



March 21, 2018

Lavington Pellet Limited Partnership
9900 School Road
Coldstream, B.C.,
V1B 3C7

Attention: **Jamie Colliss**
Re: **Air Emission Testing of March 9-12, 2018**
 Permit 107369, ME1718-208

As requested our firm provided a series of air emission tests at your facility in Lavington BC.

Testing Parameters

- Dryer 1 (North & South Stacks)
 - o North and South Stacks: Total Particulate Testing (including Condensable Organics)
 State of Oregon Method 7
- Dryer 2 (North & South Stacks)
 - o North and South Stacks: Total Particulate Testing (including Condensable Organics)
 State of Oregon Method 7

Key Personnel

- Report Generation: Matt McCall
- Field Supervisor: Dave Brandle/Dan Lawrence
- Plant Contact: Jamie Colliss

All testing procedures were conducted in accordance with acceptable methodologies as listed in the latest revision of the BC Field Sampling Manual. A copy of the method and/or Sampling Manual are digitally available upon request. All lab analysis for back half condensable organic fractions was analyzed by EXOVA Laboratories in Surrey BC. A copy of their report can be found in the Appendix of this report.

Results are summarized immediately following this cover letter. Please note that all results are expressed on a dry basis and reference conditions of 20 deg C, 1 atm pressure.

If you have any questions or concerns please don't hesitate to contact us at your earliest convenience.

Sincerely,

MCCALL ENVIRONMENTAL

Matt McCall

Summary of Test Results

Dryer 1 North Stack: March 9, 2018 Summary of Test Results 1-3

Gas Temperature:

Moisture Content (by volume):

Average Stack Gas Velocity:

Total Actual Gas Flow Rate:

Dry Gas flow Rate at Reference Conditions:

Total Particulate Concentration:

Dry Basis Actual at Reference Conditions

Front Half Particulate

Back Half Condensibles

Mass Emission Rate

98 ° F	37 ° C
3.32 %	
37.4 ft/sec	11.4 m/sec
176063 ACFM	
150314 SCFM	70.9 m³/sec
0.003 gr/ft³	6.4 mg/m³
0.001 gr/ft³	2.4 mg/m³
0.002 gr/ft³	3.9 mg/m³
3.58 lbs/hr	1.62 kg/hr

Dryer 1 South Stack: March 9, 2018 Summary of Test Results 1-3

Gas Temperature:

Moisture Content (by volume):

Average Stack Gas Velocity:

Total Actual Gas Flow Rate:

Dry Gas flow Rate at Reference Conditions:

Total Particulate Concentration:

Dry Basis Actual at Reference Conditions

Front Half Particulate

Back Half Condensibles

Mass Emission Rate

72 ° F	22 ° C
3.14 %	
28.1 ft/sec	8.6 m/sec
61898 ACFM	
55584 SCFM	26.2 m³/sec
0.002 gr/ft³	5.1 mg/m³
0.001 gr/ft³	2.9 mg/m³
0.001 gr/ft³	2.1 mg/m³
1.05 lbs/hr	0.48 kg/hr

Average of Dryer 1 North & South

	North Stack	South Stack		Weighted Avg/Combined
Volumetric Flow Rate m³/sec	70.9	26.2		97.1
Total Particulate Concentration mg/m³	6.4	5.1		6.0
Mass Emission Rate Kg/hr	1.62	.48		2.1

*Note: Particulate Concentration a Weighted Averaged Based on Flow.

Dryer 2 North Stack: March 12, 2018 Summary of Test Results 1-3

Gas Temperature:

Moisture Content (by volume):

Average Stack Gas Velocity:

Total Actual Gas Flow Rate:

Dry Gas flow Rate at Reference Conditions:

Total Particulate Concentration:

Dry Basis Actual at Reference Conditions

Front Half Particulate

Back Half Condensibles

Mass Emission Rate

96 ° F	36 ° C
3.13 %	
35.7 ft/sec	10.9 m/sec
168119 ACFM	
147736 SCFM	69.7 m ³ /sec
0.002 gr/ft ³	5.2 mg/m ³
0.001 gr/ft ³	2.6 mg/m ³
0.001 gr/ft ³	2.6 mg/m ³
2.90 lbs/hr	1.31 kg/hr

Dryer 2 South Stack: March 12, 2018 Summary of Test Results 1-3

Gas Temperature:

Moisture Content (by volume):

Average Stack Gas Velocity:

Total Actual Gas Flow Rate:

Dry Gas flow Rate at Reference Conditions:

Total Particulate Concentration:

Dry Basis Actual at Reference Conditions

Front Half Particulate

Back Half Condensibles

Mass Emission Rate

74 ° F	23 ° C
3.32 %	
26.8 ft/sec	8.2 m/sec
59013 ACFM	
53927 SCFM	25.5 m ³ /sec
0.002 gr/ft ³	4.8 mg/m ³
0.001 gr/ft ³	2.6 mg/m ³
0.001 gr/ft ³	2.2 mg/m ³
0.98 lbs/hr	0.44 kg/hr

Average of Dryer 2 North & South

	North Stack	South Stack		Weighted Avg/Combined
Volumetric Flow Rate m ³ /sec	69.7	25.5		95.2
Total Particulate Concentration mg/m ³	5.2	4.8		5.1
Mass Emission Rate Kg/hr	1.31	.44		1.75

*Note: Particulate Concentration a Weighted Averaged Based on Flow.

Pinnacle Pellet Lavington
March 9/18
Dryer 1 North Stack
Permit Number: 107369
Lavington, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	98 ° F	37 ° C
Moisture Content (by volume):	3.32 %	
Average Stack Gas Velocity:	37.4 ft/sec	11.4 m/sec
Total Actual Gas Flow Rate:	176063 ACFM	
Dry Gas flow Rate at Reference Conditions:	150314 SCFM	70.9 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.003 gr/ft ³	6.4 mg/m ³
Front Half Particulate	0.001 gr/ft ³	2.4 mg/m ³
Back Half Condensibles	0.002 gr/ft ³	3.9 mg/m ³
Mass Emission Rate	3.58 lbs/hr	1.62 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	94 ° F	34 ° C
Moisture Content (by volume):	3.7 %	
Average Stack Gas Velocity:	36.6 ft/sec	11.2 m/sec
Total Actual Gas Flow Rate:	172678 ACFM	
Dry Gas flow Rate at Reference Conditions:	147975 SCFM	69.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	7.0 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.7 mg/m ³
Back Half Condensibles	.002 gr/ft ³	4.3 mg/m ³
Mass Emission Rate	3.89 lbs/hr	1.76 kg/hr

TEST 2:

Gas Temperature:	102 ° F	39 ° C
Moisture Content (by volume):	3.2 %	
Average Stack Gas Velocity:	38.1 ft/sec	11.6 m/sec
Total Actual Gas Flow Rate:	179355 ACFM	
Dry Gas flow Rate at Reference Conditions:	152170 SCFM	71.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.5 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.8 mg/m ³
Back Half Condensibles	.002 gr/ft ³	3.7 mg/m ³
Mass Emission Rate	3.70 lbs/hr	1.68 kg/hr

TEST 3:

Gas Temperature:	98 ° F	37 ° C
Moisture Content (by volume):	3.0 %	
Average Stack Gas Velocity:	37.4 ft/sec	11.4 m/sec
Total Actual Gas Flow Rate:	176157 ACFM	
Dry Gas flow Rate at Reference Conditions:	150797 SCFM	71.2 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.6 mg/m ³
Front Half Particulate	.001 gr/ft ³	1.9 mg/m ³
Back Half Condensibles	.002 gr/ft ³	3.7 mg/m ³
Mass Emission Rate	3.15 lbs/hr	1.43 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet Lavington
Plant Location: Lavington, BC
Process: Dryer 1 North Stack
Permit Number: 107369
Job Number: ME1718-202
Pollution Control Permit: 15.0 mg/m3
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

Filter Number:
Date of Test:
Start Time:
Stop Time:
On-line Sampling Time:
Testing Personnel:
Sampler Model:
Barometric Pressure("Hg):
Static Pressure("H₂O):
%CO₂:
%O₂:
%CO:
%N₂:
Diameter of Nozzle(inches):
Meter Factor:
Type-S Pitot Tube Coefficient:
Cross Sectional Area of Stack(ft²):
Impinger Condensate(g):
Weight of Moisture in Silica Gel(g):
Weight of Filter Particulate(g):
Weight of Probe Washings(g):
Weight of Impinger Content Organic(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
83	84	85
March 9/18	March 9/18	March 9/18
8:30	9:50	11:10
9:35	10:55	12:15
60	60	60
DL/TW	DL/TW	DL/TW
MU-1013	MU-1013	MU-1013
27.95	27.95	27.95
-0.30	-0.30	-0.30
0.0	0.0	0.0
21.0	21.0	21.0
0.0	0.0	0.0
79.0	79.0	79.0
0.230	0.245	0.245
0.9953	0.9953	0.9953
0.83446	0.83446	0.83446
78.54	78.54	78.54
20	20	19
7.0	7.0	6.0
0.0005	0.0006	0.0006
0.0020	0.0024	0.0014
0.0040	0.0040	0.0040
0.0065	0.0070	0.0060

Sampling Data for - **TEST 1**

March 9/18

Pinnacle Pellet Lavington
Dryer 1 North Stack
Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN 60	TEMP OUT (° F)			
A-12	0.40	1.24	46	46	97	0.00	0.99
A-11	0.42	1.30	40	41	91	1.41	0.99
A-10	0.43	1.34	39	39	87	2.85	1.00
A-9	0.40	1.24	40	39	87	4.32	1.02
A-8	0.37	1.15	40	39	88	5.78	1.01
A-7	0.38	1.19	42	40	87	7.17	1.00
A-6	0.36	1.11	43	41	90	8.56	1.04
A-5	0.34	1.06	46	45	91	9.97	0.98
A-4	0.34	1.06	49	47	92	11.27	1.00
A-3	0.33	1.03	50	48	93	12.60	1.01
A-2	0.30	0.94	52	50	95	13.92	1.02
A-1	0.32	1.00	53	51	96	15.20	0.99
B-12	0.40	1.26	56	53	96	16.48	1.00
B-11	0.39	1.23	56	53	96	17.94	1.02
B-10	0.43	1.36	58	56	97	19.40	1.02
B-9	0.34	1.07	58	56	97	20.95	1.01
B-8	0.36	1.14	59	57	97	22.31	1.01
B-7	0.34	1.08	60	58	96	23.71	1.03
B-6	0.37	1.18	60	60	96	25.11	1.03
B-5	0.38	1.21	61	61	96	26.57	0.97
B-4	0.42	1.34	62	62	96	27.96	0.99
B-3	0.43	1.37	62	62	96	29.46	0.97
B-2	0.44	1.40	61	61	95	30.94	0.99
B-1	0.42	1.35	64	62	95	32.47	1.02
						34.02	

Sampling Data for - TEST 2

March 9/18

Pinnacle Pellet Lavington

Dryer 1 North Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
B-12	0.38	1.59	69	69	104	0.00	0.97
B-11	0.41	1.70	65	65	103	1.60	0.99
B-10	0.37	1.54	66	66	103	3.28	1.03
B-9	0.42	1.75	67	67	104	4.95	0.98
B-8	0.40	1.67	67	67	102	6.65	1.04
B-7	0.43	1.80	67	66	102	8.40	0.96
B-6	0.40	1.68	65	65	98	10.07	1.02
B-5	0.36	1.52	69	69	100	11.80	1.04
B-4	0.38	1.60	67	68	97	13.47	1.00
B-3	0.40	1.68	68	68	100	15.13	1.04
B-2	0.42	1.77	69	69	101	16.90	0.95
B-1	0.43	1.81	70	71	102	18.55	0.98
A-12	0.37	1.56	71	71	103	20.28	1.02
A-11	0.40	1.69	71	71	99	21.95	0.98
A-10	0.42	1.77	71	70	100	23.63	0.99
A-9	0.40	1.69	71	71	99	25.36	1.00
A-8	0.39	1.66	74	74	101	27.07	0.99
A-7	0.36	1.53	78	78	105	28.75	1.02
A-6	0.42	1.79	78	78	104	30.41	0.98
A-5	0.43	1.84	81	82	104	32.14	1.00
A-4	0.40	1.70	79	79	105	33.93	1.02
A-3	0.42	1.79	80	81	105	35.69	0.99
A-2	0.44	1.87	78	79	105	37.44	1.00
A-1	0.43	1.83	79	79	105	39.24	1.01
						41.04	



Sampling Data for - TEST 3

March 9/18

Pinnacle Pellet Lavington

Dryer 1 North Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.37	1.58	78	81	104	0.00	0.98
A-11	0.4	1.70	74	79	104	1.63	0.99
A-10	0.42	1.79	74	78	102	3.33	0.99
A-9	0.39	1.66	69	72	97	5.07	1.00
A-8	0.40	1.70	68	71	94	6.76	1.02
A-7	0.41	1.74	69	69	95	8.50	0.97
A-6	0.37	1.58	70	72	95	10.18	1.03
A-5	0.35	1.49	72	72	97	11.88	1.04
A-4	0.35	1.49	74	74	98	13.55	1.05
A-3	0.34	1.45	74	74	98	15.24	1.00
A-2	0.36	1.54	74	74	97	16.83	1.00
A-1	0.38	1.62	77	76	100	18.46	1.00
B-12	0.39	1.66	75	75	100	20.14	1.00
B-11	0.40	1.71	75	75	99	21.84	1.02
B-10	0.42	1.79	75	76	99	23.59	1.00
B-9	0.40	1.71	75	76	99	25.36	1.02
B-8	0.39	1.67	76	76	99	27.12	1.02
B-7	0.39	1.67	76	77	98	28.85	1.01
B-6	0.38	1.62	75	76	99	30.58	1.01
B-5	0.40	1.71	76	76	99	32.28	1.00
B-4	0.41	1.75	76	76	100	34.00	1.01
B-3	0.43	1.84	74	75	95	35.77	0.99
B-2	0.44	1.89	77	77	97	37.54	0.99
B-1	0.42	1.81	79	80	97	39.34	1.02
						41.16	



Pinnacle Pellet Lavington
Dryer 1 North Stack
Pinnacle Pellet Lavington

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 1.004

Delta P:	0.379 "H ₂ O	Us avg:	36.64 ft/sec
Delta H:	1.194	ACFM:	172678 ft ³ /min
Tm avg:	511.9 °R	SDCFM:	147975 ft ³ /min
Ts avg:	553.6 °R	Vm std:	32.73 ft ³
Bwo:	0.037	Vm corr:	33.86 ft ³
Md:	28.84	Vm:	34.02 ft ³
Ms:	28.43	MF:	0.9953
Pb:	27.95 "Hg	PCON:	7.01 mg/m ³
Pm:	28.04 "Hg	ERAT:	1.76 kg/hr
Ps:	27.93 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 1.001

Delta P:	0.403 "H ₂ O	Us avg:	38.06 ft/sec
Delta H:	1.701	ACFM:	179355 ft ³ /min
Tm avg:	531.7 °R	SDCFM:	152170 ft ³ /min
Ts avg:	562.1 °R	Vm std:	38.06 ft ³
Bwo:	0.032	Vm corr:	40.85 ft ³
Md:	28.84	Vm:	41.04 ft ³
Ms:	28.49	MF:	0.9953
Pb:	27.95 "Hg	PCON:	6.50 mg/m ³
Pm:	28.08 "Hg	ERAT:	1.68 kg/hr
Ps:	27.93 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 1.007

Delta P:	0.392 "H ₂ O	Us avg:	37.38 ft/sec
Delta H:	1.674	ACFM:	176157 ft ³ /min
Tm avg:	534.8 °R	SDCFM:	150797 ft ³ /min
Ts avg:	558.4 °R	Vm std:	37.95 ft ³
Bwo:	0.030	Vm corr:	40.97 ft ³
Md:	28.84	Vm:	41.16 ft ³
Ms:	28.51	MF:	0.9953
Pb:	27.95 "Hg	PCON:	5.58 mg/m ³
Pm:	28.07 "Hg	ERAT:	1.43 kg/hr
Ps:	27.93 "Hg		



Pinnacle Pellet Lavington
Dryer 1 South Stack
Lavington, BC

March 9/18

Permit Number: 107369

AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	72 ° F	22 ° C
Moisture Content (by volume):	3.14 %	
Average Stack Gas Velocity:	28.1 ft/sec	8.6 m/sec
Total Actual Gas Flow Rate:	61898 ACFM	
Dry Gas flow Rate at Reference Conditions:	55584 SCFM	26.2 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.002 gr/ft ³	5.1 mg/m ³
Front Half Particulate	0.001 gr/ft ³	2.9 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	2.1 mg/m ³
Mass Emission Rate	1.05 lbs/hr	0.48 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

Gas Temperature:	72 ° F	22 ° C
Moisture Content (by volume):	3.2 %	
Average Stack Gas Velocity:	27.7 ft/sec	8.4 m/sec
Total Actual Gas Flow Rate:	60930 ACFM	
Dry Gas flow Rate at Reference Conditions:	54684 SCFM	25.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.0 mg/m ³
Front Half Particulate	.001 gr/ft ³	3.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.6 mg/m ³
Mass Emission Rate	1.02 lbs/hr	0.46 kg/hr

TEST 2:

Gas Temperature:	74 ° F	23 ° C
Moisture Content (by volume):	3.1 %	
Average Stack Gas Velocity:	28.6 ft/sec	8.7 m/sec
Total Actual Gas Flow Rate:	62977 ACFM	
Dry Gas flow Rate at Reference Conditions:	56351 SCFM	26.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.4 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.8 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.6 mg/m ³
Mass Emission Rate	0.92 lbs/hr	0.42 kg/hr

TEST 3:

Gas Temperature:	70 ° F	21 ° C
Moisture Content (by volume):	3.1 %	
Average Stack Gas Velocity:	28.1 ft/sec	8.6 m/sec
Total Actual Gas Flow Rate:	61786 ACFM	
Dry Gas flow Rate at Reference Conditions:	55716 SCFM	26.3 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	5.9 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.6 mg/m ³
Back Half Condensibles	.001 gr/ft ³	3.2 mg/m ³
Mass Emission Rate	1.22 lbs/hr	0.55 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet Lavington
Plant Location: Lavington, BC
Process: Dryer 1 South Stack
Permit Number: 107369
Job Number: ME1718-202
Pollution Control Permit: 15.0 mg/m3
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

Filter Number:
Date of Test:
Start Time:
Stop Time:
On-line Sampling Time:
Testing Personnel:
Sampler Model:
Barometric Pressure("Hg):
Static Pressure("H₂O):
%CO₂:
%O₂:
%CO:
%N₂:
Diameter of Nozzle(inches):
Meter Factor:
Type-S Pitot Tube Coefficient:
Cross Sectional Area of Stack(ft²):
Impinger Condensate(g):
Weight of Moisture in Silica Gel(g):
Weight of Filter Particulate(g):
Weight of Probe Washings(g):
Weight of Impinger Content Organic(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
86	87	88
March 9/18	March 9/18	March 9/18
12:48	2:03	3:18
1:52	3:07	4:22
60	60	60
DL/TW	DL/TW	DL/TW
MU-1013	MU-1013	MU-1013
27.95	27.95	27.95
-0.06	-0.06	-0.06
0.0	0.0	0.0
21.0	21.0	21.0
0.0	0.0	0.0
79.0	79.0	79.0
0.300	0.300	0.300
0.9953	0.9953	0.9953
0.83446	0.83446	0.83446
36.67	36.67	36.67
22	21	19
9.0	10.0	11.0
0.0004	0.0003	0.0003
0.0038	0.0033	0.0030
0.0020	0.0020	0.0040
0.0062	0.0056	0.0073

Sampling Data for - **TEST 1**

March 9/18

Pinnacle Pellet Lavington
Dryer 1 South Stack
Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN 60	TEMP OUT (° F)			
A-12	0.24	2.34	64	64	79	0.00	0.99
A-11	0.23	2.27	62	67	72	1.97	1.01
A-10	0.22	2.16	61	63	72	3.96	0.99
A-9	0.22	2.19	62	64	67	5.86	0.99
A-8	0.19	1.88	62	62	69	7.77	1.03
A-7	0.20	1.98	63	64	71	9.60	1.00
A-6	0.19	1.89	64	64	69	11.42	1.02
A-5	0.18	1.79	64	64	69	13.24	1.00
A-4	0.19	1.89	66	65	71	14.98	0.99
A-3	0.18	1.79	66	66	70	16.76	1.03
A-2	0.19	1.89	66	67	72	18.56	0.98
A-1	0.20	1.99	68	68	71	20.32	0.98
B-12	0.23	2.29	69	69	72	22.13	0.98
B-11	0.24	2.40	69	69	71	24.07	1.04
B-10	0.24	2.40	68	69	70	26.18	0.97
B-9	0.25	2.51	68	68	68	28.14	1.00
B-8	0.24	2.41	69	69	69	30.21	1.01
B-7	0.23	2.31	70	70	70	32.26	1.02
B-6	0.24	2.40	72	72	73	34.28	1.00
B-5	0.26	2.60	72	72	74	36.32	0.99
B-4	0.26	2.62	76	76	74	38.41	1.02
B-3	0.26	2.61	80	80	79	40.58	1.00
B-2	0.27	2.71	78	78	77	42.72	1.00
B-1	0.29	2.92	78	79	76	44.88	1.00
						47.13	

Sampling Data for - TEST 2

March 9/18

Pinnacle Pellet Lavington

Dryer 1 South Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
B-12	0.25	2.50	79	79	81	0.00	1.00
B-11	0.24	2.41	78	82	80	2.08	1.02
B-10	0.24	2.40	76	77	77	4.17	1.03
B-9	0.26	2.61	73	77	75	6.28	0.97
B-8	0.26	2.61	73	75	74	8.33	1.00
B-7	0.25	2.51	75	77	74	10.45	0.99
B-6	0.24	2.41	74	75	74	12.52	1.01
B-5	0.25	2.52	73	76	72	14.57	1.00
B-4	0.27	2.72	74	75	72	16.65	0.99
B-3	0.26	2.62	75	76	73	18.80	1.02
B-2	0.28	2.82	75	74	72	20.96	0.98
B-1	0.28	2.82	75	75	74	23.13	1.00
A-12	0.23	2.31	73	74	73	25.33	1.02
A-11	0.22	2.21	75	76	73	27.36	1.01
A-10	0.22	2.21	76	76	71	29.33	1.00
A-9	0.23	2.32	73	74	71	31.30	0.99
A-8	0.23	2.33	72	73	72	33.28	1.01
A-7	0.24	2.41	73	73	72	35.29	1.02
A-6	0.25	2.51	75	74	72	37.37	1.01
A-5	0.24	2.43	76	76	71	39.47	1.01
A-4	0.26	2.63	79	79	74	41.55	1.00
A-3	0.21	2.12	78	78	75	43.68	1.02
A-2	0.19	1.92	80	82	77	45.64	1.01
A-1	0.18	1.82	80	81	77	47.49	1.01
						49.29	



Sampling Data for - TEST 3

March 9/18

Pinnacle Pellet Lavington

Dryer 1 South Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.24	2.41	73	73	72	0.00	1.00
A-11	0.25	2.52	71	75	71	2.03	0.99
A-10	0.23	2.31	72	73	70	4.08	0.99
A-9	0.2	2.03	73	74	68	6.06	1.02
A-8	0.17	1.72	74	74	69	7.96	0.95
A-7	0.18	1.82	74	75	68	9.60	0.96
A-6	0.19	1.93	75	75	68	11.30	0.97
A-5	0.2	2.03	76	76	70	13.07	0.99
A-4	0.19	1.93	77	77	69	14.93	0.98
A-3	0.21	2.14	78	77	68	16.72	1.02
A-2	0.22	2.25	78	78	69	18.68	0.94
A-1	0.23	2.35	80	80	71	20.53	0.97
B-12	0.23	2.35	80	81	70	22.50	0.98
B-11	0.25	2.55	81	81	71	24.48	0.99
B-10	0.26	2.66	81	81	71	26.58	0.98
B-9	0.26	2.67	81	82	69	28.69	0.99
B-8	0.25	2.56	81	81	70	30.83	0.98
B-7	0.24	2.46	82	82	71	32.91	1.00
B-6	0.26	2.66	82	83	72	34.99	0.96
B-5	0.26	2.67	83	83	71	37.07	0.98
B-4	0.25	2.57	84	83	70	39.19	1.02
B-3	0.27	2.78	84	84	69	41.35	0.95
B-2	0.28	2.89	84	84	70	43.46	0.98
B-1	0.30	2.89	84	84	70	45.67	0.99
						47.97	



Pinnacle Pellet Lavington
Dryer 1 South Stack
Pinnacle Pellet Lavington

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 1.003

Delta P:	0.226 "H ₂ O	Us avg:	27.69 ft/sec
Delta H:	2.260	ACFM:	60930 ft ³ /min
Tm avg:	528.3 °R	SDCFM:	54684 ft ³ /min
Ts avg:	531.9 °R	Vm std:	44.06 ft ³
Bwo:	0.032	Vm corr:	46.91 ft ³
Md:	28.84	Vm:	47.13 ft ³
Ms:	28.49	MF:	0.9953
Pb:	27.95 "Hg	PCON:	4.97 mg/m ³
Pm:	28.12 "Hg	ERAT:	0.46 kg/hr
Ps:	27.95 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 1.005

Delta P:	0.240 "H ₂ O	Us avg:	28.62 ft/sec
Delta H:	2.424	ACFM:	62977 ft ³ /min
Tm avg:	535.9 °R	SDCFM:	56351 ft ³ /min
Ts avg:	534.0 °R	Vm std:	45.44 ft ³
Bwo:	0.031	Vm corr:	49.06 ft ³
Md:	28.84	Vm:	49.29 ft ³
Ms:	28.50	MF:	0.9953
Pb:	27.95 "Hg	PCON:	4.35 mg/m ³
Pm:	28.13 "Hg	ERAT:	0.42 kg/hr
Ps:	27.95 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.982

Delta P:	0.233 "H ₂ O	Us avg:	28.08 ft/sec
Delta H:	2.381	ACFM:	61786 ft ³ /min
Tm avg:	538.8 °R	SDCFM:	55716 ft ³ /min
Ts avg:	529.9 °R	Vm std:	43.98 ft ³
Bwo:	0.031	Vm corr:	47.74 ft ³
Md:	28.84	Vm:	47.97 ft ³
Ms:	28.50	MF:	0.9953
Pb:	27.95 "Hg	PCON:	5.86 mg/m ³
Pm:	28.13 "Hg	ERAT:	0.55 kg/hr
Ps:	27.95 "Hg		

Pinnacle Pellet Lavington
March 12/18
Dryer 2 North Stack
Permit Number: 107369
Lavington, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	96 ° F	36 ° C
Moisture Content (by volume):	3.13 %	
Average Stack Gas Velocity:	35.7 ft/sec	10.9 m/sec
Total Actual Gas Flow Rate:	168119 ACFM	
Dry Gas flow Rate at Reference Conditions:	147736 SCFM	69.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.002 gr/ft ³	5.2 mg/m ³
Front Half Particulate	0.001 gr/ft ³	2.6 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	2.6 mg/m ³
Mass Emission Rate	2.90 lbs/hr	1.31 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	95 ° F	35 ° C
Moisture Content (by volume):	2.9 %	
Average Stack Gas Velocity:	35.3 ft/sec	10.8 m/sec
Total Actual Gas Flow Rate:	166451 ACFM	
Dry Gas flow Rate at Reference Conditions:	146966 SCFM	69.4 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.1 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.1 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	2.23 lbs/hr	1.01 kg/hr

TEST 2:

Gas Temperature:	96 ° F	36 ° C
Moisture Content (by volume):	3.2 %	
Average Stack Gas Velocity:	35.9 ft/sec	11.0 m/sec
Total Actual Gas Flow Rate:	169381 ACFM	
Dry Gas flow Rate at Reference Conditions:	148555 SCFM	70.1 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.4 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.5 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.9 mg/m ³
Mass Emission Rate	3.55 lbs/hr	1.61 kg/hr

TEST 3:

Gas Temperature:	97 ° F	36 ° C
Moisture Content (by volume):	3.3 %	
Average Stack Gas Velocity:	35.8 ft/sec	10.9 m/sec
Total Actual Gas Flow Rate:	168526 ACFM	
Dry Gas flow Rate at Reference Conditions:	147687 SCFM	69.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.3 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.3 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.9 mg/m ³
Mass Emission Rate	2.91 lbs/hr	1.32 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet Lavington
Plant Location: Lavington, BC
Process: Dryer 2 North Stack
Permit Number: 107369
Job Number: ME1718-202
Pollution Control Permit: 15.0 mg/m3
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	89	90	91
Date of Test:	March 12/18	March 12/18	March 12/18
Start Time:	8:25	9:40	10:55
Stop Time:	9:30	10:45	12:00
On-line Sampling Time:	60	60	60
Testing Personnel:	DL/TW	DL/TW	DL/TW
Sampler Model:	1013	1013	1013
Barometric Pressure("Hg):	28.60	28.60	28.60
Static Pressure("H₂O):	-0.33	-0.33	-0.33
%CO₂:	0.0	0.0	3.0
%O₂:	21.0	21.0	21.0
%CO:	0.0	0.0	0.0
%N₂:	79.0	79.0	76.0
Diameter of Nozzle(inches):	0.245	0.245	0.245
Meter Factor:	0.9953	0.9953	0.9953
Type-S Pitot Tube Coefficient:	0.83446	0.83446	0.83446
Cross Sectional Area of Stack(ft²):	78.54	78.54	78.54
Impinger Condensate(g):	17	21	19
Weight of Moisture in Silica Gel(g):	6.0	5.0	7.0
Weight of Filter Particulate(g):	0.0011	0.0008	0.0006
Weight of Probe Washings(g):	0.0011	0.0028	0.0018
Weight of Impinger Content Organic(g):	0.0020	0.0030	0.0030
Total Weight of Particulate(g):	0.0042	0.0066	0.0054

Sampling Data for - **TEST 1**

March 12/18

Pinnacle Pellet Lavington
Dryer 2 North Stack
Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.42	1.66	36	36	98	0.00	0.98
A-11	0.40	1.62	37	37	97	1.59	1.02
A-10	0.37	1.50	36	36	95	3.21	1.05
A-9	0.34	1.38	36	36	93	4.81	0.98
A-8	0.30	1.22	38	37	94	6.25	1.00
A-7	0.33	1.34	39	38	94	7.63	0.99
A-6	0.35	1.43	44	39	95	9.06	0.99
A-5	0.33	1.36	45	41	92	10.54	0.98
A-4	0.37	1.53	46	42	94	11.98	0.99
A-3	0.36	1.49	48	43	95	13.51	1.00
A-2	0.38	1.57	50	44	96	15.05	0.99
A-1	0.35	1.46	53	48	94	16.62	0.99
B-12	0.45	1.88	56	49	97	18.13	1.02
B-11	0.43	1.79	55	50	95	19.90	0.98
B-10	0.38	1.59	56	51	97	21.56	0.95
B-9	0.35	1.47	56	52	93	23.07	1.02
B-8	0.37	1.57	60	53	93	24.64	0.99
B-7	0.37	1.58	62	56	93	26.22	0.99
B-6	0.34	1.45	63	57	94	27.80	1.00
B-5	0.32	1.36	62	58	94	29.34	1.01
B-4	0.33	1.41	63	59	94	30.85	0.98
B-3	0.31	1.32	62	60	95	32.33	1.00
B-2	0.37	1.58	67	60	96	33.80	0.98
B-1	0.35	1.50	66	64	95	35.37	1.00
						36.94	

Sampling Data for - TEST 2

March 12/18

Pinnacle Pellet Lavington

Dryer 2 North Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
B-12	0.42	1.81	68	68	96	0.00	0.98
B-11	0.44	1.89	67	67	96	1.68	0.98
B-10	0.41	1.76	68	67	98	3.41	1.01
B-9	0.36	1.55	67	67	96	5.13	0.97
B-8	0.38	1.63	68	67	97	6.68	0.99
B-7	0.35	1.51	68	67	96	8.30	1.01
B-6	0.33	1.42	69	68	96	9.88	1.00
B-5	0.36	1.55	69	69	95	11.41	0.98
B-4	0.38	1.64	72	70	97	12.98	0.97
B-3	0.38	1.64	72	71	98	14.58	0.98
B-2	0.36	1.56	74	73	99	16.20	1.00
B-1	0.35	1.52	73	72	97	17.80	1.00
A-12	0.40	1.73	74	73	98	19.39	0.97
A-11	0.40	1.73	74	73	96	21.03	0.98
A-10	0.38	1.66	77	75	97	22.70	0.99
A-9	0.37	1.62	77	75	95	24.34	1.00
A-8	0.32	1.41	79	78	96	25.98	1.00
A-7	0.35	1.54	78	78	95	27.52	0.97
A-6	0.35	1.54	79	78	95	29.07	0.97
A-5	0.36	1.58	78	78	94	30.62	0.97
A-4	0.34	1.50	81	80	95	32.20	0.99
A-3	0.37	1.63	82	81	96	33.77	0.95
A-2	0.38	1.68	83	82	97	35.35	0.96
A-1	0.39	1.72	83	82	97	36.97	0.98
						38.64	



Sampling Data for - TEST 3

March 12/18

Pinnacle Pellet Lavington

Dryer 2 North Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.42	1.84	82	82	100	0.00	0.97
A-11	0.38	1.66	80	81	101	1.70	0.98
A-10	0.40	1.76	78	81	97	3.33	0.98
A-9	0.41	1.79	78	79	98	5.00	0.99
A-8	0.35	1.54	79	80	96	6.70	1.00
A-7	0.33	1.45	79	80	96	8.30	1.01
A-6	0.36	1.58	80	80	95	9.87	0.99
A-5	0.35	1.54	80	80	96	11.47	1.00
A-4	0.38	1.68	81	81	96	13.06	0.98
A-3	0.4	1.76	81	81	97	14.70	0.97
A-2	0.37	1.64	81	82	95	16.36	0.98
A-1	0.34	1.50	82	82	97	17.97	0.98
B-12	0.44	1.95	82	83	96	19.52	0.96
B-11	0.43	1.90	82	82	97	21.24	0.99
B-10	0.40	1.77	84	84	96	23.00	1.01
B-9	0.36	1.60	84	84	97	24.73	0.99
B-8	0.34	1.51	84	84	97	26.35	1.01
B-7	0.36	1.60	84	84	97	27.95	0.97
B-6	0.37	1.64	84	85	96	29.53	0.98
B-5	0.33	1.46	84	84	97	31.15	0.98
B-4	0.36	1.60	84	85	95	32.68	0.97
B-3	0.35	1.56	85	85	96	34.26	0.97
B-2	0.38	1.69	85	86	96	35.82	0.96
B-1	0.37	1.64	85	86	96	37.43	0.96
						39.02	



Pinnacle Pellet Lavington
Dryer 2 North Stack
Pinnacle Pellet Lavington

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 0.995

Delta P:	0.360 "H ₂ O	Us avg:	35.32 ft/sec
Delta H:	1.503	ACFM:	166451 ft ³ /min
Tm avg:	509.6 °R	SDCFM:	146966 ft ³ /min
Ts avg:	554.7 °R	Vm std:	36.55 ft ³
Bwo:	0.029	Vm corr:	36.77 ft ³
Md:	28.84	Vm:	36.94 ft ³
Ms:	28.53	MF:	0.9953
Pb:	28.60 "Hg	PCON:	4.06 mg/m ³
Pm:	28.71 "Hg	ERAT:	1.01 kg/hr
Ps:	28.58 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 0.983

Delta P:	0.372 "H ₂ O	Us avg:	35.94 ft/sec
Delta H:	1.618	ACFM:	169381 ft ³ /min
Tm avg:	533.7 °R	SDCFM:	148555 ft ³ /min
Ts avg:	556.3 °R	Vm std:	36.52 ft ³
Bwo:	0.032	Vm corr:	38.46 ft ³
Md:	28.84	Vm:	38.64 ft ³
Ms:	28.49	MF:	0.9953
Pb:	28.60 "Hg	PCON:	6.38 mg/m ³
Pm:	28.72 "Hg	ERAT:	1.61 kg/hr
Ps:	28.58 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.983

Delta P:	0.374 "H ₂ O	Us avg:	35.76 ft/sec
Delta H:	1.653	ACFM:	168526 ft ³ /min
Tm avg:	542.3 °R	SDCFM:	147687 ft ³ /min
Ts avg:	556.7 °R	Vm std:	36.30 ft ³
Bwo:	0.033	Vm corr:	38.84 ft ³
Md:	29.32	Vm:	39.02 ft ³
Ms:	28.95	MF:	0.9953
Pb:	28.60 "Hg	PCON:	5.25 mg/m ³
Pm:	28.72 "Hg	ERAT:	1.32 kg/hr
Ps:	28.58 "Hg		

Pinnacle Pellet Lavington
Dryer 2 South Stack
Lavington, BC

March 12/18

Permit Number: 107369

AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	74 ° F	23 ° C
Moisture Content (by volume):	3.32 %	
Average Stack Gas Velocity:	26.8 ft/sec	8.2 m/sec
Total Actual Gas Flow Rate:	59013 ACFM	
Dry Gas flow Rate at Reference Conditions:	53927 SCFM	25.5 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.002 gr/ft ³	4.8 mg/m ³
Front Half Particulate	0.001 gr/ft ³	2.6 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	2.2 mg/m ³
Mass Emission Rate	0.98 lbs/hr	0.44 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

Gas Temperature:	73 ° F	23 ° C
Moisture Content (by volume):	3.6 %	
Average Stack Gas Velocity:	26.8 ft/sec	8.2 m/sec
Total Actual Gas Flow Rate:	58988 ACFM	
Dry Gas flow Rate at Reference Conditions:	53840 SCFM	25.4 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.8 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.3 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.5 mg/m ³
Mass Emission Rate	0.98 lbs/hr	0.44 kg/hr

TEST 2:

Gas Temperature:	74 ° F	23 ° C
Moisture Content (by volume):	3.0 %	
Average Stack Gas Velocity:	26.7 ft/sec	8.1 m/sec
Total Actual Gas Flow Rate:	58800 ACFM	
Dry Gas flow Rate at Reference Conditions:	53911 SCFM	25.4 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.3 mg/m ³
Front Half Particulate	.001 gr/ft ³	1.8 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.5 mg/m ³
Mass Emission Rate	0.87 lbs/hr	0.40 kg/hr

TEST 3:

Gas Temperature:	75 ° F	24 ° C
Moisture Content (by volume):	3.3 %	
Average Stack Gas Velocity:	26.9 ft/sec	8.2 m/sec
Total Actual Gas Flow Rate:	59252 ACFM	
Dry Gas flow Rate at Reference Conditions:	54031 SCFM	25.5 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.4 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	1.09 lbs/hr	0.49 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet Lavington
Plant Location: Lavington, BC
Process: Dryer 2 South Stack
Permit Number: 107369
Job Number: ME1718-202
Pollution Control Permit: 15.0 mg/m3
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	92	93	94
Date of Test:	March 12/18	March 12/18	March 12/18
Start Time:	12:25	1:40	3:00
Stop Time:	1:30	2:45	4:05
On-line Sampling Time:	60	60	60
Testing Personnel:	DL/TW	DL/TW	DL/TW
Sampler Model:	MU-1013	MU-1013	MU-1013
Barometric Pressure("Hg):	28.60	28.60	28.60
Static Pressure("H₂O):	-0.12	-0.12	-0.12
%CO₂:	0.0	0.0	0.0
%O₂:	21.0	21.0	21.0
%CO:	0.0	0.0	0.0
%N₂:	79.0	79.0	79.0
Diameter of Nozzle(inches):	0.300	0.300	0.300
Meter Factor:	0.9953	0.9953	0.9953
Type-S Pitot Tube Coefficient:	0.83446	0.83446	0.83446
Cross Sectional Area of Stack(ft²):	36.67	36.67	36.67
Impinger Condensate(g):	24	19	20
Weight of Moisture in Silica Gel(g):	10.0	9.0	11.0
Weight of Filter Particulate(g):	0.0002	0.0002	0.0007
Weight of Probe Washings(g):	0.0026	0.0020	0.0038
Weight of Impinger Content Organic(g):	0.0030	0.0030	0.0020
Total Weight of Particulate(g):	0.0058	0.0052	0.0065



Sampling Data for - TEST 1

March 12/18

Pinnacle Pellet Lavington

Dryer 2 South Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.21	2.10	69	69	80	0.00	1.01
A-11	0.22	2.22	62	71	72	1.87	0.97
A-10	0.23	2.31	62	68	72	3.71	0.98
A-9	0.23	2.33	64	69	69	5.60	0.97
A-8	0.23	2.32	65	67	71	7.49	0.97
A-7	0.22	2.24	67	68	69	9.38	0.99
A-6	0.21	2.14	68	68	69	11.27	0.98
A-5	0.21	2.14	69	69	72	13.10	0.97
A-4	0.20	2.04	70	70	70	14.91	1.02
A-3	0.20	2.04	72	71	72	16.77	0.95
A-2	0.20	2.04	72	71	72	18.51	0.99
A-1	0.21	2.14	72	72	72	20.31	0.98
B-12	0.22	2.24	73	73	72	22.14	0.98
B-11	0.22	2.25	75	73	73	24.02	0.98
B-10	0.23	2.36	76	75	73	25.91	0.95
B-9	0.22	21.25	76	75	75	27.79	1.04
B-8	0.23	2.36	77	77	74	29.69	0.97
B-7	0.23	2.35	77	77	76	31.60	0.96
B-6	0.21	2.16	78	78	73	33.50	0.98
B-5	0.22	2.26	78	78	74	35.36	0.96
B-4	0.22	2.27	80	80	73	37.21	0.97
B-3	0.20	2.06	79	79	75	39.10	0.96
B-2	0.20	2.07	80	80	73	40.88	1.01
B-1	0.21	2.17	80	80	73	42.76	0.96
						44.59	

Sampling Data for - TEST 2

March 12/18

Pinnacle Pellet Lavington

Dryer 2 South Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
B-12	0.21	2.15	78	78	77	0.00	0.99
B-11	0.21	2.15	74	79	74	1.88	0.97
B-10	0.22	2.25	77	78	74	3.72	0.94
B-9	0.23	2.36	73	77	71	5.54	1.04
B-8	0.22	2.27	77	78	72	7.60	0.94
B-7	0.22	2.27	78	78	72	9.43	0.91
B-6	0.21	2.16	77	76	71	11.21	0.98
B-5	0.20	2.06	77	77	72	13.08	0.98
B-4	0.22	2.27	78	79	73	14.90	0.95
B-3	0.21	2.16	78	78	73	16.75	0.98
B-2	0.20	2.05	79	79	75	18.61	1.00
B-1	0.20	2.05	78	79	74	20.46	0.99
A-12	0.19	1.96	80	80	74	22.30	1.02
A-11	0.21	2.18	81	81	72	24.16	1.02
A-10	0.22	2.28	81	81	73	26.12	0.96
A-9	0.23	2.39	82	82	73	27.99	0.98
A-8	0.23	2.39	82	82	73	29.96	0.99
A-7	0.24	2.49	82	82	73	31.95	1.00
A-6	0.23	2.39	83	83	74	34.00	1.00
A-5	0.22	2.28	82	83	75	36.00	0.96
A-4	0.22	2.28	83	83	75	37.89	0.98
A-3	0.21	2.17	83	83	76	39.82	0.98
A-2	0.20	2.07	84	84	77	41.70	0.99
A-1	0.20	2.07	84	84	77	43.56	0.98
						45.40	

Sampling Data for - TEST 3

March 12/18

Pinnacle Pellet Lavington

Dryer 2 South Stack

Lavington, BC

SAMPLE POINT	VELOCITY HEAD ("H ₂ O)	ORIFICE PRESSURE ("H ₂ O)	DRY GAS METER		STACK GAS TEMP (° F)	GAS SAMPLE VOLUME (ft ³)	ISOKINETICS
			TEMP IN (° F)	TEMP OUT (° F)			
A-12	0.22	2.25	80	80	78	0.00	0.97
A-11	0.23	2.36	78	84	77	1.89	0.98
A-10	0.23	2.36	76	81	76	3.83	0.96
A-9	0.21	2.15	76	79	75	5.74	1.04
A-8	0.22	2.25	77	77	74	7.70	0.97
A-7	0.22	2.26	78	79	73	9.58	0.93
A-6	0.21	2.16	78	79	74	11.38	1.01
A-5	0.22	2.27	79	80	74	13.29	0.98
A-4	0.22	2.27	79	80	74	15.19	0.98
A-3	0.22	2.26	80	80	76	17.10	0.99
A-2	0.23	2.37	80	81	74	19.03	0.97
A-1	0.23	2.37	80	81	75	20.97	1.00
B-12	0.22	2.28	82	82	74	22.96	0.99
B-11	0.22	2.27	82	82	75	24.89	1.00
B-10	0.21	2.17	82	82	75	26.84	0.99
B-9	0.21	2.17	82	82	75	28.72	0.99
B-8	0.20	2.06	82	82	75	30.60	0.99
B-7	0.21	2.17	83	83	76	32.45	1.01
B-6	0.22	2.27	83	83	75	34.38	0.93
B-5	0.22	2.27	83	84	75	36.19	0.99
B-4	0.23	2.38	83	84	75	38.12	0.98
B-3	0.22	2.28	84	84	76	40.08	0.98
B-2	0.20	2.07	83	84	75	42.00	0.99
B-1	0.19	1.97	83	83	74	43.85	0.99
						45.66	



Pinnacle Pellet Lavington
Dryer 2 South Stack
Pinnacle Pellet Lavington

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 0.980

Delta P:	0.216 "H ₂ O	Us avg:	26.81 ft/sec
Delta H:	2.994	ACFM:	58988 ft ³ /min
Tm avg:	532.9 °R	SDCFM:	53840 ft ³ /min
Ts avg:	532.7 °R	Vm std:	42.36 ft ³
Bwo:	0.036	Vm corr:	44.38 ft ³
Md:	28.84	Vm:	44.59 ft ³
Ms:	28.45	MF:	0.9953
Pb:	28.60 "Hg	PCON:	4.84 mg/m ³
Pm:	28.82 "Hg	ERAT:	0.44 kg/hr
Ps:	28.59 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 0.981

Delta P:	0.214 "H ₂ O	Us avg:	26.72 ft/sec
Delta H:	2.215	ACFM:	58800 ft ³ /min
Tm avg:	539.9 °R	SDCFM:	53911 ft ³ /min
Ts avg:	533.8 °R	Vm std:	42.48 ft ³
Bwo:	0.030	Vm corr:	45.19 ft ³
Md:	28.84	Vm:	45.40 ft ³
Ms:	28.51	MF:	0.9953
Pb:	28.60 "Hg	PCON:	4.32 mg/m ³
Pm:	28.76 "Hg	ERAT:	0.40 kg/hr
Ps:	28.59 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.983

Delta P:	0.217 "H ₂ O	Us avg:	26.93 ft/sec
Delta H:	2.237	ACFM:	59252 ft ³ /min
Tm avg:	541.0 °R	SDCFM:	54031 ft ³ /min
Ts avg:	535.0 °R	Vm std:	42.64 ft ³
Bwo:	0.033	Vm corr:	45.45 ft ³
Md:	28.84	Vm:	45.66 ft ³
Ms:	28.48	MF:	0.9953
Pb:	28.60 "Hg	PCON:	5.38 mg/m ³
Pm:	28.76 "Hg	ERAT:	0.49 kg/hr
Ps:	28.59 "Hg		

Air Emission Monitoring Procedure

Particulate Sampling (Napp-Baldwin Model 31 Sampler)

Particulate sampling and gas velocity measurements were conducted using a Napp-Baldwin Model 31 stack sampler in accordance with the methods specified in EPA Method 5 (See Figure 1).

The air discharge was sampled isokinetically at the centroid of a series of equal area segments across the duct or stack. The stack gas velocity and temperature was recorded during the sample collection period with a calibrated pitot tube and thermocouple mounted on the sampling probe. The sample was delivered from the probe to a cyclone and a filter holder containing a 110mm Type A glass fiber filter. The gas sample was then drawn in through a series of four glass impingers which condensed and absorbed the water from the gas. A leakless vacuum pump carried the sampled gas through a dry gas test meter where the volume, temperature, and pressure were measured; and finally through a flow indicating orifice which allowed for the rapid adjustment to isokinetic sampling rates.

At the end of each test, the probe interior, cyclone and connecting tubing from the probe to the filter housing were rinsed with distilled water and acetone. These washings were evaporated to dryness and the resulting solids were weighed. The weight of the cyclone flask and the filter was used together with the weight of solids in the washings to calculate the particulate concentration. The moisture content of the stack gas was determined from the quantity of water condensed in the impingers and absorbed in the silica gel.

O₂, CO₂, CO (where applicable)

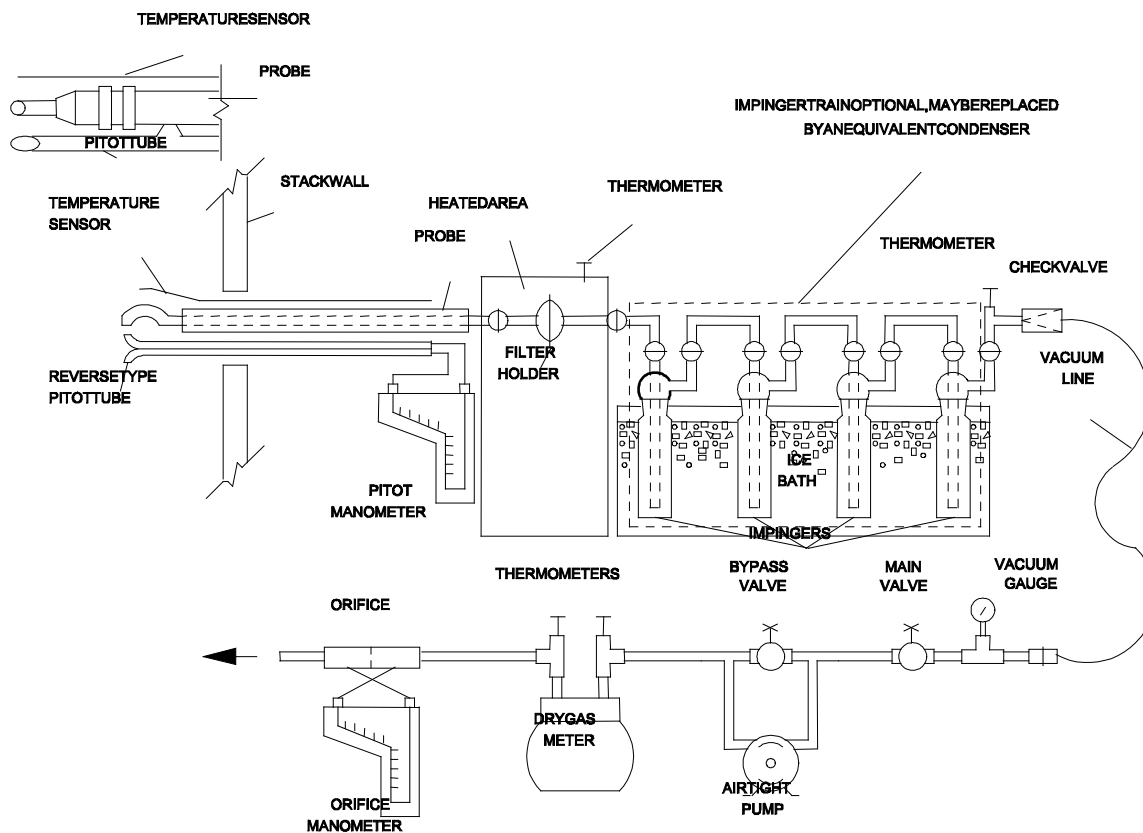
O₂, CO₂, and CO were found using either Fuji Analytical Analyzer by means of infrared and paramagnetic technology (EPA 3A) or by fyrite (EPA Method 3).

NO_x (where applicable)

NO_x was found using an API Model 252 NO_x analyzer that utilizes chemiluminescent technology. Stack gas samples were taken over a minimum period of three hours.

VOC's (where applicable)

Hydrocarbons were measured in accordance with EPA method 25A. Samples were drawn in one hour test runs using a total hydrocarbon analyzer that utilizes Flame Ionization Technology.



EPA Method 5 Diagram- Figure 1

CALCULATIONS

Carry out calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after the final calculation. Other forms of the equations may be used as long as they give equivalent results.

Nomenclature.

- A_n = Cross-sectional area of nozzle, m^2 (ft^2).
 B_{ws} = Water vapor in the gas stream, proportion by volume.
 C_a = Acetone blank residue concentration, mg/g .
 c_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, $g/dscf$ ($g/dscf$).
 I = Percent of isokinetic sampling.
 L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to $0.00057 m^3/min$ ($0.02 cfm$) or 4 percent of the average sampling rate, whichever is less.
 L_i = Individual leakage rate observed during the leak check conducted prior to the " i^{th} " component change ($i = 1, 2, 3...n$), m^3/min (cfm).
 L_p = Leakage rate observed during the post-test leak check, m^3/min (cfm).
 m_a = Mass of residue of acetone after evaporation, mg .
 m_n = Total amount of particulate matter collected, mg .
 M_w = Molecular weight of water, $18.0 g/g\text{-mole}$ ($18.0 lb/lb\text{-mole}$).
 P_{bar} = Barometric pressure at the sampling site, $mm\ Hg$ ($in.\ Hg$).
 P_s = Absolute stack gas pressure, $mm\ Hg$ ($in.\ Hg$).
 P_{std} = Standard absolute pressure, $760\ mm\ Hg$ ($29.92\ in.\ Hg$).
 R = Ideal gas constant, $0.06236 \frac{[(mmHg)(m^3)]}{[(^{\circ}K)(g\text{-mole})]}$
 $\{21.85 \frac{[(in.\ Hg)(ft^3)]}{[(^{\circ}R)(lb\text{-mole})]}\}$.
 T_m = Absolute average DGM temperature (see Figure 5-2), $^{\circ}K$ ($^{\circ}R$).
 T_s = Absolute average stack gas temperature (see Figure 5-2), $^{\circ}K$ ($^{\circ}R$).
 T_{std} = Standard absolute temperature, $293^{\circ}K$ ($528^{\circ}R$).
 V_a = Volume of acetone blank, ml .
 V_{aw} = Volume of acetone used in wash, ml .
 V_{lc} = Total volume liquid collected in impingers and silica gel (see Figure 5-3), ml .
 V_m = Volume of gas sample as measured by dry gas meter, dcm (dcf).
 $V_{m(std)}$ = Volume of gas sample measured by the dry gas meter, corrected to standard conditions, $dscm$ ($dscf$).
 $V_{w(std)}$ = Volume of water vapor in the gas sample, corrected to standard conditions, scm (scf).
 v_s = Stack gas velocity, calculated by Method 2, Equation 2-9, using data obtained from Method 5, m/sec (ft/sec).
 W_a = Weight of residue in acetone wash, mg .
 Y = Dry gas meter calibration factor.
 ΔH = Average pressure differential across the orifice meter (see Figure 5-2), $mm\ H_2O$ ($in.\ H_2O$).
 ρ_a = Density of acetone, mg/ml (see label on bottle).
 ρ_w = Density of water, $0.9982\ g/ml$ ($0.002201\ lb/ml$).
 θ = Total sampling time, min .
 θ_1 = Sampling time interval, from the beginning of a run until the first component change, min .
 θ_i = Sampling time interval, between two successive component changes, beginning with the interval between the first and second changes, min .
 θ_p = Sampling time interval, from the final (n^{th}) component change until the end of the sampling run, min .
 13.6 = Specific gravity of mercury.
 60 = Sec/min .
 100 = Conversion to percent.

Average Dry Gas Meter Temperature and Average Orifice Pressure Drop.

Dry Gas Volume. Correct the sample volume measured by the dry gas meter to standard conditions (20°C, 760 mm Hg or 68°F, 29.92 in. Hg) by using Equation 5-1.

$$V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m} \right) \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}} \right]$$

$$= K_1 V_m Y \frac{P_{bar} + \left(\frac{\Delta H}{13.6} \right)}{T_m}$$
Eq. 5-1

where:

$$K_1 = 0.3858 \text{ } ^\circ\text{K/mm Hg for metric units,}$$

$$= 17.64 \text{ } ^\circ\text{R/in. Hg for English units.}$$

NOTE: Equation 5-1 can be used as written unless leakage rate observed during any of the mandatory leak checks (i.e., the post-test leak check or leak checks conducted prior to component changes) exceeds L_a . If L_p or L_i exceeds L_a , Equation 5-1 must be modified as follows:

(a) Case I. No component changes made during sampling run. In this case, replace V_m in Equation 5-1 with the expression:

$$[V_m - (L_p - L_a) \theta]$$

(b) Case II. One or more component changes made during the sampling run. In this case, replace V_m in Equation 5-1 by the expression:

$$\left[V_m - (L_1 - L_a) \theta_1 - \sum_{i=2}^n (L_i - L_a) \theta_i - (L_p - L_a) \theta_p \right]$$

and substitute only for those leakage rates (L_i or L_p) which exceed L_a .

Volume of Water Vapor.

$$V_{w(std)} = \frac{V_{lc} \rho_w R T_{std}}{M_w P_{std}} = K_2 V_{lc}$$
Eq. 5-2

where:

$$K_2 = 0.001333 \text{ m}^3/\text{ml for metric units,}$$

$$= 0.04707 \text{ ft}^3/\text{ml for English units.}$$

Moisture Content.

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}} \quad \text{Eq. 5-3}$$

Acetone Blank Concentration.

$$C_a = \frac{m_a}{V_a \rho_a} \quad \text{Eq. 5-4}$$

Acetone Wash Blank.

$$W_a = C_a V_{aw} \rho_a \quad \text{Eq. 5-5}$$

Total Particulate Weight. Determine the total particulate matter catch from the sum of the weights obtained from Containers 1 and 2 less the acetone blank (see Figure 5-3).

Particulate Concentration.

$$C_s = (0.001 \text{ g/mg})(m_n / V_{m(std)}) \quad \text{Eq. 5-6}$$

Conversion Factors:

<u>From</u>	<u>To</u>	<u>Multiply by</u>
scf	m ³	0.02832
g/ft ³	gr/ft ³	15.43
g/ft ³	lb/ft ³	2.205 x 10 ⁻³
g/ft ³	g/m ³	35.31

Isokinetic Variation.**Calculation from Raw Data.**

$$I = \frac{100 T_s [K_3 V_{1c} + (V_m Y / T_m)(P_{bar} + \Delta H / 13.6)]}{60 \theta v_s P_s A_n} \quad \text{Eq. 5-7}$$

where:

$$\begin{aligned}
 K_3 &= 0.003454 [(\text{mm Hg})(\text{m}^3)]/[(\text{ml})(^\circ\text{K})] \text{ for metric units,} \\
 &= 0.002669 [(\text{in. Hg})(\text{ft}^3)]/[(\text{ml})(^\circ\text{R})] \text{ for English units.}
 \end{aligned}$$

Calculation from Intermediate Values.

$$I = \frac{100 T_s V_{m(std)} P_{std}}{60 T_{std} v_s \theta A_n P_s (1 - B_{ws})}$$

$$= \frac{K_4 T_s V_{m(std)}}{P_s v_s A_n \theta (1 - B_{ws})}$$
Eq.5-8

where:

$K_4 = 4.320$ for metric units,

$= 0.09450$ for English units.

Acceptable Results. If 90 percent $\leq I \leq 110$ percent, the results are acceptable. If the PM results are low in comparison to the standard, and "I" is over 110 percent or less than 90 percent, the Administrator may opt to accept the results. Citation 4 in the Bibliography may be used to make acceptability judgments. If "I" is judged to unacceptable, reject the results, and repeat the test.

Average Stack Gas Velocity.

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

Average Stack Gas Dry Volumetric Flow Rate.

$$Q_{sd} = 3,600(1 - B_{ws}) v_s A \frac{T_{std}}{T_{s(avg)}} \frac{P_s}{P_{std}}$$

where:

A	=	Cross-sectional area of stack, m^2 (ft^2).
B_{ws}	=	Water vapor in the gas stream (from Method 5 or Reference Method 4), proportion by volume.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Pitot tube constant,
M_d	=	Molecular weight of stack gas, dry basis (see Section 3.6), g/gmole (lb/lb-mole).
M_s	=	Molecular weight of stack gas, wet basis, g/g-mole (lb/lb-mole).

$$= M_d (1 - B_{ws}) + 18.0 B_{ws}$$
Eq. 2-5

P_{bar}	=	Barometric pressure at measurement site, mm Hg (in. Hg).
P_g	=	Stack static pressure, mm Hg (in. Hg).
P_s	=	Absolute stack pressure, mm Hg (in. Hg),

$$= P_{bar} + P_g$$

P_{std}	=	Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dsm^3/hr ($dscf/hr$).
t_s	=	Stack temperature, $^{\circ}C$ ($^{\circ}F$).
T_s	=	Absolute stack temperature, $^{\circ}K$ ($^{\circ}R$).

**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: Jan 10/18

CONSOLE MANUF.: NAPP/MILLENNIUM MODEL 32

CONSOLE I.D.: MU 1013

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	63.0	63.0	63.0
P=Pres. Differential at WTM ("Hg)	0.0603	0.1214	0.1692
Pb= Atmospheric Pressure ("Hg)	27.95	27.95	27.95
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.5799	0.5799	0.5799
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	76.0	76.0	81.0
To= Dry Test Meter Outlet Temp. (oF.)	74.0	74.0	80.0
Ri= Initial Dry Test volume (ft3)	0.00	0.00	0.00
Rf= Final Dry Test Volume (ft3)	5.00	4.94	4.95
Vi= Initial Wet Test Volume (ft3)	0.0	0.0	0.0
Vf= Final Wet Test Volume (ft3)	5.000	5.000	5.000
Pw= Pb - (^P/13.59) "Hg	27.8897	27.8286	27.7808
Pd= Pb + (^H/13.59) "Hg	28.0236	28.0972	28.1708
Tw= Ta +460 (oR.)	523.0	523.0	523.0
Td= [(Ti + To)/2] + 460 (oR.)	535.0	535.0	540.5
Bw= Pv/Pb ("Hg)	0.0207	0.0207	0.0207
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	0.9892	0.9964	1.0002
Y (MEAN)(WTMF) =	0.9953		

N.R. MCCALL & ASSOCIATES LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: Jan 10/18

CONSOLE I.D. MU 1013

	RUN 1	RUN 2	RUN 3
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	27.95	27.95	27.95
Y=gas meter factor	0.9892	0.9892	0.9964
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	1.85	2.65	3.25
min. samp	5	5	5
$Qm=Y(Rf-Ri)/^{\wedge}T(FT3/MIN)$	0.366004	0.524276	0.64766
To=meter outlet Temp (oF)	83	82	83
Tm=meter out temp. (oR)	543	542	543
$Pm=Pb + ^{\wedge}H$	27.986792	28.0235835	28.0603753
$SQRT(Tm/Pm*H/Md)$	0.5787042	0.81712039	1.00102989
Ko=orifice const.	0.6324544	0.64161414	0.64699366

Ko MEAN = 0.6403541

$Ko*4*144=$ 368.84395

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: Jan 10/18

CONSOLE I.D. MU 1013

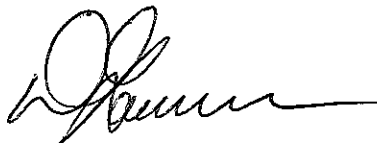
	RUN 4	RUN 5	RUN 6
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	27.95	27.95	27.95
Y=gas meter factor	0.9964	1.0002	1.0002
Delta H=	2	2.5	3
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	3.76	4.18	4.62
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \Delta T (FT^3 / MIN)$	0.7492928	0.8361672	0.9241848
To=meter outlet Temp (oF)	86	86	84
Tm=meter out temp. (oR)	546	546	544
$P_m = P_b + \Delta H$	28.097167	28.1339588	28.1707506
$SQRT(T_m / P_m * H / M_d)$	1.1583193	1.29419329	1.41419438
Ko=orifice const.	0.6468793	0.64609144	0.6535062

Ko MEAN = 0.6488257

$Ko * 4 * 144 = 373.72358$

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: Jan 9/18

CONSOLE MANUF.: NAPP/MILLENNIUM MODEL 32

CONSOLE I.D.: MU 1012

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	65.0	65.0	65.0
P=Pres. Differential at WTM ("Hg)	0.0846	0.1692	0.2355
Pb= Atmospheric Pressure ("Hg)	28.20	28.20	28.20
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6219	0.6219	0.6219
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	78.0	75.0	80.0
To= Dry Test Meter Outlet Temp. (oF.)	77.0	74.0	79.0
Ri= Initial Dry Test volume (ft3)	0.00	0.00	0.00
Rf= Final Dry Test Volume (ft3)	4.98	4.80	4.90
Vi= Initial Wet Test Volume (ft3)	0.0	0.0	0.0
Vf= Final Wet Test Volume (ft3)	5.000	5.000	5.000
Pw= Pb - (^P/13.59) "Hg	28.1154	28.0308	27.9645
Pd= Pb + (^H/13.59) "Hg	28.2736	28.3472	28.4208
Tw= Ta +460 (oR.)	525.0	525.0	525.0
Td= [(Ti + To)/2] + 460 (oR.)	537.5	534.5	539.5
Bw= Pv/Pb ("Hg)	0.0221	0.0221	0.0221
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	0.9918	1.0176	1.0011
Y (MEAN)(WTMF) =	1.0035		

N.R. MCCALL & ASSOCIATES LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: Jan 9/18

CONSOLE I.D. MU 1012

	RUN 1	RUN 2	RUN 3
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.2	28.05	28.05
Y=gas meter factor	0.9918	0.9918	1.0176
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	2.13	3.11	3.84
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \Delta T (FT^3 / MIN)$	0.4225068	0.6168996	0.7815168
To=meter outlet Temp (oF)	80	81	81
Tm=meter out temp. (oR)	540	541	541
$P_m = P_b + \Delta H$	28.236792	28.1235835	28.1603753
$SQRT(T_m / P_m * H / M_d)$	0.5745429	0.81491356	0.997409
Ko=orifice const.	0.7353791	0.75701232	0.78354697

Ko MEAN = 0.7586461

$Ko^4 * 144 = 436.98016$

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: Jan 9/18

CONSOLE I.D. MU 1012

	RUN 4	RUN 5	RUN 6
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.2	28.2	28.2
Y=gas meter factor	1.0176	1.0011	1.0011
Delta H=	2	2.5	3
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	4.48	5.04	5.46
min. samp	5	5	5
$Qm=Y(Rf-Ri)/^{\wedge}T(FT3/MIN)$	0.9117696	1.0091088	1.0932012
To=meter outlet Temp (oF)	82	83	84
Tm=meter out temp. (oR)	542	543	544
$Pm=Pb + ^{\wedge}H$	28.347167	28.3839588	28.4207506
$SQRT(Tm/Pm*H/Md)$	1.1489683	1.28493653	1.40796074
Ko=orifice const.	0.793555	0.78533747	0.77644295

Ko MEAN = 0.7851118

$Ko*4*144=$ 452.22441

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.8
Pitot I.D.: **14** *Wind Tunnel Temperature (^o F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
12.29	0.03427	0.04839	0.83312
19.68	0.08793	0.12608	0.82678
39.42	0.35272	0.51508	0.81923
63.06	0.90269	1.26316	0.83690
81.38	1.50344	2.11714	0.83426
103.58	2.43563	3.34104	0.84528

Average= 0.83260

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.8
Pitot I.D.: **15** *Wind Tunnel Temperature (^o F):* 67.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
12.95	0.03837	0.05383	0.83580
25.27	0.14607	0.21112	0.82348
54.86	0.68828	0.98426	0.82787
76.96	1.35481	1.90537	0.83480
93.23	1.98821	2.76796	0.83905
133.65	4.08556	5.61440	0.84452

Average= 0.83425

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.85
Pitot I.D.: **148** *Wind Tunnel Temperature (^o F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
13.69	0.04262	0.06065	0.82988
19.13	0.08321	0.11798	0.83141
41.58	0.39311	0.56173	0.82819
63.08	0.90476	1.26630	0.83683
81.24	1.50057	2.07940	0.84100
99.32	2.24318	3.18588	0.83072

Average= 0.83300

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.85
Pitot I.D.: **242** *Wind Tunnel Temperature (° F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
12.71	0.03676	0.05091	0.84120
19.02	0.08230	0.11495	0.83765
41.06	0.38343	0.53104	0.84123
62.85	0.89820	1.20776	0.85375
82.67	1.55395	2.11982	0.84763
103.76	2.44808	3.49980	0.82799

Average= 0.84158

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 Barometric Pressure ("Hg): 29.83

Pitot I.D.: **248** Wind Tunnel Temperature ($^{\circ}$ F): 71.0

Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
12.49	0.03545	0.04995	0.83396
19.92	0.09017	0.12459	0.84223
40.44	0.37165	0.53192	0.82753
62.76	0.89496	1.25108	0.83732
81.58	1.51225	2.12472	0.83521
103.80	2.44834	3.47904	0.83050

Average= 0.83446

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.85
Pitot I.D.: **270** *Wind Tunnel Temperature (^o F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
12.13	0.03343	0.04760	0.82969
20.29	0.09360	0.13172	0.83456
41.06	0.38326	0.53622	0.83697
63.48	0.91627	1.24964	0.84772
82.85	1.56068	2.12276	0.84887
103.39	2.43039	3.30182	0.84937

Average= 0.84120

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.85
Pitot I.D.: **286** *Wind Tunnel Temperature (^o F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
11.99	0.03270	0.04571	0.83735
19.99	0.09088	0.12640	0.83946
41.41	0.38986	0.53259	0.84701
62.08	0.87628	1.19016	0.84948
81.76	1.52008	2.05643	0.85116
102.44	2.38606	3.23704	0.84997

Average= 0.84574

Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

Calibration Certificate for S-Type Pitot Tube

Date: Jan 11/18 *Barometric Pressure ("Hg):* 29.85
Pitot I.D.: **294** *Wind Tunnel Temperature (^o F):* 71.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
12.28	0.03431	0.04849	0.83276
20.62	0.09665	0.13581	0.83517
40.72	0.37711	0.51819	0.84455
63.63	0.92067	1.25359	0.84842
81.73	1.51873	2.06836	0.84833
103.07	2.41538	3.28817	0.84850

Average= 0.84295

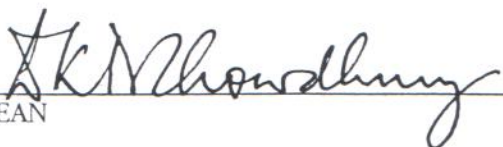
Note: The new pitot tip should be installed so that the serial number engraved is aligned directly into the gas stream.

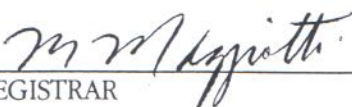


This is to verify that
Matthew McCall
has successfully completed
a course of study in
Source Testing for Particulates
(35 hours)

Endorsed by
The B.C. Ministry of Environment

Dated at Burnaby, British Columbia, Canada
December 14, 1990


DEAN


REGISTRAR

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY



North Carolina State University Environmental Programs

This certificate awarded to

Danny Lawrence

for satisfactory completion of course and examination for

SI: 414 Quality Assurance for Source Emission Measurements

Joe F. VanArsdale
Manager

Christine S. Murphy
Registrar

May 22, 2000

Date Completed

3.5 CEUs

Awarded under EPA Assistance Agreement CT - 825724



Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5 Attn: Accounts Payable Sampled By: Company:	Project ID: Pinnacle Pellet Project Name: Project Location: Lavington, BC LSD: P.O.: Proj. Acct. code:	Lot ID: 1259301 Control Number: C0066920 Date Received: Mar 14, 2018 Date Reported: Mar 16, 2018 Report Number: 2270459
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		Reference Number	1259301-1	1259301-2	1259301-3
		Sample Date	Mar 09, 2018	Mar 09, 2018	Mar 09, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Dryer 1 / North Stack Test 1 / 15 °C	Dryer 1 / North Stack Test 2 / 15 °C	Dryer 1 / North Stack Test 3 / 15 °C
		Matrix	Water	Water	Water
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	4	4	4
Volume	Sample volume	mL	310	310	320
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To:	McCall Environmental	Project ID:	Pinnacle Pellet	Lot ID:	1259301
	6733 Buchanan Road	Project Name:		Control Number:	C0066920
	Coldstream, BC, Canada	Project Location:	Lavington, BC	Date Received:	Mar 14, 2018
	V1B 3C5	LSD:		Date Reported:	Mar 16, 2018
Attn:	Accounts Payable	P.O.:		Report Number:	2270459
Sampled By:		Proj. Acct. code:			
Company:					

		Reference Number	1259301-4	1259301-5	1259301-6	Nominal Detection Limit	
		Sample Date	Mar 09, 2018	Mar 09, 2018	Mar 09, 2018		
		Sample Time	NA	NA	NA		
		Sample Location					
		Sample Description	Dryer 1 / South Stack Test 1 / 15 °C	Dryer 1 / South Stack Test 2 / 15 °C	Dryer 1 / South Stack Test 3 / 15 °C		
		Matrix	Water	Water	Water	Nominal Detection Limit	
Analyte		Units	Results	Results	Results		
Aggregate Organic Constituents							
Oil and Grease	Total	mg/sample	2	2	4		
Volume	Sample volume	mL	310	330	320		
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes		

Approved by: 
Mathieu Simoneau
Operations Manager

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5 Attn: Accounts Payable Sampled By: Company:	Project ID: Pinnacle Pellet Project Name: Project Location: Lavington, BC LSD: P.O.: Proj. Acct. code:	Lot ID: 1259296 Control Number: C0066921 Date Received: Mar 14, 2018 Date Reported: Mar 16, 2018 Report Number: 2270453
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		Reference Number	1259296-1	1259296-2	1259296-3
		Sample Date	Mar 12, 2018	Mar 12, 2018	Mar 12, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Dryer 2 / North Stack Test 1 / 16 °C	Dryer 2 / North Stack Test 2 / 16 °C	Dryer 2 / North Stack Test 3 / 16 °C
		Matrix	Water	Water	Water
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	2	3	3
Volume	Sample volume	mL	320	330	320
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To:	McCall Environmental	Project ID:	Pinnacle Pellet	Lot ID:	1259296
	6733 Buchanan Road	Project Name:		Control Number:	C0066921
	Coldstream, BC, Canada	Project Location:	Lavington, BC	Date Received:	Mar 14, 2018
	V1B 3C5	LSD:		Date Reported:	Mar 16, 2018
Attn:	Accounts Payable	P.O.:		Report Number:	2270453
Sampled By:		Proj. Acct. code:			
Company:					

		Reference Number	1259296-4	1259296-5	1259296-6	
		Sample Date	Mar 12, 2018	Mar 12, 2018	Mar 12, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Dryer 2 / South Stack Test 1 / 16 °C	Dryer 2 / South Stack Test 2 / 16 °C	Dryer 2 / South Stack Test 3 / 16 °C	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Oil and Grease	Total	mg/sample	3	3	2	2
Volume	Sample volume	mL	320	320	320	
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes	

Approved by: 
Mathieu Simoneau
Operations Manager

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Dryer #1

- i. Average hourly dryer ODt for the biomass dryer system for the previous month;
9.7 ODT/hr
- ii. 90th percentile hourly ODt throughput for the biomass dryer (Section 4.3);
11.5 ODT/hr
- iii. Average hourly throughput ODt for the biomass dryer system during stack testing;
12.6 ODT/hr

Dryer #2

- i. Average hourly dryer ODt for the biomass dryer system for the previous month;
11.4 ODT/hr
- ii. 90th percentile hourly ODt throughput for the biomass dryer (Section 4.3);
13.5 ODT/hr
- iii. Average hourly throughput ODt for the biomass dryer system during stack testing;
12.7 ODT/hr