183	0.188	0.183
A n (area of nozzle)	-	ft^2	0.00019	0.00018	0.00019	0.00018	0.00019	0.00018	0.00019	0.00018
Area of Stack (Single of Dual)	-	ft^2	524.7	298.6	524.7	298.6	524.7	298.6	524.7	298.6
H_2O Weight	-	gm	108.3	354.3	91.9	336.5	110.4	347.3	128.7	358.1
Sample Time	-	minutes	120	120	120	120	120	120	120	120
Barometric Pressure	-	" Hg	29.35	29.35	29.55	29.55	29.54	29.54	29.47	29.47
Static Pressure	-	" H_2O	12.15	-1.84	12.20	-2.05	12.70	-2.06	12.46	-2.07
% Oxygen	-		7.2	5.7	8.2	6.0	7.7	6.1	6.2	6.1
% Carbon Dioxide	-		10.2	14.4	12.0	14.1	12.3	14.0	13.8	14.1
% N_2 + CO	-		82.6	79.9	79.8	79.9	80.0	79.9	80.0	79.8
Stack Temp (Dry Bulb)	-	°F	335	130	330	129	329	128	335	129
Stack Temp (Wet Bulb)	-	°F	335.0	130.0	330.1	128.6	328.9	127.8	335	129.2
"S" sample (rms vel head)	-	" H_2O	0.990	2.147	1.041	2.130	1.000	2.156	1.100	2.189
Dust Wt.	-	gm	0.0441	0.0911	0.0675	0.0883	0.0369	0.0233	0.0962	0.0655
Sample Volume	-	DSCF	56.75	84.52	60.20	84.64	58.84	85.22	60.62	85.41
Sample Volume	-	dscm	1.607	2.394	1.705	2.397	1.666	2.413	1.717	2.419
ABS ST PRES	-	" Hg	30.24	29.21	30.45	29.40	30.47	29.39	30.39	29.32
ABS ST TEMP	-	°R	795	590	790	589	789	588	795	589
H_2O - % by Vol	-	vapor	8.2	16.5	6.7	15.8	8.1	16.1	9.1	16.5
Water Volume	-	std ft^3	5.10	16.69	4.33	15.85	5.20	16.36	6.06	16.87
Dry Molecular Weight	-	lb/lb-mole	29.92	30.53	30.25	30.50	30.28	30.48	30.46	30.50
Wet Molecular Weight	-	lb/lb-mole	28.94	28.47	29.43	28.53	29.28	28.47	29.32	28.44
% EXCESS AIR	-		49.3	37.0	63.7	39.8	57.4	40.7	41.6	40.8
Dry Mole Frac.	-		0.918	0.835	0.933	0.842	0.919	0.839	0.909	0.835
Wet Mole Frac.	-		0.082	0.165	0.067	0.158	0.081	0.161	0.091	0.165
Gas Velocity, Direct	-	ft/sec	67.70	88.31	68.40	87.49	67.12	88.06	70.73	89.00
ACFM	-		2131257	1582457	2153280	1567726	2113215	1577905	2226710	1594728
DSCFM	-		1312769	1154788	1366100	1163891	1323556	1168000	1365027	1169383
DSCFM (rounded)			1312800	1154800	1366100	1163900	1323600	1168000	1365000	1169400
DSCMM			37178	32704	38688	32961	37483	33078	38658	33117
Excess Air Free DSCFM	-		860523	839846	830118	829759	835930	827100	960091	828080
Stack-based DSCMM			41248	32704	45390	32961	42026	33078	38921	33117
CALCULATED FIRING RATE:										
Dry	-	lb/min	7004	6836	6647	6644	6724	6653	7732	6669
Wet	-	lb/min	7881	7692	7510	7507	7545	7466	8829	7615
Dry	-	lb/hr	420251	410153	398833	398661	403423	399162	463910	400123
Wet	-	lb/hr	472883	461520	450608	450413	452725	447943	529759	456918
CALCULATED FIRING RATE:										
Dry	-	tons/hr	210.1	205.1	199.4	199.3	201.7	199.6	232.0	200.1
Wet	-	tons/hr	236.4	230.8	225.3	225.2	226.4	224.0	264.9	228.5
HEAT INPUT:										
MM Btu/hr	-		5275	5148	5045	5043	5122	5068	5829	5028
PARTICULATE LOADING:										
Grains/DSCF	-		0.0120	0.0166	0.0173	0.0161	0.0097	0.0042	0.0245	0.0118
lb/hr	-		135	164.68	203	160.65	109.8	42.25	286.6	118.66
lb/MM Btu	-		0.03	0.03	0.04	0.03	0.02	0.01	0.05	0.02
Ash Production		lb/hr	55011	53689	50413	50391	49661	49137	60030	51776
Bagouse Ash			135	164.68	203	160.65	110	42.25	287	118.66
Bottom Ash			54876	53524	50210	50230	49552	49095	59743	51657
Percent Fly Ash			0.2%	0.3%	0.4%	0.3%	0.2%	0.1%	0.5%	0.2%
% ISOKINETIC	-		97.1	99.8	100.1	99.2	100.9	99.5	100.8	99.6

Impinger Components Wts & Volumes	FGD-1	STK-1	FGD-2	STK-2	FGD-3	STK-3	FGD-4	STK-4
Filter Wt., g	0.0441	0.0911	0.0675	0.0883	0.0369	0.0233	0.0962	0.0655
ppb Hg	105	<11.7	7.7	<5.0	<5.0	<5.0	75.4	<5.0
total ug	1.05E-01	1.17E-02	7.70E-03	5.00E-03	5.00E-03	5.00E-03	7.54E-02	5.00E-03
ug/dscm	6.53E-02	4.89E-03	4.52E-03	2.09E-03	3.00E-03	2.07E-03	4.39E-02	2.07E-03
Probe Rinse volume, ml	73	104	85	100	90	86	86	89
Analytical Hg, ng/ml	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	1.7
ug/dscm	<0.05	<0.04	<0.05	0.06	<0.05	<0.04	<0.05	0.06
Heated Umbilical Line Rinse volume, ml	113	NA	106	NA	101	NA	94	NA
Analytical Hg, ng/ml	<1.0		<1.0		<1.0		<1.0	
ug/dscm	<0.07		<0.06		<0.06		<0.05	
KCl volume, ml	551	793	601	769	551	778	567	794
Analytical Hg, ng/ml	41.0	3.0	18.7	3.4	23.8	3.4	13.8	3.2
ug/dscm	14.06	0.99	6.59	1.09	7.87	1.10	4.56	1.05
Nitric/Peroxide volume, ml	174	176	131	183	175	180	175	181
Analytical Hg, ng/ml	1.1	<0.70	2.4	0.6	0.5	0.9	1.7	0.8
ug/dscm	0.12	<0.05	0.18	0.05	0.05	0.07	0.17	0.06
KMnO4 volume, ml	247	243	227	244	251	247	251	248
Analytical Hg, ng/ml	4.9	16.5	3.3	12.3	2.6	12.9	11.3	26.2
ug/dscm	0.75	1.68	0.44	1.25	0.39	1.32	1.65	2.69
KMnO4-Acid Rinse volume, ml	100	100	100	100	100	100	100	100
Analytical Hg, ng/ml	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ug/dscm	0.06	<0.04	<0.06	<0.04	<0.06	<0.04	<0.06	<0.04
Particulate, ug/m^3	6.53E-02	4.89E-03	4.52E-03	2.09E-03	3.00E-03	2.07E-03	4.39E-02	2.07E-03
Particulate, mg/sec	4.49E-02	2.66E-03	3.42E-03	1.15E-03	2.10E-03	1.14E-03	2.85E-02	1.14E-03
Percent of Total	0.43	0.17	0.06	0.08	0.04	0.08	0.67	0.05
Oxidized Fraction, ug/m^3	14.17	1.04	6.70	1.15	7.98	1.13	4.66	1.11
Oxidized Fraction, mg/sec	9.74	0.57	5.07	0.63	5.59	0.62	3.02	0.61
Percent of Total	93.41	36.91	90.71	46.14	94.03	44.16	70.75	28.52
Elemental Fraction, ug/m^3	0.93	1.77	0.68	1.34	0.50	1.43	1.88	2.79
Elemental Fraction, mg/sec	0.64	0.96	0.52	0.74	0.35	0.79	1.22	1.54
Percent of Total	6.16	62.92	9.23	53.78	5.94	55.76	28.58	71.43
Total Hg (ug/m^3)	15.17	2.81	7.39	2.49	8.49	2.56	6.59	3.90
Hg mg/sec, stack flow based	10.43	1.53	5.59	1.37	5.95	1.41	4.28	2.15

APPENDIX B

Plant Process Data

Tagname *Units*	4G3000.PV MW LOAD	4C3226.PV KPPH A FEEDER	4C3326.PV KPPH B FEEDER	4C3426.PV KPPH C FEEDER	4C3526.PV KPPH D FEEDER	4C3626.PV KPPH E FEEDER	4FW2P05.PV KPPH FEED WTR	4D3372.PV DEGF A AH GAS OUT
TEST #1 START								
12-Aug-04 11:30:00	519.894	87.784	87.761	87.709	87.758	87.338	3725.923	331.647
12-Aug-04 11:40:00	519.994	87.920	87.879	87.809	87.822	87.381	3726.838	332.243
12-Aug-04 11:50:00	520.377	88.093	88.054	88.142	88.159	87.796	3722.109	332.793
12-Aug-04 12:00:00	519.607	88.256	88.271	88.175	88.210	87.790	3714.925	332.389
12-Aug-04 12:10:00	520.251	88.030	87.885	87.898	87.940	87.532	3715.522	331.369
12-Aug-04 12:20:00	520.470	87.946	87.950	87.921	87.935	87.544	3709.031	331.772
12-Aug-04 12:30:00	520.054	88.098	88.083	88.052	88.119	87.617	3731.927	331.543
12-Aug-04 12:40:00	521.617	88.261	88.242	88.160	88.249	87.773	3695.208	330.665
12-Aug-04 12:50:00	520.118	87.924	87.941	87.941	87.902	87.656	3715.115	329.377
12-Aug-04 13:00:00	520.264	88.181	88.205	88.165	88.191	87.804	3689.976	330.559
12-Aug-04 13:10:00	521.176	87.603	87.692	87.704	87.638	87.303	3697.947	330.246
12-Aug-04 13:20:00	519.957	88.543	88.455	88.403	88.478	88.112	3685.570	331.543
12-Aug-04 13:30:00	520.250	87.916	87.873	87.876	87.931	87.435	3677.677	330.622
12-Aug-04 13:40:00	519.875	87.750	87.814	87.843	87.848	87.453	3685.256	331.679
12-Aug-04 13:50:00	519.533	88.139	88.101	88.026	88.156	87.597	3682.790	332.977
12-Aug-04 14:00:00	520.036	88.172	88.188	88.089	88.163	87.699	3709.677	335.032
12-Aug-04 14:10:00	520.255	87.872	87.866	87.931	87.977	87.609	3691.081	332.989
12-Aug-04 14:20:00	519.624	88.033	88.053	87.886	88.053	87.582	3686.431	333.031
TEST #1 END								
AVERAGES	520.19	88.029	88.017	87.985	88.030	87.612	3703.50	331.80

Tagname	4D3373.PV	4M30013.PV	4N3150.PV	4N3151W.PV	4N3350.PV	4N3351W.PV	4M30014.PV	4M30015.PV
Units	DEGF	PPM	PPM	PPM	PPM	PPM	PPM	%
	B AH GAS OUT	STK SO2	A SCR INLT NOX	A SCR OUT NOX	B SCR INLT NOX	B SCR OUT NOX	STK NOX	STK CO2
TEST #1 START								
12-Aug-04 11:30:00	347.201	153.962	258.223	20.754	272.957	22.012	18.997	11.144
12-Aug-04 11:40:00	347.579	155.407	256.026	19.917	280.402	20.444	17.855	11.113
12-Aug-04 11:50:00	347.631	154.393	254.238	20.436	277.143	20.948	18.338	11.063
12-Aug-04 12:00:00	349.456	157.671	252.230	20.885	265.692	22.560	20.337	11.105
12-Aug-04 12:10:00	347.028	159.307	252.438	20.865	270.559	22.012	20.008	11.077
12-Aug-04 12:20:00	348.983	155.700	253.354	20.627	269.942	22.149	20.002	11.139
12-Aug-04 12:30:00	347.291	161.150	251.680	19.480	274.825	21.362	19.199	11.138
12-Aug-04 12:40:00	346.491	170.263	253.730	19.701	272.887	21.638	19.803	11.068
12-Aug-04 12:50:00	345.667	163.957	252.349	20.357	268.086	21.910	20.154	11.140
12-Aug-04 13:00:00	347.026	168.921	252.282	20.319	267.678	22.571	20.187	11.080
12-Aug-04 13:10:00	346.061	171.518	253.251	20.671	277.905	22.067	20.256	11.118
12-Aug-04 13:20:00	347.214	174.030	254.194	20.091	273.295	21.515	20.046	11.139
12-Aug-04 13:30:00	346.962	167.655	253.517	19.574	269.076	20.933	19.752	11.139
12-Aug-04 13:40:00	348.036	166.044	254.860	20.630	273.807	21.671	19.895	11.139
12-Aug-04 13:50:00	350.076	170.313	253.338	20.836	268.330	21.829	20.142	11.139
12-Aug-04 14:00:00	350.310	172.918	251.776	20.185	275.703	20.801	19.854	11.136
12-Aug-04 14:10:00	347.940	175.029	251.182	19.432	269.445	22.287	19.896	11.032
12-Aug-04 14:20:00	348.717	180.379	253.914	21.162	274.120	22.711	20.392	11.139
TEST #1 END								
AVERAGES	347.76	165.48	253.48	20.33	272.33	21.75	19.73	11.11

Tagname	**4M3104.PV**	4M30057.PV	4ARIT1P06.PV	4BRIT1P06.PV	4AROT1P06.PV	4BROT1P06.PV	4N3132.PV
Units	%		DEGF	DEGF	DEGF	DEGF	PPH
	BLR O2	**STK FLOW**	**A SCR INLT** TEMP	**B SCR INLT** TEMP	**A SCR OUT** TEMP	**B SCR OUT** TEMP	**A NH3 FLOW**
TEST #1 START							
12-Aug-04 11:30:00	3.562	81.704	679.351	663.886	677.400	667.798	335.055
12-Aug-04 11:40:00	3.573	82.425	678.957	663.503	677.379	667.213	327.385
12-Aug-04 11:50:00	3.622	81.917	680.094	663.773	677.782	667.271	325.669
12-Aug-04 12:00:00	3.569	82.408	679.430	663.314	677.413	667.372	325.946
12-Aug-04 12:10:00	3.551	82.407	677.727	663.472	676.485	666.775	325.999
12-Aug-04 12:20:00	3.576	81.776	677.313	663.408	675.760	667.166	331.521
12-Aug-04 12:30:00	3.537	82.394	678.004	663.154	676.330	666.712	325.019
12-Aug-04 12:40:00	3.638	82.883	679.653	664.551	676.723	667.226	327.603
12-Aug-04 12:50:00	3.633	81.637	680.014	664.769	677.445	667.879	324.413
12-Aug-04 13:00:00	3.571	81.307	680.405	665.148	677.636	668.045	325.331
12-Aug-04 13:10:00	3.515	82.071	681.332	666.090	678.346	668.715	328.851
12-Aug-04 13:20:00	3.676	81.786	682.597	667.320	678.825	669.531	333.330
12-Aug-04 13:30:00	3.556	81.686	683.383	667.975	680.076	670.540	326.202
12-Aug-04 13:40:00	3.579	81.526	684.169	668.389	680.712	671.065	327.897
12-Aug-04 13:50:00	3.596	80.823	684.990	668.395	681.601	671.767	329.837
12-Aug-04 14:00:00	3.552	81.591	682.724	665.566	681.609	670.445	329.675
12-Aug-04 14:10:00	3.556	82.648	681.739	663.931	680.476	668.881	328.077
12-Aug-04 14:20:00	3.583	81.927	678.816	662.210	678.427	667.279	333.144
TEST #1 END							
AVERAGES	3.58	81.94	680.59	664.94	678.36	668.43	328.39

Tagname	4N3332.PV	4P125APH.PV	4P125BPH.PV	4P125AFL.PV	4P125BFL.PV	4P120ADN.PV	4P120BDN.PV
Units	PPH	PH	PH				
	B NH3 FLOW	**A REACTION** TANK PH	**B REACTION** TANK PH	**A REACTANT** FLOW	**B REACTANT** FLOW	**A REACTION** TANK DEN	**B REACTION** TANK DEN
TEST #1 START							
12-Aug-04 11:30:00	347.811	5.921	5.907	134.932	118.863	8.924	8.054
12-Aug-04 11:40:00	346.642	5.933	5.902	122.793	120.495	9.118	8.280
12-Aug-04 11:50:00	338.804	5.938	5.902	110.434	120.038	9.221	8.551
12-Aug-04 12:00:00	331.616	5.940	5.899	97.260	120.972	9.462	8.707
12-Aug-04 12:10:00	337.267	5.939	5.899	86.462	122.800	9.654	8.909
12-Aug-04 12:20:00	338.421	5.926	5.907	82.888	116.662	9.738	9.155
12-Aug-04 12:30:00	341.395	5.914	5.905	81.797	115.595	9.955	9.354
12-Aug-04 12:40:00	338.785	5.894	5.907	90.959	112.547	10.168	9.561
12-Aug-04 12:50:00	331.940	5.883	5.908	98.993	108.501	10.508	9.725
12-Aug-04 13:00:00	336.228	5.879	5.904	107.975	108.562	10.621	9.897
12-Aug-04 13:10:00	345.635	5.880	5.899	113.613	111.660	10.659	10.038
12-Aug-04 13:20:00	344.712	5.876	5.897	122.726	114.363	10.728	10.181
12-Aug-04 13:30:00	338.777	5.884	5.898	125.662	115.123	10.852	10.486
12-Aug-04 13:40:00	343.187	5.897	5.900	123.274	113.973	10.992	10.662
12-Aug-04 13:50:00	338.177	5.909	5.900	117.613	113.933	10.919	10.900
12-Aug-04 14:00:00	341.798	5.918	5.897	108.416	116.740	10.969	10.941
12-Aug-04 14:10:00	336.228	5.922	5.903	103.467	113.997	10.839	11.059
12-Aug-04 14:20:00	345.888	5.944	5.908	82.550	108.960	10.651	11.233
TEST #1 END							
AVERAGES	340.18	5.91	5.90	106.21	115.21	10.22	9.76

Tagname *Units*	4G3000.PV MW LOAD	4C3226.PV KPPH A FEEDER	4C3326.PV KPPH B FEEDER	4C3426.PV KPPH C FEEDER	4C3526.PV KPPH D FEEDER	4C3626.PV KPPH E FEEDER	4FW2P05.PV KPPH FEED WTR	4D3372.PV DEGF A AH GAS OUT
TEST #2 START								
12-Aug-04 16:50:00	520.401	88.634	88.644	88.586	88.566	88.226	3639.267	331.328
12-Aug-04 17:00:00	520.204	88.068	88.116	88.133	88.051	87.709	3639.035	330.339
12-Aug-04 17:10:00	519.846	87.512	87.483	87.473	87.498	87.156	3622.493	328.805
12-Aug-04 17:20:00	518.474	87.852	87.814	87.653	87.794	87.248	3643.392	331.580
12-Aug-04 17:30:00	519.590	88.517	88.502	88.522	88.560	88.120	3634.717	331.218
12-Aug-04 17:40:00	519.691	87.341	87.340	87.346	87.414	86.970	3637.744	330.863
12-Aug-04 17:50:00	519.893	88.068	88.132	88.025	88.108	87.687	3606.419	330.812
12-Aug-04 18:00:00	518.466	87.854	87.767	87.807	87.726	87.358	3611.462	331.259
12-Aug-04 18:10:00	520.732	88.114	88.090	87.969	88.123	87.560	3615.952	331.092
12-Aug-04 18:20:00	520.457	88.135	88.149	88.206	88.198	87.790	3615.063	331.576
12-Aug-04 18:30:00	519.300	87.731	87.719	87.692	87.789	87.390	3638.439	331.301
12-Aug-04 18:40:00	520.576	87.893	87.898	87.828	87.806	87.387	3612.767	332.537
12-Aug-04 18:50:00	520.347	88.084	88.084	87.964	88.029	87.565	3630.777	331.394
12-Aug-04 19:00:00	520.999	88.210	88.153	88.182	88.180	87.859	3624.260	331.059
12-Aug-04 19:10:00	519.326	87.432	87.559	87.374	87.571	86.859	3660.629	330.982
12-Aug-04 19:20:00	521.240	88.620	88.650	88.613	88.634	88.290	3629.226	331.839
12-Aug-04 19:30:00	518.371	87.698	87.696	87.678	87.698	87.311	3625.768	329.681
12-Aug-04 19:40:00	521.654	88.169	88.128	88.178	88.181	87.832	3574.106	331.009
12-Aug-04 19:50:00	519.800	87.335	87.271	87.351	87.283	86.952	3557.923	329.591
12-Aug-04 20:00:00	519.469	87.348	87.286	87.185	87.296	86.932	3573.276	329.875
12-Aug-04 20:10:00	519.609	87.632	87.658	87.618	87.646	87.271	3604.240	327.952
12-Aug-04 20:20:00	519.154	87.709	87.798	87.724	87.788	87.434	3597.723	327.678
TEST #2 END								
AVERAGES	519.89	87.907	87.906	87.869	87.906	87.496	3617.94	330.63
					Coal Feed Total	439.084		

Tagname *Units*	4D3373.PV DEGF B AH GAS OUT	4M30013.PV PPM STK SO2	4N3150.PV PPM A SCR INLT NOX	4N3151W.PV PPM A SCR OUT NOX	4N3350.PV PPM B SCR INLT NOX	4N3351W.PV PPM B SCR OUT NOX	4M30014.PV PPM STK NOX	4M30015.PV % STK CO2
TEST #2 START								
12-Aug-04 16:50:00	346.551	168.674	250.337	20.109	282.091	20.489	19.556	10.977
12-Aug-04 17:00:00	347.630	174.155	252.324	19.595	269.444	21.448	19.949	11.063
12-Aug-04 17:10:00	345.696	179.211	252.182	20.151	271.595	21.952	20.444	11.068
12-Aug-04 17:20:00	347.520	185.566	252.381	21.127	268.662	22.100	20.694	11.124
12-Aug-04 17:30:00	347.476	195.194	252.727	20.821	266.304	22.193	20.850	11.043
12-Aug-04 17:40:00	348.380	191.061	252.349	19.465	268.838	21.331	19.798	11.051
12-Aug-04 17:50:00	346.534	190.101	253.370	20.118	268.982	21.203	20.000	11.063
12-Aug-04 18:00:00	347.656	182.377	255.157	20.354	270.109	21.267	20.497	11.063
12-Aug-04 18:10:00	347.582	176.449	255.517	20.817	279.458	20.817	20.601	11.101
12-Aug-04 18:20:00	347.782	175.988	255.876	20.001	269.994	22.102	20.341	11.063
12-Aug-04 18:30:00	347.416	180.713	256.669	20.764	272.925	23.319	21.638	11.097
12-Aug-04 18:40:00	349.246	183.521	255.429	20.285	259.661	22.241	21.794	11.105
12-Aug-04 18:50:00	346.944	162.057	230.948	20.109	253.994	17.735	17.461	9.539
12-Aug-04 19:00:00	347.962	187.168	256.655	20.708	268.119	21.865	20.038	10.876
12-Aug-04 19:10:00	347.000	185.177	255.937	21.471	270.648	21.741	20.786	11.069
12-Aug-04 19:20:00	347.775	191.184	258.443	20.830	265.795	21.322	21.405	11.027
12-Aug-04 19:30:00	345.887	184.154	256.119	19.195	267.626	19.817	19.859	11.094
12-Aug-04 19:40:00	345.845	193.438	255.600	20.601	278.268	20.483	20.396	11.147
12-Aug-04 19:50:00	344.992	187.658	255.958	20.104	267.224	20.800	19.891	11.149
12-Aug-04 20:00:00	344.888	186.575	252.913	20.335	263.556	22.538	20.989	11.175
12-Aug-04 20:10:00	343.049	176.027	251.049	20.653	266.289	22.303	21.448	11.139
12-Aug-04 20:20:00	344.190	162.583	250.533	20.158	264.256	21.159	20.099	11.115
TEST #2 END								
AVERAGES	346.73	181.77	253.11	20.35	268.81	21.37	20.39	11.01

Tagname	**4M3104.PV**	4M30057.PV	4ARIT1P06.PV	4BRIT1P06.PV	4AROT1P06.PV	4BROT1P06.PV	4N3132.PV
Units	%		DEGF	DEGF	DEGF	DEGF	PPH
	BLR O2	**STK FLOW**	**A SCR INLT** TEMP	**B SCR INLT** TEMP	**A SCR OUT** TEMP	**B SCR OUT** TEMP	**A NH3 FLOW**
TEST #2 START							
12-Aug-04 16:50:00	3.616	82.530	676.933	662.437	675.436	665.895	332.461
12-Aug-04 17:00:00	3.604	82.133	676.828	662.640	675.187	666.572	328.253
12-Aug-04 17:10:00	3.578	81.646	676.456	661.987	675.011	665.678	326.468
12-Aug-04 17:20:00	3.579	82.184	676.076	662.609	674.968	665.946	328.537
12-Aug-04 17:30:00	3.678	81.904	676.095	663.132	674.516	666.254	338.156
12-Aug-04 17:40:00	3.499	81.515	674.866	662.655	674.179	666.575	332.482
12-Aug-04 17:50:00	3.619	82.261	675.689	662.963	673.813	665.919	334.906
12-Aug-04 18:00:00	3.570	82.186	677.063	663.337	674.754	666.701	335.045
12-Aug-04 18:10:00	3.624	81.591	677.142	663.410	674.891	666.873	340.413
12-Aug-04 18:20:00	3.600	82.372	677.509	663.843	675.698	666.966	340.465
12-Aug-04 18:30:00	3.541	82.116	677.714	663.214	675.832	666.833	338.915
12-Aug-04 18:40:00	3.575	81.794	677.450	663.513	675.747	667.083	339.260
12-Aug-04 18:50:00	3.599	83.062	676.086	663.291	675.390	666.582	338.603
12-Aug-04 19:00:00	3.636	82.608	677.070	663.851	674.922	667.367	337.370
12-Aug-04 19:10:00	3.519	81.327	676.572	662.064	675.407	666.325	338.501
12-Aug-04 19:20:00	3.699	81.857	678.380	663.204	675.786	666.440	345.848
12-Aug-04 19:30:00	3.569	82.220	676.992	661.346	675.827	666.172	334.954
12-Aug-04 19:40:00	3.649	81.747	676.817	661.847	675.440	665.209	335.888
12-Aug-04 19:50:00	3.588	81.162	676.434	660.516	674.901	665.060	328.282
12-Aug-04 20:00:00	3.625	81.939	675.477	660.403	674.527	664.194	321.922
12-Aug-04 20:10:00	3.641	81.294	675.339	661.251	673.872	664.271	322.245
12-Aug-04 20:20:00	3.648	81.067	675.840	662.126	673.962	665.116	320.709
TEST #2 END							
AVERAGES	3.60	81.93	676.58	662.53	675.00	666.09	333.62

Tagname	4N3332.PV	4P125APH.PV	4P125BPH.PV	4P125AFL.PV	4P125BFL.PV	4P120ADN.PV	4P120BDN.PV
Units	PPH	PH	PH				
	B NH3 FLOW	**A REACTION** TANK PH	**B REACTION** TANK PH	**A REACTANT** FLOW	**B REACTANT** FLOW	**A REACTION** TANK DEN	**B REACTION** TANK DEN
TEST #2 START							
12-Aug-04 16:50:00	347.891	5.929	5.904	84.436	130.673	11.457	9.835
12-Aug-04 17:00:00	336.952	5.917	5.917	81.729	118.870	11.450	9.581
12-Aug-04 17:10:00	338.472	5.907	5.920	84.304	109.738	11.601	10.259
12-Aug-04 17:20:00	335.549	5.904	5.913	85.309	107.004	11.336	10.401
12-Aug-04 17:30:00	339.429	5.893	5.896	88.292	115.298	11.444	10.602
12-Aug-04 17:40:00	341.737	5.869	5.888	106.413	124.283	11.680	10.781
12-Aug-04 17:50:00	341.795	5.860	5.892	121.625	126.853	11.892	10.888
12-Aug-04 18:00:00	340.112	5.867	5.901	130.978	123.145	12.057	11.142
12-Aug-04 18:10:00	344.641	5.878	5.907	134.332	117.699	12.229	11.335
12-Aug-04 18:20:00	332.679	5.896	5.911	130.681	111.711	12.363	10.939
12-Aug-04 18:30:00	340.847	5.908	5.909	125.132	109.259	12.562	11.409
12-Aug-04 18:40:00	344.325	5.918	5.902	117.296	111.111	12.649	11.596
12-Aug-04 18:50:00	348.573	5.926	5.899	107.181	114.470	12.638	11.205
12-Aug-04 19:00:00	343.152	5.927	5.899	99.034	114.272	12.637	11.569
12-Aug-04 19:10:00	345.885	5.938	5.904	85.702	111.079	12.410	3.209
12-Aug-04 19:20:00	345.417	5.940	5.899	72.668	113.278	12.017	10.517
12-Aug-04 19:30:00	341.870	5.928	5.892	67.731	119.826	11.487	10.787
12-Aug-04 19:40:00	345.253	5.907	5.886	71.573	128.473	11.084	10.330
12-Aug-04 19:50:00	322.747	5.883	5.882	84.702	137.148	10.665	10.052
12-Aug-04 20:00:00	321.049	5.857	5.884	105.388	143.742	10.425	9.974
12-Aug-04 20:10:00	332.200	5.833	5.901	133.447	137.284	10.433	9.913
12-Aug-04 20:20:00	328.502	5.832	5.918	155.779	123.220	10.405	10.414
TEST #2 END							
AVERAGES	339.05	5.90	5.90	103.35	120.38	11.68	10.31

Tagname *Units*	4G3000.PV MW LOAD	4C3226.PV KPPH A FEEDER	4C3326.PV KPPH B FEEDER	4C3426.PV KPPH C FEEDER	4C3526.PV KPPH D FEEDER	4C3626.PV KPPH E FEEDER	4FW2P05.PV KPPH FEED WTR	4D3372.PV DEGF A AH GAS OUT
TEST #3 START								
13-Aug-04 10:00:00	517.670	86.388	86.286	86.305	86.313	86.009	3562.213	328.731
13-Aug-04 10:10:00	516.130	85.818	85.782	85.780	85.766	85.461	3542.987	326.753
13-Aug-04 10:20:00	516.578	86.029	85.998	85.973	85.977	85.657	3549.092	327.156
13-Aug-04 10:30:00	517.763	86.737	86.711	86.682	86.698	86.328	3538.771	327.168
13-Aug-04 10:40:00	517.049	86.345	86.396	86.358	86.283	85.967	3550.682	330.941
13-Aug-04 10:50:00	517.216	86.935	86.914	86.813	86.815	86.479	3545.726	330.540
13-Aug-04 11:00:00	516.096	86.400	86.430	86.355	86.473	86.040	3562.703	328.475
13-Aug-04 11:10:00	517.026	86.131	86.131	86.074	86.209	85.692	3597.520	326.988
13-Aug-04 11:20:00	517.669	86.705	86.700	86.685	86.651	86.312	3546.449	327.682
13-Aug-04 11:30:00	515.273	86.035	86.000	85.913	86.100	85.649	3557.803	327.155
13-Aug-04 11:40:00	518.784	86.957	86.932	86.931	87.053	86.658	3527.672	327.976
13-Aug-04 11:50:00	515.396	85.618	85.584	85.618	85.678	85.222	3544.530	326.955
13-Aug-04 12:00:00	516.838	86.614	86.669	86.505	86.634	86.214	3528.562	328.190
13-Aug-04 12:10:00	517.283	86.191	86.116	86.146	86.209	85.760	3531.869	327.110
13-Aug-04 12:20:00	516.447	86.359	86.379	86.340	86.312	86.030	3553.671	328.540
13-Aug-04 12:30:00	517.912	86.353	86.311	86.199	86.295	85.857	3536.246	327.756
TEST #3 END								
AVERAGES	516.95	86.351	86.334	86.292	86.342	85.958	3548.53	328.01
					Coal Feed Total	431.277		

Tagname Units	4D3373.PV DEGF B AH GAS OUT	4M30013.PV PPM STK SO2	4N3150.PV PPM A SCR INLT NOX	4N3151W.PV PPM A SCR OUT NOX	4N3350.PV PPM B SCR INLT NOX	4N3351W.PV PPM B SCR OUT NOX	4M30014.PV PPM STK NOX	4M30015.PV % STK CO2
TEST #3 START								
13-Aug-04 10:00:00	346.306	220.181	255.021	24.132	271.980	20.704	20.689	11.121
13-Aug-04 10:10:00	343.884	200.905	254.803	21.982	300.967	20.777	20.648	11.088
13-Aug-04 10:20:00	344.014	213.704	253.984	22.411	285.638	21.349	20.047	11.139
13-Aug-04 10:30:00	343.187	203.770	253.732	21.986	288.255	27.948	24.548	11.098
13-Aug-04 10:40:00	346.082	187.463	250.817	21.600	266.883	26.589	23.535	11.075
13-Aug-04 10:50:00	345.858	165.979	225.836	18.820	274.777	18.364	20.083	9.519
13-Aug-04 11:00:00	346.091	187.480	247.262	19.038	274.765	22.086	18.729	10.958
13-Aug-04 11:10:00	344.191	197.037	248.149	19.902	286.719	23.003	21.596	11.120
13-Aug-04 11:20:00	345.243	207.804	248.501	20.398	287.675	22.081	21.010	11.092
13-Aug-04 11:30:00	344.639	199.953	247.127	20.361	271.826	22.632	20.544	11.095
13-Aug-04 11:40:00	344.512	199.696	247.825	20.010	279.788	23.433	20.995	11.137
13-Aug-04 11:50:00	344.178	189.537	248.354	19.628	277.943	21.160	19.748	11.129
13-Aug-04 12:00:00	345.486	194.608	250.689	20.654	275.113	23.094	21.146	11.125
13-Aug-04 12:10:00	344.161	194.044	250.169	20.109	271.962	22.833	20.355	11.116
13-Aug-04 12:20:00	345.410	192.177	249.113	19.894	296.969	21.124	20.056	11.132
13-Aug-04 12:30:00	345.273	191.702	250.414	20.027	272.774	22.609	20.388	11.164
TEST #3 END								
AVERAGES	344.91	196.63	248.86	20.68	280.25	22.49	20.88	11.01

Tagname	**4M3104.PV**	4M30057.PV	4ARIT1P06.PV	4BRIT1P06.PV	4AROT1P06.PV	4BROT1P06.PV	4N3132.PV
Units	%		DEGF	DEGF	DEGF	DEGF	PPH
	BLR O2	**STK FLOW**	**A SCR INLT** TEMP	**B SCR INLT** TEMP	**A SCR OUT** TEMP	**B SCR OUT** TEMP	**A NH3 FLOW**
TEST #3 START							
13-Aug-04 10:00:00	3.671	80.724	678.399	664.790	677.815	669.790	321.386
13-Aug-04 10:10:00	3.584	79.971	677.277	662.821	676.770	668.074	318.206
13-Aug-04 10:20:00	3.606	79.901	677.815	663.103	676.096	667.203	322.467
13-Aug-04 10:30:00	3.678	81.769	679.466	663.450	676.655	667.321	327.559
13-Aug-04 10:40:00	3.636	81.809	678.770	660.826	677.603	666.255	325.533
13-Aug-04 10:50:00	3.678	81.683	676.363	658.203	675.703	663.442	325.269
13-Aug-04 11:00:00	3.534	81.131	675.595	662.130	674.754	664.134	316.468
13-Aug-04 11:10:00	3.555	80.557	675.296	662.596	674.394	665.650	315.244
13-Aug-04 11:20:00	3.696	81.578	676.354	663.169	674.410	666.141	316.939
13-Aug-04 11:30:00	3.569	81.628	675.399	660.834	674.128	665.967	312.971
13-Aug-04 11:40:00	3.669	81.289	676.420	662.674	674.355	664.646	317.770
13-Aug-04 11:50:00	3.514	80.576	676.219	662.793	674.714	666.313	312.178
13-Aug-04 12:00:00	3.645	81.160	676.466	663.487	674.251	666.429	324.555
13-Aug-04 12:10:00	3.616	81.469	676.168	663.737	674.746	666.871	319.652
13-Aug-04 12:20:00	3.607	80.819	676.518	663.287	674.650	666.715	322.112
13-Aug-04 12:30:00	3.594	81.089	676.349	663.191	674.495	666.909	323.769
TEST #3 END							
AVERAGES	3.62	81.07	676.80	662.57	675.35	666.37	320.13

Tagname *Units*	4N3332.PV PPH **B NH3 FLOW**	4P125APH.PV PH **A REACTION** TANK PH	4P125BPH.PV PH **B REACTION** TANK PH	4P125AFL.PV **A REACTANT** FLOW	4P125BFL.PV **B REACTANT** FLOW	4P120ADN.PV **A REACTION** TANK DEN	4P120BDN.PV **B REACTION** TANK DEN
TEST #3 START							
13-Aug-04 10:00:00	346.964	5.760	5.940	141.654	115.460	10.196	10.128
13-Aug-04 10:10:00	348.487	5.903	5.986	126.924	48.990	10.569	10.512
13-Aug-04 10:20:00	318.611	5.914	5.875	126.694	107.294	10.729	10.656
13-Aug-04 10:30:00	331.591	5.913	5.869	120.582	125.380	10.858	10.773
13-Aug-04 10:40:00	326.088	5.907	5.891	121.757	119.846	11.138	10.845
13-Aug-04 10:50:00	344.901	5.912	5.904	116.465	113.068	11.263	11.144
13-Aug-04 11:00:00	327.943	5.915	5.902	103.585	104.204	11.281	11.331
13-Aug-04 11:10:00	342.571	5.895	5.882	96.930	98.647	11.419	11.531
13-Aug-04 11:20:00	339.583	5.867	5.856	99.780	108.584	11.498	11.576
13-Aug-04 11:30:00	324.344	5.870	5.859	106.485	120.583	11.425	11.640
13-Aug-04 11:40:00	341.496	5.883	5.883	108.550	118.930	11.550	11.894
13-Aug-04 11:50:00	332.839	5.902	5.898	101.563	112.640	11.664	12.026
13-Aug-04 12:00:00	338.697	5.900	5.898	102.460	114.459	11.642	12.250
13-Aug-04 12:10:00	334.667	5.901	5.901	103.200	113.091	11.622	12.364
13-Aug-04 12:20:00	345.814	5.901	5.903	103.028	112.459	11.241	12.668
13-Aug-04 12:30:00	327.714	5.899	5.903	104.133	110.553	11.067	12.694
TEST #3 END							
AVERAGES	335.77	5.89	5.90	111.49	109.01	11.20	11.50

Tagname *Units*	4G3000.PV MW LOAD	4C3226.PV KPPH A FEEDER	4C3326.PV KPPH B FEEDER	4C3426.PV KPPH C FEEDER	4C3526.PV KPPH D FEEDER	4C3626.PV KPPH E FEEDER	4FW2P05.PV KPPH FEED WTR	4D3372.PV DEGF A AH GAS OUT
TEST #4 START								
13-Aug-04 14:10:00	516.390	85.578	85.604	85.576	85.584	85.253	3557.287	327.648
13-Aug-04 14:20:00	517.727	86.290	86.300	86.055	86.145	85.784	3562.132	328.914
13-Aug-04 14:30:00	516.789	84.630	84.635	84.850	84.721	84.333	3547.333	327.777
13-Aug-04 14:40:00	517.006	85.972	86.076	85.828	85.950	85.424	3527.236	328.356
13-Aug-04 14:50:00	517.274	85.573	85.523	85.527	85.564	85.152	3528.973	326.645
13-Aug-04 15:00:00	515.687	84.969	84.950	84.872	84.832	84.570	3535.543	328.287
13-Aug-04 15:10:00	517.455	85.230	85.180	85.340	85.220	85.001	3516.772	327.336
13-Aug-04 15:20:00	516.921	86.169	86.095	85.967	86.141	85.563	3504.401	328.559
13-Aug-04 15:30:00	516.600	85.998	85.985	85.882	86.076	85.476	3536.990	328.811
13-Aug-04 15:40:00	516.963	86.712	86.682	86.385	86.637	86.045	3526.724	329.555
13-Aug-04 15:50:00	516.416	85.322	85.319	85.206	85.208	84.876	3537.002	328.753
13-Aug-04 16:00:00	517.461	85.250	85.248	85.316	85.170	84.849	3549.090	328.398
13-Aug-04 16:10:00	516.976	86.007	85.983	85.857	85.927	85.504	3545.780	329.396
13-Aug-04 16:20:00	517.929	86.247	86.254	86.264	86.106	85.861	3525.623	328.542
13-Aug-04 16:30:00	517.015	86.004	86.050	85.863	85.962	85.436	3541.806	328.418
13-Aug-04 16:40:00	517.607	85.690	85.666	85.463	85.692	85.165	3520.275	328.980
TEST #4 END								
AVERAGES	517.01	85.728	85.722	85.641	85.683	85.268	3535.19	328.40
					Coal Feed Total	428.041		

Tagname *Units*	4D3373.PV DEGF B AH GAS OUT	4M30013.PV PPM STK SO2	4N3150.PV PPM A SCR INLT NOX	4N3151W.PV PPM A SCR OUT NOX	4N3350.PV PPM B SCR INLT NOX	4N3351W.PV PPM B SCR OUT NOX	4M30014.PV PPM STK NOX	4M30015.PV % STK CO2
TEST #4 START								
13-Aug-04 14:10:00	344.510	193.976	252.643	20.035	273.417	23.109	21.392	11.188
13-Aug-04 14:20:00	346.476	193.801	252.951	20.446	273.561	22.649	20.653	11.238
13-Aug-04 14:30:00	344.521	195.414	251.410	18.969	275.087	21.543	20.597	11.163
13-Aug-04 14:40:00	345.022	197.858	256.547	22.563	255.921	19.540	19.139	11.261
13-Aug-04 14:50:00	344.313	171.479	227.936	17.852	271.673	18.942	18.575	9.619
13-Aug-04 15:00:00	345.820	188.123	253.068	21.280	275.482	21.089	19.942	11.031
13-Aug-04 15:10:00	345.064	199.605	255.870	20.031	273.822	21.898	21.256	11.109
13-Aug-04 15:20:00	345.759	196.524	256.957	21.247	275.337	23.109	19.924	11.200
13-Aug-04 15:30:00	345.817	193.018	252.656	20.360	270.761	21.711	20.761	11.165
13-Aug-04 15:40:00	346.892	190.922	255.994	20.949	268.696	20.886	20.052	11.180
13-Aug-04 15:50:00	345.141	187.433	253.592	19.809	269.389	20.651	19.505	11.209
13-Aug-04 16:00:00	346.372	188.281	256.967	20.559	281.272	21.779	21.155	11.209
13-Aug-04 16:10:00	345.449	185.424	256.278	20.853	275.865	23.547	20.681	11.222
13-Aug-04 16:20:00	345.283	202.367	257.571	20.751	277.923	22.597	21.286	11.154
13-Aug-04 16:30:00	344.162	199.632	257.953	20.754	276.584	22.282	19.896	11.254
13-Aug-04 16:40:00	344.936	201.654	260.132	22.259	273.703	23.863	21.299	11.239
TEST #4 END								
AVERAGES	345.35	192.84	253.66	20.54	273.03	21.82	20.38	11.09

Tagname	**4M3104.PV**	4M30057.PV	4ARIT1P06.PV	4BRIT1P06.PV	4AROT1P06.PV	4BROT1P06.PV	4N3132.PV
Units	%		DEGF	DEGF	DEGF	DEGF	PPH
	BLR O2	**STK FLOW**	**A SCR INLT** TEMP	**B SCR INLT** TEMP	**A SCR OUT** TEMP	**B SCR OUT** TEMP	**A NH3 FLOW**
TEST #4 START							
13-Aug-04 14:10:00	3.594	81.653	675.677	662.480	674.178	666.154	325.532
13-Aug-04 14:20:00	3.641	80.812	674.690	661.757	673.740	665.472	328.762
13-Aug-04 14:30:00	3.520	80.842	674.272	661.821	673.821	665.598	318.483
13-Aug-04 14:40:00	3.666	79.909	673.988	660.710	672.173	664.560	333.859
13-Aug-04 14:50:00	3.635	80.920	674.768	662.415	673.090	665.606	327.326
13-Aug-04 15:00:00	3.557	79.920	673.975	662.217	673.268	665.592	322.730
13-Aug-04 15:10:00	3.600	80.957	674.889	662.816	673.112	666.078	328.313
13-Aug-04 15:20:00	3.661	80.931	674.543	662.799	672.446	665.875	331.586
13-Aug-04 15:30:00	3.679	80.518	674.990	663.199	673.436	666.503	325.603
13-Aug-04 15:40:00	3.652	80.884	674.818	662.031	673.519	666.002	332.584
13-Aug-04 15:50:00	3.547	81.160	672.929	662.053	672.904	665.804	324.133
13-Aug-04 16:00:00	3.504	80.542	674.371	661.799	672.555	665.780	330.334
13-Aug-04 16:10:00	3.648	80.922	674.471	661.518	672.803	665.135	333.581
13-Aug-04 16:20:00	3.622	81.205	675.095	662.557	673.588	665.530	335.376
13-Aug-04 16:30:00	3.534	78.723	674.881	660.718	673.460	665.094	333.725
13-Aug-04 16:40:00	3.602	79.605	674.403	661.025	672.700	664.971	334.485
TEST #4 END							
AVERAGES	3.60	80.59	674.55	661.99	673.17	665.61	329.15

Tagname	4N3332.PV	4P125APH.PV	4P125BPH.PV	4P125AFL.PV	4P125BFL.PV	4P120ADN.PV	4P120BDN.PV
Units	PPH	PH	PH				
	B NH3 FLOW	**A REACTION** TANK PH	**B REACTION** TANK PH	**A REACTANT** FLOW	**B REACTANT** FLOW	**A REACTION** TANK DEN	**B REACTION** TANK DEN
TEST #4 START							
13-Aug-04 14:10:00	345.232	5.902	5.894	106.035	116.747	10.395	13.900
13-Aug-04 14:20:00	348.997	5.910	5.901	99.894	113.664	10.462	13.988
13-Aug-04 14:30:00	348.455	5.906	5.905	100.362	110.533	10.690	13.916
13-Aug-04 14:40:00	345.708	5.904	5.901	99.340	111.689	10.837	13.790
13-Aug-04 14:50:00	347.623	5.899	5.896	102.592	116.692	10.901	14.025
13-Aug-04 15:00:00	342.706	5.903	5.901	100.455	115.581	11.163	13.779
13-Aug-04 15:10:00	340.805	5.903	5.905	99.371	111.179	11.339	13.533
13-Aug-04 15:20:00	345.398	5.904	5.898	99.198	115.041	11.480	13.250
13-Aug-04 15:30:00	342.537	5.902	5.893	98.495	121.120	11.766	12.561
13-Aug-04 15:40:00	339.736	5.903	5.895	99.569	122.498	11.823	15.551
13-Aug-04 15:50:00	331.032	5.902	5.905	97.941	117.459	11.818	15.206
13-Aug-04 16:00:00	334.897	5.938	5.908	77.139	112.125	12.054	14.676
13-Aug-04 16:10:00	336.936	5.991	5.903	35.830	114.330	12.170	13.633
13-Aug-04 16:20:00	344.007	5.891	5.901	62.809	115.282	12.112	13.377
13-Aug-04 16:30:00	337.255	5.847	5.908	97.118	109.680	12.310	13.157
13-Aug-04 16:40:00	341.986	5.865	5.897	103.273	115.128	12.471	12.884
TEST #4 END							
AVERAGES	342.08	5.90	5.90	92.46	114.92	11.49	13.83

APPENDIX C

Flue Gas Mercury Data

- Summary of Ontario-Hydro Impinger Analyses Data Sheets
- Recovery Data Sheets

Distribution: Withum - Locke
Project No.: 1621-87
Sample Date: 8-12-04

Location: SCRI Task: _____ Test: 1 Operator: Ron

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
1	1A	Probe & Filter Rinse				132		
2	1B	Heated Line Rinse				87		
3	2	KCl Impingers	300	150	105	555		
4	3	HNO_3/H_2O_2 Impinger	100	75	-1	174		
5	4	$KMnO_4$ Impingers	200	50	-6	244		
6	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 28.2795 g Filter Net wt: 23.2563 g
Filter Tare wt: 5.0232 g Probe/Line Rinse wt: 0 g Condensate Total: 108.9 ml
Filter Net wt: 23.2563 g Total Particulate wt: 23.2563 g

Recovered By: Jr. Date: 8-12-04

Location: SCRO Task: _____ Test: 1 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
7	1A	Probe & Filter Rinse				89		
8	1B	Heated Line Rinse				152		
9	2	KCl Impingers	300	150	86	536		
10	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
11	4	$KMnO_4$ Impingers	200	50	-5	245		
12	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 10.4010 g Filter Net wt: 8.8447 g
Filter Tare wt: 1.5563 g Probe/Line Rinse wt: 2.0387 g Condensate Total: 87.2 ml
Filter Net wt: 8.8447 g Total Particulate wt: 10.8834 g

Recovered By: Jr Date: 8-12-04

Location: AHO Task: _____ Test: 1 Operator: Jim

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
13	1A	Probe & Filter Rinse				93		
14	1B	Heated Line Rinse				104		
15	2	KCl Impingers	300	150	83	533		
16	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
17	4	$KMnO_4$ Impingers	200	50	-5	245		
18	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 23.9150 g Filter Net wt: 20.5950 g
Filter Tare wt: 3.3200 g Probe/Line Rinse wt: 0 g Condensate Total: 88.1 ml
Filter Net wt: 20.5950 g Total Particulate wt: 20.5950 g

Recovered By: Jr Date: 8-12-04

Location: FGD Task: _____ Test: 1 Operator: Gary.

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
19	1A	Probe & Filter Rinse				191		
20	1B	Heated Line Rinse				101		
21	2	KCl Impingers	300	150	102	552		
22	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
23	4	$KMnO_4$ Impingers	200	50	-8	242		
24	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: Faster g Filter Net wt: _____ g
Filter Tare wt: Lost g Probe/Line Rinse wt: _____ g Condensate Total: 103.2 ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: Jr Date: 8-12-04

Location: RV Task: _____ Test: Operator:

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: _____ ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: _____ Date: _____

Location: STK Task: _____ Test: 1 Operator: Bruce

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
25	1A	Probe & Filter Rinse				144		
—	1B	Heated Line Rinse						
26	2	KCl Impingers	300	150	366	816		
27	3	HNO_3/H_2O_2 Impinger	100	75	3	178		
28	4	$KMnO_4$ Impingers	200	50	-9	241		
29	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.5945 g Filter Net wt: 0.1868 g
Filter Tare wt: 0.4077 g Probe/Line Rinse wt: 0.1269 g Condensate Total: 379.8 ml
Filter Net wt: 0.1868 g Total Particulate wt: 0.3137 g

Recovered By: Jr Date: 8-12-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
30	KCl Blank		
31	HNO_3 / H2O2 Blank		
32	$KMnO_4$ Blank		
33	HNO_3 / HCl Blank		

Distribution: Methum - Locke
Project No.: 1621-87
Sample Date: 8-12-04

Location: SCRI Task: _____ Test: 2 Operator: Ron

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
34	1A	Probe & Filter Rinse				125		
35	1B	Heated Line Rinse				119		
36	2	KCl Impingers	300	150	111	561		
37	3	HNO_3/H_2O_2 Impinger	100	75	0	75		
38	4	$KMnO_4$ Impingers	200	50	-4	246		
39	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 28.9114 g Filter Net wt: 28.6374 g
Filter Tare wt: 5.2740 g Probe/Line Rinse wt: 0 g Condensate Total: 1185 ml
Filter Net wt: 23.6374 g Total Particulate wt: 28.6374 g

Recovered By: Jm Date: 8-12-04

Location: SCRO Task: _____ Test: 2 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
40	1A	Probe & Filter Rinse				57		
41	1B	Heated Line Rinse				45		
42	2	KCl Impingers	300	150	85	535		
43	3	HNO_3/H_2O_2 Impinger	100	75	-1	174		
44	4	$KMnO_4$ Impingers	200	50	-6	244		
45	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 16.2437 g Filter Net wt: 12.9249 g
Filter Tare wt: 3.3188 g Probe/Line Rinse wt: 0.0691 g Condensate Total: 84.1 ml
Filter Net wt: 12.9249 g Total Particulate wt: 12.9940 g

Recovered By: Jm Date: 8-12-04

Location: AHO Task: _____ Test: 2 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
46	1A	Probe & Filter Rinse				82		
47	1B	Heated Line Rinse				168		
48	2	KCl Impingers	300	150	97	547		
49	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
50	4	$KMnO_4$ Impingers	200	50	-5	245		
51	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 27.7710 g Filter Net wt: 22.8490 g
Filter Tare wt: 4.9260 g Probe/Line Rinse wt: 0.0970 g Condensate Total: 104.4 ml
Filter Net wt: 22.8450 g Total Particulate wt: 22.9420 g

Recovered By: Jm Date: 8-12-04

Location: FGD Task: _____ Test: 2 Operator: Gary.

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
52	1A	Probe & Filter Rinse				144		
53	1B	Heated Line Rinse				88		
54	2	KCl Impingers	300	150	154	604		
55	3	HNO_3/H_2O_2 Impinger	100	75	-1	174		
56	4	$KMnO_4$ Impingers	200	50	-8	242		
57	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.1698 g Filter Net wt: 0.0193 g
Filter Tare wt: 0.1505 g Probe/Line Rinse wt: 0 g Condensate Total: 160.8 ml
Filter Net wt: 0.0193 g Total Particulate wt: 0.0193 g

Recovered By: Jm Date: 8-12-04

Location: RV Task: _____ Test: 2 Operator: Gary.

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
58	1A	Probe & Filter Rinse				127		
—	1B	Heated Line Rinse						
59	2	KCl Impingers	300	150	353	803		
60	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
61	4	$KMnO_4$ Impingers	200	50	-8	242		
62	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: 0.0482 g Condensate Total: 365.0 ml
Filter Net wt: _____ g Total Particulate wt: 0.0482 g

Recovered By: Jm Date: 8-12-04

Location: STK Task: _____ Test: 2 Operator: Bruce

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
63	1A	Probe & Filter Rinse				165		
—	1B	Heated Line Rinse						
64	2	KCl Impingers	300	150	332	782		
65	3	HNO_3/H_2O_2 Impinger	100	75	5	180		
66	4	$KMnO_4$ Impingers	200	50	-10	240		
67	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.5291 g Filter Net wt: 0.1127 g
Filter Tare wt: 0.4164 g Probe/Line Rinse wt: 0.1206 g Condensate Total: 343.7 ml
Filter Net wt: 0.1127 g Total Particulate wt: 0.2333 g

Recovered By: Jm Date: 8-12-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3 / H2O2 Blank		
68	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

Distribution: Mitchum - Locke
Project No.: 1621-87
Sample Date: 8-13-04

Location: SCRI Task: _____ Test: 3 Operator: Ron

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
69	1A	Probe & Filter Rinse				141		
70	1B	Heated Line Rinse				114		
71	2	KCl Impingers	300	150	105	555		
72	3	HNO_3/H_2O_2 Impinger	100	75	2	177		
73	4	$KMnO_4$ Impingers	200	50	-1	249		
74	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 24.4694 g Filter Net wt: 19.6134 g
Filter Tare wt: 4.8560 g Probe/Line Rinse wt: 0 g Condensate Total: 114.3 ml
Filter Net wt: 19.6134 g Total Particulate wt: 19.6134 g

Recovered By: Jw Date: 8-13-04

Location: SCRO Task: _____ Test: 3 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
75	1A	Probe & Filter Rinse				68		
76	1B	Heated Line Rinse				73		
77	2	KCl Impingers	300	150	87	537		
78	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
79	4	$KMnO_4$ Impingers	200	50	-3	247		
80	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 13.3794 g Filter Net wt: 11.7160 g
Filter Tare wt: 1.6634 g Probe/Line Rinse wt: .1326 g Condensate Total: 90.8 ml
Filter Net wt: 11.7160 g Total Particulate wt: 11.8486 g

Recovered By: Jw Date: 8-13-04

Location: AHO Task: _____ Test: 3 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
81	1A	Probe & Filter Rinse				121		
82	1B	Heated Line Rinse				140		
83	2	KCl Impingers	300	150	82	532		
84	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
85	4	$KMnO_4$ Impingers	200	50	-1	249		
86	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 21.3515 g Filter Net wt: 18.3009 g
Filter Tare wt: 3.0506 g Probe/Line Rinse wt: 0 g Condensate Total: 90.0 ml
Filter Net wt: 18.3009 g Total Particulate wt: 18.3009 g

Recovered By: Jw Date: 8-13-04

Location: FGD Task: _____ Test: 3 Operator: Gary

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
87	1A	Probe & Filter Rinse				157		
88	1B	Heated Line Rinse				118		
89	2	KCl Impingers	300	150	135	585		
90	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
91	4	$KMnO_4$ Impingers	200	50	-1	249		
92	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.1760 g Filter Net wt: 0.0262 g
Filter Tare wt: 0.1498 g Probe/Line Rinse wt: 0 g Condensate Total: 148.4 ml
Filter Net wt: 0.0262 g Total Particulate wt: 0.0262 g

Recovered By: Jw Date: 8-13-04

Location: Blank Samp Task: _____ Test: 3 Operator: Jim

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
98	2	KCl Impingers	300	150	0	450		
99	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
100	4	$KMnO_4$ Impingers	200	50	0	250		
101	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: 0 ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: Jw Date: 8-13-04

Location: STK Task: _____ Test: 3 Operator: Bruce

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
93	1A	Probe & Filter Rinse				182		
—	1B	Heated Line Rinse						
94	2	KCl Impingers	300	150	342	792		
95	3	HNO_3/H_2O_2 Impinger	100	75	4	179		
96	4	$KMnO_4$ Impingers	200	50	-5	245		
97	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.5464 g Filter Net wt: 0.1329 g
Filter Tare wt: 4135 g Probe/Line Rinse wt: 0.0050 g Condensate Total: 357.9 ml
Filter Net wt: 0.1329 g Total Particulate wt: 0.1379 g

Recovered By: Jw Date: 8-13-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3 / H2O2 Blank		
102	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

Distribution: Withum - Locke
Project No.: 1621-87
Sample Date: 8-13-04

Location: SCRI Task: _____ Test: 4 Operator: Jon

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
103	1A	Probe & Filter Rinse				101		
104	1B	Heated Line Rinse				140		
105	2	KCl Impingers	300	150	107	557		
106	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
107	4	$KMnO_4$ Impingers	200	50	-3	247		
108	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 18.7570 g Filter Net wt: 15.7453 g
Filter Tare wt: 3.0117 g Probe/Line Rinse wt: 2.5141 g Condensate Total: 113.9 ml
Filter Net wt: 15.7453 g Total Particulate wt: 18.2594 g

Recovered By: Jon Date: 8-13-04

Location: SCRO Task: _____ Test: 4 Operator: Jeff

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
109	1A	Probe & Filter Rinse				88		
110	1B	Heated Line Rinse				71		
111	2	KCl Impingers	300	150	86	536		
112	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
113	4	$KMnO_4$ Impingers	200	50	0	250		
114	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 13.6150 g Filter Net wt: 11.9537 g
Filter Tare wt: 1.6613 g Probe/Line Rinse wt: .2053 g Condensate Total: 92.7 ml
Filter Net wt: 11.9537 g Total Particulate wt: 12.1590 g

Recovered By: Jon Date: 8-13-04

Location: AHO Task: _____ Test: 4 Operator: Jim

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
115	1A	Probe & Filter Rinse				99		
116	1B	Heated Line Rinse				135		
117	2	KCl Impingers	300	150	83	533		
118	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
119	4	$KMnO_4$ Impingers	200	50	2	252		
120	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 20.7499 g Filter Net wt: 17.9654 g
Filter Tare wt: 2.7845 g Probe/Line Rinse wt: 0 g Condensate Total: 94.7 ml
Filter Net wt: 17.9654 g Total Particulate wt: 17.9654 g

Recovered By: Jon Date: 8-13-04

Location: FGD Task: _____ Test: 4 Operator: Gary

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
121	1A	Probe & Filter Rinse				175		
122	1B	Heated Line Rinse				64		
123	2	KCl Impingers	300	150	114	564		
124	3	HNO_3/H_2O_2 Impinger	100	75	1	176		
125	4	$KMnO_4$ Impingers	200	50	-3	247		
126	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.1792 g Filter Net wt: 0.0306 g
Filter Tare wt: 0.1486 g ~~Probe/Line Rinse wt:~~ COARSE 0.1113 g Condensate Total: 124.0 ml
Filter Net wt: 0.0306 g Total Particulate wt: 0.1419 g

Recovered By: Jm Date: 8-13-04

Location: RV Task: _____ Test: 4 Operator: Gary.

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
127	1A	Probe & Filter Rinse				129		
—	1B	Heated Line Rinse						
128	2	KCl Impingers	300	150	318	768		
129	3	HNO_3/H_2O_2 Impinger	100	75	5	180		
130	4	$KMnO_4$ Impingers	200	50	0	250		
131	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: 334.8 ml
Filter Net wt: _____ g Total Particulate wt: 0.4235 g

Recovered By: Jm Date: 8-13-04

Location: STK Task: _____ Test: 4 Operator: Bruce

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
132	1A	Probe & Filter Rinse				168		
—	1B	Heated Line Rinse						
133	2	KCl Impingers	300	150	349	799		
134	3	HNO_3/H_2O_2 Impinger	100	75	8	183		
135	4	$KMnO_4$ Impingers	200	50	0	250		
136	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.5370 g Filter Net wt: 0.1305 g
Filter Tare wt: 0.4065 g Probe/Line Rinse wt: 0 g Condensate Total: 372.0 ml
Filter Net wt: 0.1305 g Total Particulate wt: 0.1305 g

Recovered By: Jm Date: 8-13-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3 / H2O2 Blank		
137	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

ANALNUM	SAMPLE	DATE	DESCR	Hg (as determined)	units
20044106	1 2 3	08/12/04	THIMBLE	<0.004	ppm
20044107	5	08/12/04	THIMBLE	<0.004	ppm
20044108	9 10	08/12/04	THIMBLE	0.061	ppm
20044109	4 12 13	08/12/04	THIMBLE	<0.004	ppm
20044110	6 7	08/12/04	THIMBLE	<0.004	ppm
20044111	11 14 15	08/12/04	THIMBLE	0.046	ppm
20044112	18 19 21	08/13/04	THIMBLE	<0.004	ppm
20044113	8	08/13/04	THIMBLE	<0.004	ppm
20044114	16 17	08/13/04	THIMBLE	0.037	ppm
20044115	24 25	08/13/04	THIMBLE	<0.004	ppm
20044116	22	08/13/04	THIMBLE	<0.004	ppm
20044117	23 26	08/13/04	THIMBLE	0.048	ppm
20044118	1 FILTER LOST	08/12/04	FILTER		ng/filter
20044119	1	08/12/04	FILTER	6.4	ng/filter
20044120	2	08/12/04	FILTER	16.0	ng/filter
20044121	2	08/12/04	FILTER	20.9	ng/filter
20044122	3	08/13/04	FILTER	48.9	ng/filter
20044123	3	08/13/04	FILTER	7.1	ng/filter
20044124	4	08/13/04	FILTER	792	ng/filter
20044125	4	08/13/04	FILTER	8.8	ng/filter
20044126	47-MM FILTER BLANK	08/13/04	FILTER	<5.0	ng/filter
20044127	3-IN FILTER BLANK	08/13/04	FILTER	<5.0	ng/filter
20044128	THIMBLE BLANK	08/13/04	FILTER	<0.005	ppm
20044129	8-12-04	08/12/04	R VENT SOLIDS	41.1	ng/filter
20044130	8-13-04	08/13/04	R VENT SOLIDS	78.0	ng/filter

Project No	Test	Date	Loc.	Operator	Sample ID #	Task	Description	Anal No.	Hg	units
1621-87	1	08/24/04	SCRI	#VALUE!	1		PROBE & FILTER RINSE	20043831	<1.0	ng/ml
1621-87	1	08/24/04	SCRI	#VALUE!	2		HEATED LINE RINSE	20043832	1.1	ng/ml
1621-87	1	08/24/04	SCRI	#VALUE!	3		KCL IMPINGER	20043833	9.0	ng/ml
1621-87	1	08/24/04	SCRI	#VALUE!	4		HNO3/H2O2 IMPINGER	20043834	3.8	ng/ml
1621-87	1	08/24/04	SCRI	#VALUE!	5		KMNO4 IMPINGER	20043835	13.8	ng/ml
1621-87	1	08/24/04	SCRI	#VALUE!	6		KMNO4 ACID RINSE	20043836	<1.0	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	7		PROBE & FILTER RINSE	20043837	<1.0	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	8		HEATED LINE RINSE	20043838	2.2	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	9		KCL IMPINGER	20043839	16.7	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	10		HNO3/H2O2 IMPINGER	20043840	2.4	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	11		KMNO4 IMPINGER	20043841	3.2	ng/ml
1621-87	1	08/24/04	SCRO	#VALUE!	12		KMNO4 ACID RINSE	20043842	<1.0	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	13		PROBE & FILTER RINSE	20043843	<1.0	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	14		HEATED LINE RINSE	20043844	3.0	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	15		KCL IMPINGER	20043845	35.3	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	16		HNO3/H2O2 IMPINGER	20043846	<0.2	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	17		KMNO4 IMPINGER	20043847	<0.2	ng/ml
1621-87	1	08/24/04	AHO	#VALUE!	18		KMNO4 ACID RINSE	20043848	<1.0	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	19		PROBE & FILTER RINSE	20043849	5.2	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	20		HEATED LINE RINSE	20043850	<1.0	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	21		KCL IMPINGER	20043851	46.2	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	22		HNO3/H2O2 IMPINGER	20043852	1.2	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	23		KMNO4 IMPINGER	20043853	<0.2	ng/ml
1621-87	1	08/24/04	FGD	#VALUE!	24		KMNO4 ACID RINSE	20043854	<1.0	ng/ml
1621-87	1	08/24/04	STK	#VALUE!	25		PROBE & FILTER RINSE	20043855	12.2	ng/ml
1621-87	1	08/24/04	STK	#VALUE!	26		KCL IMPINGER	20043856	5.8	ng/ml
1621-87	1	08/24/04	STK	#VALUE!	27		HNO3/H2O2 IMPINGER	20043857	<0.2	ng/ml
1621-87	1	08/24/04	STK	#VALUE!	28		KMNO4 IMPINGER	20043858	0.5	ng/ml
1621-87	1	08/24/04	STK	#VALUE!	29		KMNO4 ACID RINSE	20043859	<1.0	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	30	#VALUE!	KCL BLANK	20043860	<0.2	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	31	#VALUE!	HNO3/H2O2 BLANK	20043861	<0.2	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	32	#VALUE!	KMNO4 BLANK	20043862	<0.2	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	33	#VALUE!	HNO3/HCL BLANK	20043863	<0.2	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	34		PROBE & FILTER RINSE	20043864	<1.0	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	35		HEATED LINE RINSE	20043865	1.3	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	36		KCL IMPINGER	20043866	9.5	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	37		HNO3/H2O2 IMPINGER	20043867	4.2	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	38		KMNO4 IMPINGER	20043868	21.6	ng/ml
1621-87	2	08/24/04	SCRI	#VALUE!	39		KMNO4 ACID RINSE	20043869	<1.0	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	40		PROBE & FILTER RINSE	20043870	2.7	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	41		HEATED LINE RINSE	20043871	1.0	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	42		KCL IMPINGER	20043872	23.5	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	43		HNO3/H2O2 IMPINGER	20043873	1.8	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	44		KMNO4 IMPINGER	20043874	3.2	ng/ml
1621-87	2	08/24/04	SCRO	#VALUE!	45		KMNO4 ACID RINSE	20043875	<1.0	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	46		PROBE & FILTER RINSE	20043876	<1.0	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	47		HEATED LINE RINSE	20043877	2.8	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	48		KCL IMPINGER	20043878	30.2	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	49		HNO3/H2O2 IMPINGER	20043879	1.1	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	50		KMNO4 IMPINGER	20043880	3.9	ng/ml
1621-87	2	08/24/04	AHO	#VALUE!	51		KMNO4 ACID RINSE	20043881	<1.0	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	52		PROBE & FILTER RINSE	20043882	1.5	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	53		HEATED LINE RINSE	20043883	1.5	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	54		KCL IMPINGER	20043884	50.3	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	55		HNO3/H2O2 IMPINGER	20043885	1.6	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	56		KMNO4 IMPINGER	20043886	1.6	ng/ml
1621-87	2	08/24/04	FGD	#VALUE!	57		KMNO4 ACID RINSE	20043887	1.1	ng/ml
1621-87	2	08/24/04	RV	#VALUE!	58		PROBE & FILTER RINSE	20043888	34.1	ng/ml
1621-87	2	08/24/04	RV	#VALUE!	59		KCL IMPINGER	20043889	16.1	ng/ml
1621-87	2	08/24/04	RV	#VALUE!	60		HNO3/H2O2 IMPINGER	20043890	4.0	ng/ml
1621-87	2	08/24/04	RV	#VALUE!	61		KMNO4 IMPINGER	20043891	35.2	ng/ml
1621-87	2	08/24/04	RV	#VALUE!	62		KMNO4 ACID RINSE	20043892	3.1	ng/ml
1621-87	2	08/24/04	STK	#VALUE!	63		PROBE & FILTER RINSE	20043893	8.4	ng/ml
1621-87	2	08/24/04	STK	#VALUE!	64		KCL IMPINGER	20043894	2.0	ng/ml
1621-87	2	08/24/04	STK	#VALUE!	65		HNO3/H2O2 IMPINGER	20043895	<0.2	ng/ml
1621-87	2	08/24/04	STK	#VALUE!	66		KMNO4 IMPINGER	20043896	4.4	ng/ml
1621-87	2	08/24/04	STK	#VALUE!	67		KMNO4 ACID RINSE	20043897	<1.0	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	68	#VALUE!	KMNO4 BLANK	20043898	<0.2	ng/ml

1621-87	3	08/24/04	SCRI	#VALUE!	69		PROBE & FILTER RINSE	20043899	<1.0	ng/ml
1621-87	3	08/24/04	SCRI	#VALUE!	70		HEATED LINE RINSE	20043900	2.2	ng/ml
1621-87	3	08/24/04	SCRI	#VALUE!	71		KCL IMPINGER	20043901	9.1	ng/ml
1621-87	3	08/24/04	SCRI	#VALUE!	72		HNO3/H2O2 IMPINGER	20043902	3.5	ng/ml
1621-87	3	08/24/04	SCRI	#VALUE!	73		KMNO4 IMPINGER	20043903	19.4	ng/ml
1621-87	3	08/24/04	SCRI	#VALUE!	74		KMNO4 ACID RINSE	20043904	<1.0	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	75		PROBE & FILTER RINSE	20043905	<1.0	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	76		HEATED LINE RINSE	20043906	2.3	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	77		KCL IMPINGER	20043907	24.5	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	78		HNO3/H2O2 IMPINGER	20043908	1.2	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	79		KMNO4 IMPINGER	20043909	1.6	ng/ml
1621-87	3	08/24/04	SCRO	#VALUE!	80		KMNO4 ACID RINSE	20043910	<1.0	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	81		PROBE & FILTER RINSE	20043911	<1.0	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	82		HEATED LINE RINSE	20043912	1.2	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	83		KCL IMPINGER	20043913	26.0	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	84		HNO3/H2O2 IMPINGER	20043914	<0.2	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	85		KMNO4 IMPINGER	20043915	<0.2	ng/ml
1621-87	3	08/24/04	AHO	#VALUE!	86		KMNO4 ACID RINSE	20043916	<1.0	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	87		PROBE & FILTER RINSE	20043917	<1.0	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	88		HEATED LINE RINSE	20043918	1.0	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	89		KCL IMPINGER	20043919	35.0	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	90		HNO3/H2O2 IMPINGER	20043920	0.7	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	91		KMNO4 IMPINGER	20043921	0.7	ng/ml
1621-87	3	08/24/04	FGD	#VALUE!	92		KMNO4 ACID RINSE	20043922	<1.0	ng/ml
1621-87	3	08/24/04	STK	#VALUE!	93		PROBE & FILTER RINSE	20043923	1.0	ng/ml
1621-87	3	08/24/04	STK	#VALUE!	94		KCL IMPINGER	20043924	2.2	ng/ml
1621-87	3	08/24/04	STK	#VALUE!	95		HNO3/H2O2 IMPINGER	20043925	0.8	ng/ml
1621-87	3	08/24/04	STK	#VALUE!	96		KMNO4 IMPINGER	20043926	11.3	ng/ml
1621-87	3	08/24/04	STK	#VALUE!	97		KMNO4 ACID RINSE	20043927	<1.0	ng/ml
1621-87	3	08/24/04	BLKIMP	#VALUE!	98		KCL IMPINGER	20043928	<0.2	ng/ml
1621-87	3	08/24/04	BLKIMP	#VALUE!	99		HNO3/H2O2 IMPINGER	20043929	<0.2	ng/ml
1621-87	3	08/24/04	BLKIMP	#VALUE!	100		KMNO4 IMPINGER	20043930	<0.2	ng/ml
1621-87	3	08/24/04	BLKIMP	#VALUE!	101		KMNO4 ACID RINSE	20043931	<1.0	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	102	#VALUE!	KMNO4 BLANK	20043932	<0.2	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	103		PROBE & FILTER RINSE	20043933	<1.0	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	104		HEATED LINE RINSE	20043934	<1.0	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	105		KCL IMPINGER	20043935	6.5	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	106		HNO3/H2O2 IMPINGER	20043936	3.2	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	107		KMNO4 IMPINGER	20043937	13.5	ng/ml
1621-87	4	08/24/04	SCRI	#VALUE!	108		KMNO4 ACID RINSE	20043938	<1.0	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	109		PROBE & FILTER RINSE	20043939	<1.0	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	110		HEATED LINE RINSE	20043940	2.8	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	111		KCL IMPINGER	20043941	24.1	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	112		HNO3/H2O2 IMPINGER	20043942	1.0	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	113		KMNO4 IMPINGER	20043943	1.7	ng/ml
1621-87	4	08/24/04	SCRO	#VALUE!	114		KMNO4 ACID RINSE	20043944	<1.0	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	115		PROBE & FILTER RINSE	20043945	<1.0	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	116		HEATED LINE RINSE	20043946	<1.0	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	117		KCL IMPINGER	20043947	30.3	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	118		HNO3/H2O2 IMPINGER	20043948	<0.2	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	119		KMNO4 IMPINGER	20043949	<0.2	ng/ml
1621-87	4	08/24/04	AHO	#VALUE!	120		KMNO4 ACID RINSE	20043950	<1.0	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	121		PROBE & FILTER RINSE	20043951	<1.0	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	122		HEATED LINE RINSE	20043952	<1.0	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	123		KCL IMPINGER	20043953	30.9	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	124		HNO3/H2O2 IMPINGER	20043954	1.4	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	125		KMNO4 IMPINGER	20043955	<0.2	ng/ml
1621-87	4	08/24/04	FGD	#VALUE!	126		KMNO4 ACID RINSE	20043956	<1.0	ng/ml
1621-87	4	08/24/04	RV	#VALUE!	127		PROBE & FILTER RINSE	20043957	41.8	ng/ml
1621-87	4	08/24/04	RV	#VALUE!	128		KCL IMPINGER	20043958	18.0	ng/ml
1621-87	4	08/24/04	RV	#VALUE!	129		HNO3/H2O2 IMPINGER	20043959	4.4	ng/ml
1621-87	4	08/24/04	RV	#VALUE!	130		KMNO4 IMPINGER	20043960	31.0	ng/ml
1621-87	4	08/24/04	RV	#VALUE!	131		KMNO4 ACID RINSE	20043961	1.5	ng/ml
1621-87	4	08/24/04	STK	#VALUE!	132		PROBE & FILTER RINSE	20043962	1.6	ng/ml
1621-87	4	08/24/04	STK	#VALUE!	133		KCL IMPINGER	20043963	1.8	ng/ml
1621-87	4	08/24/04	STK	#VALUE!	134		HNO3/H2O2 IMPINGER	20043964	0.7	ng/ml
1621-87	4	08/24/04	STK	#VALUE!	135		KMNO4 IMPINGER	20043965	12.0	ng/ml
1621-87	4	08/24/04	STK	#VALUE!	136		KMNO4 ACID RINSE	20043966	<1.0	ng/ml
1621-87	#VALUE!	08/24/04	#VALUE!	#VALUE!	137	#VALUE!	KMNO4 BLANK	20043967	<0.2	ng/ml

Distribution: Wilkins - Locke
Project No.: 1621-87-1
Sample Date: 11-2-04

Location: FGD Inlet Task: _____ Test: 1 Operator: JL/DO

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
1	1A	Probe & Filter Rinse				73		
2	1B	Heated Line Rinse				113		
3	2	KCl Impingers	300	150	101	551		
4	3	HNO_3/H_2O_2 Impinger	100	75	-1	174		
5	4	$KMnO_4$ Impingers	200	50	-3	247		
6	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.1951 g Filter Net wt: 0.0441 g
Filter Tare wt: 0.1510 g Probe/Line Rinse wt: — g Condensate Total: ~~44.3~~ ml 108.3
Filter Net wt: 0.0441 g Total Particulate wt: 0.0441 g

Recovered By: JL Date: 11-2-04

Location: RV Task: _____ Test: _____ Operator: _____

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: _____ ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: _____ Date: _____

Location: Blank Task: _____ Test: _____ Operator: _____

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: _____ ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: _____ Date: _____

Location: Stack Task: _____ Test: 1 Operator: DC/BS

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
7	1A	Probe & Filter Rinse				104		
	1B	Heated Line Rinse				—		
8	2	KCl Impingers	300	150	343	793		
9	3	HNO_3/H_2O_2 Impinger	100	75	1	174		
10	4	$KMnO_4$ Impingers	200	50	-7	243		
11	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.5025 g Filter Net wt: 0.0911 g
Filter Tare wt: 0.4114 g Probe/Line Rinse wt: — g Condensate Total: ~~20.3~~ ml 354.3
Filter Net wt: 0.0911 g Total Particulate wt: 0.0911 g

Recovered By: JL Date: 11-2-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
12	KCl Blank		
13	HNO_3 / H2O2 Blank		
14	$KMnO_4$ Blank		
15	HNO_3 / HCl Blank		

Tests 1-2

Distribution: Withum, Locke
Project No.: 1621.87-1
Sample Date: 11-3-04

Location: FGD Inlet Task: _____ Test: 2 Operator: JL/DO

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
16	1A	Probe & Filter Rinse				85		
17	1B	Heated Line Rinse				106		
18	2	KCl Impingers	300	150	151	601		
19	3	HNO_3/H_2O_2 Impinger	100	75	-44	131		
20	4	$KMnO_4$ Impingers	200	50	-23	227		
21	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.2165 g Filter Net wt: 0.0675 g
Filter Tare wt: 0.1490 g Probe/Line Rinse wt: - g Condensate Total: ~~10~~ 9 ml 91.9
Filter Net wt: 0.0675 g Total Particulate wt: 0.0675 g

Recovered By: Jm Date: 11-3-04

Location: RV Task: _____ Test: 2 Operator: J.L.

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
27	1A	Probe & Filter Rinse				78		
	1B	Heated Line Rinse				—		
28	2	KCl Impingers	300	150	315	765		
29	3	HNO_3/H_2O_2 Impinger	100	75	4	179		
30	4	$KMnO_4$ Impingers	200	50	-7	243		
31	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.4132 g Filter Net wt: 0 g
Filter Tare wt: 0.4132 g Probe/Line Rinse wt: 0.0432 g Condensate Total: ~~43~~ 9 ml 322.9
Filter Net wt: 0 g Total Particulate wt: 0.0432 g

Recovered By: Jm Date: 11-3-04

Location: Blank Task: _____ Test: _____ Operator: _____

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: _____ ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: _____ Date: _____

Location: Stack Task: _____ Test: 2 Operator: DC/BS

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
22	1A	Probe & Filter Rinse				100		
	1B	Heated Line Rinse				—		
23	2	KCl Impingers	300	150	319	769		
24	3	HNO_3/H_2O_2 Impinger	100	75	8	183		
25	4	$KMnO_4$ Impingers	200	50	-6	244		
26	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.4965 g Filter Net wt: 0.0883 g
Filter Tare wt: 0.4082 g Probe/Line Rinse wt: - g Condensate Total: ~~18.5~~ ml 336.5
Filter Net wt: 0.0883 g Total Particulate wt: 0.0883 g

Recovered By: Jm Date: 11-3-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3 / H2O2 Blank		
	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

Distribution: Withum - Locke
Project No.: 1621-87-1
Sample Date: 11-3-04

Location: FGD Inlet Task: _____ Test: 3 Operator: JL/DO

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
32	1A	Probe & Filter Rinse				90		
33	1B	Heated Line Rinse				101		
34	2	KCl Impingers	300	150	101	551		
35	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
36	4	$KMnO_4$ Impingers	200	50	1	251		
37	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.1852 g Filter Net wt: 0.0369 g
Filter Tare wt: 0.1483 g Probe/Line Rinse wt: — g
Filter Net wt: 0.0369 g Total Particulate wt: 0.0369 g

Condensate Total: 44 ml 110.4

Recovered By: JL Date: 11-3-04

Location: RV Task: _____ Test: _____ Operator: _____

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g
Filter Net wt: _____ g Total Particulate wt: _____ g

Condensate Total: _____ ml

Recovered By: _____ Date: _____

Location: Blank Task: _____ Test: 3 Operator: JL

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
43	2	KCl Impingers	300	150	—	450		
44	3	HNO_3/H_2O_2 Impinger	100	75	—	175		
45	4	$KMnO_4$ Impingers	200	50	—	250		
46	5	$KMnO_4$ Acid Rinse		100	—	100		

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g
Filter Net wt: _____ g Total Particulate wt: _____ g

Condensate Total: — ml

Recovered By: JL Date: 11-3-04

Location: Stack Task: _____ Test: 3 Operator: DC/BS

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
38	1A	Probe & Filter Rinse				84		
	1B	Heated Line Rinse				—		
39	2	KCl Impingers	300	150	328	778		
40	3	HNO_3/H_2O_2 Impinger	100	75	5	180		
41	4	$KMnO_4$ Impingers	200	50	-3	247		
42	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.4232 g Filter Net wt: 0.0233 g
Filter Tare wt: 0.3999 g Probe/Line Rinse wt: — g
Filter Net wt: 0.0233 g Total Particulate wt: 0.0233 g

Condensate Total: ~~203~~ ml 347.3

Recovered By: JL Date: 11-3-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 In. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3/ H2O2 Blank		
47	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

Test 3-4

Distribution: Wilburn - Loche
Project No.: 1621-87-1
Sample Date: 11-3-04

Location: FGD Inlet Task: _____ Test: 4 Operator: JL/DO

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
48	1A	Probe & Filter Rinse				86		
49	1B	Heated Line Rinse				94		
50	2	KCl Impingers	300	150	117	567		
51	3	HNO_3/H_2O_2 Impinger	100	75	0	175		
52	4	$KMnO_4$ Impingers	200	50	1	251		
53	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.2455 g Filter Net wt: 0.0962 g
Filter Tare wt: 0.1493 g Probe/Line Rinse wt: — g Condensate Total: ~~13.7~~ ml 128.7
Filter Net wt: 0.0962 g Total Particulate wt: 0.0962 g

Recovered By: JL Date: 11-3-04

Location: RV Task: _____ Test: 4 Operator: JL

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
59	1A	Probe & Filter Rinse				103		
	1B	Heated Line Rinse				—		
60	2	KCl Impingers	300	150	320	770		
61	3	HNO_3/H_2O_2 Impinger	100	75	2	177		
62	4	$KMnO_4$ Impingers	200	50	-1	249		
63	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.4074 g Filter Net wt: 0 g
Filter Tare wt: 0.4074 g Probe/Line Rinse wt: 0.0743 g Condensate Total: 13.9 ml 331.9
Filter Net wt: 0 g Total Particulate wt: 0.0743 g

Recovered By: JL Date: 11-3-04

Location: Blank Task: _____ Test: _____ Operator: _____

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
	1A	Probe & Filter Rinse						
	1B	Heated Line Rinse						
	2	KCl Impingers						
	3	HNO_3/H_2O_2 Impinger						
	4	$KMnO_4$ Impingers						
	5	$KMnO_4$ Acid Rinse						

Filter Gross wt: _____ g Filter Net wt: _____ g
Filter Tare wt: _____ g Probe/Line Rinse wt: _____ g Condensate Total: _____ ml
Filter Net wt: _____ g Total Particulate wt: _____ g

Recovered By: _____ Date: _____

Location: Stack Task: _____ Test: 4 Operator: DC/BS

Sample ID	Bottle #	Description	Initial Vol mL	Rinse Vol mL	Gain mL	Final Vol mL	ppb Hg	Total ug of Hg
	S	Filter/Solids						
54	1A	Probe & Filter Rinse				89		
	1B	Heated Line Rinse				—		
55	2	KCl Impingers	300	150	344	794		
56	3	HNO_3/H_2O_2 Impinger	100	75	6	181		
57	4	$KMnO_4$ Impingers	200	50	-2	248		
58	5	$KMnO_4$ Acid Rinse		100		100		

Filter Gross wt: 0.4693 g Filter Net wt: 0.0655 g
Filter Tare wt: 0.4038 g Probe/Line Rinse wt: — g Condensate Total: ~~49~~ ml 358.1
Filter Net wt: 0.0655 g Total Particulate wt: 0.0655 g

Recovered By: JL Date: 11-3-04

Sample ID	Description	ppb Hg	Total ug of Hg
	3 in. Filter Blank		
	Thimble Blank		
	KCl Blank		
	HNO_3/ H2O2 Blank		
	$KMnO_4$ Blank		
	HNO_3 / HCl Blank		

ANALNUM	SAMPLE	DATE	DESCR	Hg	
20045484	TEST 1 1	11/02/04	FILTER	105	ng/filter
20045485	TEST 1 6	11/02/04	FILTER	11.7	ng/filter
20045486	TEST 2 2	11/03/04	FILTER	7.7	ng/filter
20045487	TEST 2 7	11/03/04	FILTER	<5.0	ng/filter
20045488	TEST 3 3	11/03/04	FILTER	<5.0	ng/filter
20045489	TEST 3 8	11/03/04	FILTER	<5.0	ng/filter
20045490	TEST 4 4	11/03/04	FILTER	75.4	ng/filter
20045491	TEST 4 9	11/03/04	FILTER	<5.0	ng/filter
20045492	TEST 2 11	11/03/04	FILTER	<5.0	ng/filter
20045493	TEST 2	11/03/04	FILTER RINSE SOLIDS	1.07	PPM
20045494	TEST 4 12	11/03/04	FILTER	<5.0	ng/filter
20045495	TEST 4	11/03/04	FILTER RINSE SOLIDS	0.075	PPM
20045496	47-MM FILTER BLANK	11/03/04	Blank	<5.0	ng/filter
20045497	3-IN FILTER BLANK	11/03/04	Blank	<5.0	ng/filter

Project No	Test	Date	Loc.	Operator	Sample ID #	Description	Anal No.	Hg	
1621-87	1	11/08/04	FGD	#VALUE!	1	PROBE & FILTER RINSE	20045363	<1.0	ng/ml
1621-87	1	11/08/04	FGD	#VALUE!	2	HEATED LINE RINSE	20045364	<1.0	ng/ml
1621-87	1	11/08/04	FGD	#VALUE!	3	KCL IMPINGER	20045365	41.0	ng/ml
1621-87	1	11/08/04	FGD	#VALUE!	4	HNO3/H2O2 IMPINGER	20045366	1.1	ng/ml
1621-87	1	11/08/04	FGD	#VALUE!	5	KMNO4 IMPINGER	20045367	4.9	ng/ml
1621-87	1	11/08/04	FGD	#VALUE!	6	KMNO4 ACID RINSE	20045368	1.0	ng/ml
1621-87	1	11/08/04	STK	#VALUE!	7	PROBE & FILTER RINSE	20045369	<1.0	ng/ml
1621-87	1	11/08/04	STK	#VALUE!	8	KCL IMPINGER	20045370	3.0	ng/ml
1621-87	1	11/08/04	STK	#VALUE!	9	HNO3/H2O2 IMPINGER	20045371	0.7	ng/ml
1621-87	1	11/08/04	STK	#VALUE!	10	KMNO4 IMPINGER	20045372	16.5	ng/ml
1621-87	1	11/08/04	STK	#VALUE!	11	KMNO4 ACID RINSE	20045373	<1.0	ng/ml
1621-87	#VALUE!	11/08/04	#VALUE!	#VALUE!	12	KCL BLANK	20045374	<0.2	ng/ml
1621-87	#VALUE!	11/08/04	#VALUE!	#VALUE!	13	HNO3/H2O2 BLANK	20045375	<0.2	ng/ml
1621-87	#VALUE!	11/08/04	#VALUE!	#VALUE!	14	KMNO4 BLANK	20045376	<0.2	ng/ml
1621-87	#VALUE!	11/08/04	#VALUE!	#VALUE!	15	HNO3/HCL BLANK	20045377	<0.2	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	16	PROBE & FILTER RINSE	20045378	<1.0	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	17	HEATED LINE RINSE	20045379	<1.0	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	18	KCL IMPINGER	20045380	18.7	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	19	HNO3/H2O2 IMPINGER	20045381	2.4	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	20	KMNO4 IMPINGER	20045382	3.3	ng/ml
1621-87	2	11/08/04	FGD	#VALUE!	21	KMNO4 ACID RINSE	20045383	<1.0	ng/ml
1621-87	2	11/08/04	STK	#VALUE!	22	PROBE & FILTER RINSE	20045384	1.4	ng/ml
1621-87	2	11/08/04	STK	#VALUE!	23	KCL IMPINGER	20045385	3.4	ng/ml
1621-87	2	11/08/04	STK	#VALUE!	24	HNO3/H2O2 IMPINGER	20045386	0.6	ng/ml
1621-87	2	11/08/04	STK	#VALUE!	25	KMNO4 IMPINGER	20045387	12.3	ng/ml
1621-87	2	11/08/04	STK	#VALUE!	26	KMNO4 ACID RINSE	20045388	<1.0	ng/ml
1621-87	2	11/08/04	RV	#VALUE!	27	PROBE & FILTER RINSE	20045389	13.1	ng/ml
1621-87	2	11/08/04	RV	#VALUE!	28	KCL IMPINGER	20045390	2.7	ng/ml
1621-87	2	11/08/04	RV	#VALUE!	29	HNO3/H2O2 IMPINGER	20045391	0.3	ng/ml
1621-87	2	11/08/04	RV	#VALUE!	30	KMNO4 IMPINGER	20045392	38.9	ng/ml
1621-87	2	11/08/04	RV	#VALUE!	31	KMNO4 ACID RINSE	20045393	2.0	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	32	PROBE & FILTER RINSE	20045394	<1.0	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	33	HEATED LINE RINSE	20045395	<1.0	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	34	KCL IMPINGER	20045396	23.8	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	35	HNO3/H2O2 IMPINGER	20045397	0.5	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	36	KMNO4 IMPINGER	20045398	2.6	ng/ml
1621-87	3	11/08/04	FGD	#VALUE!	37	KMNO4 ACID RINSE	20045399	<1.0	ng/ml
1621-87	3	11/08/04	STK	#VALUE!	38	PROBE & FILTER RINSE	20045400	<1.0	ng/ml
1621-87	3	11/08/04	STK	#VALUE!	39	KCL IMPINGER	20045401	3.4	ng/ml
1621-87	3	11/08/04	STK	#VALUE!	40	HNO3/H2O2 IMPINGER	20045402	0.9	ng/ml
1621-87	3	11/08/04	STK	#VALUE!	41	KMNO4 IMPINGER	20045403	12.9	ng/ml
1621-87	3	11/08/04	STK	#VALUE!	42	KMNO4 ACID RINSE	20045404	<1.0	ng/ml
1621-87	3	11/08/04	BLK	#VALUE!	43	KCL IMPINGER	20045405	0.2	ng/ml
1621-87	3	11/08/04	BLK	#VALUE!	44	HNO3/H2O2 IMPINGER	20045406	<0.2	ng/ml
1621-87	3	11/08/04	BLK	#VALUE!	45	KMNO4 IMPINGER	20045407	<0.2	ng/ml
1621-87	3	11/08/04	BLK	#VALUE!	46	KMNO4 ACID RINSE	20045408	<1.0	ng/ml
1621-87	#VALUE!	11/08/04	#VALUE!	#VALUE!	47	KMNO4 BLANK	20045409	<0.2	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	48	PROBE & FILTER RINSE	20045410	<1.0	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	49	HEATED LINE RINSE	20045411	<1.0	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	50	KCL IMPINGER	20045412	13.8	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	51	HNO3/H2O2 IMPINGER	20045413	1.7	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	52	KMNO4 IMPINGER	20045414	11.3	ng/ml
1621-87	4	11/08/04	FGD	#VALUE!	53	KMNO4 ACID RINSE	20045415	<1.0	ng/ml
1621-87	4	11/08/04	STK	#VALUE!	54	PROBE & FILTER RINSE	20045416	1.7	ng/ml
1621-87	4	11/08/04	STK	#VALUE!	55	KCL IMPINGER	20045417	3.2	ng/ml
1621-87	4	11/08/04	STK	#VALUE!	56	HNO3/H2O2 IMPINGER	20045418	0.8	ng/ml
1621-87	4	11/08/04	STK	#VALUE!	57	KMNO4 IMPINGER	20045419	26.2	ng/ml
1621-87	4	11/08/04	STK	#VALUE!	58	KMNO4 ACID RINSE	20045420	<1.0	ng/ml
1621-87	4	11/08/04	RV	#VALUE!	59	PROBE & FILTER RINSE	20045421	11.2	ng/ml
1621-87	4	11/08/04	RV	#VALUE!	60	KCL IMPINGER	20045422	3.9	ng/ml
1621-87	4	11/08/04	RV	#VALUE!	61	HNO3/H2O2 IMPINGER	20045423	0.6	ng/ml
1621-87	4	11/08/04	RV	#VALUE!	62	KMNO4 IMPINGER	20045424	52.0	ng/ml
1621-87	4	11/08/04	RV	#VALUE!	63	KMNO4 ACID RINSE	20045425	2.1	ng/ml

APPENDIX D

Process Material Data

- Coal Analysis Data Sheets
- Bottom Ash Analysis Data Sheets
- Limestone Slurry Solids Analysis Data Sheets
- Limestone Slurry Filtrate Analysis Data Sheets
- Ash Analysis Data Sheets
- FGD Slurry Solids Analysis Data Sheets
- FGD Slurry Filtrate Data Sheets
- FGD Makeup Water Analysis Data Sheets

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Sample Description.: COAL TEST 1
Sample No.: 1-1
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044300
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	15.40
Volatile Matter	37.78
Fixed Carbon	46.82
BTU/lb	12209
MAF BTU/lb	46.82

Ultimate (Dry)%	
Carbon	67.46
Hydrogen	4.39
Nitrogen	1.89
Chlorine	0.1115 ppm
Sulfur, Total	3.61
Ash	15.40
Oxygen (DIFF)	7.14

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.61

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.133	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.141	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 5.865 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 1
Sample No.: 1-2
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044301
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	14.06
Volatile Matter	38.12
Fixed Carbon	47.82
BTU/lb	12495
MAF BTU/lb	47.82

Ultimate (Dry)%	
Carbon	69.48
Hydrogen	4.63
Nitrogen	1.75
Chlorine	0.1423 ppm
Sulfur, Total	3.55
Ash	14.06
Oxygen (DIFF)	6.39

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.55

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.157	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.165	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 5.125 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 2
Sample No.: 2-1
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044302
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	13.83
Volatile Matter	37.45
Fixed Carbon	48.72
BTU/lb	12438
MAF BTU/lb	48.72

Ultimate (Dry)%	
Carbon	68.97
Hydrogen	4.31
Nitrogen	1.81
Chlorine	0.1381 ppm
Sulfur, Total	3.71
Ash	13.83
Oxygen (DIFF)	7.23

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.141	ppm
F		ppm

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Misc.		
Analysis	Value	
Hg	0.134	PPM

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.71

HGI/FSI
HGI
FSI

As Determined Moisture 5.115 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 2
Sample No.: 2-2
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044303
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	15.15
Volatile Matter	37.16
Fixed Carbon	47.69
BTU/lb	12247
MAF BTU/lb	47.69

Ultimate (Dry)%	
Carbon	68.06
Hydrogen	4.26
Nitrogen	1.85
Chlorine	0.0948 ppm
Sulfur, Total	3.73
Ash	15.15
Oxygen (DIFF)	6.86

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.138	ppm
F		ppm

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Misc.		
Analysis	Value	
Hg	0.130	PPM

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.73

HGI/FSI
HGI
FSI

As Determined Moisture 6.1 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 3
Sample No.: 3-1
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044304
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	13.66
Volatile Matter	38.05
Fixed Carbon	48.29
BTU/lb	12456
MAF BTU/lb	48.29

Ultimate (Dry)%	
Carbon	70.16
Hydrogen	4.51
Nitrogen	1.90
Chlorine	0.1141 ppm
Sulfur, Total	3.52
Ash	13.66
Oxygen (DIFF)	6.14

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.52

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.116	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.123	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 5.36 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 3
Sample No.: 3-2
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044305
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	12.38
Volatile Matter	38.36
Fixed Carbon	49.26
BTU/lb	12847
MAF BTU/lb	49.26

Ultimate (Dry)%	
Carbon	71.53
Hydrogen	4.77
Nitrogen	1.81
Chlorine	0.1373 ppm
Sulfur, Total	3.69
Ash	12.38
Oxygen (DIFF)	5.68

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.69

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.123	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.129	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 4.62 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 4
Sample No.: 4-1
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044306
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	12.24
Volatile Matter	38.86
Fixed Carbon	48.90
BTU/lb	12659
MAF BTU/lb	48.90

Ultimate (Dry)%	
Carbon	70.42
Hydrogen	4.39
Nitrogen	1.87
Chlorine	0.0700 ppm
Sulfur, Total	3.96
Ash	12.24
Oxygen (DIFF)	7.05

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.96

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.122	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.129	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 5.69 %

These values are preliminary and are subject to change.

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Sample Description.: COAL TEST 4
Sample No.: 4-2
Date Received: 08/30/2004
Date Completed: 09/09/2004

Analytical No.: 20044307
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	11.72
Volatile Matter	39.26
Fixed Carbon	49.02
BTU/lb	12795
MAF BTU/lb	49.02

Ultimate (Dry)%	
Carbon	70.49
Hydrogen	4.46
Nitrogen	1.92
Chlorine	0.0463 ppm
Sulfur, Total	3.79
Ash	11.72
Oxygen (DIFF)	7.57

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)	
Pyritic Sulfur	
Sulfate	
Organic	
Sulfur, Total	3.79

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.105	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.112	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 6.07 %

These values are preliminary and are subject to change.

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DESCRIPTION *COAL*
TEST 1
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1*

DATE LOGGED *11/09/04*
DATE COMPLETED *11/18/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045551**

ANALYSIS REPORT

PROXIMATE (Dry)%	
Ash	13.09
Volatile Matter	37.86
Fixed Carbon	49.05
Sulfur, Total	3.59
BTU/lb	12552
MAF BTU/lb	14443

ULTIMATE (Dry)%	
Carbon	70.36
Hydrogen	4.43
Nitrogen	1.60
Chlorine	0.116
Sulfur, Total	3.59
Ash	13.09
Oxygen (DIFF)	6.81

MAJOR ASH ELEM % Ignited at 750 C	
SiO2	45.99
Al2O3	20.80
TiO2	0.97
Fe2O3	17.94
CaO	5.08
MgO	1.03
Na2O	0.71
K2O	2.98
P2O5	0.29
SO3	4.02
UND	0.19

TOTAL MOISTURE % 11.13

MISC. (As Det.)

Hg 0.122 PPM

AS DETERMINED MOISTURE: 4.79 %

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DESCRIPTION *COAL*
TEST 2
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2*

DATE LOGGED *11/09/04*
DATE COMPLETED *11/29/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045552**

ANALYSIS REPORT

PROXIMATE (Dry)%	
Ash	12.64
Volatile Matter	39.03
Fixed Carbon	48.33
Sulfur, Total	3.60
BTU/lb	12650
MAF BTU/lb	14480

ULTIMATE (Dry)%	
Carbon	70.64
Hydrogen	4.84
Nitrogen	1.57
Chlorine	0.051
Sulfur, Total	3.60
Ash	12.64
Oxygen (DIFF)	6.66

MAJOR ASH ELEM % Ignited at 750 C	
SiO2	45.41
Al2O3	18.16
TiO2	0.88
Fe2O3	19.18
CaO	6.95
MgO	0.94
Na2O	0.50
K2O	2.40
P2O5	0.18
SO3	3.56
UND	1.84

TOTAL MOISTURE % 11.49

MISC. (As Det.)

Hg 0.103 PPM

AS DETERMINED MOISTURE: 5.03 %

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DESCRIPTION *COAL*
TEST 3
DATE SAMPLED *11/03/04*
SAMPLE NUMBER 3

DATE LOGGED *11/09/04*
DATE COMPLETED *11/18/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045553**

ANALYSIS REPORT

PROXIMATE (Dry)%	
Ash	12.31
Volatile Matter	39.46
Fixed Carbon	48.23
Sulfur, Total	3.79
BTU/lb	12697
MAF BTU/lb	14479

ULTIMATE (Dry)%	
Carbon	70.98
Hydrogen	4.53
Nitrogen	1.56
Chlorine	0.044
Sulfur, Total	3.79
Ash	12.31
Oxygen (DIFF)	6.79

MAJOR ASH ELEM % Ignited at 750 C	
SiO2	43.74
Al2O3	18.42
TiO2	0.91
Fe2O3	19.76
CaO	7.51
MgO	0.86
Na2O	0.45
K2O	2.32
P2O5	0.20
SO3	4.72
UND	1.11

TOTAL MOISTURE %	10.89

MISC. (As Det.)

Hg 0.099 PPM

AS DETERMINED MOISTURE: 4.00 %

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DESCRIPTION COAL
TEST 4
DATE SAMPLED 11/03/04
SAMPLE NUMBER 4

DATE LOGGED 11/09/04
DATE COMPLETED 11/18/04
PROJECT NUMBER 1621-87 -1
ANALYTICAL NUMBER 045554

ANALYSIS REPORT

PROXIMATE (Dry)%	
Ash	12.94
Volatile Matter	39.09
Fixed Carbon	47.97
Sulfur, Total	3.68
BTU/lb	12566
MAF BTU/lb	14434

TOTAL MOISTURE %	12.43

MISC. (As Det.)

Hg 0.113 PPM

ULTIMATE (Dry)%	
Carbon	70.30
Hydrogen	4.78
Nitrogen	1.56
Chlorine	0.049
Sulfur, Total	3.68
Ash	12.94
Oxygen (DIFF)	6.69

MAJOR ASH ELEM % Ignited at 750 C	
SiO2	46.22
Al2O3	19.62
TiO2	0.97
Fe2O3	17.83
CaO	6.14
MgO	0.96
Na2O	0.58
K2O	2.72
P2O5	0.21
SO3	4.32
UND	0.43

AS DETERMINED MOISTURE: 4.59 %

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Sample Description.: BOTTOM ASH TESTS 1 & 2

Sample No.: BOTTOM ASH-1&2
Date Received: 09/07/2004
Date Completed: 09/16/2004

Analytical No.: 20044586
Project No.: 1621 -087 -
Submitted By: WITHUM

Proximate	Wt%
Ash	98.66
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.38
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.66
Oxygen (DIFF)	-0.04

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	<0.004	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.16 %

These values are preliminary and are subject to change.

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Sample Description.: BOTTOM ASH TESTS 3 & 4

Sample No.: BOTTOM ASH-3&4
Date Received: 09/07/2004
Date Completed: 09/16/2004

Analytical No.: 20044587
Project No.: 1621 -087 -
Submitted By: WITHUM

Proximate	Wt%
Ash	99.91
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.19
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	99.91
Oxygen (DIFF)	-0.10

Major Ash Elem. (Dry)	
SiO2	48.24
Al2O3	19.70
TiO2	0.95
Fe2O3	22.93
CaO	4.28
MgO	1.10
Na2O	0.55
K2O	2.66
P2O5	0.27
SO3	0.18
Undetermined	-0.86

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	<0.004	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.22 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 1
Sample No.: 1A
Date Received: 08/30/2004
Date Completed: 10/13/2004

Analytical No.: 20044308
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.32
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Trace Elements (ppm)	
Hg	<0.004 ppm
F	ppm

Ultimate (Dry)%	
Carbon	11.43
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.32
Oxygen (DIFF)	30.25

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.31
DENSITY	1.015

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.04 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 1
Sample No.: 1B
Date Received: 08/30/2004
Date Completed: 10/21/2004

Analytical No.: 20044309
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	59.49
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.26
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	59.49
Oxygen (DIFF)	29.25

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.82
DENSITY	1.020

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.04 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 2
Sample No.: 2A
Date Received: 08/30/2004
Date Completed: 10/21/2004

Analytical No.: 20044310
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	59.18
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.29
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	59.18
Oxygen (DIFF)	29.53

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.55
DENSITY	1.020

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.07 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 2
Sample No.: 2B
Date Received: 08/30/2004
Date Completed: 10/21/2004

Analytical No.: 20044311
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.33
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.49
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.33
Oxygen (DIFF)	30.18

Major Ash Elem.
SiO2
Al2O3
TiO2
Fe2O3
CaO
MgO
Na2O
K2O
P2O5
SO3
Undetermined

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.86
DENSITY	1.052

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.09 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 3
Sample No.: 3A
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044312
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.27
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Ultimate (Dry)%	
Carbon	10.95
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.27
Oxygen (DIFF)	30.78

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Major Ash Elem. (Dry)	
SiO2	4.30
Al2O3	0.26
TiO2	0.01
Fe2O3	0.13
CaO	54.06
MgO	0.78
Na2O	0.03
K2O	0.07
P2O5	0.05
SO3	0.10
Undetermined	40.21

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.65
DENSITY	1.125

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.07 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 3
Sample No.: 3B
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044313
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.33
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.17
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.33
Oxygen (DIFF)	30.50

Major Ash Elem. (Dry)	
SiO2	4.33
Al2O3	0.25
TiO2	0.01
Fe2O3	0.13
CaO	54.79
MgO	0.78
Na2O	0.02
K2O	0.06
P2O5	0.06
SO3	0.09
Undetermined	39.48

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.50
DENSITY	1.018

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.05 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 4
Sample No.: 4A
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044314
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.31
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.21
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.31
Oxygen (DIFF)	30.48

Major Ash Elem. (Dry)	
SiO2	4.33
Al2O3	0.25
TiO2	0.01
Fe2O3	0.13
CaO	54.41
MgO	0.79
Na2O	0.02
K2O	0.06
P2O5	0.05
SO3	0.11
Undetermined	39.84

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	<0.004	PPM
% SOLID	34.95	
DENSITY	1.013	

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	<0.004	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.03 %

These values are preliminary and are subject to change.

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Sample Description.: LIMESTONE SLURRY SOLIDS TEST 4
Sample No.: 4B
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044315
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	58.40
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	11.25
Hydrogen	
Nitrogen	
Chlorine	<0.001 ppm
Sulfur, Total	
Ash	58.40
Oxygen (DIFF)	30.35

Major Ash Elem. (Dry)	
SiO2	4.16
Al2O3	0.25
TiO2	0.01
Fe2O3	0.13
CaO	54.39
MgO	0.77
Na2O	0.02
K2O	0.06
P2O5	0.05
SO3	0.12
Undetermined	40.04

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	<0.004
% SOLID	34.21
DENSITY	1.011

HGI/FSI
HGI
FSI

Trace Elements (ppm)	
Hg	<0.004 ppm
F	ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.07 %

These values are preliminary and are subject to change.

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DESCRIPTION *LIMESTONE SLURRY SOLIDS TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045555**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	57.77
Total Sulfur	0.08

MISC. (As Det.)

Hg	0.011
% SOLIDS	33.2
DENSITY	1.087

ULTIMATE	(Dry)%
Carbon	11.46
Chlorine	<0.001
Ash	57.77

MAJOR ASH ELEM	(Dry)%
SiO2	3.44
Al203	0.58
TiO2	0.02
Fe203	0.29
CaO	53.21
MgO	1.31
Na20	0.01
K20	0.13
P205	0.02
SO3	0.19
UND	40.80

AS DETERMINED MOISTURE: 0.18 %

DISTRIBUTION:
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J. WITHUM
J. LOCKE

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4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *LIMESTONE SLURRY SOLIDS TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045556**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	57.83
Total Sulfur	0.07

MISC. (As Det.)	
Hg	0.008
% SOLIDS	37.8
DENSITY	1.131

ULTIMATE	(Dry)%
Carbon	11.52
Chlorine	<0.001
Ash	57.83

MAJOR ASH ELEM	(Dry)%
SiO2	3.34
Al2O3	0.58
TiO2	0.02
Fe2O3	0.29
CaO	52.86
MgO	1.36
Na2O	0.02
K2O	0.12
P2O5	0.02
SO3	0.18
UND	41.21

AS DETERMINED MOISTURE: 0.10 %

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DESCRIPTION *LIMESTONE SLURRY SOLIDS TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045557**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	57.82
Total Sulfur	0.09

MISC. (As Det.)	
Hg	0.009
% SOLIDS	37.8
DENSITY	1.072

ULTIMATE	(Dry)%
Carbon	11.39
Chlorine	0.001
Ash	57.82

MAJOR ASH ELEM	(Dry)%
SiO2	3.35
Al2O3	0.57
TiO2	0.02
Fe2O3	0.30
CaO	53.93
MgO	1.37
Na2O	0.01
K2O	0.13
P2O5	0.02
SO3	0.22
UND	40.08

AS DETERMINED MOISTURE: 0.14 %

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DESCRIPTION *LIMESTONE SLURRY SOLIDS TEST 4*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *4*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045558**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	57.83
Total Sulfur	0.08

MISC. (As Det.)	
Hg	0.008
% SOLIDS	38.8
DENSITY	1.105

ULTIMATE	(Dry)%
Carbon	11.39
Chlorine	0.001
Ash	57.83

MAJOR ASH ELEM	(Dry)%
SiO2	3.31
Al2O3	0.57
TiO2	0.02
Fe2O3	0.31
CaO	53.37
MgO	1.38
Na2O	0.01
K2O	0.13
P2O5	0.03
SO3	0.19
UND	40.68

AS DETERMINED MOISTURE: 0.14 %

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 1
COMMENTS TANK A (12:00)
SAMPLE NUMBER 1A
ANALYTICAL NUMBER 044361

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		79.1		
Total Iron		<0.05		
Magnesium		19.3		
Potassium		8.15		
Sodium		58.0		
Ammonia as NH3	ppm	<10		
Chloride		90.0		
Nitrate as N		INT		
Sulfate		185		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 1
COMMENTS TANK B (12:05)
SAMPLE NUMBER 1B
ANALYTICAL NUMBER 044362

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		82.5		
Total Iron		<0.05		
Magnesium		21.2		
Potassium		8.69		
Sodium		63.7		
Ammonia as NH3	ppm	<10		
Chloride		80.0		
Nitrate as N		<10		
Sulfate		191		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 2
COMMENTS TANK A (17:10)
SAMPLE NUMBER 2A
ANALYTICAL NUMBER 044363

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		82.6		
Total Iron		<0.05		
Magnesium		19.4		
Potassium		8.14		
Sodium		60.1		
Ammonia as NH3	ppm	<10		
Chloride		85.0		
Nitrate as N		<10		
Sulfate		188		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 2
COMMENTS TANK B (17:10)
SAMPLE NUMBER 2B
ANALYTICAL NUMBER 044364

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		81.9		
Total Iron		<0.05		
Magnesium		19.9		
Potassium		8.66		
Sodium		63.9		
Ammonia as NH3	ppm	<10		
Chloride		85.0		
Nitrate as N		<10		
Sulfate		191		
MERCURY	ng/ml	1.0		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 3
COMMENTS TANK A (10:30)
SAMPLE NUMBER 3A
ANALYTICAL NUMBER 044365

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		75.2		
Total Iron		<0.05		
Magnesium		19.3		
Potassium		8.34		
Sodium		61.8		
Ammonia as NH3	ppm	<10		
Chloride		75.0		
Nitrate as N		<10		
Sulfate		191		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -

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DESCRIPTION LIMESTONE SLURRY LIQUID TEST 3
COMMENTS TANK B (10:35)
SAMPLE NUMBER 3B
ANALYTICAL NUMBER 044366

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		82.2		
Total Iron		<0.05		
Magnesium		19.9		
Potassium		8.54		
Sodium		62.9		
Ammonia as NH3	ppm	<10		
Chloride		90.0		
Nitrate as N		<10		
Sulfate		194		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 4
COMMENTS TANK A (14:35)
SAMPLE NUMBER 4A
ANALYTICAL NUMBER 044367

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		83.6		
Total Iron		<0.05		
Magnesium		19.5		
Potassium		8.24		
Sodium		61.0		
Ammonia as NH3	ppm	<10		
Chloride		90.0		
Nitrate as N		<10		
Sulfate		191		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY LIQUID TEST 4
COMMENTS TANK B (14:40)
SAMPLE NUMBER 4B
ANALYTICAL NUMBER 044368

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		85.6		
Total Iron		<0.05		
Magnesium		19.9		
Potassium		8.43		
Sodium		61.9		
Ammonia as NH3	ppm	<10		
Chloride		75.0		
Nitrate as N		<10		
Sulfate		196		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY FILTRATE TEST 1
SAMPLE NUMBER 1
ANALYTICAL NUMBER 045506

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		133		
Total Iron		<0.53		
Magnesium		22.1		
Potassium		9.63		
Sodium		34.5		
Ammonia as NH3	ppm	<10		
Chloride		38.0		
Nitrate as N		1.76		
Sulfate		206		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY FILTRATE TEST 2
SAMPLE NUMBER 2
ANALYTICAL NUMBER 045507

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		96.4		
Total Iron		<0.53		
Magnesium		23.9		
Potassium		10.8		
Sodium		34.3		
Ammonia as NH3	ppm	<10		
Chloride		40.0		
Nitrate as N		1.77		
Sulfate		218		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY FILTRATE TEST 3
SAMPLE NUMBER 3
ANALYTICAL NUMBER 045508

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		91.8		
Total Iron		<0.53		
Magnesium		23.5		
Potassium		10.2		
Sodium		34.2		
Ammonia as NH3	ppm	<10		
Chloride		39.0		
Nitrate as N		1.76		
Sulfate		211		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION LIMESTONE SLURRY FILTRATE TEST 4
SAMPLE NUMBER 4
ANALYTICAL NUMBER 045509

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		86.4		
Total Iron		<0.53		
Magnesium		23.8		
Potassium		10.8		
Sodium		34.9		
Ammonia as NH3	ppm	<10		
Chloride		39.0		
Nitrate as N		1.67		
Sulfate		214		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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Sample Description.: ESP HOPPER ASH HOPPER A2
Sample No.: 1-A2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044321
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	95.42
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	2.00
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	95.42
Oxygen (DIFF)	2.58

Major Ash Elem. (Dry)	
SiO2	45.88
Al2O3	20.16
TiO2	1.02
Fe2O3	18.37
CaO	4.35
MgO	1.16
Na2O	0.68
K2O	3.06
P2O5	0.62
SO3	3.09
Undetermined	1.61

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.197	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.199	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 1.06 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B2
Sample No.: 1-B2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044322
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	2.79
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	
Oxygen (DIFF)	97.21

Major Ash Elem. (AsDet)	
SiO2	39.57
Al2O3	17.06
TiO2	1.11
Fe2O3	20.11
CaO	4.73
MgO	1.27
Na2O	0.63
K2O	2.71
P2O5	0.65
SO3	4.24
Undetermined	7.92

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.136	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.136	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A6
Sample No.: 1-A6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044323
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	95.85
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.61
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	95.85
Oxygen (DIFF)	2.54

Major Ash Elem. (Dry)	
SiO2	46.86
Al2O3	19.62
TiO2	0.99
Fe2O3	19.47
CaO	4.55
MgO	1.14
Na2O	0.67
K2O	3.08
P2O5	0.49
SO3	2.63
Undetermined	0.50

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.091	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.091	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.3 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B6
Sample No.: 1-B6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044324
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.32
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	2.95
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.32
Oxygen (DIFF)	0.73

Major Ash Elem. (Dry)	
SiO2	46.53
Al2O3	19.06
TiO2	0.94
Fe2O3	20.74
CaO	5.51
MgO	1.14
Na2O	0.64
K2O	3.13
P2O5	0.40
SO3	1.41
Undetermined	0.50

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.064	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.064	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.2 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A12
Sample No.: 1-A12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044325
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.59
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.86
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.59
Oxygen (DIFF)	0.55

Major Ash Elem. (Dry)	
SiO2	49.91
Al2O3	20.31
TiO2	1.00
Fe2O3	18.11
CaO	4.69
MgO	1.20
Na2O	0.71
K2O	3.37
P2O5	0.37
SO3	1.30
Undetermined	-0.97

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.062	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.062	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.15 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B12
Sample No.: 1-B12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044326
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.99
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.48
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.99
Oxygen (DIFF)	0.53

Major Ash Elem. (Dry)	
SiO2	49.61
Al2O3	20.16
TiO2	1.01
Fe2O3	18.31
CaO	4.69
MgO	1.19
Na2O	0.68
K2O	3.25
P2O5	0.35
SO3	1.22
Undetermined	-0.47

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.084	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.084	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.2 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A16
Sample No.: 1-A16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044327
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.24
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.29
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.24
Oxygen (DIFF)	0.47

Major Ash Elem. (Dry)	
SiO2	49.46
Al2O3	20.16
TiO2	1.02
Fe2O3	19.20
CaO	4.38
MgO	1.16
Na2O	0.70
K2O	3.10
P2O5	0.24
SO3	1.06
Undetermined	-0.48

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.042	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.042	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.1 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B16
Sample No.: 1-B16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044328
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.59
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.12
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.59
Oxygen (DIFF)	0.29

Major Ash Elem. (Dry)	
SiO_2	49.11
Al_2O_3	20.23
TiO_2	1.03
Fe_2O_3	17.86
CaO	4.40
MgO	1.19
Na_2O	0.65
K_2O	3.14
P_2O_5	0.30
SO_3	0.88
Undetermined	1.21

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.050	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.050	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.09 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A2
Sample No.: 2-A2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044329
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.41
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.01
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.41
Oxygen (DIFF)	1.58

Major Ash Elem. (Dry)	
SiO2	46.61
Al2O3	20.17
TiO2	1.07
Fe2O3	19.76
CaO	4.08
MgO	1.18
Na2O	0.70
K2O	3.13
P2O5	0.50
SO3	2.38
Undetermined	0.42

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.096	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.097	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.73 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B2
Sample No.: 2-B2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044330
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.88
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.40
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.88
Oxygen (DIFF)	1.72

Major Ash Elem. (Dry)	
SiO2	46.76
Al2O3	20.22
TiO2	1.07
Fe2O3	18.45
CaO	4.33
MgO	1.20
Na2O	0.69
K2O	3.14
P2O5	0.52
SO3	2.41
Undetermined	1.21

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.090	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.091	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.58 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A6
Sample No.: 2-A6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044331
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	95.02
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.71
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	95.02
Oxygen (DIFF)	3.27

Major Ash Elem. (Dry)	
SiO2	45.05
Al2O3	18.92
TiO2	0.97
Fe2O3	19.88
CaO	4.96
MgO	1.15
Na2O	0.61
K2O	2.87
P2O5	0.57
SO3	3.13
Undetermined	1.89

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.104	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.104	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.38 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B6
Sample No.: 2-B6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044332
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.52
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	2.63
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.52
Oxygen (DIFF)	0.85

Major Ash Elem. (Dry)	
SiO2	45.63
Al2O3	18.56
TiO2	0.96
Fe2O3	20.27
CaO	5.52
MgO	1.15
Na2O	0.57
K2O	2.70
P2O5	0.46
SO3	1.54
Undetermined	2.64

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.056	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.056	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.15 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A12
Sample No.: 2-A12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044333
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.42
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.92
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.42
Oxygen (DIFF)	0.66

Major Ash Elem. (Dry)	
SiO2	49.45
Al2O3	19.83
TiO2	1.02
Fe2O3	17.64
CaO	4.82
MgO	1.20
Na2O	0.65
K2O	3.09
P2O5	0.41
SO3	1.34
Undetermined	0.55

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.062	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.062	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.14 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B12
Sample No.: 2-B12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044334
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.25
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.22
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.25
Oxygen (DIFF)	0.53

Major Ash Elem. (Dry)	
SiO2	49.19
Al2O3	19.64
TiO2	1.02
Fe2O3	17.96
CaO	4.70
MgO	1.19
Na2O	0.64
K2O	3.00
P2O5	0.37
SO3	1.25
Undetermined	1.04

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.072	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.072	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.1 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A16
Sample No.: 2-A16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044335
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.37
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.27
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.37
Oxygen (DIFF)	0.36

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.031	ppm
F		ppm

Major Ash Elem. (Dry)	
SiO2	49.09
Al2O3	19.70
TiO2	1.02
Fe2O3	19.53
CaO	4.24
MgO	1.12
Na2O	0.61
K2O	2.79
P2O5	0.25
SO3	1.01
Undetermined	0.64

Total Moisture

Misc.		
Analysis	Value	
Hg	0.031	PPM

Seive Analysis	
SIZE	WT %

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.13 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B16

Sample No.: 2-B16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044336
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.64
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.09
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.64
Oxygen (DIFF)	0.27

Major Ash Elem. (Dry)	
SiO2	50.48
Al2O3	19.82
TiO2	1.03
Fe2O3	17.51
CaO	4.41
MgO	1.17
Na2O	0.62
K2O	2.96
P2O5	0.29
SO3	0.85
Undetermined	0.86

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.050	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.050	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.08 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A2
Sample No.: 3-A2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044337
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	95.67
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)	
Hg	0.118 ppm
F	ppm

Ultimate (Dry)%	
Carbon	2.54
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	95.67
Oxygen (DIFF)	1.79

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Major Ash Elem. (Dry)	
SiO2	44.40
Al2O3	20.03
TiO2	1.04
Fe2O3	19.60
CaO	4.26
MgO	1.13
Na2O	0.61
K2O	2.81
P2O5	0.59
SO3	2.58
Undetermined	2.95

Total Moisture

Misc.		
Analysis	Value	
Hg	0.118	PPM

Seive Analysis	
SIZE	WT %

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.25 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B2
Sample No.: 3-B2
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044338
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.86
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.08
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.86
Oxygen (DIFF)	2.06

Major Ash Elem. (Dry)	
SiO2	44.65
Al2O3	20.98
TiO2	1.16
Fe2O3	16.41
CaO	4.42
MgO	1.26
Na2O	0.70
K2O	3.09
P2O5	0.93
SO3	3.92
Undetermined	2.48

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.036	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.036	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.38 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A6
Sample No.: 3-A6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044339
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.78
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.76
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.78
Oxygen (DIFF)	0.46

Major Ash Elem. (Dry)	
SiO2	46.19
Al2O3	19.22
TiO2	0.98
Fe2O3	21.00
CaO	4.86
MgO	1.11
Na2O	0.57
K2O	2.77
P2O5	0.42
SO3	1.39
Undetermined	1.49

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.067	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.067	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.18 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B6
Sample No.: 3-B6
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044340
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.27
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.86
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.27
Oxygen (DIFF)	0.87

Major Ash Elem. (Dry)	
SiO2	47.13
Al2O3	19.94
TiO2	1.03
Fe2O3	19.68
CaO	4.34
MgO	1.13
Na2O	0.59
K2O	2.86
P2O5	0.39
SO3	1.53
Undetermined	1.38

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.037	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.037	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.21 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A12
Sample No.: 3-A12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044341
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.43
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.93
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.43
Oxygen (DIFF)	0.64

Major Ash Elem. (Dry)	
SiO2	49.03
Al2O3	19.55
TiO2	1.02
Fe2O3	17.37
CaO	4.84
MgO	1.19
Na2O	0.63
K2O	2.95
P2O5	0.39
SO3	1.32
Undetermined	1.71

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.060	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.060	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.15 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B12
Sample No.: 3-B12
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044342
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.24
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.29
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.24
Oxygen (DIFF)	0.47

Major Ash Elem. (Dry)	
SiO2	49.10
Al2O3	20.01
TiO2	1.04
Fe2O3	18.55
CaO	4.40
MgO	1.16
Na2O	0.63
K2O	3.04
P2O5	0.33
SO3	1.29
Undetermined	0.45

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.068	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.068	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.14 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A16
Sample No.: 3-A16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044343
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.33
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Trace Elements (ppm)		
Hg	0.034	ppm
F		ppm

Ultimate (Dry)%	
Carbon	1.43
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.33
Oxygen (DIFF)	0.24

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Major Ash Elem. (Dry)	
SiO2	49.56
Al2O3	20.08
TiO2	1.04
Fe2O3	18.39
CaO	4.22
MgO	1.15
Na2O	0.58
K2O	2.94
P2O5	0.29
SO3	0.92
Undetermined	0.83

Total Moisture

Misc.		
Analysis	Value	
Hg	0.034	PPM

Seive Analysis	
SIZE	WT %

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.14 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B16
Sample No.: 3-B16
Date Received: 08/30/2004
Date Completed: 09/16/2004

Analytical No.: 20044344
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.59
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.20
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.59
Oxygen (DIFF)	0.21

Major Ash Elem. (Dry)	
SiO2	49.48
Al2O3	20.39
TiO2	1.05
Fe2O3	18.96
CaO	3.90
MgO	1.11
Na2O	0.57
K2O	2.77
P2O5	0.26
SO3	0.92
Undetermined	0.59

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.040	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.040	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.16 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A2
Sample No.: 4-A2
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044347
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.11
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.97
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.11
Oxygen (DIFF)	1.92

Major Ash Elem. (Dry)	
SiO2	47.06
Al2O3	21.73
TiO2	1.08
Fe2O3	17.65
CaO	3.69
MgO	1.16
Na2O	0.73
K2O	3.33
P2O5	0.59
SO3	2.66
Undetermined	0.32

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.088	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.088	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.41 %

These values are preliminary and are subject to change.

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South Park, PA 15129

Sample Description.: ESP HOPPER ASH HOPPER B2
Sample No.: 4-B2
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044348
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.52
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.50
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.52
Oxygen (DIFF)	1.98

Major Ash Elem. (Dry)	
SiO2	46.28
Al2O3	21.05
TiO2	1.07
Fe2O3	16.91
CaO	3.95
MgO	1.18
Na2O	0.72
K2O	3.23
P2O5	0.64
SO3	2.75
Undetermined	2.22

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.052	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.052	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.72 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A6
Sample No.: 4-A6
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044349
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.60
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.94
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.60
Oxygen (DIFF)	0.46

Major Ash Elem. (Dry)	
SiO2	47.10
Al2O3	20.44
TiO2	0.99
Fe2O3	21.02
CaO	4.41
MgO	1.09
Na2O	0.63
K2O	3.04
P2O5	0.36
SO3	1.33
Undetermined	-0.41

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.071	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.071	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.13 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B6
Sample No.: 4-B6
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044350
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.17
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.031	ppm
F		ppm

Ultimate (Dry)%	
Carbon	1.80
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.17
Oxygen (DIFF)	1.03

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Major Ash Elem. (Dry)	
SiO2	46.80
Al2O3	20.55
TiO2	1.02
Fe2O3	20.86
CaO	4.26
MgO	1.12
Na2O	0.65
K2O	3.03
P2O5	0.45
SO3	1.81
Undetermined	-0.55

Misc.		
Analysis	Value	
Hg	0.031	PPM

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.13 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A12
Sample No.: 4-A12
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044351
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.49
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.94
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	97.49
Oxygen (DIFF)	0.57

Major Ash Elem. (Dry)	
SiO2	49.81
Al2O3	20.25
TiO2	1.00
Fe2O3	17.29
CaO	4.79
MgO	1.17
Na2O	0.70
K2O	3.34
P2O5	0.41
SO3	1.32
Undetermined	-0.08

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.061	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.061	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.19 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B12
Sample No.: 4-B12
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044352
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.27
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	1.32
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.27
Oxygen (DIFF)	0.41

Major Ash Elem. (Dry)	
SiO2	49.03
Al2O3	21.25
TiO2	1.04
Fe2O3	20.42
CaO	3.49
MgO	1.08
Na2O	0.66
K2O	3.04
P2O5	0.22
SO3	1.05
Undetermined	-1.28

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.059	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.059	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.15 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A16
Sample No.: 4-A16
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044353
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.41
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.032	ppm
F		ppm

Ultimate (Dry)%	
Carbon	1.26
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.41
Oxygen (DIFF)	0.33

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Major Ash Elem. (Dry)	
SiO2	49.60
Al2O3	20.48
TiO2	1.00
Fe2O3	18.61
CaO	4.11
MgO	1.12
Na2O	0.62
K2O	3.14
P2O5	0.28
SO3	1.01
Undetermined	0.03

Total Moisture

Misc.		
Analysis	Value	
Hg	0.032	PPM

Seive Analysis	
SIZE	WT %

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.09 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B16
Sample No.: 4-B16
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044354
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	98.83
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.83
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	98.83
Oxygen (DIFF)	0.34

Major Ash Elem. (Dry)	
SiO2	50.71
Al2O3	21.08
TiO2	1.02
Fe2O3	18.23
CaO	3.66
MgO	1.11
Na2O	0.66
K2O	3.21
P2O5	0.25
SO3	1.00
Undetermined	-0.93

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.034	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.034	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.08 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER A2
Sample No.: A2-R
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044355
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	95.21
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Trace Elements (ppm)		
Hg	0.060	ppm
F		ppm

Ultimate (Dry)%	
Carbon	1.64
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	95.21
Oxygen (DIFF)	3.15

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Major Ash Elem. (Dry)	
SiO2	45.06
Al2O3	22.19
TiO2	1.18
Fe2O3	16.28
CaO	3.43
MgO	1.19
Na2O	0.77
K2O	3.51
P2O5	0.88
SO3	4.11
Undetermined	1.40

Total Moisture

Misc.		
Analysis	Value	
Hg	0.060	PPM

Seive Analysis	
SIZE	WT %

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 0.62 %

These values are preliminary and are subject to change.

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Sample Description.: ESP HOPPER ASH HOPPER B2
Sample No.: B2-R
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044356
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.50
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.99
Hydrogen	
Nitrogen	
Chlorine	ppm
Sulfur, Total	
Ash	96.50
Oxygen (DIFF)	2.51

Major Ash Elem. (Dry)	
SiO2	43.90
Al2O3	22.13
TiO2	1.21
Fe2O3	15.32
CaO	4.00
MgO	1.26
Na2O	0.83
K2O	3.61
P2O5	1.20
SO3	4.97
Undetermined	1.57

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.020	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.020	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 0.53 %

These values are preliminary and are subject to change.

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Sample Description.: FGD SLURRY SOLIDS TEST 1
Sample No.: 1
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044316
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.92
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.56
Hydrogen	
Nitrogen	
Chlorine	0.0066 ppm
Sulfur, Total	
Ash	96.92
Oxygen (DIFF)	2.51

Major Ash Elem. (Dry)	
SiO2	4.05
Al2O3	0.35
TiO2	0.01
Fe2O3	0.18
CaO	40.61
MgO	0.23
Na2O	0.01
K2O	0.08
P2O5	<0.00
SO3	51.03
Undetermined	3.45

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.	
Analysis	Value
Hg	0.37
% SOLID	10.76
DENSITY	1.019

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.407	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 9.19 %

These values are preliminary and are subject to change.

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Sample Description.: FGD SLURRY SOLIDS TEST 2
Sample No.: 2
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044317
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.26
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.49
Hydrogen	
Nitrogen	
Chlorine	0.0098 ppm
Sulfur, Total	
Ash	97.26
Oxygen (DIFF)	2.24

Major Ash Elem. (Dry)	
SiO2	3.76
Al2O3	0.30
TiO2	0.01
Fe2O3	0.14
CaO	40.91
MgO	0.23
Na2O	
K2O	0.08
P2O5	<0.00
SO3	51.95
Undetermined	2.62

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.43	0.47
% SOLID	11.73	
DENSITY	1.012	

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.492	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 8.51 %

These values are preliminary and are subject to change.

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Sample Description.: FGD SLURRY SOLIDS TEST 3
Sample No.: 3
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044318
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.96
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.44
Hydrogen	
Nitrogen	
Chlorine	0.0022 ppm
Sulfur, Total	
Ash	97.96
Oxygen (DIFF)	1.60

Major Ash Elem. (Dry)	
SiO2	4.11
Al2O3	0.35
TiO2	0.01
Fe2O3	0.17
CaO	40.60
MgO	0.21
Na2O	0.01
K2O	0.08
P2O5	<0.00
SO3	52.63
Undetermined	1.83

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.	
Analysis	Value
Hg	0.34
% SOLID	11.11
DENSITY	1.012

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.371	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 8.44 %

These values are preliminary and are subject to change.

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Sample Description.: FGD SLURRY SOLIDS TEST 4
Sample No.: 4
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044319
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.67
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.27
Hydrogen	
Nitrogen	
Chlorine	0.0023 ppm
Sulfur, Total	
Ash	97.67
Oxygen (DIFF)	2.06

Major Ash Elem. (Dry)	
SiO2	4.11
Al2O3	0.34
TiO2	0.01
Fe2O3	0.17
CaO	41.23
MgO	0.23
Na2O	0.01
K2O	0.08
P2O5	<0.00
SO3	52.52
Undetermined	1.30

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	0.31
% SOLID	11.93
DENSITY	1.013

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.350	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 11.43 %

These values are preliminary and are subject to change.

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RESEARCH & DEVELOPMENT
ANALYTICAL LABORATORY
4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *FGD SLURRY SOLIDS A-SIDE TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1-A*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045559**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	95.65
Total Sulfur	21.38

MISC. (As Det.)	
Hg	0.531
% SOLIDS	11.1
DENSITY	1.017

ULTIMATE	(Dry)%
Carbon	0.21
Chlorine	0.014
Ash	95.65

MAJOR ASH ELEM	(Dry)%
SiO2	3.37
Al2O3	0.74
TiO2	0.02
Fe2O3	0.37
CaO	39.59
MgO	0.40
Na2O	0.04
K2O	0.18
P2O5	<0.00
SO3	53.44
UND	1.85

AS DETERMINED MOISTURE: <0.01 %

DISTRIBUTION:
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ANALYTICAL LABORATORY
4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *FGD SLURRY SOLIDS B-SIDE TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1-B*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045560**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.78
Total Sulfur	21.60

MISC. (As Det.)	
Hg	0.439
% SOLIDS	11.8
DENSITY	1.015

ULTIMATE	(Dry)%
Carbon	0.27
Chlorine	0.015
Ash	97.78

MAJOR ASH ELEM	(Dry)%
SiO2	3.21
Al2O3	0.69
TiO2	0.02
Fe2O3	0.35
CaO	39.91
MgO	0.42
Na2O	0.04
K2O	0.15
P2O5	<0.00
SO3	53.99
UND	1.22

AS DETERMINED MOISTURE: 2.08 %

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DESCRIPTION *FGD SLURRY SOLIDS A-SIDE TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2-A*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045561**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	95.45
Total Sulfur	21.04

MISC. (As Det.)	
Hg	0.466
% SOLIDS	10.1
DENSITY	1.012

ULTIMATE	(Dry)%
Carbon	0.31
Chlorine	0.020
Ash	95.45

MAJOR ASH ELEM	(Dry)%
SiO2	3.30
Al203	0.76
TiO2	0.02
Fe203	0.36
CaO	37.88
MgO	0.49
Na20	0.04
K20	0.16
P205	<0.00
SO3	52.59
UND	4.40

AS DETERMINED MOISTURE: <0.01 %

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DESCRIPTION *FGD SLURRY SOLIDS B-SIDE TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2-B*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045562**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.51
Total Sulfur	21.56

MISC. (As Det.)	
Hg	0.447
% SOLIDS	10.9
DENSITY	1.014

ULTIMATE	(Dry)%
Carbon	0.31
Chlorine	0.023
Ash	97.51

MAJOR ASH ELEM	(Dry)%
SiO2	3.11
Al2O3	0.66
TiO2	0.02
Fe2O3	0.35
CaO	40.62
MgO	0.39
Na2O	0.04
K2O	0.15
P2O5	<0.00
SO3	53.90
UND	0.76

AS DETERMINED MOISTURE: 1.98 %

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DESCRIPTION *FGD SLURRY SOLIDS A-SIDE TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3-A*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045563**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.66
Total Sulfur	21.65

MISC. (As Det.)	
Hg	0.426
% SOLIDS	12.0
DENSITY	1.017

ULTIMATE	(Dry)%
Carbon	0.37
Chlorine	0.022
Ash	97.66

MAJOR ASH ELEM	(Dry)%
SiO2	4.03
Al2O3	0.96
TiO2	0.03
Fe2O3	0.47
CaO	40.66
MgO	0.59
Na2O	0.04
K2O	0.21
P2O5	<0.00
SO3	54.13
UND	-1.12

AS DETERMINED MOISTURE: 8.69 %

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DESCRIPTION *FGD SLURRY SOLIDS B-SIDE TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3-B*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045564**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.82
Total Sulfur	21.94

MISC. (As Det.)	
Hg	0.417
% SOLIDS	12.1
DENSITY	1.014

ULTIMATE	(Dry)%
Carbon	0.32
Chlorine	0.036
Ash	97.82

MAJOR ASH ELEM	(Dry)%
SiO2	3.42
Al2O3	0.79
TiO2	0.02
Fe2O3	0.39
CaO	39.91
MgO	0.47
Na2O	0.05
K2O	0.17
P2O5	<0.00
SO3	54.84
UND	-0.06

AS DETERMINED MOISTURE: 12.26 %

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DESCRIPTION *FGD SLURRY SOLIDS A-SIDE TEST 4*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *4-A*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045565**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.31
Total Sulfur	21.95

MISC. (As Det.)

Hg	0.439
% SOLIDS	13.4
DENSITY	1.014

ULTIMATE	(Dry)%
Carbon	0.39
Chlorine	0.018
Ash	97.31

MAJOR ASH ELEM	(Dry)%
SiO2	3.33
Al2O3	0.77
TiO2	0.02
Fe2O3	0.38
CaO	40.56
MgO	0.54
Na2O	0.05
K2O	0.18
P2O5	<0.00
SO3	54.87
UND	-0.70

AS DETERMINED MOISTURE: 12.43 %

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DESCRIPTION *FGD SLURRY SOLIDS B-SIDE TEST 4*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *4-B*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045566**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.50
Total Sulfur	22.18

MISC. (As Det.)

Hg	0.335
% SOLIDS	14.8
DENSITY	1.014

ULTIMATE	(Dry)%
Carbon	0.35
Chlorine	0.019
Ash	97.50

MAJOR ASH ELEM	(Dry)%
SiO2	3.01
Al2O3	0.65
TiO2	0.02
Fe2O3	0.34
CaO	41.32
MgO	0.43
Na2O	0.05
K2O	0.16
P2O5	<0.00
SO3	55.46
UND	-1.44

AS DETERMINED MOISTURE: 17.07 %

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 1
COMMENTS (13:45 PM)
SAMPLE NUMBER 1
ANALYTICAL NUMBER 044369

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		900		
Total Iron		<0.05		
Magnesium		602		
Potassium		12.5		
Sodium		103		
Ammonia as NH3	ppm	<10		
Chloride		1800		
Nitrate as N		12.6		
Sulfate		2900		
MERCURY	ng/ml	33.4		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 2
COMMENTS (18:25 PM)
SAMPLE NUMBER 2
ANALYTICAL NUMBER 044370

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		988		
Total Iron		<0.05		
Magnesium		656		
Potassium		11.6		
Sodium		98.3		
Ammonia as NH3	ppm	<10		
Chloride		2150		
Nitrate as N		11.1		
Sulfate		2890		
MERCURY	ng/ml	39.2		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 3
COMMENTS (11:35 PM)
SAMPLE NUMBER 3
ANALYTICAL NUMBER 044371

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		963		
Total Iron		<0.05		
Magnesium		674		
Potassium		12.4		
Sodium		102		
Ammonia as NH3	ppm	<10		
Chloride		1850		
Nitrate as N		11.1		
Sulfate		3010		
MERCURY	ng/ml	61.6		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 4
COMMENTS (16:00 PM)
SAMPLE NUMBER 4
ANALYTICAL NUMBER 044372

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		941		
Total Iron		<0.05		
Magnesium		654		
Potassium		11.6		
Sodium		97.2		
Ammonia as NH3	ppm	<10		
Chloride		1850		
Nitrate as N		10.1		
Sulfate		2930		
MERCURY	ng/ml	56.8		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 1
SAMPLE NUMBER 1-A
ANALYTICAL NUMBER 045510

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		648		
Total Iron		0.82		
Magnesium		1040		
Potassium		23.6		
Sodium		99.1		
Ammonia as NH3	ppm	<10		
Chloride		1450		
Nitrate as N		53.2		
Sulfate		4090		
MERCURY	ng/ml	5.1		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 1
SAMPLE NUMBER 1-B
ANALYTICAL NUMBER 045511

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		664		
Total Iron		0.72		
Magnesium		974		
Potassium		21.5		
Sodium		99.4		
Ammonia as NH3	ppm	<10		
Chloride		1370		
Nitrate as N		52.9		
Sulfate		4140		

MERCURY ng/ml 4.2

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 2
SAMPLE NUMBER 2-A
ANALYTICAL NUMBER 045512

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		622		
Total Iron		1.27		
Magnesium		964		
Potassium		21.8		
Sodium		95.0		
Ammonia as NH3	ppm	<10		
Chloride		1310		
Nitrate as N		48.3		
Sulfate		3850		
MERCURY	ng/ml	5.4		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 2
SAMPLE NUMBER 2-B
ANALYTICAL NUMBER 045513

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		637		
Total Iron		1.04		
Magnesium		985		
Potassium		22.4		
Sodium		97.7		
Ammonia as NH3	ppm	<10		
Chloride		1200		
Nitrate as N		46.7		
Sulfate		4040		
MERCURY	ng/ml	2.8		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 3
SAMPLE NUMBER 3-A
ANALYTICAL NUMBER 045514

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		653		
Total Iron		1.56		
Magnesium		1070		
Potassium		25.3		
Sodium		106		
Ammonia as NH3	ppm	<10		
Chloride		1370		
Nitrate as N		50.5		
Sulfate		4150		
MERCURY	ng/ml	3.4		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 3
SAMPLE NUMBER 3-B
ANALYTICAL NUMBER 045515

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		650		
Total Iron		3.61		
Magnesium		954		
Potassium		22.7		
Sodium		94.7		
Ammonia as NH3	ppm	<10		
Chloride		1210		
Nitrate as N		49.4	45.7	47.6
Sulfate		3920		

MERCURY ng/ml 1.5

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 4
SAMPLE NUMBER 4-A
ANALYTICAL NUMBER 045516

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		640		
Total Iron		1.74		
Magnesium		1000		
Potassium		23.4		
Sodium		94.8		
Ammonia as NH3	ppm	<10		
Chloride		1420		
Nitrate as N		54.7		
Sulfate		3950		

MERCURY	ng/ml	7.1

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION FGD SLURRY FILTRATE TEST 4
SAMPLE NUMBER 4-B
ANALYTICAL NUMBER 045517

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		639		
Total Iron		1.67		
Magnesium		970		
Potassium		21.2		
Sodium		91.0		
Ammonia as NH3	ppm	<10		
Chloride		1290		
Nitrate as N		51.5		
Sulfate		3920		
MERCURY	ng/ml	2.9		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD MAKE-UP WATER TEST 1
COMMENTS (13:45 PM)
SAMPLE NUMBER 1
ANALYTICAL NUMBER 044373

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		60.5		
Total Iron		0.35		
Magnesium		15.4		
Potassium		4.20		
Sodium		33.1		
Ammonia as NH3	ppm	<10		
Chloride		45.0		
Nitrate as N		0.93		
Sulfate		107		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD MAKE-UP WATER TEST 2
COMMENTS (18:25 PM)
SAMPLE NUMBER 2
ANALYTICAL NUMBER 044374

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		61.9		
Total Iron		0.12		
Magnesium		15.7		
Potassium		4.16		
Sodium		33.1		
Ammonia as NH3	ppm	<10		
Chloride		55.0		
Nitrate as N		0.72		
Sulfate		110		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD MAKE-UP WATER TEST 3
COMMENTS (11:35 AM)
SAMPLE NUMBER 3
ANALYTICAL NUMBER 044375

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		58.1		
Total Iron		<0.05		
Magnesium		15.1		
Potassium		4.24		
Sodium		33.6		
Ammonia as NH3	ppm	<10		
Chloride		50.0		
Nitrate as N		1.31		
Sulfate		101		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION FGD MAKE-UP WATER TEST 4
COMMENTS (16:00 PM)
SAMPLE NUMBER 4
ANALYTICAL NUMBER 044376

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		61.1		
Total Iron		0.53		
Magnesium		15.5		
Potassium		4.24		
Sodium		33.5		
Ammonia as NH3	ppm	<10		
Chloride		45.0		
Nitrate as N		1.16		
Sulfate		106		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 3
COMMENTS (11:50 AM)
SAMPLE NUMBER 3
ANALYTICAL NUMBER 044377

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		116		
Total Iron		<0.05		
Magnesium		33.5		
Potassium		6.23		
Sodium		50.1		
Ammonia as NH3	ppm	<10		
Chloride		90.0		
Nitrate as N		1.49		
Sulfate		246		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 4
COMMENTS (16:15 PM)
SAMPLE NUMBER 4
ANALYTICAL NUMBER 044378

ANALYSIS	UNITS	WATER ANALYSIS VALUE	VALUE	DUP AVG
Calcium		118		
Total Iron		0.92		
Magnesium		34.2		
Potassium		6.12		
Sodium		47.9		
Ammonia as NH3	ppm	<10		
Chloride		90.0		
Nitrate as N		1.92		
Sulfate		250		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 1
COMMENTS ASH POND WATER
SAMPLE NUMBER 1
ANALYTICAL NUMBER 045518

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		90.1		
Total Iron		2.57		
Magnesium		23.6		
Potassium		6.91		
Sodium		27.7		
Ammonia as NH3	ppm	<10		
Chloride		37.0		
Nitrate as N		1.81		
Sulfate		154		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 2
COMMENTS ASH POND WATER
SAMPLE NUMBER 2
ANALYTICAL NUMBER 045519

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		90.0		
Total Iron		1.88		
Magnesium		23.3		
Potassium		6.62		
Sodium		26.5		
Ammonia as NH3	ppm	<10		
Chloride		36.0		
Nitrate as N		1.69		
Sulfate		152		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 3
COMMENTS ASH POND WATER
SAMPLE NUMBER 3
ANALYTICAL NUMBER 045520

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		93.0		
Total Iron		2.42		
Magnesium		23.6		
Potassium		9.43		
Sodium		35.1		
Ammonia as NH3	ppm	<10		
Chloride		37.0		
Nitrate as N		1.70		
Sulfate		154		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION ME WASH WATER TEST 4
COMMENTS ASH POND WATER
SAMPLE NUMBER 4
ANALYTICAL NUMBER 045521

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		89.3		
Total Iron		2.33		
Magnesium		23.0		
Potassium		6.16		
Sodium		26.7		
Ammonia as NH3	ppm	<10		
Chloride		37.0		
Nitrate as N		1.64		
Sulfate		143		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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Sample Description.: HYDROCLONE UNDERFLOW TEST 3
Sample No.: HU 3
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044359
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.50
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Trace Elements (ppm)		
Hg	0.198	ppm
F		ppm

Ultimate (Dry)%	
Carbon	0.46
Hydrogen	
Nitrogen	
Chlorine	0.0012 ppm
Sulfur, Total	
Ash	97.50
Oxygen (DIFF)	2.04

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Major Ash Elem. (Dry)	
SiO2	2.79
Al2O3	0.15
TiO2	
Fe2O3	0.09
CaO	43.11
MgO	0.15
Na2O	
K2O	0.02
P2O5	<0.00
SO3	53.32
Undetermined	0.37

Misc.	
Analysis	Value
Hg	0.16
% SOLID	40.05
DENSITY	1.042

Seive Analysis	
SIZE	WT %

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

HGI/FSI
HGI
FSI

As Determined Moisture 19.23 %

These values are preliminary and are subject to change.

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Sample Description.: HYDROCLONE UNDERFLOW TEST 4
Sample No.: HU 4
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044360
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	97.53
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.55
Hydrogen	
Nitrogen	
Chlorine	0.0037 ppm
Sulfur, Total	
Ash	97.53
Oxygen (DIFF)	1.92

Major Ash Elem. (Dry)	
SiO2	3.34
Al2O3	0.14
TiO2	
Fe2O3	0.07
CaO	43.31
MgO	0.15
Na2O	0.01
K2O	0.04
P2O5	<0.00
SO3	52.36
Undetermined	0.58

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical
Fluid

Misc.		
Analysis	Value	
Hg	0.17	PPM
% SOLID	41.33	
DENSITY	1.057	

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.212	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 19.88 %

These values are preliminary and are subject to change.

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DESCRIPTION *HYDROCLONE UNDERFLOW TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045574**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	98.43
Total Sulfur	22.97

MISC. (As Det.)

Hg	0.111
% SOLIDS	37.1
DENSITY	1.124

ULTIMATE	(Dry)%
Carbon	0.19
Chlorine	0.011
Ash	98.43

MAJOR ASH ELEM	(Dry)%
SiO2	2.00
Al2O3	0.22
TiO2	0.01
Fe2O3	0.14
CaO	40.88
MgO	0.24
Na2O	0.04
K2O	0.07
P2O5	<0.00
SO3	57.42
UND	-1.02

AS DETERMINED MOISTURE: 0.29 %

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DESCRIPTION *HYDROCLONE UNDERFLOW TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER 045575

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.94
Total Sulfur	22.47

MISC. (As Det.)

Hg	0.113
% SOLIDS	37.7
DENSITY	1.177

ULTIMATE	(Dry)%
Carbon	0.27
Chlorine	0.012
Ash	97.94

MAJOR ASH ELEM	(Dry)%
SiO2	1.94
Al2O3	0.24
TiO2	0.01
Fe2O3	0.16
CaO	42.17
MgO	0.31
Na2O	0.03
K2O	0.06
P2O5	<0.00
SO3	56.17
UND	-1.09

AS DETERMINED MOISTURE: 0.26 %

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DESCRIPTION *HYDROCLONE UNDERFLOW TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045576**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	98.13
Total Sulfur	22.40

MISC. (As Det.)	
Hg	0.099
% SOLIDS	37.1
DENSITY	1.173

ULTIMATE	(Dry)%
Carbon	0.25
Chlorine	0.014
Ash	98.13

MAJOR ASH ELEM	(Dry)%
SiO2	1.97
Al2O3	0.24
TiO2	0.01
Fe2O3	0.15
CaO	41.10
MgO	0.32
Na2O	0.03
K2O	0.06
P2O5	<0.00
SO3	56.00
UND	0.12

AS DETERMINED MOISTURE: 0.14 %

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DESCRIPTION *HYDROCLONE UNDERFLOW TEST 4*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *4*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045577**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.79
Total Sulfur	22.47

MISC. (As Det.)

Hg	0.009
% SOLIDS	37.6
DENSITY	1.092

ULTIMATE	(Dry)%
Carbon	0.27
Chlorine	0.016
Ash	97.79

MAJOR ASH ELEM	(Dry)%
SiO2	1.95
Al2O3	0.24
TiO2	0.01
Fe2O3	0.15
CaO	41.22
MgO	0.33
Na2O	0.04
K2O	0.06
P2O5	<0.00
SO3	56.18
UND	-0.18

AS DETERMINED MOISTURE: 0.52 %

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW TEST 3
COMMENTS (12:20 PM)
SAMPLE NUMBER HU 3
ANALYTICAL NUMBER 044381

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		914		
Total Iron		<0.05		
Magnesium		670		
Potassium		13.3		
Sodium		110		
Ammonia as NH3	ppm	<10		
Chloride		2050		
Nitrate as N		12.9		
Sulfate		3100		
MERCURY	ng/ml	80.8		

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW TEST 4
COMMENTS (16:30 PM)
SAMPLE NUMBER HU 4
ANALYTICAL NUMBER 044382

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		929		
Total Iron		<0.05		
Magnesium		701		
Potassium		13.5		
Sodium		112		
Ammonia as NH3	ppm	<10		
Chloride		2050		
Nitrate as N		14.3		
Sulfate		3160		
MERCURY	ng/ml	78.9		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW FILTRATE TEST 1
SAMPLE NUMBER 1
ANALYTICAL NUMBER 045526

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		701		
Total Iron		7.06		
Magnesium		946		
Potassium		21.9		
Sodium		88.8		
Ammonia as NH3	ppm	<10		
Chloride		1320	1340	1330
Nitrate as N		0.88		
Sulfate		4190		

MERCURY	ng/ml	2.9

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW FILTRATE TEST 2
SAMPLE NUMBER 2
ANALYTICAL NUMBER 045527

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		675		
Total Iron		5.19		
Magnesium		1010		
Potassium		23.6		
Sodium		98.9		
Ammonia as NH3	ppm	<10		
Chloride		1250		
Nitrate as N		1.21		
Sulfate		4210		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW FILTRATE TEST 3
SAMPLE NUMBER 3
ANALYTICAL NUMBER 045528

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		644		
Total Iron		4.76		
Magnesium		963		
Potassium		22.7		
Sodium		93.9		
Ammonia as NH3	PPM	<10		
Chloride		1260		
Nitrate as N		0.63		
Sulfate		3970		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE UNDERFLOW FILTRATE TEST 4
SAMPLE NUMBER 4
ANALYTICAL NUMBER 045529

		-------- WATER ANALYSIS ---------		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		618		
Total Iron		7.36		
Magnesium		910		
Potassium		21.2		
Sodium		87.8		
Ammonia as NH3	ppm	<10		
Chloride		1260		
Nitrate as N		0.70		
Sulfate		3740		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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Sample Description.: HYDROCLONE OVERFLOW TEST 3
Sample No.: HO 3
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044357
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.84
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.34
Hydrogen	
Nitrogen	
Chlorine	0.0076 ppm
Sulfur, Total	
Ash	96.84
Oxygen (DIFF)	2.81

Major Ash Elem. (Dry)	
SiO2	5.53
Al2O3	0.54
TiO2	0.02
Fe2O3	0.27
CaO	39.91
MgO	0.31
Na2O	0.01
K2O	0.12
P2O5	0.01
SO3	49.46
Undetermined	3.82

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.	
Analysis	Value
Hg	0.37
% SOLID	8.11
DENSITY	1.020

HGI/FSI
HGI
FSI

Trace Elements (ppm)	
Hg	0.401 ppm
F	ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 7.8 %

These values are preliminary and are subject to change.

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Sample Description.: HYDROCLONE OVERFLOW TEST 4

Sample No.: HO 4
Date Received: 08/30/2004
Date Completed: 10/19/2004

Analytical No.: 20044358
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	96.41
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.93
Hydrogen	
Nitrogen	
Chlorine	0.0150 ppm
Sulfur, Total	
Ash	96.41
Oxygen (DIFF)	2.65

Major Ash Elem. (Dry)	
SiO2	9.31
Al2O3	1.02
TiO2	0.03
Fe2O3	0.50
CaO	39.10
MgO	0.56
Na2O	0.02
K2O	0.22
P2O5	0.09
SO3	46.44
Undetermined	2.71

Total Moisture

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.71	0.99
% SOLID	4.43	
DENSITY	1.016	

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.909	ppm
F		ppm

Seive Analysis	
SIZE	WT %

As Determined Moisture 6.49 %

These values are preliminary and are subject to change.

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DESCRIPTION *HYDROCLONE OVERFLOW TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045570**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	95.67
Total Sulfur	16.38

MISC. (As Det.)	
Hg	2.51 PPM
% SOLIDS	2.3
DENSITY	1.018

ULTIMATE	(Dry)%
Carbon	0.86
Chlorine	0.092
Ash	95.67

MAJOR ASH ELEM	(Dry)%
SiO2	14.39
Al2O3	4.42
TiO2	0.15
Fe2O3	2.00
CaO	32.24
MgO	1.44
Na2O	0.09
K2O	1.00
P2O5	0.06
SO3	40.96
UND	3.25

AS DETERMINED MOISTURE: 4.98 %

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J. LOCKE

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DESCRIPTION *HYDROCLONE OVERFLOW TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER 045571

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	96.14
Total Sulfur	17.84

MISC. (As Det.)

Hg	2.48 PPM
% SOLIDS	2.6
DENSITY	1.016

ULTIMATE	(Dry)%
Carbon	0.66
Chlorine	0.032
Ash	96.14

MAJOR ASH ELEM	(Dry)%
SiO2	11.75
Al2O3	3.65
TiO2	0.13
Fe2O3	1.67
CaO	34.34
MgO	1.23
Na2O	0.07
K2O	0.80
P2O5	0.02
SO3	44.59
UND	1.75

AS DETERMINED MOISTURE: 5.22 %

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DESCRIPTION *HYDROCLONE OVERFLOW TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045572**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	94.11
Total Sulfur	12.89

MISC. (As Det.)

Hg	4.51 PPM
% SOLIDS	1.6
DENSITY	1.019

ULTIMATE	(Dry)%
Carbon	1.22
Chlorine	0.062
Ash	94.11

MAJOR ASH ELEM	(Dry)%
SiO2	22.04
Al2O3	7.39
TiO2	0.24
Fe2O3	3.31
CaO	26.68
MgO	2.47
Na2O	0.13
K2O	1.62
P2O5	0.17
SO3	32.22
UND	3.73

AS DETERMINED MOISTURE: 4.81 %

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DESCRIPTION *HYDROCLONE OVERFLOW TEST 4*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *4*

DATE LOGGED *11/09/04*
DATE COMPLETED *12/02/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045573**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	90.69
Total Sulfur	15.08

MISC. (As Det.)

Hg	1.03 PPM
% SOLIDS	4.8
DENSITY	1.034

ULTIMATE	(Dry)%
Carbon	2.29
Chlorine	0.028
Ash	90.69

MAJOR ASH ELEM	(Dry)%
SiO2	6.89
Al2O3	1.95
TiO2	0.06
Fe2O3	0.90
CaO	38.35
MgO	0.92
Na2O	0.05
K2O	0.43
P2O5	<0.00
SO3	37.69
UND	12.76

AS DETERMINED MOISTURE: 4.43 %

DISTRIBUTION:
S. TSENG
J. WITHUM
J. LOCKE

Approved for transmittal _____

CONSOL ENERGY INC.
RESEARCH & DEVELOPMENT
ANALYTICAL LABORATORY
SOUTH PARK, PENNSYLVANIA 15129

TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW TEST 3
COMMENTS (11:55 AM)
SAMPLE NUMBER HO 3
ANALYTICAL NUMBER 044379

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		960		
Total Iron		<0.05		
Magnesium		653		
Potassium		11.5		
Sodium		96.4		
Ammonia as NH3	ppm	<10		
Chloride		1800		
Nitrate as N		10.4		
Sulfate		2960		

MERCURY	ng/ml	57.9

Note: All units mg/L unless specified

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TO: JAW/SCT/JEL

PROJECT NUMBER 1621-87 -

DATE LOGGED 08/30/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW TEST 4
COMMENTS (16:35 PM)
SAMPLE NUMBER HO 4
ANALYTICAL NUMBER 044380

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		1050		
Total Iron		<0.05		
Magnesium		867		
Potassium		13.4		
Sodium		116		
Ammonia as NH3	ppm	<10		
Chloride		2450		
Nitrate as N		16.6		
Sulfate		3560		
MERCURY	ng/ml	72.3		

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW FILTRATE TEST 1
COMMENTS FGD MAKEUP WATER
SAMPLE NUMBER 1
ANALYTICAL NUMBER 045522

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		713		
Total Iron		4.32		
Magnesium		966		
Potassium		22.5		
Sodium		90.7		
Ammonia as NH3	ppm	<10		
Chloride		1400		
Nitrate as N		1.19		
Sulfate		4190		

MERCURY	ng/ml	5.6

Note: All units mg/L unless specified

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TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW FILTRATE TEST 2
COMMENTS FGD MAKEUP WATER
SAMPLE NUMBER 2
ANALYTICAL NUMBER 045523

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		589		
Total Iron		1.77		
Magnesium		860		
Potassium		19.5		
Sodium		80.1		
Ammonia as NH3	ppm	<10		
Chloride		1250		
Nitrate as N		1.87		
Sulfate		3540		
MERCURY	ng/ml	<1.0		

Note: All units mg/L unless specified

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SOUTH PARK, PENNSYLVANIA 15129

TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW FILTRATE TEST 3
COMMENTS FGD MAKEUP WATER
SAMPLE NUMBER 3
ANALYTICAL NUMBER 045524

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		640		
Total Iron		2.16		
Magnesium		974		
Potassium		23.3		
Sodium		91.8		
Ammonia as NH3	ppm	<10		
Chloride		1410		
Nitrate as N		1.67		
Sulfate		3890		
MERCURY	ng/ml	3.3		

Note: All units mg/L unless specified

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ANALYTICAL LABORATORY
SOUTH PARK, PENNSYLVANIA 15129

TO: SCT/JAW/JEL

PROJECT NUMBER 1621-87 -1

DATE LOGGED 11/09/04
DATE COMPLETED / /

DESCRIPTION HYDROCLONE OVERFLOW FILTRATE TEST 4
COMMENTS FGD MAKEUP WATER
SAMPLE NUMBER 4
ANALYTICAL NUMBER 045525

		WATER ANALYSIS		
ANALYSIS	UNITS	VALUE	VALUE	DUP AVG
Calcium		610		
Total Iron		1.62		
Magnesium		971		
Potassium		22.7		
Sodium		88.8		
Ammonia as NH3	ppm	<10		
Chloride		1370		
Nitrate as N		1.50	1.31	1.41
Sulfate		3880		

MERCURY	ng/ml	1.8

Note: All units mg/L unless specified

CONSOL ENERGY

Research and Development
www.consolenergy.com
4000 Brownsville Rd.
South Park, PA 15129

Sample Description.: GYPSUM TEST 4
Sample No.: GYPSUM
Date Received: 08/30/2004
Date Completed: 09/15/2004

Analytical No.: 20044320
Project No.: 1621 -087 -
Submitted By: J. WITHUM

Proximate	Wt%
Ash	85.19
Volatile Matter	
Fixed Carbon	
BTU/lb	
MAF BTU/lb	

Ultimate (Dry)%	
Carbon	0.19
Hydrogen	
Nitrogen	
Chlorine	0.0108 ppm
Sulfur, Total	
Ash	85.19
Oxygen (DIFF)	14.61

Major Ash Elem. (Dry)	
SiO2	2.98
Al2O3	0.26
TiO2	0.01
Fe2O3	0.18
CaO	36.11
MgO	0.14
Na2O	0.01
K2O	0.05
P2O5	
SO3	44.68
Undetermined	15.58

Sulfur Forms (Dry)
Pyritic Sulfur
Sulfate
Organic
Sulfur, Total

Ash Fusion Reducing Temp (F)
Initial
Softening
Hemispherical.
Fluid

Ash Fusion Oxidizing
Initial
Softening
Hemispherical.
Fluid

Misc.		
Analysis	Value	
Hg	0.151	PPM

HGI/FSI
HGI
FSI

Trace Elements (ppm)		
Hg	0.163	ppm
F		ppm

Seive Analysis	
SIZE	WT %

Total Moisture

As Determined Moisture 7.6 %

These values are preliminary and are subject to change.

CONSOL ENERGY INC.
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ANALYTICAL LABORATORY
4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *GYPSUM TEST 1*
DATE SAMPLED *11/02/04*
SAMPLE NUMBER *1*

DATE LOGGED *11/09/04*
DATE COMPLETED *11/18/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045567**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.94
Total Sulfur	20.02

MISC. (As Det.)

Hg	0.134 PPM

ULTIMATE	(Dry)%
Carbon	0.25
Chlorine	0.007
Ash	97.94

MAJOR ASH ELEM	(Dry)%
SiO2	2.31
Al2O3	0.38
TiO2	0.02
Fe2O3	0.27
CaO	40.04
MgO	0.20
Na2O	
K2O	0.09
P2O5	<0.00
SO3	50.06
UND	6.63

AS DETERMINED MOISTURE: 19.38 %

DISTRIBUTION:
S. TSENG
J. WITHUM
J. LOCKE

Approved for transmittal _____

CONSOL ENERGY INC.
RESEARCH & DEVELOPMENT
ANALYTICAL LABORATORY
4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *GYPSUM TEST 2*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *2*

DATE LOGGED *11/09/04*
DATE COMPLETED *11/18/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045568**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.61
Total Sulfur	19.84

MISC. (As Det.)	
Hg	0.131 PPM

ULTIMATE	(Dry)%
Carbon	0.24
Chlorine	0.005
Ash	97.61

MAJOR ASH ELEM	(Dry)%
SiO2	2.19
Al2O3	0.33
TiO2	0.02
Fe2O3	0.24
CaO	39.90
MgO	0.25
Na2O	0.01
K2O	0.06
P2O5	<0.00
SO3	49.61
UND	7.39

AS DETERMINED MOISTURE: 19.27 %

DISTRIBUTION:
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CONSOL ENERGY INC.
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ANALYTICAL LABORATORY
4000 BROWNSVILLE ROAD, SOUTH PARK, PA 15129

DESCRIPTION *GYPSUM TEST 3*
DATE SAMPLED *11/03/04*
SAMPLE NUMBER *3*

DATE LOGGED *11/09/04*
DATE COMPLETED *11/18/04*
PROJECT NUMBER *1621-87 -1*
ANALYTICAL NUMBER **045569**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	97.66
Total Sulfur	19.92

MISC. (As Det.)

Hg	0.128 PPM

ULTIMATE	(Dry)%
Carbon	0.26
Chlorine	0.002
Ash	97.66

MAJOR ASH ELEM	(Dry)%
SiO2	2.12
Al2O3	0.32
TiO2	0.02
Fe2O3	0.21
CaO	39.99
MgO	0.26
Na2O	0.01
K2O	0.07
P2O5	<0.00
SO3	49.80
UND	7.20

AS DETERMINED MOISTURE: 19.33 %

DISTRIBUTION:
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J. WITHUM
J. LOCKE

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