



September 1, 2021

Pinnacle Pellet Inc.
1160 South Lakeside Dr.
Williams Lake, B.C.
V2J 6K9

Attention: Mr. Bill Carson/Evangeline Saclamacis

Reference: Revision of Cyclofilter From July 10, 2020

This letter is being added 'in front of' the revised report being issued for the July 2020 testing that took place at the Williams Lake facility.

An error was found in the mass emission calculation for the cyclofilter stack. This unit is the 'kg/hr' mass emission calc. It is not a permitted value and does not affect compliance or noncompliance. It is used for modeling purposes and for NPRI reporting.

Page 3 the 'Summary Tables' of the report has been replaced with a revised summary table for the stack. Also, page 28 the detailed Cyclofilter Average of Air Emissions has been replaced.

The remainder of the report has been left unchanged.

If you have any questions or concerns please feel free to contact us at your earliest convenience.

Sincerely,

MCCALL ENVIRONMENTAL

Matt McCall

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August 19, 2020

Pinnacle Pellet Inc.
1160 South Lakeside Dr.
Williams Lake, B.C.
V2J 6K9

Attention: Mr. Bill Carson

Reference: Parameters Tested – Total Particulate & Cond. Organics
Test Date(s) – July 9-10, 2020
Permit – PA-17557
McCall File Number – ME2021-050

As requested our firm has performed a series of air emission tests at your facility in Williams Lake BC.

Testing Parameters

Dryer Stacks 1-4

- Total Particulate and Condensable Organics State of Oregon Method

Cyclofilter Stack

- Total Particulate and Condensable Organics State of Oregon Method

Key Personnel

- Report Generation: Matt McCall 250-542-5118
- Sr Field Tech: David Brandle 250-564-9106
- Field Tech: Nick Angus 250-564-9106
- Plant Personnel: Bill Carson 250-267-7580

All stacks have been examined for cyclonic flow and determined to be tested as laminar in nature.

Test results are summarized immediately following this cover letter.

Lab analysis for condensable organic fractions was carried out by Element Labs in Surrey, B.C. A copy of their report is included in the Appendix of this report.

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

MCCALL ENVIRONMENTAL

Matt McCall

Summary of Test Results

Dryer Results July 9, 2020

Total Particulate		Average of Triplicate Tests				
Parameter	Stack 1	Stack2	Stack 3	Stack 4	Average/Total	Permit
Test Date	9-Jul-20	9-Jul-20	9-Jul-20	9-Jul-20	N/A	
Gas Temperature (°C)	29.0	32.1	28.5	33.1	30.7	
% Moisture	1.78	2.35	1.77	3.02	2.23	
Velocity (m/sec)	8.79	8.93	8.68	8.27	8.67	
ACFM	54532	55359	53843	51300	215034	
Std. Dry Flow Rate (m³/sec)	23.04	23.01	22.78	21.10	89.93	90.00
Tot Part. Dry Basis ref. Cond. (mg/m³)	9.18	5.96	11.14	19.49	11.44	15.00
Front Half Particulate (mg/m³)	3.62	3.49	9.58	16.71	8.35	
Back Half Condensibles (mg/m³)	5.56	2.47	1.56	2.78	3.09	
Mass Emission Rate (kg/hr)	0.76	0.49	0.91	1.48	3.65	

Cyclofilter Stack July 10, 2020

Particulate Results					
Parameter	Test 1	Test 2	Test 3	Average	Permit
Start Time	8:07	9:14	10:24	N/A	
Stop Time	9:08	10:16	11:24	N/A	
Gas Temperature (°C)	33.0	38.0	38.0	36.3	
% Moisture	1.4	2.7	2.8	2.3	
Velocity (m/sec)	17.82	18.14	18.35	18.10	
ACFM	68862	70089	70914	69955	
Std. Dry Flow Rate (m³/sec)	28.95	28.63	28.93	28.84	34.00
Oxygen in % (dry basis)	21.00	21.00	21.00	21.00	
Carbon Dioxide % (dry basis)	0.00	0.00	0.00	0.00	
Tot Part. Dry Basis ref. Cond. (mg/m³)	2.69	2.61	2.14	2.48	10.00
Front Half Filterable Particulate (mg/m³)	1.01	0.93	0.43	0.79	
Back Half Cond. Organics (mg/m³)	1.68	1.69	1.72	1.69	
Mass Emission Rate (kg/hr)	0.28	0.27	0.22	0.26	



**Pinnacle Pellet
Dryer Stack 1
Williams Lake**

9-Jul-20

Permit Number: RA-17557

AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	84 ° F	29 ° C
Moisture Content (by volume):	1.78 %	
Average Stack Gas Velocity:	28.9 ft/sec	8.8 m/sec
Total Actual Gas Flow Rate:	54532 ACFM	
Dry Gas flow Rate at Reference Conditions:	48827 SCFM	23.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.004 gr/ft ³	9.18 mg/m ³
Front Half Particulate	0.002 gr/ft ³	3.6 mg/m ³
Back Half Condensibles	0.002 gr/ft ³	5.6 mg/m ³
Mass Emission Rate	1.68 lbs/hr	0.76 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

Gas Temperature:	80 ° F	27 ° C
Moisture Content (by volume):	2.2 %	
Average Stack Gas Velocity:	28.7 ft/sec	8.8 m/sec
Total Actual Gas Flow Rate:	54290 ACFM	
Dry Gas flow Rate at Reference Conditions:	48791 SCFM	23.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.006 gr/ft ³	14.5 mg/m ³
Front Half Particulate	.002 gr/ft ³	5.3 mg/m ³
Back Half Condensibles	.004 gr/ft ³	9.2 mg/m ³
Mass Emission Rate	2.66 lbs/hr	1.20 kg/hr

TEST 2:

Gas Temperature:	89 ° F	32 ° C
Moisture Content (by volume):	1.5 %	
Average Stack Gas Velocity:	29.0 ft/sec	8.8 m/sec
Total Actual Gas Flow Rate:	54860 ACFM	
Dry Gas flow Rate at Reference Conditions:	48827 SCFM	23.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.7 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.9 mg/m ³
Back Half Condensibles	.002 gr/ft ³	3.8 mg/m ³
Mass Emission Rate	1.22 lbs/hr	0.55 kg/hr

TEST 3:

Gas Temperature:	84 ° F	29 ° C
Moisture Content (by volume):	1.6 %	
Average Stack Gas Velocity:	28.8 ft/sec	8.8 m/sec
Total Actual Gas Flow Rate:	54445 ACFM	
Dry Gas flow Rate at Reference Conditions:	48862 SCFM	23.1 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.3 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.6 mg/m ³
Back Half Condensibles	.002 gr/ft ³	3.7 mg/m ³
Mass Emission Rate	1.16 lbs/hr	0.53 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet
Plant Location: Williams Lake
Process: Dryer Stack 1
Permit Number: RA-17557
Job Number: ME2021-050
Pollution Control Permit: 15.0 mg/m³ 22.5 m³/sec
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	39	40	41
Date of Test:	9-Jul-20	9-Jul-20	9-Jul-20
Start Time:	10:40	11:55	13:10
Stop Time:	11:45	13:00	14:15
On-line Sampling Time:	60	60	60
Testing Personnel:	DL	DL	DL
Sampler Model:	1013	1013	1013
Barometric Pressure("Hg):	28.10	28.10	28.10
Static Pressure("H₂O):	0.15	0.15	0.15
%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):	0.275	0.275	0.275
Meter Factor:	0.9922	0.9922	0.9922
Type-S Pitot Tube Coefficient:	0.83446	0.83446	0.83446
Cross Sectional Area of Stack(ft²):	31.5	31.5	31.5
Impinger Condensate(g):	17	11	12
Weight of Moisture in Silica Gel(g):	1.5	1.0	1.5
Weight of Filter Particulate(g):	0.0029	0.0004	0.0004
Weight of Probe Washings(g):	0.0029	0.0027	0.0024
Weight of Impinger Content Organic(g):	0.0100	0.0040	0.0040
Total Weight of Particulate(g):	0.0158	0.0071	0.0068

Sampling Data for - **TEST 1**

9-Jul-20

Pinnacle Pellet
Dryer Stack 1
Williams Lake

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	0.33	2.03	54	54	76	0.00	0.97
A-11	0.30	1.87	59	58	74	1.88	0.99
A-10	0.29	1.80	58	57	73	3.73	0.99
A-9	0.28	1.74	59	58	74	5.55	1.01
A-8	0.28	1.82	60	59	75	7.38	0.99
A-7	0.25	1.56	66	61	78	9.18	1.04
A-6	0.23	1.44	66	62	76	10.97	1.02
A-5	0.21	1.32	70	64	78	12.67	1.02
A-4	0.19	1.20	70	66	77	14.29	1.03
A-3	0.18	1.43	73	68	79	15.86	0.98
A-2	0.18	1.14	73	69	79	17.31	0.96
A-1	0.19	1.20	76	71	81	18.74	0.94
B-12	0.32	2.04	78	74	81	20.18	1.00
B-11	0.31	1.97	78	74	81	22.16	1.01
B-10	0.30	1.90	78	74	81	24.14	1.03
B-9	0.27	1.71	78	75	82	26.13	1.07
B-8	0.26	1.61	78	75	83	28.08	1.06
B-7	0.27	1.68	78	75	83	29.98	1.06
B-6	0.25	1.58	76	77	85	31.91	1.01
B-5	0.23	1.45	76	77	85	33.68	0.94
B-4	0.20	1.26	76	77	82	35.27	0.97
B-3	0.19	1.21	88	86	83	36.80	0.96
B-2	0.18	1.16	88	87	84	38.30	0.98
B-1	0.17	1.10	88	88	84	39.80	1.01
						41.30	

Sampling Data for - **TEST 2**

9-Jul-20

Pinnacle Pellet
Dryer Stack 1
Williams Lake

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	0.32	2.04	90	90	92	0.00	0.96
B-11	0.33	2.12	86	90	87	1.96	0.94
B-10	0.30	1.91	84	85	87	3.90	0.98
B-9	0.28	1.79	85	86	85	5.81	1.03
B-8	0.29	1.85	85	86	87	7.76	0.92
B-7	0.26	1.66	86	86	87	9.54	1.01
B-6	0.24	1.53	86	88	87	11.38	1.00
B-5	0.20	1.28	88	88	89	13.15	1.07
B-4	0.21	1.34	88	89	88	14.87	0.94
B-3	0.20	1.28	88	89	89	16.42	0.99
B-2	0.17	1.09	89	89	89	18.01	1.06
B-1	0.17	1.09	89	89	89	19.58	0.96
A-12	0.35	2.18	89	89	89	21.01	0.93
A-11	0.31	1.98	89	91	89	22.98	0.95
A-10	0.29	1.86	92	91	88	24.88	0.98
A-9	0.29	1.86	92	92	88	26.79	0.97
A-8	0.27	1.73	92	93	91	28.68	1.01
A-7	0.25	1.61	93	93	88	30.57	0.97
A-6	0.23	1.48	92	93	91	32.33	1.03
A-5	0.21	1.35	92	93	91	34.11	0.99
A-4	0.22	1.41	92	93	91	35.75	1.00
A-3	0.19	1.22	92	93	92	37.45	1.01
A-2	0.17	1.09	94	94	94	39.05	0.96
A-1	0.16	1.02	94	93	91	40.48	0.94
						41.84	

Sampling Data for - *TEST 3*

9-Jul-20

Pinnacle Pellet

Dryer Stack 1

Williams Lake

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	0.33	2.20	91	92	89	0.00	0.98
A-11	0.32	2.15	87	93	83	2.04	1.01
A-10	0.28	1.88	87	88	80	4.10	0.95
A-9	0.28	1.88	89	90	80	5.92	0.97
A-8	0.26	1.75	89	89	80	7.79	1.00
A-7	0.24	1.62	91	91	82	9.64	0.97
A-6	0.21	1.41	90	90	81	11.36	0.98
A-5	0.21	1.41	91	91	82	12.99	0.97
A-4	0.2	1.35	91	92	82	14.60	0.98
A-3	0.18	1.22	94	94	83	16.19	1.03
A-2	0.18	1.27	93	94	82	17.78	0.98
A-1	0.17	1.15	94	95	83	19.30	0.99
B-12	0.34	2.30	96	96	84	20.80	0.97
B-11	0.33	2.23	96	96	84	22.87	1.00
B-10	0.29	1.64	98	99	83	24.96	1.02
B-9	0.29	1.97	100	100	86	26.99	0.96
B-8	0.27	1.84	100	100	84	28.90	0.99
B-7	0.26	1.78	101	101	84	30.79	0.97
B-6	0.25	1.70	101	102	87	32.62	1.02
B-5	0.21	1.43	100	102	86	34.49	1.07
B-4	0.21	1.43	102	103	88	36.29	0.99
B-3	0.19	1.30	101	102	85	37.97	1.00
B-2	0.19	1.30	103	103	85	39.58	0.98
B-1	0.18	1.23	102	102	85	41.17	0.97
						42.70	



Pinnacle Pellet
Dryer Stack 1
Pinnacle Pellet

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 1.002

Delta P:	0.242 "H ₂ O	Us avg:	28.73 ft/sec
Delta H:	1.551	ACFM:	54290 ft ³ /min
Tm avg:	531.5 °R	SDCFM:	48791 ft ³ /min
Ts avg:	539.8 °R	Vm std:	38.39 ft ³
Bwo:	0.022	Vm corr:	40.98 ft ³
Md:	28.84	Vm:	41.30 ft ³
Ms:	28.60	MF:	0.9922
Pb:	28.10 "Hg	PCON:	14.53 mg/m ³
Pm:	28.21 "Hg	ERAT:	1.20 kg/hr
Ps:	28.11 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 0.982

Delta P:	0.243 "H ₂ O	Us avg:	29.03 ft/sec
Delta H:	1.574	ACFM:	54860 ft ³ /min
Tm avg:	549.8 °R	SDCFM:	48827 ft ³ /min
Ts avg:	549.1 °R	Vm std:	37.60 ft ³
Bwo:	0.015	Vm corr:	41.51 ft ³
Md:	28.84	Vm:	41.84 ft ³
Ms:	28.68	MF:	0.9922
Pb:	28.10 "Hg	PCON:	6.67 mg/m ³
Pm:	28.22 "Hg	ERAT:	0.55 kg/hr
Ps:	28.11 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.990

Delta P:	0.242 "H ₂ O	Us avg:	28.81 ft/sec
Delta H:	1.643	ACFM:	54445 ft ³ /min
Tm avg:	555.7 °R	SDCFM:	48862 ft ³ /min
Ts avg:	543.7 °R	Vm std:	37.97 ft ³
Bwo:	0.016	Vm corr:	42.37 ft ³
Md:	28.84	Vm:	42.70 ft ³
Ms:	28.66	MF:	0.9922
Pb:	28.10 "Hg	PCON:	6.32 mg/m ³
Pm:	28.22 "Hg	ERAT:	0.53 kg/hr
Ps:	28.11 "Hg		



**Pinnacle Pellet
Dryer Stack 2
Williams Lake**

9-Jul-20

Permit Number: RA-17557

AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	90 ° F	32 ° C
Moisture Content (by volume):	2.35 %	
Average Stack Gas Velocity:	29.3 ft/sec	8.9 m/sec
Total Actual Gas Flow Rate:	55359 ACFM	
Dry Gas flow Rate at Reference Conditions:	48757 SCFM	23.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.003 gr/ft ³	5.96 mg/m ³
Front Half Particulate	0.002 gr/ft ³	3.5 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	2.5 mg/m ³
Mass Emission Rate	1.09 lbs/hr	0.49 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

Gas Temperature:	90 ° F	32 ° C
Moisture Content (by volume):	2.1 %	
Average Stack Gas Velocity:	28.9 ft/sec	8.8 m/sec
Total Actual Gas Flow Rate:	54666 ACFM	
Dry Gas flow Rate at Reference Conditions:	48187 SCFM	22.7 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	2.5 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.8 mg/m ³
Mass Emission Rate	0.97 lbs/hr	0.44 kg/hr

TEST 2:

Gas Temperature:	86 ° F	30 ° C
Moisture Content (by volume):	2.6 %	
Average Stack Gas Velocity:	29.6 ft/sec	9.0 m/sec
Total Actual Gas Flow Rate:	55942 ACFM	
Dry Gas flow Rate at Reference Conditions:	49469 SCFM	23.3 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.0 mg/m ³
Front Half Particulate	.001 gr/ft ³	3.3 mg/m ³
Back Half Condensibles	.001 gr/ft ³	2.7 mg/m ³
Mass Emission Rate	1.11 lbs/hr	0.50 kg/hr

TEST 3:

Gas Temperature:	93 ° F	34 ° C
Moisture Content (by volume):	2.3 %	
Average Stack Gas Velocity:	29.3 ft/sec	8.9 m/sec
Total Actual Gas Flow Rate:	55468 ACFM	
Dry Gas flow Rate at Reference Conditions:	48613 SCFM	22.9 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.5 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	1.19 lbs/hr	0.54 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet
Plant Location: Williams Lake
Process: Dryer Stack 2
Permit Number: RA-17557
Job Number: ME2021-050
Pollution Control Permit: 15.0 mg/m³ 22.5 m³/sec
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	42	43	44
Date of Test:	9-Jul-20	9-Jul-20	9-Jul-20
Start Time:	14:45	16:12	17:30
Stop Time:	15:50	17:18	18:35
On-line Sampling Time:	60	60	60
Testing Personnel:	DL	DL	DL
Sampler Model:	1013	1013	1013
Barometric Pressure("Hg):	28.10	28.10	28.10
Static Pressure("H₂O):	-0.09	-0.09	-0.09
%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):	0.275	0.275	0.275
Meter Factor:	0.9922	0.9922	0.9922
Type-S Pitot Tube Coefficient:	0.83446	0.83446	0.83446
Cross Sectional Area of Stack(ft²):	31.5	31.5	31.5
Impinger Condensate(g):	16	21	18
Weight of Moisture in Silica Gel(g):	1.5	1.0	1.0
Weight of Filter Particulate(g):	0.0003	0.0003	0.0005
Weight of Probe Washings(g):	0.0024	0.0033	0.0045
Weight of Impinger Content Organic(g):	0.0030	0.0030	0.0020
Total Weight of Particulate(g):	0.0057	0.0066	0.0070

Sampling Data for - **TEST 1**

9-Jul-20

Pinnacle Pellet
Dryer Stack 2
Williams Lake

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	0.32	2.08	85	85	90	0.00	1.02
A-11	0.32	2.10	83	86	89	2.04	0.97
A-10	0.30	2.25	83	87	87	3.99	1.04
A-9	0.31	2.05	86	85	87	6.01	1.03
A-8	0.30	1.98	86	86	89	8.06	1.02
A-7	0.24	1.58	88	87	89	10.05	1.06
A-6	0.22	1.45	88	87	87	11.91	1.01
A-5	0.21	1.39	89	88	90	13.60	1.05
A-4	0.19	1.26	89	89	89	15.32	1.00
A-3	0.18	1.19	90	90	90	16.89	0.93
A-2	0.17	1.12	90	90	91	18.30	0.99
A-1	0.16	1.06	91	91	93	19.76	1.01
B-12	0.33	2.18	91	91	92	21.21	0.95
B-11	0.33	2.18	91	91	92	23.16	0.99
B-10	0.35	2.34	96	97	91	25.20	1.00
B-9	0.30	2.00	95	95	91	27.34	0.98
B-8	0.26	1.74	98	97	91	29.28	0.99
B-7	0.24	1.61	97	97	90	31.12	0.97
B-6	0.21	1.41	99	98	91	32.84	1.02
B-5	0.22	1.48	99	99	91	34.54	0.97
B-4	0.20	1.35	100	100	91	36.19	0.98
B-3	0.18	1.20	100	100	94	37.79	0.96
B-2	0.16	1.08	101	101	92	39.28	0.96
B-1	0.16	1.08	101	102	92	40.69	0.95
						42.08	

Sampling Data for - **TEST 2**

9-Jul-20

Pinnacle Pellet
Dryer Stack 2
Williams Lake

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	0.33	2.23	102	101	90	0.00	0.99
B-11	0.34	2.30	97	99	86	2.06	0.99
B-10	0.32	2.17	96	100	85	4.15	1.00
B-9	0.30	2.03	95	97	84	6.20	1.00
B-8	0.31	2.10	97	98	84	8.19	0.97
B-7	0.27	1.83	96	96	82	10.15	1.00
B-6	0.25	1.70	97	98	83	12.04	1.02
B-5	0.21	1.43	97	96	83	13.89	1.06
B-4	0.22	1.50	99	100	85	15.65	1.00
B-3	0.19	1.29	100	100	86	17.36	1.06
B-2	0.18	1.22	98	99	85	19.05	1.03
B-1	0.18	1.23	99	100	84	20.65	1.00
A-12	0.34	2.30	100	101	88	22.20	1.07
A-11	0.32	2.16	100	101	88	24.46	0.96
A-10	0.31	2.10	100	101	89	26.43	0.94
A-9	0.29	1.95	100	101	90	28.33	0.94
A-8	0.28	1.91	101	105	86	30.17	0.95
A-7	0.28	1.90	103	104	90	32.01	0.96
A-6	0.24	1.64	101	103	86	33.87	1.04
A-5	0.23	1.56	101	103	87	35.73	1.04
A-4	0.22	1.50	100	101	85	37.55	1.00
A-3	0.20	1.36	102	103	86	39.26	1.06
A-2	0.18	1.23	100	102	85	41.00	0.97
A-1	0.16	1.09	101	103	89	42.50	1.03
						44.00	

Sampling Data for - **TEST 3**

9-Jul-20

Pinnacle Pellet
Dryer Stack 2
Williams Lake

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	0.33	2.18	96	95	95	0.00	1.00
A-11	0.33	2.20	92	97	91	2.07	0.97
A-10	0.31	2.07	92	96	89	4.07	1.01
A-9	0.3	2.00	92	96	90	6.09	0.97
A-8	0.28	1.87	95	94	89	8.01	1.02
A-7	0.25	1.67	94	95	91	9.96	1.04
A-6	0.23	1.53	96	95	91	11.84	1.03
A-5	0.21	1.39	97	97	96	13.62	1.03
A-4	0.2	1.33	97	97	93	15.33	1.01
A-3	0.2	1.33	97	98	94	16.96	1.00
A-2	0.18	1.20	98	97	93	18.57	1.04
A-1	0.16	1.06	98	99	96	20.17	1.04
B-12	0.32	2.13	96	97	93	21.67	1.02
B-11	0.33	2.20	96	97	93	23.75	0.99
B-10	0.30	1.99	96	97	93	25.81	0.90
B-9	0.30	1.99	96	97	93	27.59	0.89
B-8	0.27	1.81	100	100	93	29.35	0.96
B-7	0.26	1.74	100	100	93	31.17	0.99
B-6	0.24	1.61	101	100	92	33.00	0.97
B-5	0.22	1.48	99	99	92	34.73	0.98
B-4	0.22	1.48	99	100	93	36.40	1.00
B-3	0.18	1.21	99	99	92	38.10	0.99
B-2	0.19	1.27	100	100	93	39.63	1.01
B-1	0.17	1.14	101	100	95	41.23	0.99
						42.71	

Pinnacle Pellet
 Dryer Stack 2
 Pinnacle Pellet

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 0.994

Delta P:	0.240 "H ₂ O	Us avg:	28.92 ft/sec
Delta H:	1.632	ACFM:	54666 ft ³ /min
Tm avg:	552.4 °R	SDCFM:	48187 ft ³ /min
Ts avg:	550.4 °R	Vm std:	37.64 ft ³
Bwo:	0.021	Vm corr:	41.75 ft ³
Md:	28.84	Vm:	42.08 ft ³
Ms:	28.61	MF:	0.9922
Pb:	28.10 "Hg	PCON:	5.35 mg/m ³
Pm:	28.22 "Hg	ERAT:	0.44 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 1.002

Delta P:	0.253 "H ₂ O	Us avg:	29.60 ft/sec
Delta H:	1.739	ACFM:	55942 ft ³ /min
Tm avg:	559.9 °R	SDCFM:	49469 ft ³ /min
Ts avg:	546.1 °R	Vm std:	38.84 ft ³
Bwo:	0.026	Vm corr:	43.66 ft ³
Md:	28.84	Vm:	44.00 ft ³
Ms:	28.56	MF:	0.9922
Pb:	28.10 "Hg	PCON:	6.00 mg/m ³
Pm:	28.23 "Hg	ERAT:	0.50 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.994

Delta P:	0.246 "H ₂ O	Us avg:	29.35 ft/sec
Delta H:	1.662	ACFM:	55468 ft ³ /min
Tm avg:	557.3 °R	SDCFM:	48613 ft ³ /min
Ts avg:	552.6 °R	Vm std:	37.87 ft ³
Bwo:	0.023	Vm corr:	42.38 ft ³
Md:	28.84	Vm:	42.71 ft ³
Ms:	28.59	MF:	0.9922
Pb:	28.10 "Hg	PCON:	6.53 mg/m ³
Pm:	28.22 "Hg	ERAT:	0.54 kg/hr
Ps:	28.09 "Hg		

**Pinnacle Pellet
Dryer Stack 3
Williams Lake**

9-Jul-20

Permit Number: RA-17557

AVERAGE OF AIR EMISSION TESTS 1 TO 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

83 ° F	28 ° C
1.77 %	
28.5 ft/sec	8.7 m/sec
53843 ACFM	
48267 SCFM	22.8 m ³ /sec
0.005 gr/ft ³	11.14 mg/m ³
0.004 gr/ft ³	9.6 mg/m ³
0.001 gr/ft ³	1.6 mg/m ³
2.02 lbs/hr	0.91 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

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

83 ° F	28 ° C
1.5 %	
28.5 ft/sec	8.7 m/sec
53822 ACFM	
48384 SCFM	22.8 m ³ /sec

.006 gr/ft ³	13.9 mg/m ³
.005 gr/ft ³	12.4 mg/m ³
.001 gr/ft ³	1.6 mg/m ³
2.52 lbs/hr	1.14 kg/hr

TEST 2:

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

83 ° F	28 ° C
2.1 %	
28.4 ft/sec	8.7 m/sec
53688 ACFM	
47952 SCFM	22.6 m ³ /sec

.004 gr/ft ³	9.2 mg/m ³
.003 gr/ft ³	7.7 mg/m ³
.001 gr/ft ³	1.6 mg/m ³
1.66 lbs/hr	0.75 kg/hr

TEST 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

84 ° F	29 ° C
1.6 %	
28.6 ft/sec	8.7 m/sec
54020 ACFM	
48466 SCFM	22.9 m ³ /sec

.004 gr/ft ³	10.3 mg/m ³
.004 gr/ft ³	8.7 mg/m ³
.001 gr/ft ³	1.6 mg/m ³
1.86 lbs/hr	0.85 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet
Plant Location: Williams Lake
Process: Dryer Stack 3
Permit Number: RA-17557
Job Number: ME2021-050
Pollution Control Permit: 15.0 mg/m³ 22.5 m³/sec
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	E3	E17	E18
Date of Test:	9-Jul-20	9-Jul-20	9-Jul-20
Start Time:	14:03	15:20	16:29
Stop Time:	15:05	16:22	17:31
On-line Sampling Time:	60	60	60
Testing Personnel:	DB/NA	DB/NA	DB/NA
Sampler Model:	980	980	980
Barometric Pressure("Hg):	28.10	28.10	28.10
Static Pressure("H₂O):	-0.09	-0.09	-0.09
%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:	1.0174	1.0174	1.0174
Type-S Pitot Tube Coefficient:	0.83829	0.83829	0.83829
Cross Sectional Area of Stack(ft²):	31.5	31.5	31.5
Impinger Condensate(g):	14	19	15
Weight of Moisture in Silica Gel(g):	1.0	2.0	1.0
Weight of Filter Particulate(g):	0.0002	0.0006	0.0005
Weight of Probe Washings(g):	0.0157	0.0092	0.0106
Weight of Impinger Content Organic(g):	0.0020	0.0020	0.0020
Total Weight of Particulate(g):	0.0179	0.0118	0.0131

Sampling Data for - **TEST 1**

9-Jul-20

Pinnacle Pellet
Dryer Stack 3
Williams Lake

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	0.35	2.52	80	80	88	84.41	1.00
A-11	0.33	2.41	89	81	86	86.85	0.97
A-10	0.31	2.27	93	81	86	89.18	1.00
A-9	0.31	2.29	97	82	84	91.50	0.99
A-8	0.27	2.00	99	82	83	93.82	1.02
A-7	0.22	1.64	101	83	83	96.05	1.04
A-6	0.21	1.56	101	83	83	98.12	1.03
A-5	0.18	1.34	102	84	84	100.13	1.05
A-4	0.17	1.27	103	85	84	102.02	1.09
A-3	0.18	1.34	103	85	84	103.94	0.95
A-2	0.18	1.35	102	86	81	105.65	1.00
A-1	0.20	1.50	105	87	82	107.46	1.02
B-12	0.30	2.26	106	88	82	109.41	0.93
B-11	0.28	2.11	108	89	81	111.58	1.00
B-10	0.28	2.12	109	90	80	113.86	1.03
B-9	0.25	1.90	110	90	80	116.20	0.95
B-8	0.25	1.89	109	90	81	118.25	0.99
B-7	0.22	1.67	109	91	81	120.39	1.00
B-6	0.21	1.59	108	91	82	122.42	1.00
B-5	0.20	1.51	109	91	83	124.40	1.02
B-4	0.19	1.43	109	92	84	126.36	1.03
B-3	0.19	1.43	109	92	84	128.29	1.01
B-2	0.20	1.51	109	92	84	130.18	1.01
B-1	0.21	1.59	109	93	83	132.13	1.01
						134.12	

Sampling Data for - *TEST 2*

9-Jul-20

Pinnacle Pellet

Dryer Stack 3

Williams Lake

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	0.34	2.53	85	85	85	34.24	0.98
B-11	0.32	2.40	94	86	85	36.62	0.99
B-10	0.30	2.26	98	86	86	38.96	1.00
B-9	0.30	2.26	100	85	86	41.27	1.01
B-8	0.26	1.97	102	86	85	43.60	1.04
B-7	0.23	1.75	104	86	84	45.85	0.96
B-6	0.21	1.59	103	87	85	47.80	1.03
B-5	0.18	1.37	104	87	83	49.80	1.04
B-4	0.18	1.37	104	87	83	51.67	1.04
B-3	0.19	1.45	105	89	83	53.55	1.01
B-2	0.19	1.45	106	89	82	55.42	1.04
B-1	0.20	1.53	106	90	82	57.36	1.02
A-12	0.31	2.37	107	90	83	59.30	1.00
A-11	0.27	2.08	110	91	82	61.68	0.96
A-10	0.26	2.00	110	93	82	63.82	0.98
A-9	0.26	2.00	109	92	83	65.96	1.00
A-8	0.25	1.92	110	92	82	68.15	0.91
A-7	0.22	1.70	110	93	82	70.10	1.03
A-6	0.21	1.62	109	93	82	72.18	1.03
A-5	0.18	1.38	108	93	83	74.20	1.03
A-4	0.18	1.39	109	93	82	76.07	1.01
A-3	0.19	1.46	109	94	82	77.92	1.01
A-2	0.20	1.54	109	94	82	79.82	1.04
A-1	0.21	1.62	110	94	82	81.82	1.03
						83.85	

Sampling Data for - *TEST 3*

9-Jul-20

Pinnacle Pellet

Dryer Stack 3

Williams Lake

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	0.35	2.50	87	87	101	84.00	0.97
A-11	0.33	2.46	99	91	85	86.37	1.00
A-10	0.33	2.47	103	90	85	88.80	0.96
A-9	0.3	2.25	105	90	84	91.15	0.96
A-8	0.27	2.03	106	90	83	93.40	1.01
A-7	0.24	1.80	107	91	84	95.64	1.01
A-6	0.22	1.65	106	91	84	97.77	0.98
A-5	0.19	1.43	107	91	84	99.74	1.02
A-4	0.19	1.43	106	91	84	101.64	1.01
A-3	0.18	1.36	107	91	82	103.52	0.99
A-2	0.2	1.51	105	91	81	105.32	1.01
A-1	0.2	1.52	108	93	81	107.25	1.08
B-12	0.30	2.27	108	93	82	109.33	0.96
B-11	0.27	2.05	110	93	82	111.60	1.03
B-10	0.26	1.97	110	93	82	113.90	0.91
B-9	0.26	1.97	111	93	82	115.90	0.97
B-8	0.24	1.82	112	93	83	118.03	1.03
B-7	0.21	1.59	110	94	83	120.20	0.95
B-6	0.19	1.44	109	94	82	122.08	1.03
B-5	0.19	1.44	109	94	82	124.01	1.04
B-4	0.18	1.37	110	94	82	125.96	1.01
B-3	0.20	1.52	109	94	82	127.81	1.02
B-2	0.20	1.52	110	95	82	129.77	1.04
B-1	0.22	1.67	110	95	82	131.79	0.97
						133.76	

**Pinnacle Pellet
Dryer Stack 3
Pinnacle Pellet**

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 1.006

Delta P:	0.234 "H ₂ O	Us avg:	28.48 ft/sec
Delta H:	1.771	ACFM:	53822 ft ³ /min
Tm avg:	555.1 °R	SDCFM:	48384 ft ³ /min
Ts avg:	543.0 °R	Vm std:	45.39 ft ³
Bwo:	0.015	Vm corr:	50.57 ft ³
Md:	28.84	Vm:	49.71 ft ³
Ms:	28.67	MF:	1.0174
Pb:	28.10 "Hg	PCON:	13.93 mg/m ³
Pm:	28.23 "Hg	ERAT:	1.14 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 1.008

Delta P:	0.233 "H ₂ O	Us avg:	28.41 ft/sec
Delta H:	1.792	ACFM:	53688 ft ³ /min
Tm avg:	557.4 °R	SDCFM:	47952 ft ³ /min
Ts avg:	543.2 °R	Vm std:	45.11 ft ³
Bwo:	0.021	Vm corr:	50.47 ft ³
Md:	28.84	Vm:	49.61 ft ³
Ms:	28.61	MF:	1.0174
Pb:	28.10 "Hg	PCON:	9.24 mg/m ³
Pm:	28.23 "Hg	ERAT:	0.75 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.997

Delta P:	0.236 "H ₂ O	Us avg:	28.58 ft/sec
Delta H:	1.793	ACFM:	54020 ft ³ /min
Tm avg:	559.5 °R	SDCFM:	48466 ft ³ /min
Ts avg:	543.5 °R	Vm std:	45.08 ft ³
Bwo:	0.016	Vm corr:	50.63 ft ³
Md:	28.84	Vm:	49.76 ft ³
Ms:	28.66	MF:	1.0174
Pb:	28.10 "Hg	PCON:	10.26 mg/m ³
Pm:	28.23 "Hg	ERAT:	0.85 kg/hr
Ps:	28.09 "Hg		

**Pinnacle Pellet
Dryer Stack 4
Williams Lake**

9-Jul-20

Permit Number: RA-17557

AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	92 ° F	33 ° C
Moisture Content (by volume):	3.02 %	
Average Stack Gas Velocity:	27.1 ft/sec	8.3 m/sec
Total Actual Gas Flow Rate:	51300 ACFM	
Dry Gas flow Rate at Reference Conditions:	44708 SCFM	21.1 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.009 gr/ft ³	19.49 mg/m ³
Front Half Particulate	0.007 gr/ft ³	16.7 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	2.8 mg/m ³
Mass Emission Rate	3.26 lbs/hr	1.48 kg/hr

SUMMARY OF AIR EMISSION TESTS

TEST 1:

Gas Temperature:	92 ° F	33 ° C
Moisture Content (by volume):	2.8 %	
Average Stack Gas Velocity:	27.0 ft/sec	8.2 m/sec
Total Actual Gas Flow Rate:	51030 ACFM	
Dry Gas flow Rate at Reference Conditions:	44526 SCFM	21.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.007 gr/ft ³	16.8 mg/m ³
Front Half Particulate	.006 gr/ft ³	13.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	3.4 mg/m ³
Mass Emission Rate	2.80 lbs/hr	1.27 kg/hr

TEST 2:

Gas Temperature:	92 ° F	33 ° C
Moisture Content (by volume):	3.0 %	
Average Stack Gas Velocity:	27.1 ft/sec	8.3 m/sec
Total Actual Gas Flow Rate:	51287 ACFM	
Dry Gas flow Rate at Reference Conditions:	44686 SCFM	21.1 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.008 gr/ft ³	18.9 mg/m ³
Front Half Particulate	.007 gr/ft ³	15.6 mg/m ³
Back Half Condensibles	.001 gr/ft ³	3.3 mg/m ³
Mass Emission Rate	3.17 lbs/hr	1.44 kg/hr

TEST 3:

Gas Temperature:	91 ° F	33 ° C
Moisture Content (by volume):	3.2 %	
Average Stack Gas Velocity:	27.3 ft/sec	8.3 m/sec
Total Actual Gas Flow Rate:	51584 ACFM	
Dry Gas flow Rate at Reference Conditions:	44910 SCFM	21.2 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.010 gr/ft ³	22.7 mg/m ³
Front Half Particulate	.009 gr/ft ³	21.1 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.6 mg/m ³
Mass Emission Rate	3.83 lbs/hr	1.74 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet
Plant Location: Williams Lake
Process: Dryer Stack 4
Permit Number: RA-17557
Job Number: ME2021-050
Pollution Control Permit: 15.0 mg/m³ 22.5 m³/sec
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	D99	E1	E2
Date of Test:	9-Jul-20	9-Jul-20	9-Jul-20
Start Time:	10:03	11:23	12:33
Stop Time:	11:05	12:25	13:35
On-line Sampling Time:	60	60	60
Testing Personnel:	DB/NA	DB/NA	DB/NA
Sampler Model:	980	980	980
Barometric Pressure("Hg):	28.10	28.10	28.10
Static Pressure("H₂O):	-0.17	-0.17	-0.17
%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:	1.0174	1.0174	1.0174
Type-S Pitot Tube Coefficient:	0.83829	0.83829	0.83829
Cross Sectional Area of Stack(ft²):	31.5	31.5	31.5
Impinger Condensate(g):	24	26	28
Weight of Moisture in Silica Gel(g):	2.0	2.0	2.5
Weight of Filter Particulate(g):	0.0011	0.0012	0.0025
Weight of Probe Washings(g):	0.0149	0.0175	0.0233
Weight of Impinger Content Organic(g):	0.0040	0.0040	0.0020
Total Weight of Particulate(g):	0.0200	0.0227	0.0278

Sampling Data for - **TEST 1**

9-Jul-20

Pinnacle Pellet
Dryer Stack 4
Williams Lake

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	0.30	2.10	64	64	97	44.90	1.02
A-11	0.30	2.10	72	64	93	47.10	1.00
A-10	0.27	1.89	76	64	93	49.28	0.98
A-9	0.25	1.76	80	65	93	51.31	0.94
A-8	0.25	1.77	85	67	93	53.20	0.96
A-7	0.19	1.39	87	68	93	55.14	1.05
A-6	0.17	1.21	88	69	93	57.00	1.04
A-5	0.16	1.15	92	73	93	58.74	0.98
A-4	0.16	1.15	93	74	92	60.35	1.02
A-3	0.16	1.15	94	75	91	62.02	1.04
A-2	0.16	1.15	95	76	91	63.73	0.98
A-1	0.19	1.37	96	76	91	65.35	1.03
B-12	0.22	1.60	96	77	91	67.20	0.98
B-11	0.22	1.60	96	77	91	69.10	1.10
B-10	0.22	1.60	97	78	91	71.22	0.99
B-9	0.21	1.53	97	79	91	73.14	0.98
B-8	0.20	1.45	97	80	91	75.00	1.05
B-7	0.18	1.31	98	81	92	76.94	1.06
B-6	0.19	1.38	99	82	92	78.80	1.05
B-5	0.19	1.39	100	83	92	80.70	1.05
B-4	0.19	1.39	100	83	91	82.60	1.00
B-3	0.20	1.46	102	84	91	84.42	0.98
B-2	0.20	1.46	102	84	91	86.25	1.00
B-1	0.21	1.53	102	85	91	88.11	1.01
						90.04	

Sampling Data for - **TEST 2**

9-Jul-20

Pinnacle Pellet
Dryer Stack 4
Williams Lake

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	0.35	2.50	78	78	92	90.30	1.01
B-11	0.31	2.23	88	80	93	92.72	1.02
B-10	0.26	1.88	90	81	91	95.05	1.02
B-9	0.25	1.82	92	82	91	97.18	1.06
B-8	0.20	1.45	93	83	91	99.37	0.99
B-7	0.18	1.31	96	82	91	101.20	1.02
B-6	0.16	1.17	96	82	91	103.00	1.00
B-5	0.16	1.17	97	83	91	104.66	0.99
B-4	0.17	1.24	98	83	91	106.31	1.03
B-3	0.16	1.17	99	84	91	108.07	1.02
B-2	0.17	1.24	101	85	92	109.77	1.04
B-1	0.18	1.32	102	86	92	111.55	1.04
A-12	0.24	1.76	102	87	92	113.40	1.00
A-11	0.25	1.84	103	89	92	115.44	1.01
A-10	0.23	1.69	104	90	92	117.55	0.98
A-9	0.21	1.55	104	90	92	119.52	1.01
A-8	0.20	1.48	110	91	92	121.46	0.99
A-7	0.19	1.40	105	91	92	123.33	0.98
A-6	0.19	1.41	105	92	92	125.13	1.02
A-5	0.19	1.41	105	91	92	127.00	1.03
A-4	0.20	1.48	104	91	92	128.89	1.02
A-3	0.20	1.48	104	90	92	130.81	1.02
A-2	0.20	1.48	104	90	92	132.72	1.01
A-1	0.20	1.48	104	90	92	134.61	1.02
						136.52	

Sampling Data for - **TEST 3**

9-Jul-20

Pinnacle Pellet
Dryer Stack 4
Williams Lake

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	0.36	2.58	83	80	92	36.80	1.01
A-11	0.32	2.33	95	86	94	39.26	0.98
A-10	0.3	2.18	96	87	93	41.55	1.02
A-9	0.25	1.83	97	88	92	43.87	1.03
A-8	0.21	1.54	100	88	92	46.00	1.05
A-7	0.19	1.39	101	89	92	48.01	1.06
A-6	0.17	1.25	101	90	92	49.94	1.00
A-5	0.17	1.25	101	90	92	51.66	1.01
A-4	0.17	1.25	102	88	93	53.40	1.06
A-3	0.16	1.18	103	88	93	55.22	1.07
A-2	0.16	1.18	103	89	93	57.00	1.06
A-1	0.17	1.25	104	88	90	58.77	1.03
B-12	0.25	1.84	104	88	90	60.56	1.06
B-11	0.25	1.84	106	88	90	62.78	1.06
B-10	0.22	1.63	106	90	90	65.00	0.96
B-9	0.20	1.48	106	90	90	66.90	1.00
B-8	0.20	1.48	106	90	90	68.78	1.00
B-7	0.19	1.47	106	90	90	70.66	1.06
B-6	0.19	1.41	106	90	90	72.60	1.03
B-5	0.21	1.56	106	91	90	74.48	0.99
B-4	0.20	1.49	107	91	89	76.39	1.05
B-3	0.20	1.49	107	92	89	78.37	1.03
B-2	0.19	1.41	107	91	89	80.31	1.03
B-1	0.19	1.41	107	91	89	82.21	1.06
						84.16	

Pinnacle Pellet
 Dryer Stack 4
 Pinnacle Pellet

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 1.012

Delta P:	0.206 "H ₂ O	Us avg:	27.00 ft/sec
Delta H:	1.495	ACFM:	51030 ft ³ /min
Tm avg:	543.7 °R	SDCFM:	44526 ft ³ /min
Ts avg:	552.0 °R	Vm std:	42.05 ft ³
Bwo:	0.028	Vm corr:	45.93 ft ³
Md:	28.84	Vm:	45.14 ft ³
Ms:	28.53	MF:	1.0174
Pb:	28.10 "Hg	PCON:	16.80 mg/m ³
Pm:	28.21 "Hg	ERAT:	1.27 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 1.014

Delta P:	0.208 "H ₂ O	Us avg:	27.14 ft/sec
Delta H:	1.540	ACFM:	51287 ft ³ /min
Tm avg:	552.8 °R	SDCFM:	44686 ft ³ /min
Ts avg:	551.7 °R	Vm std:	42.35 ft ³
Bwo:	0.030	Vm corr:	47.02 ft ³
Md:	28.84	Vm:	46.22 ft ³
Ms:	28.51	MF:	1.0174
Pb:	28.10 "Hg	PCON:	18.93 mg/m ³
Pm:	28.21 "Hg	ERAT:	1.44 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 1.030

Delta P:	0.211 "H ₂ O	Us avg:	27.29 ft/sec
Delta H:	1.572	ACFM:	51584 ft ³ /min
Tm avg:	555.7 °R	SDCFM:	44910 ft ³ /min
Ts avg:	551.0 °R	Vm std:	43.18 ft ³
Bwo:	0.032	Vm corr:	48.18 ft ³
Md:	28.84	Vm:	47.36 ft ³
Ms:	28.49	MF:	1.0174
Pb:	28.10 "Hg	PCON:	22.74 mg/m ³
Pm:	28.22 "Hg	ERAT:	1.74 kg/hr
Ps:	28.09 "Hg		

Pinnacle Pellet
10-Jul-20
Cyclofilter Baghouse Stack
Permit Number: RA-17557
Williams Lake BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	97 ° F	36 ° C
Moisture Content (by volume):	2.30 %	
Average Stack Gas Velocity:	59.4 ft/sec	18.10 m/sec
Total Actual Gas Flow Rate:	69955 ACFM	
Dry Gas flow Rate at Reference Conditions:	61104 SCFM	28.84 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.001 gr/ft ³	2.5 mg/m ³
Front Half Particulate	0.000 gr/ft ³	0.8 mg/m ³
Back Half Condensibles	0.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.57 lbs/hr	0.26 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	91 ° F	33 ° C
Moisture Content (by volume):	1.4 %	
Average Stack Gas Velocity:	58.5 ft/sec	17.8 m/sec
Total Actual Gas Flow Rate:	68862 ACFM	
Dry Gas flow Rate at Reference Conditions:	61352 SCFM	29.0 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.001 gr/ft ³	2.7 mg/m ³
Front Half Particulate	.000 gr/ft ³	1.0 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.62 lbs/hr	0.28 kg/hr

TEST 2:

Gas Temperature:	100 ° F	38 ° C
Moisture Content (by volume):	2.7 %	
Average Stack Gas Velocity:	59.5 ft/sec	18.1 m/sec
Total Actual Gas Flow Rate:	70089 ACFM	
Dry Gas flow Rate at Reference Conditions:	60655 SCFM	28.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.001 gr/ft ³	2.6 mg/m ³
Front Half Particulate	.000 gr/ft ³	.9 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.59 lbs/hr	0.27 kg/hr

TEST 3:

Gas Temperature:	100 ° F	38 ° C
Moisture Content (by volume):	2.8 %	
Average Stack Gas Velocity:	60.2 ft/sec	18.4 m/sec
Total Actual Gas Flow Rate:	70914 ACFM	
Dry Gas flow Rate at Reference Conditions:	61305 SCFM	28.9 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.001 gr/ft ³	2.1 mg/m ³
Front Half Particulate	.000 gr/ft ³	.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.49 lbs/hr	0.22 kg/hr

DATA FOR TESTS 1 TO 3

Client: Pinnacle Pellet
Plant Location: Williams Lake BC
Process: Cyclofilter Baghouse Stack
Permit Number: RA-17557
Job Number: ME2021-050
Pollution Control Permit: 15.0 mg/m³ 30 m³/sec
Number of Tests: 3 tests
Minutes per Point: 2.5 minutes

	TEST 1	TEST 2	TEST 3
Filter Number:	E19	20	21
Date of Test:	10-Jul-20	10-Jul-20	10-Jul-20
Start Time:	8:07	9:14	10:24
Stop Time:	9:08	10:16	11:24
On-line Sampling Time:	60	60	60
Testing Personnel:	DB/NA	DB/NA	DB/NA
Sampler Model:	980	980	980
Barometric Pressure("Hg):	28.20	28.20	28.20
Static Pressure("H₂O):	0.55	0.55	0.55
%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):	0.205	0.205	0.205
Meter Factor:	1.0174	1.0174	1.0174
Type-S Pitot Tube Coefficient:	0.83365	0.83365	0.83365
Cross Sectional Area of Stack(ft²):	19.63	19.63	19.63
Impinger Condensate(g):	11	22	23
Weight of Moisture in Silica Gel(g):	2.0	2.5	2.0
Weight of Filter Particulate(g):	0.0008	0.0006	0.0004
Weight of Probe Washings(g):	0.0004	0.0005	0.0001
Weight of Impinger Content Organic(g):	0.0020	0.0020	0.0020
Total Weight of Particulate(g):	0.0032	0.0031	0.0025

Sampling Data for - **TEST 1**

10-Jul-20

Pinnacle Pellet
Cyclofilter Baghouse Stack
Williams Lake 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	1.45	2.23	40	40	82	34.00	1.02
A-11	1.15	1.70	51	40	88	36.20	1.04
A-10	0.90	1.36	61	47	88	38.21	0.98
A-9	0.80	1.20	62	47	89	39.91	1.06
A-8	0.75	1.13	61	47	89	41.64	1.01
A-7	0.75	1.13	61	48	89	43.23	0.99
A-6	0.80	1.21	62	48	89	44.80	1.11
A-5	0.90	1.36	63	49	89	46.62	0.94
A-4	0.90	1.41	86	63	89	48.26	0.94
A-3	1.00	1.57	86	65	89	49.96	0.93
A-2	1.30	2.05	91	67	90	51.72	0.87
A-1	1.45	2.29	91	70	90	53.61	0.90
B-12	1.65	2.61	92	72	90	55.68	0.91
B-11	1.70	2.69	99	73	95	57.93	0.92
B-10	1.65	2.65	101	75	89	60.24	0.99
B-9	1.00	1.61	101	77	89	62.70	0.97
B-8	0.85	1.37	103	78	90	64.59	1.07
B-7	0.75	1.21	103	78	90	66.52	1.03
B-6	0.65	1.04	105	78	94	68.26	1.09
B-5	0.75	1.19	99	78	97	69.98	0.90
B-4	0.70	1.11	97	79	94	71.48	0.91
B-3	0.80	1.27	98	79	97	72.96	1.03
B-2	0.80	1.26	100	80	103	74.75	1.00
B-1	0.85	1.34	100	80	103	76.47	0.94
						78.15	

Sampling Data for - **TEST 2**

10-Jul-20

Pinnacle Pellet
Cyclofilter Baghouse Stack
Williams Lake 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	1.40	2.16	80	76	100	78.34	1.01
A-11	1.20	1.87	91	79	101	80.57	0.99
A-10	0.95	1.49	95	79	101	82.62	0.99
A-9	0.80	1.26	95	79	100	84.45	0.99
A-8	0.80	1.26	96	79	100	86.14	0.98
A-7	0.75	1.18	97	80	100	87.81	1.02
A-6	0.85	1.34	98	80	100	89.49	1.00
A-5	0.90	1.42	99	81	100	91.25	1.02
A-4	0.90	1.42	101	81	100	93.10	1.02
A-3	1.05	1.66	101	82	100	94.95	0.97
A-2	1.35	2.15	102	82	100	96.86	0.99
A-1	1.40	2.23	105	83	100	99.07	0.98
B-12	1.60	2.55	106	84	100	101.30	0.96
B-11	1.75	2.79	106	84	100	103.65	0.99
B-10	1.65	2.60	107	85	101	106.16	0.96
B-9	0.95	1.51	107	85	101	108.53	1.02
B-8	0.80	1.27	106	86	101	110.45	1.01
B-7	0.70	1.11	104	86	101	112.19	1.00
B-6	0.75	1.19	103	86	102	113.81	0.90
B-5	0.75	1.19	104	87	101	115.32	1.02
B-4	0.85	1.35	104	87	101	117.03	0.99
B-3	0.75	1.20	105	87	101	118.79	0.99
B-2	0.80	1.28	104	88	100	120.44	0.96
B-1	0.90	1.44	104	88	100	122.10	0.94
						123.83	

Sampling Data for - **TEST 3**

10-Jul-20

Pinnacle Pellet
Cyclofilter Baghouse Stack
Williams Lake 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	1.45	2.28	85	83	95	124.11	0.97
A-11	1.25	2.00	94	86	91	126.33	1.01
A-10	0.9	1.43	98	85	98	128.51	1.09
A-9	0.85	1.35	98	85	98	130.50	0.93
A-8	0.8	1.27	99	86	99	132.14	1.01
A-7	0.75	1.19	99	87	99	133.88	1.00
A-6	0.8	1.27	99	87	99	135.54	1.03
A-5	0.95	1.51	99	88	100	137.31	0.95
A-4	0.9	1.43	99	88	100	139.10	0.94
A-3	1	1.60	104	89	100	140.81	0.93
A-2	1.3	2.07	104	89	100	142.60	0.94
A-1	1.35	2.16	108	89	101	144.66	0.93
B-12	1.50	2.40	108	89	101	146.76	0.93
B-11	1.65	2.64	108	89	101	148.96	0.93
B-10	1.60	2.56	108	89	101	151.28	0.92
B-9	1.60	2.56	108	90	102	153.52	0.95
B-8	0.95	1.52	108	90	102	155.84	0.96
B-7	0.85	1.36	107	95	103	157.65	0.95
B-6	0.75	1.20	107	91	103	159.36	0.98
B-5	0.80	1.28	107	92	103	161.00	0.95
B-4	0.70	1.11	107	92	103	162.65	0.92
B-3	0.80	1.28	107	93	104	164.15	0.95
B-2	0.80	1.28	107	93	104	165.80	0.94
B-1	0.85	1.36	107	93	104	167.44	0.95
						169.14	

Pinnacle Pellet
Cyclofilter Baghouse Stack
Pinnacle Pellet

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1: 0.982

Delta P:	0.989 "H₂O	Us avg:	58.47 ft/sec
Delta H:	1.583	ACFM:	68862 ft³/min
Tm avg:	534.4 °R	SDCFM:	61352 ft³/min
Ts avg:	551.3 °R	Vm std:	42.00 ft³
Bwo:	0.014	Vm corr:	44.92 ft³
Md:	28.84	Vm:	44.15 ft³
Ms:	28.68	MF:	1.0174
Pb:	28.20 "Hg	PCON:	2.69 mg/m³
Pm:	28.32 "Hg	ERAT:	0.28 kg/hr
Ps:	28.24 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2: 0.987

Delta P:	1.003 "H₂O	Us avg:	59.51 ft/sec
Delta H:	1.622	ACFM:	70089 ft³/min
Tm avg:	552.0 °R	SDCFM:	60655 ft³/min
Ts avg:	560.5 °R	Vm std:	41.90 ft³
Bwo:	0.027	Vm corr:	46.28 ft³
Md:	28.84	Vm:	45.49 ft³
Ms:	28.55	MF:	1.0174
Pb:	28.20 "Hg	PCON:	2.61 mg/m³
Pm:	28.32 "Hg	ERAT:	0.27 kg/hr
Ps:	28.24 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3: 0.961

Delta P:	1.027 "H₂O	Us avg:	60.21 ft/sec
Delta H:	1.671	ACFM:	70914 ft³/min
Tm avg:	556.1 °R	SDCFM:	61305 ft³/min
Ts avg:	560.5 °R	Vm std:	41.18 ft³
Bwo:	0.028	Vm corr:	45.81 ft³
Md:	28.84	Vm:	45.03 ft³
Ms:	28.54	MF:	1.0174
Pb:	28.20 "Hg	PCON:	2.14 mg/m³
Pm:	28.32 "Hg	ERAT:	0.22 kg/hr
Ps:	28.24 "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 were 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)

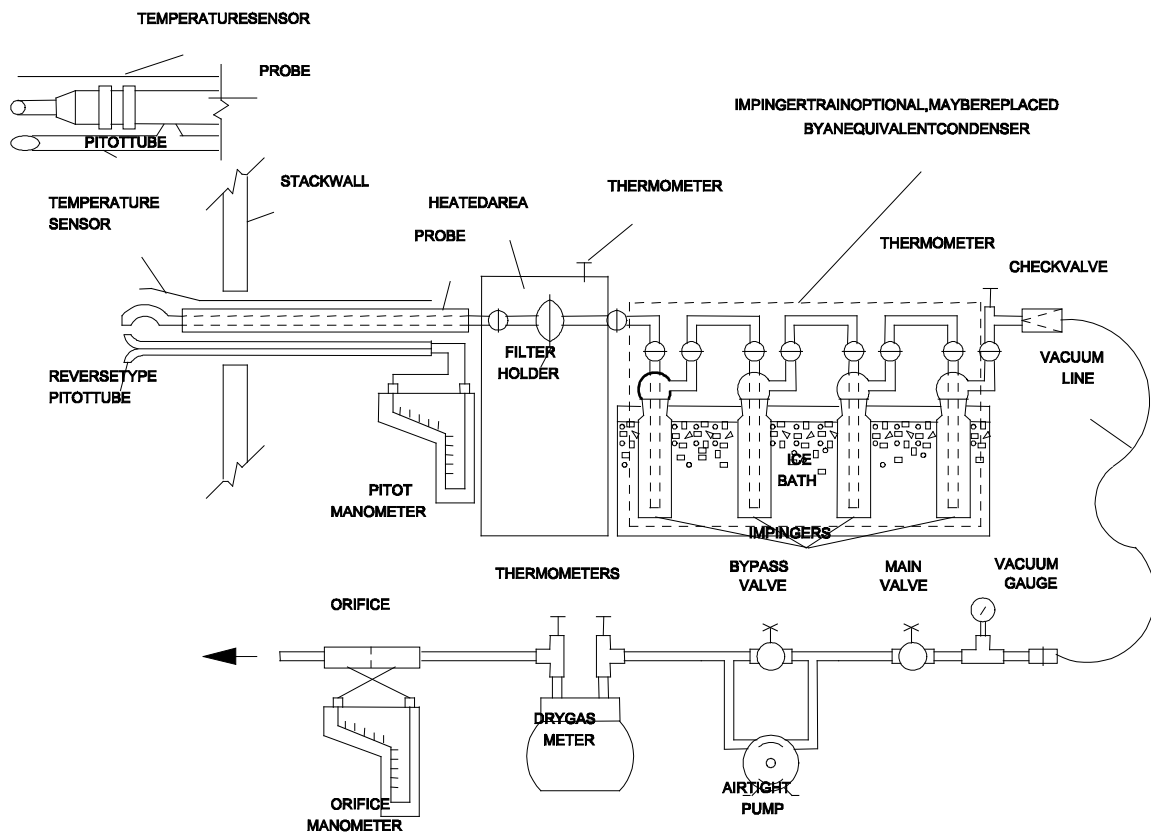
O₂, CO₂, and CO were found using either Fuji Analytical Analyzer by means of infrared and paramagnetic technology (EPA 3A) or by fyrite (EPA Method 3).

NO_x (where applicable)

NO_x was found using and API Model 252 NO_x analyzer that utilizes chemiluminescent technology. Stack gas was 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, $g/dscm$ ($g/dscf$).
 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, $0.06236 [(mmHg)(m^3)/[(^{\circ}K)(g\text{-mole})]]$
 $\{21.85 [(in. Hg)(ft^3)/[(^{\circ}R)(lb\text{-mole})]]\}$.
 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:

$K_3 = 0.003454 [(\text{mm Hg})(\text{m}^3)]/[(\text{ml})(^\circ\text{K})]$ for metric units,

$= 0.002669 [(\text{in. Hg})(\text{ft}^3)]/[(\text{ml})(^\circ\text{R})]$ for English units.

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 for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.9
Pitot I.D.: **107** Wind Tunnel Temperature ($^{\circ}$ F): 66.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
11.72	0.03161	0.04242	0.85459
26.28	0.15880	0.22190	0.83748
42.45	0.41433	0.57741	0.83863
58.04	0.77446	1.06033	0.84609
82.87	1.57900	2.18794	0.84102
98.54	2.23250	3.15269	0.83309

Average= 0.84182

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 30.05
Pitot I.D.: **126** Wind Tunnel Temperature ($^{\circ}$ F): 70.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
18.00	0.07434	0.09688	0.86723
20.50	0.09642	0.13255	0.84437
37.39	0.32060	0.45527	0.83077
57.44	0.75665	1.05584	0.83807
84.53	1.63871	2.26076	0.84287
103.68	2.46546	3.36693	0.84716

Average= 0.84508

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 30.05
Pitot I.D.: **140** Wind Tunnel Temperature ($^{\circ}$ F): 70.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
13.96	0.04470	0.05733	0.87412
19.79	0.08982	0.12082	0.85361
42.36	0.41144	0.58576	0.82971
59.59	0.81441	1.17118	0.82555
80.40	1.48260	2.12088	0.82773
101.66	2.37016	3.46311	0.81901

Average= 0.83829

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.78
Pitot I.D.: **152** Wind Tunnel Temperature ($^{\circ}$ F): 64.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
13.28	0.04053	0.05797	0.82785
24.59	0.13902	0.20424	0.81678
57.01	0.74719	1.03491	0.84120
80.85	1.50254	2.11524	0.83439
100.28	2.31163	3.24400	0.83571
130.09	3.89031	5.48834	0.83350

Average= 0.83157

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 *Barometric Pressure ("Hg):* 29.78
Pitot I.D.: **200** *Wind Tunnel Temperature (^o F):* 70.0
Nozzle: 0.250

<i>Wind Velocity (ft/sec)</i>	<i>Ref.Pitot ("H₂O)</i>	<i>S-Type Pitot ("H₂O)</i>	<i>Pitot Factor</i>
17.53	0.06982	0.10114	0.82249
41.78	0.39667	0.56684	0.82817
50.67	0.58346	0.81271	0.83883
60.32	0.82699	1.14880	0.83997
86.08	1.68407	2.38761	0.83144
101.99	2.36401	3.27573	0.84102

Average= 0.83365

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.78
Pitot I.D.: **217** Wind Tunnel Temperature ($^{\circ}$ F): 70.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
13.51	0.04147	0.05467	0.86230
19.93	0.09031	0.12262	0.84962
41.60	0.39339	0.54073	0.84442
62.13	0.87726	1.25293	0.82840
79.94	1.45249	2.09036	0.82524
101.14	2.32467	3.37170	0.82204

Average= 0.83867

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.78
Pitot I.D.: **241** Wind Tunnel Temperature ($^{\circ}$ F): 72.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
12.31	0.03430	0.04718	0.84409
20.04	0.09089	0.12565	0.84200
40.67	0.37457	0.52832	0.83359
62.64	0.88842	1.20546	0.84990
83.77	1.58888	2.13719	0.85361
104.43	2.46938	3.35661	0.84914

Average= 0.84539

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.78
Pitot I.D.: **271** Wind Tunnel Temperature ($^{\circ}$ F): 70.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
12.09	0.03322	0.04750	0.82791
19.82	0.08927	0.12920	0.82292
40.74	0.37718	0.53379	0.83219
63.09	0.90465	1.24591	0.84359
81.80	1.52066	2.09085	0.84428
102.88	2.40539	3.30056	0.84515

Average= 0.83601

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 30
Pitot I.D.: **301** Wind Tunnel Temperature ($^{\circ}$ F): 65.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
11.91	0.03274	0.04425	0.85196
19.94	0.09188	0.12337	0.85433
41.25	0.39334	0.52395	0.85777
62.08	0.89073	1.16706	0.86489
81.83	1.54787	2.07196	0.85568
102.58	2.43231	3.26403	0.85461

Average= 0.85654

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.9
Pitot I.D.: **288** Wind Tunnel Temperature ($^{\circ}$ F): 66.0
Nozzle: 0.250

Wind Velocity (ft/sec)	Ref.Pitot ("H ₂ O)	S-Type Pitot ("H ₂ O)	Pitot Factor
12.36	0.03511	0.04941	0.83455
20.03	0.09229	0.13527	0.81770
40.44	0.37596	0.54230	0.82430
40.12	0.37006	0.53470	0.82360
60.91	0.85305	1.20217	0.83395
80.80	1.50109	2.09096	0.83881

Average= 0.82882

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.8
Pitot I.D.: **Apex 1** 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
13.13	0.03916	0.05286	0.85209
18.91	0.08115	0.11117	0.84585
42.93	0.41830	0.58244	0.83898
65.63	0.97763	1.33416	0.84746
83.73	1.59148	2.14942	0.85187
101.67	2.34633	3.16217	0.85278

Average= 0.84817

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.8
Pitot I.D.: **Apex 2** 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
12.87	0.03760	0.05230	0.83938
18.85	0.08065	0.11689	0.82232
41.96	0.39973	0.55884	0.83728
66.56	1.00571	1.36575	0.84954
83.32	1.57579	2.14452	0.84863
103.42	2.42810	3.40493	0.83601

Average= 0.83886

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

Calibrating Technician Signature:



Calibration Certificate for S-Type Pitot Tube

Date: 8-Jan-20 Barometric Pressure ("Hg): 29.8
Pitot I.D.: **Apex 3** 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
12.06	0.03303	0.04523	0.84598
18.93	0.08136	0.11221	0.84302
40.79	0.37771	0.52797	0.83736
66.50	1.00373	1.38890	0.84160
80.13	1.45739	2.02841	0.83916
102.79	2.39823	3.35658	0.83682

Average= 0.84066

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

Calibrating Technician Signature:



CALIBRATION CERTIFICATE DRY GAS METER

DATE: Jan 6/2020

CONSOLE MANUF.: NAPP MODEL 31

CONSOLE I.D.: C-980

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	58.0	58.0	58.0
P=Pres. Differential at WTM ("Hg)	0.0883	0.1692	0.1839
Pb= Atmospheric Pressure ("Hg)	28.30	28.30	28.30
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.4855	0.4855	0.4855
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	86.0	77.0	95.0
To= Dry Test Meter Outlet Temp. (oF.)	72.0	71.0	74.0
Ri= Initial Dry Test volume (ft3)	85.90	64.53	91.85
Rf= Final Dry Test Volume (ft3)	90.86	69.41	96.82
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	28.2117	28.1308	28.1161
Pd= Pb + (^H/13.59) "Hg	28.3736	28.4472	28.5208
Tw= Ta +460 (oR.)	518.0	518.0	518.0
Td= [(Ti + To)/2] + 460 (oR.)	539.0	534.0	544.5
Bw= Pv/Pb ("Hg)	0.0172	0.0172	0.0172
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	1.0171	1.0186	1.0166
Y (MEAN)(WTMF) =	1.0174		

N.R. MCCALL & ASSOCIATES LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: Jan 6/2020

CONSOLE I.D. C-980

	RUN 1	RUN 2	RUN 3
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.3	28.3	28.3
Y=gas meter factor	1.0171	1.0171	1.0186
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	6.4	9.1	12.7
Rf=final gas meter vol.	8.68	12.36	16.55
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \Delta T (FT^3/MIN)$	0.4637976	0.6631492	0.784322
To=meter outlet Temp (oF)	76	80	80
Tm=meter out temp. (oR)	536	540	540
$P_m = P_b + \Delta H$	28.336792	28.3735835	28.4103753
$SQRT(T_m / P_m * H / M_d)$	0.5714001	0.81056533	0.99209272
Ko=orifice const.	0.8116863	0.81813171	0.79057328

Ko MEAN = 0.8067971

$Ko^4 * 144 = 464.71512$

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: Jan 6/2020

CONSOLE I.D. C-980

	RUN 4	RUN 5	RUN 6
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.3	28.3	28.3
Y=gas meter factor	1.0186	1.0166	1.0166
Delta H=	2	2.5	3
Ri=int. gas meter vol.	19.1	24.3	29.7
Rf=final gas meter vol.	23.45	29.1	34.9
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/\Delta T(FT^3/MIN)$	0.886182	0.975936	1.057264
Tm=meter out temp. (oF)	77	77	78
Tm=meter out temp. (oR.)	537	537	538
$P_m=P_b + \Delta H$	28.447167	28.483959	28.520751
$SQRT(T_m/P_m \cdot H/M_d)$	1.1416444	1.2755727	1.3977179
Ko=orifice const.	0.7762329	0.7650963	0.7564216

Ko MEAN = 0.7659169

$K_o \cdot 4 \cdot 144 = 441.16816$

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 03-Jul-20

CONSOLE MANUF.: NAPP/MILLENNIUM MODEL 32

CONSOLE I.D.: MU 1013

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)	0.0662	0.1361	0.1913
Pb= Atmospheric Pressure ("Hg)	27.90	27.90	27.90
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6220	0.6220	0.6220
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	70.0	68.0	74.0
To= Dry Test Meter Outlet Temp. (oF.)	67.0	64.0	73.0
Ri= Initial Dry Test volume (ft3)	0.00	0.00	0.00
Rf= Final Dry Test Volume (ft3)	4.91	4.84	4.89
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	27.8338	27.7639	27.7087
Pd= Pb + (^H/13.59) "Hg	27.9736	28.0472	28.1208
Tw= Ta +460 (oR.)	525.0	525.0	525.0
Td= [(Ti + To)/2] + 460 (oR.)	528.5	526.0	533.5
Bw= Pv/Pb ("Hg)	0.0223	0.0223	0.0223
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	0.9895	0.9939	0.9932

Y (MEAN)(WTMF) = 0.9922

N.R. MCCALL & ASSOCIATES LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 03-Jul-20

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	27.9	27.9	27.9
Y=gas meter factor	0.9895	0.9895	0.9939
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	1.88	2.76	3.37
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.372052	0.546204	0.6698886
To=meter outlet Temp (oF)	70	69	69
Tm=meter out temp. (oR)	530	529	529
Pm=Pb + ^H	27.936792	27.9735835	28.0103753
SQRT(Tm/Pm*H/Md)	0.5722462	0.80798263	0.98892246
Ko=orifice const.	0.6501607	0.67600958	0.67739244

Ko MEAN = 0.6678542

Ko*4*144= 384.68405

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 03-Jul-20

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	27.9	27.9	27.9
Y=gas meter factor	0.9939	0.9932	0.9932
Delta H=	2	2.5	3
Ri=int. gas meter vol.	0	0	0
Rf=final gas meter vol.	3.88	4.31	4.76
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/\Delta T(FT^3/MIN)$	0.7712664	0.8561384	0.9455264
To=meter outlet Temp (oF)	71.5	73	75
Tm=meter out temp. (oR)	531.5	533	535
$P_m=P_b + \Delta H$	28.047167	28.0839588	28.1207506
$SQRT(T_m/P_m \cdot H/M_d)$	1.1438534	1.27983118	1.40369355
Ko=orifice const.	0.6742703	0.66894635	0.67359888

Ko MEAN = 0.6722718

$Ko^4 \cdot 144 = 387.22858$

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



Analytical Report

Bill To: McCall Environmental
6733 Buchanan Road
Coldstream, BC, Canada
V1B 3C5
Attn: Accounts Payable
Sampled By: NA/DB/OP/DL
Company: McCall Environmental

Project ID:
Project Name: Pinnacle Pellet
Project Location: Williams Lake
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1434324**
Control Number:
Date Received: Jul 14, 2020
Date Reported: Jul 20, 2020
Report Number: 2530216

		Reference Number	1434324-1	1434324-2	1434324-3	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Dryer Stack 1 - Test 1	Dryer Stack 1 - Test 2	Dryer Stack 1 - Test 3	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Oil and Grease	Total	mg/sample	10	4	4	2
Volume	Sample volume	mL	320	310	310	
pH adjustment	required prior to O&G extraction		No	No	No	

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Project Name: Pinnacle Pellet Project Location: Williams Lake LSD: P.O.:	Lot ID: 1434324 Control Number: Date Received: Jul 14, 2020 Date Reported: Jul 20, 2020 Report Number: 2530216
Attn: Accounts Payable Sampled By: NA/DB/OP/DL Company: McCall Environmental	Proj. Acct. code:	

		Reference Number	1434324-4	1434324-5	1434324-6	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Dryer Stack 2 - Test 1	Dryer Stack 2 - Test 2	Dryer Stack 2 - Test 3	
		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	300	320	
pH adjustment	required prior to O&G extraction		No	No	No	

Analytical Report

Bill To: McCall Environmental
6733 Buchanan Road
Coldstream, BC, Canada
V1B 3C5
Attn: Accounts Payable
Sampled By: NA/DB/OP/DL
Company: McCall Environmental

Project ID:
Project Name: Pinnacle Pellet
Project Location: Williams Lake
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1434324**
Control Number:
Date Received: Jul 14, 2020
Date Reported: Jul 20, 2020
Report Number: 2530216

		Reference Number	1434324-7	1434324-8	1434324-9	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Dryer Stack 3 - Test 1	Dryer Stack 3 - Test 2	Dryer Stack 3 - Test 3	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Oil and Grease	Total	mg/sample	<2	<2	2	2
Volume	Sample volume	mL	320	320	320	
pH adjustment	required prior to O&G extraction		No	No	No	

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Project Name: Pinnacle Pellet Project Location: Williams Lake LSD: P.O.: Proj. Acct. code:	Lot ID: 1434324 Control Number: Date Received: Jul 14, 2020 Date Reported: Jul 20, 2020 Report Number: 2530216
Attn: Accounts Payable Sampled By: NA/DB/OP/DL Company: McCall Environmental		

		Reference Number	1434324-10	1434324-11	1434324-12	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Dryer Stack 4 - Test 1	Dryer Stack 4 - Test 2	Dryer Stack 4 - Test 3	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Oil and Grease	Total	mg/sample	4	2	<2	2
Volume	Sample volume	mL	320	320	320	
pH adjustment	required prior to O&G extraction		No	No	No	

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Project Name: Pinnacle Pellet Project Location: Williams Lake LSD: P.O.:	Lot ID: 1434324 Control Number: Date Received: Jul 14, 2020 Date Reported: Jul 20, 2020 Report Number: 2530216
Attn: Accounts Payable Sampled By: NA/DB/OP/DL Company: McCall Environmental	Proj. Acct. code:	

		Reference Number	1434324-13	1434324-14	1434324-15	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Cooler Baghouse Stack - Test 1	Cooler Baghouse Stack - Test 2	Cooler Baghouse Stack - Test 3	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Oil and Grease	Total	mg/sample	<2	<2	<2	2
Volume	Sample volume	mL	300	320	300	
pH adjustment	required prior to O&G extraction		No	No	No	

Approved by:



Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element'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.

Methodology and Notes

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Project Name: Pinnacle Pellet Project Location: Williams Lake LSD: P.O.:	Lot ID: 1434324 Control Number: Date Received: Jul 14, 2020 Date Reported: Jul 20, 2020 Report Number: 2530216
Attn: Accounts Payable Sampled By: NA/DB/OP/DL Company: McCall Environmental	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Oil and Grease in water (VAN)	BCELM	* Oil & Grease in Water - Direct Hexane Extraction, Oil & Grease	Jul 16, 2020	Element Vancouver
Oil and Grease in water (VAN)	BCELM	* Oil & Grease in Water - Direct Hexane Extraction, Oil & Grease	Jul 17, 2020	Element Vancouver

** Reference Method Modified*

References

BCELM B.C. Environmental Laboratory Manual

Comments:

- Jul 14, 2020 - Samples collected July 10-11, 2020.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



PRINCE GEORGE | VANCOUVER

*Pinnacle Renewable Energy Inc
Williams Lake*

July 9, 2020

Daily production rate during stack test

25.0 MT/hr

Average for the previous 30 full production days

18.0 MT/hr

80th percentile production rate

21.4 MT/hr

July 10, 2020

Daily production rate during stack test

25.2 MT/hr

Average for the previous 30 full production days

18.1 MT/hr

80th percentile production rate

21.4 MT/hr

PRINCE GEORGE

8545 Willow Cale Road, Prince George, BC V2N 6Z9
TF. 1-877-737-4344 P. 250-562-5562 F. 250-562-5584

VANCOUVER

350 - 3600 Lysander Lane, Richmond, BC V7B 1C3
P. 604-270-9613 F. 604-270-9914

| www.pinnaclepellet.com |





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





MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

David Brandle

has successfully completed

The program of studies and is awarded the certificate in

STACK SAMPLING

May 3 – May 7, 2004

May, 2004
Date

Doreen Brandle
Dean
Faculty of Continuing Education and Extension