APPENDIX A
DETAILED TEST DATA AND TEST RESULTS

TABLE A-1
SUMMARY OF MERCURY SPECIATION TEST DATA AND TEST RESULTS
UNIT 5-INLET

TEST DATA:					
Test run number	1	2		3	
Location		Unit 5 Inlet			
Test date	7/13/99	7/13/99		7/14/99	
Test time period	0905-1135	1342-1606		0815-1040	
PROCESS DATA:					
Unit Load, MW	79.0	78.6		80.9	
Coal feed rate, lb/hr.	72700	71700		74400	
Coal Btu content, Btu/lb.(as received)	12096	12149		12076	
Heat Input, 10^6 Btu/hr (F-Factor)	811.0	886.0		911.8	
SAMPLING DATA:					
Sampling duration, min.	120.0	120.0		120.0	
Nozzle diameter, in.	0.245	0.245		0.253	
Cross sectional nozzle area, sq.ft.	0.000327	0.000327		0.000349	
Barometric pressure, in. Hg	29.62	29.62		29.58	
Avg. orifice press. diff., in H_2O	1.04	1.11		1.30	
Avg. dry gas meter temp., deg F	113.4	119.5		113.7	
Avg. abs. dry gas meter temp., deg. R	573	580		574	
Total liquid collected by train, ml	138.0	139.3		152.6	
Std. vol. of H_2O vapor coll., cu.ft.	6.5	6.6		7.2	
Dry gas meter calibration factor	1.0090	1.0090		1.0090	
Sample vol. at meter cond., dcf	67.488	69.628		75.098	
Sample vol. at std. cond., dscf (1)	62.211	63.519		69.147	
Percent of isokinetic sampling	98.7	97.6		100.7	
Sample vol. at std. cond., dscm (1)	1.762	1.799		1.958	
GAS STREAM COMPOSITION DATA:					
CO_2, % by volume, dry basis	13.0	13.5		13.4	
O_2, % by volume, dry basis	5.5	5.0		4.9	
N_2, % by volume, dry basis	81.5	81.5		81.7	
Molecular wt. of dry gas, lb/lb mole	30.30	30.36		30.34	
H_20 vapor in gas stream, prop. by vol.	0.095	0.094		0.094	
Mole fraction of dry gas	0.905	0.906		0.906	
Molecular wt. of wet gas, lb/lb mole	29.14	29.20		29.18	
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:					
Static pressure, in. H_2O	-9.00	-9.00		-9.00	
Absolute pressure, in. Hg	28.96	28.96		28.92	
Avg. temperature, deg. F	338	342		346	
Avg. absolute temperature, deg.R	798	802		806	
Pitot tube coefficient	0.84	0.84		0.84	
Total number of traverse points	12	12		12	
Avg. gas stream velocity, ft./sec.	46.1	47.9		47.7	
Stack/duct cross sectional area, sq.ft.	149.500	149.500		149.500	AVERAGE
Avg. gas stream volumetric flow, wacf/min.	413796	429329		427855	423660
Avg. gas stream volumetric flow, dscf/min.(as measured)	239808	247834		245213	244285
Avg. gas stream outlet volumetric flow, dscf/min. (adjusted). (4)	182746	189315		194935	188999
MERCURY LABORATORY REPORT DATA:					
Particulate bound, ug	6.9170	5.7530		8.8660	
Oxidized, ug	0.7300	1.0550		0.7850	
Elemental, ug	0.2125	0.9100	<	0.4225	
Total catch, ug(3)	7.8595	7.7180		9.6510	
PARTICULATE BOUND MERCURY EMISSIONS:					
Conc., ug/m^3	3.93	3.20		4.53	3.88
Conc., ug/Nm^3 (2)	4.21	3.43		4.86	4.17
Emission rate, lbs/10^{12} Btu. (5)	3.31	2.56		3.63	3.17
Emission rate, lbs/hr. (5)	2.69E-03	2.27E-03		3.31E-03	2.75E-03
OXIDIZED MERCURY EMISSIONS:					
Conc., ug/m^3	0.41	0.59		0.40	0.47
Conc., ug/Nm^3 (2)	0.44	0.63		0.43	0.50
Emission rate, lbs/10^{12} Btu. (5)	0.35	0.47		0.32	0.38
Emission rate, lbs/hr. (5)	2.84E-04	4.16E-04		2.93E-04	3.31E-04
ELEMENTAL MERCURY EMISSIONS:					
Conc., ug/m^3	0.12	0.51	<	0.22	0.31
Conc., ug/Nm^3 (2)	0.13	0.54	<	0.23	0.34
Emission rate, lbs/10^{12} Btu. (5)	0.10	0.40	<	0.17	0.25
Emission rate, lbs/hr. (5)	8.26E-05	3.59E-04	<	1.58E-04	2.21E-04
TOTAL MERCURY EMISSIONS:					
Conc., ug/m^3	4.46	4.29		4.93	4.56
Conc., ug/Nm^3 (2)	4.79	4.60		5.29	4.89
Emission rate, lbs/10^{12} Btu. (5)	3.77	3.43		3.95	3.72
Emission rate, lbs/hr. (5)	3.05E-03	3.04E-03		3.60E-03	3.23E-03

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg).
(2) Nm3 = Normal cubic meter (32 deg. F. (0 deg. C.) and 29.92 inches Hg (760mm Hg)).
(3) Non-detects not included in total mercury catch value or in average emission rates.
(4) Measured volumetric flow from the corresponding test run on the Unit 5 outlet corrected for O_2 measured at the inlet location.
(5)Emission rates are based on the adjusted volumetric flow.

TABLE A-2
SUMMARY OF MERCURY SPECIATION TEST DATA AND TEST RESULTS
UNIT 5-OUTLET

TEST DATA:				
Test run number	1	2	3	
Location		Unit 5 Outlet		
Test date	7/13/99	7/13/99	7/14/99	
Test time period	0905-1144	1335-1622	0815-1039	
PROCESS DATA:				
Unit Load, MW	79.0	78.6	80.9	
Coal feed rate, lb/hr.	72700	71700	74400	
Coal Btu content, Btu/lb.(as received)	12096	12149	12076	
Heat Input, 10^6 Btu/hr (F-Factor)	811.0	886.0	911.8	
SAMPLING DATA:				
Sampling duration, min.	120.0	120.0	120.0	
Nozzle diameter, in.	0.199	0.199	0.199	
Cross sectional nozzle area, sq.ft.	0.000216	0.000216	0.000216	
Barometric pressure, in. Hg	29.62	29.62	29.58	
Avg. orifice press. diff., in H_2O	1.39	1.54	1.72	
Avg. dry gas meter temp., deg F	91.2	92.1	88.5	
Avg. abs. dry gas meter temp., deg. R	551	552	549	
Total liquid collected by train, ml	156.7	163.8	174.0	
Std. vol. of H_2O vapor coll., cu.ft.	7.4	7.7	8.2	
Dry gas meter calibration factor	1.0098	1.0098	1.0098	
Sample vol. at meter cond., dcf	75.495	79.473	82.904	
Sample vol. at std. cond., dscf (1)	72.515	76.240	79.978	
Percent of isokinetic sampling	98.1	98.9	98.8	
Sample vol. at std. cond., dscm (1)	2.053	2.159	2.265	
GAS STREAM COMPOSITION DATA:				
CO_2, % by volume, dry basis	13.2	13.4	13.2	
O_2, % by volume, dry basis	5.4	5.0	5.2	
N_2, % by volume, dry basis	81.4	81.6	81.6	
Molecular wt. of dry gas, lb/lb mole	30.33	30.34	30.32	
H_20 vapor in gas stream, prop. by vol.	0.092	0.092	0.093	
Mole fraction of dry gas	0.908	0.908	0.907	
Molecular wt. of wet gas, lb/lb mole	29.19	29.21	29.18	
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:				
Static pressure, in. H_2O	-1.50	-1.50	-1.50	
Absolute pressure, in. Hg	29.51	29.51	29.47	
Avg. temperature, deg. F	340	343	341	
Avg. absolute temperature, deg.R	800	803	801	
Pitot tube coefficient	0.84	0.84	0.84	
Total number of traverse points	12	12	12	
Avg. gas stream velocity, ft./sec.	80.5	84.3	88.4	AVERAGE
Stack/duct cross sectional area, sq.ft.	63.617	63.617	63.617	
Avg. gas stream volumetric flow, wacf/min.	307223	321658	337418	322100
Avg. gas stream volumetric flow, dscf/min.	181567	189315	198660	189847
MERCURY LABORATORY REPORT DATA:				
Particulate bound, ug	0.0200	0.0090	0.0330	
Oxidized, ug	1.2750	1.5750	1.4050	
Elemental, ug	1.9000	1.9450	1.8050	
Total mercury catch, ug	3.1950	3.5290	3.2430	
PARTICULATE BOUND MERCURY EMISSIONS:				
Conc., ug/m^3	0.010	0.004	0.015	0.009
Conc., ug/Nm^3 (2)	0.010	0.004	0.016	0.010
Emission rate, lbs/10^{12} Btu.	8.17E-03	3.34E-03	1.19E-02	7.80E-03
Emission rate, lbs/hr	6.62E-06	2.96E-06	1.08E-05	6.81E-06
OXIDIZED MERCURY EMISSIONS:				
Conc., ug/m^3	0.62	0.73	0.62	0.66
Conc., ug/Nm^3 (2)	0.67	0.78	0.67	0.70
Emission rate, lbs/10^{12} Btu.	0.52	0.58	0.51	0.54
Emission rate, lbs/hr	4.22E-04	5.17E-04	4.62E-04	4.67E-04
ELEMENTAL MERCURY EMISSIONS:				
Conc., ug/m^3	0.93	0.90	0.80	0.87
Conc., ug/Nm^3 (2)	0.99	0.97	0.86	0.94
Emission rate, lbs/10^{12} Btu.	0.78	0.72	0.65	0.72
Emission rate, lbs/hr	6.29E-04	6.39E-04	5.93E-04	6.20E-04
TOTAL MERCURY EMISSIONS:				
Conc., ug/m^3	1.56	1.63	1.43	1.54
Conc., ug/Nm^3 (2)	1.67	1.75	1.54	1.65
Emission rate, lbs/10^{12} Btu.	1.30	1.31	1.17	1.26E+00
Emission rate, lbs/hr	1.06E-03	1.16E-03	1.07E-03	1.09E-03
TOTAL MERCURY REMOVAL EFFICIENCY:	65.08%	61.87%	70.97%	65.97%

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg).
(2) Nm3 = Normal cubic meter (32 deg. F. (0 deg. C.) and 29.92 inches Hg (760mm Hg)).

TABLE A-3
SUMMARY OF MERCURY SPECIATION TEST DATA AND TEST RESULTS
UNIT 9-INLET

TEST DATA:						
Test run number	1		2		3	
Location			Unit 9 Inlet			
Test date	7/19/99		7/19/99		7/20/99	
Test time period	0940-1252		1405-1725		0800-1048	
PROCESS DATA:						
Unit Load, MW	84.0		84.3		84.7	
Coal feed rate, lb/hr.	101300		101000		101300	
Coal Btu content, Btu/lb.(as received)	9454		9588		9580	
Heat Input, 10^6 Btu/hr (F-Factor)	978.4		1000.3		1011.4	
SAMPLING DATA:						
Sampling duration, min.	140.0		140.0		140.0	
Nozzle diameter, in.	0.307		0.307		0.307	
Cross sectional nozzle area, sq.ft.	0.000514		0.000514		0.000514	
Barometric pressure, in. Hg	29.71		29.71		29.77	
Avg. orifice press. diff., in H_2O	0.98		1.07		1.02	
Avg. dry gas meter temp., deg F	99.8		102.2		101.1	
Avg. abs. dry gas meter temp., deg. R	560		562		561	
Total liquid collected by train, ml	265.5		261.9		247.6	
Std. vol. of H_2O vapor coll., cu.ft.	12.5		12.3		11.7	
Dry gas meter calibration factor	1.0090		1.0090		1.0090	
Sample vol. at meter cond., dcf	75.958		79.439		77.007	
Sample vol. at std. cond., dscf (1)	71.926		74.917		72.904	
Percent of isokinetic sampling	102.8		102.5		102.1	
Sample vol. at std. cond., dscm (1)	2.037		2.121		2.064	
GAS STREAM COMPOSITION DATA:						
CO_2, % by volume, dry basis	16.6		16.8		16.8	
O_2, % by volume, dry basis	2.1		2.0		2.1	
N_2, % by volume, dry basis	81.3		81.2		81.1	
Molecular wt. of dry gas, lb/lb mole	30.74		30.77		30.77	
H_20 vapor in gas stream, prop. by vol.	0.148		0.141		0.138	
Mole fraction of dry gas	0.852		0.859		0.862	
Molecular wt. of wet gas, lb/lb mole	28.85		28.96		29.01	
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:						
Static pressure, in. H_2O	-3.90		-3.70		-3.30	
Absolute pressure, in. Hg	29.42		29.44		29.53	
Avg. temperature, deg. F	708		719		730	
Avg. absolute temperature, deg.R	1168		1179		1190	
Pitot tube coefficient	0.84		0.84		0.84	
Total number of traverse points	35		35		35	
Avg. gas stream velocity, ft./sec.	42.8		44.7		43.8	
Stack/duct cross sectional area, sq.ft.	184.620		184.620		184.620	AVERAGE
Avg. gas stream volumetric flow, wacf/min.	473960		495455		485386	484934
Avg. gas stream volumetric flow, dscf/min.(as measured)	179465		187463		183168	183366
Avg. gas stream outlet volumetric flow, dscf/min. (adjusted). (4)	174214		175000		179663	176292
MERCURY LABORATORY REPORT DATA:						
Particulate bound, ug	0.0900	<	0.0520	<	0.0595	
Oxidized, ug	0.3000		0.3100		0.2175	
Elemental, ug	14.3300		15.4475		13.9525	
Total catch, ug(3)	14.7200		15.7575		14.1700	
PARTICULATE BOUND MERCURY EMISSIONS:						
Conc., ug/m^3	0.04	<	0.02	<	0.03	0.04
Conc., ug/Nm^3 (2)	0.05	<	0.03	<	0.03	0.05
Emission rate, lbs/10^{12} Btu.(5)	0.03	<	0.02	<	0.02	0.03
Emission rate, lbs/hr. (5)	2.97E-05	<	1.72E-05	<	1.98E-05	2.97E-05
OXIDIZED MERCURY EMISSIONS:						
Conc., ug/m^3	0.15		0.15		0.11	0.13
Conc., ug/Nm^3 (2)	0.16		0.16		0.11	0.14
Emission rate, lbs/10^{12} Btu.(5)	0.10		0.10		0.07	0.09
Emission rate, lbs/hr. (5)	9.90E-05		1.03E-04		7.23E-05	9.13E-05
ELEMENTAL MERCURY EMISSIONS:						
Conc., ug/m^3	7.04		7.28		6.76	7.03
Conc., ug/Nm^3 (2)	7.55		7.81		7.25	7.54
Emission rate, lbs/10^{12} Btu.(5)	4.83		5.11		4.58	4.84
Emission rate, lbs/hr. (5)	4.73E-03		5.11E-03		4.64E-03	4.83E-03
TOTAL MERCURY EMISSIONS:						
Conc., ug/m^3	7.23		7.43		6.86	7.17
Conc., ug/Nm^3 (2)	7.75		7.97		7.36	7.70
Emission rate, lbs/10^{12} Btu.(5)	4.97		5.21		4.66	4.95
Emission rate, lbs/hr. (5)	4.86E-03		5.22E-03		4.71E-03	4.93E-03

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg).
(2) Nm3 = Normal cubic meter (32 deg. F. (0 deg. C.) and 29.92 inches Hg (760mm Hg)).
(3) Non-detects not included in total mercury catch value or in average emission rates..
(4) Measured volumetric flow from the corresponding test run on the Unit 9 outlet corrected for O_2 measured at the inlet location.
(5)Emission rates are based on the adjusted volumetric flow.

TABLE A-4
SUMMARY OF MERCURY TEST DATA AND TEST RESULTS
UNIT 9-OUTLET

TEST DATA:						
Test run number	1		2		3	
Location			Unit 9 Outlet			
Test date	7/19/99		7/19/99		7/20/99	
Test time period	0946-1239		1408-1727		0800-1044	
PROCESS DATA:						
Unit Load, MW	84.0		84.3		84.7	
Coal feed rate, lb/hr.	101300		101000		101300	
Coal Btu content, Btu/lb.(as received)	9454		9588		9580	
Heat Input, 10^6 Btu/hr (F-Factor)	978.4		1000.3		1011.4	
SAMPLING DATA:						
Sampling duration, min.	120.0		120.0		120.0	
Nozzle diameter, in.	0.200		0.200		0.200	
Cross sectional nozzle area, sq.ft.	0.000218		0.000218		0.000218	
Barometric pressure, in. Hg	29.71		29.71		29.77	
Avg. orifice press. diff., in H_2O	1.39		1.39		1.40	
Avg. dry gas meter temp., deg F	104.3		107.5		102.3	
Avg. abs. dry gas meter temp., deg. R	564		568		562	
Total liquid collected by train, ml	257.0		241.6		244.8	
Std. vol. of H_2O vapor coll., cu.ft.	12.1		11.4		11.5	
Dry gas meter calibration factor	1.0098		1.0098		1.0098	
Sample vol. at meter cond., dcf	76.562		76.661		76.431	
Sample vol. at std. cond., dscf (1)	72.049		71.737		72.328	
Percent of isokinetic sampling	100.7		100.4		100.3	
Sample vol. at std. cond., dscm (1)	2.040		2.031		2.048	
GAS STREAM COMPOSITION DATA:						
CO_2, % by volume, dry basis	14.6		14.9		15.1	
O_2, % by volume, dry basis	4.0		3.8		3.6	
N_2, % by volume, dry basis	81.4		81.3		81.3	
Molecular wt. of dry gas, lb/lb mole	30.50		30.54		30.56	
H_2O vapor in gas stream, prop. by vol.	0.144		0.137		0.137	
Mole fraction of dry gas	0.856		0.863		0.863	
Molecular wt. of wet gas, lb/lb mole	28.70		28.82		28.83	
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:						
Static pressure, in. H_2O	-2.00		-2.00		-2.00	
Absolute pressure, in. Hg	29.56		29.56		29.62	
Avg. temperature, deg. F	383		384		386	
Avg. absolute temperature, deg.R	843		844		846	
Pitot tube coefficient	0.84		0.84		0.84	
Total number of traverse points	12		12		12	
Avg. gas stream velocity, ft./sec.	86.0		85.2		86.1	AVERAGE
Stack/duct cross sectional area, sq.ft.	70.880		70.880		70.880	
Avg. gas stream volumetric flow, wacf/min.	365799		362456		366291	364849
Avg. gas stream volumetric flow, dscf/min.	193800		193421		195241	194154
MERCURY LABORATORY REPORT DATA:						
Particulate bound, ug	0.0060	<	0.0095	<	0.0080	
Oxidized, ug	1.1075		1.3125		1.0625	
Elemental, ug	12.1600		13.0900		12.6300	
Total catch, ug(3)	13.2735		14.4025		13.6925	
PARTICULATE BOUND MERCURY EMISSIONS:						
Conc., ug/m^3	0.0029	<	0.0047	<	0.0039	0.0029
Conc., ug/Nm^3 (2)	0.003	<	0.005	<	0.004	0.003
Emission rate, lbs/10^{12} Btu.	0.002	<	0.003	<	0.003	0.002
Emission rate, lbs/hr	2.13E-06	<	3.39E-06	<	2.86E-06	2.13E-06
OXIDIZED MERCURY EMISSIONS:						
Conc., ug/m^3	0.54		0.65		0.52	0.57
Conc., ug/Nm^3 (2)	0.58		0.69		0.56	0.61
Emission rate, lbs/10^{12} Btu.	0.40		0.47		0.38	0.42
Emission rate, lbs/hr	3.94E-04		4.68E-04		3.79E-04	4.14E-04
ELEMENTAL MERCURY EMISSIONS:						
Conc., ug/m^3	5.96		6.44		6.17	6.19
Conc., ug/Nm^3 (2)	6.39		6.91		6.62	6.64
Emission rate, lbs/10^{12} Btu.	4.42		4.67		4.46	4.52
Emission rate, lbs/hr	4.33E-03		4.67E-03		4.51E-03	4.50E-03
TOTAL MERCURY EMISSIONS:						
Conc., ug/m^3	6.51		7.09		6.69	6.76
Conc., ug/Nm^3 (2)	6.98		7.61		7.17	7.25
Emission rate, lbs/10^{12} Btu.	4.83		5.14		4.83	4.93
Emission rate, lbs/hr	4.72E-03		5.14E-03		4.89E-03	4.92E-03
TOTAL MERCURY REMOVAL EFFICIENCY:	2.82%		1.60%		0.00%	1.47%

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 inches Hg (760mm Hg).
(2) Nm3 = Normal cubic meter (32 deg. F. (0 deg. C.) and 29.92 inches Hg (760mm Hg)).
(3) Non-detects not included in total mercury catch value or in average emission rates.

Table A-5
Presque Isle Hg Balance Data - July 1999
Unit #9 Hg Material Balance Data

	Test #1	Test #2	Test #3	Average
Plant Load, MWe	84.0	84.3	84.7	84.33
COAL DATA				
% Carbon	69.56	69.22	69.61	69.46
% Ash	7.02	6.99	7.08	7.03
Btu	12026	12067	12052	12048.333
ppm Hg	0.068	0.068	0.068	0.068
F-Factor	9610	9492	9587	9563
Stack DSCFM	193800	193421	195241	194154
Stack DSCMM	5485	5474	5525	5495
Outlet % O_2	4.0	3.8	3.6	3.8
EA Free, DSCFM	156709	158254	161611	158858
Heat Input, MM Btu/hr	978.4	1000.3	1011.4	996.7
Coal Firing Rate, lb/hr [1]	81358	82899	83923	82727
Inlet % O_2	2.1	2.0	2.1	2.1
Inlet DSCFM	174214	175000	179663	176292
Inlet DSCMM	4930	4952	5084	4989
ESP Ash Loading, lb/h	4009	2959	3701	3556
% Carbon in Ash	0.73	0.93	1.21	0.96
% Ash in Ash	98.93	98.81	98.6	98.78
ppm Hg in Ash	0.000	0.000	0.000	0.000
lb/h Carbon	29	28	45	34
lb/h Ash	3966	2924	3649	3513
Total Coal Fired, lb/h [2]	81400	82938	83987	82775
Total Coal Fired, lb/h [3]	79622	80194	80533	80116
% Diff in Coal Feed Rate	2%	3%	4%	3%
Total Heat Input, MM Btu/h	979	1001	1012	997
Unit Heat Rate, Btu/kwh	11654	11872	11951	11825
Carbon Utilization	99.95	99.95	99.92	100
Maximum Ash Production, lb/h	5714	5797	5946	5819
% Ash in ESP Hoppers	69%	50%	61%	60%
Hg Input, ug/min	41837	42628	43167	42544
Max Hg in Inlet Gas, ug/m^3	8.49	8.61	8.49	8.53
Hg in ESP Ash, ug/min	0	0	0	0
% of Total Hg in Coal	0.0%	0.0%	0.0%	0.0%
Total Hg at Inlet, ug/m^3	7.23	7.43	6.86	7.17
Inlet Hg, ug/min	35646	36797	34879	35774
% Hg Balance at Inlet	**85.2%**	**86.3%**	**80.8%**	**84.1%**
Gas Phase Hg at Stack, ug/m^3	6.51	7.09	6.69	6.76
Stack Hg, ug/min	35704	38809	36964	37159
Hg in Ash and Stack Gas, ug/min	35704	38809	36964	37159
% of Total Hg Input in Coal	**85.3%**	**91.0%**	**85.6%**	**87.3%**

1 - Coal firing rate from stack gas flow rate
2 - Coal firing rate from stack gas flow rate and carbon in fly ash
3 - Coal firing rate from plant totalizers

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Table A-6
Presque Isle Hg Balance Data - July 1999
Unit #5 Hg Material Balance Data

	Test #1	Test #2	Test #3	Average
Plant Load, MWe	79.0	78.6	80.9	79.5
COAL DATA				
% Carbon	73.96	72.84	73.04	73.28
% Ash	9.80	9.94	10.38	10.04
Btu	12772	12799	12766	12779
ppm Hg	0.043	0.043	0.043	0.043
F-Factor	9962	9753	9820	9845
Stack DSCFM	181567	189315	198660	189847
Stack DSCMM	5138	5358	5622	5373
Outlet % O_2	5.4	5.0	5.2	5.2
EA Free, DSCFM	134655	144024	149233	142637
Heat Input, MM Btu/hr	811.0	886.0	911.8	869.6
Coal Firing Rate, lb/hr [1]	63499	69227	71425	68050
Inlet % O_2	5.5	5.0	4.9	5.1
Inlet DSCFM	182746	189315	194935	188999
Inlet DSCMM	5172	5358	5517	5349
ESP Ash Loading, lb/h	10914	10928	11918	11253
% Carbon in Ash	32.45	35.36	32.99	33.60
% Ash in Ash	64.49	63.67	64.52	64.23
ppm Hg in Ash	0.183	0.145	0.134	0.154
lb/h Carbon	3542	3864	3932	3779
lb/h Ash	7038	6958	7689	7229
Total Coal Fired, lb/h [2]	68288	74532	76808	73209
Total Coal Fired, lb/h [3]	72700	71700	74400	72933
% Diff in Coal Feed Rate	-6%	4%	3%	0%
Total Heat Input, MM Btu/h	872	954	981	936
Unit Heat Rate, Btu/kwh	11040	12137	12120	11766
Carbon Utilization	92.99	92.88	92.99	93
Maximum Ash Production, lb/h	6692	7408	7973	7358
% Ash in ESP Hoppers	105%	94%	96%	99%
Hg Input, ug/min	22194	24223	24963	23794
Max Hg in Inlet Gas, ug/m^3	4.29	4.52	4.53	4.45
Hg in ESP Ash, ug/min	15096	11977	12071	13048
% of Total Hg in Coal	68.0%	49.4%	48.4%	55.3%
Total Hg at Inlet, ug/m^3	4.46	4.29	4.93	4.56
Inlet Hg, ug/min	23066	22984	27197	24416
% Hg Balance at Inlet	**103.9%**	**94.9%**	**108.9%**	**102.6%**
Gas Phase Hg at Stack, ug/m^3	1.56	1.63	1.43	1.54
Stack Hg, ug/min	8016	8733	8040	8263
Hg in Ash and Stack Gas, ug/min	23112	20710	20110	21311
% of Total Hg Input in Coal	**104.1%**	**85.5%**	**80.6%**	**90.1%**

1 - Coal firing rate from stack gas flow rate
2 - Coal firing rate from stack gas flow rate and carbon in fly ash
3 - Coal firing rate from plant totalizers

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APPENDIX B
PROCESS OPERATIONS, FACILITY CEMS AND ESP DATA

UNIT 5 PROCESS OPERATIONS DATA

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 0800 - 0900 DATE: 7-13-99

1. Gross Generation - MWH 79.272
2. Station Service - MWH 4.000
3. Net Generation - MWH 75.272
4. Control Valve Position % 90%
5. Main Steam Flow Lbs./Hr. 511000
6. F.W. Flow Lbs./Hr. 497000
7. F.W. Press. Psig 1560
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1020
11. Cold Reheat Press. Psig 380
12. Hot Reheat Press. Psig 358
13. F.W. (Loading/Temp.) 48% 413
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4280
18. Reheat Spray Flow 14930
19. Air Flow 600000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 151
22. Gas Outlet Temp. °F 304
23. Opacity % 7.3%
24. I.D. Fan (Loading/Amps) 99% 160
25. F.D. Fan (Loading/rpm/Amps) 77% 90
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.0	2.8	5.2
GAS	2.5	8.2	5.7

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	037667	037854	187
b	047890	048079	189
c	302467	302645	178
d	884563	884736	176

34. Coal Total Lbs. Hr. 73000
35. Lbs. Coal/Net KWH .970
36. Lbs. Steam/Net KWH 6.789
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 0900-1000 DATE: 7-13-99

1. Gross Generation - MWH 79.168
2. Station Service - MWH 5.000
3. Net Generation - MWH 74.168
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 518,000
6. F.W. Flow Lbs./Hr. 504,000
7. F.W. Press. Psig
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1015
11. Cold Reheat Press. Psig 380
12. Hot Reheat Press. Psig 349
13. F.W. (Loading/Temp.) 47% 413
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4280
18. Reheat Spray Flow 13600
19. Air Flow 600,000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 153
22. Gas Outlet Temp. °F 518
23. Opacity % 6.9%
24. I.D. Fan (Loading/Amps) 88% 160
25. F.D. Fan (Loading/rpm/Amps) 76% 90
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.0	2.6	5.4
GAS	2.4	8.2	5.8

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	037854	038040	186
b	048079	048267	188
c	302645	302821	176
d	884736	884911	175

34. Coal Total Lbs. Hr. 72500
35. Lbs. Coal/Net KWH .977
36. Lbs. Steam/Net KWH 6.984
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1000-1100 DATE: 7-13-99

1. Gross Generation - MWH 79.224
2. Station Service - MWH 4.000
3. Net Generation - MWH 75.224
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 525,000
6. F.W. Flow Lbs./Hr. 504,000
7. F.W. Press. Psig 1560
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1045
11. Cold Reheat Press. Psig 387
12. Hot Reheat Press. Psig 364
13. F.W. (Loading/Temp.) 48% 413
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4430
18. Reheat Spray Flow 13470
19. Air Flow 610,000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 154
22. Gas Outlet Temp. °F 307
23. Opacity % 7.6%
24. I.D. Fan (Loading/Amps) 90% 162
25. F.D. Fan (Loading/rpm/Amps) 77% 92
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.3	3.0	5.3
GAS	-2.5	-8.5	6.0

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038040	038228	188
b	048267	048455	188
c	302821	302998	177
d	884911	885085	174

34. Coal Total Lbs. Hr. 72,700

35. Lbs. Coal/Net KWH .996
36. Lbs. Steam/Net KWH 6.979
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1100-1200 DATE: 7-13-99

1. Gross Generation - MWH 79,296
2. Station Service - MWH 4,000
3. Net Generation - MWH 75,296
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 518,000
6. F.W. Flow Lbs./Hr. 504,000
7. F.W. Press. Psig 1670
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1030
11. Cold Reheat Press. Psig 384
12. Hot Reheat Press. Psig 364
13. F.W. (Loading/Temp.) 48% 414
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4420
18. Reheat Spray Flow 13370
19. Air Flow 610,000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 153
22. Gas Outlet Temp. °F 309
23. Opacity % 7.9%
24. I.D. Fan (Loading/Amps) 91% 161
25. F.D. Fan (Loading/rpm/Amps) 87% 92
26. Air Heater Press. (H2O)

	IN	OUT	P
AIR	8.1	2.9	5.2
GAS	-2.5	-8.3	5.8

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038228	038414	186
b	048455	048643	188
c	302998	303174	176
d	885085	885260	175

34. Coal Total Lbs. Hr. 72500
35. Lbs. Coal/Net KWH .963
36. Lbs. Steam/Net KWH 6.880
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W / S or E)
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1200 - 1300 DATE: 07-13-99

1. Gross Generation - MWH 79,032
2. Station Service - MWH 4,000
3. Net Generation - MWH 75,032
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 532,000
6. F.W. Flow Lbs./Hr. 525,000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1040
11. Cold Reheat Press. Psig 385
12. Hot Reheat Press. Psig 364
13. F.W. (Loading/Temp.) 49% 414
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4550
18. Reheat Spray Flow 11800
19. Air Flow 620,000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 154
22. Gas Outlet Temp. °F 312
23. Opacity % 7.9%
24. I.D. Fan (Loading/Amps) 92% 166
25. F.D. Fan (Loading/rpm/Amps) 97% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.7	3.1	5.6
GAS	-2.5	-8.8	6.3

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038414	038605	191
b	048643	048836	193
c	303174	303355	181
d	885260	885439	179

34. Coal Total Lbs. Hr. 74400
35. Lbs. Coal/Net KWH .992
36. Lbs. Steam/Net KWH 7.090
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1300 – 1400 DATE: 07-13-99

1. Gross Generation - MWH 79.296
2. Station Service - MWH 4.000
3. Net Generation - MWH 75.296
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 525000
6. F.W. Flow Lbs./Hr. 504,000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1040
11. Cold Reheat Press. Psig 388
12. Hot Reheat Press. Psig 364
13. F.W. (Loading/Temp.) 49% 414
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 665
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4500
18. Reheat Spray Flow 14,800
19. Air Flow 620000
20. Excess Oxygen % 3.3%
21. Inlet Air Temp. °F 155
22. Gas Outlet Temp. °F 315
23. Opacity % 7.1%
24. I.D. Fan (Loading/Amps) 92% 167
25. F.D. Fan (Loading/rpm/Amps) 79% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.4	3.1	5.3
GAS	-2.5	-8.7	6.2

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038605	038790	185
b	048836	049024	188
c	303355	303532	177
d	885439	885614	175

34. Coal Total Lbs. Hr. 72,500
35. Lbs. Coal/Net KWH .963
36. Lbs. Steam/Net KWH 6.972
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1400-1500 DATE: 07-13-99

1. Gross Generation - MWH 78.240
2. Station Service - MWH 4.000
3. Net Generation - MWH 74.240
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 518000
6. F.W. Flow Lbs./Hr. 497000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1025
11. Cold Reheat Press. Psig 385
12. Hot Reheat Press. Psig 360
13. F.W. (Loading/Temp.) 48% 414
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 669
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4520
18. Reheat Spray Flow 1530
19. Air Flow 620000
20. Excess Oxygen % 3.4%
21. Inlet Air Temp. °F 155
22. Gas Outlet Temp. °F 311
23. Opacity % 8.2%
24. I.D. Fan (Loading/Amps) 92% 167
25. F.D. Fan (Loading/rpm/Amps) 80% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.7	3.1	5.6
GAS	-2.5	-8.7	6.2

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038790	038973	183
b	049024	049209	185
c	303532	303706	174
d	885614	885786	172

34. Coal Total Lbs. Hr. 71400
35. Lbs. Coal/Net KWH .962
36. Lbs. Steam/Net KWH 7.813
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1500 - 1600 DATE: JULY 13 1999

1. Gross Generation - MWH 78.264
2. Station Service - MWH 4.000
3. Net Generation - MWH 74.264
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 518000
6. F.W. Flow Lbs./Hr. 497800
7. F.W. Press. Psig 1570
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1015
11. Cold Reheat Press. Psig 380
12. Hot Reheat Press. Psig 361
13. F.W. (Loading/Temp.) 47%
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 669
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4550
18. Reheat Spray Flow 15320
19. Air Flow 625000
20. Excess Oxygen % 3.3
21. Inlet Air Temp. °F 155
22. Gas Outlet Temp. °F 374
23. Opacity % 3.4
24. I.D. Fan (Loading/Amps) 92% 167
25. F.D. Fan (Loading/rpm/Amps) 80% 94
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.7	3.1	5.6
GAS	-2.4	-8.7	6.3

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	038973	039156	183
b	049209	049394	185
c	303706	303879	173
d	885786	885958	172

34. Coal Total Lbs. Hr. 71300
35. Lbs. Coal/Net KWH 960
36. Lbs. Steam/Net KWH 6.975
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 1600-1700 DATE: JULY 13 1999

1. Gross Generation - MWH 78.600
2. Station Service - MWH 4.000
3. Net Generation - MWH 74.600
4. Control Valve Position % 92%
5. Main Steam Flow Lbs./Hr. 511000
6. F.W. Flow Lbs./Hr. 504000
7. F.W. Press. Psig 1570
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1010
11. Cold Reheat Press. Psig 384
12. Hot Reheat Press. Psig 361
13. F.W. (Loading/Temp.) 47%
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 669
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4560
18. Reheat Spray Flow 16120
19. Air Flow 625000
20. Excess Oxygen % 3.4
21. Inlet Air Temp. °F 155
22. Gas Outlet Temp. °F 315
23. Opacity % 7.3%
24. I.D. Fan (Loading/Amps) 92% 167
25. F.D. Fan (Loading/rpm/Amps) 79% 94
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.6	3.1	5.5
GAS	-2.4	-8.7	6.3

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	039156	039341	185
b	049394	049582	188
c	303879	304055	176
d	885958	886133	175

34. Coal Total Lbs. Hr. 72400
35. Lbs. Coal/Net KWH .971
36. Lbs. Steam/Net KWH 6.850
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 0800-0900 DATE: 07-14-99

1. Gross Generation - MWH 80.880
2. Station Service - MWH 4.000
3. Net Generation - MWH 76.880
4. Control Valve Position % 93%
5. Main Steam Flow Lbs./Hr. 539000
6. F.W. Flow Lbs./Hr. 525000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1060
11. Cold Reheat Press. Psig 397
12. Hot Reheat Press. Psig 370
13. F.W. (Loading/Temp.) 49% 416
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 670
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4320
18. Reheat Spray Flow 17350
19. Air Flow 635000
20. Excess Oxygen % 3.3%
21. Inlet Air Temp. °F 149
22. Gas Outlet Temp. °F 301
23. Opacity % 10.6%
24. I.D. Fan (Loading/Amps) 100% 149
25. F.D. Fan (Loading/rpm/Amps) 80% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.9	3.2	5.7
GAS	-2.4	-8.8	6.4

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	041940	042129	189
b	052201	052388	187
c	306497	306676	179
d	888563	888749	186

34. Coal Total Lbs. Hr. 74,100
35. Lbs. Coal/Net KWH .963
36. Lbs. Steam/Net KWH 7.011
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: FIVE TIME: 0900 - 1000 DATE: 07-14-99

1. Gross Generation - MWH 80,352
2. Station Service - MWH 5,000
3. Net Generation - MWH 75,352
4. Control Valve Position % 93%
5. Main Steam Flow Lbs./Hr. 539,000
6. F.W. Flow Lbs./Hr. 575,000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1050
11. Cold Reheat Press. Psig 390
12. Hot Reheat Press. Psig 369
13. F.W. (Loading/Temp.) 49% 416
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 670
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 1360
18. Reheat Spray Flow 17750
19. Air Flow 635000
20. Excess Oxygen % 3.2%
21. Inlet Air Temp. °F 150
22. Gas Outlet Temp. °F 306
23. Opacity % 9.4%
24. I.D. Fan (Loading/Amps) 99% 168
25. F.D. Fan (Loading/rpm/Amps) 80% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.8	3.2	5.6
GAS	-2.4	-8.9	6.5

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	042129	042320	191
b	052388	052575	187
c	306676	306856	180
d	888749	888936	187

34. Coal Total Lbs. Hr. 74,500

35. Lbs. Coal/Net KWH 989
36. Lbs. Steam/Net KWH 7.153
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: #5 TIME: 1000 - 1100 DATE: 07-14-99

1. Gross Generation - MWH 81.600
2. Station Service - MWH 5.000
3. Net Generation - MWH 76.600
4. Control Valve Position % 94%
5. Main Steam Flow Lbs./Hr. 539000
6. F.W. Flow Lbs./Hr. 525.000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1060
11. Cold Reheat Press. Psig 399
12. Hot Reheat Press. Psig 374
13. F.W. (Loading/Temp.) 49% 417
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 669
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 4390
18. Reheat Spray Flow 15850
19. Air Flow 630,000
20. Excess Oxygen % 3.0 %
21. Inlet Air Temp. °F 152
22. Gas Outlet Temp. °F 310
23. Opacity % 8.7%
24. I.D. Fan (Loading/Amps) 96% 168
25. F.D. Fan (Loading/rpm/Amps) 80% 95
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.6	3.1	5.5
GAS	-2.4	-8.9	6.5

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	042320	042510	190
b	052575	052762	187
c	306856	307037	181
d	888936	889123	187

34. Coal Total Lbs. Hr. 74,500
35. Lbs. Coal/Net KWH .973
36. Lbs. Steam/Net KWH 7.037
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

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UNIT 5 CEMS DATA

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:41

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	08:05	12.6	479.1	575.9	343.6	19.7	7.	313.6	78.
	08:06	12.6	477.1	573.1	343.7	20.5	7.	313.9	79.
	08:07	12.5	479.3	574.1	343.7	20.5	7.	313.9	78.
	08:08	12.5	483.3	572.0	343.2	19.6	8.	314.4	78.
	08:09	12.5	483.7	569.4	342.8	19.5	8.	314.5	78.
	08:10	12.5	482.8	568.4	342.8	20.4	8.	314.5	78.
	08:11	12.6	477.9	572.1	343.0	19.9	6.	314.8	78.
	08:12	12.6	477.7	576.3	343.6	18.4	6.	315.5	78.
	08:13	12.6	476.4	573.6	343.6	19.1	7.	315.5	78.
	08:14	12.5	474.3	571.9	343.5	19.4	6.	315.3	78.
	08:15	12.5	476.9	568.8	343.4	20.3	7.	315.0	78.
	08:16	12.5	477.8	573.1	343.4	19.5	7.	315.0	78.
	08:17	12.7	477.6	579.1	343.4	21.1	7.	315.0	79.
	08:18	12.7	480.4	581.1	342.4	20.0	7.	315.7	79.
	08:19	12.6	479.2	580.6	342.3	20.3	9.	315.8	79.
	08:20	12.6	483.1	577.4	342.3	19.9	7.	315.9	78.
	08:21	12.5	486.2	574.1	342.0	19.0	8.	317.4	78.
	08:22	12.4	485.8	568.1	342.0	18.5	6.	317.4	78.
	08:23	12.5	480.3	568.8	342.3	19.1	8.	315.4	79.
	08:24	12.6	479.4	571.1	342.3	19.5	6.	315.1	78.
	08:25	12.6	480.1	568.1	342.4	19.7	8.	315.0	78.
	08:26	12.6	482.6	567.4	343.3	19.2	8.	312.5	78.
	08:27	12.6	483.0	566.8	343.3	20.0	7.	312.5	78.
	08:28	12.5	482.4	566.3	343.0	20.4	7.	311.8	78.
	08:29	12.5	482.2	568.0	342.8	19.3	7.	311.4	78.
	08:30	12.6	481.9	567.4	342.8	19.2	9.	311.4	78.
	08:31	12.5	484.5	567.3	343.2	20.1	7.	312.7	78.
	08:32	12.6	480.7	568.3	343.2	18.8	6.	312.7	79.
	08:33	12.6	482.1	566.0	342.6	18.5	6.	315.8	79.
	08:34	12.5	485.0	568.4	342.0	18.6	7.	316.6	79.
	08:35	12.6	487.7	566.6	342.0	19.3	8.	316.6	79.
	08:36	12.6	489.4	566.1	341.6	19.3	7.	315.4	79.
	08:37	12.7	487.9	570.7	341.3	20.5	6.	315.1	79.
	08:38	12.6	490.5	565.4	341.9	20.2	7.	316.0	79.
	08:39	12.6	491.2	563.7	343.0	19.7	6.	317.6	79.
	08:40	12.5	492.5	559.6	342.9	18.8	9.	317.6	79.
	08:41	12.6	487.4	559.8	343.6	18.8	8.	316.8	79.
	08:42	12.5	488.6	560.2	344.2	18.0	8.	316.2	79.
	08:43	12.5	486.5	564.5	344.1	19.6	6.	316.9	79.
	08:44	12.5	484.4	567.1	343.7	19.1	8.	318.2	79.
	08:45	12.6	486.2	570.6	343.7	20.4	6.	318.2	79.
	08:46	12.6	484.7	574.0	343.3	19.3	7.	317.1	79.
	08:47	12.6	484.9	572.3	342.5	21.2	8.	315.9	79.
	08:48	12.6	486.4	576.0	342.5	20.2	6.	315.9	79.
	08:49	12.6	484.3	574.0	343.0	19.4	7.	316.3	79.
	08:50	12.5	486.4	570.9	343.7	21.8	7.	316.7	79.
	08:51	12.5	488.2	570.1	343.7	22.5	6.	316.7	79.
	08:52	12.7	488.0	578.6	343.7	20.8	9.	316.7	80.
	08:53	12.7	485.3	580.6	343.7	25.5	7.	316.7	80.
	08:54	12.7	484.4	578.0	343.6	25.2	7.	317.8	80.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:41

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	08:55	12.6	488.9	575.4	343.4	26.1	7.	320.0	79.
	08:56	12.5	490.3	571.8	343.4	24.5	10.	320.0	79.
	08:57	12.6	490.4	573.6	343.3	23.0	9.	322.2	79.
	08:58	12.5	492.3	571.9	343.3	24.8	7.	322.5	79.
	08:59	12.5	491.2	572.8	343.3	25.9	7.	322.5	79.
	09:00	12.5	490.1	574.8	344.0	25.4	6.	323.9	80.
	09:01	12.6	488.2	577.5	344.0	25.4	10.	323.9	80.
	09:02	12.6	487.2	579.6	343.7	25.1	8.	323.9	80.
	09:03	12.6	487.6	578.9	343.4	25.5	7.	323.9	80.
	09:04	12.7	488.7	579.0	343.4	25.4	7.	323.9	79.
	09:05	12.6	489.0	576.3	343.5	24.3	7.	319.7	79.
	09:06	12.4	490.2	569.1	343.6	24.7	7.	318.7	79.
	09:07	12.5	490.2	570.4	344.2	24.3	10.	318.1	79.
	09:08	12.6	488.1	573.7	344.8	25.7	7.	317.4	79.
	09:09	12.7	484.2	579.1	344.8	26.4	6.	317.4	79.
	09:10	12.6	483.9	575.1	344.6	23.4	7.	316.2	79.
	09:11	12.5	489.3	574.1	344.5	25.5	10.	315.0	79.
	09:12	12.6	490.3	575.6	344.5	26.2	8.	315.0	79.
	09:13	12.5	492.6	570.4	345.2	24.6	8.	316.5	79.
	09:14	12.6	488.5	575.4	345.4	25.0	7.	317.0	80.
	09:15	12.7	490.7	580.7	345.5	26.0	9.	316.5	80.
	09:16	12.7	490.9	584.6	345.6	25.1	7.	315.8	80.
	09:17	12.7	489.5	582.1	345.6	24.1	6.	315.8	79.
	09:18	12.6	492.3	576.8	344.9	25.7	7.	316.5	80.
	09:19	12.5	494.8	571.2	344.0	27.1	7.	317.4	80.
	09:20	12.5	495.4	568.7	344.3	27.4	7.	317.8	79.
	09:21	12.5	495.3	568.5	345.1	28.1	8.	318.7	80.
	09:22	12.6	495.1	571.3	345.1	28.1	7.	318.7	80.
	09:23	12.6	493.2	572.5	345.2	29.1	8.	320.3	80.
	09:24	12.6	491.9	571.8	345.3	25.0	9.	322.2	80.
	09:25	12.5	491.3	569.9	345.3	25.9	7.	322.3	80.
	09:26	12.6	491.3	573.0	345.7	27.3	7.	323.4	80.
	09:27	12.5	492.1	567.0	345.7	26.2	11.	323.3	80.
	09:28	12.5	494.7	568.1	345.7	27.0	8.	323.3	80.
	09:29	12.6	495.2	568.8	346.0	24.6	8.	322.9	79.
	09:30	12.6	495.6	569.2	346.0	26.4	7.	322.9	80.
	09:31	12.6	494.2	570.8	345.7	24.6	7.	321.0	80.
	09:32	12.6	490.5	568.0	345.6	26.0	12.	320.5	80.
	09:33	12.6	490.1	568.4	345.6	25.7	7.	320.4	80.
	09:34	12.5	492.2	566.4	345.9	23.9	7.	317.3	80.
	09:35	12.6	491.9	570.4	345.9	24.0	7.	317.3	80.
	09:36	12.6	492.7	573.4	345.6	25.2	7.	317.3	79.
	09:37	12.5	488.7	567.8	345.4	24.6	7.	317.3	79.
	09:38	12.5	487.2	568.4	345.4	26.9	11.	317.3	79.
	09:39	12.5	488.8	569.4	345.6	26.1	7.	317.9	79.
	09:40	12.5	488.6	569.1	345.7	27.0	7.	318.1	80.
	09:41	12.5	490.7	571.8	346.1	25.6	7.	319.0	80.
	09:42	12.6	492.4	575.6	346.8	25.1	6.	320.5	80.
	09:43	12.6	493.9	574.1	346.8	25.5	9.	320.5	79.
	09:44	12.5	493.9	573.8	346.8	24.6	7.	319.5	79.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Time of Report: 07/19/99 07:41

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	09:45	12.5	493.5	573.1	346.9	25.7	7.	318.9	79.
	09:46	12.6	493.3	573.5	346.8	23.5	6.	318.8	80.
	09:47	12.6	490.4	575.8	345.3	25.7	7.	317.6	80.
	09:48	12.7	489.4	577.0	345.3	22.4	12.	317.6	80.
	09:49	12.5	491.6	568.9	345.6	25.0	7.	317.7	79.
	09:50	12.4	494.3	564.0	347.1	26.9	7.	318.0	79.
	09:51	12.4	497.3	565.3	347.1	24.0	7.	318.0	80.
	09:52	12.5	498.3	566.1	347.3	25.2	11.	319.2	80.
	09:53	12.6	497.2	570.5	347.4	26.4	7.	319.4	80.
	09:54	12.5	494.8	570.0	347.4	23.6	7.	319.4	80.
	09:55	12.5	492.3	569.6	345.5	28.3	7.	320.5	79.
	09:56	12.5	491.9	568.4	345.1	25.6	7.	320.7	79.
	09:57	12.5	495.2	568.2	346.2	27.1	8.	320.7	79.
	09:58	12.4	493.8	562.6	347.7	24.4	7.	320.7	79.
	09:59	12.5	494.5	568.1	347.7	24.9	8.	320.7	79.
	10:00	12.6	489.8	569.5	346.8	25.4	7.	319.9	79.
	10:01	12.6	489.8	569.2	346.2	24.8	7.	319.8	79.
	10:02	12.6	490.2	571.6	346.2	26.3	6.	319.1	79.
	10:03	12.6	489.5	570.7	346.2	25.3	12.	318.1	79.
	10:04	12.5	489.5	568.4	346.2	26.4	10.	318.1	80.
	10:05	12.5	493.5	571.4	346.2	23.8	7.	316.6	80.
	10:06	12.6	493.9	577.1	346.3	23.1	7.	314.4	79.
	10:07	12.5	491.1	567.1	346.5	25.0	7.	314.9	79.
	10:08	12.6	493.1	573.6	347.1	24.0	7.	316.7	79.
	10:09	12.5	490.9	570.1	347.1	24.6	9.	316.7	80.
	10:10	12.4	489.4	563.2	346.8	26.1	7.	316.8	80.
	10:11	12.5	494.7	565.3	345.9	23.0	6.	317.1	80.
	10:12	12.5	497.5	568.6	345.9	24.3	7.	317.1	80.
	10:13	12.6	498.2	571.3	347.2	21.8	7.	316.9	80.
	10:14	12.6	497.8	572.4	347.2	22.7	7.	316.9	80.
	10:15	12.6	497.9	571.0	347.2	26.5	7.	316.9	80.
	10:16	12.6	494.9	570.1	346.5	21.8	7.	315.9	80.
	10:17	12.5	496.8	566.9	346.5	23.1	7.	315.9	80.
	10:18	12.5	493.1	565.2	347.7	26.0	7.	317.4	79.
	10:19	12.4	493.7	560.8	348.1	22.0	8.	318.0	79.
	10:20	12.4	492.1	560.2	348.1	24.2	8.	318.0	79.
	10:21	12.5	493.1	565.5	347.4	24.3	7.	319.3	79.
	10:22	12.5	489.6	563.8	347.2	21.8	6.	319.6	80.
	10:23	12.6	486.7	570.5	347.2	23.4	7.	318.6	79.
	10:24	12.6	486.2	572.3	347.2	24.6	8.	317.6	80.
	10:25	12.5	492.4	564.9	347.2	23.0	9.	317.6	79.
	10:26	12.6	493.5	566.6	347.9	24.3	7.	317.2	79.
	10:27	12.5	494.7	562.5	348.8	22.0	6.	316.7	79.
	10:28	12.4	492.4	560.5	348.6	22.6	7.	316.5	80.
	10:29	12.7	486.4	575.1	347.8	24.6	8.	315.9	79.
	10:30	12.6	486.8	567.5	347.8	25.3	10.	315.9	79.
	10:31	12.6	491.7	570.1	348.0	25.9	7.	316.3	79.
	10:32	12.6	491.8	568.2	348.5	26.0	7.	317.8	79.
	10:33	12.5	493.7	565.0	348.5	22.9	7.	317.8	79.
	10:34	12.5	498.5	565.5	348.2	22.3	10.	317.8	79.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Time of Report: 07/19/99 07:41

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	10:35	12.5	496.7	565.8	348.1	23.5	7.	317.8	79.
	10:36	12.5	495.4	566.8	348.1	25.5	8.	317.8	79.
	10:37	12.6	493.4	567.4	348.1	22.3	7.	320.0	80.
	10:38	12.6	491.7	569.5	348.1	23.2	7.	320.0	80.
	10:39	12.7	490.2	573.0	348.3	23.9	8.	319.5	80.
	10:40	12.5	491.5	564.3	348.5	22.0	10.	319.2	80.
	10:41	12.4	493.7	558.1	348.5	23.2	7.	319.2	79.
	10:42	12.4	495.2	556.7	348.3	23.7	7.	320.3	79.
	10:43	12.4	496.1	554.5	348.3	22.6	10.	321.0	80.
	10:44	12.7	494.4	570.3	348.1	24.2	9.	321.2	80.
Average =		12.6	489.3	570.3	345.2	23.3	7.	317.7	79.
Maximum =		12.7	498.5	584.6	348.8	29.1	12.	323.9	80.
Minimum =		12.4	474.3	554.5	341.3	18.0	6.	311.4	78.
Possible Values =		160	160	160	160	160	160	160	160
Included Values =		160	160	160	160	160	160	160	160
Total =		2008.6	78294.7	91247.1	55230.8	3733.5	1198.	50839.5	12677.

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
V - invalid for state
H - exceedance
F - stack not operating
B - invalid (PADER) -
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:41

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	12:35	12.3	491.3	555.8	349.1	24.6	7.	324.4	80.
	12:36	12.3	493.6	556.3	349.1	26.9	7.	324.4	80.
	12:37	12.3	494.7	555.7	349.1	26.2	7.	324.4	80.
	12:38	12.2	494.7	554.0	349.6	26.2	9.	325.0	79.
	12:39	12.1	494.3	550.8	349.7	25.4	8.	325.1	79.
	12:40	12.2	495.4	553.3	350.0	26.5	8.	325.6	80.
	12:41	12.3	494.3	555.9	350.3	26.0	11.	325.9	79.
	12:42	12.3	493.1	557.0	350.3	26.0	7.	325.9	79.
	12:43	12.3	494.6	559.0	350.1	26.0	8.	326.8	79.
	12:44	12.2	491.0	556.3	349.8	27.5	9.	327.7	79.
	12:45	12.2	493.8	555.6	349.8	25.7	7.	327.7	79.
	12:46	12.3	492.7	558.5	349.5	24.2	7.	329.1	79.
	12:47	12.2	492.9	556.3	349.5	26.8	7.	329.1	79.
	12:48	12.4	493.2	562.4	349.5	26.7	8.	329.1	79.
	12:49	12.3	495.5	556.0	349.1	26.7	10.	329.8	79.
	12:50	12.2	495.1	554.4	349.1	28.2	7.	329.8	79.
	12:51	12.3	493.3	558.2	350.7	27.2	7.	326.5	79.
	12:52	12.3	494.0	557.3	351.2	29.5	7.	325.5	79.
	12:53	12.2	493.7	554.1	351.2	27.9	10.	325.5	79.
	12:54	12.3	494.9	556.2	350.6	25.8	8.	322.5	80.
	12:55	12.3	496.4	557.0	350.4	29.4	8.	321.3	80.
	12:56	12.4	496.4	559.2	350.5	28.0	7.	321.6	79.
	12:57	12.3	495.2	555.8	350.6	26.5	7.	322.0	80.
	12:58	12.3	494.3	558.6	350.6	28.3	10.	322.0	80.
	12:59	12.3	492.2	555.5	350.6	26.9	9.	323.9	80.
	13:00	12.3	494.4	554.8	350.6	27.1	8.	325.8	79.
	13:01	12.3	496.9	557.1	350.7	26.0	13.	326.3	79.
	13:02	12.2	496.8	549.8	351.5	26.9	9.	329.1	79.
	13:03	12.3	497.4	552.4	351.5	26.3	7.	329.1	79.
	13:04	12.3	495.9	551.0	350.8	29.1	8.	328.9	79.
	13:05	12.4	497.4	561.0	349.1	25.8	9.	328.4	80.
	13:06	12.4	493.9	558.8	349.1	27.3	7.	328.4	79.
	13:07	12.2	495.4	551.7	349.3	26.6	7.	326.6	79.
	13:08	12.1	495.8	548.6	349.4	29.2	7.	326.5	78.
	13:09	12.1	495.4	547.2	349.4	26.1	7.	326.3	79.
	13:10	12.2	496.3	551.2	351.5	27.9	13.	324.3	79.
	13:11	12.4	493.4	562.8	351.7	22.8	8.	324.3	80.
	13:12	12.5	494.4	568.0	350.9	27.3	7.	324.7	79.
	13:13	12.3	493.7	558.1	350.0	25.2	7.	324.8	79.
	13:14	12.2	494.6	556.0	350.0	28.5	8.	324.9	79.
	13:15	12.2	496.0	559.7	350.5	28.0	13.	325.6	79.
	13:16	12.2	492.6	555.7	351.2	29.6	8.	325.9	79.
	13:17	12.1	495.0	554.0	351.0	25.9	7.	326.0	79.
	13:18	12.2	494.7	555.0	349.7	29.8	7.	326.1	79.
	13:19	12.3	493.1	559.3	349.7	26.6	7.	326.1	79.
	13:20	12.3	493.5	559.4	349.7	26.3	11.	326.2	79.
	13:21	12.3	493.0	558.4	349.7	27.3	10.	326.5	79.
	13:22	12.2	492.9	553.7	349.7	26.3	7.	326.5	78.
	13:23	12.1	492.8	549.0	350.5	24.0	7.	326.5	78.
	13:24	12.1	493.5	550.0	350.6	27.7	8.	326.5	78.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Time of Report: 07/19/99 07:41

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	13:25	12.2	494.0	553.4	350.6	29.1	8.	326.5	78.
	13:26	12.2	493.7	555.4	351.8	28.1	8.	327.5	78.
	13:27	12.2	493.7	553.8	352.0	27.1	7.	327.7	78.
	13:28	12.2	494.1	552.6	351.1	26.8	7.	327.2	78.
	13:29	12.1	492.6	549.4	350.3	25.7	11.	326.9	79.
	13:30	12.3	493.4	561.7	350.3	28.7	7.	326.9	79.
	13:31	12.2	493.6	554.6	351.3	28.7	7.	325.3	78.
	13:32	12.2	495.4	550.2	351.8	30.2	7.	324.8	78.
	13:33	12.1	492.3	543.6	351.5	29.1	8.	323.9	78.
	13:34	12.1	493.1	549.8	351.1	29.4	9.	323.3	78.
	13:35	12.2	491.6	550.6	351.1	28.7	7.	323.3	78.
	13:36	12.1	491.4	547.4	351.9	29.9	8.	324.1	78.
	13:37	12.2	490.9	549.4	352.9	28.0	7.	325.1	78.
	13:38	12.2	491.4	552.5	352.9	29.8	8.	325.3	78.
	13:39	12.1	491.2	550.6	353.4	27.2	9.	326.6	78.
	13:40	12.1	491.0	549.4	353.4	27.7	7.	326.6	78.
	13:41	12.1	492.6	548.4	353.3	28.8	8.	326.7	78.
	13:42	12.1	491.8	548.7	353.3	30.2	7.	326.9	79.
	13:43	12.3	492.2	556.3	353.3	30.2	8.	326.8	79.
	13:44	12.3	492.2	555.2	352.1	28.8	10.	324.6	79.
	13:45	12.1	489.3	549.3	352.0	26.9	7.	324.6	78.
	13:46	12.1	492.5	548.8	352.0	25.9	8.	324.6	78.
	13:47	12.1	493.2	548.9	353.2	27.4	7.	325.0	78.
	13:48	12.2	496.3	555.6	353.2	30.4	8.	325.0	79.
	13:49	12.3	493.7	557.6	351.6	29.7	7.	325.4	79.
	13:50	12.3	493.7	551.0	351.1	27.5	9.	325.5	78.
	13:51	12.2	493.3	548.4	351.0	25.9	11.	325.5	78.
	13:52	12.2	494.4	551.0	351.0	25.4	8.	325.1	78.
	13:53	12.2	494.3	553.2	351.0	25.0	8.	325.0	78.
	13:54	12.1	493.8	551.1	351.9	24.9	7.	323.7	78.
	13:55	12.2	493.2	551.9	353.0	26.9	7.	322.2	78.
	13:56	12.2	494.3	552.3	353.0	29.4	9.	322.2	79.
	13:57	12.2	495.2	552.5	352.5	23.4	7.	320.8	78.
	13:58	12.3	495.0	557.0	351.8	26.3	7.	320.2	78.
	13:59	12.2	495.0	551.9	351.9	23.1	7.	320.4	78.
	14:00	12.2	496.0	556.0	352.3	25.0	8.	321.3	78.
	14:01	12.2	493.7	553.3	352.3	26.1	9.	321.3	78.
	14:02	12.1	494.9	550.4	352.2	26.6	8.	321.9	78.
	14:03	12.2	493.3	550.5	352.1	24.5	9.	322.5	78.
	14:04	12.1	496.0	548.6	352.2	29.3	9.	322.4	79.
	14:05	12.1	495.6	549.1	353.8	25.5	8.	322.2	79.
	14:06	12.2	496.6	554.3	353.8	24.5	7.	322.2	79.
	14:07	12.4	494.6	560.7	353.5	27.7	10.	322.3	79.
	14:08	12.3	494.2	556.9	352.0	23.7	7.	322.6	79.
	14:09	12.3	494.7	554.4	352.0	26.4	7.	322.6	79.
	14:10	12.2	493.3	548.7	351.8	23.0	7.	324.8	79.
	14:11	12.2	493.5	551.0	351.8	24.8	8.	325.3	78.
	14:12	12.1	494.4	549.9	351.8	25.6	10.	325.3	78.
	14:13	12.3	495.0	555.6	352.3	23.1	7.	326.4	79.
	14:14	12.3	494.0	556.9	352.4	25.7	9.	326.4	79.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:41

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	14:15	12.2	492.6	549.9	352.3	25.6	7.	325.5	79.
	14:16	12.2	493.9	550.7	352.1	23.3	8.	325.1	78.
	14:17	12.3	494.2	551.9	352.1	27.5	10.	325.1	78.
	14:18	12.2	494.8	552.0	352.7	26.6	7.	324.5	79.
	14:19	12.2	494.5	550.9	353.2	27.7	7.	324.0	79.
	14:20	12.3	494.2	552.7	353.4	24.8	7.	324.2	79.
	14:21	12.3	491.8	556.8	354.3	25.5	7.	325.1	78.
	14:22	12.2	494.0	551.9	354.3	24.6	9.	325.1	78.
	14:23	12.1	492.3	547.6	353.6	27.0	7.	325.6	79.
	14:24	12.2	493.4	551.5	352.6	25.9	8.	326.5	78.
	14:25	12.2	495.1	555.4	352.6	26.8	8.	326.5	79.
	14:26	12.3	494.4	553.5	353.0	26.1	9.	325.5	79.
	14:27	12.2	495.0	550.0	353.0	25.4	9.	325.5	78.
	14:28	12.1	494.7	546.0	353.0	27.5	7.	325.5	78.
	14:29	12.2	496.5	547.3	352.4	27.4	7.	325.4	78.
	14:30	12.2	495.7	547.1	352.4	27.5	7.	325.4	79.
	14:31	12.2	495.6	548.1	352.1	25.3	8.	326.0	79.
	14:32	12.2	495.6	550.8	352.0	27.9	9.	326.2	79.
	14:33	12.2	495.8	551.0	352.0	24.5	7.	326.2	78.
	14:34	12.2	493.4	551.6	353.5	24.1	8.	327.3	79.
	14:35	12.3	494.4	550.8	354.0	25.7	7.	327.6	79.
	14:36	12.2	493.2	550.8	353.5	27.0	7.	327.9	78.
	14:37	12.2	495.6	549.5	352.6	23.2	9.	328.6	79.
	14:38	12.2	495.3	553.5	352.6	25.9	8.	328.6	79.
	14:39	12.2	496.7	552.0	352.6	25.4	7.	328.5	79.
	14:40	12.3	493.9	553.3	352.9	24.9	7.	328.2	79.
	14:41	12.2	494.0	544.0	352.9	26.8	7.	328.2	78.
	14:42	12.1	495.9	541.8	355.0	24.3	7.	328.3	78.
	14:43	12.2	494.8	542.6	355.2	25.8	8.	328.3	79.
	14:44	12.3	494.3	547.0	355.0	24.3	8.	328.3	79.
	14:45	12.3	494.4	552.3	352.6	24.2	7.	328.3	79.
	14:46	12.2	495.0	549.9	352.6	24.3	8.	328.3	78.
	14:47	12.2	495.3	546.1	353.4	23.2	11.	326.5	78.
	14:48	12.1	496.1	540.9	353.8	27.1	10.	325.8	78.
	14:49	12.2	495.4	546.1	353.8	24.2	7.	325.8	79.
	14:50	12.3	495.1	554.0	353.6	25.3	7.	325.0	79.
	14:51	12.3	495.3	550.4	353.3	26.9	7.	324.7	78.
	14:52	12.1	493.7	543.9	352.9	24.7	7.	324.2	78.
	14:53	12.2	497.3	546.6	352.4	23.8	8.	323.7	78.
	14:54	12.3	496.2	549.3	352.4	22.9	7.	323.7	79.
	14:55	12.2	495.6	544.6	352.2	24.4	7.	325.3	79.
	14:56	12.1	495.1	544.1	352.0	24.4	8.	326.6	79.
	14:57	12.2	497.0	550.6	352.4	25.8	9.	326.8	79.
	14:58	12.3	495.9	551.3	353.6	23.7	9.	327.2	79.
	14:59	12.2	495.2	550.9	353.6	23.9	7.	327.2	78.
	15:00	12.1	495.7	548.3	353.5	27.1	10.	327.3	79.
	15:01	12.2	493.5	550.5	352.9	24.7	7.	327.6	79.
	15:02	12.3	497.0	554.8	352.9	27.0	7.	327.6	79.
	15:03	12.3	494.9	553.2	353.1	28.1	9.	328.6	79.
	15:04	12.3	494.7	553.3	353.2	24.9	8.	328.7	79.

Plant Name: PIPP

General Average Report

Reporting Period: 07/13/1999 to 07/13/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:41

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/13/99	15:05	12.2	494.5	551.3	353.2	25.9	7.	328.7	79.
	15:06	12.2	494.2	553.3	352.8	26.7	8.	326.4	79.
	15:07	12.3	494.2	556.0	352.7	25.2	11.	326.4	79.
	15:08	12.3	495.5	556.6	353.2	27.7	10.	326.2	79.
	15:09	12.3	495.8	555.8	353.7	28.0	9.	326.0	79.
	15:10	12.3	495.1	555.4	353.7	26.8	7.	326.0	79.
	15:11	12.3	494.7	557.1	352.8	27.3	7.	324.4	79.
	15:12	12.3	494.8	553.2	352.1	27.0	8.	322.8	78.
	15:13	12.2	492.8	550.6	352.4	26.7	10.	322.8	79.
	15:14	12.2	495.1	550.3	353.7	27.4	7.	323.3	79.
	15:15	12.2	493.9	548.1	353.7	26.6	8.	323.3	79.
	15:16	12.2	493.1	549.9	353.7	26.0	8.	323.5	79.
	15:17	12.2	496.5	550.2	354.3	24.9	7.	324.3	79.
	15:18	12.2	494.0	552.3	354.3	27.3	7.	324.3	79.
	15:19	12.2	494.7	550.8	353.2	25.5	7.	327.1	79.
	15:20	12.2	495.8	551.0	353.2	25.5	8.	327.5	79.
	15:21	12.3	494.1	555.0	353.1	28.3	8.	327.5	79.
	15:22	12.4	496.7	555.6	351.8	27.6	8.	330.4	79.
Average =		12.2	494.3	552.6	351.9	26.5	8.	325.6	79.
Maximum =		12.5	497.4	568.0	355.2	30.4	13.	330.4	80.
Minimum =		12.1	489.3	540.9	349.1	22.8	7.	320.2	78.
Possible Values =		168	168	168	168	168	168	168	168
Included Values =		168	168	168	168	168	168	168	168
Total =		2053.8	83048.4	92837.5	59124.2	4450.3	1341.	54704.8	13228.

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
V - invalid for state
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: PIPP

General Average Report

Reporting Period: 07/14/1999 to 07/14/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:42

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/14/99	07:15	12.7	508.7	567.2	340.5	15.6	9.	328.6	81.
	07:16	12.5	512.0	560.4	340.5	17.0	10.	329.4	81.
	07:17	12.4	514.4	552.8	340.5	17.8	10.	329.4	81.
	07:18	12.5	514.1	556.5	341.8	16.3	9.	328.7	81.
	07:19	12.6	514.6	560.7	342.3	16.8	11.	328.5	81.
	07:20	12.6	514.2	560.5	342.7	16.6	10.	328.5	81.
	07:21	12.6	514.6	561.7	342.9	20.5	11.	328.5	81.
	07:22	12.6	511.4	563.4	342.9	19.3	13.	328.5	81.
	07:23	12.6	515.9	562.4	343.3	16.5	9.	328.5	81.
	07:24	12.5	515.2	562.4	343.6	16.9	8.	328.5	81.
	07:25	12.5	515.2	559.9	343.5	15.6	9.	329.1	81.
	07:26	12.6	511.1	563.4	343.1	14.2	8.	330.3	81.
	07:27	12.6	512.0	564.4	343.1	16.6	13.	330.3	81.
	07:28	12.6	514.5	562.6	343.2	18.7	10.	329.9	81.
	07:29	12.5	515.1	559.0	343.4	17.8	9.	328.7	80.
	07:30	12.5	514.9	558.6	343.4	17.6	12.	328.7	80.
	07:31	12.5	514.1	558.1	344.6	16.2	8.	326.1	80.
	07:32	12.5	514.8	559.5	344.6	18.4	8.	326.1	80.
	07:33	12.5	514.2	559.0	344.6	17.4	10.	326.1	80.
	07:34	12.5	513.8	561.0	343.4	15.3	10.	323.6	80.
	07:35	12.5	512.9	563.1	343.4	18.7	9.	323.6	80.
	07:36	12.5	513.2	561.2	344.0	21.9	14.	323.3	80.
	07:37	12.5	513.7	560.4	344.3	20.8	9.	323.2	80.
	07:38	12.5	512.8	556.9	344.3	20.8	9.	323.2	80.
	07:39	12.5	511.5	558.4	344.1	19.3	9.	325.4	81.
	07:40	12.5	512.7	558.6	343.9	22.2	9.	326.2	81.
	07:41	12.6	511.6	562.4	343.7	21.8	10.	325.9	81.
	07:42	12.5	511.4	565.1	343.4	18.2	9.	325.4	81.
	07:43	12.5	513.2	564.4	343.4	23.2	12.	325.4	81.
	07:44	12.6	512.1	565.9	344.0	19.9	9.	325.7	80.
	07:45	12.5	514.1	563.6	345.2	19.3	9.	325.9	80.
	07:46	12.3	512.9	556.0	345.5	18.7	9.	325.9	80.
	07:47	12.3	513.0	554.9	347.1	21.4	12.	325.9	80.
	07:48	12.5	512.1	558.4	347.1	20.3	9.	325.9	80.
	07:49	12.5	511.9	564.6	346.9	19.4	10.	327.3	80.
	07:50	12.4	512.6	559.0	346.0	18.7	17.	330.6	80.
	07:51	12.4	509.7	559.0	346.0	20.7	9.	330.6	80.
	07:52	12.4	513.6	559.1	345.9	21.9	8.	332.9	81.
	07:53	12.6	513.8	565.4	345.9	18.2	12.	333.4	81.
	07:54	12.6	510.5	565.4	345.9	20.7	9.	333.4	81.
	07:55	12.5	513.4	558.4	344.6	20.3	8.	333.4	80.
	07:56	12.4	513.6	555.6	344.5	19.7	10.	333.4	81.
	07:57	12.5	512.8	558.8	345.6	19.9	11.	332.4	81.
	07:58	12.7	512.0	568.3	346.5	17.8	10.	331.7	81.
	07:59	12.5	512.9	560.7	346.5	19.4	9.	331.7	81.
	08:00	12.5	513.5	561.2	345.9	19.5	9.	331.5	81.
	08:01	12.4	512.8	559.7	345.5	20.3	8.	331.3	81.
	08:02	12.4	514.2	554.9	346.1	19.6	12.	330.3	81.
	08:03	12.5	513.1	560.3	346.9	19.6	10.	328.6	81.
	08:04	12.6	514.2	562.0	346.9	18.2	10.	328.6	81.

Plant Name: PIPP

General Average Report

Reporting Period: 07/14/1999 to 07/14/1999

Site Name: PIPPF5P5

Time of Report: 07/19/99 07:42

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/14/99	08:05	12.7	510.9	563.7	346.7	17.3	9.	329.0	81.
	08:06	12.7	509.0	565.7	346.5	19.4	8.	329.4	81.
	08:07	12.6	508.9	566.5	346.5	19.6	9.	328.9	81.
	08:08	12.7	507.4	565.1	347.4	19.3	13.	327.5	80.
	08:09	12.5	508.5	556.4	347.4	18.9	9.	327.5	80.
	08:10	12.4	513.9	552.5	347.4	19.7	9.	327.6	80.
	08:11	12.3	509.4	550.6	347.8	18.7	9.	328.8	80.
	08:12	12.5	513.3	558.1	347.8	16.7	9.	328.8	81.
	08:13	12.6	510.0	565.5	347.4	17.4	11.	328.6	81.
	08:14	12.5	510.5	561.2	347.2	19.1	11.	328.5	81.
	08:15	12.6	509.0	563.2	347.2	22.0	9.	328.6	81.
	08:16	12.6	512.4	562.6	346.7	20.0	9.	328.8	81.
	08:17	12.5	509.3	563.1	346.6	22.1	11.	328.8	81.
	08:18	12.5	510.2	563.2	346.9	17.4	10.	328.8	80.
	08:19	12.5	509.4	564.0	347.2	18.2	9.	328.8	81.
	08:20	12.5	512.7	560.6	347.2	19.3	8.	328.8	81.
	08:21	12.4	513.3	559.7	347.7	18.1	9.	328.5	81.
	08:22	12.5	510.6	561.2	348.1	18.3	13.	328.4	81.
	08:23	12.7	511.2	564.1	348.0	19.3	9.	328.8	81.
	08:24	12.5	511.3	559.6	347.8	20.1	9.	329.5	81.
	08:25	12.5	508.6	559.0	347.8	18.9	8.	329.5	81.
	08:26	12.5	509.5	559.8	347.6	20.0	11.	329.1	81.
	08:27	12.6	509.3	561.2	347.2	19.4	8.	328.7	81.
	08:28	12.6	510.1	563.2	347.2	18.8	12.	328.7	81.
	08:29	12.4	510.6	557.3	347.8	20.7	9.	328.1	81.
	08:30	12.6	512.9	561.9	347.8	17.8	8.	328.1	81.
	08:31	12.5	511.4	558.4	348.0	18.6	10.	328.4	81.
	08:32	12.5	509.5	561.1	348.8	18.1	9.	329.7	81.
	08:33	12.6	510.2	566.0	348.7	17.7	13.	329.6	81.
	08:34	12.6	509.3	567.4	348.8	18.9	11.	333.6	81.
	08:35	12.6	508.6	564.7	348.8	18.2	8.	333.8	81.
	08:36	12.6	506.6	566.3	348.7	17.1	9.	333.8	81.
	08:37	12.6	508.6	566.3	348.9	18.1	9.	333.9	81.
	08:38	12.6	505.6	566.1	348.9	17.0	10.	333.9	81.
	08:39	12.6	504.4	569.5	348.0	20.1	12.	332.3	81.
	08:40	12.7	502.9	569.7	347.4	17.1	10.	331.2	81.
	08:41	12.6	505.4	566.3	347.4	16.7	9.	331.2	81.
	08:42	12.6	506.5	565.0	349.0	16.7	13.	327.1	81.
	08:43	12.5	508.1	561.8	349.4	17.0	10.	326.3	81.
	08:44	12.5	507.8	562.1	348.2	18.1	8.	325.4	81.
	08:45	12.6	506.2	565.1	347.4	17.9	9.	324.8	81.
	08:46	12.7	504.6	568.9	347.4	19.1	9.	324.8	82.
	08:47	12.7	507.1	569.7	347.4	16.8	8.	324.8	82.
	08:48	12.8	503.2	572.6	347.4	16.1	17.	324.8	82.
	08:49	12.6	507.6	564.9	347.9	17.3	9.	325.8	82.
	08:50	12.7	507.0	567.3	349.8	17.2	9.	328.8	81.
	08:51	12.6	503.4	565.9	349.8	16.8	9.	328.8	82.
	08:52	12.8	506.2	570.8	349.7	17.9	12.	329.0	82.
	08:53	12.7	505.4	569.1	348.9	17.1	9.	331.3	82.
	08:54	12.7	506.1	565.8	348.9	18.1	9.	331.3	81.

Plant Name: PIPP

General Average Report

Reporting Period: 07/14/1999 to 07/14/1999

Site Name: PIPPF5P5

Data Averaging Type: 1m

Time of Report: 07/19/99 07:42

Rolling Average Interval: 1

Date	Time	F5CPCO2 (PERCENT)	F5CPNOX (PPM)	F5CPSO2 (PPM)	F5STEMP (DEGFAHRE)	F5CO (PPM)	F5OPC (PERCENT)	F5AFLOW (KACFM)	U5MEG (MEGAWATT)
07/14/99	08:55	12.5	506.2	560.5	350.3	16.3	8.	333.6	81.
	08:56	12.5	507.0	559.5	350.7	16.9	8.	333.9	82.
	08:57	12.7	506.4	570.1	350.7	16.0	15.	333.9	82.
	08:58	12.7	506.5	568.2	348.5	16.4	9.	330.9	82.
	08:59	12.8	506.6	576.6	348.3	17.8	9.	330.6	82.
	09:00	12.7	508.6	571.2	349.4	17.2	8.	330.8	82.
	09:01	12.6	504.6	565.7	351.2	19.1	10.	330.9	81.
	09:02	12.6	503.4	567.6	351.2	18.5	9.	330.9	81.
	09:03	12.7	503.8	568.3	351.2	18.6	12.	331.0	81.
	09:04	12.6	505.2	562.3	351.2	15.6	9.	331.0	81.
	09:05	12.6	505.6	565.4	351.1	17.3	9.	331.1	82.
	09:06	12.7	507.2	568.4	348.9	18.7	9.	332.0	81.
	09:07	12.7	508.0	569.5	348.9	17.8	10.	332.0	82.
	09:08	12.7	507.4	567.9	349.1	16.9	9.	331.8	82.
	09:09	12.7	505.6	566.1	350.3	16.6	13.	330.5	82.
	09:10	12.7	504.2	567.1	350.3	18.3	12.	330.5	82.
	09:11	12.6	505.0	564.8	350.9	16.7	9.	330.8	81.
	09:12	12.6	505.2	563.3	351.0	18.6	9.	330.9	81.
	09:13	12.6	506.4	565.3	351.0	15.8	8.	330.9	81.
	09:14	12.6	508.5	565.1	350.5	16.8	8.	329.1	82.
	09:15	12.7	502.9	569.5	350.3	15.2	9.	328.8	82.
	09:16	12.7	504.8	570.9	350.2	16.4	9.	327.7	82.
	09:17	12.7	504.7	569.2	350.1	15.4	11.	326.2	82.
	09:18	12.7	503.2	568.2	350.1	15.9	12.	326.2	82.
	09:19	12.7	505.6	564.6	349.9	18.4	9.	325.1	82.
	09:20	12.7	505.2	566.3	349.7	17.9	8.	324.3	82.
	09:21	12.8	505.7	568.4	350.0	17.4	10.	324.8	82.
	09:22	12.7	504.7	566.8	350.9	18.5	12.	326.1	81.
	09:23	12.6	503.9	562.5	350.9	18.7	8.	326.1	82.
	09:24	12.7	504.0	564.0	351.2	21.1	9.	327.7	82.
	09:25	12.7	503.0	566.6	352.1	19.0	12.	329.9	82.
	09:26	12.7	503.5	567.8	352.1	21.6	16.	329.9	81.
	09:27	12.6	505.2	567.0	351.4	19.8	10.	327.4	81.
	09:28	12.6	504.0	565.1	351.4	21.6	9.	327.4	81.
	09:29	12.6	503.5	562.6	351.2	19.2	8.	327.4	81.
	09:30	12.6	502.0	559.6	349.4	19.7	8.	326.9	81.
	09:31	12.6	502.2	560.8	349.4	21.0	11.	326.9	81.
	09:32	12.6	501.8	561.2	350.6	22.9	9.	326.3	81.
	09:33	12.5	505.1	558.2	351.5	21.9	10.	325.9	81.
	09:34	12.5	503.9	561.1	351.5	18.8	12.	325.9	81.
	09:35	12.6	502.2	565.5	351.6	21.0	9.	326.3	81.
	09:36	12.6	501.9	564.4	351.7	20.2	8.	326.3	81.
	09:37	12.6	500.1	565.9	352.3	19.7	8.	326.5	81.
	09:38	12.7	499.9	569.9	352.9	21.7	10.	326.7	81.
	09:39	12.6	501.2	565.7	352.9	20.3	9.	326.8	82.
	09:40	12.7	499.8	572.4	353.0	21.6	12.	325.8	82.
Average =		12.6	508.9	563.4	347.6	18.6	10.	328.7	81.
Maximum =		12.8	515.9	576.6	353.0	23.2	17.	333.9	82.
Minimum =		12.3	499.8	550.6	340.5	14.2	8.	323.2	80.
Possible Values =		146	146	146	146	146	146	146	146
Included Values =		146	146	146	146	146	146	146	146
Total =		1835.9	74296.0	82252.3	50744.3	2712.2	1435.	47989.6	11834.

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid
S - suspect
V - invalid for state
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

UNIT 5 ESP DATA

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	352	81	41	505
T/R 5B	311	63	36	358
T/R 5C	326	88	36	519
T/R 5D	309	88	36	492

OPACITY 6.37%
Boiler Load 79 Mw
Excess Air 3.20%

DATE: 07/13/1999 TIME: 9:06

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	341	76	40	460
T/R 5B	307	60	36	341
T/R 5C	317	83	35	485
T/R 5D	298	82	35	447

OPACITY 7.33%
Boiler Load 80 Mw
Excess Air 3.15%

DATE: 07/13/1999 TIME: 9:54

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	336	74	40	454
T/R 5B	300	57	36	319
T/R 5C	306	78	34	443
T/R 5D	299	83	35	453

OPACITY 8.57%
Boiler Load 80 Mw
Excess Air 3.26%

DATE: 07/13/1999 TIME: 10:42

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	361	88	42	565
T/R 5B	314	63	37	364
T/R 5C	329	91	36	541
T/R 5D	313	93	36	528

OPACITY 6.81%
Boiler Load 80 Mw
Excess Air 2.96%

DATE: 07/13/1999 TIME: 11:54

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	349	79	41	487
T/R 5B	315	61	37	347
T/R 5C	329	89	36	525
T/R 5D	309	89	36	497

OPACITY 7.52%
Boiler Load 80 Mw
Excess Air 3.50%

DATE: 07/13/1999 TIME: 13:36

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	344	79	41	482
T/R 5B	300	57	36	319
T/R 5C	316	82	35	474
T/R 5D	303	85	35	470

OPACITY 8.08%
Boiler Load 79 Mw
Excess Air 3.58%

DATE: 07/13/1999 TIME: 14:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	346	78	41	476
T/R 5B	310	58	37	326
T/R 5C	320	84	35	488
T/R 5D	311	90	36	504

OPACITY 7.37%
Boiler Load 79 Mw
Excess Air 3.58%

DATE: 07/13/1999 TIME: 15:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	335	71	40	427
T/R 5B	312	59	37	329
T/R 5C	320	83	35	476
T/R 5D	309	89	36	495

OPACITY 8.30%
Boiler Load 79 Mw
Excess Air 3.47%

DATE: 07/13/1999 TIME: 16:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	334	69	41	409
T/R 5B	302	54	36	296
T/R 5C	323	84	36	487
T/R 5D	310	88	36	487

OPACITY 8.84%
Boiler Load 79 Mw
Excess Air 3.63%

DATE: 07/13/1999 TIME: 16:24

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	349	77	42	475
T/R 5B	307	51	37	271
T/R 5C	312	74	35	411
T/R 5D	299	78	36	420

OPACITY 9.33%
Boiler Load 82 Mw
Excess Air 3.07%

DATE: 07/14/1999 TIME: 8:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	338	73	40	443
T/R 5B	294	46	36	242
T/R 5C	302	68	34	374
T/R 5D	295	75	35	399

OPACITY 10.23%
Boiler Load 81 Mw
Excess Air 3.11%

DATE: 07/14/1999 TIME: 8:12

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	346	77	41	470
T/R 5B	302	49	37	263
T/R 5C	308	73	34	406
T/R 5D	297	78	35	418

OPACITY 9.26%
Boiler Load 81 Mw
Excess Air 3.16%

DATE: 07/14/1999 TIME: 9:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	342	76	41	469
T/R 5B	296	47	36	252
T/R 5C	302	69	34	384
T/R 5D	293	76	35	404

OPACITY 10.18%
Boiler Load 82 Mw
Excess Air 2.91%

DATE: 07/14/1999 TIME: 10:00

Wepco Presque Isle
Unit 5 Precipitator

Console	Primary VAC	Primary IAC	Secondary Kv	Secondary mA
T/R 5A	350	83	41	525
T/R 5B	306	51	37	272
T/R 5C	314	77	35	436
T/R 5D	297	80	35	432

OPACITY 8.50%
Boiler Load 82 Mw
Excess Air 2.90%

DATE: 07/14/1999 TIME: 10:42

UNIT 9 PROCESS OPERATION DATA

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 0900 DATE: 7-19-99

1. Gross Generation - MWH 84
2. Station Service - MWH 8
3. Net Generation - MWH 76
4. Control Valve Position % 94
5. Main Steam Flow Lbs./Hr. 550,000
6. F.W. Flow Lbs./Hr. 525,000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 160
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 69/ 451
14. Main Steam Temp. °F 1005°
15. Cold Reheat Temp. °F 665°
16. Hot Reheat Temp. °F 1002°
17. Superheat Spray Flow 15,100
18. Reheat Spray Flow 14,000
19. Air Flow 560,000
20. Excess Oxygen % 1.6
21. Inlet Air Temp. °F 107
22. Gas Outlet Temp. °F 350
23. Opacity % 6.2
24. I.D. Fan (Loading/Amps) 84 / 270
25. F.D. Fan (Loading/rpm/Amps) 71 / 165
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3.	-15.	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	945 863	946 103	240
b	956 601	956 853	252
c	465 390	465 654	264
d	550 350	550 614	264

34. Coal Total Lbs. Hr. 102000

35. Lbs. Coal/Net KWH 1342.1
36. Lbs. Steam/Net KWH 1236.8
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: Nine TIME: 10:00 DATE: 7-19-99

1. Gross Generation - MWH 64
2. Station Service - MWH 7
3. Net Generation - MWH 77
4. Control Valve Position % 94
5. Main Steam Flow Lbs./Hr. 541,000
6. F.W. Flow Lbs./Hr. 526,000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1160
11. Cold Reheat Press. Psig 400
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 70/449
14. Main Steam Temp. °F 1000
15. Cold Reheat Temp. °F 685°
16. Hot Reheat Temp. °F 998
17. Superheat Spray Flow 13,900
18. Reheat Spray Flow 7,300
19. Air Flow 560,000
20. Excess Oxygen % 1.9
21. Inlet Air Temp. °F 106
22. Gas Outlet Temp. °F 354
23. Opacity % 6.4
24. I.D. Fan (Loading/Amps) 95 - 282
25. F.D. Fan (Loading/rpm/Amps) 71 - 162
26. Air Heater Press. (H2O)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3.	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	946 103	946 338	235
b	956 853	957 099	246
c	456 654	465 914	260
d	550 614	550 875	261

34. Coal Total Lbs. Hr. 1002.00

35. Lbs. Coal/Net KWH 1301.2
36. Lbs. Steam/Net KWH 7025.9
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 11:00 DATE: 7-19-99

1. Gross Generation - MWH 84
2. Station Service - MWH 5
3. Net Generation - MWH 79
4. Control Valve Position % 94
5. Main Steam Flow Lbs./Hr. 548,000
6. F.W. Flow Lbs./Hr. 535,000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1170
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 71 - 451
14. Main Steam Temp. °F 1005
15. Cold Reheat Temp. °F 685
16. Hot Reheat Temp. °F 1005
17. Superheat Spray Flow 15,400
18. Reheat Spray Flow 15,300
19. Air Flow 560,000
20. Excess Oxygen % 1.9
21. Inlet Air Temp. °F 106
22. Gas Outlet Temp. °F 352
23. Opacity % 6.
24. I.D. Fan (Loading/Amps) 100 · 285
25. F.D. Fan (Loading/rpm/Amps) 75 · 170
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	946338	946580	242
b	957099	957353	254
c	465914	466181	267
d	550875	551141	266

34. Coal Total Lbs. Hr. 102900

35. Lbs. Coal/Net KWH 1302.5
36. Lbs. Steam/Net KWH 6936.7
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 1200 DATE: 7-19-99

1. Gross Generation - MWH 85
2. Station Service - MWH 7
3. Net Generation - MWH 78.
4. Control Valve Position % 95
5. Main Steam Flow Lbs./Hr. 552,000
6. F.W. Flow Lbs./Hr. 526,000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1175
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 70/450
14. Main Steam Temp. °F 1005
15. Cold Reheat Temp. °F 685
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 20,000
18. Reheat Spray Flow 14,200
19. Air Flow 560,000
20. Excess Oxygen % 6
21. Inlet Air Temp. °F 109
22. Gas Outlet Temp. °F 385
23. Opacity % 6.1
24. I.D. Fan (Loading/Amps) 76 - 265
25. F.D. Fan (Loading/rpm/Amps) 70 162
26. Air Heater Press. (H2O)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B
C
30. Coal Feeder Loading A B
C D
31. Pulverizer Amps A B
C D
32. Mill Outage Temp. A B
C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	946 580	946 818	238
b	957 353	957 602	249
c	466 181	466 442	261
d	551 141	551 402	261

34. Coal Total Lbs. Hr. 100900

35. Lbs. Coal/Net KWH 1293.5
36. Lbs. Steam/Net KWH 7076.9
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 15:00 DATE: 7-19-99

1. Gross Generation - MWH 84
2. Station Service - MWH 5
3. Net Generation - MWH 79
4. Control Valve Position % 94
5. Main Steam Flow Lbs./Hr. 548,000
6. F.W. Flow Lbs./Hr. 526,000
7. F.W. Press. Psig 1560
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1175
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 71 / 451
14. Main Steam Temp. °F 1005
15. Cold Reheat Temp. °F 685
16. Hot Reheat Temp. °F 1005°
17. Superheat Spray Flow 17,600
18. Reheat Spray Flow 12,000
19. Air Flow 560000
20. Excess Oxygen % 1.6
21. Inlet Air Temp. °F 97
22. Gas Outlet Temp. °F 350
23. Opacity % 8.2
24. I.D. Fan (Loading/Amps) 100 - 285
25. F.D. Fan (Loading/rpm/Amps) 72 - 165
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	946 818	947055	237
b	957 602	957852	250
c	466 442	466 702	260
d	551 402	551662	260

34. Coal Total Lbs. Hr. 100,700

35. Lbs. Coal/Net KWH 1274.6
36. Lbs. Steam/Net KWH 6956.7
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 1400 DATE: 7-19-99

1. Gross Generation - MWH 87
2. Station Service - MWH 6
3. Net Generation - MWH 81
4. Control Valve Position % 95
5. Main Steam Flow Lbs./Hr. 561,000
6. F.W. Flow Lbs./Hr. 539,000
7. F.W. Press. Psig 1560
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1160
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 69-451
14. Main Steam Temp. °F 1005
15. Cold Reheat Temp. °F 683
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 16200
18. Reheat Spray Flow 16000
19. Air Flow 560,000
20. Excess Oxygen % 1.7
21. Inlet Air Temp. °F 108
22. Gas Outlet Temp. °F 347
23. Opacity % 6.
24. I.D. Fan (Loading/Amps) 79 - 265
25. F.D. Fan (Loading/rpm/Amps) 70 - 161
26. Air Heater Press. (H_2O)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A___ B___
29. Boiler Feed Pump Amps A___ B___ C___
30. Coal Feeder Loading A___ B___ C___ D___
Lbs./Hr. x 1000 A___ B___ C___ D___
31. Pulverizer Amps A___ B___ C___ D___
32. Mill Outage Temp. A___ B___ C___ D___
33. Coal Scale Readings:

	Beginning	Ending	Total
a	947055	947300	245
b	957852	958109	257
c	466702	466970	268
d	551662	551930	268

34. Coal Total Lbs. Hr. 103800

35. Lbs. Coal/Net KWH 1281.4
36. Lbs. Steam/Net KWH 6925.9
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A___ B___
N or W S or E
42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-)
5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: UNIT 5 TIME: 1500 DATE: 7-19-99

1. Gross Generation - MWH: 82
2. Station Service - MWH: 8
3. Net Generation - MWH: 74
4. Control Valve Position %: 94
5. Main Steam Flow Lbs./Hr.: 539,000
6. F.W. Flow Lbs./Hr.: 510,000
7. F.W. Press. Psig: 1560
8. Chart Throttle Press. Psig: ____
9. Test Gauge Throttle Press. Psig: ____
10. First Stage Press. Psig: 1160
11. Cold Reheat Press. Psig: 405
12. Hot Reheat Press. Psig: 400
13. F.W. (Loading/Temp.): 70/451
14. Main Steam Temp. °F: 1005
15. Cold Reheat Temp. °F: 685
16. Hot Reheat Temp. °F: 1000
17. Superheat Spray Flow: 18000
18. Reheat Spray Flow: 14900
19. Air Flow: 560,000
20. Excess Oxygen %: 1.6
21. Inlet Air Temp. °F: 108
22. Gas Outlet Temp. °F: 350
23. Opacity %: 5.3
24. I.D. Fan (Loading/Amps): 82/265
25. F.D. Fan (Loading/rpm/Amps): 71/162
26. Air Heater Press. (H20)

	IN	OUT	P
AIR			
GAS			

27. Burner Tilt Position/RH P: ____
28. Condensate Pump Amps A____ B____
29. Boiler Feed Pump Amps A____ B____ C____
30. Coal Feeder Loading A____ B____ C____ D____
31. Pulverizer Amps A____ B____ C____ D____
32. Mill Outage Temp. A____ B____ C____ D____
33. Coal Scale Readings:

	Beginning	Ending	Total
a	947300	947531	231
b	958109	958350	241
c	466970	467226	256
d	551930	552185	255

34. Coal Total Lbs. Hr.: 98300
35. Lbs. Coal/Net KWH: 1328.3
36. Lbs. Steam/Net KWH: 7283.7
38. Barometric Press. In.Hg: ____
39. Vacuum In.Hg: ____
40. Back Press. In.Hg: ____
41. Circ. Water Pump Amps A____ B____ (N or W S or E)
42. Circ. Water Inlet Temp.°F: ____
43. Circ. Water Outlet Temp °F: ____
44. Circ. Water Inlet Press. Psig: ____
45. Circ. Water Outlet Press. Psig: ____
46. Condensate Make-up: ____
47. Condensate Draw-off: ____
48. Hot Well Temp. °F: ____
49. Turbine Exhaust Temp. °F: ____
50. 1st Pt.Htr.Ext.Press. Psig: ____
51. 1st Pt.Htr.Ext.Temp. °F: ____
52. 1st Pt.Htr.F.W.Out Temp °F: ____
53. 2nd Pt.Htr.Ext.Press. Psig: ____
54. 2nd Pt.Htr.Ext. Temp. °F: ____
55. 2nd Pt.Htr.F.W.Out Temp. °F: ____
56. 3rd Pt.Htr.Ext. Press. Psig: ____
57. 3rd Pt.Htr.Ext. Temp. °F: ____
58. 3rd Pt.Htr.F.W.Out Temp. °F: ____
59. 4th Pt.Htr.Ext.Press. Psig: ____
60. 4th Pt.Htr.Ext. Temp. °F: ____
61. 4th Pt.Htr.F.W.Out Temp. °F: ____
62. 5th Pt.Htr.Ext. Press.In.Hg: ____
63. 5th Pt.Htr.Ext. Temp. °F: ____
64. 5th Pt.Htr.F.W.In Temp. °F: ____
65. 5th Pt.Htr.F.W.Out Temp. °F: ____
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F = ____
67. 1st Pt. Drain Temp. °F: ____
68. 2nd Pt. Drain Temp. °F: ____
69. 3rd Pt. Drain Temp. °F: ____
70. 4th Pt. Drain Temp. °F: ____
71. 5th Pt. Drain Temp. °F: ____
72. Vars - Mvar: ____
73. Generator Voltage - K volts: ____
74. Auxiliary Steam Uses: ____
75. Remarks: ____

CRO ____ Engineer ____

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NWE TIME: 1600 DATE: 7-19-99

1. Gross Generation - MWH: 81
2. Station Service - MWH: 7
3. Net Generation - MWH: 74
4. Control Valve Position %: 94
5. Main Steam Flow Lbs./Hr.: 551,000
6. F.W. Flow Lbs./Hr.: 533,000
7. F.W. Press. Psig: 1580
8. Chart Throttle Press. Psig: _____
9. Test Gauge Throttle Press. Psig: _____
10. First Stage Press. Psig: 1160
11. Cold Reheat Press. Psig: 405
12. Hot Reheat Press. Psig: 400
13. F.W. (Loading/Temp.): 69-449
14. Main Steam Temp. °F: 1000
15. Cold Reheat Temp. °F: 685
16. Hot Reheat Temp. °F: 1002
17. Superheat Spray Flow: 16200
18. Reheat Spray Flow: 18200
19. Air Flow: 555,000
20. Excess Oxygen %: 1.6
21. Inlet Air Temp. °F: 109
22. Gas Outlet Temp. °F: 587
23. Opacity %: 6.4
24. I.D. Fan (Loading/Amps): 86-270
25. F.D. Fan (Loading/rpm/Amps): 74-162
26. Air Heater Press. (H2O)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P: _____
28. Condensate Pump Amps A____ B____
29. Boiler Feed Pump Amps A____ B____ C____
30. Coal Feeder Loading A____ B____ C____ D____
31. Pulverizer Amps A____ B____ C____ D____
32. Mill Outage Temp. A____ B____ C____ D____
33. Coal Scale Readings:

	Beginning	Ending	Total
a	947531	947767	236
b	958350	958600	250
c	467226	467486	260
d	552185	552446	261

34. Coal Total Lbs. Hr.: 100,900
35. Lbs. Coal/Net KWH: 1360.8
36. Lbs. Steam/Net KWH: 7445.9
38. Barometric Press. In.Hg: _____
39. Vacuum In.Hg: _____
40. Back Press. In.Hg: _____
41. Circ. Water Pump Amps A____ B____ (N or W S or E)
42. Circ. Water Inlet Temp.°F: _____
43. Circ. Water Outlet Temp °F: _____
44. Circ. Water Inlet Press. Psig: _____
45. Circ. Water Outlet Press. Psig: _____
46. Condensate Make-up: _____
47. Condensate Draw-off: _____
48. Hot Well Temp. °F: _____
49. Turbine Exhaust Temp. °F: _____
50. 1st Pt.Htr.Ext.Press. Psig: _____
51. 1st Pt.Htr.Ext.Temp. °F: _____
52. 1st Pt.Htr.F.W.Out Temp °F: _____
53. 2nd Pt.Htr.Ext.Press. Psig: _____
54. 2nd Pt.Htr.Ext. Temp. °F: _____
55. 2nd Pt.Htr.F.W.Out Temp. °F: _____
56. 3rd Pt.Htr.Ext. Press. Psig: _____
57. 3rd Pt.Htr.Ext. Temp. °F: _____
58. 3rd Pt.Htr.F.W.Out Temp. °F: _____
59. 4th Pt.Htr.Ext.Press. Psig: _____
60. 4th Pt.Htr.Ext. Temp. °F: _____
61. 4th Pt.Htr.F.W.Out Temp. °F: _____
62. 5th Pt.Htr.Ext. Press.In.Hg: _____
63. 5th Pt.Htr.Ext. Temp. °F: _____
64. 5th Pt.Htr.F.W.In Temp. °F: _____
65. 5th Pt.Htr.F.W.Out Temp. °F: _____
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F = _____
67. 1st Pt. Drain Temp. °F: _____
68. 2nd Pt. Drain Temp. °F: _____
69. 3rd Pt. Drain Temp. °F: _____
70. 4th Pt. Drain Temp. °F: _____
71. 5th Pt. Drain Temp. °F: _____
72. Vars - Mvar: _____
73. Generator Voltage - K volts: _____
74. Auxiliary Steam Uses: _____
75. Remarks: _____

CRO _____ Engineer _____

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NW5 TIME: 1100 DATE: 7-19-99

1. Gross Generation - MWH 87
2. Station Service - MWH 6
3. Net Generation - MWH 81
4. Control Valve Position % 94
5. Main Steam Flow Lbs./Hr. 544000
6. F.W. Flow Lbs./Hr. 528000
7. F.W. Press. Psig 1580
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1155
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 400
13. F.W. (Loading/Temp.) 69-449
14. Main Steam Temp. °F 1002
15. Cold Reheat Temp. °F 685
16. Hot Reheat Temp. °F 1000
17. Superheat Spray Flow 17800
18. Reheat Spray Flow 16400
19. Air Flow 555000
20. Excess Oxygen % 1.4
21. Inlet Air Temp. °F 109
22. Gas Outlet Temp. °F 355
23. Opacity % 7.3
24. I.D. Fan (Loading/Amps) 100 - 285
25. F.D. Fan (Loading/rpm/Amps) 74 - 165
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	7.2	7.6	
GAS	-3	-15	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	947767	948005	238
b	958600	958849	249
c	467486	467749	263
d	552446	552709	263

34. Coal Total Lbs. Hr. 101300

35. Lbs. Coal/Net KWH 1250.6
36. Lbs. Steam/Net KWH 6716.0
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B
N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: NINE TIME: 0800-0900 DATE: 7-20-99

1. Gross Generation - MWH 89
2. Station Service - MWH 7
3. Net Generation - MWH 82.
4. Control Valve Position % 95
5. Main Steam Flow Lbs./Hr. 546,000
6. F.W. Flow Lbs./Hr. 521,000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1180
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 395
13. F.W. (Loading/Temp.) 90/450
14. Main Steam Temp. °F 1000°
15. Cold Reheat Temp. °F 689
16. Hot Reheat Temp. °F 1002°
17. Superheat Spray Flow 16,400
18. Reheat Spray Flow 12,100
19. Air Flow 555,000
20. Excess Oxygen % 1.5
21. Inlet Air Temp. °F 112
22. Gas Outlet Temp. °F 585
23. Opacity % 6.0
24. I.D. Fan (Loading/Amps) 90 278
25. F.D. Fan (Loading/rpm/Amps) 25 165
26. Air Heater Press. (H2O)

	IN	OUT	P
AIR	8.4	7.3	
GAS	-3.7	-15.3	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	951 211	951437	226
b	962 238	962476	238
c	471 539	471806	267
d	556 499	556765	266

34. Coal Total Lbs. Hr. 997,000
35. Lbs. Coal/Net KWH 1215.8
36. Lbs. Steam/Net KWH 6658.5
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B (N or W S or E)
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: N/WB TIME: 0900-1000 DATE: 7-20-99

1. Gross Generation - MWH 81
2. Station Service - MWH 8
3. Net Generation - MWH 73
4. Control Valve Position % 95
5. Main Steam Flow Lbs./Hr. 671,000
6. F.W. Flow Lbs./Hr. 558,000
7. F.W. Press. Psig 1590
8. Chart Throttle Press. Psig
9. Test Gauge Throttle Press. Psig
10. First Stage Press. Psig 1175
11. Cold Reheat Press. Psig 400
12. Hot Reheat Press. Psig 390
13. F.W. (Loading/Temp.) 70/
14. Main Steam Temp. °F 1000°
15. Cold Reheat Temp. °F 689
16. Hot Reheat Temp. °F 1000°
17. Superheat Spray Flow 860
18. Reheat Spray Flow 4000
19. Air Flow 550000
20. Excess Oxygen % 1.5
21. Inlet Air Temp. °F 113
22. Gas Outlet Temp. °F 358
23. Opacity % 6.2
24. I.D. Fan (Loading/Amps) 79 265
25. F.D. Fan (Loading/rpm/Amps) 72 160
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.4	7.3	
GAS	-3.7	-15.3	

27. Burner Tilt Position/RH P
28. Condensate Pump Amps A B
29. Boiler Feed Pump Amps A B C
30. Coal Feeder Loading A B C D
31. Pulverizer Amps A B C D
32. Mill Outage Temp. A B C D
33. Coal Scale Readings:

	Beginning	Ending	Total
a	951437	951670	233
b	962476	962720	244
c	471806	472081	275
d	556765	557040	275

34. Coal Total Lbs. Hr. 102,700
35. Lbs. Coal/Net KWH 1406.8
36. Lbs. Steam/Net KWH 9191.7
38. Barometric Press. In.Hg
39. Vacuum In.Hg
40. Back Press. In.Hg
41. Circ. Water Pump Amps A B N or W S or E
42. Circ. Water Inlet Temp.°F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:
75. Remarks:

CRO Engineer

2PE0691

PRESQUE ISLE POWER PLANT LOAD TEST DATA (Units 1-9)

UNIT NO.: N/US TIME: 10:00 - 11:00 DATE: 7-20-99

1. Gross Generation - MWH 84
2. Station Service - MWH 7
3. Net Generation - MWH 77
4. Control Valve Position % 95
5. Main Steam Flow Lbs./Hr. 554,000
6. F.W. Flow Lbs./Hr. 548,000
7. F.W. Press. Psig 1590

10. First Stage Press. Psig 1175
11. Cold Reheat Press. Psig 405
12. Hot Reheat Press. Psig 395
13. F.W. (Loading/Temp.) 711 449
14. Main Steam Temp. °F 1005
15. Cold Reheat Temp. °F 689°
16. Hot Reheat Temp. °F 1005
17. Superheat Spray Flow 8600
18. Reheat Spray Flow 12100
19. Air Flow 560,000
20. Excess Oxygen % 1.5
21. Inlet Air Temp. °F 112
22. Gas Outlet Temp. °F 355
23. Opacity % 8.2
24. I.D. Fan (Loading/Amps) 100 / 28
25. F.D. Fan (Loading/rpm/Amps) 78 / 681 / 170
26. Air Heater Press. (H20)

	IN	OUT	P
AIR	8.4	7.3	
GAS	-3.7	-15.3	

Burner Tilt Position/RH P

Condensate Pump Amps A B

Boiler Feed Pump Amps A B C

Coal Feeder Loading A B C D

Pulverizer Amps A B C D

Mill Outage Temp. A B C D

33. Coal Scale Readings:

	Beginning	Ending	Total
a	951670	951899	229
b	962720	962961	241
c	472081	472354	273
d	557040	557313	273

34. Coal Total Lbs. Hr. 101,600

35. Lbs. Coal/Net KWH 1319.4
36. Lbs. Steam/Net KWH 7194.8

Barometric Press. In.Hg

Vacuum In.Hg

Back Press. In.Hg

Circ. Water Pump Amps A B

N or W S or E

42. Circ. Water Inlet Temp. °F
43. Circ. Water Outlet Temp °F
44. Circ. Water Inlet Press. Psig
45. Circ. Water Outlet Press. Psig
46. Condensate Make-up
47. Condensate Draw-off
48. Hot Well Temp. °F
49. Turbine Exhaust Temp. °F
50. 1st Pt.Htr.Ext.Press. Psig
51. 1st Pt.Htr.Ext.Temp. °F
52. 1st Pt.Htr.F.W.Out Temp °F
53. 2nd Pt.Htr.Ext.Press. Psig
54. 2nd Pt.Htr.Ext. Temp. °F
55. 2nd Pt.Htr.F.W.Out Temp. °F
56. 3rd Pt.Htr.Ext. Press. Psig
57. 3rd Pt.Htr.Ext. Temp. °F
58. 3rd Pt.Htr.F.W.Out Temp. °F
59. 4th Pt.Htr.Ext.Press. Psig
60. 4th Pt.Htr.Ext. Temp. °F
61. 4th Pt.Htr.F.W.Out Temp. °F
62. 5th Pt.Htr.Ext. Press.In.Hg
63. 5th Pt.Htr.Ext. Temp. °F
64. 5th Pt.Htr.F.W.In Temp. °F
65. 5th Pt.Htr.F.W.Out Temp. °F
66. 1st Pt.F.W.Out Temp.Minus(-) 5th Pt.F.W. In Temp. °F =
67. 1st Pt. Drain Temp. °F
68. 2nd Pt. Drain Temp. °F
69. 3rd Pt. Drain Temp. °F
70. 4th Pt. Drain Temp. °F
71. 5th Pt. Drain Temp. °F
72. Vars - Mvar
73. Generator Voltage - K volts
74. Auxiliary Steam Uses:

75. Remarks:

CRO Engineer

2PE0691

UNIT 9 CEMS DATA

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 09:13

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	08:40	12.4<	276.3<	243.9<	403.5	14.5<	8.	346.1	83.
	08:41	13.0<	271.6<	263.1<	402.4	16.5<	7.	346.0	83.
	08:42	12.9<	280.4<	262.2<	401.1	14.8<	6.	346.0	83.
	08:43	12.8<	284.0<	259.7<	401.2	14.5<	6.	345.9	83.
	08:44	13.0	280.1	263.4	401.5	12.9	6.	345.8	83.
	08:45	13.2	277.9	265.9	401.5	12.9	6.	345.5	83.
	08:46	13.1	280.8	261.9	400.8	16.7	6.	343.6	84.
	08:47	13.5	265.2	275.5	400.8	21.0	7.	343.5	85.
	08:48	13.6	270.2	279.3	401.8	73.6	7.	341.7	85.
	08:49	13.3	282.2	271.2	401.8	26.4	7.	341.7	85.
	08:50	13.1	292.4	262.6	401.8	13.6	7.	342.6	84.
	08:51	13.1	287.2	263.7	401.8	15.3	7.	343.0	84.
	08:52	13.1	290.7	263.4	402.2	16.7	7.	343.6	84.
	08:53	13.4	286.4	271.2	402.9	13.7	8.	344.3	84.
	08:54	13.4	291.3	270.8	402.8	17.2	7.	344.7	84.
	08:55	13.2	295.2	264.5	401.7	20.8	7.	347.6	84.
	08:56	13.2	294.4	262.6	401.7	15.6	8.	347.6	84.
	08:57	13.3	291.2	265.8	400.3	11.7	10.	348.0	84.
	08:58	13.4	288.6	269.4	400.1	15.1	8.	348.1	84.
	08:59	13.6	282.0	273.6	400.8	14.1	8.	347.8	84.
	09:00	13.4	284.8	270.4	401.7	15.3	9.	347.2	85.
	09:01	13.4	288.9	268.6	401.5	16.5	8.	347.2	85.
	09:02	13.6	285.6	274.5	400.4	15.8	8.	347.2	85.
	09:03	13.5	284.2	272.1	400.4	12.8	7.	347.2	85.
	09:04	13.4	286.5	270.2	402.2	13.6	8.	347.1	85.
	09:05	13.5	286.8	271.6	402.7	12.2	7.	347.1	84.
	09:06	13.4	293.4	267.8	401.4	18.0	7.	347.5	84.
	09:07	13.4	289.0	268.7	400.5	15.7	7.	347.6	85.
	09:08	13.6	283.4	275.8	400.6	16.8	8.	347.6	84.
	09:09	13.2	294.7	264.5	401.4	16.8	7.	347.4	84.
	09:10	13.3	294.5	266.1	401.2	14.5	7.	347.6	84.
	09:11	13.4	290.0	269.5	400.3	16.4	7.	349.1	84.
	09:12	13.3	292.5	266.2	400.3	15.8	8.	349.1	84.
	09:13	13.4	288.9	269.6	399.8	14.0	7.	348.3	85.
	09:14	13.9	281.1	283.6	399.5	25.6	6.	347.8	85.
	09:15	13.4	291.1	270.6	399.9	45.7	6.	347.0	85.
	09:16	13.3	294.6	267.3	400.4	20.9	7.	346.5	85.
	09:17	13.6	289.6	273.7	400.4	13.1	7.	346.5	85.
	09:18	13.5	294.6	271.7	398.2	16.8	7.	346.0	84.
	09:19	13.4	292.3	268.9	398.1	14.4	7.	345.9	85.
	09:20	13.6	284.6	275.7	400.1	13.6	7.	346.4	85.
	09:21	13.7	286.1	277.3	400.4	16.0	8.	346.5	85.
	09:22	13.4	295.4	268.4	399.9	14.9	7.	346.6	85.
	09:23	13.6	285.5	274.2	397.5	13.5	7.	346.9	85.
	09:24	13.7	284.4	278.5	397.5	22.0	6.	346.8	85.
	09:25	13.5	292.0	273.4	399.2	21.0	7.	345.2	85.
	09:26	13.4	297.9	270.0	399.5	13.0	6.	345.2	85.
	09:27	13.5	291.7	273.2	399.3	13.5	6.	345.3	84.
	09:28	13.3	294.0	268.2	398.9	13.2	7.	345.4	84.
	09:29	13.4	291.9	269.6	398.8	11.7	7.	345.5	85.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 09:13

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	09:30	13.7	290.1	276.1	398.5	16.6	6.	345.8	85.
	09:31	13.6	292.2	274.8	398.5	10.0	6.	345.8	85.
	09:32	13.3	298.7	268.0	399.7	12.0	7.	346.4	85.
	09:33	13.4	295.2	268.3	400.1	16.1	6.	346.7	85.
	09:34	13.5	296.6	271.6	398.0	10.3	6.	347.1	85.
	09:35	13.5	293.7	270.5	396.3	12.7	6.	347.4	85.
	09:36	13.5	294.8	271.4	396.3	14.1	6.	347.4	84.
	09:37	13.4	297.6	268.1	399.4	14.7	6.	348.7	84.
	09:38	13.2	303.0	262.5	400.0	11.6	7.	348.7	84.
	09:39	13.6	288.8	273.8	398.5	11.9	6.	348.3	85.
	09:40	13.7	287.6	277.4	398.0	27.2	7.	348.2	85.
	09:41	13.5	292.4	272.3	398.2	19.6	8.	347.9	85.
	09:42	13.5	296.1	271.7	398.9	17.6	7.	347.4	85.
	09:43	13.5	294.2	271.1	398.9	16.3	6.	347.4	85.
	09:44	13.5	295.3	268.8	398.2	15.2	7.	345.6	85.
	09:45	13.5	293.3	270.7	398.1	15.8	8.	345.6	84.
	09:46	13.5	295.1	270.9	397.5	17.2	9.	345.5	84.
	09:47	13.3	294.6	265.8	396.3	15.3	8.	345.4	84.
	09:48	13.6	287.1	271.0	396.4	16.4	7.	345.4	85.
	09:49	13.9	278.2	282.9	396.6	24.5	8.	345.2	86.
	09:50	13.7	290.4	276.2	396.6	34.2	8.	345.2	85.
	09:51	13.4	295.1	267.9	396.4	15.5	7.	345.0	85.
	09:52	13.4	295.6	266.7	396.3	14.3	8.	345.0	84.
	09:53	13.4	295.5	266.3	397.9	10.9	8.	345.5	84.
	09:54	13.6	291.6	270.3	398.3	13.5	8.	345.6	85.
	09:55	13.7	287.3	274.1	398.1	14.8	8.	346.0	85.
	09:56	13.7	286.7	275.2	396.9	16.4	8.	346.7	85.
	09:57	13.6	292.2	271.9	396.9	16.5	8.	346.8	85.
	09:58	13.5	296.5	268.1	397.2	11.6	7.	348.0	85.
	09:59	13.6	294.5	270.2	397.2	13.2	7.	348.0	85.
	10:00	13.5	295.8	268.7	396.6	12.6	7.	349.5	84.
	10:01	13.3	296.0	262.6	396.2	13.2	7.	350.0	85.
	10:02	13.6	293.3	269.0	396.2	16.2	8.	350.0	85.
	10:03	13.7	288.2	273.2	394.9	13.1	7.	348.6	85.
	10:04	13.4	293.8	267.5	394.8	15.5	7.	348.5	84.
	10:05	13.3	295.3	261.3	395.2	14.5	7.	347.7	85.
	10:06	13.7	283.2	274.2	395.7	21.0	7.	346.7	84.
	10:07	13.5	288.3	268.7	395.7	17.2	6.	345.5	85.
	10:08	13.5	288.2	266.2	395.7	16.6	7.	343.2	85.
	10:09	13.7	279.9	273.2	395.7	15.1	7.	343.2	85.
	10:10	13.5	285.6	268.4	394.2	22.0	8.	341.8	85.
	10:11	13.5	284.5	267.7	394.2	18.3	7.	341.7	85.
	10:12	13.6	282.0	268.8	394.3	18.3	7.	341.4	85.
	10:13	13.8	276.0	274.4	395.4	19.7	7.	340.6	85.
	10:14	13.9	280.9	278.1	395.4	26.2	6.	340.6	85.
	10:15	13.8	286.5	274.4	390.5	19.0	6.	339.8	85.
	10:16	13.6	293.2	268.5	389.4	12.7	6.	339.5	85.
	10:17	13.7	290.6	271.0	389.4	17.7	6.	339.5	85.
	10:18	13.8	288.1	273.5	388.5	14.8	7.	339.0	84.
	10:19	13.7	288.7	272.2	388.4	15.0	8.	339.0	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 09:13

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	10:20	13.7	288.8	272.6	387.5	15.2	7.	338.2	85.
	10:21	14.0	284.1	278.5	386.5	17.8	7.	337.4	85.
	10:22	13.7	290.1	273.2	386.4	16.5	7.	337.2	85.
	10:23	13.9	288.2	276.9	385.5	15.9	7.	336.1	85.
	10:24	13.8	291.9	274.0	385.6	20.9	7.	335.9	85.
	10:25	13.6	296.6	267.1	386.5	20.5	6.	335.1	85.
	10:26	13.8	290.9	272.5	386.5	13.0	7.	335.1	85.
	10:27	13.8	290.6	272.9	385.6	18.3	6.	336.3	85.
	10:28	13.7	291.4	270.3	385.5	13.1	6.	336.6	85.
	10:29	13.8	287.6	274.4	385.5	17.8	7.	336.6	85.
	10:30	13.9	286.6	276.2	384.9	17.0	7.	336.4	85.
	10:31	13.8	288.7	274.3	384.8	20.5	7.	336.4	85.
	10:32	13.9	286.2	276.3	385.6	17.5	6.	336.9	85.
	10:33	13.9	286.5	276.2	386.1	25.3	7.	337.2	84.
	10:34	13.6	294.2	266.4	386.1	17.5	7.	337.2	85.
	10:35	13.8	287.4	272.4	384.8	15.3	6.	336.2	85.
	10:36	14.0	284.9	278.8	384.5	17.5	6.	336.1	84.
	10:37	13.6	293.1	267.3	384.9	22.4	6.	336.3	84.
	10:38	13.9	285.6	274.2	385.2	15.0	6.	336.4	85.
	10:39	14.2	277.3	285.5	385.2	25.6	6.	336.4	85.
	10:40	13.7	291.4	273.3	384.7	44.9	6.	336.7	85.
	10:41	13.6	294.2	269.1	384.4	20.7	6.	337.0	84.
	10:42	13.6	292.2	267.6	384.4	16.3	6.	336.9	84.
	10:43	13.6	287.8	268.4	384.5	15.0	6.	336.2	85.
	10:44	13.8	284.4	274.5	384.5	19.5	6.	336.2	85.
	10:45	13.8	288.0	273.6	383.8	14.9	6.	335.8	85.
	10:46	13.7	289.9	269.6	383.6	14.2	5.	335.7	85.
	10:47	13.6	291.2	267.8	383.9	15.3	5.	335.7	85.
	10:48	13.8	286.4	272.0	384.4	16.8	5.	335.7	84.
	10:49	13.7	286.5	270.4	384.0	10.1	6.	335.8	85.
	10:50	13.9	278.5	277.0	383.2	14.9	6.	335.9	85.
	10:51	13.9	282.1	275.7	383.2	20.0	6.	335.9	85.
	10:52	13.7	286.7	270.1	384.5	13.9	6.	336.4	84.
	10:53	13.7	288.0	268.6	384.5	9.7	6.	336.4	84.
	10:54	13.9	282.0	275.1	384.6	28.3	6.	335.8	84.
	10:55	13.8	283.3	271.0	384.7	25.0	6.	334.2	84.
	10:56	13.7	282.8	271.2	384.7	12.2	6.	334.2	85.
	10:57	14.0	275.7	280.1	384.7	24.7	5.	333.7	85.
	10:58	13.9	280.2	278.9	384.7	44.6	5.	333.7	85.
	10:59	13.7	287.7	271.2	384.7	23.4	5.	333.5	85.
	11:00	13.7	288.6	270.4	384.5	15.7	5.	332.9	84.
	11:01	13.6	288.8	268.1	384.5	15.1	6.	332.9	84.
	11:02	13.6	289.1	266.0	384.8	16.0	6.	333.6	84.
	11:03	13.8	279.4	272.4	384.8	18.3	6.	333.7	84.
	11:04	13.9	280.1	275.1	384.8	27.9	6.	334.1	84.
	11:05	13.6	286.8	267.0	384.8	20.1	6.	334.4	84.
	11:06	13.8	280.7	271.2	384.8	15.1	6.	334.4	85.
	11:07	14.0	276.5	277.9	385.0	21.0	6.	335.3	85.
	11:08	13.8	283.0	272.1	385.1	29.9	7.	335.9	85.
	11:09	13.7	285.3	269.5	385.3	16.3	7.	335.8	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 09:13

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	11:10	13.7	285.8	269.6	385.6	15.9	7.	335.7	84.
	11:11	13.8	285.9	270.6	385.6	16.7	7.	335.7	84.
	11:12	13.8	285.0	272.2	385.8	15.9	7.	336.1	85.
	11:13	13.8	282.6	273.4	386.1	15.9	7.	336.4	84.
	11:14	13.7	285.4	269.8	386.1	21.5	6.	336.4	84.
	11:15	13.6	287.1	267.1	386.4	18.2	8.	335.5	84.
	11:16	13.8	275.4	277.8	386.5	14.3	8.	335.5	84.
	11:17	13.8	271.3	289.9	389.0	31.5	8.	335.6	85.
	11:18	13.7	276.1	283.0	390.0	30.1	8.	335.7	85.
	11:19	13.7	280.5	275.9	390.0	14.1	8.	336.2	85.
	11:20	13.7	284.0	276.8	390.0	20.3	7.	336.8	84.
	11:21	13.4	284.8	275.6	390.1	19.4	7.	336.8	84.
	11:22	13.5	282.5	274.7	392.0	16.4	7.	337.0	84.
	11:23	13.7	276.9	277.6	392.0	18.4	7.	337.0	84.
	11:24	13.8	278.0	280.6	391.0	23.4	7.	338.4	84.
	11:25	13.5	280.9	279.3	390.3	21.2	7.	338.8	84.
	11:26	13.5	282.3	275.9	391.9	9.1	7.	339.2	84.
	11:27	13.7	278.9	277.2	393.4	16.9	8.	339.5	84.
	11:28	13.6	283.7	274.6	393.4	15.9	7.	339.6	83.
	11:29	13.4	285.0	273.5	392.8	15.1	7.	341.9	83.
	11:30	13.6	276.5	278.6	392.8	15.6	6.	341.9	83.
	11:31	13.6	276.2	276.7	392.2	13.1	7.	340.1	83.
	11:32	13.5	282.7	271.7	392.0	21.1	9.	339.9	83.
	11:33	13.7	269.9	275.4	392.2	14.6	8.	339.1	84.
	11:34	13.9	266.2	281.4	392.6	50.9	8.	338.3	85.
	11:35	13.9	269.3	282.9	392.7	82.3	7.	338.1	85.
	11:36	13.6	285.3	271.1	393.2	53.5	8.	337.5	84.
	11:37	13.4	287.0	264.1	393.2	20.5	8.	337.5	84.
	11:38	13.4	286.8	262.8	395.5	13.4	9.	339.6	85.
	11:39	13.7	279.3	274.5	395.9	21.2	7.	339.9	85.
	11:40	13.7	285.3	274.1	394.4	33.1	8.	342.8	85.
	11:41	13.3	293.1	262.8	392.9	20.3	8.	344.3	85.
	11:42	13.4	285.3	264.8	393.2	19.5	9.	344.8	85.
	11:43	13.6	279.6	269.5	394.3	24.4	9.	346.9	85.
	11:44	13.7	281.7	272.2	394.3	29.3	8.	346.9	85.
	11:45	13.5	287.2	267.5	392.5	16.9	8.	347.9	85.
	11:46	13.6	281.0	270.0	392.5	15.4	7.	348.0	85.
	11:47	13.5	284.3	266.6	393.2	17.9	8.	346.8	85.
	11:48	13.5	283.4	268.1	393.7	12.0	8.	346.3	85.
	11:49	13.6	284.5	269.2	393.7	16.7	7.	346.3	84.
	11:50	13.5	282.7	265.6	393.3	14.1	8.	346.1	84.
	11:51	13.4	281.6	265.3	393.3	18.8	7.	346.2	85.
	11:52	13.7	274.5	273.2	394.6	25.2	8.	346.7	85.
Average =		13.6	286.9	271.6	393.4	18.7	7.	342.0	85.
Maximum =		14.2	303.0	289.9	403.5	82.3	10.	350.0	86.
Minimum =		13.0	265.2	261.3	383.2	9.1	5.	332.9	83.
Possible Values =		193	193	193	193	193	193	193	193
Included Values =		189	189	189	193	189	193	193	193
Total =		2569.3	54217.2	51338.4	75930.0	3537.1	1336.	66004.0	16309.

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid

S - suspect

V - invalid for state

H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 09:13

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	13:05	13.9	279.4	274.4	387.0	26.8	7.	333.8	84.
	13:06	13.9	279.2	275.8	387.1	22.1	6.	333.5	84.
	13:07	13.8	281.9	274.0	386.9	17.3	6.	332.8	84.
	13:08	13.7	283.5	271.2	386.5	18.5	6.	331.7	84.
	13:09	14.0	276.3	279.8	386.5	17.0	6.	331.7	85.
	13:10	14.0	278.3	280.5	387.3	33.8	7.	332.7	84.
	13:11	13.8	288.2	272.8	387.7	27.3	7.	333.3	84.
	13:12	13.7	290.0	268.7	387.8	15.3	6.	333.2	84.
	13:13	13.6	289.1	267.3	387.9	14.8	7.	333.0	84.
	13:14	13.7	287.8	269.0	387.9	14.2	6.	333.0	84.
	13:15	14.0	278.2	280.6	387.4	31.5	6.	335.0	84.
	13:16	13.8	283.4	275.0	387.4	53.5	6.	335.0	84.
	13:17	13.8	283.4	272.5	388.8	21.8	7.	336.1	85.
	13:18	14.0	275.0	281.0	389.3	25.6	7.	336.2	85.
	13:19	14.1	279.0	284.6	388.8	54.6	7.	337.1	85.
	13:20	13.8	287.7	274.9	388.1	28.4	6.	338.4	84.
	13:21	13.6	292.2	267.9	388.4	16.6	6.	338.4	85.
	13:22	13.8	286.5	273.6	388.8	16.0	6.	338.3	85.
	13:23	13.9	285.7	275.6	388.8	21.6	6.	338.3	84.
	13:24	13.7	288.5	270.6	387.6	16.4	6.	338.1	85.
	13:25	13.9	282.8	275.1	387.4	14.4	6.	338.1	85.
	13:26	14.0	280.7	279.8	387.5	38.6	6.	338.1	85.
	13:27	13.7	288.4	271.0	387.7	39.4	6.	338.3	84.
	13:28	13.6	286.7	268.7	387.7	15.9	7.	338.3	84.
	13:29	13.9	279.7	275.9	389.1	24.6	5.	339.4	84.
	13:30	14.0	276.1	281.2	389.3	96.1	5.	339.5	84.
	13:31	13.8	281.7	274.7	389.3	76.8	5.	339.5	84.
	13:32	13.7	283.6	271.4	389.4	28.3	6.	338.6	85.
	13:33	14.1	273.5	285.0	389.4	29.6	5.	338.6	85.
	13:34	14.0	280.4	282.8	388.5	175.4	6.	337.0	85.
	13:35	13.7	288.2	271.1	387.9	74.0	6.	336.1	85.
	13:36	13.9	287.0	274.7	387.9	21.8	6.	336.1	85.
	13:37	13.9	286.1	276.4	389.6	21.2	5.	335.9	85.
	13:38	13.8	288.4	272.2	390.7	21.0	5.	335.9	84.
	13:39	13.7	289.6	269.8	390.4	18.3	5.	335.6	85.
	13:40	13.9	286.0	275.8	389.4	18.7	5.	335.1	85.
	13:41	13.9	283.4	277.8	389.5	25.2	5.	335.3	85.
	13:42	13.9	283.2	277.2	390.0	27.2	5.	337.2	85.
	13:43	13.7	288.9	270.5	390.0	24.1	6.	337.2	85.
	13:44	13.9	279.9	277.7	390.0	28.4	6.	336.7	84.
	13:45	13.8	284.3	272.2	390.0	37.5	6.	336.4	84.
	13:46	13.9	278.3	276.0	390.0	24.6	6.	336.4	85.
	13:47	14.1	274.7	284.7	390.0	57.4	6.	336.4	85.
	13:48	14.1	279.0	284.0	390.0	123.7	5.	336.4	85.
	13:49	13.8	286.2	274.7	390.3	65.2	6.	335.4	85.
	13:50	13.8	287.1	273.4	390.3	29.8	6.	335.3	85.
	13:51	13.8	285.3	275.5	391.1	36.7	6.	335.2	85.
	13:52	13.7	289.2	270.5	391.4	25.9	6.	335.1	84.
	13:53	13.7	286.8	270.9	391.5	15.8	6.	335.6	84.
	13:54	13.7	285.7	271.4	391.9	22.1	6.	336.8	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 09:13

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	13:55	13.8	283.6	273.1	392.0	18.9	6.	336.8	84.
	13:56	13.9	281.2	275.5	392.9	24.3	6.	336.6	84.
	13:57	14.0	279.3	279.7	392.9	30.0	6.	336.6	85.
	13:58	14.0	279.2	280.8	391.9	29.1	6.	335.8	85.
	13:59	14.0	281.5	279.4	391.1	36.9	6.	335.5	85.
	14:00	13.8	286.3	272.6	391.3	33.1	7.	335.3	85.
	14:01	13.9	285.5	275.8	391.6	16.0	6.	335.1	84.
	14:02	13.8	287.6	273.4	391.7	32.6	6.	335.3	85.
	14:03	13.9	284.9	277.6	392.6	28.8	7.	336.2	84.
	14:04	13.9	282.9	277.8	392.6	40.4	6.	336.2	84.
	14:05	13.8	280.7	276.1	392.3	41.5	7.	336.4	84.
	14:06	13.9	277.9	278.3	392.2	38.8	6.	336.4	84.
	14:07	14.0	279.2	280.5	392.0	66.9	7.	335.8	84.
	14:08	13.7	288.2	271.0	391.7	34.4	7.	334.6	84.
	14:09	13.8	284.9	271.5	392.2	20.0	8.	334.7	84.
	14:10	14.1	278.9	286.1	393.6	39.4	7.	335.0	84.
	14:11	13.8	281.1	288.5	393.6	49.2	6.	335.0	84.
	14:12	13.6	286.3	281.3	397.1	23.5	6.	337.8	84.
	14:13	13.4	292.8	270.0	398.3	9.1	7.	338.6	84.
	14:14	13.6	290.9	274.1	398.2	17.6	7.	341.7	84.
	14:15	13.6	284.2	280.0	398.1	17.0	7.	343.2	83.
	14:16	13.5	284.2	276.5	398.9	15.5	7.	343.8	83.
	14:17	13.4	281.7	272.8	401.8	16.1	8.	344.9	84.
	14:18	14.0	269.0	292.7	401.7	55.4	6.	345.1	84.
	14:19	13.7	275.6	290.2	400.1	171.6	6.	345.8	84.
	14:20	13.5	280.5	279.3	400.1	49.1	6.	345.8	83.
	14:21	13.5	281.4	275.9	401.4	21.5	6.	344.7	83.
	14:22	13.9	274.6	286.6	401.8	20.8	6.	344.3	83.
	14:23	13.9	273.8	295.0	401.3	67.5	6.	343.7	83.
	14:24	13.6	281.3	284.5	400.9	39.9	6.	343.2	83.
	14:25	13.5	282.9	277.8	400.7	20.3	6.	342.3	83.
	14:26	13.7	282.3	281.3	400.0	19.3	6.	340.1	84.
	14:27	13.7	276.4	280.5	400.2	20.2	6.	339.9	84.
	14:28	13.6	281.7	272.5	401.5	15.4	6.	339.0	83.
	14:29	13.6	280.3	273.0	401.5	15.9	6.	339.0	83.
	14:30	13.7	280.2	273.4	400.8	20.4	6.	339.3	83.
	14:31	13.8	276.8	283.5	400.6	18.5	6.	339.4	83.
	14:32	13.8	276.0	286.5	401.1	28.2	7.	340.1	84.
	14:33	13.8	278.6	280.8	401.5	28.1	7.	340.6	84.
	14:34	13.6	284.0	277.4	401.1	19.9	7.	341.4	83.
	14:35	13.5	283.5	279.8	399.8	20.1	6.	343.4	83.
	14:36	13.6	282.4	282.7	400.3	17.4	7.	343.5	83.
	14:37	13.6	280.3	278.9	402.7	16.2	7.	343.9	83.
	14:38	13.4	287.7	270.9	402.7	15.5	7.	343.9	83.
	14:39	13.5	285.5	274.0	400.8	15.8	6.	345.2	83.
	14:40	13.7	279.3	278.5	400.1	34.5	6.	345.8	83.
	14:41	13.4	285.2	268.3	400.4	32.1	6.	344.4	83.
	14:42	13.6	278.5	271.7	400.6	14.8	7.	343.2	83.
	14:43	13.9	266.9	282.5	400.5	16.2	6.	342.7	84.
	14:44	14.0	262.1	288.9	399.7	113.7	6.	341.4	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 09:13

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	14:45	13.7	274.0	278.2	400.1	155.5	7.	341.1	84.
	14:46	13.6	280.7	273.9	402.1	50.4	7.	339.7	84.
	14:47	13.7	279.7	276.3	402.1	27.9	7.	339.7	84.
	14:48	13.4	284.0	268.9	402.3	22.2	8.	341.0	83.
	14:49	13.5	283.7	269.3	402.4	17.0	8.	341.4	84.
	14:50	13.8	279.1	277.3	401.2	17.1	8.	343.1	84.
	14:51	13.8	280.6	277.8	400.4	23.8	7.	343.8	84.
	14:52	13.6	283.7	273.5	400.6	19.9	6.	344.5	84.
	14:53	13.4	287.6	269.1	401.7	19.5	6.	346.7	84.
	14:54	13.5	285.3	269.4	401.7	19.3	7.	346.8	84.
	14:55	13.4	285.3	268.4	399.9	18.2	6.	347.4	84.
	14:56	13.6	278.6	272.3	399.8	17.2	6.	347.4	84.
	14:57	13.7	277.2	275.7	400.9	27.2	7.	347.5	84.
	14:58	13.6	279.3	273.3	401.7	41.2	8.	347.6	84.
	14:59	13.5	283.2	270.1	401.7	17.3	7.	347.6	84.
	15:00	13.7	277.0	275.2	400.9	18.9	7.	346.7	85.
	15:01	13.8	275.6	279.9	400.8	45.4	6.	346.5	85.
	15:02	13.6	285.8	273.2	400.9	67.3	7.	346.4	84.
	15:03	13.4	292.0	265.6	401.4	28.2	6.	346.1	84.
	15:04	13.6	284.2	271.0	401.5	19.1	6.	346.7	84.
	15:05	13.8	278.2	277.9	402.0	75.4	6.	347.4	84.
	15:06	13.5	289.6	269.5	402.0	91.5	8.	347.4	84.
	15:07	13.3	294.0	263.5	401.0	24.8	7.	348.1	84.
	15:08	13.6	282.1	271.3	400.7	20.2	7.	348.1	84.
	15:09	13.4	285.9	267.7	401.5	23.0	6.	348.8	83.
	15:10	13.5	283.3	269.4	402.0	18.6	7.	348.9	84.
	15:11	13.6	282.8	272.8	401.5	17.0	6.	348.5	84.
	15:12	13.6	276.5	274.6	400.4	62.7	6.	347.6	83.
	15:13	13.6	277.2	272.9	400.9	50.5	7.	347.3	84.
	15:14	13.6	276.8	273.5	402.4	30.3	8.	346.3	84.
	15:15	13.8	273.4	279.5	402.4	27.4	7.	346.3	84.
	15:16	13.9	269.3	283.3	401.4	91.0	7.	343.9	84.
	15:17	13.6	279.7	275.6	400.9	66.0	7.	343.6	84.
	15:18	13.6	282.3	274.5	400.7	26.5	8.	344.7	84.
	15:19	13.5	289.5	272.2	400.4	18.6	7.	345.0	84.
	15:20	13.4	287.3	270.1	401.1	14.4	8.	345.3	84.
	15:21	13.5	285.7	272.1	402.6	15.5	8.	345.8	84.
	15:22	13.7	284.7	275.8	401.9	23.2	8.	346.3	84.
	15:23	13.5	291.2	271.2	399.1	19.0	8.	349.1	84.
	15:24	13.5	285.8	271.4	399.1	17.7	8.	349.1	84.
	15:25	13.5	284.8	272.3	400.5	13.3	7.	349.1	84.
	15:26	13.6	281.5	274.4	401.1	18.7	8.	349.1	84.
	15:27	13.7	286.6	276.5	400.0	19.7	8.	349.5	84.
	15:28	13.5	284.1	273.3	399.4	20.7	7.	349.8	84.
	15:29	13.5	283.5	271.8	399.6	22.3	8.	349.8	84.
	15:30	13.5	283.8	271.3	402.0	21.4	9.	349.4	84.
	15:31	13.6	283.8	275.1	402.0	15.2	8.	349.4	84.
	15:32	13.5	285.1	273.4	401.3	20.1	7.	349.2	84.
	15:33	13.6	283.1	273.3	400.8	37.4	7.	349.1	84.
	15:34	13.6	281.9	275.1	400.8	36.0	7.	348.0	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 09:13

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	15:35	13.6	289.4	273.4	400.8	24.6	7.	347.2	84.
	15:36	13.6	282.4	274.1	400.8	23.3	8.	347.2	85.
	15:37	13.7	282.5	277.1	401.7	38.1	7.	347.6	85.
	15:38	13.7	284.6	278.6	401.7	34.9	9.	347.7	85.
	15:39	13.5	295.6	269.5	398.1	30.7	9.	348.7	84.
	15:40	13.3	295.8	264.0	398.0	18.2	8.	348.7	84.
	15:41	13.3	290.7	265.1	399.4	15.8	8.	349.4	84.
	15:42	13.7	280.3	276.0	400.4	23.0	8.	349.8	85.
	15:43	13.9	276.6	284.8	399.0	90.0	8.	349.6	85.
	15:44	13.6	283.4	276.1	398.1	78.9	6.	349.4	85.
	15:45	13.4	290.4	268.4	398.2	26.6	6.	348.9	84.
	15:46	13.5	286.0	271.2	399.5	16.4	7.	346.7	85.
	15:47	13.8	282.6	278.0	399.5	21.5	7.	346.7	85.
	15:48	13.8	281.3	280.5	397.3	32.3	7.	346.7	85.
	15:49	13.7	285.4	276.9	397.2	36.9	7.	346.7	85.
	15:50	13.4	291.8	268.7	398.3	22.0	7.	345.3	84.
	15:51	13.5	292.9	267.5	398.9	16.4	7.	344.3	84.
	15:52	13.6	285.5	274.1	398.2	17.4	7.	343.1	84.
	15:53	13.7	283.3	274.4	397.7	20.3	7.	342.5	85.
	15:54	14.0	275.3	285.3	397.7	33.7	8.	342.5	85.
	15:55	13.8	285.3	279.3	396.9	77.3	8.	341.4	84.
	15:56	13.4	292.8	269.0	396.9	34.4	7.	341.4	84.
	15:57	13.6	290.4	269.9	397.3	17.2	7.	341.5	84.
	15:58	13.7	286.6	274.3	397.4	18.2	8.	341.5	85.
	15:59	13.8	283.6	278.3	397.2	30.5	7.	342.0	84.
	16:00	13.5	292.5	269.1	396.8	43.8	8.	342.7	84.
	16:01	13.5	290.2	269.3	396.5	22.0	7.	342.3	84.
	16:02	13.7	283.0	274.0	395.6	16.0	8.	341.0	84.
	16:03	13.7	287.9	273.4	395.6	26.2	8.	341.0	84.
	16:04	13.6	287.0	271.2	394.7	22.0	8.	339.7	84.
	16:05	13.7	284.8	273.2	394.3	20.5	7.	339.2	85.
	16:06	13.9	277.3	282.3	394.5	51.1	7.	337.9	85.
	16:07	13.6	287.2	272.9	394.6	61.0	7.	337.2	85.
	16:08	13.7	282.7	275.7	394.6	25.1	8.	337.1	84.
	16:09	13.6	287.1	270.8	393.6	22.8	8.	336.6	84.
	16:10	13.5	287.2	269.5	393.6	17.3	8.	336.6	85.
	16:11	13.8	285.0	276.4	390.0	14.5	8.	336.8	85.
	16:12	13.9	284.3	281.3	389.7	31.1	8.	336.8	85.
	16:13	13.7	292.6	273.3	389.0	31.9	7.	336.6	85.
	16:14	13.7	291.1	271.7	387.6	19.6	7.	336.1	85.
	16:15	13.8	286.7	276.2	387.6	15.2	7.	335.9	85.
	16:16	14.0	283.2	282.1	387.4	37.9	6.	335.1	85.
	16:17	13.8	289.4	275.3	387.4	40.1	6.	335.1	84.
	16:18	13.6	289.6	270.9	387.4	18.0	6.	333.9	84.
	16:19	13.8	284.4	275.6	387.3	16.6	7.	333.5	84.
	16:20	13.8	286.3	273.8	387.3	19.9	7.	333.2	84.
	16:21	14.0	279.6	280.2	387.3	19.9	6.	332.9	85.
	16:22	14.0	281.4	281.6	387.3	23.0	5.	332.9	85.
	16:23	13.8	285.8	277.8	385.3	18.9	5.	331.7	84.
	16:24	13.6	292.4	270.0	385.3	17.3	5.	331.7	84.

Plant Name: PIPP

General Average Report

Reporting Period: 07/19/1999 to 07/19/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 09:13

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/19/99	16:25	13.8	285.3	275.4	385.8	14.2	5.	331.3	84.
	16:26	14.0	282.7	281.5	385.9	15.3	6.	331.3	84.
	16:27	13.8	286.2	275.8	385.9	18.7	5.	331.4	85.
Average =		13.7	283.4	275.4	395.5	32.0	7.	340.9	84.
Maximum =		14.1	295.8	295.0	402.7	175.4	9.	349.8	85.
Minimum =		13.3	262.1	263.5	385.3	9.1	5.	331.3	83.
Possible Values =		203	203	203	203	203	203	203	203
Included Values =		203	203	203	203	203	203	203	203
Total =		2782.8	57530.7	55899.5	80278.4	6487.6	1355.	69194.7	17086.

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
V - invalid for state
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: PIPP

General Average Report

Reporting Period: 07/20/1999 to 07/20/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 13:23

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/20/99	07:00	13.8	292.4	280.5	378.9	15.6	6.	335.7	85.
	07:01	13.8	294.1	277.7	379.0	18.8	6.	335.7	85.
	07:02	13.8	290.8	279.1	380.3	17.7	6.	336.1	85.
	07:03	13.8	293.0	280.0	380.3	16.0	6.	336.1	85.
	07:04	13.8	293.4	278.5	380.3	17.3	6.	336.1	85.
	07:05	13.7	292.5	276.5	380.6	14.1	6.	336.1	86.
	07:06	14.1	285.5	287.8	380.6	17.5	7.	336.1	86.
	07:07	14.0	292.4	284.6	381.7	23.2	7.	336.1	86.
	07:08	13.7	297.3	277.3	382.0	14.1	6.	336.1	86.
	07:09	13.9	295.7	280.5	382.1	16.4	6.	336.3	86.
	07:10	13.7	301.9	277.8	383.3	16.7	6.	337.9	85.
	07:11	13.7	302.2	276.1	383.3	16.8	8.	337.9	86.
	07:12	13.8	300.3	279.4	382.8	16.5	7.	338.7	86.
	07:13	13.9	291.0	284.4	382.6	16.0	7.	339.2	86.
	07:14	13.8	289.0	281.0	382.6	20.8	7.	339.2	86.
	07:15	13.8	291.1	281.4	383.4	19.0	7.	340.3	86.
	07:16	13.9	296.2	281.9	383.5	14.0	7.	340.5	85.
	07:17	13.7	296.9	275.3	383.7	17.6	6.	339.1	85.
	07:18	13.9	293.3	281.0	383.9	17.5	7.	337.9	85.
	07:19	13.9	293.5	283.0	383.9	12.1	7.	337.9	86.
	07:20	14.0	292.3	284.3	384.0	14.4	9.	337.8	86.
	07:21	14.0	292.2	283.8	384.1	24.5	8.	337.7	86.
	07:22	13.9	294.3	283.1	384.4	36.5	7.	337.9	85.
	07:23	13.5	300.8	272.3	385.9	47.2	7.	338.8	86.
	07:24	14.0	292.1	284.4	385.9	19.1	7.	339.1	86.
	07:25	13.8	301.0	281.8	386.2	24.2	7.	341.6	85.
	07:26	13.6	300.1	273.0	386.2	16.2	7.	341.6	85.
	07:27	13.9	295.4	280.6	386.1	16.5	6.	342.0	85.
	07:28	13.7	298.8	277.7	386.1	28.2	6.	342.1	85.
	07:29	13.8	296.4	279.2	386.3	20.3	7.	342.0	85.
	07:30	13.9	293.2	281.3	387.6	18.4	7.	341.6	85.
	07:31	13.9	293.5	281.6	387.6	19.3	7.	341.6	86.
	07:32	13.9	292.5	281.6	387.2	16.7	6.	338.9	85.
	07:33	14.0	292.4	287.1	387.1	18.6	6.	338.6	86.
	07:34	13.7	302.6	277.4	388.0	17.3	6.	338.2	85.
	07:35	13.7	302.8	274.8	389.4	16.1	6.	337.5	86.
	07:36	14.0	293.0	284.6	389.4	17.6	6.	337.5	85.
	07:37	13.7	299.8	277.7	389.3	14.8	6.	337.0	85.
	07:38	13.7	299.5	275.3	389.3	18.1	6.	337.0	85.
	07:39	13.9	294.7	280.8	389.1	12.4	6.	337.7	85.
	07:40	13.9	288.7	281.2	389.0	12.1	6.	337.9	86.
	07:41	14.0	290.5	282.8	389.6	16.6	6.	337.6	86.
	07:42	13.9	295.1	279.7	390.0	15.0	6.	337.4	86.
	07:43	13.9	294.1	281.8	390.1	14.9	6.	337.4	86.
	07:44	13.8	298.3	278.6	389.2	15.7	6.	336.7	86.
	07:45	14.1	294.3	284.8	389.1	16.1	6.	336.6	86.
	07:46	13.7	298.9	276.6	390.4	21.4	6.	336.5	85.
	07:47	13.6	300.2	272.8	391.0	12.1	6.	336.4	85.
	07:48	13.8	297.7	276.6	391.0	17.3	6.	336.9	85.
	07:49	13.8	300.0	277.6	390.4	15.4	5.	338.3	85.

Plant Name: PIPP

General Average Report

Reporting Period: 07/20/1999 to 07/20/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 13:23

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/20/99	07:50	13.8	299.5	277.3	390.4	15.8	6.	338.3	85.
	07:51	13.8	298.4	278.8	392.3	18.4	6.	338.3	86.
	07:52	14.0	294.1	284.0	392.3	13.5	6.	338.3	86.
	07:53	13.8	298.4	279.5	392.3	20.8	6.	338.9	86.
	07:54	13.9	296.2	282.9	392.2	14.0	6.	339.9	86.
	07:55	14.0	298.1	285.6	392.4	15.2	6.	339.9	85.
	07:56	13.7	303.0	275.5	394.2	14.8	6.	339.9	85.
	07:57	13.5	304.6	269.7	394.2	13.9	6.	339.9	85.
	07:58	13.7	300.0	273.6	394.5	17.1	6.	340.1	85.
	07:59	13.9	294.4	280.3	394.6	14.6	6.	340.1	85.
	08:00	13.9	293.4	281.5	394.5	14.9	7.	338.8	85.
	08:01	14.0	294.3	285.2	394.3	12.8	7.	338.1	85.
	08:02	13.7	299.8	277.2	394.3	16.6	7.	338.0	85.
	08:03	13.8	297.4	276.1	394.3	16.2	7.	337.2	85.
	08:04	14.0	293.3	283.2	394.3	13.9	7.	337.2	85.
	08:05	13.8	297.4	278.5	394.8	14.3	7.	339.4	85.
	08:06	13.9	295.1	279.9	394.8	14.9	8.	339.4	85.
	08:07	14.0	295.8	282.9	394.9	13.5	7.	340.1	85.
	08:08	13.7	300.1	275.6	395.1	14.7	7.	340.8	85.
	08:09	13.8	298.5	275.7	395.1	14.0	8.	340.8	85.
	08:10	13.9	296.4	281.1	394.8	14.4	7.	341.2	85.
	08:11	14.2	290.4	290.3	394.6	17.9	7.	341.2	85.
	08:12	13.6	303.3	272.6	394.9	19.2	8.	341.1	85.
	08:13	13.6	299.3	271.9	395.4	13.4	7.	340.7	85.
	08:14	13.9	293.7	281.1	395.4	16.2	7.	340.7	85.
	08:15	14.1	292.4	289.6	395.8	24.1	6.	340.3	85.
	08:16	13.5	304.9	270.6	396.2	26.3	6.	339.9	85.
	08:17	13.6	298.2	270.2	396.2	15.4	6.	339.9	85.
	08:18	13.9	291.2	279.3	396.2	17.3	6.	340.5	85.
	08:19	13.9	286.3	296.4	396.2	17.4	6.	340.5	85.
	08:20	13.6	294.0	286.6	398.0	32.5	6.	340.0	84.
	08:21	13.7	286.1	284.5	400.0	20.1	6.	339.6	84.
	08:22	13.7	285.8	281.8	400.0	23.1	7.	339.6	84.
	08:23	13.8	283.4	284.8	399.2	37.9	7.	337.2	84.
	08:24	14.0	279.4	288.4	398.9	32.6	7.	336.8	85.
	08:25	14.1	271.7	300.2	399.2	23.4	6.	337.0	86.
	08:26	14.0	278.1	296.6	401.5	27.9	6.	337.4	85.
	08:27	13.6	290.5	280.1	401.9	21.5	7.	337.8	85.
	08:28	13.4	297.9	270.1	403.1	18.1	7.	339.2	85.
	08:29	13.7	291.9	284.2	403.1	15.6	6.	339.2	85.
	08:30	13.6	287.7	285.9	404.0	20.7	17.	343.7	85.
	08:31	13.6	282.7	281.1	404.4	36.3	8.	346.0	85.
	08:32	13.3	295.5	270.8	403.9	22.6	8.	347.3	85.
	08:33	13.6	283.9	284.8	403.4	19.2	7.	347.8	85.
	08:34	13.7	285.6	290.7	403.5	18.5	6.	348.3	84.
	08:35	13.5	287.9	279.0	404.4	18.1	7.	349.3	84.
	08:36	13.6	287.1	278.3	404.4	15.8	7.	349.2	84.
	08:37	13.5	286.3	280.2	403.4	18.4	7.	346.0	84.
	08:38	13.6	281.4	285.3	403.4	14.1	7.	346.0	85.
	08:39	14.0	273.0	292.6	404.1	23.0	7.	345.0	85.

Plant Name: PIPP

General Average Report

Reporting Period: 07/20/1999 to 07/20/1999

Site Name: PIPPF9P9

Time of Report: 07/20/99 13:23

Data Averaging Type: 1m

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/20/99	08:40	13.8	280.4	288.2	404.4	36.6	7.	344.5	85.
	08:41	13.6	284.8	276.4	404.4	20.4	7.	344.5	85.
	08:42	13.6	281.1	277.7	405.6	14.2	8.	342.7	85.
	08:43	13.7	282.8	279.3	406.0	16.8	8.	342.5	85.
	08:44	13.6	289.6	276.2	405.0	18.1	7.	342.9	85.
	08:45	13.6	292.6	277.9	403.7	19.0	7.	343.6	85.
	08:46	13.8	279.4	287.9	403.9	16.3	7.	344.3	85.
	08:47	13.7	280.8	283.7	404.4	49.6	6.	346.2	85.
	08:48	13.3	293.3	271.0	404.4	22.8	8.	346.2	85.
	08:49	13.5	288.1	278.1	403.3	21.5	6.	347.8	85.
	08:50	13.8	279.0	291.0	402.9	19.0	7.	347.8	85.
	08:51	13.6	282.9	280.3	405.5	26.3	6.	348.9	84.
	08:52	13.4	286.7	274.8	406.7	20.8	7.	349.5	85.
	08:53	13.6	286.1	279.2	405.3	17.7	7.	349.6	85.
	08:54	13.5	283.7	275.4	402.9	15.6	7.	349.8	84.
	08:55	13.4	287.3	270.0	403.0	21.1	7.	349.7	85.
	08:56	13.7	278.6	278.4	403.7	17.3	6.	349.4	85.
	08:57	13.8	276.7	281.4	403.7	19.4	6.	349.5	85.
	08:58	13.8	270.7	284.3	404.2	23.1	7.	347.3	85.
	08:59	13.9	271.2	284.8	404.4	25.5	6.	346.7	86.
	09:00	13.8	277.9	281.9	404.7	33.9	7.	346.1	86.
	09:01	13.5	290.1	273.1	404.9	25.7	7.	345.8	86.
	09:02	13.6	283.7	275.8	404.9	20.1	6.	345.8	86.
	09:03	13.5	287.8	274.1	405.5	35.0	7.	346.0	85.
	09:04	13.3	292.4	268.7	405.5	22.2	8.	346.0	85.
	09:05	13.5	294.9	271.8	404.2	19.1	7.	347.4	85.
	09:06	13.6	290.3	277.1	404.0	17.5	6.	347.4	85.
	09:07	13.5	293.0	274.3	404.2	24.3	6.	347.8	85.
	09:08	13.5	293.9	272.1	404.7	20.2	8.	348.5	86.
	09:09	13.7	292.2	277.9	404.5	18.3	7.	349.0	85.
	09:10	13.4	292.9	271.9	402.3	19.7	7.	350.0	85.
	09:11	13.3	296.7	268.2	402.3	18.4	7.	350.0	86.
	09:12	13.7	285.6	280.1	403.1	16.1	7.	351.0	86.
	09:13	13.7	287.9	281.5	403.5	18.3	7.	351.5	85.
	09:14	13.4	291.9	272.2	403.7	17.4	7.	350.7	85.
	09:15	13.4	296.7	269.0	404.0	13.9	7.	349.8	86.
	09:16	13.6	292.0	276.1	404.0	13.6	7.	349.8	86.
	09:17	13.6	296.6	274.5	401.2	23.7	7.	348.9	85.
	09:18	13.4	295.2	270.6	400.5	14.8	7.	348.9	85.
	09:19	13.5	295.2	271.6	402.6	20.4	7.	349.6	86.
	09:20	13.7	291.8	277.5	403.5	14.3	7.	349.6	85.
	09:21	13.5	298.6	273.1	403.3	17.0	7.	350.1	85.
	09:22	13.3	295.1	267.1	402.7	17.7	7.	352.0	85.
	09:23	13.7	285.1	278.6	402.8	13.9	7.	351.8	85.
	09:24	13.6	290.9	277.1	403.0	14.2	8.	351.3	85.
	09:25	13.7	290.9	276.6	403.1	15.4	8.	351.3	85.
	09:26	13.5	290.5	272.4	402.9	17.3	8.	349.9	85.
	09:27	13.6	285.6	276.7	402.9	16.3	8.	349.6	85.
	09:28	13.6	284.9	276.5	403.3	17.3	8.	349.0	85.
	09:29	13.5	291.8	274.1	403.5	15.8	8.	348.7	85.

Plant Name: PIPP

General Average Report

Reporting Period: 07/20/1999 to 07/20/1999

Site Name: PIPPF9P9

Data Averaging Type: 1m

Time of Report: 07/20/99 13:23

Rolling Average Interval: 1

Date	Time	F9CPCO2 (PERCENT)	F9CPNOX (PPM)	F9CPSO2 (PPM)	F9STEMP (DEGFAHRE)	F9CO (PPM)	F9OPC (PERCENT)	F9AFLOW (KACFM)	U9MEG (MEGAWATT)
07/20/99	09:30	13.4	290.6	272.3	403.4	15.8	8.	348.7	85.
	09:31	13.9	274.9	287.1	402.6	25.0	7.	348.5	85.
	09:32	13.4	290.4	272.6	402.6	40.9	8.	348.8	85.
	09:33	13.3	296.3	268.2	402.3	21.6	10.	350.0	85.
	09:34	13.6	287.1	276.8	402.3	20.1	9.	350.0	86.
	09:35	14.0	277.0	290.3	402.0	77.5	8.	350.4	85.
	09:36	13.3	296.2	271.3	401.5	103.8	9.	350.9	85.
	09:37	13.3	299.8	266.3	401.6	25.1	9.	351.4	85.
	09:38	13.8	280.2	282.5	402.0	21.7	7.	352.4	85.
	09:39	13.8	284.3	284.1	402.0	47.9	7.	352.4	85.
	09:40	13.4	297.1	271.7	402.8	26.4	7.	351.7	85.
	09:41	13.4	301.3	270.4	403.2	18.8	7.	351.3	84.
	09:42	13.4	295.6	270.6	403.5	19.7	8.	350.7	85.
	09:43	13.6	290.5	274.6	403.8	16.0	8.	350.2	85.
	09:44	13.9	284.9	285.1	403.8	18.9	8.	350.1	85.
	09:45	13.6	298.9	276.6	402.0	19.1	7.	349.4	85.
	09:46	13.3	301.8	268.1	402.0	17.4	6.	349.4	85.
	09:47	13.6	292.2	274.6	402.2	15.7	6.	349.6	85.
	09:48	13.6	289.2	277.1	402.3	17.9	6.	349.6	85.
Average =		13.7	291.7	278.9	396.4	20.3	7.	343.3	85.
Maximum =		14.2	304.9	300.2	406.7	103.8	17.	352.4	86.
Minimum =		13.3	270.7	266.3	378.9	12.1	5.	335.7	84.
Possible Values =		169	169	169	169	169	169	169	169
Included Values =		169	169	169	169	169	169	169	169
Total =		2317.5	49302.8	47139.4	66993.5	3437.5	1169.	58010.5	14389.

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
V - invalid for state
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

UNIT 9 ESP DATA

"Daily Values 7/19/99"

" "	"9A"	"9A"	"9A"	"9A"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"9:36"	126.00	191.00	689.00	26.30
"9:42"	119.00	184.00	641.00	24.50
"9:48"	134.00	198.00	734.00	24.90
"9:54"	117.00	186.00	605.00	24.40
"10:00"	115.00	184.00	604.00	24.80
"10:06"	138.00	198.00	774.00	25.50
"10:12"	148.00	201.00	844.00	25.20
"10:18"	135.00	198.00	741.00	25.00
"10:24"	149.00	204.00	815.00	25.80
"10:30"	124.00	187.00	684.00	24.40
"10:36"	149.00	204.00	868.00	25.80
"10:42"	162.00	209.00	954.00	25.70
"10:48"	116.00	183.00	617.00	24.70
"10:54"	130.00	194.00	725.00	25.00
"11:00"	117.00	183.00	644.00	24.70
"11:06"	136.00	191.00	779.00	25.40
"11:12"	120.00	184.00	650.00	25.10
"11:18"	134.00	196.00	747.00	25.40
"11:24"	123.00	188.00	663.00	25.10
"11:30"	142.00	202.00	778.00	25.90
"11:36"	139.00	197.00	810.00	25.70
"11:42"	141.00	198.00	785.00	25.10
"11:48"	160.00	210.00	925.00	25.30
"11:54"	134.00	194.00	761.00	25.40
"12:00"	158.00	206.00	921.00	25.90
"12:06"	149.00	205.00	892.00	25.90
"12:12"	153.00	205.00	873.00	25.50
"12:18"	147.00	202.00	848.00	25.10
"12:24"	140.00	199.00	781.00	25.10
"12:30"	131.00	193.00	714.00	25.20
"12:36"	130.00	192.00	714.00	25.20
"12:42"	149.00	203.00	840.00	25.90
"12:48"	150.00	205.00	874.00	26.00
"12:54"	132.00	195.00	712.00	25.60
"13:00"	129.00	194.00	689.00	25.60
"13:06"	135.00	198.00	732.00	25.20
"13:12"	123.00	190.00	665.00	25.30
"13:18"	141.00	201.00	778.00	26.10
"13:24"	142.00	199.00	794.00	25.50
"13:30"	135.00	196.00	785.00	24.80
"13:36"	147.00	203.00	844.00	25.50
"13:42"	153.00	205.00	891.00	25.20
"13:48"	161.00	211.00	915.00	25.80
"13:54"	161.00	212.00	938.00	25.90

				Temp
"14:00"	145.00	202.00	848.00	25.00
"14:06"	157.00	206.00	937.00	24.90
"14:12"	135.00	195.00	773.00	24.70
"14:18"	154.00	208.00	880.00	25.10
"14:24"	122.00	188.00	656.00	24.40
"14:30"	128.00	188.00	712.00	24.10
"14:36"	153.00	206.00	869.00	25.10
"14:42"	143.00	198.00	794.00	25.00
"14:48"	128.00	189.00	711.00	24.70
"14:54"	123.00	188.00	669.00	24.10
"15:00"	114.00	183.00	614.00	23.50
"15:06"	126.00	190.00	697.00	24.20
"15:12"	127.00	191.00	682.00	24.60
"15:18"	98.00	173.00	479.00	23.70
"15:24"	100.00	175.00	499.00	24.10
"15:30"	115.00	182.00	603.00	24.60
"15:36"	120.00	188.00	638.00	24.60
"15:42"	136.00	197.00	739.00	25.30
"15:48"	116.00	184.00	633.00	24.80
"15:54"	131.00	194.00	705.00	25.20
"16:00"	104.00	175.00	534.00	24.60
"16:06"	136.00	198.00	769.00	25.00
"16:12"	145.00	203.00	797.00	25.60
"16:18"	137.00	198.00	758.00	25.60
"16:24"	126.00	191.00	682.00	25.00
"16:30"	133.00	194.00	718.00	24.90
"16:36"	129.00	194.00	695.00	25.30
"16:42"	123.00	188.00	666.00	24.80
"16:48"	117.00	184.00	642.00	25.00
"16:54"	131.00	194.00	712.00	25.40
"17:00"	110.00	181.00	554.00	24.90
"17:06"	111.00	179.00	588.00	24.80
"17:12"	142.00	199.00	802.00	25.50
"17:18"	133.00	194.00	740.00	25.10
"17:24"	152.00	207.00	869.00	25.90
"17:30"	148.00	205.00	835.00	25.80

"Daily Values 7/19/99"
" ","9B","9B","9B","9B"
" ","Amps","Volts","mA","KV1"
" ","Amps","Volts","mA","KV1"

"9:36",248.00,332.00,1781.00,36.50
"9:42",246.00,331.00,1761.00,36.40
"9:48",246.00,330.00,1755.00,36.20
"9:54",241.00,330.00,1717.00,36.30
"10:00",241.00,329.00,1716.00,36.40
"10:06",242.00,329.00,1732.00,36.10
"10:12",249.00,333.00,1790.00,36.70
"10:18",245.00,329.00,1760.00,36.20
"10:24",243.00,330.00,1741.00,36.10
"10:30",245.00,330.00,1743.00,36.40
"10:36",244.00,330.00,1752.00,36.40
"10:42",249.00,330.00,1805.00,36.30
"10:48",247.00,331.00,1751.00,36.30
"10:54",250.00,329.00,1801.00,36.10
"11:00",244.00,328.00,1753.00,36.10
"11:06",248.00,329.00,1791.00,36.20
"11:12",241.00,326.00,1704.00,35.90
"11:18",240.00,318.00,1714.00,35.00
"11:24",247.00,318.00,1766.00,35.00
"11:30",247.00,320.00,1763.00,35.10
"11:36",250.00,319.00,1789.00,35.00
"11:42",249.00,320.00,1786.00,35.00
"11:48",250.00,320.00,1796.00,35.00
"11:54",248.00,319.00,1786.00,35.00
"12:00",249.00,319.00,1796.00,35.00
"12:06",244.00,317.00,1759.00,34.70
"12:12",250.00,318.00,1797.00,34.90
"12:18",249.00,320.00,1789.00,35.20
"12:24",241.00,319.00,1713.00,35.20
"12:30",250.00,327.00,1793.00,35.80
"12:36",241.00,323.00,1682.00,35.40
"12:42",240.00,326.00,1681.00,35.80
"12:48",243.00,325.00,1729.00,35.80
"12:54",237.00,324.00,1681.00,35.50
"13:00",238.00,324.00,1702.00,35.60
"13:06",229.00,318.00,1610.00,35.30
"13:12",241.00,324.00,1696.00,35.70
"13:18",245.00,326.00,1738.00,35.70
"13:24",241.00,321.00,1711.00,35.20
"13:30",250.00,317.00,1798.00,34.80
"13:36",249.00,317.00,1795.00,34.70
"13:42",250.00,316.00,1794.00,34.70
"13:48",250.00,317.00,1792.00,34.70

				Temp
"13:54"	249.00	318.00	1785.00	34.80
"14:00"	250.00	317.00	1798.00	34.80
"14:06"	249.00	317.00	1795.00	34.80
"14:12"	250.00	317.00	1795.00	34.80
"14:18"	250.00	316.00	1797.00	34.70
"14:24"	251.00	317.00	1789.00	34.80
"14:30"	244.00	316.00	1753.00	34.70
"14:36"	245.00	315.00	1742.00	34.60
"14:42"	250.00	318.00	1790.00	34.80
"14:48"	250.00	318.00	1792.00	35.00
"14:54"	250.00	318.00	1797.00	35.00
"15:00"	250.00	318.00	1797.00	35.00
"15:06"	245.00	317.00	1768.00	34.70
"15:12"	246.00	320.00	1745.00	35.20
"15:18"	245.00	326.00	1743.00	36.10
"15:24"	239.00	324.00	1681.00	35.70
"15:30"	239.00	323.00	1692.00	35.60
"15:36"	248.00	327.00	1784.00	36.10
"15:42"	249.00	327.00	1784.00	35.90
"15:48"	234.00	319.00	1618.00	35.30
"15:54"	234.00	319.00	1656.00	35.20
"16:00"	233.00	322.00	1622.00	35.50
"16:06"	243.00	323.00	1730.00	35.70
"16:12"	241.00	323.00	1694.00	35.50
"16:18"	243.00	326.00	1710.00	35.80
"16:24"	240.00	324.00	1686.00	35.70
"16:30"	247.00	326.00	1766.00	35.90
"16:36"	239.00	325.00	1707.00	35.60
"16:42"	244.00	324.00	1756.00	35.60
"16:48"	241.00	323.00	1673.00	35.40
"16:54"	246.00	325.00	1753.00	35.70
"17:00"	244.00	323.00	1739.00	35.60
"17:06"	245.00	324.00	1760.00	35.60
"17:12"	247.00	321.00	1737.00	35.10
"17:18"	247.00	317.00	1753.00	34.70
"17:24"	244.00	315.00	1755.00	34.40
"17:30"	249.00	316.00	1791.00	34.60

"Daily Values 7/19/99"

" "	"9C"	"9C"	"9C"	"9C"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"9:36"	246.00	299.00	1795.00	31.90
"9:42"	246.00	300.00	1801.00	32.00
"9:48"	244.00	295.00	1761.00	31.50
"9:54"	241.00	297.00	1770.00	31.80
"10:00"	243.00	300.00	1764.00	32.00
"10:06"	241.00	298.00	1749.00	31.80
"10:12"	243.00	300.00	1782.00	32.10
"10:18"	244.00	299.00	1763.00	31.80
"10:24"	241.00	296.00	1771.00	31.70
"10:30"	237.00	297.00	1709.00	31.70
"10:36"	244.00	300.00	1794.00	32.00
"10:42"	243.00	298.00	1792.00	31.80
"10:48"	242.00	297.00	1774.00	31.60
"10:54"	244.00	297.00	1782.00	31.70
"11:00"	244.00	297.00	1806.00	31.60
"11:06"	244.00	298.00	1802.00	31.70
"11:12"	245.00	297.00	1797.00	31.60
"11:18"	241.00	290.00	1725.00	30.90
"11:24"	235.00	285.00	1765.00	30.60
"11:30"	244.00	291.00	1784.00	30.90
"11:36"	241.00	289.00	1754.00	30.70
"11:42"	245.00	290.00	1806.00	30.90
"11:48"	244.00	290.00	1804.00	30.80
"11:54"	242.00	288.00	1771.00	30.70
"12:00"	243.00	289.00	1793.00	30.70
"12:06"	239.00	287.00	1760.00	30.50
"12:12"	245.00	289.00	1805.00	30.70
"12:18"	242.00	290.00	1755.00	30.80
"12:24"	225.00	286.00	1697.00	30.80
"12:30"	244.00	296.00	1775.00	31.50
"12:36"	230.00	289.00	1641.00	30.90
"12:42"	220.00	288.00	1569.00	30.80
"12:48"	235.00	293.00	1688.00	31.20
"12:54"	226.00	290.00	1643.00	31.00
"13:00"	232.00	290.00	1712.00	31.20
"13:06"	218.00	286.00	1575.00	30.70
"13:12"	228.00	292.00	1669.00	31.10
"13:18"	233.00	292.00	1694.00	31.10
"13:24"	241.00	292.00	1719.00	30.90
"13:30"	238.00	288.00	1800.00	30.60
"13:36"	245.00	288.00	1804.00	30.50
"13:42"	246.00	288.00	1803.00	30.50
"13:48"	240.00	285.00	1750.00	30.20
"13:54"	245.00	288.00	1802.00	30.60

				Temp
"14:00"	245.00	288.00	1808.00	30.60
"14:06"	246.00	288.00	1799.00	30.50
"14:12"	245.00	288.00	1803.00	30.60
"14:18"	241.00	286.00	1746.00	30.40
"14:24"	245.00	287.00	1788.00	30.50
"14:30"	243.00	286.00	1771.00	30.50
"14:36"	243.00	285.00	1777.00	30.40
"14:42"	245.00	287.00	1804.00	30.60
"14:48"	229.00	278.00	1725.00	30.10
"14:54"	244.00	288.00	1805.00	30.70
"15:00"	244.00	287.00	1804.00	30.70
"15:06"	247.00	288.00	1804.00	30.70
"15:12"	245.00	290.00	1781.00	30.90
"15:18"	236.00	291.00	1734.00	31.20
"15:24"	237.00	293.00	1744.00	31.20
"15:30"	237.00	292.00	1732.00	31.30
"15:36"	236.00	293.00	1743.00	31.30
"15:42"	245.00	295.00	1805.00	31.60
"15:48"	230.00	290.00	1603.00	30.90
"15:54"	226.00	287.00	1645.00	31.10
"16:00"	218.00	287.00	1631.00	31.10
"16:06"	236.00	292.00	1710.00	31.20
"16:12"	240.00	296.00	1717.00	31.50
"16:18"	231.00	291.00	1667.00	31.20
"16:24"	239.00	294.00	1712.00	31.40
"16:30"	240.00	296.00	1749.00	31.50
"16:36"	232.00	293.00	1720.00	31.20
"16:42"	242.00	295.00	1757.00	31.40
"16:48"	240.00	294.00	1737.00	31.30
"16:54"	244.00	295.00	1772.00	31.40
"17:00"	237.00	292.00	1725.00	31.20
"17:06"	245.00	295.00	1807.00	31.40
"17:12"	234.00	284.00	1700.00	30.50
"17:18"	244.00	289.00	1805.00	30.80
"17:24"	245.00	289.00	1789.00	30.60
"17:30"	245.00	289.00	1799.00	30.70

"Daily Values 7/19/99"

" "	"9D"	"9D"	"9D"	"9D"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"9:30"	242.00	253.00	1624.00	19.40
"9:36"	248.00	256.00	1686.00	19.60
"9:42"	249.00	257.00	1683.00	19.60
"9:48"	245.00	253.00	1657.00	19.40
"9:54"	245.00	255.00	1635.00	19.40
"10:00"	243.00	256.00	1624.00	19.60
"10:06"	235.00	251.00	1619.00	19.40
"10:12"	249.00	259.00	1696.00	19.80
"10:18"	247.00	258.00	1637.00	19.70
"10:24"	246.00	256.00	1659.00	19.50
"10:30"	242.00	255.00	1629.00	19.50
"10:36"	241.00	257.00	1623.00	19.60
"10:42"	248.00	258.00	1695.00	19.80
"10:48"	241.00	253.00	1641.00	19.30
"10:54"	244.00	255.00	1647.00	19.40
"11:00"	248.00	256.00	1698.00	19.60
"11:06"	248.00	256.00	1695.00	19.60
"11:12"	246.00	255.00	1667.00	19.40
"11:18"	245.00	252.00	1659.00	19.10
"11:24"	247.00	250.00	1677.00	19.00
"11:30"	248.00	251.00	1686.00	19.00
"11:36"	248.00	250.00	1689.00	18.90
"11:42"	244.00	249.00	1656.00	18.80
"11:48"	248.00	249.00	1695.00	18.90
"11:54"	240.00	245.00	1672.00	18.60
"12:00"	245.00	247.00	1668.00	18.70
"12:06"	248.00	248.00	1695.00	18.80
"12:12"	240.00	243.00	1662.00	18.60
"12:18"	248.00	249.00	1676.00	18.90
"12:24"	246.00	253.00	1632.00	19.20
"12:30"	248.00	255.00	1666.00	19.30
"12:36"	226.00	240.00	1592.00	18.70
"12:42"	235.00	253.00	1520.00	19.10
"12:48"	245.00	255.00	1650.00	19.30
"12:54"	228.00	244.00	1572.00	18.90
"13:00"	219.00	242.00	1564.00	18.80
"13:06"	242.00	254.00	1587.00	19.30
"13:12"	246.00	255.00	1657.00	19.50
"13:18"	237.00	251.00	1607.00	19.20
"13:24"	244.00	253.00	1657.00	19.20
"13:30"	248.00	247.00	1695.00	18.70
"13:36"	248.00	247.00	1692.00	18.70
"13:42"	248.00	247.00	1695.00	18.70
"13:48"	248.00	247.00	1692.00	18.70

				Temp
"13:54"	248.00	247.00	1692.00	18.70
"14:00"	247.00	246.00	1676.00	18.60
"14:06"	248.00	246.00	1694.00	18.60
"14:12"	248.00	246.00	1684.00	18.60
"14:18"	248.00	246.00	1694.00	18.70
"14:24"	248.00	246.00	1694.00	18.70
"14:30"	249.00	246.00	1692.00	18.60
"14:36"	247.00	246.00	1672.00	18.60
"14:42"	249.00	246.00	1694.00	18.60
"14:48"	248.00	246.00	1687.00	18.70
"14:54"	248.00	247.00	1686.00	18.70
"15:00"	248.00	246.00	1692.00	18.60
"15:06"	248.00	245.00	1692.00	18.60
"15:12"	248.00	247.00	1694.00	18.70
"15:18"	241.00	251.00	1633.00	19.10
"15:24"	245.00	250.00	1672.00	19.20
"15:30"	248.00	254.00	1693.00	19.40
"15:36"	248.00	254.00	1678.00	19.40
"15:42"	248.00	254.00	1692.00	19.40
"15:48"	224.00	245.00	1519.00	18.70
"15:54"	245.00	253.00	1654.00	19.40
"16:00"	242.00	255.00	1597.00	19.40
"16:06"	238.00	251.00	1605.00	19.20
"16:12"	237.00	252.00	1609.00	19.30
"16:18"	239.00	252.00	1596.00	19.20
"16:24"	230.00	249.00	1568.00	19.10
"16:30"	245.00	256.00	1649.00	19.50
"16:36"	229.00	245.00	1610.00	19.10
"16:42"	247.00	255.00	1666.00	19.50
"16:48"	240.00	250.00	1638.00	19.20
"16:54"	247.00	254.00	1665.00	19.40
"17:00"	245.00	253.00	1654.00	19.30
"17:06"	248.00	254.00	1694.00	19.40
"17:12"	248.00	252.00	1690.00	19.20
"17:18"	248.00	250.00	1678.00	18.90
"17:24"	248.00	249.00	1693.00	18.80
"17:30"	248.00	249.00	1683.00	18.80

"Daily Values 7/19/99"

" "	"9E"	"9E"	"9E"	"9E"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"9:36"	237.00	243.00	1520.00	21.60
"9:42"	238.00	239.00	1549.00	21.30
"9:48"	227.00	239.00	1491.00	20.90
"9:54"	226.00	239.00	1462.00	21.10
"10:00"	211.00	232.00	1365.00	20.80
"10:06"	233.00	241.00	1478.00	21.40
"10:12"	235.00	240.00	1515.00	21.30
"10:18"	198.00	227.00	1360.00	20.50
"10:24"	223.00	236.00	1477.00	21.00
"10:30"	231.00	240.00	1507.00	21.10
"10:36"	231.00	241.00	1496.00	21.40
"10:42"	225.00	239.00	1479.00	21.20
"10:48"	218.00	231.00	1497.00	20.80
"10:54"	227.00	237.00	1507.00	21.00
"11:00"	241.00	243.00	1570.00	21.40
"11:06"	242.00	244.00	1582.00	21.40
"11:12"	239.00	240.00	1603.00	21.20
"11:18"	229.00	233.00	1518.00	20.60
"11:24"	221.00	224.00	1533.00	20.10
"11:30"	247.00	238.00	1604.00	20.80
"11:36"	232.00	230.00	1570.00	20.40
"11:42"	245.00	236.00	1584.00	20.60
"11:48"	241.00	235.00	1597.00	20.50
"11:54"	248.00	236.00	1632.00	20.60
"12:00"	242.00	234.00	1596.00	20.50
"12:06"	232.00	231.00	1557.00	20.30
"12:12"	234.00	231.00	1555.00	20.20
"12:18"	233.00	232.00	1545.00	20.30
"12:24"	226.00	233.00	1444.00	20.60
"12:30"	229.00	235.00	1500.00	20.60
"12:36"	217.00	231.00	1450.00	20.20
"12:42"	199.00	225.00	1356.00	20.20
"12:48"	192.00	223.00	1361.00	20.00
"12:54"	214.00	231.00	1397.00	20.50
"13:00"	218.00	232.00	1438.00	20.60
"13:06"	192.00	224.00	1277.00	20.00
"13:12"	213.00	230.00	1443.00	20.60
"13:18"	196.00	221.00	1359.00	19.90
"13:24"	225.00	234.00	1511.00	20.50
"13:30"	246.00	234.00	1602.00	20.40
"13:36"	245.00	234.00	1599.00	20.40
"13:42"	248.00	234.00	1625.00	20.50
"13:48"	242.00	233.00	1598.00	20.30
"13:54"	246.00	234.00	1593.00	20.50

				Temp
"14:00"	249.00	235.00	1624.00	20.50
"14:06"	248.00	234.00	1624.00	20.50
"14:12"	240.00	231.00	1591.00	20.30
"14:18"	245.00	234.00	1592.00	20.50
"14:24"	241.00	232.00	1596.00	20.30
"14:30"	237.00	232.00	1554.00	20.20
"14:36"	237.00	230.00	1564.00	20.20
"14:42"	242.00	232.00	1572.00	20.30
"14:48"	241.00	232.00	1604.00	20.40
"14:54"	248.00	235.00	1626.00	20.60
"15:00"	239.00	231.00	1592.00	20.40
"15:06"	242.00	233.00	1594.00	20.50
"15:12"	240.00	235.00	1577.00	20.60
"15:18"	206.00	227.00	1415.00	20.40
"15:24"	229.00	234.00	1509.00	20.70
"15:30"	239.00	239.00	1571.00	21.10
"15:36"	243.00	242.00	1582.00	21.30
"15:42"	239.00	239.00	1581.00	21.10
"15:48"	219.00	231.00	1407.00	20.30
"15:54"	217.00	230.00	1464.00	20.60
"16:00"	227.00	236.00	1463.00	20.90
"16:06"	213.00	230.00	1429.00	20.50
"16:12"	208.00	231.00	1372.00	20.30
"16:18"	222.00	229.00	1463.00	20.60
"16:24"	209.00	229.00	1382.00	20.40
"16:30"	229.00	232.00	1500.00	20.90
"16:36"	212.00	227.00	1489.00	20.50
"16:42"	219.00	235.00	1424.00	20.60
"16:48"	220.00	233.00	1465.00	20.50
"16:54"	241.00	240.00	1543.00	21.00
"17:00"	237.00	238.00	1568.00	21.10
"17:06"	239.00	238.00	1594.00	21.00
"17:12"	227.00	234.00	1485.00	20.40
"17:18"	249.00	236.00	1607.00	20.60
"17:24"	248.00	236.00	1617.00	20.60
"17:30"	249.00	236.00	1626.00	20.60

"Daily Values 7/19/99"
" ","9F","9F","9F","9F"
" ","Amps","Volts","mA","KV1"
" ","Amps","Volts","mA","KV1"
"9:36",183.00,217.00,1192.00,16.80
"9:42",187.00,216.00,1197.00,16.90
"9:48",190.00,217.00,1194.00,16.80
"9:54",167.00,209.00,1102.00,16.30
"10:00",180.00,215.00,1112.00,16.80
"10:06",172.00,212.00,1084.00,16.40
"10:12",186.00,216.00,1146.00,16.80
"10:18",171.00,210.00,1069.00,16.50
"10:24",178.00,210.00,1157.00,16.50
"10:30",185.00,214.00,1172.00,16.70
"10:36",180.00,216.00,1142.00,16.70
"10:42",181.00,212.00,1192.00,16.70
"10:48",171.00,211.00,1106.00,16.30
"10:54",173.00,210.00,1129.00,16.30
"11:00",185.00,213.00,1210.00,16.70
"11:06",197.00,220.00,1293.00,16.70
"11:12",166.00,203.00,1200.00,16.00
"11:18",151.00,193.00,1136.00,15.60
"11:24",148.00,191.00,1099.00,15.20
"11:30",170.00,197.00,1200.00,15.80
"11:36",169.00,200.00,1181.00,15.50
"11:42",138.00,188.00,1141.00,15.20
"11:48",141.00,188.00,1181.00,15.10
"11:54",137.00,182.00,1202.00,15.10
"12:00",166.00,204.00,1134.00,15.50
"12:06",157.00,197.00,1237.00,15.50
"12:12",137.00,187.00,1165.00,15.00
"12:18",134.00,185.00,1145.00,15.20
"12:24",158.00,202.00,1081.00,15.50
"12:30",162.00,202.00,1135.00,15.70
"12:36",154.00,194.00,1121.00,15.60
"12:42",157.00,202.00,1040.00,15.90
"12:48",160.00,206.00,1069.00,15.90
"12:54",136.00,196.00,970.00,15.30
"13:00",153.00,200.00,1070.00,15.70
"13:06",156.00,203.00,1017.00,15.80
"13:12",164.00,205.00,1089.00,16.00
"13:18",142.00,196.00,1034.00,15.40
"13:24",156.00,198.00,1124.00,15.60
"13:30",126.00,182.00,1117.00,14.70
"13:36",143.00,189.00,1156.00,15.00
"13:42",149.00,192.00,1180.00,14.90
"13:48",149.00,189.00,1190.00,15.20
"13:54",145.00,189.00,1193.00,15.20

				Temp
"14:00"	132.00	184.00	1211.00	15.10
"14:06"	144.00	186.00	1270.00	15.20
"14:12"	159.00	194.00	1292.00	15.50
"14:18"	169.00	199.00	1285.00	15.70
"14:24"	190.00	207.00	1357.00	15.90
"14:30"	167.00	194.00	1322.00	15.70
"14:36"	170.00	196.00	1269.00	15.60
"14:42"	151.00	192.00	1280.00	15.40
"14:48"	166.00	200.00	1274.00	15.60
"14:54"	199.00	216.00	1414.00	16.30
"15:00"	178.00	207.00	1332.00	15.80
"15:06"	168.00	203.00	1245.00	15.80
"15:12"	187.00	207.00	1311.00	16.00
"15:18"	166.00	208.00	1113.00	16.10
"15:24"	173.00	206.00	1190.00	16.20
"15:30"	154.00	201.00	1178.00	15.80
"15:36"	182.00	208.00	1190.00	16.10
"15:42"	189.00	210.00	1316.00	16.60
"15:48"	184.00	210.00	1192.00	16.20
"15:54"	170.00	210.00	1111.00	16.10
"16:00"	161.00	202.00	1089.00	16.10
"16:06"	160.00	203.00	1129.00	16.00
"16:12"	175.00	208.00	1146.00	16.30
"16:18"	160.00	203.00	1089.00	15.90
"16:24"	145.00	195.00	1065.00	15.70
"16:30"	174.00	208.00	1184.00	16.20
"16:36"	184.00	212.00	1218.00	16.30
"16:42"	160.00	206.00	1130.00	15.90
"16:48"	155.00	202.00	1079.00	15.60
"16:54"	146.00	194.00	1130.00	15.60
"17:00"	156.00	198.00	1193.00	15.80
"17:06"	166.00	200.00	1227.00	16.00
"17:12"	137.00	186.00	1120.00	15.20
"17:18"	151.00	192.00	1159.00	15.10
"17:24"	151.00	193.00	1140.00	15.20
"17:30"	137.00	183.00	1155.00	14.90

"Daily Values 7/20/99"
" ","9A","9A","9A","9A"
" ","Amps","Volts","mA","KV1"
" ","Amps","Volts","mA","KV1"

"8:00",130.00,192.00,711.00,24.50
"8:06",122.00,188.00,644.00,24.30
"8:12",125.00,186.00,673.00,23.90
"8:18",129.00,192.00,713.00,24.20
"8:24",133.00,194.00,732.00,24.30
"8:30",121.00,188.00,639.00,24.20
"8:36",113.00,183.00,598.00,23.90
"8:42",113.00,199.00,617.00,23.80
"8:48",113.00,181.00,588.00,24.20
"8:54",124.00,190.00,671.00,23.90
"9:00",117.00,187.00,598.00,24.30
"9:06",118.00,187.00,637.00,23.50
"9:12",114.00,182.00,607.00,23.70
"9:18",128.00,194.00,680.00,24.40
"9:24",126.00,191.00,684.00,24.10
"9:30",106.00,178.00,533.00,23.60
"9:36",100.00,176.00,496.00,24.00
"9:42",120.00,189.00,628.00,24.20
"9:48",117.00,184.00,611.00,24.30
"9:54",113.00,182.00,592.00,23.80
"10:00",118.00,183.00,641.00,24.50
"10:06",89.00,165.00,431.00,23.40
"10:12",112.00,182.00,597.00,24.50
"10:18",116.00,184.00,598.00,24.60
"10:24",137.00,202.00,738.00,25.20
"10:30",106.00,178.00,542.00,24.10
"10:36",122.00,190.00,627.00,25.10
"10:42",121.00,191.00,657.00,24.90
"10:48",117.00,184.00,620.00,24.20

"Daily Values 7/20/99"

" "	"9B"	"9B"	"9B"	"9B"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"8:00"	245.00	315.00	1740.00	34.50
"8:06"	249.00	316.00	1786.00	34.70
"8:12"	250.00	317.00	1798.00	34.80
"8:18"	250.00	318.00	1800.00	34.90
"8:24"	249.00	318.00	1799.00	34.90
"8:30"	244.00	318.00	1733.00	34.80
"8:36"	247.00	318.00	1758.00	35.00
"8:42"	247.00	319.00	1766.00	35.10
"8:48"	247.00	319.00	1771.00	34.90
"8:54"	250.00	319.00	1800.00	35.10
"9:00"	248.00	320.00	1779.00	35.20
"9:06"	249.00	320.00	1783.00	35.20
"9:12"	245.00	319.00	1752.00	35.20
"9:18"	250.00	321.00	1796.00	35.40
"9:24"	243.00	321.00	1750.00	35.40
"9:30"	240.00	325.00	1701.00	35.90
"9:36"	244.00	327.00	1740.00	36.10
"9:42"	242.00	326.00	1708.00	36.00
"9:48"	245.00	327.00	1754.00	36.10
"9:54"	248.00	329.00	1770.00	36.20
"10:00"	247.00	328.00	1748.00	36.00
"10:06"	231.00	326.00	1624.00	35.90
"10:12"	248.00	330.00	1771.00	36.40
"10:18"	238.00	325.00	1700.00	35.80
"10:24"	247.00	328.00	1709.00	36.20
"10:30"	235.00	325.00	1688.00	35.90
"10:36"	240.00	327.00	1688.00	36.10
"10:42"	243.00	327.00	1742.00	36.20
"10:48"	247.00	332.00	1778.00	36.50

"Daily Values 7/20/99"

" "	"9C"	"9C"	"9C"	"9C"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"8:00"	244.00	284.00	1792.00	30.10
"8:06"	246.00	285.00	1802.00	30.20
"8:12"	245.00	285.00	1807.00	30.30
"8:18"	246.00	287.00	1798.00	30.40
"8:24"	245.00	286.00	1802.00	30.40
"8:30"	243.00	284.00	1771.00	30.30
"8:36"	246.00	287.00	1797.00	30.40
"8:42"	246.00	287.00	1799.00	30.60
"8:48"	245.00	287.00	1800.00	30.50
"8:54"	246.00	287.00	1803.00	30.50
"9:00"	247.00	287.00	1805.00	30.50
"9:06"	243.00	285.00	1802.00	30.50
"9:12"	245.00	287.00	1804.00	30.60
"9:18"	245.00	288.00	1804.00	30.80
"9:24"	244.00	290.00	1790.00	30.90
"9:30"	240.00	293.00	1734.00	31.30
"9:36"	241.00	295.00	1740.00	31.60
"9:42"	242.00	295.00	1762.00	31.50
"9:48"	239.00	294.00	1742.00	31.50
"9:54"	246.00	296.00	1802.00	31.60
"10:00"	246.00	296.00	1823.00	31.50
"10:06"	231.00	293.00	1660.00	31.30
"10:12"	237.00	294.00	1752.00	31.50
"10:18"	231.00	290.00	1654.00	31.20
"10:24"	241.00	294.00	1758.00	31.70
"10:30"	241.00	296.00	1739.00	31.70
"10:36"	237.00	294.00	1734.00	31.70
"10:42"	242.00	296.00	1762.00	31.70
"10:48"	245.00	299.00	1799.00	32.00

"Daily Values 7/20/99"

" "	"9D"	"9D"	"9D"	"9D"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"8:00"	243.00	244.00	1640.00	18.40
"8:06"	242.00	241.00	1654.00	18.30
"8:12"	248.00	244.00	1694.00	18.50
"8:18"	248.00	245.00	1695.00	18.50
"8:24"	248.00	245.00	1695.00	18.60
"8:30"	245.00	245.00	1670.00	18.60
"8:36"	245.00	245.00	1666.00	18.50
"8:42"	247.00	246.00	1664.00	18.60
"8:48"	246.00	245.00	1666.00	18.60
"8:54"	248.00	246.00	1695.00	18.70
"9:00"	248.00	247.00	1695.00	18.70
"9:06"	248.00	246.00	1694.00	18.70
"9:12"	248.00	246.00	1686.00	18.70
"9:18"	248.00	247.00	1694.00	18.80
"9:24"	246.00	249.00	1669.00	19.00
"9:30"	242.00	252.00	1585.00	19.20
"9:36"	244.00	254.00	1631.00	19.40
"9:42"	244.00	255.00	1625.00	19.50
"9:48"	241.00	254.00	1625.00	19.40
"9:54"	239.00	250.00	1656.00	19.30
"10:00"	247.00	256.00	1664.00	19.50
"10:06"	229.00	251.00	1495.00	19.10
"10:12"	241.00	256.00	1601.00	19.50
"10:18"	236.00	252.00	1587.00	19.30
"10:24"	238.00	256.00	1588.00	19.60
"10:30"	242.00	254.00	1630.00	19.60
"10:36"	243.00	257.00	1620.00	19.60
"10:42"	243.00	257.00	1616.00	19.60
"10:48"	245.00	258.00	1662.00	19.70

"Daily Values 7/20/99"

" "	"9E"	"9E"	"9E"	"9E"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"8:00"	202.00	221.00	1395.00	19.70
"8:06"	201.00	224.00	1350.00	19.30
"8:12"	220.00	229.00	1497.00	20.20
"8:18"	214.00	222.00	1487.00	20.00
"8:24"	216.00	225.00	1484.00	20.10
"8:30"	231.00	231.00	1544.00	20.40
"8:36"	210.00	227.00	1400.00	20.10
"8:42"	225.00	232.00	1504.00	20.40
"8:48"	236.00	235.00	1554.00	20.60
"8:54"	240.00	236.00	1557.00	20.80
"9:00"	226.00	233.00	1522.00	20.60
"9:06"	242.00	238.00	1582.00	20.90
"9:12"	241.00	237.00	1585.00	20.90
"9:18"	217.00	232.00	1442.00	20.40
"9:24"	239.00	239.00	1548.00	21.30
"9:30"	207.00	231.00	1334.00	20.70
"9:36"	208.00	233.00	1307.00	20.80
"9:42"	218.00	237.00	1373.00	21.00
"9:48"	224.00	238.00	1429.00	21.20
"9:54"	227.00	241.00	1466.00	21.10
"10:00"	231.00	238.00	1489.00	21.10
"10:06"	213.00	234.00	1333.00	21.00
"10:12"	216.00	236.00	1375.00	20.90
"10:18"	227.00	238.00	1448.00	21.10
"10:24"	222.00	239.00	1416.00	21.30
"10:30"	218.00	237.00	1359.00	21.00
"10:36"	225.00	235.00	1473.00	21.20
"10:42"	221.00	239.00	1419.00	21.10
"10:48"	230.00	242.00	1496.00	21.40

"Daily Values 7/20/99"

" "	"9F"	"9F"	"9F"	"9F"
" "	"Amps"	"Volts"	"mA"	"KV1"
" "	"Amps"	"Volts"	"mA"	"KV1"
"8:00"	153.00	197.00	1026.00	15.30
"8:06"	133.00	187.00	1021.00	15.00
"8:12"	140.00	190.00	1063.00	15.20
"8:18"	152.00	193.00	1070.00	15.50
"8:24"	152.00	199.00	1081.00	15.40
"8:30"	138.00	190.00	1005.00	15.10
"8:36"	153.00	196.00	1057.00	15.60
"8:42"	152.00	199.00	1072.00	15.60
"8:48"	145.00	192.00	1078.00	15.50
"8:54"	163.00	202.00	1100.00	15.80
"9:00"	175.00	209.00	1144.00	16.00
"9:06"	164.00	207.00	1085.00	15.80
"9:12"	159.00	201.00	1127.00	15.70
"9:18"	169.00	208.00	1122.00	16.00
"9:24"	186.00	213.00	1203.00	16.50
"9:30"	167.00	210.00	1038.00	16.30
"9:36"	167.00	211.00	1009.00	16.50
"9:42"	168.00	212.00	1012.00	16.50
"9:48"	175.00	212.00	1139.00	16.50
"9:54"	194.00	218.00	1163.00	16.90
"10:00"	166.00	206.00	1100.00	16.20
"10:06"	175.00	213.00	1051.00	16.70
"10:12"	167.00	208.00	1080.00	16.50
"10:18"	176.00	213.00	1075.00	16.60
"10:24"	181.00	216.00	1123.00	16.80
"10:30"	179.00	211.00	1095.00	16.70
"10:36"	170.00	210.00	1077.00	16.40
"10:42"	173.00	210.00	1084.00	16.50
"10:48"	175.00	212.00	1120.00	16.60

APPENDIX C
RAW TEST DATA

Sample and Velocity Traverse Point Data Sheet - Method 1

Client: US DOE
Loaction/Plant: Presque Isle
Source: #5 Inlet

Operator: Briggs/Fowler
Date: 7-12-95
W.O. Number: 20009-011-006

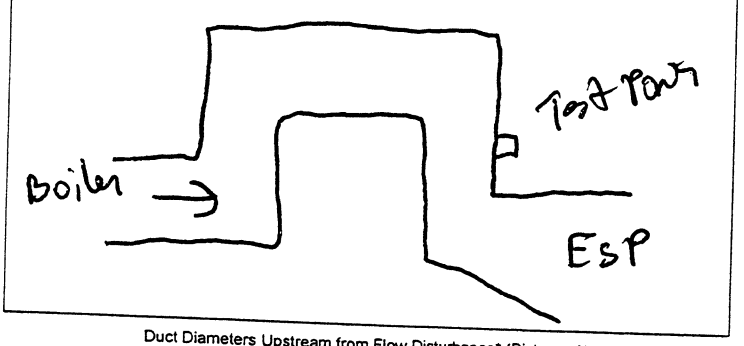
Duct Type	☐ Circular	☒ Rectangular Duct	Indicate appropriate type
Traverse Type	☒ Particulate Traverse	☐ Velocity Traverse	

Distance from far wall to outside of port (in.) = C	95.75
Port Depth (in.) = D	14
Depth of Duct, diameter (in.) = C-D	* 83.75 ~~81.75~~ 102
Area of Duct (ft^2)	149.5 ~~127.9~~
Total Traverse Points	12
Total Traverse Points per Port	6

Rectangular Ducts Only	
Width of Duct, rectangular duct only (in.)	257.0
Total Ports (rectangular duct only)	2 of 4

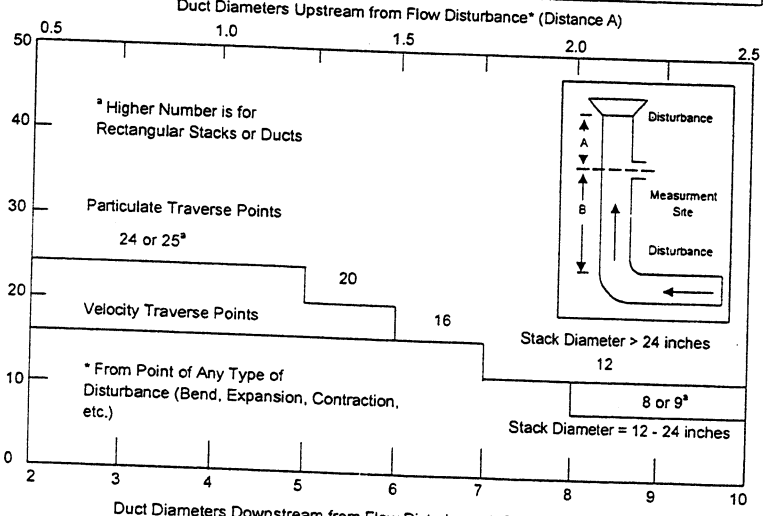
Flow Disturbances	
Upstream - A (ft)	5'
Downstream - B (ft)	5'
Upstream - A (duct diameters)	<0.5
Downstream - B (duct diameters)	<0.5

Diagram of Stack



Traverse Point Locations

Traverse Point	% of Duct	Distance from Inside Duct Wall (in)	Distance from Outside of Port (in)
1	.083	6.8	20.8
2	.250	20.4	34.4
3	.417	34.1 ~~38.5~~	~~52.5~~ 48.1
4	.583	47.7	61.7
5	.750	61.3	75.3
6	.917	75	89.0
7			
8			
9			
10	* 2" of 14" port		
11	extends into duct		
12			



Equivalent Diameter = (2*L*W)/(L+W)

Traverse Point Location Percent of Stack -Circular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		14.6		6.7		4.4		3.2		2.6		2.1
2		85.4		25		14.6		10.5		8.2		6.7
3				75		29.6		19.4		14.6		11.8
4				93.3		70.4		32.3		22.6		17.7
5						85.4		67.7		34.2		25
6						95.6		80.6		65.8		35.6
7								89.5		77.4		64.4
8								96.8		85.4		75
9										91.8		82.3
10										97.4		88.2
11												93.3
12												97.9

Traverse Point Location Percent of Stack -Rectangular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2		75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3			83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4				87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5					90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6						91.7	78.6	68.8	61.1	55.0	50.0	45.8
7							92.9	81.3	72.2	65.0	59.1	54.2
8								93.8	83.3	75.0	68.2	62.5
9									94.4	85.0	77.3	70.8
10										95.0	86.4	79.2
11											95.5	87.5
12												95.8

Rectangular Stack Points & Matrix
9 - 3 x 3
12 - 4 x 3
16 - 4 x 4
20 - 5 x 4
25 - 5 x 5
30 - 6 x 5
36 - 6 x 6
42 - 7 x 6
49 - 7 x 7

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Method1.xls

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Determination of Stack Gas Velocity - Method 2

Client DOE
Location/Plant Marquette Mi
Source Unit 5 Inlet

Operator [illegible]
Date 7-13-99
W.O. Number 20009-011-006

Pitot Coeff (Cp) 0.84
Stack Area, ft² (As) 127.8
Pitot Tube/Thermo ID P142

Run Number	1		
Time	0752		
Barometric Press, in Hg (Pb)	29.62		
Static Press, in H_2O (Pstatic)	-9.0		
Source Moisture, % (BWS)	12		
O_2, %	10		
CO_2, %	10		

Cyclonic Flow Determination		Traverse Location		Leak Check good ? Y / N		Leak Check good ? Y / N		Leak Check good ? Y / N	
Delta P at 0°	Angle yeilding zero Delta P	Port	Point	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)
0	0	1	1	0.18	356				
.05	5		2	0.50	360				
0.08	5		3	0.54	365				
.05	5		4	0.57	362				
.09	10		5	0.54	359				
.05	5		6	0.51	350				
.06	5	2	1	0.10					
.08	10		2	0.45	331				
.09	10		3	0.55	330				
.09	10		4	0.58	326				
.04	5		5	0.54	322				
.03	5		6	0.51	322				
Avg Angle		Avg Delta P & Temp		0.46417	346.1				
		avg √DeltaP		0.66745					
Average gas stream velocity, ft/sec.									
Vol. flow rate @ actual conditions, wacf/min									
Vol. flow rate at standard conditions, dscf/min									

$$MWd = (0.32 * O_2) + (0.44 * CO_2) + (0.28 * (100 - (CO_2 + O_2)))$$

$$MWs = (MWd * (1 - (BWS/100))) + (18 * (BWS/100))$$

$$Tsa = Ts + 460$$

$$Ps = Pb + (Pstatic/13.6)$$

$$Vs = 85.49 * Cp * avg\sqrt{DeltaP} * \sqrt{Tsa/(Ps * MWs)}$$

$$Qs(act) = 60 * Vs * As$$

$$Qs(std) = 17.64 * (1 - (BWS/100)) * (Ps/Tsa) * Qs(act)$$

Comments _____

where:
MWd = Dry molecular weight source gas, lb/lb-mole.
MWs = Wet molecular weight source gas, lb/lb-mole.
Tsa = Source Temperature, absolute(oR)
Ps = Absolute stack static pressure, inches Hg.
Vs = Average gas stream velocity, ft/sec.
Qs(act) = Volumetric flow rate of wet stack gas at actual,
Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min

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Determination of Moisture Content in Stack Gases - Method 4

Client: DOE
Location/Plant: Marquette, Mi.
Source: #5 Inlet
W.O. Number: 20009-011-006
Operator: ADR
Meter Box ID: 12
Temperature °C or °F: 116
Date: 7-12-99
Meter Box Y: 1.009
Sample Volume, ft³ or L: 16.694

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
1										Initial OK
	End Test	1720	969.449	123	NA	1.00	230	313	@3'	Final 0.008
Baro Press., Pb (in Hg)	Start Test	1650	952.755	116	NA	1.00	200	300	Moisture Volume, Vw(std)	Percent Moisture (%), BWS
29.50	Avg. or Total	30	16.694	119.5		1.00	30	13	11.9	17.9%

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
										Initial
	End Test									Final
Baro Press., Pb (in Hg)	Start Test								Moisture Volume, Vw(std)	Percent Moisture (%), BWS
	Avg. or Total									

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
										Initial
	End Test									Final
Baro Press., Pb (in Hg)	Start Test								Moisture Volume, Vw(std)	Percent Moisture (%), BWS
	Avg. or Total									

$$Vm(std) = \frac{17.64 * Y * Vm * (Pb + (deltaH / 13.6))}{(Tm + 460)}$$

if Tm is C° than $Tm = (Tmc * 1.8) + 32$

if Vm is liters than $Vm = Vml * 28.32$

$$Vw(std) = (0.04707 * Vwc) + (0.04715 * Wwsg)$$

$$BWS = \left(\frac{Vw(std)}{Vw(std) + Vm(std)}\right) * 100$$

WHERE:
Vm(std)= Sample volume corrected to standard temp and pressure, scf or L
Vm= Actual sample volume, calculated, scf
Vml= Actual sample volume, calculated, Liters
Y= Dry gas meter calibration factor.
Pb= Barometric pressure, in. Hg
delta H= Meter pressure, in H2O
Tm= Average temperature of meter (DGM is used) or rotomter, degrees °I
Tmc= Average temperature of meter (DGM is used) or rotomter, degrees °I
Vw(std)= Volume of water vapor at standard conditions, scf or L
Vwc= Volume of water condensed, mL
Wwsg= Weight of Silica Gel, g
Bws= Water vapor in gas stream, percer

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Use either ft³ or liters in calculations. DO NOT MIX CUBIC FEET AND LITERS IN ANY CALCULATION.

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	IN
Run No.ID	1
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Inlet
Sample Date	13 Jul 99
Baro. Press (in Hg)	29.60
Operator	TB

Stack Conditions

	Assumed	Actual
% Moisture	12	
Impinger Vol (ml)		125.19
Silica gel (g)		12.8
CO2, % by Vol	12	13.0
O2, % by Vol	10	5.5
Temperature (°F)	346	
Meter Temp (°F)	115	
Static Press (in H_2O)	-9.0	-9.0
Ambient Temp (°F)	101	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.9055
Probe ID / Length	P300 8'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	BORO
Avg Nozzle Dia (in)	.245
Area of Stack (ft^2)	12.78
Sample Time	120
Total Traverse Pts	12

K Factor 2.34

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.012	0.005	0.012
Leak Check @ (in Hg)	15	8	8
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	100	101
Reference Temp	99	100
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	0905			974.637									
1	5		0.16	0.42	976.9	329	109	108	241	247	67	2.5		
	10		0.18	0.42	978.8	330	111	109	254	250	66	2.5		
2	15		0.40	0.94	981.5	332	112	109	259	251	65	3.5		
	20		0.40	0.94	984.2	336	113	109	253	254	60	3.5		
3	25		0.50	1.17	987.1	323	114	109	255	253	59	4		
	30		0.48	1.12	990.0	323	115	110	260	252	59	4		
4	35		0.53	1.24	993.1	318	116	110	257	255	60	4.5		
	40		0.51	1.19	996.1	319	116	110	255	253	60	5		
5	45		0.48	1.12	999.0	317	115	110	256	254	61	5		
	50		0.48	1.12	1002.0	314	115	110	256	251	61	5		
6	55		0.43	1.01	1004.7	314	115	111	253	253	62	5.5		
	60	1005	0.43	1.01	1007.590	310	115	111	255	254	61	5.5		
					32.953									
									125.19		H_2O			
									12.8		5.6			
									141.55					
									15.1					
													62.21	ft^3
													1.74	m^3
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

Ontario Hydro Method

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Inlet
Operator: TB
Run No.: 1
Date: 7-13-99
K Factor: 2.34

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1035			1007.983									
1	5		0.22	0.51	1010.0	354	113	112	243	241	66	2.5		
	10		0.25	0.59	1012.1	355	114	112	243	243	64	3		
2	15		0.49	1.15	1015.1	356	115	112	248	244	64	4		
	20		0.49	1.15	1018.0	361	117	113	249	256	59	4		
3	25		0.55	1.29	1021.0	360	117	112	253	252	57	4.5		
	30		0.52	1.22	1024.1	359	119	113	254	253	57	4.5		
4	35		0.54	1.26	1027.2	355	118	112	250	251	57	5		
	40		0.54	1.26	1030.2	355	119	113	247	252	58	5		
5	45		0.52	1.22	1033.2	351	120	113	253	250	59	5		
	50		0.52	1.22	1036.3	354	119	113	257	253	59	5		
6	55		0.54	1.26	1039.3	348	119	113	251	250	59	5		
	60	1135	0.52	1.22	1042.518	339	119	114	247	252	61	5		
					34.535									
											~~98.9~~			

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
~~.66051~~	1.04375	67.488	338.1	113.4	241/260	241/256	67	5.5	

Avg Sqrt Del H
1.01061

Comments:

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.65750 2.a
0.66051

Fd2

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	IN
Run No.ID	2
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Inlet
Sample Date	7-13-99
Baro. Press (in Hg)	29.62
Operator	TB

Stack Conditions

	Assumed	Actual
% Moisture	12	
Impinger Vol (ml)		126
Silica gel (g)		13.30
CO2, % by Vol	15	13.5
O2, % by Vol	5	5.0
Temperature (°F)	345	
Meter Temp (°F)	115	
Static Press (in H_2O)	-9.0	-9.0
Ambient Temp (°F)	110°	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.9055
Probe ID / Length	P300 8'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	BORO
Avg Nozzle Dia (in)	.245
Area of Stack (ft^2)	127.8
Sample Time	120
Total Traverse Pts	12

K Factor 2.34

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.009	0.011	0.07
Leak Check @ (in Hg)	11"	8	10"
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	102	101
Reference Temp	100	100
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1342			43.583									
1	5		0.35	0.82	45.8	352	117	115	247	252	68	2.5		
	10		0.33	0.82	48.4	358	118	115	243	253	66	2.5		
2	15		0.47	1.10	51.2	362	119	115	245	247	63	3.5		
	20		0.47	1.10	54.1	363	120	116	248	254	61	3		
3	25		0.62	1.45	57.3	362	121	116	255	250	60	3.5		
	30		0.60	1.40	60.6	362	122	117	258	256	61	3.5		
4	35		0.56	1.31	63.7	351	123	117	251	244	61	3.5		
	40		0.56	1.31	66.9	356	124	118	254	254	61	4		
5	45		0.53	1.24	70.0	353	124	117	247	253	62	4		
	50		0.53	1.24	73.1	355	123	117	250	251	62	4		
6	55		0.53	1.24	76.2	355	123	117	245	254	63	4		
	60	1442	0.53	1.24	79.229	350	124	118	250	252	63	4		
					35.646					Iso = 77.6				
											9.4 % M			
											212000		DSCF	
											63.514		ft^3	

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
0.68437	1.11458	69.628	342.1	119.5	241 / 259	244/256	68	4	

Avg Sqrt Del H: 1.04699

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Inlet
Operator: TB
Run No.: 2
Date: 7-13-99
K Factor: 2.34

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1500			79.473									
1	5		0.20	0.47	81.4	330	117	116	243	251	66	2.5		
	10		0.18	0.42	83.3	336	119	117	247	251	63	2.5		
2	15		0.43	1.01	86.8	341	119	117	251	251	63	3		
	20		0.43	1.01	89.0	343	121	118	247	253	60	3		
3	25		0.54	1.26	92.3	337	122	118	252	254	60	3.5		
	30		0.53	1.24	95.3	332	123	118	256	254	60	3.5		
4	35		0.54	1.26	98.4	324	124	118	257	254	60	4		
	40		0.53	1.24	101.4	324	124	118	259	254	61	4		
5	45		0.52	1.22	104.5	318	124	118	253	248	61	4		
	50		0.52	1.22	107.6	319	123	118	251	253	62	4		
6	55		0.44	1.03	110.5	316	124	118	252	253	64	4		
	60	1600	0.47	1.10	113.455	315	124	119	247	254	64	4		
					33.982									
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	IN
Run No.ID	3
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Inlet
Sample Date	7-14-99
Baro. Press (in Hg)	29.58
Operator	TB

Stack Conditions

	Assumed	Actual
% Moisture	10	
Impinger Vol (ml)		138.5
Silica gel (g)		14.1
CO2, % by Vol	15	13.4
O2, % by Vol	5	4.8
Temperature (°F)	345	
Meter Temp (°F)	115	
Static Press (in H_2O)	-9	-9
Ambient Temp (°F)	110	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.9055
Probe ID / Length	P 300 / 8'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.253
Area of Stack (ft^2)	127.8
Sample Time	120
Total Traverse Pts	12

K Factor 2.76

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.008	0.008	0.004
Leak Check @ (in Hg)	1	8	1
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	102	100
Reference Temp	100	99
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT No.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	0815			114.027									
1	5		0.17	0.47	116.0	328	110	107	244	254	67	2		
	10		0.15	0.41	117.9	336	110	107	248	258	66	2		
2	15		0.42	1.16	120.8	341	111	107	245	258	63	2.5		
	20		0.42	1.16	123.8	343	113	108	246	255	58	2.5		
3	25		0.51	1.49	127.1	340	114	108	249	253	57	3		
	30		0.51	1.41	130.4	335	115	109	246	255	57	3.5		
4	35		0.56	1.55	133.8	329	116	109	254	254	56	3.5		
	40		0.56	1.55	137.2	327	117	110	257	256	57	3.5		
5	45		0.53	1.46	140.5	325	118	111	252	254	58	4		
	50		0.53	1.46	143.9	323	118	111	254	254	58	4		
6	55		0.48	1.32	147.1	322	118	111	249	254	59	4		
	60	0915	0.48	1.32	150.300	321	118	111	250	252	59	4		
			Avg Sqrt Delta P	Avg Delta H	Total Volume 36.273	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

100.6 Iso

9.4 % M

209600 SCFM

69.15 ft3

Avg Sqrt Del H

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Inlet
Operator: TB
Run No.: 3
Date: 7-14-99
K Factor: 2.76

Post mid pt LC = .01 at 15" Hg

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	0940			150.990									
1	5		0.31	0.86	153.6	362	113	111	247	251	66	2.5		Changed
	10		0.30	0.83	156.2	364	114	111	251	253	62	2.5		Thimble
2	15		0.47	1.30	159.3	364	116	111	250	251	61	3		cut mid pt.
	20		0.44	1.21	162.4	367	117	111	249	253	61	3		
3	25		0.59	1.63	165.8	367	117	112	250	254	60	4		
	30		0.53	1.46	169.1	368	119	113	252	255	60	4		
4	35		0.59	1.63	172.6	362	120	113	253	254	61	4.5		
	40		0.59	1.63	176.1	362	121	113	254	256	61	5		
5	45		0.56	1.55	179.5	357	121	113	254	255	62	5		
	50		0.54	1.49	183.0	360	121	113	254	255	63	6		
6	55		0.56	1.55	186.5	359	121	114	253	255	63	6.5		
	60	1040	0.53	1.46	189.815	350	121	114	255	256	64	7		
					38.825									
	120													

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
.679485	1.303	75.098	346.3	113.65	247/255	251/258	67	7	

Avg Sqrt Del H: 1.12897

Comments:

WESTON MANAGERS DESIGNERS/CONSULTANTS

Source Gas Analysis Data Sheet - Method 3

Client DOE - WP

Analyst KK

Location/Plant MARQUETTE

Date 7/13/99

Source # 5 INLET

Analytical Method (circle one) EPA 3 using 3A analyzers

W.O. Number 20009-011-006

Run Number 1

* Cal ~~Leak~~ Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.0		5.5	
2		13.0		5.5	
3		13.1		5.5	
	Average	13.0 ✓		5.5	✓

Run Number 2

Cal ~~Leak~~ Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.5		5.0	
2		13.5		5.0	
3		13.6		4.9	
	Average	13.5 ✓		5.0	✓

Run Number 3

Leak Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.4		4.9	
2		13.4		4.9	
3		13.4		4.9	
	Average	13.4 ✓		4.9	✓

Acceptable differences for repeat analysis:

if CO_2 > 4% than +/- 0.3%

if CO_2 < or = 4% than +/- 0.2%

if O_2 > or = 15% than +/- 0.2%

if O_2 < 15% than +/- 0.3%

Ambient Check

Oxygen ✓ (20.9)

Carbon Dioxide ✓ (0.0)

Report all values to the nearest 0.1 percent

Comments * Cal w/ ø N2, 9.91% CO2, 12.63% O2

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Method3

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Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/13/99
Run In-1 US
Fund # _____
Cost Center # _____
12:00

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	726.73	826.9	100.17
BUBBLER	KCl	703.10	718.39	15.29
IMPINGER	KCl	728.99	733.81	4.82
BUBBLER	H_2O_2/HNO_3	729.87	732.82	2.95
BUBBLER	$KMnO_4/H_2SO_4$	697.59	698.27	0.68
BUBBLER	$KMnO_4/H_2SO_4$	711.10	711.46	0.36
IMPINGER	$KMnO_4/H_2SO_4$	641.96	642.88	0.92
BUBBLER	SILICA GEL	814.9	827.7	12.8
			Total H_2O (g)	125.19
FILTER			~~Sil~~ = Si	12.8
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/13/99
Run Jn-2 U5
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	756.94	848.5	91.56
BUBBLER	KCl	728.11	748.2	20.09
IMPINGER	KCl	739.21	748.3	9.09
BUBBLER	H_2O_2/HNO_3	775.00	780.3	5.3
BUBBLER	$KMnO_4/H_2SO_4$	631.99	632.2	0.21
BUBBLER	$KMnO_4/H_2SO_4$	750.36	750.4	0.04
IMPINGER	$KMnO_4/H_2SO_4$	618.19	617.9	-.29
BUBBLER	SILICA GEL	814.7	828.0	13.30
			Total H_2O (g)	126
FILTER			Sil gel	13.3
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. Unit 5 Inlet

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/14/99 Unit 5
Run In-#3
Fund #
Cost Center #

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	709.3	809.0	99.7
BUBBLER	KCl	704.4	729.8	25.4
IMPINGER	KCl	607.6	614.8	7.2
BUBBLER	H_2O_2/HNO_3	717.3	722.0	4.7
BUBBLER	$KMnO_4/H_2SO_4$	716.9	717.4	0.5
BUBBLER	$KMnO_4/H_2SO_4$	637.2	638.0	0.8
IMPINGER	$KMnO_4/H_2SO_4$	715.6	715.8	0.2
BUBBLER	SILICA GEL	945.9	960.0	14.1
			Total H_2O (g)	~~152.6~~ 138.5
FILTER			Sigd	14.1
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std$ / ($Q_n std$ * Time) _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL - Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample and Velocity Traverse Point Data Sheet - Method 1

Client: US DOE
Loaction/Plant: Presque Isle
Source: #5 Outlet

Operator: Hill
Date: 7-12-99
W.O. Number: 20009-011-006

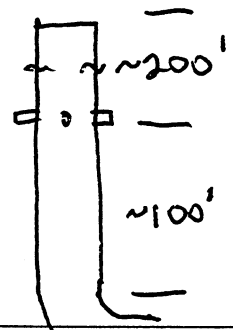
Duct Type	☒ Circular	☐ Rectangular Duct	Indicate appropriate type
Traverse Type	☒ Particulate Traverse	☐ Velocity Traverse	

Distance from far wall to outside of port (in.) = C	115"
Port Depth (in.) = D	7"
Depth of Duct, diameter (in.) = C-D	108"
Area of Duct (ft^2)	63.617
Total Traverse Points	12
Total Traverse Points per Port	3

Rectangular Ducts Only	
Width of Duct, rectangular duct only (in.)	—
Total Ports (rectangular duct only)	—

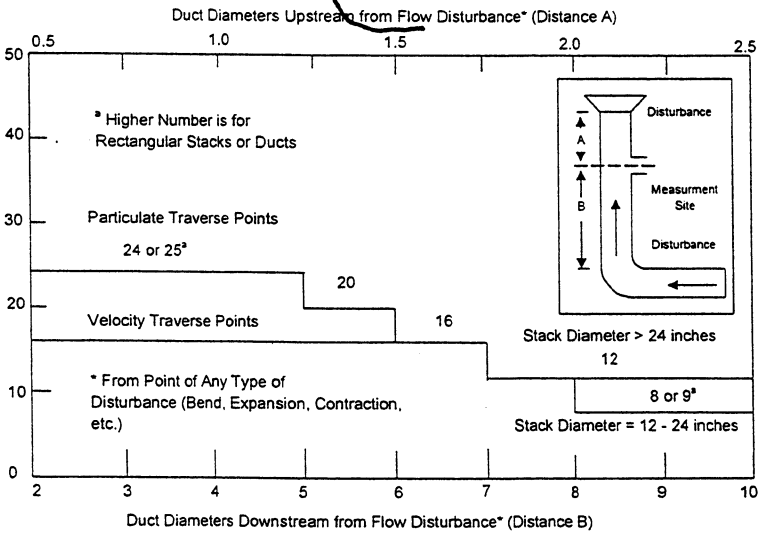
Flow Disturbances	
Upstream - A (ft)	200'
Downstream - B (ft)	100'
Upstream - A (duct diameters)	22
Downstream - B (duct diameters)	11

Diagram of Stack



Traverse Point Locations

Traverse Point	% of Duct	Distance from Inside Duct Wall (in)	Distance from Outside of Port (in)
1	.074	4.752	11 3/4
2	.146	15.768	22 3/4
3	.296	31.968	39
4			
5			
6			
7			
8			
9			
10			
11			
12			



Equivalent Diameter = (2*L*W)/(L+W)

Traverse Point Location Percent of Stack -Circular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		14.6		6.7		4.4		3.2		2.6		2.1
2		85.4		25		14.6		10.5		8.2		6.7
3				75		29.6		19.4		14.6		11.8
4				93.3		70.4		32.3		22.6		17.7
5						85.4		67.7		34.2		25
6						95.6		80.6		65.8		35.6
7								89.5		77.4		64.4
8								96.8		85.4		75
9										91.8		82.3
10										97.4		88.2
11												93.3
12												97.9

Traverse Point Location Percent of Stack -Rectangular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2		75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3			83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4				87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5					90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6						91.7	78.6	68.8	61.1	55.0	50.0	45.8
7							92.9	81.3	72.2	65.0	59.1	54.2
8								93.8	83.3	75.0	68.2	62.5
9									94.4	85.0	77.3	70.8
10										95.0	86.4	79.2
11											95.5	87.5
12												95.8

Rectangular Stack Points & Matrix
9 - 3 x 3
12 - 4 x 3
16 - 4 x 4
20 - 5 x 4
25 - 5 x 5
30 - 6 x 5
36 - 6 x 6
42 - 7 x 6
49 - 7 x 7

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Determination of Stack Gas Velocity - Method 2

Client: DOE / WP
Location/Plant: MARQUETTE
Source: #5 STACK
Operator: KH JC
Date: 7/12/99
W.O. Number:
Pitot Coeff (Cp): .84
Stack Area, ft² (As): 63.617
Pitot Tube/Thermo ID: P200

Run Number	PRE	PRE (2)
Time	1620	0810
Barometric Press, in Hg (Pb)		
Static Press, in H_20 (Pstatic)	-1.1	-1.5
Source Moisture, % (BWS)		
O_2, %		
CO_2, %		

Cyclonic Flow Determination		Traverse Location		Leak Check good ? Y / N		Leak Check good ? Y / N		Leak Check good ? Y / N	
Delta P at 0°	Angle yeilding zero Delta P	Port	Point	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)
0	—	A B	1	.66	297	A 1.6	328		
-.05	<5		2	.61	297	1.5	328		
-.10	10		3	.51	297	1.2	328		
0	—	B C	1	.73	298	B 1.6	328		
-.10	8		2	.61	297	1.5	328		
-.10	5		3	.52	297	1.2	328		
-.05	5	C D	1	.59	296	C 1.5	328		
0	—		2	.54	296	1.3	328		
-.10	10		3	.50	296	1.2	328		
-.08	5	D A	1	.45	295	D 1.5	335		
-.05	<5		2	.54	295	1.3	336		
0	—		3	.57	295	1.0	334		
Avg Angle	<5	Avg Delta P & Temp		.56917	296.3	1.36667	329.75		
		avg √DeltaP		.75290		1.16630			
		Average gas stream velocity, ft/sec.							
		Vol. flow rate @ actual conditions, wacf/min							
		Vol. flow rate at standard conditions, dscf/min							

$$MWd = (0.32 * O_2) + (0.44 * CO_2) + (0.28 * (100 - (CO_2 + O_2)))$$

$$MWs = (MWd * (1 - (BWS/100))) + (18 * (BWS/100))$$

$$Tsa = Ts + 460$$

$$Ps = Pb + (Pstatic/13.6)$$

$$Vs = 85.49 * Cp * avg\sqrt{DeltaP} * \sqrt{Tsa/(Ps * MWs)}$$

$$Qs(act) = 60 * Vs * As$$

$$Qs(std) = 17.64 * (1 - (BWS/100)) * (Ps/Tsa) * Qs(act)$$

Comments

where:
MWd = Dry molecular weight source gas, lb/lb-mole.
MWs = Wet molecular weight source gas, lb/lb-mole.
Tsa = Source Temperature, absolute(oR)
Ps = Absolute stack static pressure, inches Hg.
Vs = Average gas stream velocity, ft/sec.
Qs(act) = Volumetric flow rate of wet stack gas at actual,
Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Page 1 of 1

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	OUT
Run No.ID	1
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Outlet
Sample Date	7/13/99
Baro. Press (in Hg)	29.62
Operator	KW JP

Stack Conditions	Assumed	Actual
% Moisture	12	
Impinger Vol (ml)		141.55
Silica gel (g)		15.1
CO2, % by Vol	10	13.2
O2, % by Vol	11	5.4
Temperature (°F)	340	
Meter Temp (°F)	100	
Static Press (in H_2O)	-1.5	-1.5
Ambient Temp (°F)	~ 95	

Meter Box ID	NUTECH #14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	P301 3'
Probe Material	Boro
Pitot / Thermocouple ID	P301
Pitot Coefficient	0.84
Nozzle ID	~~KW~~ .199
Avg Nozzle Dia (in)	.199
Area of Stack (ft^2)	63.617
Sample Time	120
Total Traverse Pts	12

K Factor 1.03 1.02

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.15		.8
Leak Check @ (in Hg)	.010		.006
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	89	91
Reference Temp	90	90
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
1	0	0905			973.914									
	5		1.5	1.55	977.3	335	96	97	225	248	67	3.0		
2	10		1.5	1.55	980.6	335	98	97	228	246	59	3.0		
	15		1.3	1.34	983.9	336	102	97	228	250	53	3.0		
3	20		1.3	1.34	987.3	335	103	96	230	238	50	3.0		
	25		1.1	1.13	989.9	334	102	96	229	238	49	3.0		
	30	0935	1.1	1.13	992.685	334	92	94	228	236	49	3.0		18.771
						LC	good	@	5" Hg					
B 1	0	0946			992.758									
	5		1.6	1.65	996.2	339	92	90	225	238	65	3.0		
2	10		1.6	1.65	999.7	339	92	90	227	238	55	3.0		
	15		1.5	1.55	1003.0	338	92	89	231	231	56	3.0		
3	20		1.5	1.55	1006.3	340	91	88	229	233	57	3.0		
	25		1.3	1.34	1009.0	340	92	88	229	233	61	3.0		
	30	1016	1.3	1.34	1012.478	341	93	88	230	239	62	3.0		19.720
						LC	good	@	5" Hg				Iso	= 98.1
													% M	9.2
													SCFM	182000
													DSCF	= 72.5
			~~1.66339~~											
			~~1.35033~~	1.39333	75.495	339.5	91.2		225/252	231/250	67	3.0		
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac		Max Temp
			~~1.17393~~	~~1.42667~~	~~38.441~~	~~337~~	~~93.9~~		~~225/230~~	~~231/250~~	~~67~~	~~3.0~~		
				Avg Sqrt Del H	Comments:									
				~~1.19711~~										
				1.17821										

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Outlet
Operator: KK SP
Run No.: 1
Date: 2/13/99
K Factor: 1.02

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1036			1012.558									
C 1	5		1.5	1.53	1015.6	343	90	87	227	240	67	3.0		
2	10		1.5	1.53	1018.9	341	92	88	236	241	55	3.0		
	15		1.4	1.43	1022.1	341	92	86	237	234	57	3.0		
3	20		1.4	1.43	1025.3	341	92	86	237	231	51	3.0		
	25		1.2	1.22	1028.2	340	90	85	240	235	51	3.0		
	30	1106	1.2	1.22	1031.138	341	91	86	228	235	52	3.0		18.580
						CC good @ 5" Hg								
D 1	0	1114			1031.246									
	5		1.5	1.53	1034.5	342	86	87	252	250	65	3.0		
2	10		1.5	1.53	1037.7	343	89	86	250	251	58	3.0		
	15		1.3	1.33	1040.9	342	91	86	250	247	59	3.0		
3	20		1.3	1.33	1043.9	342	91	86	249	246	60	3.0		
	25		1.1	1.12	1046.7	343	91	86	245	248	60	3.0		
	30	1144	1.1	1.12	1049.670	344	91	87	239	245	63	3.0		18.424

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp

Avg Sqrt Del H

Comments:

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	OUT
Run No.ID	2
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Outlet
Sample Date	7/12/99
Baro. Press (in Hg)	29.62
Operator	KA JP

Stack Conditions

	Assumed	Actual
% Moisture	12/16	
Impinger Vol (ml)		147.92
Silica gel (g)		16.4
CO2, % by Vol	15	13.4
O2, % by Vol	5	5.0
Temperature (°F)	340	
Meter Temp (°F)	90	
Static Press (in H_2O)	-1.5	-1.5
Ambient Temp (°F)	~85	

Meter Box ID	Nutech #14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	P301 3'
Probe Material	Boro
Pitot / Thermocouple ID	P301
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.199
Area of Stack (ft^2)	63.617
Sample Time	120
Total Traverse Pts	12

K Factor 1.02 1.01/1.06

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	15		.004
Leak Check @ (in Hg)	.008		~~.005~~ .008
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	84	83
Reference Temp	82	81
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1335			049.846									
D	5		1.6	1.63	053.3	341	87	85	226	252	67	3.5		
2	10		1.6	1.63	056.8	341	90	86	235	254	65	3.5		
	15		1.4	1.41	059.9	341	91	86	234	254	62	3.5		
3	20		1.4	1.41	063.1	342	93	87	235	251	61	3.5		
	25		1.2	1.21	066.2	343	94	88	240	249	61	3.5		
	30	1405	1.2	1.21	069.287	342	94	87	241	247	61	~~3.5~~ 3.0		
						L.C. good JP @ 5 in Hg								
C 1	0	1415			069.367									
	5		1.6	1.64	072.0	342	91	88	226	247	66	3.5		
2	10		1.6	1.64	075.5	342	92	87	228	245	63	3.5		
	15		1.7	1.71	078.9	343	94	88	257	243	60	3.5		
3	20		1.6	1.64	082.3	343	96	89	255	243	60	3.5		
	25		1.4	1.41	085.5	343	97	90	251	241	61	3.5		new
	30	1445	1.4	1.48	088.740	343	97	90	250	245	64	3.0	←	filter
						L.C. good @ 5 in Hg JP								
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

141.55 JP
154 JP

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Outlet
Operator: JK JP
Run No.: 2
Date: 7/13/99
K Factor: 1.06

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1306			088.855									
B	5		1.8	1.90	092.6	344	93	90	257	240	66	3.5		
2	10		1.8	1.90	096.3	345	97	92	260	243	63	4.0		
	15		1.7	1.80	099.9	345	98	92	255	248	60	4.0		
3	20		1.7	1.80	103.5	344	97	91	250	245	60	4.0		
	25		1.1	1.16	106.6	344	97	91	247	240	61	4.0		
	30	1336	1.1	1.16	109.661	344	97	92	243	240	62	4.0		
						L.C	good @ 5 in Hg dP							
A 1	0	1352			109.775									
	5		1.7	1.80	113.3	344	93	90	240	240	66	4.0		
2	10		1.7	1.80	117.0	344	95	90	242	245	64	4.0		
	15		1.6	1.69	120.4	344	97	91	245	245	62	4.0		
3	20		1.6	1.69	123.9	344	96	90	245	242	60	4.0		
	25		1.1	1.16	126.7	344	98	91	240	242	63	4.0		
	30	1622	1.1	1.16	129.628	344	98	92	238	240	64	4.0		
													989	I.D
													9.2	9.0 m
													189000	DSCFM
													76.2	ft/s

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
1.21566	1.54333	79.473	343.2	92.1	226/260	240/254	67	4.0	

Avg Sqrt Del H: 1.03806

Comments:

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 5
Samp. Loc. ID	OUT
Run No.ID	3
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 5 Outlet
Sample Date	7/14/99
Baro. Press (in Hg)	29.58
Operator	~~29.58~~ JP/EH

Stack Conditions

	Assumed	Actual
% Moisture	10	
Impinger Vol (ml)		157.1
Silica gel (g)		16.9
CO2, % by Vol	14	13.2
O2, % by Vol	5.5	~~5.8~~ 5.8 JP
Temperature (°F)	340	
Meter Temp (°F)	90	
Static Press (in H_2O)	-1.5	-1.5
Ambient Temp (°F)	~~68~~ JP 76	

Meter Box ID	14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	P301 ~~3'~~ 3'
Probe Material	Boro
Pitot / Thermocouple ID	P301
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.199
Area of Stack (ft^2)	63.617
Sample Time	120
Total Traverse Pts	12

K Factor 1.06

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.005		.004
Leak Check @ (in Hg)	15		8
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	77	81
Reference Temp	76.4	80.5
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT No.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	A1 815			129.825									
A 1	5		1.97 JP	~~2.00~~ 2.01	133.5	337	85	84	235	239	61	3.5		
~~2~~ JP	10	2	1.8	1.90	137.2	337	87	84	237	243	47	3.5		
2 ~~3~~ JP	15		1.6	1.70	140.6	337	89	83	240	241	45	3.0		
	20	3	1.6	1.70	144.1	338	90	84	243	244	45	3.5		
3	25		1.4	1.48	147.3	338	91	84	245	243	45	3.5		
~~B~~ JP ~~0~~ JP	30	~~8~~45	1.4	1.48	150.551	339	91	84	241	242	45	3.5		20.726
							L.C. good @ 5 in Hg							
B B1	0	8 55	~~1.9~~ JP	~~2.01~~ JP	151.285									
B JP	JP 0 5		1.9	2.01	154.2	340	88	85	JP ~~219~~ 229	237	51	3.5		
2	10		1.9	2.01	158.3	340	90	85	230	234	48	3.5		
~~B~~ JP	15		1.8	1.90	161.7	340	93	85	235	234	47	3.5		
3	20		1.9	2.01	165.6	341	94	86	237	236	48	3.5		
~~B~~ JP	25		1.4	1.48	168.8	341	94	86	231	230	50	3.5		
	30	9.26	1.6	1.70	172.355	341	94	86	230	233	52	3.5		21.07
							L.C. good @ 5 in Hg							
													99.1	JP ~~% Iso~~
													9.3	% M
													~~198.00~~ 198	SCFM
													~~79.98~~ 79.8	ft/s
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
				Avg Sqrt Del H	Comments:									

WESTON MANAGERS DESIGNERS/CONSULTANTS

Ontario Hydro Method

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 5
Sample Loc.: Outlet
Operator: JP/KH
Run No.: 3
Date: 7/14/97
K Factor: 1.06

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	934			172.479									
C	5		1.8	1.90	176.1	342	90	86	230	240	58	3.5		
2	10		1.8	1.90	179.9	342	92	86	235	241	54	3.5		
	15		1.7	1.80	183.4	342	93	86	236	239	53	3.5		
3	20		1.7	1.80	187.0	343	94	86	238	238	54	3.5		
	25		1.5	1.59	190.3	343	94	86	235	235	55	3.5		
	30	1004	1.5	1.59	193.708	343	94	86	233	238	55	3.5		21.229
							L.L. good @ 5 in Hg							
D 1	0	1009			193.842									
	5		1.7	1.80	197.3	342	89	85	232	238	62	3.5		
2	10		1.7	1.80	200.8	342	90	86	235	241	56	3.5		
	15		1.6	1.70	204.3	343	92	86	240	243	56	3.5		
3	20		1.6	1.70	207.7	344	94	87	241	245	58	3.5		
	25		1.2	1.27	210.7	344	96	88	243	243	59	3.5		
	30	1039	1.2	1.27	213.721	343	94	87	241	242	60	3.5		19.879
													150	98.83
													M	9.29
													SCFM	198659.98
													SVO2	7998

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
~~1.27237~~	1.72042	82.904	340.91	~~82.904~~	229/245	230/245	62	3.5	
1.27542	Avg Sqrt Del H 1.30915	Comments:		88.52					

WESTON MANAGERS DESIGNERS/CONSULTANTS

Source Gas Analysis Data Sheet - Method 3

Client: DOE - WP

Analyst: KH

Location/Plant: MARQUETTE

Date: 7/13/99

Source: #5 STACK

Analytical Method (circle one): EPA 3 USING 3A ANALYZER

W.O. Number: 20009-011-006

Run Number: 1

* Cal ~~Leak~~ Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.1	—	5.4	
2		13.2	—	5.4	
3		13.2	—	5.4	
	Average	13.2		5.4	

Run Number: 2

Cal ~~Leak~~ Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.4		5.0	
2		13.4		5.0	
3		13.4		5.1	
	Average	13.4		5.0	

Run Number: 3

Leak Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 (A)	Percent Total (B)	Percent O_2 (B - A)	Percent N_2 (100 - B)
1		13.2		5.2	
2		13.2		5.2	
3		13.2		5.2	
	Average	13.2		5.2	

Acceptable differences for repeat analysis:

if CO_2 > 4% than +/- 0.3%

if CO_2 < or = 4% than +/- 0.2%

if O_2 > or = 15% than +/- 0.2%

if O_2 < 15% than +/- 0.3%

Ambient Check

Oxygen: ✓ (20.9)

Carbon Dioxide: ✓ (0.0)

Report all values to the nearest 0.1 percent

Comments: * Cal w/ Ø N_2, 9.91% CO_2, 12.63% O_2

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Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/13/99
Run OUT-1 US
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	737.53	851.7	114.17
BUBBLER	KCl	696.76	716.69	19.93
IMPINGER	KCl	705.72	707.91	2.19
BUBBLER	H_2O_2/HNO_3	729.31	731.12	1.81
BUBBLER	$KMnO_4/H_2SO_4$	749.79	752.74	2.95
BUBBLER	$KMnO_4/H_2SO_4$	749.15	749.37	0.22
IMPINGER	$KMnO_4/H_2SO_4$	647.02	647.30	0.28
BUBBLER	SILICA GEL	933.0	948.1	15.1
			Total H_2O (g)	141.53
FILTER			Sigel	15.1
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/13/99
Run Out-2 U5
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	755.06	866.4	111.34
BUBBLER	KCl	741.29	762.2	20.91
IMPINGER	KCl	719.12	726.8	7.68
BUBBLER	H_2O_2/HNO_3	767.36	771.7	4.34
BUBBLER	$KMnO_4/H_2SO_4$	732.03	733.4	1.37
BUBBLER	$KMnO_4/H_2SO_4$	728.25	727.9	-.35
IMPINGER	$KMnO_4/H_2SO_4$	719.47	721.6	2.13
BUBBLER	SILICA GEL	936.9	953.3	16.4
			Total H_2O (g)	147.42
FILTER			Silicel	16.4
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. Unit 5 Outlet

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/14/95 Unit 5
Run Out #3
Fund #
Cost Center #

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	698.2	823.1	124.9
BUBBLER	KCl	706.7	729.6	22.9
IMPINGER	KCl	720.3	724.0	3.7
BUBBLER	H_2O_2/HNO_3	717.2	721.5	4.3
BUBBLER	$KMnO_4/H_2SO_4$	720.7	721.2	0.5
BUBBLER	$KMnO_4/H_2SO_4$	605.6	605.0	-0.6
IMPINGER	$KMnO_4/H_2SO_4$	644.9	646.3	1.4
BUBBLER	SILICA GEL	824.5	841.4	16.9
			Total H_2O (g)	~~174.5~~ 157.1
FILTER				16.9
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * $P_s/T_s * 17.71$ _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Determination of Stack Gas Velocity - Method 2

Client: DOE
Location/Plant: PRESQUE ISLE
Source: UNIT 9 INLET
Operator: TB
Date: 7-15-99
Pitot Tube/Thermo ID: P ~~200~~ 142
Pitot Coeff (Cp): 1.84
Stack Area, ft² (As): 184.62

Run Number	PRELIM.		
Time			
Barometric Press, in Hg (Pb)			
Static Press, in H_2O (Pstatic)	-3.0		
Source Moisture, % (BWS)			
O_2, %			
CO_2, %			

Cyclonic Flow Determination		Traverse Location		Leak Check good ? Y / N		Leak Check good ? Y / N		Leak Check good ? Y / N	
Delta P at 0°	Angle yeilding zero Delta P	Port	Point	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)
-0.02	0°	6	1	0.29	677	0.01 PORT #1		0.19	
			2	0.28	678			0.24	
-0.01	0°		3	0.25	678			0.27	
			4	0.23	678	0.0 0		0.24	
			5	0.19	673			0.08	
-0.01	0°	5	1	0.34	675				
			2	0.32	670				
0.01	0°		3	0.29	674				
			4	0.27	673				
			5	0.20	670				
0.00	0°	4	1	0.38	684				
			2	0.28	685				
0.01	0°		3	0.33	684				
			4	0.30	683				
0.01	0		5	0.22	683				
		3	1	0.34					
			2	0.27					
0.01	0°		3	0.36					
			4	0.35					
0.0	0°		5	0.21					
		2	1	0.29					
			2	0.29					
0.00	0°		3	0.31					
			4	0.31					
			5	0.20					
Avg Angle		Avg Delta P & Temp		.28	680				
		avg $\sqrt{DeltaP}$							
Average gas stream velocity, ft/sec.									
Vol. flow rate @ actual conditions, wacf/min									
Vol. flow rate at standard conditions, dscf/min									

$$MWd = (0.32 * O_2) + (0.44 * CO_2) + (0.28 * (100 - (CO_2 + O_2)))$$

$$MWs = (MWd * (1 - (BWS/100))) + (18 * (BWS/100))$$

$$Tsa = Ts + 460$$

$$Ps = Pb + (Pstatic/13.6)$$

$$Vs = 85.49 * Cp * avg\sqrt{DeltaP} * \sqrt{Tsa/(Ps * MWs)}$$

$$Qs(act) = 60 * Vs * As$$

$$Qs(std) = 17.64 * (1 - (BWS/100)) * (Ps/Tsa) * Qs(act)$$

Comments _____

where:
MWd = Dry molecular weight source gas, lb/lb-mole.
MWs = Wet molecular weight source gas, lb/lb-mole.
Tsa = Source Temperature, absolute(oR)
Ps = Absolute stack static pressure, inches Hg.
Vs = Average gas stream velocity, ft/sec.
Qs(act) = Volumetric flow rate of wet stack gas at actual,
Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min

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Method2

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Determination of Moisture Content in Stack Gases - Method 4

Client: DOE
Location/Plant: PRESQUE ISLE
Source: INLET, 9 INLET
W.O. Number:
Operator: TB
Meter Box ID: 12
Temperature °C or °F: °F
Date: 7-15-99
Meter Box Y: 1.009
Sample Volume, ft³ or L: FT3

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
PRELIM.										Initial -020@10"
	End Test	1830	419.655	114	109	1.2	240	308.4		Final .020@10"
Baro Press., Pb (in Hg)	Start Test	1807	405.970	107	106	1.2	200	300	Moisture Volume, Vw(std)	Percent Moisture (%), BWS
29.56	Avg. or Total	23 MIN	13.685	109		1.2	40	8.4	15.2	15.2

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
										Initial
	End Test									Final
Baro Press., Pb (in Hg)	Start Test								Moisture Volume, Vw(std)	Percent Moisture (%), BWS
	Avg. or Total									

Run Number		Sample Time (min)	Meter Volume, Vm	Meter Temp (or ambient temp for rotometer) Inlet	Meter Temp Outlet	Meter Press, Delta H (in H_2O)	Impinger Volume, ml	Silica Gel Weight, g	Corrected Volume, Vm(std)	Leak Rate Check
										Initial
	End Test									Final
Baro Press., Pb (in Hg)	Start Test								Moisture Volume, Vw(std)	Percent Moisture (%), BWS
	Avg. or Total									

$$Vm(std) = \frac{17.64 * Y * Vm * (Pb + (deltaH / 13.6))}{(Tm + 460)}$$

if Tm is C° than $Tm = (Tmc * 1.8) + 32$

if Vm is liters than $Vm = Vml * 28.32$

$$Vw(std) = (0.04707 * Vwc) + (0.04715 * Wwsg)$$

$$BWS = \left(\frac{Vw(std)}{Vw(std) + Vm(std)}\right) * 100$$

WHERE:
Vm(std)= Sample volume corrected to standard temp and pressure, scf or L
Vm= Actual sample volume, calculated, scf
Vml= Actual sample volume, calculated, Liters
Y= Dry gas meter calibration factor.
Pb= Barometric pressure, in. Hg
delta H= Meter pressure, in H2O
Tm= Average temperature of meter (DGM is used) or rotomter, degrees °
Tmc= Average temperature of meter (DGM is used) or rotomter, degrees °
Vw(std)= Volume of water vapor at standard conditions, scf or L
Vwc= Volume of water condensed, mL
Wwsg= Weight of Silica Gel, g
Bws= Water vapor in gas stream, percer

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Use either ft³ or liters in calculations. DO NOT MIX CUBIC FEET AND LITERS IN ANY CALCULATION.

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	IN
Run No.ID	1
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 9 Inlet
Sample Date	7-19-99
Baro. Press (in Hg)	29.71
Operator	TB

Stack Conditions

	Assumed	Actual
% Moisture	14	
Impinger Vol (ml)		249.6
Silica gel (g)		15.9
CO2, % by Vol	17	16.6
O2, % by Vol	3	2.1
Temperature (°F)	720	
Meter Temp (°F)	90	
Static Press (in H_2O)	-3	-3.9
Ambient Temp (°F)	~100	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.9055
Probe ID / Length	P300 8'
Probe Material	Horo
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.307
Area of Stack (ft^2)	154.62
Sample Time	140
Total Traverse Pts	35

K Factor: ~~3.69~~ 3.75 TB

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.0006		0.0006
Leak Check @ (in Hg)	15		15
Pitot good	yes / no.	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	99	101
Reference Temp	99	102
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

	TRAVERSE POINT No.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS	
		0	0940			688.537										
	1	4		0.17	0.64	690.6	718	98	97	252	237	66	2			10:295
	2	8		0.17	0.71	692.5	706	97	96	249	237	65	3			
7	3	12		0.26	0.98	694.7	714	99	97	245	236	64	4			
	4	16		0.24	0.90	696.8	721	100	96	243	236	63	3.5		POST LEAK CK:	
	5	20	1000	0.24	0.90	699.090	718	101	97	246	236	63	4		0.006 @ 5"	
		0	1006	—	—	699.535	—	—	—	—	—	—	—		PRE LEAK CK	
	1	4		0.32	1.20	701.8	710	99	97	252	234	67	4		0.006 @ 5"	10:493
	2	8		0.29	1.09	704.1	712	101	98	251	233	64	4			
6	3	12		0.26	0.98	706.2	723	101	98	252	233	64	4			
	4	16		0.18	0.68	707.8	713	103	98	250	234	62	3.5		POST LEAK CK	
	5	20	1026	0.25	0.94	710.088	706	102	98	250	234	63	4.5		0.005 @ 6"	
		0	1038	—	—	710.172	—	—	—	—	—	—	—		PRE LEAK CK	
	1	4		0.32	1.20	712.4	700	98	98	252	234	66	4.5		0.005 @ 6"	11:095
	2	8		0.39	1.46	715.1	701	100	98	250	233	63	6			
5	3	12		0.24	0.90	717.2	708	101	98	251	233	62	5			
	4	16		0.24	0.90	719.3	703	103	99	248	233	62	5		POST LEAK CK	
	5	20	1058	0.18	0.68	721.267	706	102	99	250	233	61			0.006 @ 8"	

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
0.50802									

Avg Sqrt Del H

Comments:

Ontario Hydro Method

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Inlet
Operator: TB
Run No.: 1
Date: 7-19-99
K Factor: 3.75

	TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
		0	1113			721.424									
	1	4		0.33	1.24	723.7	700	99	99	247	233	67	5.5		PRE LEAK CK
	2	8		0.30	1.13	725.9	702	99	99	249	234	65	5		0.006 @ 8"
4	3	12		0.27	1.01	728.1	700	100	99	249	234	64	5.5		
	4	16		0.27	1.01	730.4	702	102	99	250	234	64	5.5		POST LEAK CK
	5	20	1133	0.20	0.75	732.344	702	103	99	247	234	64	5		0.005 @ 9"
		0	1138	–	–	732.510	–	–	–	–	–	–	–		PRE LEAK CK.
	1	4		0.30	1.13	734.7	705	100	99	250	233	66	5.5		0.005 @ 10"
	2	8		0.32	1.20	737.1	708	101	99	252	233	64	6.5		
3	3	12		0.26	0.98	739.4	706	101	99	250	233	62	7		
	4	16		0.26	0.98	741.6	706	103	100	247	233	63	6.5		POST LEAK CK
	5	20	1158	0.20	0.75	743.593	705	103	99	250	233	64	6.5		0.006 @ 10"
		0	1209	–	–	743.763	–	–	–	–	–	–	–		PRE LEAK CK.
	1	4		0.32	1.20	745.9	718	100	100	244	234	67	3.5		0.006 @ 10"
	2	8		0.25	0.94	748.2	721	101	100	248	234	66	4		
2	3	12		0.27	1.01	750.4	717	101	99	249	234	64	4		
	4	16		0.27	1.01	752.6	707	103	100	249	234	64	4		POST LEAK CK
	5	20	1229	0.18	0.68	754.615	703	103	99	251	234	65	3		0.006 @ 9"
		0	1232	–	–	754.830	–	–	–	–	–	–	–		PRE LEAK CK.
	1	4		0.24	0.90	756.9	693	101	99	251	233	66	4.5		0.008 @ 9"
	2	8		0.27	1.01	759.2	697	102	99	253	233	65	5		
	3	12		0.29	1.09	761.4	710	102	99	254	234	64	5	ISO	102.8
1	4	16		0.27	1.01	763.7	697	105	100	251	234	64	5	M	14.7
	5	20	1252	0.30	1.13	766.050	695	104	100	250	234	65	5	SCFM	179473.0
														DSCF	71.95

10.920

11.083

10.852

11.220

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
0.50802	0.98057	75.958	707.8	99.6	244/253	233/237	67	7	

Avg Sqrt Del H: 0.98576

Comments:

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	IN
Run No.ID	2
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 9 Inlet
Sample Date	7-14-99
Baro. Press (in Hg)	29.77
Operator	TB

Stack Conditions

	Assumed	Actual
% Moisture	14	
Impinger Vol (ml)		245.7
Silica gel (g)		16.2
CO2, % by Vol	17	16.8
O2, % by Vol	3	2.0
Temperature (°F)	710	
Meter Temp (°F)	100	
Static Press (in H_2O)	-3.9	-3.7
Ambient Temp (°F)	~100	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.9055
Probe ID / Length	P300 8'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	0.307
Area of Stack (ft^2)	184.62
Sample Time	140
Total Traverse Pts	35

K Factor 3.78

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.009		0.008
Leak Check @ (in Hg)	15		9"
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	102	100
Reference Temp	100	99
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1405			766.480									
1	4		0.24	0.91	768.6	706	99	98	250	234	66	2.5		
2	8		0.24	0.91	770.6	710	101	99	243	234	65	2.5		
3	12		0.26	0.98	772.8	720	101	99	247	234	62	3		
4	16		0.24	0.91	774.9	724	103	100	247	235	63	2.5		POST LEAK CK.
5	20	1425	0.20	0.76	776.910	715	103	99	251	235	64	2.5	10:430	0.008 @8"
														PRE LEAK CK
	0	1429	—	—	777.120	—	—	—	—	—	—	—		0.008 @8"
1	4		0.33	1.25	779.4	724	102	99	250	233	65	4		
2	8		0.30	1.13	781.7	729	102	99	244	233	62	4		
3	12		0.26	0.98	784.0	732	103	99	246	234	61	4		
4	16		0.26	0.98	786.8	734	105	101	249	234	62			POST LEAK CK
5	20	1449	0.21	0.79	788.140	722	104	100	250	234	63	3.5	11:018	0.010 @8"
														PRE LEAK CK
	0	1453	—	—	788.263	—	—	—	—	—	—	—		0.006 @8"
1	4		0.30	1.13	790.5	740	101	100	251	234	66	4.5		
2	8		0.34	1.29	792.9	740	103	100	249	233	61	5.5		
3	12		0.29	1.10	795.2	740	105	101	251	234	61	5.5		
4	16		0.27	1.02	797.5	733	105	100	250	234	63	5.5		POST LEAK CK
5	20		0.26	0.98	799.728	742	105	101	245	233	65	5.5	11:465	0.008 @7"
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

10:430

11:018

11:465

Avg Sqrt Del H

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

26' 4½"

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Inlet
Operator: TB
Run No.: 2
Date: 7-21-99
K Factor: ~~3.78~~ 3.78

	TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	HEATED BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
		0	1517			799.890									PRE LEAK CK
	1	4		0.37	1.40	802.3	722	101	100	253	233	66	6.5		0.008@7"
	2	8		0.34	1.29	804.8	731	103	100	252	233	63	6.5		
4	3	12		0.26	0.98	807.10	728	104	101	251	233	64	6.5		
	4	16		0.26	0.98	809.2	725	105	101	244	233	63	6.5		POST LEAK CK
	5	20	1537	0.19	0.72	811.276	726	104	100	246	233	62	6.5	11:386	0.010@8"
		0	1617	—	—	811.421	—	—	—	—	—	—	—	—	PRE LEAK CK
	1	4		0.32	1.21	813.8	705	100	100	250	233	67	3.5		0.006@9"
	2	8		0.32	1.21	816.2	711	100	100	253	233	63	4		
5	3	12		0.32	1.21	818.5	715	103	100	251	233	61	4		
	4	16		0.27	1.02	820.8	715	104	100	243	233	63	4		POST LEAK CK
	5	20	1637	0.24	0.91	822.964	706	104	100	248	233	63	3.5	11:543	0.008@8"
		0	1642	—	—	823.155	—	—	—	—	—	—	—	—	PRE LEAK CK
	1	4		0.32	1.21	825.5	700	102	100	250	233	66	4.5		0.008@10"
	2	8		0.29	1.10	827.7	710	104	101	250	234	65	4.5		
6	3	12		0.27	1.02	829.9	707	104	101	246	233	63	4.5		
	4	16		0.32	1.21	832.3	720	106	101	244	233	61	5		POST LEAK CK
	5	20	1702	0.21	0.79	834.470	703	106	101	251	233	63	4.5	11:491	0.008@8"
		0	1705	—	—	834.646	—	—	—	—	—	—	—	—	PRE LEAK CK
	1	4		0.30	1.13	836.9	698	103	100	252	234	66	5		0.008@10"
	2	8		0.35	1.32	839.4	702	104	101	251	233	61	6		
7	3	12		0.32	1.21	841.8	702	104	100	246	233	60	6		
	4	16		0.36	1.36	844.4	705	106	101	251	234	61	6.5		
	5	20	1725	0.26	0.98	846.752	705	106	100	250	233	64	6	12:106	
				Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts		Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
				~~0.25~~	1.06800	~~79.083~~	~~718.5~~		102.2	238/253	233/235	67	6.5		
				~~0.50996~~	Avg Sqrt Del H	Comments:									
				0.52978	1.08994	79.439	718.5								

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	IN
Run No.ID	3
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 9 Inlet
Sample Date	7-20-99
Baro. Press (in Hg)	29.77
Operator	TB

Stack Conditions	Assumed	Actual
% Moisture	14	
Impinger Vol (ml)		231.8
Silica gel (g)		15.8
CO2, % by Vol	17	16.8
O2, % by Vol	3	2.1
Temperature (°F)	710	
Meter Temp (°F)	100	
Static Press (in H_2O)	-3.7	-3.3
Ambient Temp (°F)	~100	

Meter Box ID	12
Meter Box Y	1.009
Meter Box Del H	1.5055
Probe ID / Length	P300 8'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.307
Area of Stack (ft^2)	184.62
Sample Time	140
Total Traverse Pts	35

K Factor 3.78

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.005		0.007
Leak Check @ (in Hg)	15"		15"
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	100	97
Reference Temp	99	99
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

	TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	HEAT BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
		0	0800			847.120									
	1	4		0.29	1.10	849.4	715	94	93	249	234	66	3		
	2	8		0.22	0.83	851.4	724	95	94	252	234	69	3	10.675	
7	3	12		0.26	0.98	853.6	734	96	94	253	234	68	3		
	4	16		0.26	0.98	855.7	740	98	94	250	234	68	3		POST LEAK CK
	5	20	0820	0.22	0.83	857.795	733	96	94	249	233	68	3	10.675	0.004 @ 16"
		0	0823	-	-	857.937	-	-	-	-	-	-	-		PRE LEAK CK
	1	4		0.31	1.17	860.2	728	99	96	251	233	65	4		0.004 @ 7"
	2	8		0.28	1.06	862.4	728	100	96	250	233	67	4	10.873	
6	3	12		0.25	0.95	864.6	731	100	96	247	233	61	4		
	4	16		0.27	1.02	866.8	736	100	97	250	233	62	4		POST LEAK CK
	5	20	0843	0.21	0.79	868.810	736	100	97	250	234	63	4	10.873	0.006 @ 7"
		0	0846	-	-	869.955	-	-	-	-	-	-	-		PRE LEAK CK
	1	4		0.22	0.83	872.0	720	100	97	250	234	66	4		.005 @ 8"
	2	8		0.36	1.36	873.3	726	101	98	251	235	64	5.5	10.705	
5	3	12		0.27	1.02	875.5	729	104	99	251	234	63	5		
	4	16		0.25	0.95	877.7	735	104	99	252	233	63	5		POST LEAK CK
	5	20	0906	0.21	0.79	879.690	736	104	99	254	233	64	5	10.705	0.006 @ 8"
				Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Inlet
Operator: TB
Run No.: 3
Date: 7-20-99
K Factor: 3.78

	TRAVERSE POINT No.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	HEATED BOX FILTER CON TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
		0	0909			879.993									PRE LEAK CK
	1	4		0.35	1.32	882.0	730	102	99	248	232	65	6		0.006 @8"
	2	8		0.30	1.13	884.5	761	104	100	251	234	65	6		
4	3	12		0.27	1.02	886.7	753	104	100	250	233	62	6		
	4	16		0.25	0.95	888.9	747	106	101	251	233	63	5.5		POST LEAK CK
	5	20	0929	0.24	0.91	891.026	742	105	100	249	233	64	5.5	11.033	0.008 @8"
		0	0941	–	–	891.780	–	–	–	–	–	–	–		PRE LEAK CK
	1	4		0.27	1.02	894.1	735	100	101	250	233	66	3		0.008 @7"
	2	8		0.35	1.32	896.6	736	103	102	251	235	67	4		
3	3	12		0.30	1.13	898.9	737	104	102	251	235	61	4		
	4	16		0.33	1.25	901.3	737	106	102	248	234	62	4.5		POST LEAK CK
	5	20	1001	0.23	0.87	903.440	737	106	102	244	234	67	4	11.660	0.006 @8"
		0	1005	–	–	903.622	–	–	–	–	–	–	–		PRE LEAK CK
	1	4		0.30	1.13	905.9	720	103	102	248	233	67	5	8	0.008 @8"
	2	8		0.30	1.13	908.2	720	105	103	249	233	67	5	8	
2	3	12		0.30	1.13	910.5	721	106	103	248	232	64	5		
	4	16		0.24	0.91	912.6	721	106	103	243	233	63	5		POST LEAK CK
	5	20	1025	0.25	0.95	914.768	721	107	103	246	233	64	5	11.146	0.008 @7"
		0	1028	–	–	914.900	–	–	–	–	–	–	–	8	PRE LEAK CK
	1	4		0.27	1.02	917.1	720	105	103	255	232	67	5	8	
	2	8		0.23	0.87	919.2	724	106	103	247	234	65	5		
1	3	12		0.23	0.87	921.3	713	106	103	248	233	65	6		
	4	16		0.27	1.02	923.4	730	106	103	251	233	64	6		~~POST LEAK CK~~
	5	20	1048	0.27	1.02	925.815	719	107	103	247	233	65	6	10.915	
				Avg Sqrt Delta P: 0.51771	Avg Delta H: 1.018	Total Volume: 77.007	Avg Ts: 730	Avg Tm: 101.1		Min/Max: ~~247~~ 242/255	Min/Max: 233/235	Max Temp: 67	Max Vac: 6	Max Temp	
					Avg Sqrt Del H: 1.0035	Comments:									

11.033
11.660
11.146
10.915

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Source Gas Analysis Data Sheet - Method 3

Client DOE / WP

Analyst RH

Location/Plant MARQUETTE

Date 7/19/99

Source # 9 INLET / STACK

Analytical Method (circle one) EPA 3 USING 3A ANALYZERS

W.O. Number

Run Number 1

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK (A)	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK (B - A)	Percent N_2 (100 - B)
1		16.6	14.7		2.1	4.0	
2		16.7	14.6		2.1	4.1	
3		16.6	14.6		2.1	4.0	
Average		16.6	14.6		2.1	4.0	

Run Number 2

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK (A)	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK (B - A)	Percent N_2 (100 - B)
1		16.7	14.9		2.0	3.8	
2		16.8	14.9		2.0	3.8	
3		16.8	14.9		2.0	3.8	
Average		16.8	14.9		2.0	3.8	

Run Number 3

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK (A)	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK (B - A)	Percent N_2 (100 - B)
1		16.8	15.1		2.1	3.6	
2		16.9	15.1		2.1	3.6	
3		16.7	15.1		2.2	3.6	
Average		16.8	15.1		2.1	3.6	

Acceptable differences for repeat analysis:

if CO_2 > 4% than +/- 0.3%

if CO_2 < or = 4% than +/- 0.2%

if O_2 > or = 15% than +/- 0.2%

if O_2 < 15% than +/- 0.3%

Ambient Check

Oxygen ✓ (20.9)

Carbon Dioxide ✓ (0.0)

Report all values to the nearest 0.1 percent

Comments Cal L/ 9.9 1 % CO_2, 12.63 % O_2, Ø N_2

WESTON

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Method3

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Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/19/99 Inlet am
Run 309-IN-1
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	694.5	896.4	201.9
BUBBLER	KCl	732.8	768.4	35.6
IMPINGER	KCl	707.6	716.0	8.4
BUBBLER	H_2O_2/HNO_3	714.8	716.8	2.0
BUBBLER	$KMnO_4/H_2SO_4$	710.9	712.2	1.3
BUBBLER	$KMnO_4/H_2SO_4$	725.6	725.2	-0.4
IMPINGER	$KMnO_4/H_2SO_4$	739.1	739.9	0.8
BUBBLER	SILICA GEL	938.9	954.8	15.9
			Total H_2O (g)	~~265.5~~ 249.6
FILTER				15.9
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/19/99 Inlet (pm)
Run B09-IN-2
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	735.3	917.2	181.9
BUBBLER	KCl	716.7	768.8	52.1
IMPINGER	KCl	744.1	751.9	7.8
BUBBLER	H_2O_2/HNO_3	614.6	616.2	1.6
BUBBLER	$KMnO_4/H_2SO_4$	614.2	616.2	2
BUBBLER	$KMnO_4/H_2SO_4$	651.9	652.1	0.2
IMPINGER	$KMnO_4/H_2SO_4$	627.2	627.3	0.1
BUBBLER	SILICA GEL	793.5	809.7	16.2
			Total H_2O (g)	~~261.9~~ 245.7
FILTER			51 gd	16.2
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/20/99 Inlet
Run B09-IN-3
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	700.6	855.0	154.4
BUBBLER	KCl	729.6	776.5	46.9
IMPINGER	KCl	727.5	746.8	19.3
BUBBLER	H_2O_2/HNO_3	712.5	718.7	6.2
BUBBLER	$KMnO_4/H_2SO_4$	737.4	741.1	3.7
BUBBLER	$KMnO_4/H_2SO_4$	708.6	707.9	-.7
IMPINGER	$KMnO_4/H_2SO_4$	708.4	710.4	2
BUBBLER	SILICA GEL	920.1	935.9	15.8
			Total H_2O (g)	231.8
FILTER			Sigd	15.8
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample and Velocity Traverse Point Data Sheet - Method 1

Client: DOE / WP
Loaction/Plant: MANCHESTER
Source: #9 STACK
Operator: KK
Date: 7/15/99
W.O. Number:

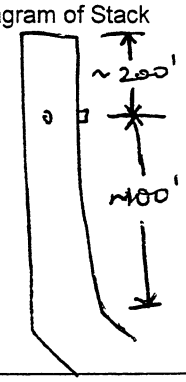
Duct Type	☒ Circular	☐ Rectangular Duct	Indicate appropriate type
Traverse Type	☒ Particulate Traverse	☐ Velocity Traverse	

Distance from far wall to outside of port (in.) = C	121
Port Depth (in.) = D	7
Depth of Duct, diameter (in.) = C-D	114
Area of Duct (ft^2)	70.882
Total Traverse Points	12
Total Traverse Points per Port	6

Rectangular Ducts Only	
Width of Duct, rectangular duct only (in.)	
Total Ports (rectangular duct only)	

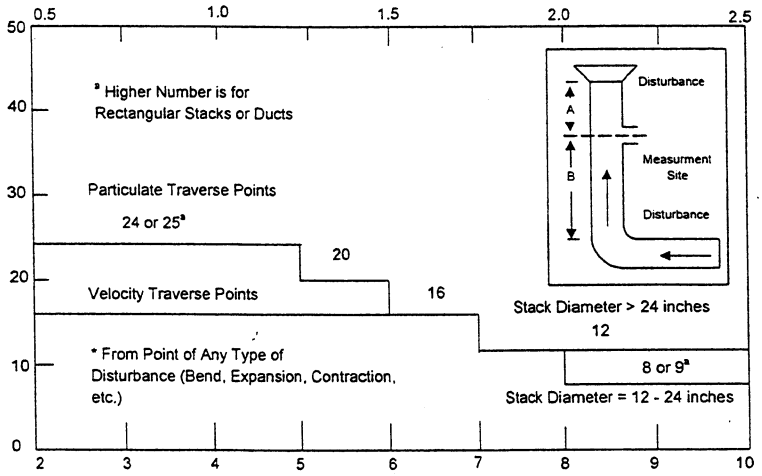
Flow Disturbances	
Upstream - A (ft)	~200'
Downstream - B (ft)	~100
Upstream - A (duct diameters)	~22
Downstream - B (duct diameters)	~11

Diagram of Stack



Traverse Point Locations

Traverse Point	% of Duct	Distance from Inside Duct Wall (in)	Distance from Outside of Port (in)
1	.044	5.016	12
2	.146	16.644	23 5/8
3	.296	33.744	40 3/4
4	.704	80.256	87 1/4
5	.854	97.356	104 3/8
6	.956	108.984	KK ~~115~~ 116
7			
8			
9			
10			
11			
12			



Equivalent Diameter = (2*L*W)/(L+W)

Traverse Point Location Percent of Stack -Circular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		14.6		6.7		4.4		3.2		2.6		2.1
2		85.4		25		14.6		10.5		8.2		6.7
3				75		29.6		19.4		14.6		11.8
4				93.3		70.4		32.3		22.6		17.7
5						85.4		67.7		34.2		25
6						95.6		80.6		65.8		35.6
7								89.5		77.4		64.4
8								96.8		85.4		75
9										91.8		82.3
10										97.4		88.2
11												93.3
12												97.9

Traverse Point Location Percent of Stack -Rectangular

Traverse Point Location	Number of Traverse Points: 1	2	3	4	5	6	7	8	9	10	11	12
1		25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2		75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3			83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4				87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5					90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6						91.7	78.6	68.8	61.1	55.0	50.0	45.8
7							92.9	81.3	72.2	65.0	59.1	54.2
8								93.8	83.3	75.0	68.2	62.5
9									94.4	85.0	77.3	70.8
10										95.0	86.4	79.2
11											95.5	87.5
12												95.8

Rectangular Stack Points & Matrix
9 - 3 x 3
12 - 4 x 3
16 - 4 x 4
20 - 5 x 4
25 - 5 x 5
30 - 6 x 5
36 - 6 x 6
42 - 7 x 6
49 - 7 x 7

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Determination of Stack Gas Velocity - Method 2

Client: DOE / WP
Location/Plant: MARQUETTE
Source: # 9 STACK
Operator: JC / JP / KH
Date: 7/16/99
W.O. Number:
Pitot Coeff (Cp): .84
Stack Area, ft² (As): 70,882
Pitot Tube/Thermo ID: P 260

Run Number	PRE		
Time	1845		
Barometric Press, in Hg (Pb)			
Static Press, in H_2O (Pstatic)	-2.0		
Source Moisture, % (BWS)			
O_2, %			
CO_2, %			

Cyclonic Flow Determination		Traverse Location		Leak Check good ? Y / N		Leak Check good ? Y / N		Leak Check good ? Y / N	
Delta P at 0°	Angle yeilding zero Delta P	Port	Point	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)
0	—	A	1	1.5	368				
.0	<5		2	1.5	370				
.01	<5		3	1.2	364				
.01	<5		4	1.4	370				
.01	<5		5	1.3	375				
.01	<5		6	1.3	375				
~~.01~~	~~<5~~								
-.05	5	B	1	1.5	369				
.0	—		2	1.4	370				
.05	<5		3	1.1	370				
.0	<5		4	1.5	375				
.0	—		5	1.5	371				
.0	—		6	1.4	376				
Avg Angle	<5	Avg Delta P & Temp		1.4	371				
		avg $\sqrt{DeltaP}$							
		Average gas stream velocity, ft/sec.							
		Vol. flow rate @ actual conditions, wacf/min							
		Vol. flow rate at standard conditions, dscf/min							

$$MWd = (0.32 * O_2) + (0.44 * CO_2) + (0.28 * (100 - (CO_2 + O_2)))$$

$$MWs = (MWd * (1 - (BWS/100))) + (18 * (BWS/100))$$

$$Tsa = Ts + 460$$

$$Ps = Pb + (Pstatic/13.6)$$

$$Vs = 85.49 * Cp * avg\sqrt{DeltaP} * \sqrt{Tsa/(Ps * MWs)}$$

$$Qs(act) = 60 * Vs * As$$

$$Qs(std) = 17.64 * (1 - (BWS/100)) * (Ps/Tsa) * Qs(act)$$

Comments _____

where:
MWd = Dry molecular weight source gas, lb/lb-mole.
MWs = Wet molecular weight source gas, lb/lb-mole.
Tsa = Source Temperature, absolute(oR)
Ps = Absolute stack static pressure, inches Hg.
Vs = Average gas stream velocity, ft/sec.
Qs(act) = Volumetric flow rate of wet stack gas at actual,
Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min

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ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	OUT
Run No.ID	1
Test Method ID	OHM
Date ID	19 ~~13~~JUL1999
Source/Location	Boiler 9 Outlet
Sample Date	7/19/99
Baro. Press (in Hg)	29.71
Operator	JP

Stack Conditions

	Assumed	Actual
% Moisture	14	
Impinger Vol (ml)		242.1
Silica gel (g)		14.9
CO2, % by Vol	16	14.6
O2, % by Vol	4	4.0
Temperature (°F)	375	
Meter Temp (°F)	100	
Static Press (in H_2O)	-2.0	-2.0
Ambient Temp (°F)	90	

Meter Box ID	WC-14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	~~10730~~ ~~10~~ 9
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	.200
Avg Nozzle Dia (in)	.200
Area of Stack (ft^2)	70.88
Sample Time	120
Total Traverse Pts	12

K Factor .97/.96

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.005	.005 / .005	.006
Leak Check @ (in Hg)	15	6 / 6	8
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	89	89
Reference Temp	88	86.9
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	9.46			919.936									
A 1	5		1.5	1.45	923.3	389	99	97	233	244	62	3.5		
2	10		1.5	1.44	926.5	388	99	94	233	243	57	3.5		K-factor chang
2	15		1.6	1.53	929.8	388	103	95	232	243	54	3.5		.96
3	20		1.6	1.53	933.2	389	105	97	232	242	53	3.5		
3	25		1.6	1.53	936.6	389	107	99	235	249	54	3.5		
4	30		1.6	1.53	939.9	387	108	100	236	250	54	3.5		
4	35		1.4	1.34	943.0	386	109	101	236	248	55	3.5		
5	40		1.4	1.34	946.2	385	109	102	241	248	55	3.5		
5	45		1.5	1.45	949.4	384	109	103	241	248	57	3.5		
6	50		1.4	1.34	952.6	384	108	103	239	249	56	3.5		
6	55		1.3	1.24	955.6	384	109	104	229	248	57	3.5		
	60	10.46	1.3	1.24	958.663	384	109	104	229	251	59	3.5		38.727
							L-C good @ 6 in Hg							
	50													
	55													
	60													
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
				Avg Sqrt Del H	Comments:									

WESTON MANAGERS DESIGNERS/CONSULTANTS

Ontario Hydro Method

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Outlet
Operator: JP
Run No.: 1
Date: 7/19/99
K Factor: .96

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1110			958.827									
B 1	5		1.4	1.34	961.8	377	~~109~~	102	239	245	67	3.5		
2	10		1.4	1.34	965.0	381	105	102	244	249	60	3.5		
	15		1.5	1.45	968.3	379	107	102	243	249	56	3.5		
3	20		1.5	1.44	971.6	377	108	103	241	249	54	3.5		
	25		1.5	1.44	974.8	377	109	103	240	248	55	3.5		
4	30		1.5	1.44	978.1	377	110	104	240	248	56	3.5		
	35		1.4	1.34	981.2	376	110	105	240	248	57	3.5		23.188
5	40	1146/1215	1.4	1.34	982.015	377	111	105	238	247	56	3.5		stop test @ 11.46
	45		1.4	1.34	984.4 982.120	378	103	103	238	246	58	3.5		L.C good @
6	50		1.4	1.34	8 ~~105~~ 9875	380	105	103	236	249	60	3.5		Gin Hg
	55		1.3	1.24	990.6	381	109	104	229	248	57	3.5		~~[illegible]~~ resume
	60	1239	1.3	1.24	993.7	381	110	105	229	249	59	3.5		test @ 1215
					996.662									
														14.542
													ISO	100.62
													M	14.37
													SCFM	193892.16
													VOLS	72.04

Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
1.20177	~~1.38542~~ ~~1.3575~~ ~~1.385~~	~~76.4574~~	382.8	104.3	229/244	242/251	67	3.5	

Avg Sqrt Del H: ~~1.16473~~ 1.17636

Comments: 76.562

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	OUT
Run No.ID	2
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 9 Outlet
Sample Date	7/19/99
Baro. Press (in Hg)	29.71
Operator	JP

Stack Conditions

	Assumed	Actual
%.Moisture	14	
Impinger Vol (ml)		226.9
Silica gel (g)		14.7
CO2, % by Vol	16	14.5
O2, % by Vol	4	3.3
Temperature (°F)	~~350~~	
Meter Temp (°F)	105	
Static Press (in H_2O)	-2.0	-2.0
Ambient Temp (°F)	93	

Meter Box ID	14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	P302 9'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.200
Area of Stack (ft^2)	70.88
Sample Time	120
Total Traverse Pts	12

K Factor ~~.99~~ .98

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.006	.006 / .009	.006
Leak Check @ (in Hg)	10	6 / 15	9
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	90	92
Reference Temp	90.4	93.7
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1408			996.844									
AB	5		1.3	~~1.28~~ 1.27	000.0	381	101	99	230	231	65	3.0		
2	10		1.4	1.37	003.2	384	104	100	231	244	65	3.0		
	15		1.5	1.47	006.4	384	109	101	240	246	61	3.0		
3	20		1.4	1.37	009.6	382	108	101	240	245	55	3.0		
	25		1.5	1.47	012.9	382	109	102	240	246	54	3.0		
4	30		1.5	1.47	016.1	383	110	104	239	245	53	3.0		
	35		1.4	1.37	019.3	382	110	105	242	246	53	3.0		
5	40		1.4	1.37	022.4	383	~~106~~ 111	106	238	247	53	3.0		
	45		1.4	1.37	025.6	384	111	106	237	247	55	3.0		
6	50		1.4	1.37	028.8	384	112	107	234	247	54	3.0		
	55		1.3	1.27	031.9	385	111	107	229	248	55	3.0		
	60	1508	1.3	1.27	034.869	385	112	108	229	248	57	3.0		38.025
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Outlet
Operator: ~~7/19/99~~ JP
Run No.: 2
Date: 7/19/99
K Factor: 0.98

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	1628			03.4.915									
A	5		1.6	1.56	38.2	386	104	103	245	229	65	3.5		
2	10		1.5	1.47	41.5	387	108	104	243	250	60	3.5		
	15		1.6	1.56	45.0	388	109	104	242	249	52	3.5		
3	20		1.5	1.47	48.1	387	110	105	246	249	49	3.5		
	25		1.6	1.56	51.5	388	112	106	246	248	50	3.5		
4	30		1.6	1.56	54.9	386	113	107	246	249	50	3.5		
	35		1.5	1.47	58.2	384	113	107	247	249	50	3.5		
5	40		1.4	1.37	61.5	382	114	108	246	249	51	3.5		
	45		1.3	1.27	64.5	381	113	107	239	249	51	3.5		
6	50		1.3	1.27	67.6	380	113	108	237	249	52	3.5		
	55		1.3	1.27	70.6	378	112	107	228	250	52	3.5		
	60	1727	1.2	1.17	73.551	378	114	108	231	249	53	3.5		38.636
													150	100.43
													M	13.68
													SPM	193421.3
													SVO2	71.73
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
			1.19230	1.39333	76.661	383.5	107.5		228/247	229/250	65	3.5		
				Avg Sqrt Del H	Comments:									
				1.17947										

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client	DOE
W.O.#	20009-011-006-0500
Project ID	DOE
Mode/Source ID	BO 9
Samp. Loc. ID	OUT
Run No.ID	3
Test Method ID	OHM
Date ID	13JUL1999
Source/Location	Boiler 9 Outlet
Sample Date	7/20/99
Baro. Press (in Hg)	29.77
Operator	JP

Stack Conditions

	Assumed	Actual
% Moisture	14	
Impinger Vol (ml)		229.3
Silica gel (g)		15.5
CO2, % by Vol	16	15.5
O2, % by Vol	4	3.6
Temperature (°F)	375	
Meter Temp (°F)	95	
Static Press (in H_2O)	-2.0	-2.0
Ambient Temp (°F)	92	

Meter Box ID	14
Meter Box Y	1.0098
Meter Box Del H	1.9408
Probe ID / Length	TBL 9'
Probe Material	Boro
Pitot / Thermocouple ID	
Pitot Coefficient	0.84
Nozzle ID	
Avg Nozzle Dia (in)	.200
Area of Stack (ft^2)	70.88
Sample Time	120
Total Traverse Pts	12

K Factor .97

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	.01	.008 / .006	.004
Leak Check @ (in Hg)	15	7 / 7	10
Pitot good	yes / no	yes / no	yes / no
Orsat good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	88	93
Reference Temp	89.7	94.6
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
A	0	08:00			073.746									
	5		1.4	1.35	76.9	374	91	89	236	249	65	4.0		
2	10		1.3	1.26	79.9	375	93	89	236	251	65	4.0		
	15		1.5	1.45	83.1	376	95	90	234	249	60	3.5		
3	20		1.4	1.35	86.2	378	98	91	235	249	56	3.5		
	25		1.5	1.45	89.3	381	101	93	233	249	55	3.5		
4	30		1.5	1.45	92.6	380	102	94	235	250	55	4.0		
	35		1.4	1.35	95.7	382	103	96	236	250	55	4.0		
5	40		1.4	1.35	98.8	382	104	97	234	250	56	4.0		
	45		1.3	1.26	101.9	384	106	98	234	249	55	4.0		
6	50		1.4	1.35	105.0	384	106	99	230	251	55	4.0		
	55		1.4	1.35	108.1	385	106	100	230	251	56	4.0		
	60	9:00	1.4	1.35	111.249	387	108	102	230	251	57	4.0		37.503
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	

Avg Sqrt Del H

Comments:

Ontario Hydro Method

WESTON MANAGERS DESIGNERS/CONSULTANTS

ISOKINETIC FIELD DATA SHEET

Ontario Hydro Method - Mercury

Client: DOE
Source: Boiler 9
Sample Loc.: Outlet
Operator: JP
Run No.: 3
Date: 7/20/99
K Factor: 0.96

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)		COMMENTS
	0	931			111.397									
	5		1.4	1.34	114.5	391	102	101	248	247	65	4.0		
2	10		1.4	1.34	117.7	392	104	102	246	249	56	4.0		
	15		1.5	1.44	120.8	392	107	103	245	247	54	4.0		
3	20		1.6	1.53	124.2	392	109	104	245	248	53	4.0		
	25		1.5	1.44	127.5	392	110	104	245	249	54	4.0		
4	30		1.4	1.34	130.7	392	111	105	245	249	54	4.0		
	35		1.5	1.44	133.9	392	111	106	246	248	55	4.0		
5	40		1.5	1.44	137.2	391	111	106	243	249	54	4.0		
	45		1.6	1.53	140.5	389	111	106	233	249	55	4.0		
6	50		1.6	1.53	143.8	388	111	107	230	249	52	4.0		stop @ 1017
	55		1.5	1.44	147.1	388	108	106	230	249	56	4.0		resume
	60	1044	1.5	1.44	150.325	388	107	106	230	248	57	4.0		sampling
														@ 1030
														38.928
													150	100.32
													M	13.74
													SCFM	195240.99
													SVOL	72.32
			Avg Sqrt Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm		Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
			1.20541	1.39875	76.431	385.62	102.31		230/248	248/257	65	4.0		
				Avg Sqrt Del H	Comments:									
				1.18226										

WESTON MANAGERS DESIGNERS/CONSULTANTS

MR

Source Gas Analysis Data Sheet - Method 3

Client DOE / WP

Analyst RH

Location/Plant MARQUETTE

Date 7/19/99

Source # 9 INLET / STACK

Analytical Method (circle one) EPA 3 USING 3A ANALYZERS

W.O. Number

Run Number 1

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK	Percent N_2 (100 - B)
1		16.6	14.7		2.1	4.0	
2		16.7	14.6		2.1	4.1	
3		16.6	14.6		2.1	4.0	
	Average	16.6	14.6		2.1	4.0	

Run Number 2

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK	Percent N_2 (100 - B)
1		16.7	14.9		2.0	3.8	
2		16.8	14.9		2.0	3.8	
3		16.8	14.9		2.0	3.8	
	Average	16.8	14.9		2.0	3.8	

Run Number 3

~~Leak~~ Cal Check Good? (circle one) Yes No

Analysis Number	Analysis Time	Percent CO_2 IN (A)	Percent CO_2 STACK	Percent Total (B)	Percent O_2 IN (B - A)	Percent O_2 STACK	Percent N_2 (100 - B)
1		16.8	15.1		2.1	3.6	
2		16.9	15.1		2.1	3.6	
3		16.7	15.1		2.2	3.6	
	Average	16.8	15.1		2.1	3.6	

Acceptable differences for repeat analysis:

if CO_2 > 4% than +/- 0.3%

if CO_2 < or = 4% than +/- 0.2%

if O_2 > or = 15% than +/- 0.2%

if O_2 < 15% than +/- 0.3%

Ambient Check

Oxygen ✓ (20.9)

Carbon Dioxide ✓ (0.0)

Report all values to the nearest 0.1 percent

Comments Cal L/ 9.9 1 % CO_2, 12.63 % O_2, Ø N_2

WESTON MANAGERS DESIGNERS/CONSULTANTS

Method3

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Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/19/99 Outlet gm
Run B09-OUT-1
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	691.3	842.4	151.1
BUBBLER	KCl	693.7	773.5	79.8
IMPINGER	KCl	700.7	706.9	6.2
BUBBLER	H_2O_2/HNO_3	752.3	755.9	3.6
BUBBLER	$KMnO_4/H_2SO_4$	709.8	710.4	0.6
BUBBLER	$KMnO_4/H_2SO_4$	738.1	737.9	-0.2
IMPINGER	$KMnO_4/H_2SO_4$	725.7	726.7	1.0
BUBBLER	SILICA GEL	825.9	840.8	14.9
			Total H_2O (g)	~~257.0~~ 242.1
FILTER			Sigal	14.9
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/19/99 Out - pm
Run B09-OUT-2
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	725.8	904.8	179.0
BUBBLER	KCl	625.6	661.5	35.9
IMPINGER	KCl	699.7	705.8	6.1
BUBBLER	H_2O_2/HNO_3	720.5	722.9	2.4
BUBBLER	$KMnO_4/H_2SO_4$	699.7	700.9	1.2
BUBBLER	$KMnO_4/H_2SO_4$	751.1	750.9	-0.2
IMPINGER	$KMnO_4/H_2SO_4$	703.7	706.2	2.5
BUBBLER	SILICA GEL	812.0	826.7	14.7
			Total H_2O (g)	~~241.6~~ 22.6
FILTER			Sigd	14.7
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Sample Pt. _____

Train Type : **ONTARIO-HYDRO METHOD**

Date 7/20/99 outlet
Run B09-OUT-3
Fund # _____
Cost Center # _____

Stopper Type	Type Of Solution	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
BUBBLER	KCl	620.7	785.9	165.2
BUBBLER	KCl	721.4	776.4	55.0
IMPINGER	KCl	695.9	700.5	4.6
BUBBLER	H_2O_2/HNO_3	711.9	715.3	3.4
BUBBLER	$KMnO_4/H_2SO_4$	704.6	705.5	0.9
BUBBLER	$KMnO_4/H_2SO_4$	753.0	752.5	-0.5
IMPINGER	$KMnO_4/H_2SO_4$	713.5	714.2	0.7
BUBBLER	SILICA GEL	935.8	951.3	15.5
			Total H_2O (g)	~~244.8~~ 229
FILTER			5 gel	15.5
			Total Dust (g)	

$V_w std = 0.0474 * (H_2O\ g)$ _____ SCF

$V_m Corrected = V_m * C_m$ _____ ACF

$V_m std = \frac{17.71\ V_m C\ (P_b + \Delta H/13.6)}{T_m}$ _____ SCF

$V_t std = V_w std + V_m std$ _____ SCF

$\%H_2O = (V_w std / V_t std) * 100$ _____ $\%H_2O$

$Q_n std = 17.71\ Q_n\ P_s / T_s$ _____ SCFM

% Isokinetic = $V_t std / (Q_n std * Time)$ _____ %

DUST LOADING CALCULATIONS (Concentration Basis)

DCL = 15.432 (dust g) / $V_t std$ _____ grains/scf

% Efficiency = $\frac{(\text{Inlet DCL} - \text{Outlet DCL})}{\text{Inlet DCL}} * 100$ _____ %

ACFM = V_s * Pipe Area (ft^2) _____ ACFM

SCFM = ACFM * $P_s/29.92 * 530/T_s$ = ACFM * P_s/T_s * 17.71 _____ SCFM

lbs/hour = grains / scf * 0.000143 * SCFM * 60 _____ lbs/hour

Unit 5
Test 1
Coal

0855 to 1130

PROCESS STREAM SAMPLING SHEET

Sample Stream: Unit #5 Coal

Plant WEPCO - Presque Isle

Date 7-13-99

Increment	1	2	3	4	5	6	7	8
Time	0855	0915	0930	0945	1000	1020	1040	1100
Weigth / Volume	500 mg	200	400	400	400	400	400	400
Comp / Grab	GRAB	6	6	6	6	6	6	6
Process Status	79 mw	79	79	79	79	79	80	80
Sampler Condition	Clean	Clean	C	C	C	C	C	C
Container Condition	Clean	Clean	C	C	C	C	C	C
Container Label	Y	Y	Y	Y	Y	Y	Y	Y
Sampler	MSD	MSD	MSD	MSD	MSD	MSD	MSD	MSD
Sample Stored	Y	Y	Y	Y	Y	Y	Y	Y
pH (if required)								
Temperature								
Preservative								
Mill-Tube	A1	A2	B1	B1	C1	C1	D1	D1

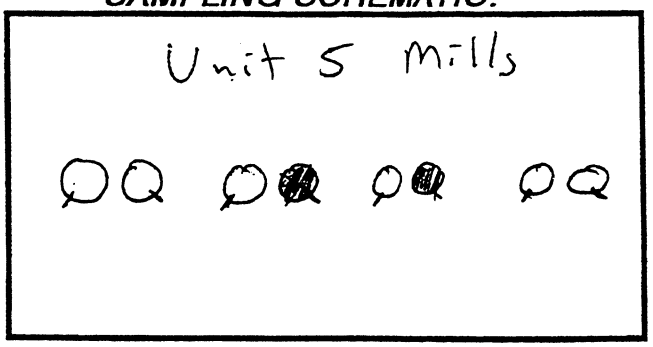
Test ID	Unit 5 - Test 1 - Coal	Composite Logged?	Yes
Sample Stream	Unit # 5 Coal	Sample Stored?	Yes
Sample ID	Unit5 - Test 1 - Coal	Storage Method:	Bag/Bag/Bucket
Target Size	3-5 kg	Checked By:	MSD & Vito
Sample Device	mill Sampler	Shipped By:	MSD
Analysis		Received By:	MSD - 7-23-99
Preservative	–		
Container	Plastic Bag		
Frequency	20 min		
Safety Issues	Dust		
Protective Gear	Mask, Gloves, Glasses		

SAMPLING NOTES:

Outside to Inside traverse - 30 seconds
Inside to Outside traverse - 30 seconds

Used Presque Isle Sampler

SAMPLING SCHEMATIC:



← Unit 4

→ Unit 6

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Unit 5
Test 1
ESP Ash Front

PROCESS STREAM SAMPLING SHEET

Plant WEPCO Presque Isle

Sample Stream: Unit 5 ESP Ash Front Field

Date 7-13-99

Increment	1	2	3	4	5	6	7	8
Time	1000							
Weigth / Volume								
Comp / Grab	3 hoppers							
Process Status	79							
Sampler Condition	OK							
Container Condition	OK							
Container Label	Y							
Sampler	Thief	MSD						
Sample Stored	Yes							
pH (if required)								
Temperature								
Preservative								

Test ID: Unit 5- Test 1
Sample Stream: Front Field ESP Ash
Sample ID: Unit 5- Test 1- F
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Glass Bottles
Frequency: 2 per Test
Safety Issues: Dust- Heat
Protective Gear: Gloves- mask- Glasses

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: M.S. DiNato
Shipped By: MSD
Received By: MSD 7-23-99

SAMPLING NOTES:

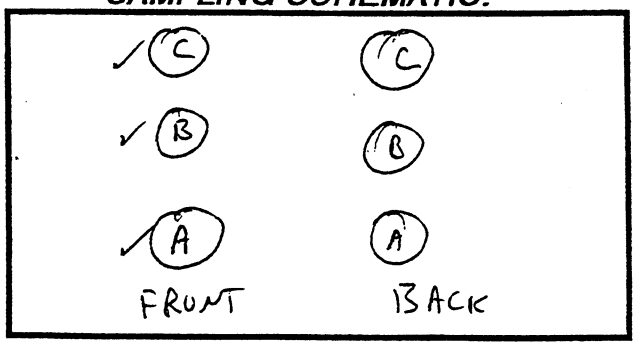
Hoppers Pulled Clean @

Dust Accumulated for min

Hoppers Pulled

Dust Accumulated for min

SAMPLING SCHEMATIC:



Gas Flow

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Unit 5
Test 1
ESP Ash Back

PROCESS STREAM SAMPLING SHEET

Sample Stream: Unit #5 ESP Ash Back Field

Plant Wepco Presque Isle

Date 7-13-99

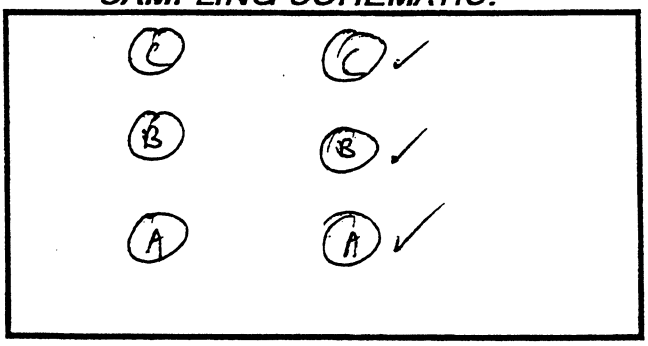
Increment	1	2	3	4	5	6	7	8
Time	0950							
Weigth / Volume								
Comp / Grab	3 hoppers							
Process Status	79 mw							
Sampler Condition	OK							
Container Condition	OK							
Container Label	Y							
Sampler	MSD							
Sample Stored	Y							
pH (if required)								
Temperature								
Preservative								

Test ID: Unit #5 - Test 1
Sample Stream: Back Field ESP Ash
Sample ID: Unit 5 - Test 1 - Back
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Bottles / Glass
Frequency: 2 per Test
Safety Issues:
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: M. S. DeVito
Shipped By: MSD
Received By: MSD 7-23-99

SAMPLING NOTES:

SAMPLING SCHEMATIC:



Gas Flow

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Unit 5
Test 2
Coal

PROCESS STREAM SAMPLING SHEET

Sample Stream: Unit #5 Coal

Plant WEPCO Presque Isle

Date 7-13-99

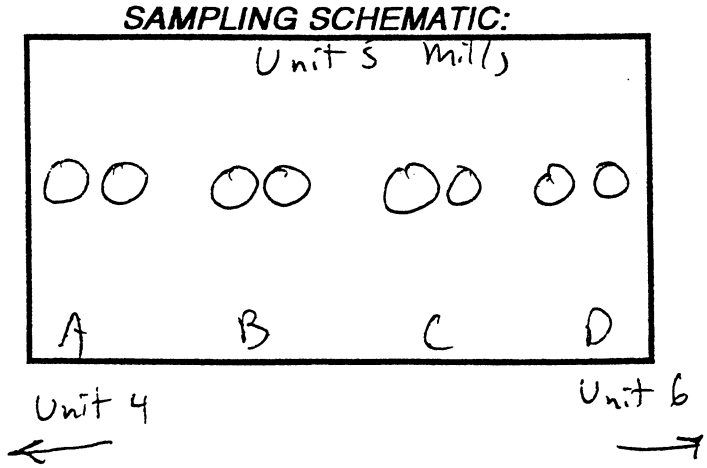
Increment	1	2	3	4	5	6	7	8
Time	1335	1355	1415	1435	1500	1520	1540	1605
Weigth / Volume	500 g							
Comp / Grab								
Process Status	80 mw							
Sampler Condition	OK	OK	OK	OK	OK	OK	OK	OK
Container Condition	OK	OK	OK	OK	OK	OK	OK	OK
Container Label	Y	Y	Y	Y	Y	Y	Y	Y
Sampler	MSD	MSD	MSD	MSD	MSD	MSD	MSD	MSD
Sample Stored	Y	Y	Y	Y	Y	Y	Y	Y
pH (if required)								
Temperature								
Preservative								
Mill-Tube	D-1	D-1	C-1	C-1	B-1	B-1	A-1	A-2

Test ID: Unit 5 - Test 2
Sample Stream: Unit #5 Coal
Sample ID: Unit 5 - Test-2 Coal
Target Size: 3-5 Kg
Sample Device: Mill Sampler
Analysis:
Preservative:
Container: Plastic Bag
Frequency: 20 min
Safety Issues: Dust
Protective Gear: Mask

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Bag/Bag/Bucket
Checked By: M. S. [illegible]
Shipped By: MSD
Received By: MSD 7-23-99

SAMPLING NOTES:

SAMPLING SCHEMATIC:



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Unit 5
Test 2
ESP Ash Front

PROCESS STREAM SAMPLING SHEET

Sample Stream: Unit 5 ESP Ash Front Field

Plant WEPCO Presque Isle

Date 7-13-99

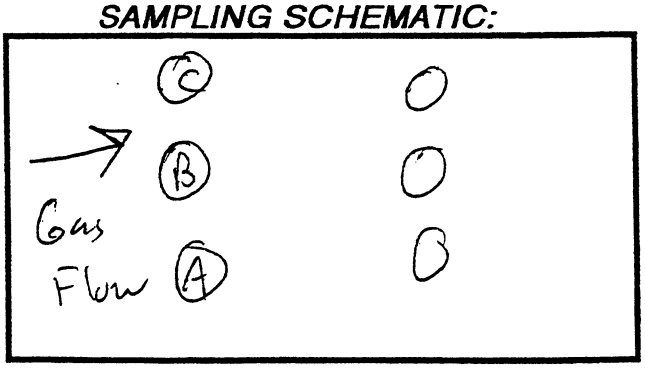
Increment	1	2	3	4	5	6	7	8
Time	1440							
Weigth / Volume								
Comp / Grab	3 hopper							
Process Status	80 mw							
Sampler Condition	OK							
Container Condition	OK							
Container Label	Y							
Sampler	MSD							
Sample Stored	Y							
pH (if required)								
Temperature								
Preservative								

Test ID: Unit 5 / Test 2
Sample Stream: Front Field ESP Ash
Sample ID: Unit 5 - Test 2 Front
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Glass Bottle
Frequency: 1 per Test
Safety Issues:
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: M. & Dikto
Shipped By: MSD
Received By: MSD - 7-23-99

SAMPLING NOTES:

SAMPLING SCHEMATIC:



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Unit 5
Test 2
ESP Ash Back

PROCESS STREAM SAMPLING SHEET

Plant WEPCO Presque Isle

Sample Stream: Unit 5 ESP Ash Back Field

Date 7-13-99

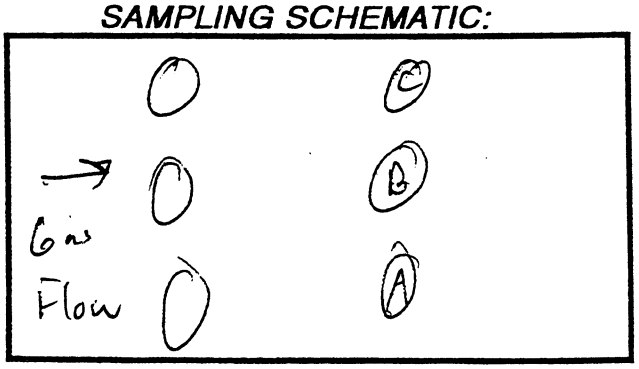
Increment	1	2	3	4	5	6	7	8
Time	1450							
Weigth / Volume								
Comp / Grab	3 hoppers							
Process Status	80 mw							
Sampler Condition	OK							
Container Condition	OK							
Container Label	Y							
Sampler	MSD							
Sample Stored	Y							
pH (if required)								
Temperature								
Preservative								

Test ID: Unit 5 / Test 2
Sample Stream: Back Field ESP Ash
Sample ID: Unit 5 - Test 2 Back
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Glass Bottle
Frequency: 1 Per Test
Safety Issues:
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: M. S. DeVita
Shipped By: MSD
Received By: MSD 7-23-99

SAMPLING NOTES:

SAMPLING SCHEMATIC:



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Unit 5
Test 3
Coal

PROCESS STREAM SAMPLING SHEET

Sample Stream: Unit 5 Coal

Plant WEPCO Presque Isle

Date 7-14-99

Increment	1	2	3	4	5	6	7	8
Time	0815	0835	0858	0915	0935	0955	1020	
Weigth / Volume	~500g							
Comp / Grab								
Process Status	82 mw	82	82	82	82	82		
Sampler Condition	clean							
Container Condition	new							
Container Label	Yes							
Sampler	OK							
Sample Stored	Yes							
pH (if required)								
Temperature								
Preservative								
mill / Tube	A-1	A-1	B-1	B-1	C-1	C-1	D-1	D-1

Test ID	Unit #5 - Test #3	Composite Logged?	Yes
Sample Stream	Unit 5 Coal		
Sample ID	Unit 5 - Test 3 - Coal	Sample Stored?	Yes
Target Size	3-5 Kg		
Sample Device	mill Sampler	Storage Method:	Bag / Bag / Bagged
Analysis			
Preservative		Checked By:	M. S. DeMto
Container	Plastic Bag		
Frequency	20 min	Shipped By:	MSD
Safety Issues	Dust		
Protective Gear	mask	Received By:	MSD 7-23-99

SAMPLING NOTES:

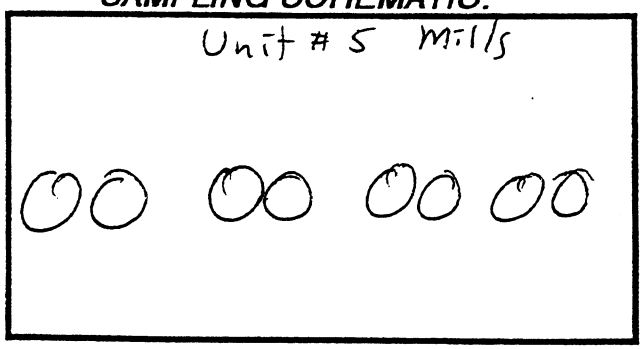
10 Traverse Points -
8 seconds / point.

Test Start - 0815

Test stop -

SAMPLING SCHEMATIC:

Unit #5 Mills



← Unit 4

Unit 6 →

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Unit 5
Test 3
ESP Ash Front

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle

Sample Stream: Unit 5 ESP ASH Front

Date 7/14/99

Increment	1	2	3	4	5	6	7	8
Time	0945							
Weigth / Volume								
Comp / Grab	3-hoppers							
Process Status								
Sampler Condition	"							
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								

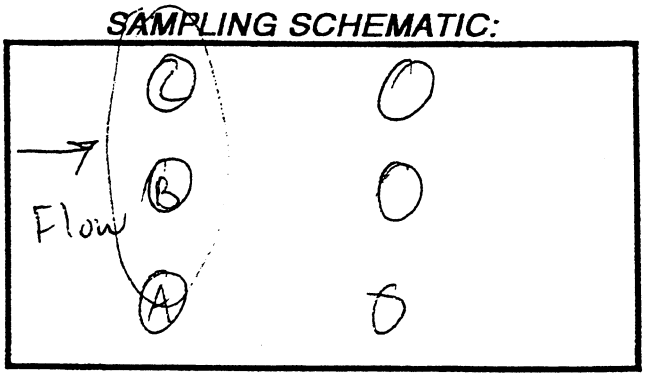
Test ID: Unit 5 - Test 3
Sample Stream: Front Field ESP
Sample ID:
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Glass Bottles
Frequency: Grab
Safety Issues:
Protective Gear:

Composite Logged? Y
Sample Stored? Y
Storage Method: Glass Bottle
Checked By: M. S. DeVito
Shipped By: MSD
Received By: MSD - 7-23-99

SAMPLING NOTES:

Plant Clean-out of Hopper @ 0800
Hoppers allowed to fill.
Sampled with thief @
0945

SAMPLING SCHEMATIC:



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Unit 5
Test 3
ESP Ash Back

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle

Sample Stream: Unit 5 ESP Ash Back

Date 7/14/99

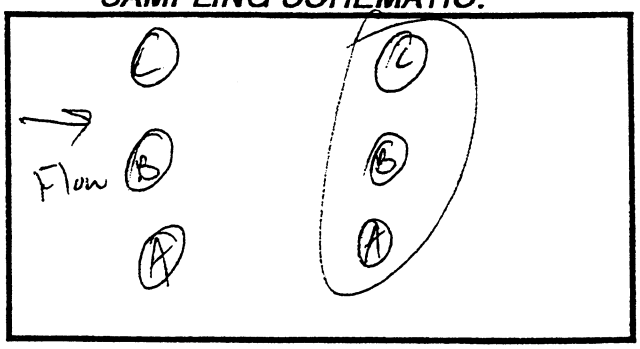
Increment	1	2	3	4	5	6	7	8
Time	0940							
Weigth / Volume								
Comp / Grab								
Process Status								
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								

Test ID: Unit 5 / Test 3
Sample Stream: Back Field ESP
Sample ID:
Target Size:
Sample Device: Thief
Analysis:
Preservative:
Container: Glass Bottles
Frequency: Grab
Safety Issues:
Protective Gear:

Composite Logged? Y
Sample Stored? Y
Storage Method: Glass Bottle
Checked By: M.S.D.V.
Shipped By: MSD
Received By: MSD 7-23-99

SAMPLING NOTES: 0940

SAMPLING SCHEMATIC:



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Unit 9
Test 1
Coal

PROCESS STREAM SAMPLING SHEET

Sample Stream: Coal

Plant Presque Isle

Date 7/19/99

Increment	1	2	3	4	5	6	7	8
Time	0940	1010	1035	1100	1125	1150	1215	1245
Weigth / Volume								
Comp / Grab								
Process Status	84mu	—	—	—	—	—	—	—
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								
Tube	1	2	3	4	5	6	7	8

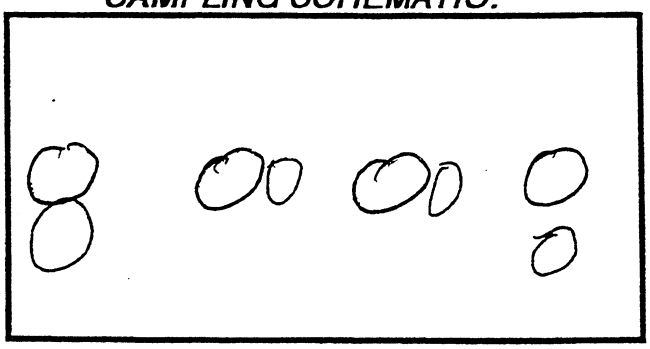
Test ID: Unit 9 - Test 1
Sample Stream: Coal
Sample ID:
Target Size: 5 kg
Sample Device: mill Sampler
Analysis:
Preservative:
Container: Plastic Bag
Frequency: Every 20 minutes
Safety Issues: Dust
Protective Gear: Gloves / Mask

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Bag / Bag / Bucket
Checked By: MSD
Shipped By: MSD
Received By: MSD - 7/23/99

SAMPLING NOTES:

4 mills - 8 feed pipes.
1 sample / pipe - every 25 min.

SAMPLING SCHEMATIC:



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Unit 9
Test 1
ESP Ash

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle **Sample Stream:** ESP Ash

Date 7/19/99

Increment	1	2	3	4	5	6	7	8
Time	1145							
Weigth / Volume								
Comp / Grab								
Process Status								
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								

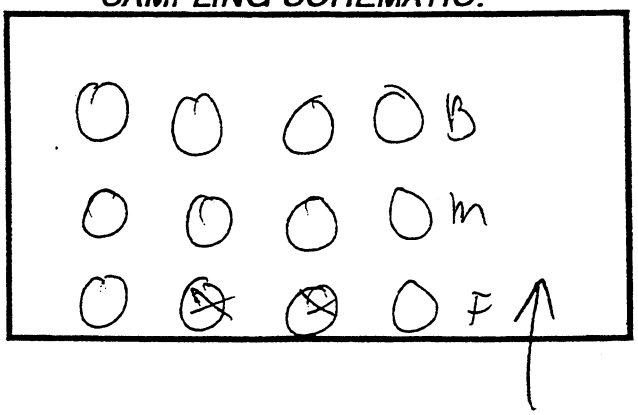
Test ID: Unit 9- Test 1
Sample Stream: Unit 9 - ESP Ash
Sample ID: 1
Target Size: 1 Qs
Sample Device: Scoop
Analysis:
Preservative:
Container: Glass Bottle
Frequency: 1 per Test
Safety Issues: Hot Ash!
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: MSD
Shipped By: MSD
Received By: MSD- 7-23-99

SAMPLING NOTES: Composite from all 3 fields

Sample Taken by Plant Operators

SAMPLING SCHEMATIC:



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Unit 9
Test 2
Coal

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle

Sample Stream: Coal

Date 7/19/99

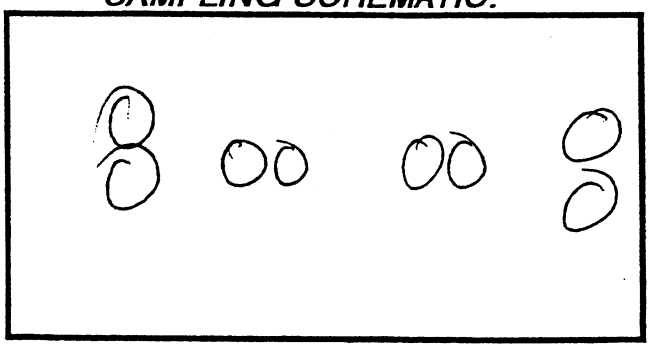
Increment	1	2	3	4	5	6	7	8
Time	1405	1430	1455	1520	1545	1615	1645	1715
Weigth / Volume								
Comp / Grab								
Process Status	664 mw							
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								
Tube	1	2	3	4	5	6	7	8

Test ID: Unit 9 - Test 2
Sample Stream: Unit 9 Coal
Sample ID:
Target Size: 5 lb
Sample Device: mill Sampler
Analysis:
Preservative:
Container: Plastic Bag
Frequency: Every 20 min.
Safety Issues: Dust
Protective Gear: Gloves / Mask

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Bag / Bag / Bottle
Checked By: MSD
Shipped By: MSD
Received By: MSD - 7/23/99

SAMPLING NOTES:

SAMPLING SCHEMATIC:



O:\appres\stack\process

Unit 9
Test 2
ESP Ash

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle **Sample Stream:** ESP Ash Date 7/19/99

Increment	1	2	3	4	5	6	7	8
Time	1625							
Weigth / Volume								
Comp / Grab								
Process Status								
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								

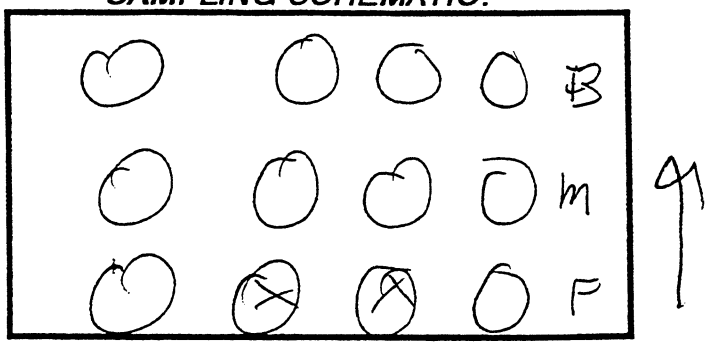
Test ID: Unit 9 - Test 2
Sample Stream: Unit 9 - ESP Ash
Sample ID: 1 Kg
Target Size:
Sample Device: Scoop
Analysis:
Preservative:
Container: Glass Bottle
Frequency: 1 Per test
Safety Issues:
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: MSP
Shipped By: MSP
Received By: MSP - 7/23/99

SAMPLING NOTES: Composite from all 3 Fields

Taken By Plant Operators

SAMPLING SCHEMATIC:



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Unit 9
Test 3
Coal

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle **Sample Stream:** Coal

Date 7/20/99

Increment	1	2	3	4	5	6	7	8
Time	0800	0825	0850	0975	0935	1000	1020	1040
Weigth / Volume								
Comp / Grab								
Process Status	8 c/ mill							
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								
Tube	1	2	3	4	5	6	7	8

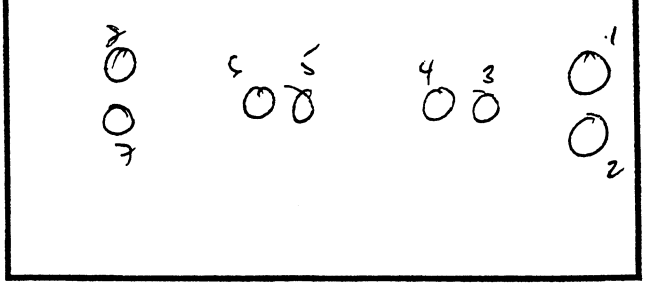
Test ID: Unit 9 / Test 3
Sample Stream: Coal
Sample ID:
Target Size: 5 lbs
Sample Device: Mill Sampler
Analysis:
Preservative:
Container: Plastic Bag
Frequency: Every 20 min
Safety Issues:
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Bag / Bag / Buckel
Checked By: MSD
Shipped By: MSD
Received By: MSD - 7-23-99

SAMPLING NOTES: 0800 to 1050

4 mills / 8 pipes

SAMPLING SCHEMATIC:



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Unit 9
Test 3
ESP Ash

PROCESS STREAM SAMPLING SHEET

Plant Presque Isle **Sample Stream:** ESP Ash

Date 7/20/99

Increment	1	2	3	4	5	6	7	8
Time	1000							
Weigth / Volume								
Comp / Grab								
Process Status								
Sampler Condition								
Container Condition								
Container Label								
Sampler								
Sample Stored								
pH (if required)								
Temperature								
Preservative								

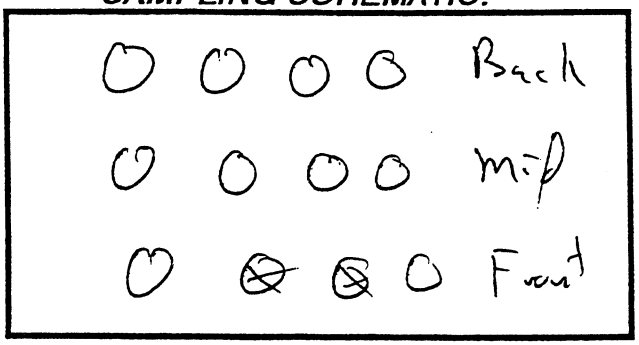
Test ID: Unit 9- Test 3
Sample Stream: Unit 9- ESP Ash
Sample ID: ~~5 kg~~
Target Size: 1 kg
Sample Device: Scoop
Analysis:
Preservative:
Container: Glass Bottle
Frequency: 1 Grab /Test
Safety Issues: Hot!
Protective Gear:

Composite Logged? Yes
Sample Stored? Yes
Storage Method: Glass Bottle
Checked By: msp
Shipped By: msp
Received By: msp -7-23-99

SAMPLING NOTES:

Sample taken by Plant Operators

SAMPLING SCHEMATIC:



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APPENDIX D
LABORATORY ANALYTICAL REPORTS

ONTARIO HYDRO SAMPLES ANALYTICAL REPORT

Lab Tracking Number

Chain-of-Custody Record/Lab Work Request

WESTON

Client	DOE, PRESQE ISLE		
Work Order Number	20009-011-006-0500	Phone Number	610-701-7201
Contact Person	Jeff ONeill	Turn Around Time	Standard

Lab ID	Field Sample ID	Sample Collection Date	Analysis	Hg	Filt #		Sample Check-off
	DOE - BO 5 - IN - 1 - OHM - 13JUL1999 - FHHNO3	7/13/99	OHM	X			
	DOE - BO 5 - IN - 1 - OHM - 13JUL1999 - FILT		OHM	X	3/5		
	DOE - BO 5 - IN - 1 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - IN - 1 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - IN - 1 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - IN - 2 - OHM - 13JUL1999 - FHHNO3	7/13/99	OHM	X			
	DOE - BO 5 - IN - 2 - OHM - 13JUL1999 - FILT		OHM	X	7/10		
	DOE - BO 5 - IN - 2 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - IN - 2 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - IN - 2 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - IN - 3 - OHM - 13JUL1999 - FHHNO3	7/14/99	OHM	X			
	DOE - BO 5 - IN - 3 - OHM - 13JUL1999 - FILT		OHM	X	11/13		
	DOE - BO 5 - IN - 3 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - IN - 3 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - IN - 3 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - IN - BT - OHM - 13JUL1999 - FHHNO3	7/13/99	OHM	X			
	DOE - BO 5 - IN - BT - OHM - 13JUL1999 - FILT		OHM	X	6 ✓		
	DOE - BO 5 - IN - BT - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - IN - BT - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - IN - BT - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	~~DOE - BO 5 - IN - SB - OHM - 13JUL1999 - KCl~~		OHM				
	~~DOE - BO 5 - IN - SB - OHM - 13JUL1999 - FILT~~		OHM				
	~~DOE - BO 5 - IN - SB - OHM - 13JUL1999 - KMNO4~~		OHM				
	~~DOE - BO 5 - IN - SB - OHM - 13JUL1999 - HNO3/H2O2~~		OHM				
	~~DOE - BO 5 - IN - SB - OHM - 13JUL1999 - HNO3~~		OHM				
	DOE-BOS-IN-1-OHM-PTR	7/13/99	OHM	X			
	DOE-BOS-IN-2-OHM-PTR	7/13/99	OHM	X			
	DOE-BOS-IN-3-OHM-PTR	7/14/99	OHM	X			
	DOE-BOS-IN-BT-OHM-PTR	7/13/99	OHM	X			

Notes: OHM - Speciated Mercury Analysis per Ontario Hydro Method

Relinquished By	Received By	Date	Time	Lab Use Only	
[illegible]		7/14/99		Shipper	Air Bill #
				Opened By	Date/Time
				Temp °C	Condition
				Custody Seals: Yes No None N/A	

Laboratory Comments:

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Lab Tracking Number

Chain-of-Custody Record/Lab Work Request

WESTON

Client	DOE, PRESQE ISLE		
Work Order Number	20009-011-006-0500	Phone Number	610-701-7201
Contact Person	Jeff ONeill	Turn Around Time	Standard

Lab ID	Field Sample ID	Sample Collection Date	Analysis	Hg	Filt. #		Sample Check-off
	DOE - BO 5 - OUT - 1 - OHM - 13JUL1999 - FHHNO3	7/13/99	OHM	X			
	DOE - BO 5 - OUT - 1 - OHM - 13JUL1999 - FILT		OHM	X	4		
	DOE - BO 5 - OUT - 1 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - OUT - 1 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - OUT - 1 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - OUT - 2 - OHM - 13JUL1999 - FHHNO3	7/13/99	OHM	X			
	DOE - BO 5 - OUT - 2 - OHM - 13JUL1999 - FILT		OHM	X	8		
	DOE - BO 5 - OUT - 2 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - OUT - 2 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - OUT - 2 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - OUT - 3 - OHM - 13JUL1999 - FHHNO3	7/14/99	OHM	X			
	DOE - BO 5 - OUT - 3 - OHM - 13JUL1999 - FILT		OHM	X	12		
	DOE - BO 5 - OUT - 3 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - OUT - 3 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - OUT - 3 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 5 - OUT - BT - OHM - 13JUL1999 - FHHNO3	7/14/99	OHM	X			
	DOE - BO 5 - OUT - BT - OHM - 13JUL1999 - FILT		OHM	X	9 ✓		
	DOE - BO 5 - OUT - BT - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 5 - OUT - BT - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 5 - OUT - BT - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	~~DOE - BO 5 - OUT - SB - OHM - 13JUL1999 - KCl~~		OHM				
	~~DOE - BO 5 - OUT - SB - OHM - 13JUL1999 - FILT~~		OHM				
	~~DOE - BO 5 - OUT - SB - OHM - 13JUL1999 - KMNO4~~		OHM				
	~~DOE - BO 5 - OUT - SB - OHM - 13JUL1999 - HNO3/H2O2~~		OHM				
	~~DOE - BO 5 - OUT - SB - OHM - 13JUL1999 - HNO3~~		OHM				
	DOE-BOS-OUT-1-OHM-PTR	7/13/99	OHM	X			
	DOE-BOS-OUT-2-OHM-PTR	7/13/99	OHM	X			
	DOE-BOS-OUT-3-OHM-PTR	7/14/99	OHM	X			
	DOE-BOS-OUT-BT-OHM-PTR	7/14/99	OHM	X			

Notes: OHM - Speciated Mercury Analysis per Ontario Hydro Method

Relinquished By	Received By	Date	Time	Lab Use Only	
JD ONeill		7/14/99		Shipper	Air Bill #
				Opened By	Date/Time
				Temp °C	Condition
				Custody Seals: Yes No None N/A	

Laboratory Comments:

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Lab Tracking Number

Chain-of-Custody Record/Lab Work Request

WESTON

Client	DOE, PRESQE ISLE		
Work Order Number	20009-011-006-0500	Phone Number	610-701-7201
Contact Person	Jeff ONeill	Turn Around Time	Standard

Lab ID	Field Sample ID	Sample Collection Date	Analysis	Hg	Filt #		Sample Check-off
			Analyses Requested/Other Info				
	DOE - BO 9 - IN - 1 - OHM - 13JUL1999 - FHHNO3	7/19/99	OHM	X			
	DOE - BO 9 - IN - 1 - OHM - 13JUL1999 - FILT		OHM	X	23/25		
	DOE - BO 9 - IN - 1 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - IN - 1 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - IN - 1 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - IN - 2 - OHM - 13JUL1999 - FHHNO3	7/19/99	OHM	X			
	DOE - BO 9 - IN - 2 - OHM - 13JUL1999 - FILT		OHM	X	24/27		
	DOE - BO 9 - IN - 2 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - IN - 2 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - IN - 2 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - IN - 3 - OHM - 13JUL1999 - FHHNO3	7/20/99	OHM	X			
	DOE - BO 9 - IN - 3 - OHM - 13JUL1999 - FILT		OHM	X	31/30		
	DOE - BO 9 - IN - 3 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - IN - 3 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - IN - 3 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - IN - BT - OHM - 13JUL1999 - FHHNO3	7/20/99	OHM	X			
	DOE - BO 9 - IN - BT - OHM - 13JUL1999 - FILT		OHM	X	329		
	DOE - BO 9 - IN - BT - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - IN - BT - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - IN - BT - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE-BO9-IN-1-OHM-PTR	7/19/99	OHM	X			
	DOE-BO9-IN-2-OHM-PTR	7/19/99	OHM	X			
	DOE-BO9-IN-3-OHM-PTR	7/20/99	OHM	X			
	DOE-BO9-IN-BT-OHM-PTR	7/20/99	OHM	X			

Notes: OHM - Speciated Mercury Analysis per Ontario Hydro Method

Relinquished By	Received By	Date	Time	Lab Use Only	
[illegible]		7/20/99		Shipper	Air Bill #
				Opened By	Date/Time
				Temp °C	Condition
				Custody Seals: Yes No None N/A	

Laboratory Comments:

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Lab Tracking Number

Chain-of-Custody Record/Lab Work Request

WESTON

ATTENTION

Client	DOE, PRESQE ISLE		
Work Order Number	20009-011-006-0500	Phone Number	610-701-7201
Contact Person	Jeff ONeill	Turn Around Time	Standard

Lab ID	Field Sample ID	Sample Collection Date	Analysis	Hg	Filt #		Sample Check-off
	DOE - BO 9 - OUT - 1 - OHM - 13JUL1999 - FHHNO3	7/19/99	OHM	X			
	DOE - BO 9 - OUT - 1 - OHM - 13JUL1999 - FILT		OHM	X	22		
	DOE - BO 9 - OUT - 1 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - OUT - 1 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - OUT - 1 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - OUT - 2 - OHM - 13JUL1999 - FHHNO3	7/19/99	OHM	X			
	DOE - BO 9 - OUT - 2 - OHM - 13JUL1999 - FILT		OHM	X	28		
	DOE - BO 9 - OUT - 2 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - OUT - 2 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - OUT - 2 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - OUT - 3 - OHM - 13JUL1999 - FHHNO3	7/20/99	OHM	X			
	DOE - BO 9 - OUT - 3 - OHM - 13JUL1999 - FILT		OHM	X	32		
	DOE - BO 9 - OUT - 3 - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - OUT - 3 - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - OUT - 3 - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	DOE - BO 9 - OUT - BT - OHM - 13JUL1999 - FHHNO3	7/19/99	OHM	X			
	DOE - BO 9 - OUT - BT - OHM - 13JUL1999 - FILT		OHM	X	26		
	DOE - BO 9 - OUT - BT - OHM - 13JUL1999 - BHKCL		OHM	X			
	DOE - BO 9 - OUT - BT - OHM - 13JUL1999 - BHHNO3		OHM	X			
	DOE - BO 9 - OUT - BT - OHM - 13JUL1999 - BHKMNO4		OHM	X			
	~~DOE - BO 9 - OUT - SB - OHM - 13JUL1999 - KCL~~		~~OHM~~				
	DOE - BO 9 - OUT - SB - OHM - 13JUL1999 - FILT	7/20/99	OHM	X			
	~~DOE - BO 9 - OUT - SB - OHM - 13JUL1999 - KMNO4~~		~~OHM~~				
	~~DOE - BO 9 - OUT - SB - OHM - 13JUL1999 - HNO3/H2O2~~		~~OHM~~				
	~~DOE - BO 9 - OUT - SB - OHM - 13JUL1999 - HNO3~~		~~OHM~~				
	DOE-BO9-OUT-1-OHM-PTR	7/19/99	OHM	X			
	DOE-BO9-OUT-2-OHM-PTR	7/19/99	OHM	X			
	DOE-BO9-OUT-3-OHM-PTR	7/20/99	OHM	X			
	DOE-BO9-OUT-BT-OHM-PTR	7/19/99	OHM	X			

Notes: OHM - Speciated Mercury Analysis per Ontario Hydro Method

Relinquished By	Received By	Date	Time	Lab Use Only	
[illegible]		7/20/99		Shipper	Air Bill #
				Opened By	Date/Time
				Temp °C	Condition
				Custody Seals: Yes No None N/A	

Laboratory Comments:

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MERCURY ANALYSIS

DATE: 7/14/99
LOCATION: PRESQUE ISLE POWER PLANT

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
71399-1	BO5-IN-1-FHHNO3	0.1 N HNO3	250	<0.03
71399-2	BO5-IN-1-PFHNO3	0.1 N HNO3	250	<0.03
71399-3	BO5-IN-1-BHKCL	KCL	500	1.46
71399-4	BO5-IN-1-BHHNO3	H2O2	250	<0.03
71399-5	BO5-IN-1-BHKMNO4	KMnO4	500	0.41
71399-6	BO5-OUT-1-FHHNO3	0.1 N HNO3	250	<0.03
71399-7	BO5-OUT-1-PFHNO3	0.1 N HNO3	250	<0.03
71399-8	BO5-OUT-1-BHKCL	KCL	500	2.55
71399-9	BO5-OUT-1-BHHNO3	H2O2	250	<0.03
71399-10	BO5-OUT-1-BHKMN	KMnO4	500	3.8
71399-11	BO5-IN-2-FHHNO3	0.1 N HNO3	250	<0.03
71399-12	BO5-IN-2-PFHNO3	0.1 N HNO3	250	<0.03
71399-13	BO5-IN-2-BHKCL	KCL	500	2.11
71399-14	BO5-IN-2-BHHNO3	H2O2	250	0.04
71399-15	BO5-IN-2-BHKMNO4	KMnO4	500	1.8
71399-19	BO5-FBSPK-KCL	KCL	500	2.06
71399-20	B05-FBSPK-HNO3	H2O2	250	1.95
71399-21	BO5-FBSPK-KMNO4	KMnO4	500	1.77
71399-22	10% HNO3 BLANK	10% HNO3	100	<0.03
71399-23	KCL BLANK	KCL	100	<0.03
71399-24	H2O2 BLANK	H2O2	100	<0.03
71399-25	KMNO4 BLANK	KMNO4	100	<0.03
71399-26	BO5-OUT-2-FHHNO3	0.1 N HNO3	250	<0.03
71399-27	BO5-OUT-2-PFHNO3	0.1 N HNO3	250	<0.03
71399-28	BO5-OUT-2-BHKCL	KCL	500	3.15
71399-29	BO5-OUT-2-BHHNO3	H2O2	250	<0.03
71399-30	BO5-OUT-2-BHKMN	KMnO4	500	3.89
71399-31	BO5-OUT-BT-FHHNO	0.1 N HNO3	250	<0.03
71399-32	BO5-OUT-BT-PFHNO	0.1 N HNO3	250	<0.03
71399-33	BO5-OUT-BT-BHKCL	KCL	500	<0.03
71399-34	BO5-OUT-BT-BHHNO	H2O2	250	<0.03
71399-35	BO5-OUT-BT-BHKMN	KMnO4	500	<0.03

DATE: 7/15/99
LOCATION: PRESQUE ISLE POWER PLANT

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME, ml	CONCENTRATION, ug/L
71499-1	BO5-IN-3-FHHNO3	0.1 N HNO3	250	<0.03
71499-2	BO5-IN-3-PFHNO3	0.1 N HNO3	200	<0.03
71499-3	BO5-IN-3-BHKCL	KCL	500	1.57
71499-4	BO5-IN-3-BHHNO3	H2O2	250	<0.03
71499-5	BO5-IN-3-BHKMNO4	KMnO4	500	0.83
71499-6	BO5-OUT-3-FHHNO3	0.1 N HNO3	250	<0.03
71499-7	BO5-OUT-3-PFHNO3	0.1 N HNO3	200	<0.03
71499-8	BO5-OUT-3-BHKCL	KCL	500	2.81
71499-9	BO5-OUT-3-BHHNO3	H2O2	250	<0.03
71499-10	BO5-OUT-3-BHKMN	KMnO4	500	3.61
71499-11	BO5-IN-BT-FHHNO3	0.1 N HNO3	100	<0.03
71499-12	BO5-IN-BT-PFHNO3	0.1 N HNO3	100	<0.03
71499-13	BO5-IN-BT-BHKCL	KCL	500	<0.03
71499-14	BO5-IN-BT-BHHNO3	H2O2	250	<0.03
71499-15	BO5-IN-BT-BHKMNO	KMnO4	500	<0.03

Mercury in Ash Collecting in the Sampling Train Thimbles at Presque Isle

Sample Code Code	Sample ID ID	Measued Hg	Total Hg µg	Total Ash g
49863-01	DOE-BO5 IN-1	0.244	6.917	28.348
49863-02	DOE-BO5 OUT-1 (total ug)	0.020	0.020	
49863-03	DOE-BO5 IN-2	0.207	5.753	27.79441
49863-04	DOE-BO5 OUT-2 (total ug)	0.009	0.009	
49863-05	DOE-BO5 IN-3	0.282	8.866	31.44131
49863-06	DOE-BO5 OUT-3 (total ug)	0.033	0.033	

MERCURY ANALYSIS

DATE: 7/20/99
LOCATION: PRESQUE ISLE POWER PLANT

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME (ml)	CONCENTRATION (ug/L)
71999-1	BO9-IN-1-FHHNO3	0.1 N HNO3	250	<0.03
71999-2	BO9-IN-1-PFHNO3	0.1 N HNO3	250	<0.03
71999-3A	BO9-IN-1-BHKCL	KCL	500	0.49
71999-3B	BO9-IN-1-BHKCL-excess	KCL excess	250	0.22
71999-4	BO9-IN-1-BHHNO3	H2O2	250	0.14
71999-5	BO9-IN-1-BHKMNO4	KMnO4	500	28.59
71999-6	BO9-OUT-1-FHHNO3	0.1 N HNO3	200	<0.03
71999-7	BO9-OUT-1-PFHNO3	0.1 N HNO3	250	<0.03
71999-8A	BO9-OUT-1-BHKCL	KCL	500	2.14
71999-8B	BO9-OUT-1-BHKCL-excess	KCL excess	250	0.15
71999-9	BO9-OUT-1-BHHNO3	H2O2	250	0.24
71999-10	BO9-OUT-1-BHKMNO4	KMnO4	500	24.2
71999-11	BO9-IN-2-FHHNO3	0.1 N HNO3	250	<0.03
71999-12	BO9-IN-2-PFHNO3	0.1 N HNO3	500	<0.03
71999-13A	BO9-IN-2-BHKCL	KCL	500	0.6
71999-13B	BO9-IN-2-BHKCL-excess	KCL excess	250	0.04
71999-14	BO9-IN-2-BHHNO3	H2O2	250	0.11
71999-15	BO9-IN-2-BHKMNO4	KMnO4	500	30.84
71999-16	BO9-OUT-2-FHHNO3	0.1 N HNO3	250	<0.03
71999-17	BO9-OUT-2-PFHNO3	0.1 N HNO3	500	<0.03
71999-18A	BO9-OUT-2-BHKCL	KCL	500	2.58
71999-18B	BO9-OUT-2-BHKCL-excess	KCL excess	250	0.09
71999-19	BO9-OUT-2-BHHNO3	H2O2	250	0.12
71999-20	BO9-OUT-2-BHKMNO4	KMnO4	500	26.12
71999-21	BO9-OUT-BT-FHHNO3	0.1 N HNO3	250	<0.03
71999-22	BO9-OUT-BT-PFHNO3	0.1 N HNO3	250	<0.03
71999-23	BO9-OUT-BT-BHKCL	KCL	500	<0.03
71999-24	BO9-OUT-BT-BHHNO3	H2O2	250	<0.03
71999-25	BO9-OUT-BT-BHKMNO4	KMnO4	500	<0.03
71999-26	BO9-FBSPK-19JUL1999-KCL	KCL	500	5.67
71999-27	BO9-FBSPK-19JUL1999-HNO3	H2O2	250	5.1
71999-28	BO9-FBSPK-19JUL1999-KMNO4	KMnO4	500	5.33

DATE: 7/21/99
LOCATION: PRESQUE ISLE POWER PLANT

LAB #	SAMPLE ID	SAMPLE TYPE	VOLUME (ml)	CONCENTRATION (ug/L)
72099-1	BO9-IN-3-FHHNO3	0.1 N HNO3	250	<0.03
72099-2	BO9-IN-3-PFHNO3	0.1 N HNO3	250	<0.03
72099-3A	BO9-IN-3-BHKCL	KCL	500	0.39
72099-3B	BO9-IN-3-BHKCL-excess	KCL excess	250	0.09
72099-4	BO9-IN-3-BHHNO3	H2O2	250	0.21
72099-5	BO9-IN-3-BHKMNO4	KMnO4	500	27.8
72099-6	BO9-OUT-3-FHHNO3	0.1 N HNO3	200	<0.03
72099-7	BO9-OUT-3-PFHNO3	0.1 N HNO3	250	<0.03
72099-8A	BO9-OUT-3-BHKCL	KCL	500	1.99
72099-8B	BO9-OUT-3-BHKCL-excess	KCL excess	250	0.27
72099-9	BO9-OUT-3-BHHNO3	H2O2	250	0.28
72099-10	BO9-OUT-3-BHKMNO4	KMnO4	500	25.12
72099-11	BO9-IN-BT-FHHNO3	0.1 N HNO3	250	<0.03
72099-12	BO9-IN-BT-PFHNO3	0.1 N HNO3	500	<0.03
72099-13	BO9-IN-BT-BHKCL	KCL	500	<0.03
72099-14	BO9-IN-BT-BHHNO3	H2O2	250	<0.03
72099-15	BO9-IN-BT-BHKMNO4	KMnO4	500	<0.03
72099-16	BO9-FBSPK-20JUL1999-KCL	KCL	500	5.45
72099-17	BO9-FBSPK-20JUL1999-HNO3	H2O2	250	4.77
72099-18	BO9-FBSPK-20JUL1999-KMNO4	KMnO4	500	4.74

Mercury in Ash Collecting in the Sampling Train Thimbles at Presque Isle

Sample Code Code	Sample ID ID	Measued Hg	Total Hg µg	Total Ash g
49863-13	DOE-BO9 IN-1	0.008	0.090	11.28547
49863-14	DOE-BO9 OUT-1 (total ug)	0.006	0.006	
49863-15	DOE-BO9 IN-2	< 0.005	< 0.044	8.70171
49863-16	DOE-BO9 OUT-2 (total ug)	< 0.002	< 0.002	
49863-17	DOE-BO9 IN-3	< 0.005	< 0.052	10.48393
49863-18	DOE-BO9 OUT-3 (total ug)	< 0.002	< 0.002	

ONTARIO HYDRO SAMPLES QA/QC SUMMARY

TRIPLICATE SAMPLE DATA AND CHECK STANDARD RESULTS

LOCATION:PRESQUE ISLE POWER PLANT

	POTASSIUM CHLORIDE				HYDROGEN PEROXIDE				POTASSSIUM PERMANGANATE			
	TRIAL #				TRIAL #				TRIAL #			
SAMPLE ID	1	2	3	S.D.	1	2	3	S.D.	1	2	3	S.D.
BO5-IN-1	1.5	1.41	1.46	0.0451	-0.08	-0.069	-0.062	0.01124	0.37	0.42	0.43	0.0321
BO5-IN-3	1.58	1.57	1.57	0.0058	-0.04	-0.035	-0.037	0.001528	0.83	0.83	0.83	0.0000
POPULATION STANDARD DEVIATION				0.01966				0.004856				0.016072744

CHECK STANDARD RESULTS. %	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
	101	102	103	101	105
	104	101	101	105	102
	103	104	101	102	103
	102	101	99.9	104	103
		101	98.5	101	
		103	97.5	101	
				100	
				98.8	
				99.6	

DATE: 7/14/99

Calibration Standards: 0, 1, 5, 10, 20 ppb
R=0.9999 QC= 4.01 (4) R=0.9998 QC=4.10(4)

LAB #	SAMPLE ID	SAMPLE TYPE	SPIKE AMOUNT (ppb)	SAMPLE READING(ug/L)	SPIKE READING(ug/L)	SPIKE LOCATION	SPIKE RECOVERY%
71399-3	BO5-IN-1-BHKCL	KCl	5	1.46	7.06	LAB	**111.90**
71399-3	BO5-IN-1-BHKCL	KCl	10	1.46	12.08	LAB	**106.20**
71399-19	BO5-FBSPK-KCL	KCl	2	0	2.06	**FIELD**	**103.00**
71399-19	BO5-FBSPK-KCL	KCl	5	2.06	7.67	LAB	**112.20**
71399-4	BO5-IN-1-BHHNO3	H2O2	5	0	4.59	LAB	**91.80**
71399-4	BO5-IN-1-BHHNO3	H2O2	10	0	10.53	LAB	**105.30**
71399-20	B05-FBSPK-HNO3	H2O2	2	0	1.95	**FIELD**	**97.60**
71399-20	B05-FBSPK-HNO3	H2O2	10	0	10.62	LAB	**106.20**
71399-5	BO5-IN-1-BHKMNO4	KMnO4	5	0.41	5.56	LAB	**103.00**
71399-21	BO5-FBSPK-KMNO4	KMnO4	2	0	1.77	**FIELD**	**88.50**

DATE: 7/15/99

Calibration Standards: 0, 1, 5, 10, 20 ppb

R=0.9999 QC= 4.01 (4) R=0.9999 QC=4.08(4)

LAB #	SAMPLE ID	SAMPLE TYPE	SPIKE AMOUNT (ppb)	SAMPLE READING(ug/L)	SPIKE READING(ug/L)	SPIKE LOCATION	SPIKE RECOVERY%
71499-3	BO5-IN-3-BHKCL	KCl	5	1.57	7.08	LAB	**110.20**
71499-3	BO5-IN-3-BHKCL	KCl	10	1.57	12.29	LAB	**107.20**
71499-4	BO5-IN-3-BHHNO3	H2O2	5	0	4.84	LAB	**96.90**
71499-4	BO5-IN-3-BHHNO3	H2O2	10	0	10.56	LAB	**105.60**
71499-5	BO5-IN-3-BHKMNO4	KMnO4	5	0.83	5.93	LAB	**102.00**

FIELD BLANK SPIKE STATISTICAL INFORMATION

Solution	Standard Deviation
KCL	100± 3.418
H2O2	100± 6.693
KMnO4	100± 6.362

TRIPLICATE SAMPLE DATA AND CHECK STANDARD RESULTS

LOCATION:PRESQUE ISLE POWER PLANT

	POTASSIUM CHLORIDE				HYDROGEN PEROXIDE				POTASSSIUM PERMANGANATE			
	TRIAL #				TRIAL #				TRIAL #			
SAMPLE ID	1	2	3	S.D.	1	2	3	S.D.	1	2	3	S.D.
BO9-IN-1	0.51	0.48	0.49	0.0153	----	----	----	----	28.92	28.84	28	0.5096
BO9-OUT-1	2.09	2.09	2.09	0.0000	----	----	----	----	----	----	----	----
BO9-IN-2	----	----	----		0.13	0.08	0.11	0.0252	----	----	----	----
BO9-IN-3	0.36	0.43	0.39	0.0351	0.09	0.29	0.24	0.1041	26.72	27.48	29.2	1.2706
BO9-OUT-3	1.93	1.92	1.9	0.0153	----	----	----	----	----	----	----	----
POPULATION STANDARD DEVIATION				0.012469				0.039459				0.3805

CHECK STANDARD RESULTS.

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
101	102	103	101	105
104	101	101	105	102
103	104	101	102	103
102	101	99.9	104	103
	101	98.5	101	
	103	97.5	101	
			100	
			98.8	
			99.6	

DATE: 7/20/99

Calibration Standards:

R=0.9999 QC= 4.01 (4) R=0.9998 QC=4.18(4)

LAB #	SAMPLE ID	SAMPLE TYPE	SPIKE AMOUNT (ppb)	SAMPLE READING(ug/L)	SPIKE READING(ug/L)	SPIKE LOCATION	SPIKE RECOVERY%
71999-26	BO9-FBSPK-19JUL1999-KCL	KCl	5	0	5.5	**FIELD**	**110.40**
71999-26	BO9-FBSPK-19JUL1999-KCL	KCl	5	5.5	10.93	LAB	**108.68**
71999-26	BO9-FBSPK-19JUL1999-KCL	KCl	10	5.5	15.82	LAB	**103.20**
71999-8A	BO9-OUT-1-BHKCL	KCl	5	2.14	7.6	LAB	**109.12**
71999-8A	BO9-OUT-1-BHKCL	KCl	10	2.14	12.41	LAB	**102.70**
71999-27	BO9-FBSPK-19JUL1999-HNO3	H2O2	5	0	5.1	**FIELD**	**102.08**
71999-27	BO9-FBSPK-19JUL1999-HNO3	H2O2	5	5.1	9.37	LAB	**85.34**
71999-27	BO9-FBSPK-19JUL1999-HNO3	H2O2	10	5.1	14.41	LAB	**93.10**
71999-14	BO9-IN-2-BHHNO3	H2O2	5	0.11	4.84	LAB	**94.66**
71999-14	BO9-IN-2-BHHNO3	H2O2	10	0.11	9.89	LAB	**97.80**
71999-28	BO9-FBSPK-19JUL1999-KMNO4	KMnO4	5	0	5.33	**FIELD**	**106.60**
71999-28	BO9-FBSPK-19JUL1999-KMNO4	KMnO4	5	5.33	10.5	LAB	**103.40**
71999-28	BO9-FBSPK-19JUL1999-KMNO4	KMnO4	10	5.33	15	LAB	**96.70**
71999-5	BO9-IN-1-BHKMNO4	KMnO4	5	28.59	34.14	LAB	**87.00**
71999-5	BO9-IN-1-BHKMNO4	KMnO4	10	28.59	39.14	LAB	**105.50**

DATE: 7/21/99

Calibration Standards:

				R=0.9999	QC= 4.01 (4)	R=0.9998	QC=4.11(4)	
LAB #	SAMPLE ID		SAMPLE TYPE	SPIKE AMOUNT (ppb)	SAMPLE READING(ug/L)	SPIKE READING(ug/L)	SPIKE LOCATION	SPIKE RECOVERY%
72099-16	BO9-FBSPK-20JUL1999-KCL		KCl	5	0	5.26	**FIELD**	**105.28**
71999-26	BO9-FBSPK-20JUL1999-KCL		KCl	5	5.26	10.7	LAB	**108.72**
71999-26	BO9-FBSPK-20JUL1999-KCL		KCl	10	5.26	15.4	LAB	**101.40**
72099-8A	BO9-OUT-3-BHKCL	BO9-OUT-3-BHKCL	KCl	5	1.99	7.53	LAB	**110.84**
72099-8A	BO9-OUT-3-BHKCL	BO9-OUT-3-BHKCL	KCl	10	1.99	12.39	LAB	**104.00**
72099-17	BO9-FBSPK-20JUL1999-HNO3		H2O2	5	0	4.77	**FIELD**	**95.40**
72099-17	BO9-FBSPK-20JUL1999-HNO3		H2O2	5	4.77	10.8	LAB	**120.60**
72099-17	BO9-FBSPK-20JUL1999-HNO3		H2O2	10	4.77	16.23	LAB	**114.60**
72099-4	BO9-IN-3-BHHNO3		H2O2	5	0.21	4.44	LAB	**84.60**
72099-4	BO9-IN-3-BHHNO3		H2O2	10	0.21	10.83	LAB	**106.20**
72099-18	BO9-FBSPK-20JUL1999-KMNO4		KMnO4	5	0	4.74	**FIELD**	**94.80**
72099-18	BO9-FBSPK-20JUL1999-KMNO4		KMnO4	5	4.74	9.42	LAB	**93.60**
72099-18	BO9-FBSPK-20JUL1999-KMNO4		KMnO4	10	4.74	13.5	LAB	**87.60**
72099-5	BO9-IN-3-BHKMNO4		KMnO4	5	27.8	32.45	LAB	**93.00**
72099-5	BO9-IN-3-BHKMNO4		KMnO4	10	27.8	36.75	LAB	**89.50**

FIELD BLANK SPIKE STATISTICAL INFORMATION

Solution	Standard Deviation
KCL	100± 3.418
H2O2	100± 6.693
KMnO4	100± 6.362

PROCESS SOLID SAMPLES ANALYTICAL REPORT

Presque Isle Power Plant Coal Samples – Unit #5

As Determined Basis

Test ID	T–1	T–2	T–3			
Date	7/13/99	7/13/99	7/14/99	AVG	SDEV	PRSD
Moisture	5.29	5.07	5.41	5.26	0.17	3.3%
Volatile Matter	36.37	36.26	33.13	35.25	1.83	5.2%
Ash	9.28	9.44	9.82	9.51	0.28	2.9%
Carbon	70.05	69.15	69.09	69.43	0.54	0.8%
Hydrogen	5.10	5.04	5.04	5.06	0.03	0.7%
Nitrogen	1.53	1.49	1.46	1.49	0.03	2.3%
Sulfur	0.96	0.97	0.98	0.97	0.01	1.0%
Oxygen	7.79	8.84	8.20	8.28	0.53	6.4%
Chlorine, ppm	171	209	161	180	25	14.1%
Mercury, ppb	43	38	41	41	3	6.2%
Btu/lb	12096	12150	12075	12107	39	0.3%
Total Moisture	5.29	5.07	5.41	5.26	0.17	3.3%

Dry Basis

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
Volatile Matter	38.40	38.20	35.02	37.21	1.89	5.1%
Ash	9.80	9.94	10.38	10.04	0.30	3.0%
Carbon	73.96	72.84	73.04	73.28	0.60	0.8%
Hydrogen	4.76	4.71	4.69	4.72	0.04	0.8%
Nitrogen	1.62	1.57	1.54	1.58	0.04	2.3%
Sulfur	1.01	1.02	1.04	1.02	0.01	1.1%
Oxygen	8.83	9.94	9.29	9.35	0.56	5.9%
Chlorine, ppm	180	220	170	190	26	13.9%
Mercury, ppb	45	40	43	43	3	6.3%
Btu/lb	12772	12799	12766	12779	18	0.1%
F_d Factor, O_2	9962	9753	9820	9845	106	1.1%
F Factor, CO_2	1859	1827	1837	1841	16	0.9%

Major Ash Elements: (% of Coal Ash)

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
SiO_2	57.31	56.49	56.09	56.63	0.62	1.1%
Al_2O_3	25.07	25.47	24.99	25.18	0.26	1.0%
TiO_2	0.84	0.83	0.83	0.83	0.01	0.7%
Fe_2O_3	4.94	4.81	4.89	4.88	0.07	1.3%
CaO	3.51	3.48	3.24	3.41	0.15	4.3%
MgO	1.78	1.77	1.76	1.77	0.01	0.6%
Na_2O	2.23	2.22	2.19	2.21	0.02	0.9%
K_2O	1.03	1.02	1.07	1.04	0.03	2.5%
P_2O_5	0.47	0.48	0.47	0.47	0.01	1.2%
SO_3	3.39	3.52	3.18	3.36	0.17	5.1%
Undetermined	–0.57	–0.09	1.29	0.21	0.96	---

Presque Isle Power Plant ESP Ash Samples – Unit #5 – FRONT

As Determined Basis

Test ID	T–1	T–2	T–3			
Date	7/13/99	7/13/99	7/14/99	AVG	SDEV	PRSD
Moisture	0.32	0.51	0.35	0.39	0.10	25.9%
Ash	72.15	68.40	69.71	70.09	1.90	2.7%
Carbon	25.66	29.31	27.89	27.62	1.83	6.6%
Sulfur	0.83	0.90	0.84	0.86	0.04	4.4%
Mercury, ppb	159	114	93	122	34	27.5%

Dry Basis

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
Ash	72.38	68.75	69.95	70.36	1.84	2.6%
Carbon	25.74	29.46	27.99	27.73	1.87	6.7%
Sulfur	0.83	0.90	0.84	0.86	0.04	4.5%
Mercury, ppb	160	115	93	122	34	27.5%

Major Ash Elements:

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
SiO_2	43.51	41.24	42.08	42.28	1.14	2.7%
Al_2O_3	17.25	17.01	17.25	17.17	0.14	0.8%
TiO_2	0.55	0.51	0.56	0.54	0.03	4.9%
Fe_2O_3	4.30	3.79	3.97	4.02	0.26	6.4%
CaO	2.63	2.43	2.53	2.53	0.10	3.9%
MgO	1.34	1.22	1.25	1.27	0.06	4.9%
Na_2O	1.58	1.44	1.53	1.52	0.07	4.7%
K_2O	0.74	0.64	0.71	0.70	0.05	7.3%
P_2O_5	0.32	0.28	0.33	0.31	0.03	8.5%
SO_3	0.51	0.43	0.43	0.46	0.05	10.1%
Undetermined	27.27	31.01	29.36	29.21	1.87	6.4%

Presque Isle Power Plant ESP Ash Samples – Unit #5 – BACK

As Determined Basis

Test ID	T–1	T–2	T–3			
Date	7/13/99	7/13/99	7/14/99	AVG	SDEV	PRSD
Moisture	0.56	0.49	0.56	0.54	0.04	7.5%
Ash	48.86	51.55	51.57	50.66	1.55	3.1%
Carbon	47.82	45.84	44.40	46.02	1.71	3.7%
Sulfur	1.51	1.38	1.21	1.37	0.15	11.0%
Mercury, ppb	234	214	228	225	10	4.5%

Dry Basis

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
Ash	49.14	51.80	51.86	50.93	1.55	3.0%
Carbon	48.09	46.07	44.65	46.27	1.72	3.7%
Sulfur	1.52	1.39	1.22	1.37	0.15	11.0%
Mercury, ppb	235	215	229	227	10	4.6%

Major Ash Elements:

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
SiO_2	*Analysis Not Requested*					
Al_2O_3						
TiO_2						
Fe_2O_3						
CaO						
MgO						
Na_2O						
K_2O						
P_2O_5						
SO_3						
Undetermined						

Presque Isle Power Plant Coal Samples – Unit #9

As Determined Basis

Test ID	T–1	T–2	T–3			
Date	7/19/99	7/20/99	7/20/99	AVG	SDEV	PRSD
Moisture	21.39	20.55	20.51	20.82	0.49	2.4%
Volatile Matter	34.56	35.22	34.62	34.80	0.36	1.0%
Ash	5.52	5.55	5.63	5.57	0.06	1.0%
Carbon	54.68	55.00	55.33	55.00	0.32	0.6%
Hydrogen	6.02	5.90	5.93	5.95	0.06	1.0%
Nitrogen	0.76	0.76	0.77	0.76	0.01	1.0%
Sulfur	0.32	0.33	0.33	0.33	0.00	1.5%
Oxygen	11.31	11.93	11.50	11.58	0.31	2.7%
Chlorine, ppm	165	199	167			
Mercury, ppb	54	52	56	54	2	3.7%
Btu/lb	9454	9587	9580	9540	75	0.8%
Total Moisture	21.39	20.55	20.51	20.82	0.49	2.4%

Dry Basis

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
Volatile Matter	43.96	44.33	43.55	43.95	0.39	0.9%
Ash	7.02	6.99	7.08	7.03	0.05	0.7%
Carbon	69.56	69.22	69.61	69.46	0.21	0.3%
Hydrogen	4.61	4.53	4.57	4.57	0.04	0.9%
Nitrogen	0.97	0.95	0.97	0.96	0.01	1.0%
Sulfur	0.41	0.41	0.42	0.41	0.00	1.0%
Oxygen	17.41	17.88	17.33	17.54	0.30	1.7%
Chlorine, ppm	210	250	210	223	23	10.4%
Mercury, ppb	69	65	70	68	3	3.7%
Btu/lb	12026	12067	12052	12048	20	0.2%
F_d Factor, O_2	9610	9492	9587	9563	62	0.6%
F Factor, CO_2	1857	1841	1854	1851	8	0.4%

Major Ash Elements: (% of Coal Ash)

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
SiO_2	35.87	35.91	36.87	36.22	0.56	1.6%
Al_2O_3	17.32	17.05	17.05	17.14	0.16	0.9%
TiO_2	1.14	1.13	1.11	1.13	0.02	1.4%
Fe_2O_3	4.97	4.83	4.97	4.92	0.08	1.6%
CaO	16.11	16.13	15.93	16.06	0.11	0.7%
MgO	4.18	4.13	4.07	4.13	0.05	1.3%
Na_2O	3.63	3.70	3.49	3.61	0.11	3.0%
K_2O	0.78	0.78	0.81	0.79	0.02	2.2%
P_2O_5	1.13	1.13	1.07	1.11	0.03	3.1%
SO_3	13.92	13.11	13.60	13.54	0.41	3.0%
Undetermined	0.95	2.10	1.03	1.36	0.64	47.0%

Presque Isle Power Plant ESP Ash Samples – Unit #9

As Determined Basis

Test ID	T–1	T–2	T–3			
Date	7/19/99	7/19/99	7/20/99	AVG	SDEV	PRSD
Moisture	0.08	0.01	0.02	0.04	0.04	102.9%
Ash	98.85	98.80	98.58	98.74	0.14	0.1%
Carbon	0.73	0.93	1.21	0.96	0.24	25.1%
Sulfur	0.00	0.00	0.00	0.00	0.00	0.0%
Mercury, ppb	8.4	5.9	7.9	7	1	17.8%

Dry Basis

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
Ash	98.93	98.81	98.60	98.78	0.17	0.2%
Carbon	0.73	0.93	1.21	0.96	0.24	25.1%
Sulfur	0.00	0.00	0.00	0.00	0.00	0.0%
Mercury, ppb	8	6	8	7	1	17.8%

Major Ash Elements:

Test ID	T–1	T–2	T–3	AVG	SDEV	PRSD
SiO_2	39.05	40.13	38.69	39.29	0.75	1.9%
Al_2O_3	19.05	18.87	19.11	19.01	0.12	0.7%
TiO_2	1.35	1.34	1.30	1.33	0.03	2.0%
Fe_2O_3	5.50	5.47	5.37	5.45	0.07	1.2%
CaO	19.63	19.49	19.54	19.55	0.07	0.4%
MgO	4.78	4.69	4.75	4.74	0.05	1.0%
Na_2O	4.50	4.33	4.49	4.44	0.10	2.1%
K_2O	0.85	0.84	0.89	0.86	0.03	3.1%
P_2O_5	1.31	1.22	1.30	1.28	0.05	3.8%
SO_3	1.89	1.54	1.88	1.77	0.20	11.2%
Undetermined	2.09	2.08	2.68	2.28	0.34	15.0%

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 5 - TEST 1

DATE LOGGED *07/26/99*
DATE COMPLETED *08/13/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994575**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	9.80
Volatile Matter	38.40
Fixed Carbon	51.80
Sulfur, Total	1.01
BTU/lb	12772
MAF BTU/lb	14160

ULTIMATE	(Dry)%
Carbon	73.96
Hydrogen	4.76
Nitrogen	1.62
Chlorine	0.018
Sulfur, Total	1.01
Ash	9.80
Oxygen (DIFF)	8.83

MAJOR ASH ELEM	%
Ignited at 750 C	
SiO2	57.31
Al2O3	25.07
TiO2	0.84
Fe2O3	4.94
CaO	3.51
MgO	1.78
Na2O	2.23
K2O	1.03
P2O5	0.47
SO3	3.39
UND	-0.57

MISC. (As Det.)

Hg 43 PPB

AS DETERMINED MOISTURE: 5.29 %

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 5 - TEST 2

DATE LOGGED *07/26/99*
DATE COMPLETED *08/13/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994576**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	9.94
Volatile Matter	38.20
Fixed Carbon	51.86
Sulfur, Total	1.02
BTU/lb	12799
MAF BTU/lb	14212

ULTIMATE	(Dry)%
Carbon	72.84
Hydrogen	4.71
Nitrogen	1.57
Chlorine	0.022
Sulfur, Total	1.02
Ash	9.94
Oxygen (DIFF)	9.90

MAJOR ASH ELEM	%
Ignited at 750 C	
SiO_2	56.49
Al_2O_3	25.47
TiO_2	0.83
Fe_2O_3	4.81
CaO	3.48
MgO	1.77
Na_2O	2.22
K_2O	1.02
P_2O_5	0.48
SO_3	3.51
UND	-0.08

MISC. (As Det.)

Hg 38 PPB

AS DETERMINED MOISTURE: 5.07 %

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 5 - TEST 3

DATE LOGGED *07/26/99*
DATE COMPLETED *08/23/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994577**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	10.38
Volatile Matter	35.02
Fixed Carbon	54.60
Sulfur, Total	1.04
BTU/lb	12766
MAF BTU/lb	14245

ULTIMATE	(Dry)%
Carbon	73.04
Hydrogen	4.69
Nitrogen	1.54
Chlorine	0.018
Sulfur, Total	1.04
Ash	10.38
Oxygen (DIFF)	9.29

MAJOR ASH ELEM	%
Ignited at 50 C	
SiO2	56.09
Al2O3	24.99
TiO2	0.83
Fe2O3	4.89
CaO	3.24
MgO	1.76
Na2O	2.19
K2O	1.07
P2O5	0.47
SO3	3.18
UND	1.29

MISC. (As Det.)

Hg 41 PPB

AS DETERMINED MOISTURE: 5.41 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #1 - FRONT

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER 994543

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	72.38
Sulfur, Total	0.83

MISC. (As Det.)	
Hg	159 ppb

ULTIMATE	(Dry)%
Carbon	25.74
Hydrogen	0.00
Nitrogen	0.42
Sulfur, Total	0.83
Ash	72.38
Oxygen (DIFF)	0.60

MAJOR ASH ELEM	(Dry)%
SiO_2	43.51
Al_2O_3	17.25
TiO_2	0.55
Fe_2O_3	4.30
CaO	2.63
MgO	1.34
Na_2O	1.58
K_2O	0.74
P_2O_5	0.32
SO_3	0.51
UND	27.27

AS DETERMINED MOISTURE: 0.32 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #2 - FRONT

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994544**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	68.75
Sulfur, Total	0.90

MISC. (As Det.)	
Hg	114 ppb

ULTIMATE	(Dry)%
Carbon	29.46
Hydrogen	-0.02
Nitrogen	0.42
Sulfur, Total	0.90
Ash	68.75
Oxygen (DIFF)	0.44

MAJOR ASH ELEM	(Dry)%
SiO2	41.24
Al2O3	17.01
TiO2	0.51
Fe2O3	3.79
CaO	2.43
MgO	1.22
Na2O	1.44
K2O	0.64
P2O5	0.28
SO3	0.43
UND	31.01

AS DETERMINED MOISTURE: 0.51 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #3 - FRONT

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994546**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	69.95
Sulfur, Total	0.84
MISC. (As Det.)	
Hg	93 ppb

ULTIMATE	(Dry)%
Carbon	27.99
Hydrogen	-0.01
Nitrogen	0.42
Sulfur, Total	0.84
Ash	69.95
Oxygen (DIFF)	0.78

MAJOR ASH ELEM	(Dry)%
SiO2	42.08
Al2O3	17.25
TiO2	0.56
Fe2O3	3.97
CaO	2.53
MgO	1.25
Na2O	1.53
K2O	0.71
P2O5	0.33
SO3	0.43
UND	29.36

AS DETERMINED MOISTURE: 0.35 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #1 - BACK

DATE LOGGED *07/23/99*
DATE COMPLETED *08/10/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994553**

ANALYSIS REPORT

PROXIMATE	(Dry)%	ULTIMATE	(Dry)%
Ash	49.14	Carbon	48.09
Sulfur, Total	1.52	Hydrogen	0.00
		Nitrogen	0.67
MISC. (As Det.)		Sulfur, Total	1.52
		Ash	49.14
Hg	234	Oxygen (DIFF)	0.52

AS DETERMINED MOISTURE: 0.56 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #2 - BACK

DATE LOGGED *07/23/99*
DATE COMPLETED *08/10/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994554**

ANALYSIS REPORT

PROXIMATE	(Dry)%	ULTIMATE	(Dry)%
Ash	51.80	Carbon	46.07
Sulfur, Total	1.39	Hydrogen	0.00
		Nitrogen	0.62
MISC. (As Det.)		Sulfur, Total	1.39
		Ash	51.80
Hg	214	Oxygen (DIFF)	0.08

AS DETERMINED MOISTURE: 0.49 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 5 #3 - BACK

DATE LOGGED *07/23/99*
DATE COMPLETED *08/10/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994555**

ANALYSIS REPORT

PROXIMATE	(Dry)%	ULTIMATE	(Dry)%
Ash	51.86	Carbon	44.65
Sulfur, Total	1.22	Hydrogen	-0.01
		Nitrogen	0.61
MISC. (As Det.)		Sulfur, Total	1.22
		Ash	51.86
Hg	228	Oxygen (DIFF)	1.62

AS DETERMINED MOISTURE: 0.56 %

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 9 - TEST 1

DATE LOGGED *07/26/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1361-25 -*
ANALYTICAL NUMBER **994578**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	7.02
Volatile Matter	43.96
Fixed Carbon	49.02
Sulfur, Total	0.41
BTU/lb	12026
MAF BTU/lb	12934

ULTIMATE	(Dry)%
Carbon	69.56
Hydrogen	4.61
Nitrogen	0.97
Chlorine	0.022
Sulfur, Total	0.41
Ash	7.02
Oxygen (DIFF)	17.41

MAJOR ASH ELEM	%
Ignited at 750 C	
SiO2	35.87
Al2O3	17.32
TiO2	1.14
Fe2O3	4.97
CaO	16.11
MgO	4.18
Na2O	3.63
K2O	0.78
P2O5	1.13
SO3	13.92
UND	0.95

MISC. (As Det.)

Hg 54 ppb

AS DETERMINED MOISTURE: 21.39 %

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 9 - TEST 2

DATE LOGGED *07/26/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1361-25 -*
ANALYTICAL NUMBER **994579**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	6.99
Volatile Matter	44.33
Fixed Carbon	48.68
Sulfur, Total	0.41
BTU/lb	12067
MAF BTU/lb	12974

ULTIMATE	(Dry)%
Carbon	69.22
Hydrogen	4.53
Nitrogen	0.95
Chlorine	0.025
Sulfur, Total	0.41
Ash	6.99
Oxygen (DIFF)	17.88

MAJOR ASH ELEM	%
Ignited at 750 C	
SiO2	35.91
Al2O3	17.05
TiO2	1.13
Fe2O3	4.83
CaO	16.13
MgO	4.13
Na2O	3.70
K2O	0.78
P2O5	1.13
SO3	13.11
UND	2.10

MISC. (As Det.)	
Hg	52 ppb

AS DETERMINED MOISTURE: 20.55 %

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DESCRIPTION *PRESQUE ISLE COAL SAMPLE*

SAMPLE NUMBER UNIT 9 - TEST 3

DATE LOGGED *07/26/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1361-25 -*
ANALYTICAL NUMBER **994580**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	7.08
Volatile Matter	43.55
Fixed Carbon	49.37
Sulfur, Total	0.42
BTU/lb	12052
MAF BTU/lb	12970

ULTIMATE	(Dry)%
Carbon	69.61
Hydrogen	4.57
Nitrogen	0.97
Chlorine	0.021
Sulfur, Total	0.42
Ash	7.08
Oxygen (DIFF)	17.33

MAJOR ASH ELEM	%
Ignited at 750 C	
SiO2	36.87
Al2O3	17.05
TiO2	1.11
Fe2O3	4.97
CaO	15.93
MgO	4.07
Na2O	3.49
K2O	0.81
P2O5	1.07
SO3	13.60
UND	1.03

MISC. (As Det.)

Hg 56 ppb

AS DETERMINED MOISTURE: 20.51 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 9 #1

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994556**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	98.93
Total Sulfur	0.76

MISC. (As Det.)	
Hg	8.4 ppb

ULTIMATE	(Dry)%
Carbon	0.73
Hydrogen	0.00
Nitrogen	<0.01
Ash	98.93

MAJOR ASH ELEM	(Dry)%
SiO2	39.05
Al2O3	19.05
TiO2	1.35
Fe2O3	5.50
CaO	19.63
MgO	4.78
Na2O	4.50
K2O	0.85
P2O5	1.31
SO3	1.89
UND	2.09

AS DETERMINED MOISTURE: 0.08 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 9 #2

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994557**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	98.81
Total Sulfur	0.62

MISC. (As Det.)	
Hg	5.9 ppb

ULTIMATE	(Dry)%
Carbon	0.93
Hydrogen	<0.01
Nitrogen	<0.01
Ash	98.81

MAJOR ASH ELEM	(Dry)%
SiO2	40.13
Al2O3	18.87
TiO2	1.34
Fe2O3	5.47
CaO	19.49
MgO	4.69
Na2O	4.33
K2O	0.84
P2O5	1.22
SO3	1.54
UND	2.08

AS DETERMINED MOISTURE: 0.01 %

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DESCRIPTION *PRESQUE ISLE ASH SAMPLES*

SAMPLE NUMBER UNIT 9 #3

DATE LOGGED *07/23/99*
DATE COMPLETED *08/25/99*
PROJECT NUMBER *1621-29 -7*
ANALYTICAL NUMBER **994558**

ANALYSIS REPORT

PROXIMATE	(Dry)%
Ash	98.60
Total Sulfur	0.75

MISC. (As Det.)	
Hg	7.9 ppb

ULTIMATE	(Dry)%
Carbon	1.21
Hydrogen	<0.01
Nitrogen	<0.01
Ash	98.60

MAJOR ASH ELEM	(Dry)%
SiO2	38.69
Al2O3	19.11
TiO2	1.30
Fe2O3	5.37
CaO	19.54
MgO	4.75
Na2O	4.49
K2O	0.89
P2O5	1.30
SO3	1.88
UND	2.68

AS DETERMINED MOISTURE: 0.02 %

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PROCESS SOLID SAMPLES QA/QC SUMMARY

QA/QC Text for Coal and Ash Samples Analyzed by CONSOL Inc.

All process stream samples were analyzed by CONSOL following carefully written sampling and analytical procedures. These procedures are reviewed periodically to maintain consistency with industry standards and practices. Professional staff members take an active part in the development and testing of the ASTM methods used in this program. The individual determinations were completed by experiences staff personnel who were specifically trained in the individual analytical procedures. Analyst performance and data quality are monitored using quality control samples, certified standards, blind samples and duplicate samples. For this program, duplicate analysis was performed on every sample. The CONSOL R&D Laboratory participates in a variety of external auditing programs specific to coal analyses. Two of these programs specific to these samples are the EPRI-sponsored mercury-in-coal-analysis round robin study and the Standard Laboratories Inc., "Interlab" round robin program. A summary of the performance indicators used to access data quality for this program are discussed as follows.

Quality Control Check Samples

The CONSOL R&D lab utilized a number of quality control check samples (QCCS) for this program. Accuracy is determined from the percent difference in the measured value from the QCCS reference value. The specific samples and the results obtained from the analysis of these samples used to access the quality of the coal analysis are shown Table 1. Similar data for the ash samples are presented in Table 3.

Analytical Precision

All process stream samples were analyzed in duplicate. Analytical precision was determined by the percent difference in the duplicate sample analysis. The percent relative difference (PRD) obtained in for the sample analyses completed in this program are summarized in Table 2 (coal samples) and Table 4 (ash samples).

Summary of Analytical Performance

A summary of the QC checks and relative percent differences are as follows:

Parameter	Coal Samples		ESP Ash Samples	
	Accuracy	PRD	Accuracy	PRD
Ult./Prox.	98% - 102%	0% - 2%	—	---
Carbon	—	—	98% - 102%	1%
Ash	—	—	98% - 102%	<1%
Sulfur	98% -102%	2%	98% - 102%	2%
Btu	100%	0.1%	—	—
Ash Elements	94% - 107%	1% - 4%	96% - 105%	2% - 6%

Mercury	105% - 109%	10%	88% - 92%	6%
Chlorine	92% - 96%	6%	—	—

The analytical accuracy for both the coal and ash samples were 100 ± 10%. This is well within the data quality objectives. The relative percent differences, as an indication of analytical precision were ≤10%. Again, this is within the data quality objective. The coal mercury analysis showed the greatest PRD at 10%. This is a result of the extremely low mercury concentration in the coal samples which for this test ranged from 0.04 to 0.06 ppm. A precision of 10% is excellent for this low level.

Table 1. QCCS Summary for Coal Analysis
(units are % unless noted)

Parameter	QC Sample	QCCS Value	# of Checks	Avg Result	% Recovery
Moisture	Coal	1.08	1	1.06	98.0
Carbon	EDTA	41.10	4	40.81	99.3
Hydrogen	EDTA	5.52	4	5.54	100.3
Nitrogen	EDTA	9.59	4	9.78	102.0
Ash	Coal	6.01	1	5.92	98.5
Volatile Matter	Coal	38.05	1	37.82	99.4
Sulfur	NIST 2692A	1.16	2	1.16	100.0
Cl, ppm	NIST 1630a	1143	1	1078	94.3
Hg, ppm	BCR 181	0.138	2	0.148	107.2
Btu	Benzoic Acid	1136	1	11356	99.9
SiO_2	NIST 1633a	48.78	2	49.20	100.9
$Al2O_3$	NIST 1633a	27.02	2	26.70	98.8
TiO_2	NIST 1633a	1.33	2	1.33	100.0
Fe_2O_3	NIST 1633a	13.44	2	13.50	100.4
CaO	NIST 1633a	1.55	2	1.58	101.9
MgO	NIST 1633a	0.75	2	0.74	98.7

Na_2O	NIST 1633a	0.22	2	0.23	104.5
K_2O	NIST 1633a	2.26	2	2.25	99.6
P_2O_5	NIST 1633a	0.44	2	0.44	100.0
SO_3	NIST 1633a	0.37	2	0.31	83.8

Table 2. Precision Summary for Coal Analysis

Parameter	No. of Pairs	Average PRD
Moisture	6	1.9
Carbon	6	0.6
Hydrogen	6	1.5
Nitrogen	6	0.4
Ash	6	1.0
Volatile Matter	6	0.5
Sulfur	6	2.2
Cl, ppm	6	6.4
Hg, ppm	6	10.1
Btu	6	0.1
SiO_2	6	1.2
$Al2O_3$	6	1.5
TiO_2	6	3.4
Fe_2O_3	6	1.8
CaO	6	1.9
MgO	6	1.9
Na_2O	6	2.0
K_2O	6	1.9
P_2O_5	6	3.6
SO_3	6	1.7

Table 3. QCCS Summary for Ash Analysis
(units are % unless noted)

Parameter	QC Sample	QCCS Value	# of Checks	Avg Result	% Recovery
Moisture	Coal	1.08	2	1.04	96.3
Carbon	EDTA	41.10	2	41.13	100.1
Ash	Coal	6.01	2	6.12	102.0
Sulfur	Ash	1.96	4	1.94	99.0
Hg, ppm	BCR 181	0.138	1	0.124	89.9
SiO_2	NIST 1633a	48.78	2	49.40	101.3
$Al2O_3$	NIST 1633a	27.02	2	26.84	99.3
TiO_2	NIST 1633a	1.33	2	1.32	99.2
Fe_2O_3	NIST 1633a	13.44	2	13.41	99.8
CaO	NIST 1633a	1.55	2	1.55	100.0
MgO	NIST 1633a	0.75	2	0.75	100.0
Na_2O	NIST 1633a	0.22	2	0.23	104.5
K_2O	NIST 1633a	2.26	2	2.28	100.9
P_2O_5	NIST 1633a	0.44	2	0.42	95.5
SO_3	NIST 1633a	0.37	2	0.33	89.2

Table 4. Precision Summary for Ash Analysis

Parameter	No. of Pairs	Average PRD
Carbon	9	1.2
Ash	9	0.4
Sulfur	9	1.8
Hg, ppm	9 (6)	16.0 (5.9)[1]
SiO_2	6	1.9
$Al2O_3$	6	1.8
TiO_2	6	3.3
Fe_2O_3	6	1.9
CaO	6	1.4
MgO	6	2.0
Na_2O	6	1.7
K_2O	6	3.9
P_2O_5	6	5.8
SO_3	6	4.8

1 - Average PRD for six duplicate Hg analysis performed on Unit #5 ESP ash was 5.9%. These samples showed an average Hg concentrations of 100 to 200 ppb while ash from Unit #5 showed an average Hg concentration of ~10 ppb. The precision results from the Unit #5 ash samples are more representative of the value expected for this analysis.

Calculation of % RPD for WESTON Presque Isle Samples

Coal Moisture Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	5.22	5.36	-0.14	5.29	2.65
# 5 - 2	5.02	5.13	-0.11	5.08	2.17
# 5 - 3	5.33	5.48	-0.15	5.41	2.78
# 9 - 1	21.51	21.27	0.24	21.39	1.12
# 9 - 2	20.61	20.48	0.13	20.55	0.63
# 9 - 3	20.30	20.72	-0.42	20.51	2.05

Average Relative Percent Difference **1.90**

Coal Ash Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	9.25	9.31	-0.06	9.28	0.65
# 5 - 2	9.36	9.52	-0.16	9.44	1.69
# 5 - 3	9.83	9.81	0.02	9.82	0.20
# 9 - 1	5.54	5.49	0.05	5.52	0.91
# 9 - 2	5.55	5.55	0.00	5.55	0.00
# 9 - 3	5.71	5.55	0.16	5.63	2.84

Average Relative Percent Difference **1.05**

Coal VM Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	36.36	36.37	-0.01	36.37	0.03
# 5 - 2	36.38	36.15	0.23	36.27	0.63
# 5 - 3	32.90	33.35	-0.45	33.13	1.36
# 9 - 1	34.56	34.56	0.00	34.56	0.00
# 9 - 2	35.14	35.30	-0.16	35.22	0.45
# 9 - 3	34.51	34.72	-0.21	34.62	0.61

Average Relative Percent Difference **0.51**

Coal Carbon Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	70.66	69.94	0.72	70.30	1.02
# 5 - 2	69.14	69.14	0.00	69.14	0.00
# 5 - 3	69.09	69.09	0.00	69.09	0.00
# 9 - 1	54.74	54.62	0.12	54.68	0.22
# 9 - 2	55.15	54.86	0.29	55.01	0.53
# 9 - 3	55.80	54.86	0.94	55.33	1.70

Average Relative Percent Difference **0.58**

Coal Hydrogen Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	5.12	5.07	0.05	5.10	0.98
# 5 - 2	5.04	5.04	0.00	5.04	0.00
# 5 - 3	4.97	5.11	-0.14	5.04	2.78
# 9 - 1	6.03	6.01	0.02	6.02	0.33
# 9 - 2	5.93	5.86	0.07	5.90	1.19
# 9 - 3	6.04	5.82	0.22	5.93	3.71

Average Relative Percent Difference **1.50**

Coal Nitrogen Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	1.53	1.53	0.00	1.53	0.00
# 5 - 2	1.48	1.50	-0.02	1.49	1.34
# 5 - 3	1.46	1.46	0.00	1.46	0.00
# 9 - 1	0.76	0.76	0.00	0.76	0.00
# 9 - 2	0.76	0.75	0.01	0.76	1.32
# 9 - 3	0.77	0.77	0.00	0.77	0.00

Average Relative Percent Difference **0.44**

Coal Sulfur Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	0.95	0.97	-0.02	0.96	2.08
# 5 - 2	0.98	0.96	0.02	0.97	2.06
# 5 - 3	0.98	0.98	0.00	0.98	0.00
# 9 - 1	0.32	0.33	-0.01	0.33	3.08
# 9 - 2	0.32	0.33	-0.01	0.33	3.08
# 9 - 3	0.34	0.33	0.01	0.34	2.99

Average Relative Percent Difference **2.21**

Coal Chlorine Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	0.018	0.017	0.001	0.018	5.71
# 5 - 2	0.020	0.022	-0.002	0.021	9.52
# 5 - 3	0.018	0.016	0.002	0.017	11.76
# 9 - 1	0.017	0.016	0.001	0.017	6.06
# 9 - 2	0.019	0.020	-0.001	0.020	5.13
# 9 - 3	0.017	0.017	0.000	0.017	0.00

Average Relative Percent Difference **6.37**

Coal Mercury Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	42	44	-2	43	4.65
# 5 - 2	35	40	-5	38	13.33
# 5 - 3	41	40	1	41	2.47
# 9 - 1	55	52	3	54	5.61
# 9 - 2	59	44	15	52	29.13
# 9 - 3	57	54	3	56	5.41

Average Relative Percent Difference **10.10**

Coal Btu Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	12088	12104	-16	12096	0.13
# 5 - 2	12146	12152	-6	12149	0.05
# 5 - 3	12081	12071	10	12076	0.08
# 9 - 1	9449	9459	-10	9454	0.11
# 9 - 2	9588	9587	1	9588	0.01
# 9 - 3	9582	9578	4	9580	0.04

Average Relative Percent Difference **0.07**

Coal SiO_2 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	57.18	57.44	-0.26	57.31	0.45
# 5 - 2	56.70	56.28	0.42	56.49	0.74
# 5 - 3	59.13	58.17	0.96	58.65	1.64
# 9 - 1	36.23	35.51	0.72	35.87	2.01
# 9 - 2	35.85	35.97	-0.12	35.91	0.33
# 9 - 3	37.21	36.52	0.69	36.87	1.87

Average Relative Percent Difference **1.17**

Coal TiO_2 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	0.85	0.82	0.03	0.84	3.59
# 5 - 2	0.84	0.82	0.02	0.83	2.41
# 5 - 3	0.86	0.80	0.06	0.83	7.23
# 9 - 1	1.15	1.12	0.03	1.14	2.64
# 9 - 2	1.12	1.13	-0.01	1.13	0.89
# 9 - 3	1.13	1.09	0.04	1.11	3.60

Average Relative Percent Difference **3.39**

Coal CaO Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	3.50	3.52	-0.02	3.51	0.57
# 5 - 2	3.51	3.45	0.06	3.48	1.72
# 5 - 3	3.39	3.25	0.14	3.32	4.22
# 9 - 1	16.25	15.96	0.29	16.11	1.80
# 9 - 2	16.02	16.23	-0.21	16.13	1.30
# 9 - 3	16.09	15.77	0.32	15.93	2.01

Average Relative Percent Difference **1.94**

Coal Na_2O Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	2.23	2.22	0.01	2.23	0.45
# 5 - 2	2.23	2.21	0.02	2.22	0.90
# 5 - 3	2.23	2.15	0.08	2.19	3.65
# 9 - 1	3.67	3.59	0.08	3.63	2.20
# 9 - 2	3.66	3.73	-0.07	3.70	1.89
# 9 - 3	3.43	3.54	-0.11	3.49	3.16

Average Relative Percent Difference **2.04**

Coal P_2O_5 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	0.48	0.46	0.02	0.47	4.26
# 5 - 2	0.49	0.47	0.02	0.48	4.17
# 5 - 3	0.49	0.45	0.04	0.47	8.51
# 9 - 1	1.14	1.12	0.02	1.13	1.77
# 9 - 2	1.13	1.13	0.00	1.13	0.00
# 9 - 3	1.08	1.05	0.03	1.07	2.82

Average Relative Percent Difference **3.59**

Coal Al_2O_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	25.08	25.05	0.03	25.07	0.12
# 5 - 2	25.63	25.30	0.33	25.47	1.30
# 5 - 3	26.18	25.36	0.82	25.77	3.18
# 9 - 1	17.49	17.15	0.34	17.32	1.96
# 9 - 2	17.03	17.06	-0.03	17.05	0.18
# 9 - 3	17.26	16.83	0.43	17.05	2.52

Average Relative Percent Difference **1.54**

Coal Fe_2O_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	4.94	4.93	0.01	4.94	0.20
# 5 - 2	4.81	4.81	0.00	4.81	0.00
# 5 - 3	5.02	4.75	0.27	4.89	5.53
# 9 - 1	5.03	4.91	0.12	4.97	2.41
# 9 - 2	4.83	4.82	0.01	4.83	0.21
# 9 - 3	5.03	4.92	0.11	4.98	2.21

Average Relative Percent Difference **1.76**

Coal MgO Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	1.77	1.78	-0.01	1.78	0.56
# 5 - 2	1.78	1.75	0.03	1.77	1.70
# 5 - 3	1.79	1.72	0.07	1.76	3.99
# 9 - 1	4.21	4.14	0.07	4.18	1.68
# 9 - 2	4.11	4.14	-0.03	4.13	0.73
# 9 - 3	4.13	4.02	0.11	4.08	2.70

Average Relative Percent Difference **1.89**

Coal K_2O Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	1.03	1.03	0.00	1.03	0.00
# 5 - 2	1.01	1.02	-0.01	1.02	0.99
# 5 - 3	1.10	1.04	0.06	1.07	5.61
# 9 - 1	0.78	0.78	0.00	0.78	0.00
# 9 - 2	0.78	0.77	0.01	0.78	1.29
# 9 - 3	0.82	0.79	0.03	0.81	3.73

Average Relative Percent Difference **1.93**

Coal SO_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1	3.38	3.40	-0.02	3.39	0.59
# 5 - 2	3.55	3.48	0.07	3.52	1.99
# 5 - 3	3.22	3.14	0.08	3.18	2.52
# 9 - 1	14.00	13.83	0.17	13.92	1.22
# 9 - 2	13.03	13.19	-0.16	13.11	1.22
# 9 - 3	13.76	13.44	0.32	13.60	2.35

Average Relative Percent Difference **1.65**

Calculation of % RPD for WESTON Presque Isle Samples
ESP Hopper Ash Samples

Moisture Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.30	0.34	-0.04	0.32	12.50
# 5 - 2F	0.56	0.45	0.11	0.51	21.78
# 5 - 3F	0.35	0.35	0.00	0.35	0.00
# 5 - 1B	0.54	0.59	-0.05	0.57	8.65
# 5 - 2B	0.48	0.50	-0.02	0.49	4.08
# 5 - 3B	0.57	0.50	0.07	0.54	13.08
# 9 - 1	0.13	0.03	0.10	0.08	125.00
# 9 - 2	0.05	0.01	0.04	0.03	133.33
# 9 - 3	0.02	0.02	0.00	0.02	0.00

Average Relative Percent Difference **35.40**

Ash Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	72.09	72.20	-0.11	72.15	0.15
# 5 - 2F	68.41	68.39	0.02	68.40	0.03
# 5 - 3F	69.66	69.75	-0.09	69.71	0.13
# 5 - 1B	49.12	48.60	0.52	48.86	1.06
# 5 - 2B	51.97	51.13	0.84	51.55	1.63
# 5 - 3B	51.68	51.45	0.23	51.57	0.45
# 9 - 1	98.82	98.88	-0.06	98.85	0.06
# 9 - 2	98.80	98.81	-0.01	98.81	0.01
# 9 - 3	98.54	98.63	-0.09	98.59	0.09

Average Relative Percent Difference **0.40**

Carbon Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	25.63	25.68	-0.05	25.66	0.19
# 5 - 2F	29.52	29.11	0.41	29.32	1.40
# 5 - 3F	28.12	27.66	0.46	27.89	1.65
# 5 - 1B	47.78	47.85	-0.07	47.82	0.15
# 5 - 2B	45.59	46.10	-0.51	45.85	1.11
# 5 - 3B	44.40	44.40	0.00	44.40	0.00
# 9 - 1	0.75	0.71	0.04	0.73	5.48
# 9 - 2	0.92	0.93	-0.01	0.93	1.08
# 9 - 3	1.21	1.21	0.00	1.21	0.00

Average Relative Percent Difference **1.23**

Sulfur Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.83	0.82	0.01	0.83	1.21
# 5 - 2F	0.90	0.90	0.00	0.90	0.00
# 5 - 3F	0.83	0.85	-0.02	0.84	2.38
# 5 - 1B	1.49	1.54	-0.05	1.52	3.30
# 5 - 2B	1.39	1.37	0.02	1.38	1.45
# 5 - 3B	1.22	1.21	0.01	1.22	0.82
# 9 - 1	0.75	0.76	-0.01	0.76	1.32
# 9 - 2	0.62	0.62	0.00	0.62	0.00
# 9 - 3	0.77	0.73	0.04	0.75	5.33

Average Relative Percent Difference **1.76**

Mercury Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	162	155	7	159	4.42
# 5 - 2F	115	112	3	114	2.64
# 5 - 3F	90	95	-5	93	5.41
# 5 - 1B	227	240	-13	234	5.57
# 5 - 2B	198	229	-31	214	14.52
# 5 - 3B	225	231	-6	228	2.63
# 9 - 1	11	6	5	9	58.82
# 9 - 2	6	6	0	6	0.00
# 9 - 3	10	6	4	8	50.00

Average Relative Percent Difference **16.00**

SiO_2 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	43.77	42.97	0.80	43.37	1.84
# 5 - 2F	41.12	40.95	0.17	41.04	0.41
# 5 - 3F	41.44	42.42	-0.98	41.93	2.34
# 9 - 1	39.11	38.93	0.18	39.02	0.46
# 9 - 2	39.80	40.46	-0.66	40.13	1.64
# 9 - 3	37.79	39.58	-1.79	38.69	4.63

Average Relative Percent Difference **1.89**

Al_2O_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	17.34	17.04	0.30	17.19	1.75
# 5 - 2F	16.83	17.01	-0.18	16.92	1.06
# 5 - 3F	16.83	17.54	-0.71	17.19	4.13
# 9 - 1	19.07	18.99	0.08	19.03	0.42
# 9 - 2	18.74	19.00	-0.26	18.87	1.38
# 9 - 3	19.32	18.89	0.43	19.11	2.25

Average Relative Percent Difference **1.83**

TiO_2 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.54	0.55	-0.01	0.55	1.83
# 5 - 2F	0.49	0.53	-0.04	0.51	7.84
# 5 - 3F	0.56	0.55	0.01	0.56	1.80
# 9 - 1	1.36	1.33	0.03	1.35	2.23
# 9 - 2	1.35	1.33	0.02	1.34	1.49
# 9 - 3	1.33	1.27	0.06	1.30	4.62

Average Relative Percent Difference **3.30**

Fe_2O_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	4.20	4.38	-0.18	4.29	4.20
# 5 - 2F	3.70	3.84	-0.14	3.77	3.71
# 5 - 3F	3.97	3.94	0.03	3.96	0.76
# 9 - 1	5.52	5.48	0.04	5.50	0.73
# 9 - 2	5.47	5.47	0.00	5.47	0.00
# 9 - 3	5.42	5.32	0.10	5.37	1.86

Average Relative Percent Difference **1.88**

CaO Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	2.63	2.62	0.01	2.63	0.38
# 5 - 2F	2.38	2.46	-0.08	2.42	3.31
# 5 - 3F	2.55	2.50	0.05	2.53	1.98
# 9 - 1	19.71	19.51	0.20	19.61	1.02
# 9 - 2	19.57	19.41	0.16	19.49	0.82
# 9 - 3	19.62	19.45	0.17	19.54	0.87

Average Relative Percent Difference **1.40**

MgO Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	1.32	1.35	-0.03	1.34	2.25
# 5 - 2F	1.20	1.22	-0.02	1.21	1.65
# 5 - 3F	1.28	1.22	0.06	1.25	4.80
# 9 - 1	4.78	4.78	0.00	4.78	0.00
# 9 - 2	4.65	4.72	-0.07	4.69	1.49
# 9 - 3	4.79	4.71	0.08	4.75	1.68

Average Relative Percent Difference **1.98**

Na_2O Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	1.57	1.57	0.00	1.57	0.00
# 5 - 2F	1.40	1.47	-0.07	1.44	4.86
# 5 - 3F	1.52	1.53	-0.01	1.53	0.66
# 9 - 1	4.48	4.52	-0.04	4.50	0.89
# 9 - 2	4.28	4.37	-0.09	4.33	2.08
# 9 - 3	4.79	4.71	0.08	4.75	1.68

Average Relative Percent Difference **1.70**

K_2O Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.73	0.74	-0.01	0.74	1.36
# 5 - 2F	0.60	0.68	-0.08	0.64	12.50
# 5 - 3F	0.72	0.70	0.02	0.71	2.82
# 9 - 1	0.85	0.85	0.00	0.85	0.00
# 9 - 2	0.82	0.85	-0.03	0.84	3.59
# 9 - 3	0.90	0.87	0.03	0.89	3.39

Average Relative Percent Difference **3.94**

P_2O_5 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.32	0.32	0.00	0.32	0.00
# 5 - 2F	0.26	0.30	-0.04	0.28	14.29
# 5 - 3F	0.34	0.31	0.03	0.33	9.23
# 9 - 1	1.32	1.30	0.02	1.31	1.53
# 9 - 2	1.25	1.19	0.06	1.22	4.92
# 9 - 3	1.33	1.27	0.06	1.30	4.62

Average Relative Percent Difference **5.76**

SO_3 Determination:

Sample	Run 1	Run 2	R1-R2	Avg	RPD
# 5 - 1F	0.51	0.51	0.00	0.51	0.00
# 5 - 2F	0.39	0.46	-0.07	0.43	16.47
# 5 - 3F	0.44	0.42	0.02	0.43	4.65
# 9 - 1	1.87	1.91	-0.04	1.89	2.12
# 9 - 2	1.54	1.54	0.00	1.54	0.00
# 9 - 3	1.93	1.83	0.10	1.88	5.32

Average Relative Percent Difference **4.76**

APPENDIX E
SAMPLE CALCULATIONS

SAMPLE CALCULATIONS FOR FLOW, MOISTURE AND ISO

Client: DOE
Test Number: Run 1
Test Location: Unit 5 inlet

Plant: Presque Isle
Test Date: 7/13/99
Test Period: 0905-1135

1. Volume of dry gas sampled at standard conditions (68 deg F, 29.92 in. Hg), dscf.

$$Vm(std) = \frac{17.64 \times Y \times Vm \times \left(Pb + \frac{\text{delta H}}{13.6} \right)}{(Tm + 460)}$$

$$Vm(std) = \frac{17.64 \times 1.0090 \times 67.488 \times \left(29.62 + \frac{1.044}{13.6} \right)}{113.40 + 460} = 62.211$$

Where:

Vm(std) =	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Vm =	Volume of gas sample measured by the dry gas meter at meter conditions, dcf.
Pb =	Barometric Pressure, in Hg.
delt H =	Average pressure drop across the orifice meter, in H_2O
Tm =	Average dry gas meter temperature , deg F.
Y =	Dry gas meter calia!bration factor.
17.64 =	Factor that includes ratio of standard temperature (528 deg R) to standard pressure (29.92 in. Hg), deg R/in. Hg.
13.6 =	Specific gravity of mercury.

2. Volume of water vapor in the gas sample corrected to standard conditions, scf.

Vw(std) = (0.04707 x Vwc) + (0.04715 x Wwsg)

Vw(std) = (0.04707 x 125.2) + (0.04715 x 12.8) = 6.5

Where:

Vw(std) =	Volume of water vapor in the gas sample corrected to standard conditions, scf.
Vwc =	Volume of liquid condensed in impingers, ml.
Wwsg =	Weight of water vapor collected in silica gel, g.
0.04707 =	Factor which includes the density of water (0.002201 lb/ml), the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant 21.85 (in. Hg) (ft^3)/lb-mole)(deg R); absolute temperature at standard conditions (528 deg R), absolute pressure at standard conditions (29.92 in. Hg), ft^3/ml.
0.04715 =	Factor which includes the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant 21.85 (in. Hg) (ft^3)/lb-mole)(deg R); absolute temperature at standard conditions (528 deg R), absolute pressure at standard conditions (29.92 in. Hg), and 453.6 g/lb, ft^3/g.

3. Moisture content

$$bws = \frac{Vw(std)}{Vw(std) + Vm(std)}$$

$$bws = \frac{6.496}{6.496 + 62.211} = 0.095$$

Where:

bws =	Proportion of water vapor, by volume, in the gas stream, dimensionless.

4. Mole fraction of dry gas.

Md = 1 - bws

Md = 1 - 0.095 = 0.905

Where:

Md = Mole fraction of dry gas, dimensionless.

5. Dry molecular weight of gas stream, lb/lb-mole.

MWd = (0.440 x % CO_2) + (0.320 x % O_2) + (0.280 x (% N_2 + % CO))

MWd = (0.440 x 13.0) + (0.320 x 5.5) + (0.280 x (81.5 + 0.00))

= 30.30

Where:

MWd =	Dry molecular weight , lb/lb-mole.
% CO2 =	Percent carbon dioxide by volume, dry basis.
% O_2 =	Percent oxygen by volume, dry basis.
% N_2 =	Percent nitrogen by volume, dry basis.
% CO =	Percent carbon monoxide by volume, dry basis.
0.440 =	Molecular weight of carbon dioxide, divided by 100.
0.320 =	Molecular weight of oxygen, divided by 100.
0.280 =	Molecular weight of nitrogen or carbon monoxide, divided by 100.

6. Actual molecular weight of gas stream (wet basis), lb/lb-mole.

MWs = (MWd x Md) + (18 x (1 - Md))

MWs = (30.30 x 0.905) +(18 (1 - 0.905)) = 29.14

Where:

MWs =	Molecular weight of wet gas, lb/lb-mole.
18 =	Molecular weight of water, lb/lb-mole.

7. Average velocity of gas stream at actual conditions, ft/sec.

$$Vs = 85.49 \times Cp \times ((\text{delt } p)^{1/2})avg \times \left(\frac{Ts\ (avg)}{Ps \times MWs} \right)^{1/2}$$

$$Vs = 85.49 \times 0.84 \times 0.660510 \times \left(\frac{798}{28.96 \times 29.14} \right)^{\wedge}1/2 = 46.1$$

Where:

Vs =	Average gas stream velocity, ft/sec.
85.49 =	Pitot tube constant, ft/sec x $\frac{(\text{lb/lb-mole})(\text{in. Hg})^{1/2}}{(\text{deg R})(\text{in } H_2O)}$
Cp =	Pitot tube coefficient, dimensionless.
Ts =	Absolute gas stream temperature, deg R = Ts, deg F + 460.
Ps =	Absolute gas stack pressure, in. Hg. = Pb + $\frac{P(\text{static})}{13.6}$
delt p =	Velocity head of stack, in. H_2O

8. Average gas stream volumetric flowrate at actual conditions, wacf/min.

$$Qs(act) = 60 \times Vs \times As$$

$$Qs(act) = 60 \times 46.13 \times 149.50 = 413796$$

Where:

Qs(act) =	Volumetric flowrate of wet stack gas at actual conditions, wacf/min.
As =	Cross-sectional area of stack, ft^2.
60 =	Conversion factor from seconds to minutes.

9. Average gas stream dry volumetric flowrate at standard conditions, dscf/min.

$$Qs(std) = 17.64 \times Md \times \frac{Ps}{Ts} \times Qs(act)$$

$$Qs(std) = 17.64 \times 0.905 \times \frac{28.96}{798} \times 413796$$

$$= 239808$$

Where:

Qs(std) = Volumetric flowrate of dry stack gas at standard conditions, dscf/min.

Note: Volumetric flowrate from the unit 5 outlet (corrected to the Unit 5 inlet O_2 concentration) was used in the emission rate calculations. That value is 182,746 dscfm.

10. Isokinetic variation calculated from intermediate values, percent.

$$I = \frac{17.327 \times Ts \times Vm(std)}{Vs \times O \times Ps \times Md \times (Dn)^2}$$

$$I = \frac{17.327 \times 798 \times 62.211}{46.13 \times 120 \times 28.96 \times 0.905 \times (0.245)^2} = 98.7$$

Where:

I = Percent of isokinetic sampling.

O = Total sampling time, minutes.

Dn = Diameter of nozzle, inches.

17.327 = Factor which includes standard temperature (528 deg R), standard pressure (29.92 in. Hg), the formula for calculating area of circle $D^{2/4}$, conversion of square feet to square inches (144), conversion of seconds to minutes (60), and conversion to percent (100), $\frac{(in.\ Hg)(in^2)(min)}{(deg\ R)(ft^2)(sec)}$

SAMPLE CALCULATIONS FOR METALS

Client: DOE
Test Number: Run 1
Test Location: Unit 5 inlet

Plant: Presque Isle
Test Date: 7/13/99
Test Period: 0905-1135

1. Total Mercury concentration, lb/dscf.

$$C_1 = \frac{W \times 2.2046 \times 10E\text{-}9}{Vm_{(std)}}$$

$$C_1 = \frac{7.86 \times 2.2046 \times 10E\text{-}9}{62.211}$$

$$= 2.79E\text{-}10$$

Where:

W = Weight of Total Mercury collected in sample in ug.
C_1 = Total Mercury concentration, lb/dscf.
2.2046×10^{-9} = Conversion factor from ug to pounds.

2. Total Mercury concentration, ug/dscm

$$C_2 = \frac{W}{Vm_{(std)} \times 0.02832}$$

$$C_2 = \frac{7.8595}{62.211 \times 0.02832}$$

$$= 4.46$$

Where:

C_2 = Total Mercury concentration, µg/dscm.
W = Total Mercury catch, µg.
0.02832 = Conversion factor from cubic feet to cubic meters.

3. Total Mercury concentration, ug/Nm3

$$C_3 = \frac{W}{Vm_{(std)} \times 0.02832 \times (16.44/17.64)}$$

$$C_3 = \frac{7.8595}{1.64}$$

$$C_3 = 4.79$$

Where:

C_3	=	Total Mercury concentration, ug/Nm^3
W	=	Total Mercury catch, µg.
0.02832	=	Conversion factor from cubic feet to cubic meters.
16.44/17.64	=	Ratio of conversion factors for standard temperature and pressure and normal temperature.

4. Total Mercury mass emission rate, lbs/hr.

$$MR1 = C_1 \times Qs(std) \times 60$$

$$MR1 = 2.79E\text{-}10 \times 182746 \times 60$$

$$MR1 = 3.05E\text{-}03$$

Where:

MR1	=	Total Mercury mass emission rate, lbs/hr.
60	=	Conversion factor from minutes to hours.

5. Total Mercury mass emission rate, lbs/10E+12 Btu.

$$MR2 = MR1/F\text{-}Factor \times 10E{+}6$$

$$MR2 = 3.05E\text{-}03 / 811 \times 10E{+}6$$

$$MR2 = 3.77$$

Where:

MR2	=	Total Mercury mass emission rate, lbs/10E+12 Btu.
Heat Input	=	811 x 10^6 Btu/hr

APPENDIX F
EQUIPMENT CALIBRATION RECORDS

WESTON

LONG/PRE DRY GAS METER CALIBRATION DATA FORM

Calibrator P. Mack

Date 3/22/99 Meter Box Number 6 Plant

Barometric pressure, P_b = 29.33 in. Hg Dry Gas Meter Number 9429 Comments

Setting	Gas volume		Temperatures						
Orifice manometer	Wet test meter	Dry gas meter	Wet test meter	Dry gas meter					
(Δ H) in. H_2O	(V_w) ft^3	(V_d) ft^3	(t_w) °F	Inlet (td_i) °F	Outlet (td_o) °F	Avg (t_d) °F	Time (θ), min	Y_i	ΔH @$_i$ in. H_2O
0.5	5	684.986 / 679.850	64	74, 77	74, 75	75	12.6	.9927	1.7613
1.0	5	690.127 / 684.986	64	78, 81	76, 77	78	9.1	.9961	1.8271
1.5	10	700.434 / 690.127	64	81, 88	77, 80	81.5	15.5	.9940	1.9750
2.0	10	710.741 / 700.484	64	83, 92	80, 83	86	13.5	.9915	1.9811
3.0	10	721.401 / 710.941	64	93, 97	83, 86	90	11.1	.9960	1.9944
							Avg	Y .9941	ΔH @ 1.9078

If there is only one thermometer on the dry gas meter, record the temperature under td_o.

(ΔH) in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H@i = \frac{0.0317 \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\Theta}{V_w}\right]^2$
0.5	0.0368	$\frac{(5)(29.33)(75+460)}{(5.136)(29.33+.0368)(64+460)}$	$\frac{(.0317)(.5)}{(29.33)(75+460)}\left[\frac{(64+460)(12.6)}{5}\right]^2$
1.0	0.0735	$\frac{(5)(29.33)(78+460)}{(5.141)(29.33+.0735)(64+460)}$	$\frac{(.0317)(1.0)}{(29.33)(78+460)}\left[\frac{(64+460)(9.1)}{5}\right]^2$
1.5	0.110	$\frac{(10)(29.33)(81.5+460)}{(10.357)(29.33+.110)(64+460)}$	$\frac{(.0317)(1.5)}{(29.33)(81.5+460)}\left[\frac{(64+460)(15.5)}{10}\right]^2$
2.0	0.147	$\frac{(10)(29.33)(86+460)}{(10.457)(29.33+.147)(64+460)}$	$\frac{(.0317)(2.0)}{(29.33)(86+460)}\left[\frac{(64+460)(15.5)}{10}\right]^2$
3.0	0.221	$\frac{(10)(29.33)(90+460)}{(10.46)(29.33+.221)(64+460)}$	$\frac{(.0317)(3.0)}{(29.33)(90+460)}\left[\frac{(64+460)(11.1)}{10}\right]^2$

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 3/04/99
AMBIENT TEMPERATURE [illegible]
CALIBRATION [illegible]

POTENTIOMETER NUMBER 2010 #6
BAROMETRIC PRESSURE 29.33
REFERENCE: THERMOCOUPLE SIMULATOR
(ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ⊙	TEMPERATURE DIFFERENCE ⊙ (%)
0	32	32	32	32	32	32	32	0° - 0%
100	212	213	213	213	213	213	213	1° - .15%
500	932	933	933	933	933	933	933	1° - .107%
1000	1832	1831	1831	1831	1831	1831	1831	1° - .04

COMMENTS

⊙ AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

⊙ THE CHANNEL READINGS MUST AGREE WITHIN ± 5°F OR 3°C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^{\circ}\text{F} + 460) - (\text{TEST TEMP}^{\circ}\text{F} + 460)}{(\text{REF TEMP}^{\circ}\text{F} + 460)}\right) \times 100$

WESTON
MANAGERS DESIGNERS/CONSULTANTS

DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

CLIENT: DOE-Wisconsin Electric Co.

FACILITY: Marquette, MI.

DATE: 7/24/99

METER BOX #: 6

DRY GAS METER SERIAL #: 9429

CRITICAL ORIFICE SET SERIAL #: 13225

BAROMETRIC PRESSURE (In Hg):	INITIAL	FINAL	AVG (P_{bar})
	29.27	29.27	29.72

IF Y VARIATI
ORIFICE SHOULD

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (In Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (In H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y
11	1	0.3237	24	630.898	635.253	4.355	72	73	74	71	71	72.25	10.00	0.62	4.2977	4.1722	0.9708
	2	0.3237	24	635.253	639.680	4.427	72	74	76	72	72	73.5	10.10	0.62	4.3585	4.2139	0.9668
	3	0.3237	24	639.680	644.078	4.398	72	77	78	73	74	75.5	10.10	0.62	4.3137	4.2139	0.9769
																AVG =	0.9715
24	1	0.6703	21	644.078	653.294	9.216	72	79	84	74	77	78.5	10.20	2.6	9.0330	8.8123	0.9756
	2	0.6703	21	653.294	662.359	9.065	72	84	88	77	79	82	10.00	2.6	8.8276	8.6395	0.9787
	3	0.6703	21	662.359	671.490	9.131	72	89	91	80	81	85.25	10.00	2.6	8.8388	8.6395	0.9774
																AVG =	0.9772
16	1	0.4501	22	671.490	677.706	6.216	72	87	89	82	83	85.25	10.00	1.2	5.9979	5.8013	0.9672
	2	0.4501	22	677.706	683.925	6.219	72	88	89	83	84	85.5	10.00	1.2	5.9980	5.8013	0.9672
	3	0.4501	22	683.925	690.155	6.230	72	89	89	84	85	86.75	10.00	1.2	5.9949	5.8013	0.9677
																AVG =	0.9674

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.9720

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at maximum attainable vacuum (open coarse valve, close fine valve), for period of 5 minutes minimum for large orifice up to 10 minutes for smallest orifice.
4) Record readings in outlined boxes, other columns are automatically calculated.

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Calibrator: P. Mack

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 7/26/99
AMBIENT TEMPERATURE 77
CALIBRATION [illegible]

POTENTIOMETER NUMBER 2010 #6
BAROMETRIC PRESSURE 29.22
REFERENCE: THERMOCOUPLE SIMULATOR
(ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ②	TEMPERATURE DIFFERENCE ① (%)
0	32	33	33	33	33	33	33	1° - .20%
100	212	214	214	214	214	214	214	2° - .30%
500	932	933	933	933	933	933	933	1° - .07%
1000	1832	1830	1830	1830	1830	1830	1830	2° - .09%

COMMENTS

② AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

① THE CHANNEL READINGS MUST AGREE WITHIN ± 5°F OR 3°C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^{\circ}\text{F} + 460) - (\text{TEST TEMP}^{\circ}\text{F} + 460)}{(\text{REF TEMP}^{\circ}\text{F} + 460)}\right) \times 100$

WESTON

LONG/PRE DRY GAS METER CALIBRATION DATA FORM

Calibrator P. Mack

Date 2/25/99 Meter Box Number 12 Plant

Barometric pressure, P_b = 29.72 in. Hg Dry Gas Meter Number 6898070 Comments

Setting	Gas volume		Temperatures						
Orifice manometer	Wet test meter	Dry gas meter	Wet test meter	Dry gas meter					
(Δ H) in. H_2O	(V_w) ft^3	(V_d) ft^3	(t_w) °F	Inlet (td_i) °F	Outlet (td_o) °F	Avg (t_d) °F	Time (θ), min	Y_i	ΔH @$_i$ in. H_2O
0.5	5	728.659 723.650	66	69, 75	69, 72	71	12.6	1.006	1.7646
1.0	5	733.685 728.659	66	75, 77	72, 73	74	9.2	1.007	1.8710
1.5	10	743.761 733.685	66	79, 84	73, 76	78	15.4	1.011	1.9513
2.0	10	753.860 743.761	67	83, 86	76, 77	80.5	13.5	1.010	1.9977
3.0	10	763.977 753.860	67	87, 90	78, 79	83.5	10.9	1.012	1.9427
							Avg	Y 1.009	Δ H @ 1.9055

If there is only one thermometer on the dry gas meter, record the temperature under td_o.

(ΔH) in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H@i = \frac{0.0317 \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\Theta}{V_w}\right]^2$
0.5	0.0368	$\frac{(5)(29.72)(71+460)}{(5.009)(29.72+.0368)(66+460)}$	$\frac{(.0317)(.5)}{(29.72)(71+460)} \left[\frac{(66+460)(12.6)}{5}\right]^2$
1.0	0.0735	$\frac{(5)(29.72)(74+460)}{(5.026)(29.72+.0735)(66+460)}$	$\frac{(.0317)(1.0)}{(29.72)(74+460)} \left[\frac{(66+460)(9.2)}{5}\right]^2$
1.5	0.110	$\frac{(10)(29.72)(78+460)}{(10.076)(29.72+.110)(66+460)}$	$\frac{(.0317)(1.5)}{(29.72)(78+460)} \left[\frac{(66+460)(15.4)}{10}\right]^2$
2.0	0.147	$\frac{(10)(29.72)(80.5+460)}{(10.099)(29.72+.147)(67+460)}$	$\frac{(.0317)(2.0)}{(29.72)(80.5+460)} \left[\frac{(67+460)(13.5)}{10}\right]^2$
3.0	0.221	$\frac{(10)(29.72)(83.5+460)}{(10.117)(29.72+.221)(67+460)}$	$\frac{(.0317)(3.0)}{(29.72)(83.5+460)} \left[\frac{(67+460)(10.9)}{10}\right]^2$

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 23 FEB 99
AMBIENT TEMPERATURE 72
CALIBRATION 6P

POTENTIOMETER NUMBER NUTECH # 12
BAROMETRIC PRESSURE 29.94
REFERENCE: THERMOCOUPLE SIMULATOR (ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ①	TEMPERATURE DIFFERENCE ② (%)
0	32	32	32	32	32	32	32	0° - 0%
100	212	213	213	213	213	213	213	1° - .15%
500	932	933	933	933	933	933	933	1° - .07%
1000	1832	1830	1830	1831	1831	1832	1830.8	1.2° - .05%

COMMENTS

① AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

② THE CHANNEL READINGS MUST AGREE WITHIN ± 5°F OR 3°C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^\circ\text{F} + 460) - (\text{TEST TEMP}^\circ\text{F} + 460)}{(\text{REF TEMP}^\circ\text{F} + 460)}\right) \times 100$

WESTON
MANAGERS DESIGNERS/CONSULTANTS

DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

CLIENT: DOE-Wisconsin Electric Ic.Co.

FACILITY: Marquette, MI.

DATE: 8/9/99

METER BOX #: 12

DRY GAS METER SERIAL #: 6898070

CRITICAL ORIFICE SET SERIAL #: 1322S

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	29.25	29.25	29.25

IF Y VARIATI
ORIFICE SHOULD

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y
11	1	0.3237	27	931.266	935.664	4.398	72	74	76	71	72	73.25	10.00	0.68	4.2842	4.1062	0.9630
	2	0.3237	27	935.664	940.061	4.397	72	80	80	73	72	76.25	10.00	0.68	4.2393	4.1062	0.9686
	3	0.3237	27	940.061	944.472	4.411	72	80	82	73	74	77.25	10.00	0.68	4.2449	4.1062	0.9673
																AVG =	0.9663
18	1	0.5114	22	944.472	951.362	6.890	72	77	81	74	74	76.5	10.00	1.6	6.6568	6.4872	0.9746
	2	0.5114	22	951.362	958.263	6.901	72	80	82	74	75	77.75	10.00	1.6	6.6520	6.4872	0.9762
	3	0.5114	22	958.263	965.162	6.899	72	84	85	77	77	80.75	10.00	1.6	6.6131	6.4872	0.9810
																AVG =	0.9769
24	1	0.6703	20	965.162	973.944	8.782	72	81	86	75	78	80	10.00	2.65	8.4520	8.5029	1.0060
	2	0.6703	20	973.944	982.994	9.050	72	80	86	76	78	80	10.00	2.65	8.7099	8.5029	0.9762
	3	0.6703	20	982.994	992.024	9.030	72	86	88	78	79	82.75	10.00	2.65	8.6466	8.5029	0.9834
																AVG =	0.9885

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.9772

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at maximum attainable vacuum (open coarse valve, close fine valve), for period of 5 minutes minimum for large orifice up to 10 minutes for smallest orifice.
4) Record readings in outlined boxes, other columns are automatically calculated.

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Calibrator: P. Mack

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 8/09/99
AMBIENT TEMPERATURE 72
CALIBRATION [illegible]

POTENTIOMETER NUMBER 2010 #12
BAROMETRIC PRESSURE 29.25
REFERENCE: THERMOCOUPLE SIMULATOR
(ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ⊙	TEMPERATURE DIFFERENCE ⊙ (%)
0	32	31	31	31	31	31	31	1° - .20%
100	212	212	212	212	212	212	212	0° - 0%
500	932	932	932	932	932	932	932	0° - 0%
1000	1832	1828	1828	1828	1828	1828	1828	4° - .17%

COMMENTS

⊙ AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

⊙ THE CHANNEL READINGS MUST AGREE WITHIN ± 5°F OR 3°C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^{\circ}\text{F} + 460) - (\text{TEST TEMP}^{\circ}\text{F} + 460)}{(\text{REF TEMP}^{\circ}\text{F} + 460)}\right) \times 100$

WESTON

LONG/PRE DRY GAS METER CALIBRATION DATA FORM

Calibrator P. Mack

Date 3/30/99 **Meter Box Number** 14 **Plant** _____

Barometric pressure, P_b = 29.83 **in. Hg** **Dry Gas Meter Number** 6848169 **Comments** _____

Setting	Gas volume		Temperatures						
Orifice manometer	Wet test meter	Dry gas meter	Wet test meter	Dry gas meter					
(Δ H) in. H_2O	(V_w) ft^3	(V_d) ft^3	(t_w) °F	Inlet (td_i) °F	Outlet (td_o) °F	Avg (t_d) °F	Time (θ), min	Y_i	ΔH @$_i$ in. H_2O
0.5	5	938.444 933.449	69	77, 79	74, 75	76	13.0	1.0089	1.8753
1.0	5	943.481 938.464	69	80, 82	76, 76	78.5	9.2	1.0120	1.8697
1.5	10	953.563 943.481	69.5	82, 87	76, 78	81	15.7	1.0097	2.0362
2.0	10	963.675 953.563	69.5	85, 89	79, 80	83	13.4	1.0102	1.9705
3.0	10	973.749 963.675	69.5	85, 90	80, 81	84	10.9	1.0082	1.9521
							Avg	Y 1.0088	Δ H @ 1.9408

If there is only one thermometer on the dry gas meter, record the temperature under td_o.

(ΔH) in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H@i = \frac{0.0317 \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\Theta}{V_w}\right]^2$
0.5	0.0368	$\frac{(5)(29.83)(76+460)}{(5.015)(29.83+.0368)(69+460)}$	$\frac{(.0317)(.5)}{(29.83)(76+460)}\left[\frac{(69+460)(13.0)}{5}\right]^2$
1.0	0.0735	$\frac{(5)(29.83)(78.5+460)}{(5.017)(29.83+.0735)(69+460)}$	$\frac{(.0317)(1.0)}{(29.83)(78.5+460)}\left[\frac{(69+460)(9.2)}{5}\right]^2$
1.5	0.110	$\frac{(10)(29.83)(81+460)}{(10.082)(29.83+.110)(69.5+460)}$	$\frac{(.0317)(1.5)}{(29.83)(81+460)}\left[\frac{(69.5+460)(15.7)}{10}\right]^2$
2.0	0.147	$\frac{(10)(29.83)(83+460)}{(10.102)(29.83+.147)(69.5+460)}$	$\frac{(.0317)(2.0)}{(29.83)(83+460)}\left[\frac{(69.5+460)(13.4)}{10}\right]^2$
3.0	0.221	$\frac{(10)(29.83)(84+460)}{(10.115)(29.83+.221)(69.5+460)}$	$\frac{(.0317)(3.0)}{(29.83)(84+460)}\left[\frac{(69.5+460)(10.9)}{10}\right]^2$

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 23 FEB 99
AMBIENT TEMPERATURE GP ~~62~~ 72
CALIBRATION GP

POTENTIOMETER NUMBER NUTECH #14
BAROMETRIC PRESSURE 29.94
REFERENCE: THERMOCOUPLE SIMULATOR (ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ①	TEMPERATURE DIFFERENCE ② (%)
0	32	34	34	34	34	34	34	2° - .41
100	212	214	214	214	214	214	214	2° - .30%
500	932	934	934	934	934	93~~3~~4 GP	934	2° - .14%
1000	1832	1831	1831	1831	1831	183~~3~~1 GP	1831	1° - .04%

COMMENTS

① AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

② THE CHANNEL READINGS MUST AGREE WITHIN ± 5° F OR 3 °C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^{\circ}\text{F} + 460) - (\text{TEST TEMP}^{\circ}\text{F} + 460)}{(\text{REF TEMP}^{\circ}\text{F} + 460)}\right) \times 100$

WESTON®
MANAGERS DESIGNERS/CONSULTANTS

DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

CLIENT: DOE-Wisconsin Electric Co.

FACILITY: Marquette, MI.

DATE: 7/24/99

METER BOX #: 14

DRY GAS METER SERIAL #: 6848169

CRITICAL ORIFICE SET SERIAL #: 13223

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	29.27	29.27	29.27

IF Y VARIATI
ORIFICE SHOULD

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y
24	1	0.6703	19	159.210	167.871	8.661	72	83	84	82	82	82.75	10.00	2.6	8.2978	8.5067	1.0254
	2	0.6703	19	167.871	176.521	8.650	72	83	85	81	81	82.5	10.00	2.6	8.2911	8.5067	1.0262
	3	0.6703	19	176.521	185.174	8.653	72	84	86	81	82	83.25	10.00	2.6	8.2825	8.5067	1.0273
																AVG =	1.0263
16	1	0.4501	22	185.174	190.997	5.823	72	86	86	82	82	83.75	10.00	1.2	5.5491	5.7135	1.0296
	2	0.4501	22	190.997	196.813	5.816	72	86	86	82	82	83.5	10.00	1.2	5.5450	5.7135	1.0304
	3	0.4501	22	196.813	202.633	5.820	72	86	87	83	84	85	10.00	1.2	5.5335	5.7135	1.0325
																AVG =	1.0308
11	1	0.3237	24	202.633	206.799	4.166	72	86	86	84	84	85	10.00	0.56	3.9546	4.1090	1.0390
	2	0.3237	24	206.799	210.966	4.166	72	86	86	84	83	84.5	10.00	0.56	3.9532	4.1090	1.0391
	3	0.3237	24	210.966	215.125	4.160	72	86	87	84	86	85.5	10.00	0.56	3.9453	4.1090	1.0415
																AVG =	1.0396

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at maximum attainable vacuum (open coarse valve, close fine valve), for period of 5 minutes minimum for large orifice up to 10 minutes for smallest orifice.
4) Record readings in outlined boxes, other columns are automatically calculated.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.0322

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Calibrator: P. Mack

WESTON

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

DATE 7/24/99
AMBIENT TEMPERATURE 72
CALIBRATION Okay [illegible]

POTENTIOMETER NUMBER 2010 #14
BAROMETRIC PRESSURE 29.27
REFERENCE: THERMOCOUPLE SIMULATOR (ACCURACY ± 1°F)

REFERENCE TEMPERATURE °C	°F	TEMPERATURE READING FROM THERMOCOUPLE CHANNEL INPUT NUMBER 1	2	3	4	5	AVERAGE TEMPERATURE READING ①	TEMPERATURE DIFFERENCE ② (%)
0	32	33	33	33	33	33	33	1° - .20%
100	212	214	214	214	214	214	214	2° - .30%
500	932	934	934	934	934	934	934	2° - .14%
1000	1832	1831	1831	1831	1831	1831	1831	1° - .04%

COMMENTS

① AVERAGE TEMPERATURE READING = MEAN OF THE TEMPERATURE READINGS FOR THE THERMOCOUPLE CHANNELS

② THE CHANNEL READINGS MUST AGREE WITHIN ± 5°F OR 3°C

ACCEPTABLE TEMPERATURE DIFFERNCE ≤ 1.5 = $\left(\frac{(\text{REF TEMP}^{\circ}\text{F} + 460) - (\text{TEST TEMP}^{\circ}\text{F} + 460)}{(\text{REF TEMP}^{\circ}\text{F} + 460)}\right) \times 100$

WESTON

PITOT TUBE IDENTIFICATION NUMBER: P142

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ASSEMBLY LEVEL? ✓ (YES) _____ (NO)

PITOT TUBE OPENINGS DAMAGED? _____ (YES-EXPLAIN BELOW) ✓ (NO)

α_1 = 0° (<10) α_2 = 0° (<10)

β_1 = 0° (<5) β_2 = 0° (<5)

γ = 1° θ = 0° A = .94 in.

z = A sin γ = .01 in.; (< 1/8 in.),

w = A sin θ = 0 in.; (< 1/32 in.),

P_a = .47 in. P_b = .47 in.

D_t = .38 in. $P_a = P_b$? ✓ (YES) _____ (NO)

COMMENTS _____

CALIBRATION REQUIRED? _____ (YES) ✓ (NO)

INSPECTOR Tony Bruce DATE 12-22-98

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WESTON

PITOT TUBE IDENTIFICATION NUMBER: P200

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ASSEMBLY LEVEL? ✓ (YES) ____ (NO)

PITOT TUBE OPENINGS DAMAGED? ____ (YES-EXPLAIN BELOW) ✓ (NO)

α_1 = 0 ° (<10) α_2 = 1 ° (<10)

β_1 = 1 ° (<5) β_2 = 0 ° (<5)

γ = 0 ° θ = 0 ° A = .100 in.

z = A sin γ = 0 in.; (<1/8 in.),

w = A sin θ = 0 in.; (<1/32 in.),

P_a = .31 in. P_b = .31 in.

D_t = .25 in. $P_a = P_b$? ✓ (YES) ____ (NO)

COMMENTS ____

CALIBRATION REQUIRED? ____ (YES) ✓ (NO)

INSPECTOR [illegible] DATE 4/14/99

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WESTON

PITOT TUBE IDENTIFICATION NUMBER: P-300

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ASSEMBLY LEVEL? ✓ (YES) ____ (NO)

PITOT TUBE OPENINGS DAMAGED? ____ (YES-EXPLAIN BELOW) ✓ (NO)

α_1 = 3 ° (< 10) α_2 = 2 ° (< 10)

β_1 = 1 ° (< 5) β_2 = 1 ° (< 5)

γ = 0 ° θ = 0 A = .94 in.

z = A sin γ = 0 in.; (< 1/8 in.)

w = A sin θ = 0 in.; (< 1/32 in.).

P_a = .47 in P_b = .47 in.

D_t = .58 in. $P_a = P_b$? ✓ (YES) ____ (NO)

COMMENTS 17 inch head

CALIBRATION REQUIRED? ____ (YES) ✓ (NO)

INSPECTOR [signature] DATE 2-10-99

WESTON

PITOT TUBE IDENTIFICATION NUMBER: P-301

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ASSEMBLY LEVEL? ✓ (YES) ____ (NO)

PITOT TUBE OPENINGS DAMAGED? ____ (YES-EXPLAIN BELOW) ✓ (NO)

α_1 = 0° (<10) α_2 = 0° (<10)

β_1 = 0° (<5) β_2 = 0° (<5)

γ = 1° θ = 0° A = .83 in.

[illegible] = .01 in. (<1/8 in.)

w = A sinθ = 0 in.; (<1/32 in.),

P_a = .465 in P_b = .465 in.

D_t = .38 in $P_a = P_b$? ✓ (YES) ____ (NO)

COMMENTS 17 inch head

CALIBRATION REQUIRED? ____ (YES) ✓ (NO)

[illegible] [signature] DATE 2-10-99

WESTON

PITOT TUBE IDENTIFICATION NUMBER: 302

TYPE S PITOT TUBE INSPECTION DATA FORM

PITOT TUBE ASSEMBLY LEVEL? ✓ (YES) ____ (NO)

PITOT TUBE OPENINGS DAMAGED? ____ (YES-EXPLAIN BELOW) ✓ (NO)

α_1 = 0° (<10) α_2 = 0° (<10)

β_1 = 0° (<5) β_2 = 0° (<5)

γ = 1° θ = 0 A = .93 in.

α = .01 in. (<1/8)

w = A sin θ = 0 in.; (<1/32 in.),

P_a = .465 in. P_b = .465 in.

P_t = .38 in. $P_a = P_b$? ✓ (YES) ____ (NO)

COMMENTS 18 in head

CALIBRATION REQUIRED? ____ (YES) ✓ (NO)

[signature] DATE 2/10/99