Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

Reference Number: 90

Title: Summary of Results Methods 1, 2, 3A, 4, and 5, Geoenergy at Louisiana Pacific, Dawson Creek, British Columbia

Am Test-Air Quality, Inc.

June 1994

AMTEST
AIR QUALITY, INC.

AmTest-Air Quality, Inc.
30545 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7746
FAX: (206) 222-7849

AMTEST 6 94

4-90)

June 28, 1994

4-
Rel 90

w/ metals analysis in back

Mr. Steve Jason
Geoenergy International Corporation
1819 South Central
Suite 143
Kent, Washington 98032

Dear Mr. Jason:

Geoenergy International Corporation contracted Am Test-Air Quality, Inc. to quantify particulate matter emissions at the inlet to the E-Tube and at the E-Tube outlet stack at Louisiana Pacific's plywood (OSB) mill in Dawson Creek, British Columbia. The E-Tube is installed to control emissions from the core dryer. On June 7, 1994, two (2) particulate matter emission samples were collected at the E-Tube outlet, and one (1) particulate matter emission sample was collected at the E-Tube inlet.

Particulate matter emissions were quantified by conducting one-hour tests at the E-Tube inlet and outlet using Environmental Protection Agency (EPA) methodology presented in the July 1, 1993 edition of EPA Title 40, Code of Federal Regulations, Parts 53-60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4 and 5. Methods 1 and 2 were performed to measure the stack gas velocity and temperature for calculating the volumetric flow rate. Method 3A was performed to determine the molecular weight of the stack gas. Method 4 was performed to determine the moisture content of the stack gas. Method 5 was performed to quantify particulate matter emissions. Condensible particulate matter was quantified by performing a methylene chloride extraction of the back-half portion of the Method 5 sample train per the State of Oregon Department of Environmental Quality (ODEQ) Source Sampling Manual Method 5 procedures.

Mr. Stanley B. Moye of Am Test-Air Quality, Inc. conducted the field sampling. Mr. Kris A. Hansen, Ms. Angela F. Blaisdell, Ms. Judy A. Aasland and Ms. Annika Woehr of Am Test-Air Quality, Inc. performed laboratory analysis and data reduction. Mr. Bill Nygen of Louisiana Pacific and Mr. Bob Smith of Geoenergy International Corporation coordinated this project.

The results of the three (3) Method 5 tests for quantifying particulate matter emissions are presented on the enclosed computer printout titled "Summary of Results - Methods 1, 2, 3A, 4 and 5", and in Table 1 below:

Table 1. Summary of particulate matter emission concentration test results from samples collected at the core dryer E-Tube inlet and outlet on June 7, 1994 at Louisiana Pacific's facility in Dawson Creek, British Columbia.

Sample Run #	Front-half Partic. Matter Emission Conc. (gr/dscf)	Back-half Partic. Matter Emission Conc. (gr/dscf)	Total Partic. Matter Emission Conc. (gr/dscf)	Total P.M. Emission Rate (lb/hr)	Total P.M. Emission Rate (tons/yr)
E-TUBE OUTLET STACK					
1	0.007	0.008	0.016	5.21	22.8
2	0.005	0.005	0.010	3.48	15.3
Average	0.006	0.007	0.013	4.35	19.1
E-TUBE INLET DUCT					
1	0.054	0.037	0.091	29.6	129.6

The front-half, back-half and total particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf) of gas sampled. The total particulate matter emission rate results are presented in units of pounds per hour (lb/hr) and tons per year (tons/yr). Tons per year calculations assume 24 hours per day 365 days per year operation. An acceptable leak check of less than 0.02 cfm at the highest vacuum rate (or greater) used during the test preceded and followed each run. The percentage isokinetics were within the acceptable limits of 100 $\pm$ 10% for all three (3) runs.

AMTEST
AIR QUALITY, INC.

Please find enclosed three (3) copies of this letter and a complete data package which includes a summary table of results, separate computer printouts for each run, example calculations of results and field data sheets Please call Am Test-Air Quality, Inc. at (206) 222-7746 if you have any questions or require further information.

Sincerely,
Am Test-Air Quality, Inc.

Kris A. Hansen
Project Manager

KAH/AFB/jaa
Enclosure
[jaa\c\word\report\geoltr2]

AMTEST
AIR QUALITY, INC.

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 5
AM TEST - AIR QUALITY, INC.

FILE NAME: LB604\GEODCSUM
CLIENT: Geoenergy @ Louisiana Pacific
LOCATION: Dawson Creek, British Columbia

	CORE DRYER E-TUBE			
	Outlet			Inlet
	RUN #1	RUN #2	AVERAGE	RUN #1
LAB #:	5827	5828		5826
DATE:	6/7/94	6/7/94		6/7/94
START TIME:	10:25	12:20		18:57
STOP TIME:	11:30	13:25		19:57
SAMPLE LENGTH (minutes):	60.0	60.0		60.0
VOLUME SAMPLED (cubic feet):	48.309	52.312	50.311	42.096
VOLUME SAMPLED (dry std. cubic feet):	45.328	48.781	47.055	37.440
VOLUME SAMPLED (dry std. cubic meters):	1.284	1.382	1.333	1.060
STACK GAS MOISTURE (percent):	20.48	19.82	20.15	19.41
BAROMETRIC PRESSURE (inches of Hg):	27.40	27.46	27.43	27.67
STATIC PRESSURE (inches of H2O):	-0.05	-0.05	-0.05	-8.50
STACK PRESSURE (inches of Hg):	27.40	27.46	27.43	27.05
STACK TEMPERATURE (degrees F.):	135.2	134.4	134.8	250.6
STACK TEMPERATURE (degrees R.):	595.2	594.4	594.8	710.6
CARBON DIOXIDE (percent):	0.1	0.6	0.4	0.1
OXYGEN (percent):	20.1	18.3	19.2	18.0
CARBON MONOXIDE (ppm):	173	576	375	1131
MOLECULAR WEIGHT (dry, g/g-mole):	28.82	28.83	28.83	28.74
MOLECULAR WEIGHT (wet, g/g-mole):	26.60	26.68	26.64	26.65
AVERAGE VELOCITY HEAD (inches of H2O):	0.904	1.037	0.971	2.938
PITOT TUBE Cp:	0.84	0.84		0.84
STACK GAS VELOCITY (feet per second):	61.7	65.9	63.8	122.2
STACK DIAMETER (inches):	54.0	54.0		41.75
STACK AREA (square feet):	15.9	15.9		9.51
STACK GAS AIRFLOW (dry std. cubic feet per min.):	38020.6	41092.2	39556.4	37736.6
STACK GAS AIRFLOW (actual cubic feet per min.):	58863.2	62869.7	60866.5	69713.5
NOZZLE DIAMETER (inches):	0.242	0.242		0.167
ISOKINETICS (percent):	99	99		103
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.007	0.005	0.006	0.054
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.008	0.005	0.007	0.037
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.016	0.010	0.013	0.091
TOTAL PARTICULATE EMISSION CONC. (mg/dscm):	36.6	22.6	29.6	209.4
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	5.21	3.48	4.35	29.6
TOTAL PARTICULATE MATTER EMISSION RATE (tons/year):	22.8	15.3	19.1	129.6

METHODS 1, 2, 3A, 4, AND 5
AM TEST-AIR QUALITY, INC.

FILE NAME:	LB604\GEDCM5R1	LAB #:	5827
CLIENT:	Geoenergy @ Louisiana Pacific	START TIME:	10:25 o'clock
		STOP TIME:	11:30 o'clock
LOCATION:	Dawson Creek, B.C.	SAMPLE LENGTH:	60.0 minutes
SAMPLE SITE:	E-Tube Core Stack Outlet		
SAMPLE DATE:	June 7, 1994		
RUN #:	1 - Method 5		
OPERATORS:	Moye		

IMPINGER WEIGHTS

FINAL grams	INITIAL grams	NET grams
844.6	643.8	200.8
670.6	638.6	32.0
545.7	542.2	3.5
790.2	778.9	11.3

TOTAL H2O GAIN:	247.6
TOTAL VOLUME (SCF):	11.67
PERCENT MOISTURE:	20.48
Bws:	0.2048
INIT. METER VOLUME:	199.807
FINAL METER VOLUME:	248.116
VOLUME SAMPLED:	48.309
STD VOLUME (DSCF):	45.328
STD VOLUME (DSCM):	1.284
Y FACTOR:	0.997

PITOT TUBE Cp:	0.84	
NOZZLE DIAMETER:	0.242	inches
NOZZLE AREA:	0.0003	sq. feet
STACK DIAMETER:	54.0	inches
STACK AREA:	15.9	sq. feet
METER TEMPERATURE:	56.8	degrees F
BAROMETRIC PRES.:	27.40	inches Hg
STATIC PRESSURE:	-0.05	inches H2O
STACK PRESSURE:	27.40	inches Hg
ORIFICE PRESSURE:	2.187	inches H2O
METER PRESSURE:	27.56	inches Hg
AVERAGE CONC. CO2:	0.1	percent
AVERAGE CONC. O2:	20.1	percent
AVERAGE CONC. CO:	173	ppm
MOLECULAR WEIGHT:	28.82	g/g-mole-dry
MOLECULAR WEIGHT:	26.60	g/g-mole-wet

	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F		SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F
W	1	0.86	135	N	1	0.78	135
	2	0.87	134		2	0.81	135
	3	0.87	135		3	0.81	135
	4	0.93	136		4	0.80	136
	5	0.97	136		5	0.93	136
	6	0.98	135		6	0.98	135
	7	0.97	135		7	1.00	135
	8	0.98	135		8	0.98	136
	9	0.98	135		9	0.92	135
	10	0.85	135		10	0.83	135

PERCENT ISOKINETICS:	99 %	
STACK TEMPERATURE:	135.2 degrees F	595.2 degrees R
AVERAGE VELOCITY HEAD:	0.904 " of H2O	
STACK GAS VELOCITY:		61.7 ft/second
STACK GAS AIR FLOW:	58863.2 acf/min	38020.6 dscf/min
PARTICULATE EMISSION CONCENTRATION (front-half):		0.007 gr/dscf
PARTICULATE EMISSION CONCENTRATION (back-half):		0.008 gr/dscf
TOTAL PARTICULATE EMISSION CONC. (front & back-half):		0.016 gr/dscf
TOTAL PARTICULATE EMISSION CONCENTRATION:		36.6 mg/dscm
TOTAL PARTICULATE MATTER EMISSION RATE:		5.21 lb/hr
TOTAL PARTICULATE MATTER EMISSION RATE:		22.8 tons/yr

FRONT-HALF PARTICULATE MATTER MASS LOADING

FILTER NUMBER:	#110-548
TARE WEIGHT OF FILTER (grams):	0.8271
FINAL WEIGHT OF FILTER (grams):	0.8435
NET WEIGHT OF PARTICULATE MATTER (grams):	0.0164
BEAKER NUMBER:	#150-488
TARE WEIGHT OF BEAKER (grams):	69.3334
FINAL WEIGHT OF BEAKER (grams):	69.3392
NET WEIGHT OF PARTICULATE MATTER (grams):	0.0058
VOLUME OF ACETONE (milliliters):	240.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0002
TOTAL FRONT-HALF PARTICULATE MATTER (grams):	0.0220

BACK-HALF PARTICULATE MATTER MASS LOADING

"C" SECTION - CONDENSER PARTICULATE	#150-1285
TARE WEIGHT OF BEAKER (grams):	65.3490
FINAL WEIGHT OF BEAKER (grams):	65.3643
NET WEIGHT OF PARTIC. MATTER (grams):	0.0153
TOTAL VOLUME OF WATER (milliliters):	640.0
VOLUME OF WATER CONDENSED (milliliters):	236.3
NET VOLUME OF WATER FOR BLANK (milliliters):	403.7
WT./VOL. OF WATER BLANK (milligrams/ml):	0.0004
NET WEIGHT OF PARTIC. DUE TO WATER (grams):	0.0002
"Cx" SECTION - HYDROCARBON EXTRACTION	#150-1305
TARE WEIGHT OF BEAKER (grams):	77.7265
FINAL WEIGHT OF BEAKER (grams):	77.7363
NET WEIGHT OF PARTIC. MATTER (grams):	0.0098
TOTAL VOLUME OF CH2Cl2 (milliliters):	150.0
WT./VOL. OF CH2Cl2 BLANK (milligrams/ml):	0.000
NET WEIGHT OF PARTIC. DUE TO CH2Cl2 (grams):	0.0000
"D" SECTION - ACETONE RINSE OF CONDENSER	#150-1308
TARE WEIGHT OF BEAKER (grams):	65.2213
FINAL WEIGHT OF BEAKER (grams):	65.2213
NET WEIGHT OF PARTIC. MATTER (grams):	0.0000
TOTAL VOLUME OF ACETONE (milliliters):	65.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0000
TOTAL BACK-HALF PARTICULATE MATTER (grams):	0.0249
TOTAL WEIGHT OF PARTICULATE MATTER (grams):	0.0469

filter = 74.5%

METHODS 1, 2, 3A, 4, AND 5
AM TEST-AIR QUALITY, INC.

FILE NAME:	LB604\GEDCM5R2	LAB #:	5828
CLIENT:	Geoenergy	START TIME:	12:20 o'clock
LOCATION:	Dawson Creek, B.C.	STOP TIME:	13:25 o'clock
SAMPLE SITE:	E-Tube Core Stack Outlet	SAMPLE LENGTH:	60.0 minutes
SAMPLE DATE:	June 7, 1994		
RUN #:	2 - Method 5		
OPERATORS:	Moye		

IMPINGER WEIGHTS

FINAL grams	INITIAL grams	NET grams
840.7	642.1	198.6
733.9	695.0	38.9
542.0	537.8	4.2
692.4	678.4	14.0

TOTAL H2O GAIN:	255.7
TOTAL VOLUME (SCF):	12.06
PERCENT MOISTURE:	19.82
Bws:	0.1982

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	0.242 inches
NOZZLE AREA:	0.0003 sq. feet
STACK DIAMETER:	54.0 inches
STACK AREA:	15.9 sq. feet
METER TEMPERATURE:	61.7 degrees F
BAROMETRIC PRES.:	27.46 inches Hg
STATIC PRESSURE:	-0.05 inches H2O
STACK PRESSURE:	27.46 inches Hg
ORIFICE PRESSURE:	2.595 inches H2O
METER PRESSURE:	27.65 inches Hg

INIT. METER VOLUME:	248.552
FINAL METER VOLUME:	300.864
VOLUME SAMPLED:	52.312
STD VOLUME (DSCF):	48.781
STD VOLUME (DSCM):	1.382
Y FACTOR:	0.997

AVERAGE CONC. CO2:	0.6 percent
AVERAGE CONC. O2:	18.3 percent
AVERAGE CONC. CO:	576 ppm
MOLECULAR WEIGHT:	28.83 g/g-mole-dry
MOLECULAR WEIGHT:	26.68 g/g-mole-wet

	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F		SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F
W	1	0.90	136	N	1	1.00	134
	2	1.10	137		2	1.08	133
	3	1.10	136		3	1.16	131
	4	1.00	133		4	0.92	131
	5	1.10	136		5	0.90	133
	6	1.05	137		6	1.00	130
	7	1.20	138		7	0.97	131
	8	1.10	136		8	0.98	136
	9	1.10	135		9	1.02	135
	10	1.00	136		10	1.10	134

PERCENT ISOKINETICS:	99 %	
STACK TEMPERATURE:	134.4 degrees F	594.4 degrees R
AVERAGE VELOCITY HEAD:	1.037 " of H2O	
STACK GAS VELOCITY:		65.9 ft/second
STACK GAS AIR FLOW:	62869.7 acf/min	41092.2 dscf/min
PARTICULATE EMISSION CONCENTRATION (front-half):		0.005 gr/dscf
PARTICULATE EMISSION CONCENTRATION (back-half):		0.005 gr/dscf
TOTAL PARTICULATE EMISSION CONC. (front & back-half):		0.010 gr/dscf
TOTAL PARTICULATE EMISSION CONCENTRATION:		22.6 mg/dscm
TOTAL PARTICULATE MATTER EMISSION RATE:		3.48 lb/hr
TOTAL PARTICULATE MATTER EMISSION RATE:		15.3 tons/yr

FRONT-HALF PARTICULATE MATTER MASS LOADING

FILTER NUMBER:	#110-566
TARE WEIGHT OF FILTER (grams):	0.8267
FINAL WEIGHT OF FILTER (grams):	0.8394
NET WEIGHT OF PARTICULATE MATTER (grams):	0.0127
BEAKER NUMBER:	#150-489
TARE WEIGHT OF BEAKER (grams):	80.1872
FINAL WEIGHT OF BEAKER (grams):	80.1906
NET WEIGHT OF PARTICULATE MATTER (grams):	0.0034
VOLUME OF ACETONE (milliliters):	205.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0001
TOTAL FRONT-HALF PARTICULATE MATTER (grams):	0.0160

BACK-HALF PARTICULATE MATTER MASS LOADING

"C" SECTION - CONDENSER PARTICULATE	#150-1286
TARE WEIGHT OF BEAKER (grams):	65.3241
FINAL WEIGHT OF BEAKER (grams):	65.3311
NET WEIGHT OF PARTIC. MATTER (grams):	0.0070
TOTAL VOLUME OF WATER (milliliters):	600.0
VOLUME OF WATER CONDENSED (milliliters):	241.7
NET VOLUME OF WATER FOR BLANK (milliliters):	358.3
WT./VOL. OF WATER BLANK (milligrams/ml):	0.0004
NET WEIGHT OF PARTIC. DUE TO WATER (grams):	0.0001
"Cx" SECTION - HYDROCARBON EXTRACTION	#150-1306
TARE WEIGHT OF BEAKER (grams):	65.8334
FINAL WEIGHT OF BEAKER (grams):	65.8419
NET WEIGHT OF PARTIC. MATTER (grams):	0.0085
TOTAL VOLUME OF CH2Cl2 (milliliters):	150.0
WT./VOL. OF CH2Cl2 BLANK (milligrams/ml):	0.0000
NET WEIGHT OF PARTIC. DUE TO CH2Cl2 (grams):	0.0000
"D" SECTION - ACETONE RINSE OF CONDENSER	#150-1288
TARE WEIGHT OF BEAKER (grams):	81.3865
FINAL WEIGHT OF BEAKER (grams):	81.3865
NET WEIGHT OF PARTIC. MATTER (grams):	0.0000
TOTAL VOLUME OF ACETONE (milliliters):	75.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0001
TOTAL BACK-HALF PARTICULATE MATTER (grams):	0.0153
TOTAL WEIGHT OF PARTICULATE MATTER (grams):	0.0313

filter = 79.4 %

METHODS 1, 2, 3A, 4, AND 5
AM TEST-AIR QUALITY, INC.

FILE NAME:	LB604\GEDCINR1	LAB #:	5826
CLIENT:	Geoenergy @ Louisiana Pacific	START TIME:	18:57 o'clock
		STOP TIME:	19:57 o'clock
LOCATION:	Dawson Creek, B.C.	SAMPLE LENGTH:	60.0 minutes
SAMPLE SITE:	E-Tube Core Scrubber Inlet		
SAMPLE DATE:	June 7, 1994		
RUN #:	1 - Method 5		
OPERATORS:	Moye		

IMPINGER WEIGHTS

FINAL grams	INITIAL grams	NET grams
722.2	595.2	127.0
660.2	622.4	37.8
530.6	516.0	14.6
742.8	731.0	11.8

TOTAL H2O GAIN:	191.2
TOTAL VOLUME (SCF):	9.02
PERCENT MOISTURE:	19.41
Bws:	0.1941

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	0.167 inches
NOZZLE AREA:	0.0002 sq. feet
STACK DIAMETER:	41.75 inches
STACK AREA:	9.51 sq. feet
METER TEMPERATURE:	89.8 degrees F
BAROMETRIC PRES.:	27.67 inches Hg
STATIC PRESSURE:	-8.5 inches H2O
STACK PRESSURE:	27.05 inches Hg
ORIFICE PRESSURE:	1.668 inches H2O
METER PRESSURE:	27.79 inches Hg

INIT. METER VOLUME:	301.111
FINAL METER VOLUME:	343.207
VOLUME SAMPLED:	42.096
STD VOLUME (DSCF):	37.440
STD VOLUME (DSCM):	1.060
Y FACTOR:	0.997

AVERAGE CONC. CO2:	0.1 percent
AVERAGE CONC. O2:	18.0 percent
AVERAGE CONC. CO:	1131 ppm
MOLECULAR WEIGHT:	28.74 g/g-mole-dry
MOLECULAR WEIGHT:	26.65 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE °F
1	2.60	245	7	3.10	253
2	2.65	249	8	3.00	254
3	2.70	248	9	3.15	253
4	2.75	250	10	3.20	253
5	2.95	252	11	3.10	252
6	3.00	253	12	3.10	245

PERCENT ISOKINETICS:	103 %	
STACK TEMPERATURE:	250.6 degrees F	710.6 degrees R
AVERAGE VELOCITY HEAD:	2.938 " of H2O	
STACK GAS VELOCITY:		122.2 ft/second
STACK GAS AIR FLOW:	69713.5 acf/min	37736.6 dscf/min
PARTICULATE EMISSION CONCENTRATION (front-half):		0.054 gr/dscf
PARTICULATE EMISSION CONCENTRATION (back-half):		0.037 gr/dscf
TOTAL PARTICULATE EMISSION CONC. (front & back-half):		0.091 gr/dscf
TOTAL PARTICULATE EMISSION CONCENTRATION:		209.4 mg/dscm
TOTAL PARTICULATE MATTER EMISSION RATE:		29.6 lb/hr
TOTAL PARTICULATE MATTER EMISSION RATE:		129.6 tons/yr

FRONT-HALF PARTICULATE MATTER MASS LOADING

FILTER NUMBER:	#110-556
TARE WEIGHT OF FILTER (grams):	0.8299
FINAL WEIGHT OF FILTER (grams):	0.9544
NET WEIGHT OF PARTICULATE MATTER (grams):	0.1245
BEAKER NUMBER:	#150-490
TARE WEIGHT OF BEAKER (grams):	69.4617
FINAL WEIGHT OF BEAKER (grams):	69.4687
NET WEIGHT OF PARTICULATE MATTER (grams):	0.0070
VOLUME OF ACETONE (milliliters):	190.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0001
TOTAL FRONT-HALF PARTICULATE MATTER (grams):	0.1314

BACK-HALF PARTICULATE MATTER MASS LOADING

"C" SECTION - CONDENSER PARTICULATE	#150-1287
TARE WEIGHT OF BEAKER (grams):	68.3939
FINAL WEIGHT OF BEAKER (grams):	68.4510
NET WEIGHT OF PARTIC. MATTER (grams):	0.0571
TOTAL VOLUME OF WATER (milliliters):	670.0
VOLUME OF WATER CONDENSED (milliliters):	179.4
NET VOLUME OF WATER FOR BLANK (milliliters):	490.6
WT./VOL. OF WATER BLANK (milligrams/ml):	0.0004
NET WEIGHT OF PARTIC. DUE TO WATER (grams):	0.0002
"Cx" SECTION - HYDROCARBON EXTRACTION	#150-1307
TARE WEIGHT OF BEAKER (grams):	66.0346
FINAL WEIGHT OF BEAKER (grams):	66.0684
NET WEIGHT OF PARTIC. MATTER (grams):	0.0338
TOTAL VOLUME OF CH2Cl2 (milliliters):	150.0
WT./VOL. OF CH2Cl2 BLANK (milligrams/ml):	0.0000
NET WEIGHT OF PARTIC. DUE TO CH2Cl2 (grams):	0.0000
"D" SECTION - ACETONE RINSE OF CONDENSER	#150-1289
TARE WEIGHT OF BEAKER (grams):	79.6366
FINAL WEIGHT OF BEAKER (grams):	79.6366
NET WEIGHT OF PARTIC. MATTER (grams):	0.0000
TOTAL VOLUME OF ACETONE (milliliters):	100.0
WT./VOL. OF ACETONE BLANK (milligrams/ml):	0.0007
NET WEIGHT OF PARTIC. DUE TO ACETONE (grams):	0.0001
TOTAL BACK-HALF PARTICULATE MATTER (grams):	0.0906
TOTAL WEIGHT OF PARTICULATE MATTER (grams):	0.2220

94.7 % filter

EXAMPLE CALCULATION SHEET
EPA METHODS 1, 2, 3A, 4 AND 5

CLIENT: Geoenergy LOCATION: Dawson Creek, B.C. DATE: 6/7/94

RUN #: 2 LAB #: 5828 SITE LOCATION: E-Tube Core Stack Outlet

Particulate Matter Emission Concentration - Equation 5-1

Vm_{std} =17.647°R/"Hg$_{(constant)}$*volume sampled*Yfactor*(P_B+ ΔH/13.6)/(460+T_m)

=17.647°R/"Hg* 52.312 ft³*0.997*(27.46"Hg + (2.595"H_2O/13.6))/(460 +61.7° F)

= 48.781 dscf

dscm = 48.781 dscf/35.31 ft³/m³

= 1.382 dscm

Substitution of Equation 5-4 into 5-5

W_a = mg/ml blank * ml sample = mg sample due to acetone blank

= 0.14 mg = 0.0007 mg/ml * 205 ml

M_n = (net weight filter catch) + (net weight "B" section) - Wa + Back-half

= 31.3 mg = 12.7 mg + 3.4 mg - 0.14 mg + 15.3 mg

C_s = (0.001 g/mg) * (15.43 grains/gram) * M_n / Vm_{std}

= (0.001 g/mg) * (15.43 grains/gram) * 31.3 mg / 48.781 dscf

= 0.010 gr/dscf (Equation 5-6)

gr/dscf @____% O_2 = _____gr/dscf * (20.9% - _____%O_2)/(20.9% - _____%O_2)
% correction % measured

= NA gr/dscf @ ____% O_2

gr/dscf @____%CO_2 = _____gr/dscf * _____% / _____%CO_2
% correction % measured

= NA gr/dscf @ ____% CO_2

mg/dscm = 31.3 mg/ 1.382 dscm

= 22.6 mg/dscm

Particulate Matter Emission Rate

pounds/hour = C_s * dscf/min * 60 min/hr * 1 lb/7000 grains

= 0.010 gr/dscf * 40454.3 dscf/min * 60 min/hr * 1 lb/7000 grains

= 3.48 lb/hr

$$\frac{tons}{yr} = 3.48\,\frac{lb}{hr} \times 24\,\frac{hrs}{day} \times 365\,\frac{days}{yr} \times \frac{1\ ton}{2000\ lb} = 15.3\,\frac{tons}{yr}$$

EXAMPLE CALCULATION SHEET (continued)
EPA METHODS 1, 2, 3A, 4 and 5

Moisture - Equation 5-2 and 5-3

Vw_{std} = 0.04715 ft³/g * 255.7 grams of H_2O collected in impingers

= 12.06 scf

B_{ws} = (12.06 scf)/(12.06 scf + 48.781 dscf)

= 0.1982

% Moisture = 19.82 % = B_{ws} * 100

Molecular weight - Equation 3-2

M_d = 0.440*(0.6 %CO_2)+0.320*(18.3 %O_2)+0.280*(100%-0.6 %CO_2-18.3 %O_2(%CO+%N_2))

= 28.83 g/g-mole (dry)

M_s = M_d * (1-B_{ws}) + 18.0 * B_{ws} = 28.83 g/g-mole * (1 -0.1982) + 18.0 g/g-mole * 0.1982

= 26.68 g/g-mole (wet)

F_o = (20.9 - _____)%O_2/_____%CO_2 = NA

Stack gas velocity and volumetric flow rate - Equation 2-9 and 2-10

V_s = 85.49 * Cp*$\sqrt{\Delta P * T_s{}^o R / (M_s \text{ g/g-mole} * P_s\text{"Hg})}$

= 85.49 * 0.84 * $\sqrt{1.037 * 594.4{}^o R / (26.68 \text{ g/g-mole} * 27.46 \text{ "Hg})}$

(134.4° F + 460)° R (27.46 P_B+-0.05P_s/13.6)

= 65.9 ft/sec (std)

Q_{sd} = 3600 * (1 - B_{ws}) * V_s ft/sec * A_s ft² * ($T_{std}{}^o$ R/$T_s{}^o$ R) * (P_s"Hg / P_{std}"Hg) / 60 min/hr

= 3600 * (1 -0.1982) * 65.9 ft/sec * 15.9 ft² * (528° R/594.4 ° R) * (27.46 "Hg / 29.92"Hg) / 60

54²*π/4/144

=41092.2 dscf/min (dry standard cubic feet per minute)

acfm = 65.9 ft/sec * 15.9 ft²* 60 sec/min

=62869.7 acfm (actual cubic feet per minute)

Isokinetic variation - Equation 5-8

I = 0.09450 * Vm_{std} dscf * $T_s{}^o$ R ÷ [P_s"Hg * $V_s$ft/sec * minutes * $A_n$ft² *(1 -B_{ws})]

= 0.09450 * 48.781 dscf *594.4 ° R/[27.46 "Hg * 65.9 ft/sec * 60 min * 0.0003 ft² *(1 -0.1982)]

0.242N_{dia}/12/2)²*Pi

= 99 %

All of the above numbered equations are from the 40 CFR 60 and assume English units.

[cbh\c:\word\b-plate\M5.doc]

EXAMPLE CALCULATION SHEET (continued)
EPA METHODS 1, 2, 3A, 4 and 5

BACK-HALF PARTICULATE

"C" Section (write in final and intial wts for all appropriate impingers for *c* below)

a 7.0 mg particulate in "C" Section Beaker
b 600 ml of water in condensers, including rinses
c 241.7 ml condensation in 1st, 2nd and 3rd bubblers (final wt - initial wt, assumes 1g/1ml water density)
d 358.3 ml DI water used in bubblers including rinses = *b* - *c*
e 0.0004 mg/ml blank particulate = 0.1 mg blank / 250 ml blank
f 0.14 mg blank particulate = *e* • *d*
6.9 **mg of "C" particulate** = *a* - *f* = 7.0 mg - 0.14 mg

"Cx" Section

a 8.5 mg particulate in "Cx" Section Beaker
b 150 ml CH_2Cl_2 used for sample
c 0.0 mg/ml blank particulate = 0.0 mg blank / 150 ml blank
d 0.0 mg blank particulate = *b* • *c*
8.5 **mg of "Cx" particulate** = *a* - *d* = 8.5 mg - 0.0 mg

"D" Section

a 0.0 mg particulate in "D" Section Beaker
b 75 ml Acetone used for sample
c 0.0007 mg/ml blank particulate (Same as "B" Section)
d 0.1 mg blank particulate = *b* * *c*
(0.1) **mg of "D" particulate** = *a* - *d* = 0.0 mg - 0.1 mg

TOTAL BACK-HALF PARTICULATE

+ 6.9 mg "C" Section Particulate
+ 8.5 mg "Cx" Section Particulate
+ (0.1) mg "D" Section Particulate
+ — mg Back-half Filter Particulate (If applicable)

= 15.3 **mg Back-half Particulate**

[cbh\c:\word\b-plate\M5.doc]

STACK SCHEMATIC AND LOCATION OF SAMPLE POINTS

Client Geo - Energy

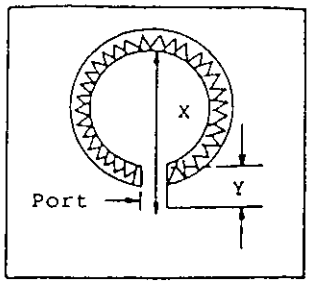
Location Dawson Creek

Sampling Location E-Tube Coke Stack

Inside of far wall to outside of port (distance, X) 60"

Inside of near wall to outside of port (distance, Y) 6

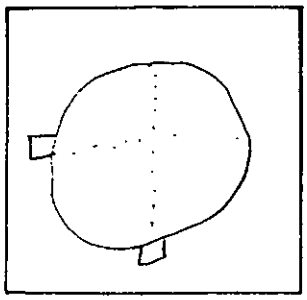
Stack I.D. (distance X - distance Y) 54"

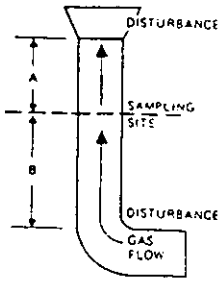


Schematic of Sampling Location

1 Traverse Point #	2 Fractional Percent of Stack I.D.	3 Stack I.D. inches	4 Column 2 x 3	5 Distance Y	6 Traverse Point Location from Outside of Port columns 4 + 5
1	2.6	54"	1.40	6"	7.40
2	8.2		4.43		10.43
3	14.6		7.88		13.88
4	22.6		12.20		18.20
5	34.2		18.47		24.47
6	65.8		35.53		41.53
7	77.4		41.80		47.80
8	85.4		46.12		52.12
9	91.8		49.57		55.57
10	97.4		52.60		58.60
11					
12					

CROSS SECTION

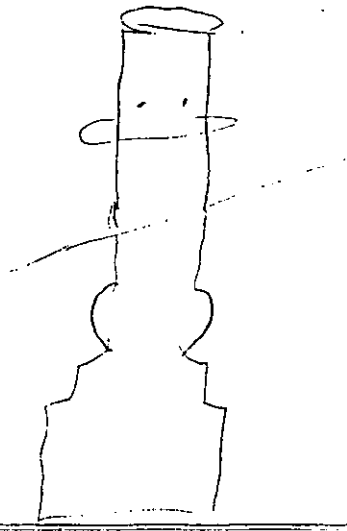




Distance A = 28 ft *downstream*

Distance B = 24 ft *upstream*

STACK, CONTROL DEVICE AND PROCESS FLOW DIAGRAM



5827

TRAVERSE SAMPLING DATA SHEET

Page ___ of ___

Client: Geo-Energy
Location: Dawson Cr.
Sample Site: E-Tube Core Stack
Stack Diameter: 54
Date: 6-7-94
Operators: SBM
Run I.D.: R1 M5 outlet

QA FORMS COMPLETED
Stack Schematic ✓
Sample Train ✓
Pitot Tube Insp. ✓
Magnehelic Cal. ✓
Temp. Probe Cal. ✓
Gas Meter Calib. ✓

Start Time: 1025
Stop Time: 1150
Barometric Pressure "Hg: 27.40
Static Pres "H_2O: -0.05
Production Rate: ___

Filter #: ___ Box #: R1

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	0.0" / 0.001
Leak Test Vacuum	12" / 12
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
___ Gas Sampling System	
✓ Integrated Bag	
M5 Rinse Acetone/H_2O/Other	

	Final Wt. gram	Initial Wt. gram		Net Wt. gram
#1 Imp.	844.6	643.8	=	200.8
#2 Imp.	670.6	638.6	=	32.0
#3 Imp.	545.7	542.2	=	3.5
#4 Imp.			=	
#5 Imp.			=	
#6 S.G.	790.2	778.9	=	11.3

Total H_2O Volume: 247.6 ✓g

SAMPLING PARAMETERS

% Moisture: 2.0% 2.0%
Meter Temp.: 60
Stack Temp.: 140
Δ H@: 2.0[illegible] Y: [illegible]
Pitot #: [illegible] Side #: A
Cp: 0.8[illegible]
Nozzle Diameter: [illegible] inch
D_1: [illegible] D_2: [illegible] D_3: [illegible]
K Factor: [illegible]

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
N 1	0	[illegible]	[illegible]	[illegible]	[illegible]	54	54	1/2	240	47	[illegible]		
2	3		0.87	2.10	2.10	55	54	1/2	244	45	134		
3	[illegible]	203.50	0.5[illegible]	[illegible]	[illegible]	55	54	1 1/2	253	45	135		
4	9	206.85	0.93	2.25	2.25	55	54	1 1/2	260	46	136		
5	12	209.33	0.97	2.35	2.35	56	55	1 1/2	261	48	136		
6	15	211.85	0.95	2.37	2.37	56	55	2	254	49	135		
7	18	214.42	0.97	2.35	2.35	57	56	2	256	48	135		
8	21	216.87	0.98	2.37	2.37	58	56	2	256	49	135		
9	24	219.03	0.95	2.37	2.37	58	56	2	257	49	135		
10	27	221.[illegible]	0.85	2.05	2.05	58	56	2	255	49	135		
N 1	30	224.30	0.78	1.88	1.85	58	56	2	258	50	135		
2	33	226.50	0.81	1.96	1.96	58	57	2	260	50	135		
3	36	228.78	0.81	1.96	1.96	58	56	2	259	47	135		
4	39	231.16	0.80	1.93	1.93	58	57	2	260	48	136		
5	42	233.34	0.93	2.25	2.25	59	57	2	259	48	136		
6	44	235.76	0.99	2.37	2.37	59	57	2 1/2	258	49	135		
7	48	239.[illegible]	1.00	[illegible]	2.41	59	57	2 1/2	259	48	135		
8	[illegible]		0.95	2.37	2.37	60	57	2 1/2	258	49	136		
9	54	243.34	0.92	2.22	2.22	50	58	2 1/2	260	50	135		
10	57	245.80	0.83	2.00	2.00	60	58	2 1/2	261	51	135		
	[illegible]	248.116											
			0.902		219		56.8				135.7		

METHOD 5
LABORATORY ANALYSIS

Client Geo-Energy Run Number 1

Sample Location

Date 6/7/94

"A" Section (Filter)

Filter # 110-548 Tare Weight 0.8271 grams
Final Weight 0.8435 grams ✓
Net Weight 0.0164 grams

"B" Section (Probe Wash)

Beaker # 150-488 Tare Weight 69.3334 grams
Volume Acetone 240 mls Final Weight 69.3392 grams ✓
Net Weight 0.0058 grams

"C" Section (Condenser Particulate - Inorganic Catch)

Beaker # 150-1285 Tare Weight 65.3490 grams
Volume Water 640 mls Final Weight 65.3643 grams ✓
Net Weight 0.0153 grams

"Cx" Section (Condenser Particulate - Organic Catch)

Beaker # 150-1305 Tare Weight 77.7265 grams
Volume CH_2Cl_2 150 mls Final Weight 77.7363 grams ✓
Net Weight 0.0098 grams

"D" Section (Final Acetone Rinse of Impingers)

Beaker # 150-1308 Tare Weight 65.2213 grams
Volume Acetone ~~100~~ 65 mls Final Weight 65.2213 grams ✓
Net Weight 0.0000 grams

5827

5828

TRAVERSE SAMPLING DATA SHEET

Page ___ of ___

Client: Geo Energy
Location: Dawson Cr.
Sample Site: E-Tube Core STACK
Stack Diameter: 54"
Date: 6-7-96
Operators: SBM
Run I.D.: R2 M5 outlet

EQUIPMENT CHECKS

	Initial	Final
Leak Rate cfm	0.0051	0.001
Leak Test Vacuum	12"	13"

✓ Pitots, Pre Leak Ck
✓ Pitots, Post Leak Ck
___ Gas Sampling System
✓ Integrated Bag
M5 Rinse Acetone/H_2O/Other

QA FORMS COMPLETED
Stack Schematic ✓
Sample Train ✓
Pitot Tube Insp. ✓
Magnehelic Cal. ___
Temp. Probe Cal. ✓
Gas Meter Calib. ✓

Filter # ___ Box # R2

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	840.7	642.1	198.6
#2 Imp.	733.9	695.0	38.9
#3 Imp.	542.0	537.8	4.2
#4 Imp.			
#5 Imp.			
#6 S.G.	692.4	678.4	14.0

Total H_2O Volume 255.7 ✓ g

Start Time ~~1240~~ 1220
Stop Time 1325
Barometric Pressure "Hg 27.46
Static Pres "H_2O -0.05
Production Rate ___

SAMPLING PARAMETERS
Anderson Box

% Moisture 2.0
Meter Temp. 60
Stack Temp. 135
Δ H@ 2.086 Y 0.997
Pitot # P54 Side # A
Cp 0.84
Nozzle Diameter 0.242 inch
D_1 ___ D_2 ___ D_3 ___
K Factor 2.498

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
W 1	0	248.552	0.90	2.25	2.25	60	59	2	259	48	136		
2	3	2	1.10	2.75	2.75	60	60	2½	261	44	137		
3	6	253.58	1.10	2.75	2.75	60	60	2½	260	45	136		
4	9	256.26	1.00	2.50	2.50	61	60	2½	262	50	133		
5	12	258.85	1.10	2.75	2.75	61	59	3.0	259	51	136		
6	15	261.71	1.05	2.62	2.62	61	59	3.0	261	53	137		
7	18	264.08	1.20	3.00	3.00	62	60	3.0	262	52	138		
8	21	267.05	1.10	2.75	2.75	62	60	3.0	260	53	136		
9	24	269.74	1.10	2.75	2.75	62	60	3.0	261	54	135		
10	27	272.56	1.00	2.50	2.50	63	60	3.0	261	54	136		
N 1	30	275.04	1.00	2.50	2.50	63	61	3.0	259	54	134		
2	33	277.63	1.08	2.70	2.70	63	61	3.0	258	53	133		
3	36	280.32	1.16	2.90	2.90	63	60	3.0	258	55	131		
4	39	283.01	0.90	2.25	2.25	64	61	2½	263	57	131		
5	42	285.74	0.90	2.25	2.25	64	61	2½	261	57	133		
6	45	287.90	1.00	2.50	2.50	64	61	3	259	57	130		
7	48	290.50	0.97	~~2.60~~	2.42	65	62	3	263	56	131		
8	51	293.05	0.98	2.45	2.45	66	62	3	259	54	136		
9	54	295.62	1.02	2.55	2.55	66	62	3	260	55	135		
10	57	298.17	1.10	2.75	2.75	67	63	3	262	55	134		
	60	300.864											

METHOD 5
LABORATORY ANALYSIS

Client Geo-Energy Run Number 2

Sample Location

Date 6/7/94

19% Probe Wash

"A" Section (Filter)

Filter # 110-566

Tare Weight 0.8267 grams
Final Weight 0.8394 grams ✓
Net Weight 0.0127 grams

"B" Section (Probe Wash)

Beaker # 150-489
Volume Acetone 205 mls

Tare Weight 80.1872 grams
Final Weight 80.1906 grams ✓
Net Weight 0.0034 grams

"C" Section (Condenser Particulate - Inorganic Catch)

Beaker # 150-1286
Volume Water 600 mls

Tare Weight 65.3241 grams
Final Weight 65.3311 grams ✓
Net Weight 0.0070 grams

"Cx" Section (Condenser Particulate - Organic Catch)

Beaker # 150-1306
Volume CH_2Cl_2 150 mls

Tare Weight 65.8334 grams
Final Weight 65.8419 grams ✓
Net Weight 0.0085 grams

"D" Section (Final Acetone Rinse of Impingers)

Beaker # 150-1288
Volume Acetone 75 mls

Tare Weight 81.3865 grams
Final Weight 81.3854 grams ✓
Net Weight -0.0011 grams

use tare

5828

AMTEST AIR QUALITY, INC.

SAMPLE TRAIN INFORMATION

Fill out one sheet per site and per test type.

CLIENT: GEO-Energy

LOCATION: Dawson Creek CANADA

SITE: F Tube Core STACK

TEST TEAM: SBM DATE(S): 6-7-96

RUN #'S: 2 TYPE: M5

Probe/Filter Temperature: ✓ 248+25 F ____ 320 F ____ Other

Impinger Temperature: ✓ <68 F ____ Other

THIMBLE: ____ yes ✓ no NOZZLE TYPE: ____ quartz ✓ steel ____ none

PROBE LINER: ____ quartz ____ glass ✓ steel ____ teflon

PROBE TYPE: ✓ regular ____ water-cooled

FRONT-HALF FILTER: ✓ yes ____ no SIZE (mm): ____ 90 ____ 110 ✓ 125 ____ other____

FRONT-HALF FILTER MEDIA: ✓ quartz fiber ____ glass fiber ____ teflon

SUPPORT: ____ steel ✓ glass frit ____ teflon GASKET: ____ silicon ✓ teflon

BACK-HALF FILTER: ____ yes ✓ no

BACK-HALF FILTER MEDIA: ____ quartz fiber ____ glass fiber ____ telfon ____ tared ____ untared

NOTE: Show the back-half filter location with an arrow on the table below.

CONTENTS	Initial Volume (mL)	Clean-up Solution Used	Bottle Type	Comments
Nozzle/Probe Rinse		Acetone		
Filter				
#1 H_2O	100	DI H_2O		
#2 H_2O	100			
#3 Emt.				
#4 Silica				
#5				
#6				
#7				

IF THIS INFORMATION IS NOT ACCURATE FOR ALL RUNS, NOTE ALL EXCEPTIONS.

STACK SCHEMATIC AND LOCATION OF SAMPLE POINTS

Client Geo · Energy

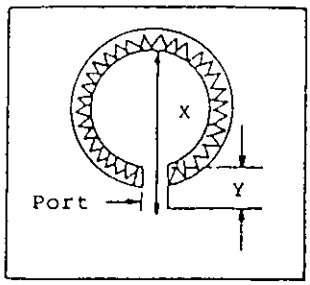
Location Dawson Creek Canada

Sampling Location Cyclone Inlet

Inside of far wall to outside of port (distance, X) 41 3/4

Inside of near wall to outside of port (distance, Y) _____

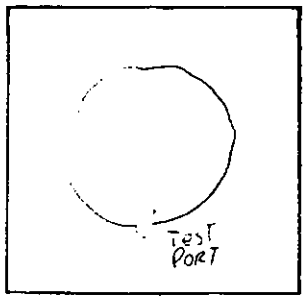
Stack I.D. (distance X - distance Y) 41 3/4

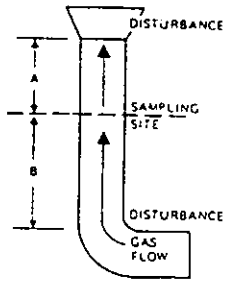


Schematic of Sampling Location

1 Traverse Point #	2 Fractional Percent of Stack I.D.	3 Stack I.D. inches	4 Column 2 x 3	5 Distance Y	6 Traverse Point Location from Outside of Port columns 4 + 5
1	2.1	41.75	0.88	0	0.88
2	6.7		2.80		2.80
3	11.8		4.93		4.93
4	17.7		7.39		7.39
5	25.0		10.44		10.44
6	35.6		14.86		14.86
7	64.4		26.89		26.89
8	75.0		31.31		31.31
9	82.3		34.36		34.36
10	88.2		36.82		36.82
11	93.3		38.95		38.95
12	97.9				40.87

CROSS SECTION

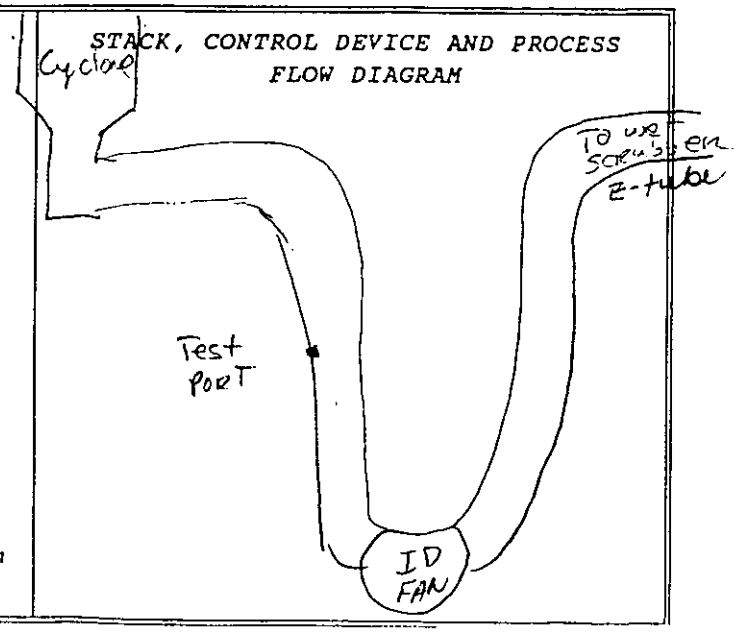




Distance A = 25 ft downstream

Distance B = 15 ft upstream

STACK, CONTROL DEVICE AND PROCESS FLOW DIAGRAM



5826

TRAVERSE SAMPLING DATA SHEET

Page ___ of ___

Client: Geo - Energy
Location: Dawson Creek
Sample Site: Inlet to E-Tube Core ~~Scrubber~~
Stack Diameter: 41 3/4
Date: 6-7-94
Operators: SBM
Run I.D.: R1 M5 Inlet

QA FORMS COMPLETED
Stack Schematic ✓
Sample Train ✓
Pitot Tube Insp. ✓
Magnehelic Cal. ✓
Temp. Probe Cal. ✓
Gas Meter Calib. ✓

Start Time: 1857
Stop Time: 1957
Barometric Pressure "Hg: 27.67
Static Pres "H_2O: -8.5
Production Rate: ___

Filter # ___ Box # R3

EQUIPMENT CHECKS

	Initial	Final
Leak Rate cfm	0.051	0.002
Leak Test Vacuum	10"	14"

✓ Pitots, Pre Leak Ck
✓ Pitots, Post Leak Ck
___ Gas Sampling System
✓ Integrated Bag
M5 Rinse Acetone/H_2O/Other

	Final Wt. gram	Initial Wt. gram		Net Wt. gram
#1 Imp.	722.2	595.2	=	177.0
#2 Imp.	660.2	622.4	=	37.8
#3 Imp.	530.0	516.0	=	14.0
#4 Imp.			=	
#5 Imp.			=	
#6 S.G.	742.8	731.0	=	11.8

Total H_2O Volume 191.2 ✓g

SAMPLING PARAMETERS

% Moisture: 16.90
Meter Temp.: 90
Stack Temp.: 248
Δ H@: 2.096 Y: 0.997
Pitot # B5A Side # A
Cp: 0.84
Nozzle Diameter: 0.167 inch
D_1 0.168 D_2 0.167 D_3 0.167
K Factor: 0.567

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
1	0	301.111	2.60	1.47	1.47	88	87	5	258	53	245		
2	5	304.30	2.65	1.50	1.50	88	87	5	258	53	249		
3	10	307.63	2.70	1.53	1.53	88	87	6	255	53	248		
4	15	311.04	2.75	1.56	1.56	90	88	7	259	58	250		
5	20	314.44	2.95	1.67	1.67	91	88	7	256	59	252		
6	25	317.93	3.00	1.70	1.70	91	89	7 1/2	258	60	253		
7	30	321.52	3.10	1.76	1.76	91	89	8	253	62	253		
8	35		3.00	1.70	1.70	92	90	8	255	60	254		
9	40	328.69	3.15	1.79	1.79	90	92	9	253	63	253		
10	45	332.31	3.20	1.81	1.81	92	90	9	254	60	253		
11	50	335.95	3.10	1.76	1.76	92	91	10	255	61	252		
12	55	339.52	3.10	1.76	1.76	92	91	10	256	62	245		
	60	343.207											
		[illegible]	2.939		1.114	89.8					250.6		

METHOD 5
LABORATORY ANALYSIS

Client Geoenergy Run Number 1

Sample Location

Date 6/7/94

"A" Section (Filter)

Filter # 110-556

Tare Weight 0.8299 grams
Final Weight 0.9544 grams ✓
Net Weight 0.1245 grams

"B" Section (Probe Wash)

Beaker # 150-490
Volume Acetone 190 mls

Tare Weight 69.4617 grams
Final Weight 69.4687 grams ✓
Net Weight 0.0070 grams

"C" Section (Condenser Particulate - Inorganic Catch)

Beaker # 150-1287
Volume Water 670 mls

Tare Weight 68.3939 grams
Final Weight 68.4510 grams ✓
Net Weight 0.0571 grams

"Cx" Section (Condenser Particulate - Organic Catch)

Beaker # 150-1307
Volume CH_2Cl_2 150 mls

Tare Weight 66.0346 grams
Final Weight 66.0684 grams ✓
Net Weight 0.0338 grams

"D" Section (Final Acetone Rinse of Impingers)

Beaker # 150-1289
Volume Acetone 100 mls

Tare Weight 79.6366 grams
Final Weight 79.6338 grams ✓
Net Weight -0.0022 grams
use tare

5876

AMTEST AIR QUALITY, INC.

SAMPLE TRAIN INFORMATION

Fill out one sheet per site and per test type.

CLIENT: Geo-Energy Dawson Creek

LOCATION: Dawson Creek Canada

SITE: Inlet to E-Tube Precip

TEST TEAM: SBM DATE(S): 6-7-94

RUN #'S: 1 TYPE: MS 1 BH

Probe/Filter Temperature: ✓ 248+25 F ____ 320 F ____ Other

Impinger Temperature: ✓ <68 F ____ Other

THIMBLE: ____ yes ✓ no NOZZLE TYPE: ____ quartz ✓ steel ____ none

PROBE LINER: ____ quartz ____ glass ✓ steel ____ teflon

PROBE TYPE: ✓ regular ____ water-cooled

FRONT-HALF FILTER: ✓ yes ____ no SIZE (mm): ____ 90 ✓ 110 ____ 125 ____ other____
FRONT-HALF FILTER MEDIA: ✓ quartz fiber ____ glass fiber ____ teflon

SUPPORT: ____ steel ✓ glass frit ____ teflon GASKET: ____ silicon ✓ teflon

BACK-HALF FILTER: ____ yes ✓ no
BACK-HALF FILTER MEDIA: ____ quartz fiber ____ glass fiber ____ telfon ____ tared ____ untared
NOTE: Show the back-half filter location with an arrow on the table below.

CONTENTS	Initial Volume (mL)	Clean-up Solution Used	Bottle Type	Comments
Nozzle/Probe Rinse		Acetone	Nalg	
Filter				
#1 H_2O	100ml	DI H_2O	Nalg	
#2 H_2O	100ml			
#3 Empty				
#4 Silica Gell				
#5				
#6				
#7				

IF THIS INFORMATION IS NOT ACCURATE FOR ALL RUNS, NOTE ALL EXCEPTIONS.

GEOENERGY
DAWSON CREEK

METHOD 5
LABORATORY ANALYSIS

Acetone Blank

Beaker # 150-486 Tare Weight 62.2666 grams
Volume Acetone 140 mls Final Weight 65.2667 grams
Net Weight 0.0001 grams

Distilled, Deionized Water Blank 0.0007

Beaker # 150-1245 Tare Weight 68.7797 grams
Volume Water 250 mls Final Weight 68.7798 grams
Net Weight 0.0001 grams
$= 0.0001\,g \times 1000\,\frac{mg}{g} \div 250\,ml$
$= 0.0004\,mg/ml$

Methylene Chloride (CH2Cl2) Blank

Beaker # 150-1279 Tare Weight 79.3019 grams
Volume CH_2Cl_2 150 mls Final Weight 79.3007 grams
Net Weight -0.0012 grams

use 0.000

AMTEST
AIR QUALITY, INC.

DRY GAS METER CALIBRATION
AM TEST - AIR QUALITY, INC.

FILE NAME: SLV1293.WK1
METER BOX #: SILVER MANOMETER
CALIBRATION DATE: 12-20-93
METHOD OF CALIB.: STANDARD DRY GAS METER (Method 5 Section 7.1)

TOTAL TIME min	DELTA H "H2O	METER VOL V1 cf	METER VOL V2 cf	TEMP IN deg F	TEMP OUT deg F	BARO. PRES. "Hg	STD DGM V1	STD DGM V2	ST.DGM TEMP IN deg F	ST.DGM TEMP OUT deg F	ST.DGM Yds FACTOR	Y FACTOR	DELTA H@
10.28	0.5	978.877	982.751	65.0	62.0	28.90	280.000	283.900	70.0	69.0	0.997	0.9911	2.059
10.22	1.0	983.353	988.789	64.0	62.0	28.90	284.500	290.000	70.0	69.0	0.997	0.9938	2.046
11.25	1.5	989.477	996.702	65.0	62.0	28.90	290.700	298.000	70.0	69.0	0.997	0.9921	2.111
9.40	2.0	969.486	976.416	65.0	63.0	28.90	270.500	277.500	70.0	67.0	0.997	0.9934	2.125
10.10	2.5	997.686	1006.002	66.0	63.0	28.90	299.000	307.500	71.0	70.0	0.997	1.0012	2.096
11.26	3.0	7.071	17.268	68.0	63.0	28.90	308.500	318.900	70.0	69.0	0.997	1.0015	2.080
10.98	4.0	18.354	29.798	70.0	63.0	28.90	320.000	331.700	70.0	69.0	0.997	1.0033	2.084
AVERAGE												0.997	2.086

[redacted] TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-19-94 Thermocouple Indicator # Silver M5

Ambient Temperature 65 °F Barometric Pressure 29.7 in Hg

THERMOCOUPLE # OR REFERENCE	REFERENCE THERMOMETER TEMPERATURE °F	THERMOCOUPLE TEMPERATURE °F	TEMPERATURE DIFFERENCE °F	%
Silver	M5 Box			
Meter in	210	205	5	0.7%
	33	33	0.0	0.0%
Meter out	210	205	5	0.7
	33	32	1	0.2%

$$\frac{(\text{ref temp, °F} + 460) - (\text{test therm. temp, °F} + 460)}{(\text{ref temp, °F} + 460)} \cdot 100 \leq 1.5\%$$

VP

AMTEST
AIR QUALITY, INC.

STANDARD DRY GAS METER CALIBRATION DATA SUMMARY
AMTEST - AIR QUALITY, INC.

PERFORMED BY HOMER R. DULIN CO

CAL. DGM IND. SCFM	PRIMARY STANDARD SCFM	Yds
0.393	0.392	0.997
0.394	0.396	1.005
0.393	0.391	0.995
0.601	0.603	1.003
0.606	0.602	0.993
0.603	0.600	0.995
0.801	0.793	0.990
0.801	0.796	0.994
0.800	0.795	0.994
1.021	1.017	0.996
1.017	1.015	0.998
1.020	1.015	0.995
1.205	1.200	0.996
1.206	1.207	1.001
1.208	1.203	0.996

NET RESULTS

FLOW RATE SCFM	Yds
0.393	0.999
0.603	0.997
0.801	0.993
1.019	0.996
1.206	0.998
AVG Yds =	0.997

DATE: 3-23-93
FILENAME: STD-GAS2.WK1

HOMER R. DULIN CO.

729 EAST WILLOW STREET
LONG BEACH, CALIFORNIA 90806
(310) 424-8533 (213) 636-4096 FAX (310) 426-7707

CERT. NO. 3-488-3

CALIBRATION CERTIFICATION

SUBMITTED BY: KRIS A HANSEN CO

FLOWMETER SERIAL No. ---

MANUFACTURER EQUIMETER MFG. SERIAL No. 27735

TUBE No. --- FLOAT No. ---
MODEL NO.: T-110

REMARKS: CALIBRATED IN CFM AIR @ 14.7 PSIA & 70 DEG F

ACCURACY: SEE DATA

INDICATED		ACTUAL	
CFM		CFM	
1.205		1.200	
1.206		1.207	
1.208		1.203	
1.021		1.017	
1.017		1.015	
1.020		1.015	
0.801		0.793	
0.801		0.796	
0.800		0.795	
0.601		0.603	
0.606		0.602	
0.603		0.600	

Flowmeter Certified with HOMER R. DULIN CO.

Equipment No. 12400 Accuracy 0.2% Calib. Due 5-28-94
Procedure No. 101G
NIST Cert. No. 821/249576-92

Our standards are certified by or are traceable to the National Institute of Standards and Technology and comply with MIL-STD-45662A.

P.O. No. 1194 Shipper No. ---

3-23-93	3-23-94	B Haynes
CALIBRATION DATE	RECALIBRATION DATE	CALIBRATION TECHNICIAN B. HAYNES

HRD 1

HOMER R. DULIN CO.

729 EAST WILLOW STREET
LONG BEACH, CALIFORNIA 90806
(310) 424-8533 (213) 636-4096 FAX (310) 426-7707

CERT. NO. 3-488-3 CONT.

CALIBRATION CERTIFICATION

SUBMITTED BY: KRIS A HANSEN CO

FLOWMETER SERIAL No. ---

MANUFACTURER EQUIMETER MFG. SERIAL No. 27735

TUBE No. --- FLOAT No. ---
MODEL NO.: T-110

REMARKS: CALIBRATED IN CFM AIR @ 14.7 PSIA & 70 DEG F

ACCURACY: SEE DATA

INDICATED		ACTUAL	
CFM CONT.		CFM CONT.	
0.393		0.392	
0.394		0.396	
0.393		0.391	

Flowmeter Certified with HOMER R. DULIN CO.

Equipment No. 12400 Accuracy 0.2% Calib. Due 5-28-94
Procedure No. 101G
NIST Cert. No. 821/249576-92

Our standards are certified by or are traceable to the National Institute of Standards and Technology and comply with MIL-STD-45662A.

P.O. No. 1194 Shipper No. ---

3-23-93 — CALIBRATION DATE

3-23-94 — RECALIBRATION DATE

B Haynes — CALIBRATION TECHNICIAN
B. HAYNES

TYPE S PITOT TUBE INSPECTION DATA FORM

Date 2-18-93 Pitot Tube # P5A

Client Geoenergy @ Louisiana Pacific

Location Dawson Creek, British Columbia

Site(s) E-Tube inlet and outlet

Test Date(s) June 7, 1994

Pitot tube assembly level? ✓ yes ____ no

Pitot tube openings damaged? ____ yes (explain below) ✓ no

α_1 = 2.5 ° (<10°), α_2 = 2.0 ° (<10°), β_1 = 1.0 ° (<5°),

β_2 = 1.0 ° (<5°)

γ = 0.0 °, θ = 1.5 °, A = 0.861 cm (in.)

z = A sin γ = 0.000 cm (in.); <0.32 cm (<1/8 in.),

w = A sin θ = 0.022 cm (in.); <.08 cm (<1/32 in.)

P_A 0.429 cm (in.) P_b 0.432 cm (in.)

D_t = 0.375 cm (in.)

Comments:

Calibration required? ____ yes* ✓ no

*If yes, tag and take out of service until repaired.

VP

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 12-29-93 Thermocouple Indicator # Red L/F

Ambient Temperature 71 °F Barometric Pressure 29.85 in Hg

THERMOCOUPLE # OR REFERENCE	REFERENCE THERMOMETER TEMPERATURE °F	THERMOCOUPLE TEMPERATURE °F	TEMPERATURE DIFFERENCE °F	%
TSCJ				
	33	33	0	0.00%
	210	213	3	0.45%
	376	375	1	0.12%

$$\frac{(\text{ref temp, °F} + 460) - (\text{test therm. temp, °F} + 460)}{(\text{ref temp, °F} + 460)} \cdot 100 \leq 1.5\%$$

VP

GEOENERGY
International Corporation

1619 S. Central, Suite 143
Kent, Washington 98032 USA
(206) 859-8909
FAX (206) 854-5311

July 14, 1994

Fax To:
Mr. Tony Cavadeas
c/o:
Louisiana-Pacific Corp.
Chilco OSB Mill
Chilco, Idaho

Fax No: (208) 772-~~0521~~ 2426

Dear Tony,

We have just received the results of the metals analysis using inductively coupled plasma (ICP) spectroscopy. As you will see this analysis quantifies all metals including 1) calcium, 2) potassium, 3) magnesium, 4) sodium, 5) and sulfur. This test method (ICP) is an integral part of EPA Method 12 for lead and is the analytical part of a forthcoming EPA Method 29 for metals analysis.

At Dawson Creek, we had three Method 5 tests performed; two at the outlet and one at the inlet of the core E-Tube unit. The inlet sample port was not at a good location so the results may be understated. At Chilco, we had three tests performed at the E-Tube outlet only.

For an ICP analysis on a Method 5 front half, the residue from the probe rinsing is typically combined with the filter catch. The testing firm which performed the source tests could not locate all of these samples for ICP analysis (see AMTEST letter of July 14, 1994). In order to compare apples to apples, we used filter catch only data at the inlet and outlet of the E-Tube at Dawson Creek and compared the filter plus probe rinsing at the outlet of the E-Tube at both mills.

We, therefore, looked at Dawson Creek filter catch only at the inlet (test 3) and compared it with the filter catch only at the outlet (average of tests 1 & 2). This comparison is illustrated in Table 1.

Since all three ICP tests at Chilco included the filter catch plus probe rinsings, a comparison was made between the E-Tube outlet at Chilco (average of tests 1, 2, &3) and the E-Tube outlet at Dawson Creek (test 1 - filter catch plus probe rinsing). These results are summarized in Table 2.

Since all of this data is expressed in micrograms of each element on the filter, the concentration in gr/sdcf can be calculated from the source test data attached. This is summarized in Table 2A.

You will notice that the outlet numbers are considerably lower for Chilco than for Dawson Creek. The specific collection area (Ft2/1000 CFM) is considerably greater for Chilco.

I hope this is not too confusing. If you have any questions or comments, please don't hesitate to call.

Sincerely,

Gary A. Raemhild
GEOENERGY INTERNATIONAL

TABLE 1
DAWSON CREEK OSB MILL
INLET VS OUTLET OF E-TUBE

ELEMENTS	INLET (MICROGRAMS)	OUTLET (MICROGRAMS)	REDUCTION (%)
CALCIUM	1706	47	97%
POTASSIUM	15350	1910	88%
MAGNESIUM	255	9	97%
SODIUM	2580	250	90%
SULFUR	1265	132	90%

NOTES:

1. Analysis was performed using Inductively Coupled Plasma (ICP) Spectroscopy
2. Values on Table are absolute weights (micrograms)
3. Sample volumes were nearly identical for all tests (approximately 49 sdcf)
4. To convert to concentration (gr/sdcf) multiply by 3.1×10^{-7}
5. Results are filters only :
   - **A)** Outlet average of tests 1&2
   - **B)** Inlet test 3

TABLE 2

COMPARISON OF E-TUBE OUTLET AT DAWSON CREEK AND CHILCO OSB MILLS

Filter

	ELEMENTS	DAWSON CREEK (MICROGRAMS)	CHILCO (MICROGRAMS)	CHILCO vs DAWSON (%)
56.5	CALCIUM	301	97	32%
<50	POTASSIUM	3140	876	28%
10.5	MAGNESIUM	31	16	50%
220	SODIUM	420	223	53%
<5	SULFUR	276	199	72%

NOTES:

1. Analysis was performed using Inductively Coupled Plasma (ICP) Spectroscopy
2. Values on Table are absolute weights (micrograms)
3. Sample volumes were nearly identical for all tests (approximately 49 sdcf)
4. To convert to concentration (gr/sdcf) multiply by 3.1×10^{-7}
5. Filter and Probe rinse combined
   - **A)** Dawson Creek test 1
   - **B)** Chilco average of tests 1,2 &3

TABLE 2A

COMPARISON OF E-TUBE OUTLET AT DAWSON CREEK AND CHILCO OSB MILLS

ELEMENTS	DAWSON CREEK (gr/scfd)	CHILCO (gr/scfd)	CHILCO vs DAWSON (%)
CALCIUM	0.00009	0.00003	32%
POTASSIUM	0.00100	0.00027	28%
MAGNESIUM	0.00001	0.000005	50%
SODIUM	0.00013	0.00007	53%
SULFUR	0.00008	0.00006	72%

NOTES:

1. Analysis was performed using Inductively Coupled Plasma (ICP) Spectroscopy
2. Values on Tables are calculated from absolute weights in micrograms
3. Sample volumes were nearly identical for all tests (approximately 49 sdcf)
4. Total front half concentration
   - **A)** Dawson Creek 0.006 gr/scfd
   - **B)** Chilco 0.005 gr/scfd
5. Filter and Probe rinse combined
   - **A)** Dawson Creek test 1
   - **B)** Chilco average of tests 1,2 &3

AMTEST
AIR QUALITY, INC.

AmTest-Air Quality, Inc.
30543 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7748
FAX: (206) 222-7849

July 14, 1994

Mr. Steve Isasund
Geoenergy International Corporation
1819 South Central
Suite 143
Kent, Washington 98032

Dear Steve:

Please find enclosed the results of additional analyses you requested for the front-half sample portions from recent particulate matter tests performed at Louisiana Pacific in Chilco, Idaho and in Dawson Creek, BC.

For the samples from Chilco, the probe rinse residue and filter from runs 1, 2 and 3 were combined prior to analysis. The samples were submitted to Am Test, Inc. in Redmond, Washington for metals (cation) analysis. A blank filter was also analyzed. The results are presented in micrograms per filter, which in the case of these samples is actually micrograms per front-half sample.

For the samples from Dawson Creek (DC), the probe rinse residues from runs 2 and 3 could not be located in the laboratory, so the filter from runs 1, 2 and 3 and the probe rinse from run 1 were submitted and analyzed separately. The results are presented in micrograms per filter, which in the case of these samples is actually micrograms per filter or probe rinse beaker.

The metals analysis was performed using inductively coupled plasma (ICP) spectroscopy. The samples were digested and brought to known volumes of 50 mL for analysis. It is important to compare data with the blank filter analysis data when looking for trends.

AMTEST
AIR QUALITY, INC.

Please call Am Test-Air Quality, Inc. at (206) 222-7746 if you have any questions or require further information.

Sincerely,
Am Test-Air Quality, Inc.

Kris A. Hansen

Kris A. Hansen
Project Manager

Enclosure

[illegible]

AMTEST

ANALYSIS REPORT

Am Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT	Lab Blank	Beaker + Filter
94-A013080				
Client ID: 5826 R-1,DC Beaker Sample Volume = 48.31 ft³				
Volume	(mls)	50.0		
METALS				
Aluminum	(ug/filter)	10.5		
Antimony	(ug/filter)	< 1		
Arsenic	(ug/filter)	< 1.5		
Boron	(ug/filter)	16.5		
Barium	(ug/filter)	5.5		
Beryllium	(ug/filter)	< 0.35		
Calcium	(ug/filter)	303.	247	301
Cadmium	(ug/filter)	0.450		
Cobalt	(ug/filter)	0.20		
Chromium	(ug/filter)	0.300		
Copper	(ug/filter)	6.5		
Iron	(ug/filter)	6.50		
Mercury	(ug/filter)	< 0.5		
Potassium	(ug/filter)	1400	1350	3140
Lithium	(ug/filter)	< 1		
Magnesium	(ug/filter)	32.0	22	31
Manganese	(ug/filter)	1.0		
Molybdenum	(ug/filter)	< 0.5		
Sodium	(ug/filter)	300	180	420
Nickel	(ug/filter)	< 0.5		
Phosphorus	(ug/filter)	6.00		
Lead	(ug/filter)	< 1		
Sulfur	(ug/filter)	156.	151	276
Selenium	(ug/filter)	< 1.5		
Silicon	(ug/filter)	107.		
Silver	(ug/filter)	< 0.5		
Tin	(ug/filter)	< 1		
Strontium	(ug/filter)	2.55		
Titanium	(ug/filter)	< 0.5		
Thallium	(ug/filter)	< 1.5		
Vanadium	(ug/filter)	0.200		
Yttrium	(ug/filter)	< 0.05		
Zinc	(ug/filter)	30.		

Dawson Creek
Test 1 : E-Tube Outlet
Probe Rinsing

2384 ug

Reported by: 2393

AMTEST

ANALYSIS REPORT

AmTest Inc.
Professional Analytical Services
14802 N.E. 87th St.
Redmond, WA 98052
Fax: 206 883 3409
Tel: 206 885 1664

Am Test Air Quality, Inc.
30545 SE 84th Street
Suite 5
Preston, WA 98050
Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

Project Name: Geoenergy
PO Number: 94-086

PARAMETER	UNITS	RESULT
94-A013077		
Client ID: 5827 R-1,DC Filter		
Volume	(mls)	50.0
METALS		Loss Blank
Aluminum	(ug/filter)	10.5
Antimony	(ug/filter)	< 1
Arsenic	(ug/filter)	< 1.5
Boron	(ug/filter)	11.0
Barium	(ug/filter)	6.0
Beryllium	(ug/filter)	< 0.35
Calcium	(ug/filter)	110. 54
Cadmium	(ug/filter)	0.550
Cobalt	(ug/filter)	1.2
Chromium	(ug/filter)	0.450
Copper	(ug/filter)	2.6
Iron	(ug/filter)	8.50
Mercury	(ug/filter)	< 0.5
Potassium	(ug/filter)	1840 1790
Lithium	(ug/filter)	< 1
Magnesium	(ug/filter)	19.5 9.0
Manganese	(ug/filter)	1.4
Molybdenum	(ug/filter)	< 0.5
Sodium	(ug/filter)	460 240
Nickel	(ug/filter)	< 0.5
Phosphorus	(ug/filter)	55.0
Lead	(ug/filter)	< 1
Sulfur	(ug/filter)	130. 125
Selenium	(ug/filter)	< 1.5
Silicon	(ug/filter)	660.
Silver	(ug/filter)	< 0.5
Tin	(ug/filter)	58.0
Strontium	(ug/filter)	0.950
Titanium	(ug/filter)	< 0.5
Thallium	(ug/filter)	< 1.5
Vanadium	(ug/filter)	< 0.1
Yttrium	(ug/filter)	< 0.05
Zinc	(ug/filter)	40.

Dawson Creek
Test 1: E-Tube Outlet
Filter Catch
~~[illegible]~~ combined
Source test 22 mg
+ .5
21.5

3415 mg
+ page 1
5799 mg
− 5.8 mg
.5
5.3 mg.

26%

AMTEST

ANALYSIS REPORT

An Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT	Less Blank	Avg. out (142/2)	eff
94-A013078					
Client ID: 5828 R-2,DC Filter					
Volume	(mls)	50.0			
METALS					
Aluminum	(ug/filter)	7.50			
Antimony	(ug/filter)	< 1			
Arsenic	(ug/filter)	< 1.5			
Boron	(ug/filter)	12.0			
Barium	(ug/filter)	6.5			
Beryllium	(ug/filter)	< 0.35			
Calcium	(ug/filter)	96.0	40.0	47	97.2%
Cadmium	(ug/filter)	0.650			
Cobalt	(ug/filter)	< 0.15			
Chromium	(ug/filter)	< 0.3			
Copper	(ug/filter)	2.5			
Iron	(ug/filter)	8.50			
Mercury	(ug/filter)	< 0.5			
Potassium	(ug/filter)	2080	2030	1910	87.6%
Lithium	(ug/filter)	< 1			
Magnesium	(ug/filter)	18.0	8	8.5	96.7%
Manganese	(ug/filter)	1.0			
Molybdenum	(ug/filter)	< 0.5			
Sodium	(ug/filter)	480	260	250	90.3%
Nickel	(ug/filter)	< 0.5			
Phosphorus	(ug/filter)	58.0			
Lead	(ug/filter)	2.00			
Sulfur	(ug/filter)	144.	139	132	99.6%
Selenium	(ug/filter)	4.00			
Silicon	(ug/filter)	276.			
Silver	(ug/filter)	< 0.5			
Tin	(ug/filter)	7.00			
Strontium	(ug/filter)	1.00			
Titanium	(ug/filter)	< 0.5			
Thallium	(ug/filter)	< 1.5			
Vanadium	(ug/filter)	< 0.1			
Yttrium	(ug/filter)	< 0.05			
Zinc	(ug/filter)	40.			

Dawson Creek
Test 2: E-Tube Outlet
Filter Catch

3250.5 mg
3.2505 mg
−.5 mg
2.75 mg

12.7 mg −.5 = 12.2

+probe rinse 16.0 mg

2.75 / 12.2 = 22.5%

AMTEST

ANALYSIS REPORT

Am Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT	
94-A013079			
Client ID: 5826 R-3,DC Filter			
Volume	(mls)	50.0	NET WT (MINUS BLANK)
METALS			
Aluminum	(ug/filter)	15.0	
Antimony	(ug/filter)	< 1	
Arsenic	(ug/filter)	< 1.5	
Boron	(ug/filter)	25.0	
Barium	(ug/filter)	55.	
Beryllium	(ug/filter)	< 0.35	
Calcium	(ug/filter)	1760	1706
Cadmium	(ug/filter)	4.65	
Cobalt	(ug/filter)	0.30	
Chromium	(ug/filter)	0.700	
Copper	(ug/filter)	16.	
Iron	(ug/filter)	26.0	
Mercury	(ug/filter)	< 0.5	
Potassium	(ug/filter)	15400	15350
Lithium	(ug/filter)	< 1	
Magnesium	(ug/filter)	265.	254.5
Manganese	(ug/filter)	9.5	
Molybdenum	(ug/filter)	1.00	
Sodium	(ug/filter)	2800	2580
Nickel	(ug/filter)	< 0.5	
Phosphorus	(ug/filter)	118.	
Lead	(ug/filter)	3.00	
Sulfur	(ug/filter)	1270	1265
Selenium	(ug/filter)	< 1.5	
Silicon	(ug/filter)	370.	297
Silver	(ug/filter)	< 0.5	
Tin	(ug/filter)	5.50	
Strontium	(ug/filter)	12.8	
Titanium	(ug/filter)	< 0.5	
Thallium	(ug/filter)	< 1.5	
Vanadium	(ug/filter)	< 0.1	
Yttrium	(ug/filter)	< 0.05	
Zinc	(ug/filter)	320	

Dawson Creek
Test 3: E-Tube Inlet 22,477 mg
Filter Only

22.5 mg
19%

124.5 mg - .5 = 124 mg

$\frac{22}{124}$ = 17.7%

22.5
- .5
22 mg

ANALYSIS REPORT AMTEST

AmTest Inc.
Professional Analytical Services
14603 N.E. 87th St.
Redmond WA 98052
Fax 206 883 3405
Tel 206 885 1664

Am Test Air Quality, Inc.
30545 SE 84th Street
Suite 5
Preston, WA 98050
Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

Project Name: Geoenergy
PO Number: 94-081

PARAMETER	UNITS	RESULT
94-A013082		
Client ID: 3769 R-1 Chilco FltrsBkr		
Volume	(mls)	50.0
METALS		
Aluminum	(ug/filter)	36.5
Antimony	(ug/filter)	< 1
Arsenic	(ug/filter)	< 1.5
Boron	(ug/filter)	5.50
Barium	(ug/filter)	4.2
Beryllium	(ug/filter)	< 0.35
Calcium	(ug/filter)	150.
Cadmium	(ug/filter)	0.650
Cobalt	(ug/filter)	< 0.15
Chromium	(ug/filter)	4.50
Copper	(ug/filter)	4.0
Iron	(ug/filter)	51.0
Mercury	(ug/filter)	< 0.5
Potassium	(ug/filter)	820.
Lithium	(ug/filter)	< 1
Magnesium	(ug/filter)	24.5
Manganese	(ug/filter)	22.
Molybdenum	(ug/filter)	1.00
Sodium	(ug/filter)	260
Nickel	(ug/filter)	2.50
Phosphorus	(ug/filter)	27.0
Lead	(ug/filter)	5.00
Sulfur	(ug/filter)	254.
Selenium	(ug/filter)	12.5
Silicon	(ug/filter)	170.
Silver	(ug/filter)	3.50
Tin	(ug/filter)	< 1
Strontium	(ug/filter)	1.05
Titanium	(ug/filter)	0.50
Thallium	(ug/filter)	< 1.5
Vanadium	(ug/filter)	< 0.1
Yttrium	(ug/filter)	< 0.05
Zinc	(ug/filter)	28.

combined

Chilco ; Test 1
E-Tube outlet
Filter + Probe Rinsing

1892.5 mg
1.8925 mg
-.5
1.3925 mg

F+PR = [redacted] mg
19.0 - 5 = 18.5 mg

$\frac{1.3925}{18.5} = 7\frac{1}{2}\%$

AMTEST

ANALYSIS REPORT

Am Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT
94-A013083		
Client ID: 5770 R-2 Chilco FltrsBkr		
Volume	(mls)	50.0
METALS		
Aluminum	(ug/filter)	19.5
Antimony	(ug/filter)	< 1
Arsenic	(ug/filter)	< 1.5
Boron	(ug/filter)	6.50
Barium	(ug/filter)	3.5
Beryllium	(ug/filter)	< 0.35
Calcium	(ug/filter)	138.
Cadmium	(ug/filter)	0.500
Cobalt	(ug/filter)	< 0.15
Chromium	(ug/filter)	2.45
Copper	(ug/filter)	2.6
Iron	(ug/filter)	32.0
Mercury	(ug/filter)	< 0.5
Potassium	(ug/filter)	750.
Lithium	(ug/filter)	< 1
Magnesium	(ug/filter)	23.8
Manganese	(ug/filter)	15.
Molybdenum	(ug/filter)	1.50
Sodium	(ug/filter)	470
Nickel	(ug/filter)	< 0.5
Phosphorus	(ug/filter)	89.0
Lead	(ug/filter)	3.50
Sulfur	(ug/filter)	151.
Selenium	(ug/filter)	2.50
Silicon	(ug/filter)	170.
Silver	(ug/filter)	< 0.5
Tin	(ug/filter)	< 1
Strontium	(ug/filter)	0.650
Titanium	(ug/filter)	< 0.5
Thallium	(ug/filter)	< 1.5
Vanadium	(ug/filter)	< 0.1
Yttrium	(ug/filter)	< 0.05
Zinc	(ug/filter)	24.

combined

1909.5 mg

Chilco : Test 2
E-Tube Outlet
Filter + Probe Rinsing

1.9095 mg
-.5
1.4095 mg

$\frac{1.04095}{7.5} = 13.8\%$

F+PR = 8 mg - .5 = 7.5 mg

AMTEST

ANALYSIS REPORT

Am Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT		
94-A013084				
Client ID: 5771 R-3 Chilco Fltr&Bkr		Avg Sample Vol = 49.13 SDCF		
Volume	(mls)	50.0	Avg 1,2,3	Avg 1,2,3 Less Blank
METALS				
Aluminum	(ug/filter)	23.0		
Antimony	(ug/filter)	< 1		
Arsenic	(ug/filter)	< 1.5		
Boron	(ug/filter)	9.50		
Barium	(ug/filter)	5.0		
Beryllium	(ug/filter)	< 0.35		
Calcium	(ug/filter)	171.	153	96.5
Cadmium	(ug/filter)	0.550		.00003 gr/scf
Cobalt	(ug/filter)	< 0.15		
Chromium	(ug/filter)	2.70		
Copper	(ug/filter)	3.5		
Iron	(ug/filter)	40.5		
Mercury	(ug/filter)	< 0.5		.0003 gr/scf
Potassium	(ug/filter)	1180	917	867.0
Lithium	(ug/filter)	< 1		.000005
Magnesium	(ug/filter)	30.0	26.1	15.6
Manganese	(ug/filter)	24.		
Molybdenum	(ug/filter)	0.50		.0001 gr/scf
Sodium	(ug/filter)	600	443	223.0
Nickel	(ug/filter)	1.50		
Phosphorus	(ug/filter)	103.		
Lead	(ug/filter)	2.00		.0001 gr/scf
Sulfur	(ug/filter)	208.	207	199.0
Selenium	(ug/filter)	7.50		
Silicon	(ug/filter)	227.		
Silver	(ug/filter)	< 0.5		
Tin	(ug/filter)	< 1		
Strontium	(ug/filter)	0.900		
Titanium	(ug/filter)	< 0.5		
Thallium	(ug/filter)	< 1.5		
Vanadium	(ug/filter)	< 0.1		
Yttrium	(ug/filter)	< 0.05		
Zinc	(ug/filter)	25.		

Combined

Chilco: Test 3
E-Tube Outlet
Filter + Probe Rinsing

16.5 mg - .5 = 16 mg

2673.5 mg
2.6735 mg
-.5
2.1735

$\frac{2.1735}{16} = 13.6$

AMTEST

ANALYSIS REPORT

Am Test Air Quality, Inc.

Attention: Stacy/Angela

Date Received: 7/12/94
Date Reported: 7/14/94

PARAMETER	UNITS	RESULT
94-A013085		
Client ID: Blank 125mm Filter		
Volume	(mls)	50.0
METALS		
Aluminum	(ug/filter)	7.50
Antimony	(ug/filter)	< 1
Arsenic	(ug/filter)	< 1.5
Boron	(ug/filter)	< 5
Barium	(ug/filter)	0.15
Beryllium	(ug/filter)	< 0.35
Calcium	(ug/filter)	56.5
Cadmium	(ug/filter)	< 0.1
Cobalt	(ug/filter)	< 0.15
Chromium	(ug/filter)	0.300
Copper	(ug/filter)	0.60
Iron	(ug/filter)	10.0
Mercury	(ug/filter)	< 0.5
Potassium	(ug/filter)	< 50
Lithium	(ug/filter)	< 1
Magnesium	(ug/filter)	10.5
Manganese	(ug/filter)	0.15
Molybdenum	(ug/filter)	< 0.5
Sodium	(ug/filter)	220
Nickel	(ug/filter)	< 0.5
Phosphorus	(ug/filter)	56.5
Lead	(ug/filter)	< 1
Sulfur	(ug/filter)	< 5
Selenium	(ug/filter)	< 1.5
Silicon	(ug/filter)	73.0
Silver	(ug/filter)	< 0.5
Tin	(ug/filter)	< 1
Strontium	(ug/filter)	< 0.15
Titanium	(ug/filter)	< 0.5
Thallium	(ug/filter)	< 1.5
Vanadium	(ug/filter)	< 0.1
Yttrium	(ug/filter)	< 0.05
Zinc	(ug/filter)	1.2

≈ 500 mg ≈ .5 mg

Filter Blank
(*) To Be Subtracted from
Sample Weight

Reported by:

GEOENERGY
International Corporation

1819 S. Central, Suite 140
Kent, Washington 98032 USA
(206) 859-8909
FAX (206) 854-5311

Source Test Summaries:

1. Dawson Creek OSB
2. Chilco OSB

AMTEST
AIR QUALITY, INC.

AmTest-Air Quality, Inc.
30545 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7746
FAX: (206) 222-7849

June 28, 1994

Mr. Steve Jason
Geoenergy International Corporation
1819 South Central
Suite 143
Kent, Washington 98032

Dear Mr. Jason:

Geoenergy International Corporation contracted Am Test-Air Quality, Inc. to quantify particulate matter emissions at the inlet to the E-Tube and at the E-Tube outlet stack at Louisiana Pacific's plywood mill in Dawson Creek, British Columbia. The E-Tube is installed to control emissions from the core dryer. On June 7, 1994, two (2) particulate matter emission samples were collected at the E-Tube outlet, and one (1) particulate matter emission sample was collected at the E-Tube inlet.

Particulate matter emissions were quantified by conducting one-hour tests at the E-Tube inlet and outlet using Environmental Protection Agency (EPA) methodology presented in the July 1, 1993 edition of EPA Title 40, Code of Federal Regulations, Parts 53-60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4 and 5. Methods 1 and 2 were performed to measure the stack gas velocity and temperature for calculating the volumetric flow rate. Method 3A was performed to determine the molecular weight of the stack gas. Method 4 was performed to determine the moisture content of the stack gas. Method 5 was performed to quantify particulate matter emissions. Condensible particulate matter was quantified by performing a methylene chloride extraction of the back-half portion of the Method 5 sample train per the State of Oregon Department of Environmental Quality (ODEQ) Source Sampling Manual Method 5 procedures.

Mr. Stanley B. Moye of Am Test-Air Quality, Inc. conducted the field sampling. Mr. Kris A. Hansen, Ms. Angela F. Blaisdell, Ms. Judy A. Aasland and Ms. Annika Woehr of Am Test-Air Quality, Inc. performed laboratory analysis and data reduction. Mr. Bill Nygen of Louisiana Pacific and Mr. Bob Smith of Geoenergy International Corporation coordinated this project.

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AIR QUALITY, INC.

The results of the three (3) Method 5 tests for quantifying particulate matter emissions are presented on the enclosed computer printout titled "Summary of Results - Methods 1, 2, 3A, 4 and 5", and in Table 1 below:

Table 1. Summary of particulate matter emission concentration test results from samples collected at the core dryer E-Tube inlet and outlet on June 7, 1994 at Louisiana Pacific's facility in Dawson Creek, British Columbia.

Sample Run #	Front-half Partic. Matter Emission Conc. (gr/dscf)	Back-half Partic. Matter Emission Conc. (gr/dscf)	Total Partic. Matter Emission Conc. (gr/dscf)	Total P.M. Emission Rate (lb/hr)	Total P.M. Emission Rate (tons/yr)
E-TUBE OUTLET STACK					
1	0.007	0.008	0.016	5.21	22.8
2	0.005	0.005	0.010	3.48	15.3
Average	0.006	0.007	0.013	4.35	19.1
E-TUBE INLET DUCT					
1	0.054	0.037	0.091	29.6	129.6

The front-half, back-half and total particulate matter emission concentrations are presented in units of grains per dry standard cubic foot (gr/dscf) of gas sampled. The total particulate matter emission rate results are presented in units of pounds per hour (lb/hr) and tons per year (tons/yr). Tons per year calculations assume 24 hours per day 365 days per year operation. An acceptable leak check of less than 0.02 cfm at the highest vacuum rate (or greater) used during the test preceded and followed each run. The percentage isokinetics were within the acceptable limits of 100 $\pm$ 10% for all three (3) runs.

AMTEST
AIR QUALITY, INC

Please find enclosed three (3) copies of this letter and a complete data package which includes a summary table of results, separate computer printouts for each run, example calculations of results and field data sheets Please call Am Test-Air Quality, Inc. at (206) 222-7746 if you have any questions or require further information.

Sincerely,
Am Test-Air Quality, Inc.

Kris A. Hansen
Project Manager

KAH/AFB/jaa
Enclosure
[jaa\c\word\report\geoltr2]

AMTEST
AIR QUALITY, INC.

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4 AND 5
AM TEST - AIR QUALITY, INC.

FILE NAME: LB604\GEODCSUM
CLIENT: Geoenergy @ Louisiana Pacific
LOCATION: Dawson Creek, British Columbia

	CORE DRYER E-TUBE			
	Outlet			Inlet
	RUN #1	RUN #2	AVERAGE	RUN #1
LAB #:	5827	5828		5826
DATE:	6/7/94	6/7/94		6/7/94
START TIME:	10:25	12:20		18:57
STOP TIME:	11:30	13:25		19:57
SAMPLE LENGTH (minutes):	60.0	60.0		60.0
VOLUME SAMPLED (cubic feet):	48.309	52.312	50.311	42.096
VOLUME SAMPLED (dry std. cubic feet):	45.328	48.781	47.055	37.440
VOLUME SAMPLED (dry std. cubic meters):	1.284	1.382	1.333	1.060
STACK GAS MOISTURE (percent):	20.48	19.82	20.15	19.41
BAROMETRIC PRESSURE (inches of Hg):	27.40	27.46	27.43	27.67
STATIC PRESSURE (inches of H2O):	-0.05	-0.05	-0.05	-8.50
STACK PRESSURE (inches of Hg):	27.40	27.46	27.43	27.05
STACK TEMPERATURE (degrees F.):	135.2	134.4	134.8	250.6
STACK TEMPERATURE (degrees R.):	595.2	594.4	594.8	710.6
CARBON DIOXIDE (percent):	0.1	0.6	0.4	0.1
OXYGEN (percent):	20.1	18.3	19.2	18.0
CARBON MONOXIDE (ppm):	173	576	375	1131
MOLECULAR WEIGHT (dry, g/g-mole):	28.82	28.83	28.83	28.74
MOLECULAR WEIGHT (wet, g/g-mole):	26.60	26.68	26.64	26.65
AVERAGE VELOCITY HEAD (inches of H2O):	0.904	1.037	0.971	2.938
PITOT TUBE Cp:	0.84	0.84		0.84
STACK GAS VELOCITY (feet per second):	61.7	65.9	63.8	122.2
STACK DIAMETER (inches):	54.0	54.0		41.75
STACK AREA (square feet):	15.9	15.9		9.51
STACK GAS AIRFLOW (dry std. cubic feet per min.):	38020.6	41092.2	39556.4	37736.6
STACK GAS AIRFLOW (actual cubic feet per min.):	58863.2	62869.7	60866.5	69713.5
NOZZLE DIAMETER (inches):	0.242	0.242		0.167
ISOKINETICS (percent):	99	99		103
FRONT-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.007	0.005	0.006	0.054
BACK-HALF PARTICULATE EMISSION CONC. (gr/dscf):	0.008	0.005	0.007	0.037
TOTAL PARTICULATE EMISSION CONC. (gr/dscf):	0.016	0.010	0.013	0.091
TOTAL PARTICULATE EMISSION CONC. (mg/dscm):	36.6	22.6	29.6	209.4
TOTAL PARTICULATE MATTER EMISSION RATE (lb/hr):	5.21	3.48	4.35	29.6
TOTAL PARTICULATE MATTER EMISSION RATE (tons/year):	22.8	15.3	19.1	129.6