

**Pinnacle Renewable Energy
Williams Lake Div**

**Total Particulate Testing
March 15, 2024
RA-17557**

Our Job Number: ME2425-007

Report Author: Matt McCall
McCall Environmental



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April 5, 2024

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

Attention: Mr. Ian Tencarre

Reference: Parameters Tested – Total Particulate & Cond. Organics
Test Date(s) – March 15, 2024
Permit – PA-17557
McCall File Number – ME2425-007

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

Key Personnel

- Report Generation: Matt McCall 250-542-5118
- Field Tech: Kiefer Stauber, Chris Bodden 250-564-9106
- Plant Personnel: Ian Tencarre 250-267-7580

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 March 15, 2024

Average of Triplicate Tests Dryer Stacks 1-4

Parameter	Stack 1	Stack2	Stack 3	Stack 4	Avg/Total	Permit	20-Dec-23
Test Date	15-Mar-24	15-Mar-24	15-Mar-24	15-Mar-24	N/A		N/A
Gas Temperature (°C)	17.6	29.3	23.6	35.5	26.5		29.55
% Moisture	1.55	3.48	2.28	2.95	2.57		1.83
Velocity (m/sec)	6.74	7.10	6.85	6.86	6.89		7.64
ACFM	41818	44005	42501	42550	170873		189533
Std. Dry Flow Rate (m ³ /sec)	18.69	18.54	18.47	17.65	73.35	132.00	78.86
Tot Part. Dry Basis ref. Cond. (mg/m ³)	4.48	4.45	4.52	5.82	4.82	15.00	13.45
Front Half Particulate (mg/m ³)	2.69	2.69	2.61	3.96	2.99		10.92
Back Half Condensables (mg/m ³)	1.79	1.76	1.91	1.86	1.83		2.53
Mass Emission Rate (kg/hr)	0.30	0.30	0.30	0.37	1.27	7.67	3.83

* Mass Emission Rates (Flow, kg/hr are a total combined value, concentration, temp etc is averaged)

* Standard reference conditions are on a dry basis corrected to 20 deg C and a pressure of 29.92 inches Hg

Discussion Of Test Results

Test results are in compliance with permitted limits.

The last time this sources was tested was in December of 2023. Those results are included in the summary table above.

Field personnel did not notice any abnormalities in and around the test site in terms of abnormal opacity of fly ash during testing. To the best of our knowledge the plant was operating normally throughout the duration of the testing.

These sources are quite turbulent however are not considered cyclonic and are tested with standard testing methodologies.

Dryer Stack 1
15-Mar-24
Pinnacle Renewable Energy
Permit Number: RA-17557
Williams Lake, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	64 ° F	18 ° C
Moisture Content (by volume):	1.55 %	
Average Stack Gas Velocity:	22.13 ft/sec	6.74 m/sec
Total Actual Gas Flow Rate:	41818 ACFM	
Dry Gas flow Rate at Reference Conditions:	39600 SCFM	18.69 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	4.48 mg/m ³
Front Half Particulate	0.00 gr/ft ³	2.69 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.79 mg/m ³
Mass Emission Rate	0.66 lbs/hr	0.30 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	68 ° F	20 ° C
Moisture Content (by volume):	1.7 %	
Average Stack Gas Velocity:	22.2 ft/sec	6.8 m/sec
Total Actual Gas Flow Rate:	41934 ACFM	
Dry Gas flow Rate at Reference Conditions:	39291 SCFM	18.5 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.2 mg/m ³
Front Half Particulate	.001 gr/ft ³	3.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.77 lbs/hr	0.35 kg/hr

TEST 2:

Gas Temperature:	59 ° F	15 ° C
Moisture Content (by volume):	1.3 %	
Average Stack Gas Velocity:	22.0 ft/sec	6.7 m/sec
Total Actual Gas Flow Rate:	41588 ACFM	
Dry Gas flow Rate at Reference Conditions:	39859 SCFM	18.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.5 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.67 lbs/hr	0.30 kg/hr

TEST 3:

Gas Temperature:	64 ° F	18 ° C
Moisture Content (by volume):	1.6 %	
Average Stack Gas Velocity:	22.2 ft/sec	6.8 m/sec
Total Actual Gas Flow Rate:	41930 ACFM	
Dry Gas flow Rate at Reference Conditions:	39650 SCFM	18.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	3.7 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.0 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.56 lbs/hr	0.25 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 1
Permit Number: RA-17557
Job Number: ME2425-007
Pollution Control Permit: 15 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(g):
Weight of 2" Filter(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
I25	I26	I27
15-Mar-24	15-Mar-24	15-Mar-24
8:30	9:38	10:45
9:34	10:41	11:49
60	60	60
CB/KS	CB/KS	CB/KS
955	955	955
28.55	28.55	28.55
-0.09	-0.09	-0.09
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.310	0.310	0.310
1.0079	1.0079	1.0079
0.85654	0.85654	0.85654
31.5	31.5	31.5
10	7	9
4.4	4	4.9
0.0002	0.0003	0.0004
0.0036	0.0027	0.0018
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0058	0.0050	0.0042

Sampling Data for - TEST 1-
Dryer Stack 1
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.16	1.77	45	43	69	38.39	0.97
A-11	0.17	1.89	47	38	65	40.04	1.03
A-10	0.15	1.69	55	39	64	41.85	1.00
A-9	0.14	1.58	60	39	66	43.52	0.96
A-8	0.11	1.25	63	41	64	45.08	1.06
A-7	0.12	1.37	64	43	63	46.61	0.98
A-6	0.13	1.49	75	45	66	48.10	1.00
A-5	0.14	1.60	76	46	69	49.69	0.99
A-4	0.14	1.61	75	48	69	51.33	0.96
A-3	0.13	1.50	76	49	67	52.91	1.06
A-2	0.15	1.73	79	50	68	54.61	0.94
A-1	0.18	2.08	81	53	71	56.23	0.97
B-12	0.17	1.96	81	55	73	58.07	1.01
B-11	0.16	1.84	82	56	74	59.93	1.04
B-10	0.15	1.74	85	58	73	61.79	1.01
B-9	0.15	1.74	86	60	74	63.54	0.99
B-8	0.14	1.63	87	61	72	65.27	1.01
B-7	0.12	1.40	90	63	73	66.98	1.03
B-6	0.11	1.30	90	64	70	68.59	1.06
B-5	0.13	1.54	90	65	68	70.19	0.97
B-4	0.15	1.78	91	66	67	71.79	1.02
B-3	0.14	1.67	92	67	66	73.59	0.97
B-2	0.13	1.55	91	67	65	75.25	1.06
B-1	0.17	2.03	91	69	66	77.01	1.00
						78.91	

Sampling Data for - TEST 2-
Dryer Stack 1
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.15	1.75	72	69	69	79.50	1.01
A-11	0.17	2.01	86	69	68	81.26	1.01
A-10	0.16	1.91	88	69	65	83.16	0.92
A-9	0.15	1.81	90	70	61	84.86	1.00
A-8	0.14	1.71	94	71	57	86.65	0.98
A-7	0.14	1.72	95	72	56	88.37	1.04
A-6	0.13	1.60	98	73	55	90.19	1.03
A-5	0.15	1.86	99	73	52	91.93	0.92
A-4	0.14	1.74	100	73	53	93.62	0.99
A-3	0.12	1.47	94	73	56	95.36	1.03
A-2	0.16	1.96	94	74	57	97.03	0.96
A-1	0.18	2.20	95	74	57	98.82	0.97
B-12	0.16	1.96	97	75	58	100.74	1.02
B-11	0.17	2.08	98	75	58	102.66	0.99
B-10	0.14	1.72	98	7	57	104.57	1.06
B-9	0.13	1.60	98	76	58	106.32	1.02
B-8	0.15	1.85	98	77	57	108.05	0.95
B-7	0.14	1.72	99	78	60	109.79	0.97
B-6	0.11	1.35	100	78	61	111.50	1.03
B-5	0.12	1.47	101	79	61	113.11	0.99
B-4	0.12	1.48	100	79	59	114.72	0.97
B-3	0.13	1.60	101	80	59	116.31	1.03
B-2	0.14	1.73	100	80	58	118.07	0.96
B-1	0.15	1.85	99	80	57	119.76	0.97
						121.54	

Sampling Data for - TEST 3-
Dryer Stack 1
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.17	1.98	81	79	79	22.57	0.98
A-11	0.18	2.16	96	81	72	24.41	0.96
A-10	0.16	1.94	98	80	67	26.29	0.97
A-9	0.15	1.82	97	79	64	28.09	1.05
A-8	0.14	1.71	96	78	62	29.99	1.03
A-7	0.13	1.58	96	78	63	31.79	1.04
A-6	0.11	1.33	97	78	65	33.54	1.01
A-5	0.12	1.46	97	78	63	35.10	0.99
A-4	0.15	1.83	98	78	63	36.70	0.96
A-3	0.14	1.71	99	78	63	38.44	1.05
A-2	0.12	1.46	97	78	62	40.27	1.01
A-1	0.15	1.22	95	77	62	41.90	0.92
B-12	0.18	2.18	94	77	64	43.57	0.93
B-11	0.16	1.95	99	76	63	45.40	1.10
B-10	0.15	1.81	93	75	63	47.45	0.99
B-9	0.14	1.69	92	75	63	49.23	1.04
B-8	0.12	1.45	91	74	62	51.04	1.04
B-7	0.11	1.33	90	73	62	52.71	1.05
B-6	0.14	1.69	90	73	62	54.32	0.95
B-5	0.15	1.81	91	73	61	55.96	1.03
B-4	0.16	1.92	90	71	63	57.81	1.09
B-3	0.15	1.81	90	71	62	59.81	0.95
B-2	0.14	1.68	89	71	62	61.51	1.00
B-1	0.15	1.80	89	71	63	63.24	0.91
						64.87	



Dryer Stack 1
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 1.004

Delta P:	0.143 "H₂O	Us avg:	22.19 ft/sec
Delta H:	1.656	ACFM:	41934 ft³/min
Tm avg:	525.4 °R	SDCFM:	39291 ft³/min
Ts avg:	528.4 °R	Vm std:	39.33 ft³
Bwo:	0.017	Vm corr:	40.84 ft³
Md:	28.96	Vm:	40.52 ft³
Ms:	28.77	MF:	1.0079
Pb:	28.55 "Hg	PCON:	5.21 mg/m³
Pm:	28.67 "Hg	ERAT:	0.35 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 0.993

Delta P:	0.143 "H₂O	Us avg:	22.00 ft/sec
Delta H:	1.756	ACFM:	41588 ft³/min
Tm avg:	543.7 °R	SDCFM:	39859 ft³/min
Ts avg:	518.7 °R	Vm std:	39.44 ft³
Bwo:	0.013	Vm corr:	42.37 ft³
Md:	28.96	Vm:	42.04 ft³
Ms:	28.82	MF:	1.0079
Pb:	28.55 "Hg	PCON:	4.48 mg/m³
Pm:	28.68 "Hg	ERAT:	0.30 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.002

Delta P:	0.144 "H₂O	Us avg:	22.19 ft/sec
Delta H:	1.722	ACFM:	41930 ft³/min
Tm avg:	544.7 °R	SDCFM:	39650 ft³/min
Ts avg:	524.0 °R	Vm std:	39.61 ft³
Bwo:	0.016	Vm corr:	42.63 ft³
Md:	28.96	Vm:	42.30 ft³
Ms:	28.78	MF:	1.0079
Pb:	28.55 "Hg	PCON:	3.74 mg/m³
Pm:	28.68 "Hg	ERAT:	0.25 kg/hr
Ps:	28.54 "Hg		

Dryer Stack 2
15-Mar-24
Pinnacle Renewable Energy
Permit Number: RA-17557
Williams Lake, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	85 ° F	29 ° C
Moisture Content (by volume):	3.48 %	
Average Stack Gas Velocity:	23.28 ft/sec	7.10 m/sec
Total Actual Gas Flow Rate:	44005 ACFM	
Dry Gas flow Rate at Reference Conditions:	39275 SCFM	18.54 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	4.45 mg/m ³
Front Half Particulate	0.00 gr/ft ³	2.69 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.76 mg/m ³
Mass Emission Rate	0.66 lbs/hr	0.30 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	83 ° F	28 ° C
Moisture Content (by volume):	3.5 %	
Average Stack Gas Velocity:	23.3 ft/sec	7.1 m/sec
Total Actual Gas Flow Rate:	44084 ACFM	
Dry Gas flow Rate at Reference Conditions:	39453 SCFM	18.6 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	3.2 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.73 lbs/hr	0.33 kg/hr

TEST 2:

Gas Temperature:	85 ° F	29 ° C
Moisture Content (by volume):	3.1 %	
Average Stack Gas Velocity:	22.9 ft/sec	7.0 m/sec
Total Actual Gas Flow Rate:	43191 ACFM	
Dry Gas flow Rate at Reference Conditions:	38680 SCFM	18.3 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	3.9 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.1 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.56 lbs/hr	0.25 kg/hr

TEST 3:

Gas Temperature:	86 ° F	30 ° C
Moisture Content (by volume):	3.8 %	
Average Stack Gas Velocity:	23.7 ft/sec	7.2 m/sec
Total Actual Gas Flow Rate:	44738 ACFM	
Dry Gas flow Rate at Reference Conditions:	39691 SCFM	18.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.5 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.8 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.67 lbs/hr	0.30 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 2
Permit Number: RA-17557
Job Number: ME2425-007
Pollution Control Permit: 15 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(g):
Weight of 2" Filter(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
I19	I20	I21
15-Mar-24	15-Mar-24	15-Mar-24
8:47	9:51	10:56
9:49	10:53	11:58
60	60	60
NA/CB/KS	NA/CB/KS	NA/CB/KS
1021	1021	1021
28.55	28.55	28.55
-0.10	-0.10	-0.10
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.310	0.310	0.310
1.0175	1.0175	1.0175
0.83867	0.83867	0.83867
31.5	31.5	31.5
27	22	30
4.1	4.5	4.3
0.0005	0.0009	0.0003
0.0032	0.0014	0.0029
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0057	0.0043	0.0052

Sampling Data for - TEST 1-
Dryer Stack 2
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.14	1.48	52	52	86	98.01	1.01
A-11	0.16	1.68	57	52	84	99.56	1.03
A-10	0.15	1.58	61	53	83	101.25	1.02
A-9	0.16	1.70	65	54	83	102.89	1.04
A-8	0.17	1.81	67	55	82	104.61	1.04
A-7	0.18	1.92	68	56	82	106.40	1.06
A-6	0.17	1.83	70	58	81	108.27	1.05
A-5	0.15	1.62	72	59	81	110.08	1.04
A-4	0.15	1.62	74	60	82	111.78	1.03
A-3	0.13	1.41	76	63	83	113.46	1.01
A-2	0.13	1.41	79	66	83	115.00	1.02
A-1	0.13	1.42	81	69	84	116.57	1.01
B-12	0.19	2.08	83	71	84	118.13	1.05
B-11	0.17	1.86	85	72	85	120.09	1.01
B-10	0.16	1.77	87	74	83	121.88	0.98
B-9	0.15	1.66	88	75	83	123.57	1.02
B-8	0.17	1.89	89	77	82	125.28	1.02
B-7	0.17	1.90	90	79	81	127.10	1.01
B-6	0.19	2.12	90	82	82	128.92	1.04
B-5	0.20	2.23	91	81	82	130.89	1.04
B-4	0.18	2.01	92	82	83	132.91	1.03
B-3	0.15	1.67	92	83	84	134.82	1.04
B-2	0.14	1.56	93	84	85	136.58	1.04
B-1	0.14	1.57	94	85	85	138.28	1.02
						139.96	

Sampling Data for - TEST 2-
Dryer Stack 2
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.13	1.41	80	80	82	40.69	1.03
A-11	0.15	1.62	80	78	83	42.30	1.02
A-10	0.15	1.63	81	78	83	44.01	1.02
A-9	0.17	1.84	81	79	84	45.72	0.99
A-8	0.18	1.95	82	79	84	47.49	1.02
A-7	0.18	1.95	83	79	85	49.37	1.00
A-6	0.15	1.63	83	79	84	51.20	1.02
A-5	0.14	1.52	83	79	84	52.92	1.04
A-4	0.13	1.41	84	79	85	54.60	1.01
A-3	0.13	1.41	84	80	85	56.18	1.01
A-2	0.12	1.30	85	80	85	57.76	1.03
A-1	0.14	1.52	85	80	84	59.31	1.04
B-12	0.18	1.95	85	80	85	61.00	1.03
B-11	0.18	1.95	86	80	86	62.89	0.99
B-10	0.17	1.85	86	81	86	64.71	1.02
B-9	0.15	1.63	86	81	86	66.53	1.02
B-8	0.17	1.85	87	81	85	68.25	1.03
B-7	0.18	1.96	87	82	86	70.10	1.02
B-6	0.16	1.74	88	82	86	71.98	1.02
B-5	0.16	1.74	88	82	87	73.75	1.02
B-4	0.15	1.63	89	82	87	75.52	0.99
B-3	0.14	1.53	89	83	86	77.20	1.02
B-2	0.13	1.42	89	83	86	78.86	1.02
B-1	0.13	1.42	89	83	86	80.47	1.01
						82.06	

Sampling Data for - TEST 3-
Dryer Stack 2
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.14	1.53	86	86	86	82.67	1.04
A-11	0.15	1.64	89	86	87	84.36	1.03
A-10	0.17	1.86	92	87	87	86.10	1.06
A-9	0.17	1.86	93	87	88	88.00	1.03
A-8	0.19	2.08	94	87	88	89.86	1.03
A-7	0.20	2.20	95	88	88	91.81	1.03
A-6	0.18	1.98	95	88	87	93.83	1.02
A-5	0.16	1.76	95	88	87	95.73	1.04
A-4	0.16	1.76	96	88	87	97.55	1.00
A-3	0.14	1.55	96	89	86	99.31	1.04
A-2	0.13	1.43	96	89	87	101.02	1.02
A-1	0.13	1.43	96	89	86	102.64	1.00
B-12	0.16	1.77	96	89	85	104.23	1.06
B-11	0.16	1.77	96	89	84	106.10	1.03
B-10	0.18	1.99	96	89	84	107.91	1.03
B-9	0.20	2.22	97	89	85	109.83	1.03
B-8	0.19	2.10	97	90	86	111.86	1.01
B-7	0.17	1.59	97	90	84	113.80	1.05
B-6	0.17	1.89	98	91	84	115.70	1.03
B-5	0.18	2.00	98	91	85	117.57	1.03
B-4	0.16	1.48	99	92	85	119.50	1.03
B-3	0.16	1.78	99	92	86	121.33	1.02
B-2	0.14	1.55	99	93	86	123.14	0.99
B-1	0.13	1.45	100	93	85	124.78	1.00
						126.38	

Dryer Stack 2
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 1.027

Delta P:	0.159 "H₂O	Us avg:	23.32 ft/sec
Delta H:	1.742	ACFM:	44084 ft³/min
Tm avg:	533.7 °R	SDCFM:	39453 ft³/min
Ts avg:	543.0 °R	Vm std:	40.47 ft³
Bwo:	0.035	Vm corr:	42.68 ft³
Md:	28.96	Vm:	41.95 ft³
Ms:	28.57	MF:	1.0175
Pb:	28.55 "Hg	PCON:	4.97 mg/m³
Pm:	28.68 "Hg	ERAT:	0.33 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 1.017

Delta P:	0.152 "H₂O	Us avg:	22.85 ft/sec
Delta H:	1.661	ACFM:	43191 ft³/min
Tm avg:	542.7 °R	SDCFM:	38680 ft³/min
Ts avg:	545.0 °R	Vm std:	39.25 ft³
Bwo:	0.031	Vm corr:	42.09 ft³
Md:	28.96	Vm:	41.37 ft³
Ms:	28.62	MF:	1.0175
Pb:	28.55 "Hg	PCON:	3.87 mg/m³
Pm:	28.67 "Hg	ERAT:	0.25 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.028

Delta P:	0.163 "H₂O	Us avg:	23.67 ft/sec
Delta H:	1.778	ACFM:	44738 ft³/min
Tm avg:	552.4 °R	SDCFM:	39691 ft³/min
Ts avg:	546.0 °R	Vm std:	40.75 ft³
Bwo:	0.038	Vm corr:	44.47 ft³
Md:	28.96	Vm:	43.71 ft³
Ms:	28.54	MF:	1.0175
Pb:	28.55 "Hg	PCON:	4.51 mg/m³
Pm:	28.68 "Hg	ERAT:	0.30 kg/hr
Ps:	28.54 "Hg		

Dryer Stack 3
15-Mar-24
Pinnacle Renewable Energy
Permit Number: RA-17557
Williams Lake, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	75 ° F	24 ° C
Moisture Content (by volume):	2.28 %	
Average Stack Gas Velocity:	22.49 ft/sec	6.85 m/sec
Total Actual Gas Flow Rate:	42501 ACFM	
Dry Gas flow Rate at Reference Conditions:	39134 SCFM	18.47 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	4.52 mg/m ³
Front Half Particulate	0.00 gr/ft ³	2.61 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.91 mg/m ³
Mass Emission Rate	0.66 lbs/hr	0.30 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	78 ° F	26 ° C
Moisture Content (by volume):	2.3 %	
Average Stack Gas Velocity:	22.4 ft/sec	6.8 m/sec
Total Actual Gas Flow Rate:	42354 ACFM	
Dry Gas flow Rate at Reference Conditions:	38704 SCFM	18.3 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	2.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	0.63 lbs/hr	0.29 kg/hr

TEST 2:

Gas Temperature:	73 ° F	23 ° C
Moisture Content (by volume):	2.2 %	
Average Stack Gas Velocity:	22.4 ft/sec	6.8 m/sec
Total Actual Gas Flow Rate:	42317 ACFM	
Dry Gas flow Rate at Reference Conditions:	39086 SCFM	18.4 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	5.9 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.0 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	0.87 lbs/hr	0.39 kg/hr

TEST 3:

Gas Temperature:	72 ° F	22 ° C
Moisture Content (by volume):	2.4 %	
Average Stack Gas Velocity:	22.7 ft/sec	6.9 m/sec
Total Actual Gas Flow Rate:	42833 ACFM	
Dry Gas flow Rate at Reference Conditions:	39610 SCFM	18.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.001 gr/ft ³	3.3 mg/m ³
Front Half Particulate	.001 gr/ft ³	1.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	0.49 lbs/hr	0.22 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 3
Permit Number: RA-17557
Job Number: ME2425-007
Pollution Control Permit: 15 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(g):
Weight of 2" Filter(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
I28	I29	I30
15-Mar-24	15-Mar-24	15-Mar-24
12:03	13:12	14:16
13:06	14:15	15:20
60	60	60
NA/CB/KS	NA/CB/KS	NA/CB/KS
955	955	955
28.55	28.55	28.55
-0.12	-0.12	-0.12
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.300	0.300	0.300
1.0079	1.0079	1.0079
0.85654	0.85654	0.85654
31.5	31.5	31.5
13	12	14
5.2	5.5	5.1
0.0003	0.0002	0.0003
0.0022	0.0040	0.0012
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0045	0.0062	0.0035

Sampling Data for - TEST 1-
Dryer Stack 3
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.12	1.19	62	64	80	66.03	0.99
A-11	0.13	1.30	70	63	79	67.44	1.09
A-10	0.11	1.10	74	62	80	69.06	1.02
A-9	0.12	1.20	76	62	79	70.46	1.04
A-8	0.11	1.10	78	61	78	71.95	0.93
A-7	0.10	1.01	83	61	77	73.23	1.04
A-6	0.13	1.31	80	61	77	74.61	1.05
A-5	0.15	1.51	82	61	77	76.18	0.94
A-4	0.17	1.72	82	61	77	77.70	1.01
A-3	0.19	1.92	83	62	78	79.43	0.98
A-2	0.17	1.72	84	62	77	81.21	1.02
A-1	0.16	1.62	86	62	78	82.96	1.00
B-12	0.13	1.31	85	61	78	84.64	1.06
B-11	0.14	1.42	84	63	78	86.23	1.02
B-10	0.13	1.31	84	63	79	87.83	1.00
B-9	0.12	1.21	84	63	78	89.33	1.03
B-8	0.11	1.11	85	63	79	90.82	1.05
B-7	0.14	1.41	85	63	79	92.28	1.02
B-6	0.16	1.62	86	64	79	93.87	0.94
B-5	0.17	1.72	86	64	79	95.45	1.01
B-4	0.19	1.93	87	64	79	97.19	0.96
B-3	0.18	1.83	87	65	79	98.95	1.02
B-2	0.16	1.62	88	65	79	100.77	1.05
B-1	0.16	1.62	88	65	80	102.54	0.99
						104.20	

Sampling Data for - TEST 2-
Dryer Stack 3
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.13	1.29	68	64	80	4.94	1.04
A-11	0.14	1.41	80	65	80	6.48	1.10
A-10	0.12	1.21	83	65	78	8.19	0.96
A-9	0.13	1.33	85	65	75	9.58	1.00
A-8	0.11	1.13	87	65	73	11.10	1.03
A-7	0.10	1.03	87	66	71	12.54	1.00
A-6	0.14	1.45	89	67	70	13.88	0.98
A-5	0.15	1.55	89	67	71	15.44	1.06
A-4	0.18	1.86	90	68	71	17.19	0.94
A-3	0.19	1.96	90	68	73	18.88	0.98
A-2	0.18	1.86	90	68	72	20.69	1.05
A-1	0.15	1.55	90	69	74	22.58	0.95
B-12	0.12	1.24	92	69	75	24.15	1.00
B-11	0.14	1.44	94	70	77	25.62	1.04
B-10	0.14	1.43	93	70	79	27.27	1.04
B-9	0.11	1.13	91	70	78	28.92	1.08
B-8	0.10	1.03	91	71	75	30.44	1.06
B-7	0.14	1.45	91	71	72	31.87	0.99
B-6	0.15	1.55	92	71	73	33.45	1.01
B-5	0.18	1.88	93	72	69	35.12	0.99
B-4	0.19	1.98	94	72	69	36.92	0.95
B-3	0.18	1.89	94	73	68	38.70	1.01
B-2	0.15	1.58	94	73	68	40.55	1.04
B-1	0.16	1.68	95	74	69	42.29	1.03
						44.06	

Sampling Data for - TEST 3-
Dryer Stack 3
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.11	1.10	76	72	83	46.64	1.05
A-11	0.14	1.42	90	72	84	48.09	1.00
A-10	0.13	1.32	92	72	86	49.66	1.04
A-9	0.12	1.23	92	73	80	51.24	1.01
A-8	0.11	1.13	92	73	78	52.73	1.02
A-7	0.12	1.26	93	73	69	54.17	0.96
A-6	0.13	1.70	93	73	65	55.59	1.01
A-5	0.16	1.68	94	73	69	57.16	1.03
A-4	0.17	1.78	94	73	70	58.92	1.00
A-3	0.19	1.97	94	73	74	60.68	0.98
A-2	0.18	1.87	95	73	73	62.50	1.04
A-1	0.17	1.78	95	73	71	64.38	1.03
B-12	0.13	1.36	95	74	69	66.20	0.99
B-11	0.13	1.37	94	74	66	67.74	1.09
B-10	0.12	1.27	95	74	66	69.44	0.98
B-9	0.11	1.16	95	74	66	70.90	1.08
B-8	0.15	1.58	94	77	67	72.44	1.05
B-7	0.16	1.69	95	74	67	74.19	0.99
B-6	0.17	1.80	95	74	66	75.90	1.09
B-5	0.17	1.79	96	75	68	77.84	1.00
B-4	0.18	1.89	95	75	69	79.61	0.96
B-3	0.19	1.99	95	74	71	81.36	0.98
B-2	0.17	1.77	95	74	73	83.19	1.04
B-1	0.16	1.66	94	74	74	85.02	0.98
						86.70	



Dryer Stack 3
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 1.011

Delta P:	0.143 "H₂O	Us avg:	22.41 ft/sec
Delta H:	1.450	ACFM:	42354 ft³/min
Tm avg:	532.4 °R	SDCFM:	38704 ft³/min
Ts avg:	538.5 °R	Vm std:	36.54 ft³
Bwo:	0.023	Vm corr:	38.47 ft³
Md:	28.96	Vm:	38.17 ft³
Ms:	28.71	MF:	1.0079
Pb:	28.55 "Hg	PCON:	4.35 mg/m³
Pm:	28.66 "Hg	ERAT:	0.29 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 1.013

Delta P:	0.144 "H₂O	Us avg:	22.39 ft/sec
Delta H:	1.496	ACFM:	42317 ft³/min
Tm avg:	539.1 °R	SDCFM:	39086 ft³/min
Ts avg:	533.3 °R	Vm std:	36.99 ft³
Bwo:	0.022	Vm corr:	39.43 ft³
Md:	28.96	Vm:	39.12 ft³
Ms:	28.72	MF:	1.0079
Pb:	28.55 "Hg	PCON:	5.92 mg/m³
Pm:	28.66 "Hg	ERAT:	0.39 kg/hr
Ps:	28.54 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.015

Delta P:	0.148 "H₂O	Us avg:	22.66 ft/sec
Delta H:	1.565	ACFM:	42833 ft³/min
Tm avg:	543.4 °R	SDCFM:	39610 ft³/min
Ts avg:	531.8 °R	Vm std:	37.59 ft³
Bwo:	0.024	Vm corr:	40.38 ft³
Md:	28.96	Vm:	40.06 ft³
Ms:	28.70	MF:	1.0079
Pb:	28.55 "Hg	PCON:	3.29 mg/m³
Pm:	28.67 "Hg	ERAT:	0.22 kg/hr
Ps:	28.54 "Hg		

Dryer Stack 4
15-Mar-24
Pinnacle Renewable Energy
Permit Number: RA-17557
Williams Lake, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	96 ° F	36 ° C
Moisture Content (by volume):	2.95 %	
Average Stack Gas Velocity:	22.51 ft/sec	6.86 m/sec
Total Actual Gas Flow Rate:	42550 ACFM	
Dry Gas flow Rate at Reference Conditions:	37408 SCFM	17.65 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	5.82 mg/m ³
Front Half Particulate	0.00 gr/ft ³	3.96 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.86 mg/m ³
Mass Emission Rate	0.82 lbs/hr	0.37 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	95 ° F	35 ° C
Moisture Content (by volume):	2.0 %	
Average Stack Gas Velocity:	22.1 ft/sec	6.7 m/sec
Total Actual Gas Flow Rate:	41813 ACFM	
Dry Gas flow Rate at Reference Conditions:	37189 SCFM	17.6 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	3.5 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	0.75 lbs/hr	0.34 kg/hr

TEST 2:

Gas Temperature:	97 ° F	36 ° C
Moisture Content (by volume):	3.3 %	
Average Stack Gas Velocity:	22.6 ft/sec	6.9 m/sec
Total Actual Gas Flow Rate:	42695 ACFM	
Dry Gas flow Rate at Reference Conditions:	37377 SCFM	17.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.3 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.5 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.9 mg/m ³
Mass Emission Rate	0.89 lbs/hr	0.40 kg/hr

TEST 3:

Gas Temperature:	96 ° F	36 ° C
Moisture Content (by volume):	3.6 %	
Average Stack Gas Velocity:	22.8 ft/sec	7.0 m/sec
Total Actual Gas Flow Rate:	43141 ACFM	
Dry Gas flow Rate at Reference Conditions:	37659 SCFM	17.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	5.7 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.9 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.81 lbs/hr	0.37 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 4
Permit Number: RA-17557
Job Number: ME2425-007
Pollution Control Permit: 15 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(g):
Weight of 2" Filter(g):
Total Weight of Particulate(g):

TEST 1	TEST 2	TEST 3
I22	I23	I24
15-Mar-24	15-Mar-24	15-Mar-24
12:27	13:32	14:37
13:30	14:34	15:39
60	60	60
NA/CB/KS	NA/CB/KS	NA/CB/KS
1021	1021	1021
28.55	28.55	28.55
-0.11	-0.11	-0.11
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.310	0.310	0.310
1.0175	1.0175	1.0175
0.83867	0.83867	0.83867
31.5	31.5	31.5
12	23	23
4.4	4	6.9
0.0015	0.0008	0.0014
0.0023	0.0040	0.0028
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0058	0.0068	0.0062

Sampling Data for - TEST 1-
Dryer Stack 4
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.12	1.31	79	79	97	27.19	1.02
A-11	0.12	1.31	82	78	96	28.71	1.01
A-10	0.13	1.42	83	78	96	30.22	1.00
A-9	0.13	1.43	85	79	97	31.78	1.00
A-8	0.14	1.54	85	79	96	33.35	1.03
A-7	0.14	1.54	86	80	95	35.02	1.02
A-6	0.15	1.66	87	8	94	36.68	1.09
A-5	0.15	1.66	88	82	94	38.40	0.99
A-4	0.16	1.77	90	82	95	40.08	1.05
A-3	0.14	1.46	91	83	94	41.92	1.02
A-2	0.12	1.34	93	84	94	43.60	1.00
A-1	0.11	1.23	93	85	93	45.13	1.05
B-12	0.14	1.57	94	86	93	46.66	0.98
B-11	0.14	1.58	9	88	93	48.28	1.08
B-10	0.17	1.91	96	89	93	49.93	1.02
B-9	0.18	2.03	97	89	94	51.80	1.03
B-8	0.15	1.69	98	90	94	53.74	1.01
B-7	0.14	1.58	98	92	95	55.47	1.03
B-6	0.14	1.58	99	92	95	57.19	1.02
B-5	0.15	1.70	100	93	94	58.89	0.99
B-4	0.15	1.70	101	94	96	60.60	1.00
B-3	0.16	1.81	102	94	96	62.33	1.02
B-2	0.14	1.58	102	95	97	64.15	1.01
B-1	0.12	1.36	103	96	97	65.84	0.99
						67.38	

Sampling Data for - TEST 2-
Dryer Stack 4
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.11	1.22	96	96	96	68.04	1.02
A-11	0.13	1.44	98	96	96	69.53	1.01
A-10	0.14	1.55	100	95	97	71.14	1.01
A-9	0.14	1.55	100	95	97	72.80	1.04
A-8	0.15	1.66	101	96	98	74.51	1.03
A-7	0.17	1.89	101	96	97	76.27	1.01
A-6	0.16	1.78	102	96	97	78.11	1.04
A-5	0.15	1.67	102	97	96	79.95	1.03
A-4	0.12	1.34	102	97	96	81.72	1.01
A-3	0.12	1.34	103	98	96	83.27	0.99
A-2	0.11	1.23	104	99	95	84.80	0.99
A-1	0.11	1.23	104	100	96	86.26	1.03
B-12	0.17	1.90	104	100	97	87.78	1.00
B-11	0.16	1.79	105	101	97	89.62	1.03
B-10	0.14	1.57	105	101	96	91.46	1.02
B-9	0.12	1.35	106	101	95	93.16	1.00
B-8	0.14	1.58	106	102	95	94.71	1.03
B-7	0.16	1.80	107	102	96	96.43	1.04
B-6	0.16	1.80	107	102	97	98.28	1.06
B-5	0.17	1.91	107	102	97	100.18	0.95
B-4	0.19	2.13	106	103	98	101.93	1.00
B-3	0.20	2.24	106	103	98	103.88	1.02
B-2	0.17	1.91	107	104	98	105.92	1.03
B-1	0.13	1.46	107	104	97	107.82	1.01
						109.45	

Sampling Data for - TEST 3-
Dryer Stack 4
Pinnacle Renewable Energy
Williams Lake, BC

15-Mar-24

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	0.12	1.32	102	102	97	10.20	1.00
A-11	0.12	1.32	103	101	97	11.74	1.03
A-10	0.15	1.65	104	101	97	13.33	1.01
A-9	0.17	1.88	104	101	96	15.06	1.03
A-8	0.17	1.88	104	101	96	16.94	1.05
A-7	0.19	2.09	104	102	98	18.87	0.99
A-6	0.16	1.76	105	102	98	20.79	1.02
A-5	0.13	1.43	105	102	97	22.60	1.02
A-4	0.12	1.32	104	101	96	24.24	1.01
A-3	0.11	1.21	104	101	96	25.79	1.02
A-2	0.12	1.33	105	102	95	27.30	1.02
A-1	0.16	1.77	105	102	95	28.87	1.00
B-12	0.14	1.55	105	102	95	30.65	1.03
B-11	0.14	1.55	106	102	96	32.36	1.03
B-10	0.13	1.44	106	102	96	34.08	1.02
B-9	0.15	1.66	106	103	97	35.72	1.03
B-8	0.18	1.99	107	102	96	37.49	1.02
B-7	0.18	1.99	107	102	96	39.41	1.03
B-6	0.20	2.22	107	103	95	41.35	1.02
B-5	0.17	1.88	107	103	96	43.38	1.02
B-4	0.16	1.77	108	103	96	45.26	1.00
B-3	0.15	1.66	108	103	98	47.04	1.00
B-2	0.15	1.66	109	103	97	48.77	1.05
B-1	0.12	1.33	109	103	97	50.58	0.97
						52.08	



Dryer Stack 4
Pinnacle Renewable Energy
Williams Lake, BC

Data for <i>TEST 1</i>		OVERALL ISOKINETICS - TEST 1 1.020	
Delta P:	0.141 "H ₂ O	Us avg:	22.12 ft/sec
Delta H:	1.573	ACFM:	41813 ft ³ /min
Tm avg:	546.2 °R	SDCFM:	37189 ft ³ /min
Ts avg:	554.9 °R	Vm std:	37.88 ft ³
Bwo:	0.020	Vm corr:	40.89 ft ³
Md:	28.96	Vm:	40.19 ft ³
Ms:	28.74	MF:	1.0175
Pb:	28.55 "Hg	PCON:	5.41 mg/m ³
Pm:	28.67 "Hg	ERAT:	0.34 kg/hr
Ps:	28.54 "Hg		

Data for <i>TEST 2</i>		OVERALL ISOKINETICS - TEST 2 1.017	
Delta P:	0.146 "H ₂ O	Us avg:	22.59 ft/sec
Delta H:	1.639	ACFM:	42695 ft ³ /min
Tm avg:	561.5 °R	SDCFM:	37377 ft ³ /min
Ts avg:	556.6 °R	Vm std:	37.97 ft ³
Bwo:	0.033	Vm corr:	42.13 ft ³
Md:	28.96	Vm:	41.41 ft ³
Ms:	28.60	MF:	1.0175
Pb:	28.55 "Hg	PCON:	6.33 mg/m ³
Pm:	28.67 "Hg	ERAT:	0.40 kg/hr
Ps:	28.54 "Hg		

Data for <i>TEST 3</i>		OVERALL ISOKINETICS - TEST 3 1.017	
Delta P:	0.149 "H ₂ O	Us avg:	22.83 ft/sec
Delta H:	1.653	ACFM:	43141 ft ³ /min
Tm avg:	563.8 °R	SDCFM:	37659 ft ³ /min
Ts avg:	556.4 °R	Vm std:	38.24 ft ³
Bwo:	0.036	Vm corr:	42.61 ft ³
Md:	28.96	Vm:	41.88 ft ³
Ms:	28.57	MF:	1.0175
Pb:	28.55 "Hg	PCON:	5.73 mg/m ³
Pm:	28.67 "Hg	ERAT:	0.37 kg/hr
Ps:	28.54 "Hg		

Air Emission Monitoring Procedure **State Of Oregon Method 7**

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 State of Oregon Method 7 (See Figure 1). The State of Oregon Method 7 sampling train is a modified Method 5 sample train with the addition of a non heated filter in-between the third and fourth impinger.

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 filterable 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.

Condensable Organics are collected in the impinger train and a rinsing procedure is employed utilizing solvents such as Hexane or Methylene Chloride in between tests. The rinsings and condensate are forwarded to a laboratory accredited to perform the analysis in accordance with the method and a copy of that report is included in the Appendix of any report issued.

O₂, CO₂, CO (where applicable)

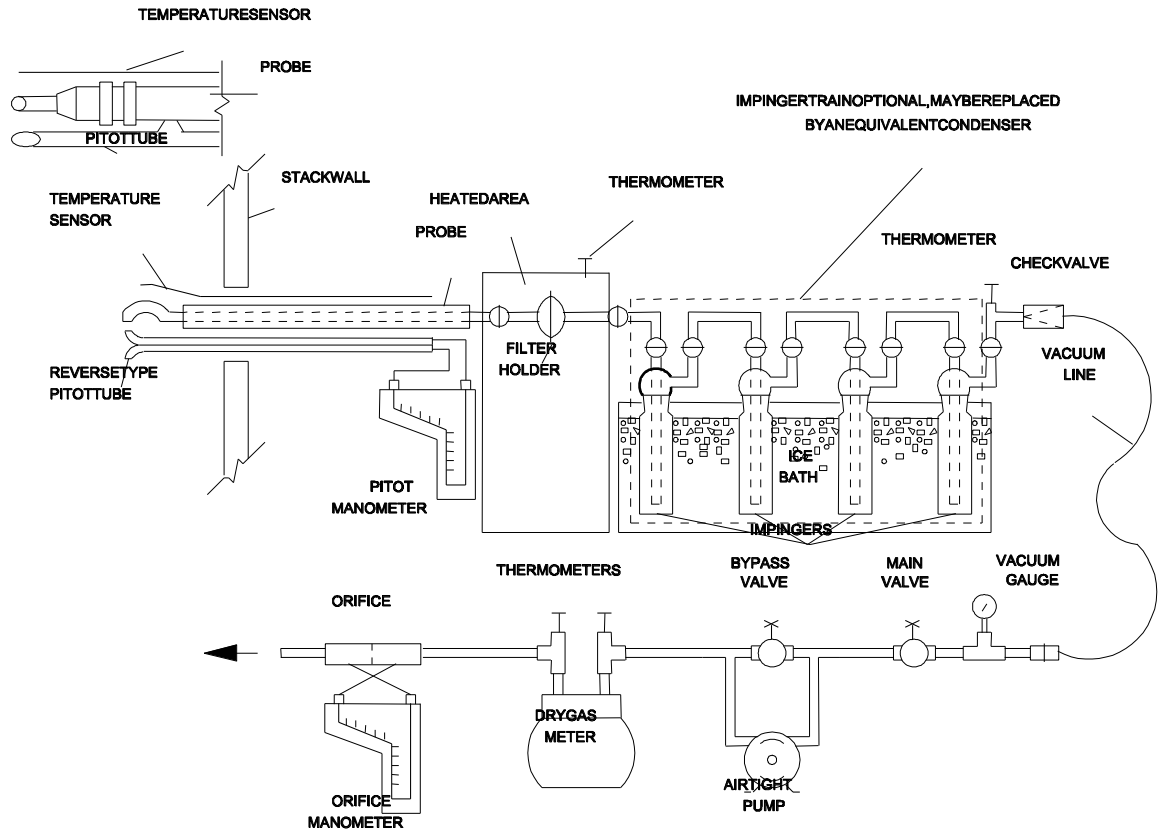
O₂, CO₂, and CO were found using either Fuji Analytical Analyzer by means of infrared and paramagnetic technology (EPA 3A) or by fyrite (EPA Method 3).

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.



Modified EPA Method 5 Diagram (State of Oregon Method 7)- Figure 1

GENERAL 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, $0.06236 \frac{[(mmHg)(m^3)]}{(^{\circ}K)(g\text{-mole})}$
 $\{21.85 \frac{[(in. Hg)(ft^3)]}{(^{\circ}R)(lb\text{-mole})}\}$.
 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.

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

$$= K_1 V_m Y \frac{P_{\text{bar}} + \left(\frac{\Delta H}{13.6} \right)}{T_m}$$

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.

$$V_{w(\text{std})} = \frac{V_{lc} \rho_w R T_{\text{std}}}{M_w P_{\text{std}}} = K_2 V_{lc}$$

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.

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

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.

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

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.

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

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.

$$I = \frac{100 T_s V_{m(\text{std})} P_{\text{std}}}{60 T_{\text{std}} v_s \theta A_n P_s (1 - B_{ws})} = \frac{K_4 T_s V_{m(\text{std})}}{P_s v_s A_n \theta (1 - B_{ws})}$$

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.

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

Average Stack Gas Dry Volumetric Flow Rate.

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

where:

- A = Cross-sectional area of stack, m² (ft²).
- 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),

$$= P_{\text{bar}} + P_g$$

- P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
- Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions, dsm³/hr (dscf/hr).
- t_s = Stack temperature, °C (°F).
- T_s = Absolute stack temperature, °K (°R).

Calibration Certificate for S-Type Pitot Tube

Date: 10-Jan-24 *Barometric Pressure ("Hg):* 29.78
Pitot I.D.: **217** *Wind Tunnel Temperature (°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>
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: 10-Jan-24 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:



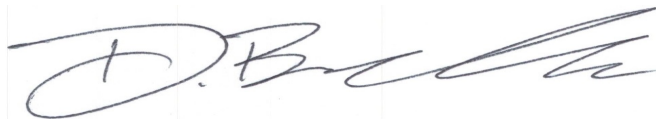
**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 10-Jan-24
 CONSOLE MANUF.: NAPP MODEL 31
 CONSOLE I.D.: C-955

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	64.0	64.0	64.0
P=Pres. Differential at WTM ("Hg)	0.0699	0.1250	0.1766
Pb= Atmospheric Pressure ("Hg)	27.95	27.95	27.95
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6006	0.6006	0.6006
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	86.0	84.0	90.0
To= Dry Test Meter Outlet Temp. (oF.)	67.0	66.0	68.0
Ri= Initial Dry Test volume (ft3)	97.56	89.73	4.38
Rf= Final Dry Test Volume (ft3)	102.43	94.62	9.28
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	27.8801	27.8250	27.7734
Pd= Pb + (^H/13.59) "Hg	28.0236	28.0972	28.1708
Tw= Ta +460 (oR.)	524.0	524.0	524.0
Td= [(Ti + To)/2] + 460 (oR.)	536.5	535.0	539.0
Bw= Pv/Pb ("Hg)	0.0215	0.0215	0.0215
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
(Calculated Y Value)(WTMF)	1.0153	1.0037	1.0047
Y (MEAN)(WTMF) =	1.0079		

MCCALL ENVIRONMENTAL

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 10-Jan-24

CONSOLE I.D. C-955

	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	1.0153	1.0153	1.0037
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	12.7	14.9	21.9
Rf=final gas meter vol.	14.67	17.66	25.21
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/\sqrt{T(FT^3/MIN)}$	0.400028	0.560446	0.664449
To=meter outlet Temp (oF)	68	68	68
Tm=meter out temp. (oR)	528	528	528
$P_m=P_b + \Delta H$	27.98679	28.02358	28.06038
$SQRT(T_m/P_m * H/M_d)$	0.570655	0.806498	0.987107
Ko=orifice const.	0.700998	0.694912	0.673128

Ko MEAN : 0.68968

$Ko^4 * 144 = 397.2555$

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: 10-Jan-24

CONSOLE I.D. C-955

	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	1.0037	1.0047	1.0047
Delta H=	2	2.5	3
Ri=int. gas meter vol.	25.6	29.7	34.3
Rf=final gas meter vol.	29.42	33.9	38.84
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.766827	0.843948	0.912268
Tm=meter out temp. (oF)	69	69	70
Tm=meter out temp. (oR.)	529	529	530
Pm=Pb + ^H	28.09717	28.13396	28.17075
SQRT(Tm/Pm*H/Md)	1.140144	1.273886	1.395878
Ko=orifice const.	0.67257	0.662499	0.653544

Ko MEAN : 0.662871

Ko*4*144= 381.8136

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:



**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 09-Jan-24
 CONSOLE MANUF.: NAPP MODEL 31
 CONSOLE I.D.: C-1021

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	64.0	64.0	64.0
P=Pres. Differential at WTM ("Hg)	0.0669	0.1250	0.1839
Pb= Atmospheric Pressure ("Hg)	27.90	27.90	27.90
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6006	0.6006	0.6006
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	81.0	83.0	86.0
To= Dry Test Meter Outlet Temp. (oF.)	72.0	69.0	70.0
Ri= Initial Dry Test volume (ft3)	73.67	66.93	80.43
Rf= Final Dry Test Volume (ft3)	78.52	71.76	85.27
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	27.8331	27.7750	27.7161
Pd= Pb + (^H/13.59) "Hg	27.9736	28.0472	28.1208
Tw= Ta +460 (oR.)	524.0	524.0	524.0
Td= [(Ti + To)/2] + 460 (oR.)	536.5	536.0	538.0
Bw= Pv/Pb ("Hg)	0.0215	0.0215	0.0215
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
(Calculated Y Value)(WTMF)	1.0196	1.0181	1.0149
Y (MEAN)(WTMF) =	1.0175		

MCCALL ENVIRONMENTAL

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 09-Jan-24

CONSOLE I.D. C-1021

	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	1.0196	1.0196	1.0181
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	91.2	93.6	97
Rf=final gas meter vol.	93.05	96.23	100.22
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \sqrt{T(FT^3/MIN)}$	0.377252	0.5363096	0.6556564
To=meter outlet Temp (oF)	69	69	69
Tm=meter out temp. (oR)	529	529	529
$P_m = P_b + \Delta H$	27.936792	27.973584	28.010375
$SQRT(T_m / P_m * H / M_d)$	0.5717061	0.8079826	0.9889225
Ko=orifice const.	0.6598705	0.6637638	0.6630008

Ko MEAN = 0.6622117

$K_o * 4 * 144 = 381.43394$

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: 09-Jan-24

CONSOLE I.D. C-1021

	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	1.0181	1.0149	1.0149
Delta H=	2	2.5	3
Ri=int. gas meter vol.	1.1	5.7	10.5
Rf=final gas meter vol.	4.8	9.88	15.1
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \sqrt{T(FT^3/MIN)}$	0.753394	0.8484564	0.933708
To=meter outlet Temp (oF)	69	69	70
Tm=meter out temp. (oR)	529	529	530
$P_m = P_b + \Delta H$	28.047167	28.083959	28.120751
$SQRT(T_m / P_m * H / M_d)$	1.1411601	1.2750198	1.3971188
Ko=orifice const.	0.6602001	0.6654457	0.6683096

Ko MEAN = 0.6646518

$Ko * 4 * 144 = 382.83944$

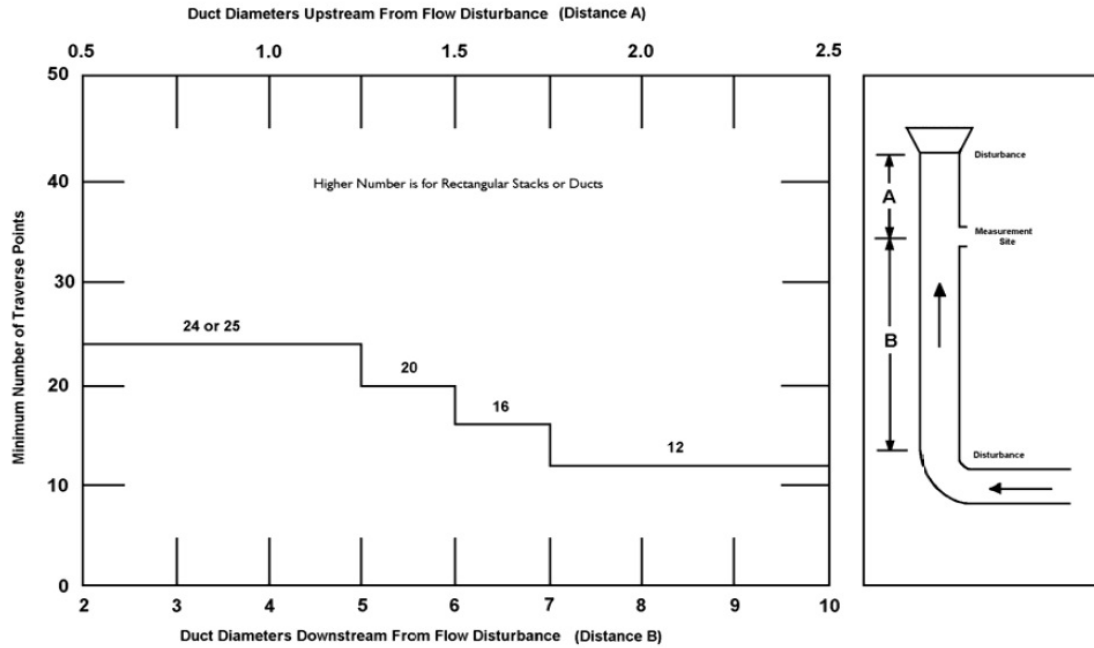
McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:





Site Diagram & Sample Point Selection



Client: Pinnacle Pellet Williams Lake
 Source: Dryer Stacks 1-4
 Pollution Abatement Equipment:
 Duct Diameters Up (A): >2
 Duct Diameters Down (B): 4
 Area of Stack (ft): 31.5
 Stack Diameter (in): 76
 Zero (in): 4
 Number of Points: 24

Traverse Points (in):	
PT-1	1.6
PT-2	5.1
PT-3	8.97
PT-4	13.45
PT-5	19
PT-6	26.98
PT-7	49.02
PT-8	57
PT-9	62.55
PT-10	67.03
PT-11	70.91
PT-12	74.4

Cyclonic Angle: 5°

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS Company: McCall Environmental	Proj. Acct. code:	

Reference Number	1720363-1	1720363-2	1720363-3
Sample Date	Mar 15, 2024	Mar 15, 2024	Mar 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	I25 / Dryer Stack 1 Test 1 / 12.1 °C	I26 / Dryer Stack 1 Test 2 / 12.1 °C	I27 / Dryer Stack 1 Test 3 / 12.1 °C
Matrix	Liquids	Liquids	Liquids

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	303	311	305
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS Company: McCall Environmental	Proj. Acct. code:	

Reference Number	1720363-4	1720363-5	1720363-6
Sample Date	Mar 15, 2024	Mar 15, 2024	Mar 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	I19 / Dryer Stack 2 Test 1 / 12.1 °C	I20 / Dryer Stack 2 Test 2 / 12.1 °C	I21 / Dryer Stack 2 Test 3 / 12.1 °C
Matrix	Liquids	Liquids	Liquids

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	326	318	328
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS Company: McCall Environmental	Proj. Acct. code:	

Reference Number	1720363-7	1720363-8	1720363-9
Sample Date	Mar 15, 2024	Mar 15, 2024	Mar 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	I28 / Dryer Stack 3 Test 1 / 12.1 °C	I29 / Dryer Stack 3 Test 2 / 12.1 °C	I30 / Dryer Stack 3 Test 3 / 12.1 °C
Matrix	Liquids	Liquids	Liquids

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	318	316	317
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS Company: McCall Environmental	Proj. Acct. code:	

Reference Number	1720363-10	1720363-11	1720363-12
Sample Date	Mar 15, 2024	Mar 15, 2024	Mar 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	I22 / Dryer Stack 4 Test 1 / 12.1 °C	I23 / Dryer Stack 4 Test 2 / 12.1 °C	I24 / Dryer Stack 4 Test 3 / 12.1 °C
Matrix	Liquids	Liquids	Liquids


Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	311	323	321
pH adjustment	required prior to O&G extraction		Yes	Yes	Yes

Analytical Report

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS Company: McCall Environmental	Proj. Acct. code:	

Reference Number 1720363-13
Sample Date Mar 15, 2024
Sample Time NA
Sample Location
Sample Description I / Blank H2O / 12.1 °C
Matrix Liquids

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2		2
Volume	Sample volume	mL	289		
pH adjustment	required prior to O&G extraction		Yes		

Approved by: 
 Rachel Eden, B. Sc.
 Operations Manager

Methodology and Notes

Bill To: McCall Environmental 6733 Buchanan Road Coldstream, BC, Canada V1B 3C5	Project ID: Drax Project Name: Project Location: Williams Lake LSD: P.O.:	Lot ID: 1720363 Control Number: Date Received: Mar 20, 2024 Date Reported: Mar 22, 2024 Report Number: 2985293 Report Type: Final Report
Attn: Accounts Payable Sampled By: NA/CB/KS 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 (2023), Oil & Grease <i>* Reference Method Modified</i>	Mar 20, 2024	Element Vancouver

References

BCELM B.C. Environmental Laboratory Manual

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.



*Drax
Williams Lake*

Daily production rate March 15, 2023

23.7 MT/hr

Average for the previous calendar month

22.1 MT/hr

90th percentile production rate

26.4 MT/hr

Average Dryer Fan 1 exit gas temperature

Included in Stack Test

Average Dryer Fan 2 exit gas temperature

Included in Stack Test

Average Dryer Fan 3 exit gas temperature

Included in Stack Test

Average Dryer Fan 4 exit gas temperature

Included in Stack Test

Average Cyclofilter exit gas temperature, [°C]

Included in Stack Test

Volumetric emission flow rates, [m³/hour]

Included in Stack Test

TPM, [mg/m³]

Included in Stack Test

PM, [mg/m³]

Included in Stack Test

Client Name: Prax
Williams lake
 Process: Dryer Stack 1
 Test Number: 1
 Date: Mar 15 2024
 Start Time 830
 Finish Time 934
 Starting Vol. 300
 Final Vol. 310
 Flask: 125
 Console: 955
 Stack Diameter _____

BP 28.55
 DN 310
 CP .85654
 MF 1.0079
 Moist. 2.1
 PM 28.66
 AS _____
 Ko .6628
 Pitot 301
 Port _____
 Static -.09 -.03 Load:
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		
0	21		
0	21		
0	21		

Duct Diameters
Up-Stream

 Duct Diameters
Downstream

 Mean Yaw Angle

 Leakage Rate @ 15 inches
 Start: .008 Finish: 1008

Personnel: KS/CS

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A 12	.16	1.77	45	43	69	38.39	2	270	1ced	
11	.17	1.89	47	38	65	40.04				
10	.15	1.69	55	39	64	41.85				
9	.14	1.58	60	39	66	43.52				
8	.11	1.25	63	41	64	45.08				
7	.12	1.37	64	43	63	46.61				
6	.13	1.49	75	45	66	48.10	3			
5	.14	1.60	76	46	69	49.69				
4	.14	1.61	75	48	69	51.33				
3	.13	1.50	76	49	67	52.91				
2	.15	1.73	79	50	68	54.61				
1	.18	2.08	81	53	71	56.23				
B 12	.17	1.96	81	55	73	58.07	4			
11	.16	1.84	82	56	74	59.93				
10	.15	1.74	85	58	73	61.79				
9	.15	1.74	86	60	74	63.54				
8	.14	1.63	87	61	72	65.27				
7	.12	1.40	90	63	73	66.98				
6	.11	1.30	90	64	70	68.59	2			
5	.13	1.54	90	65	68	70.19				
4	.15	1.78	91	66	67	71.79				
3	.14	1.67	92	67	66	73.59				
2	.13	1.55	91	67	65	75.25				
1	.17	2.03	91	69	66	77.01				
						78.91				

Client Name: Doxy
Williams Lake
 Process: Dryer Stack 1
 Test Number: 2
 Date: Mar 15 2024
 Start Time: 938
 Finish Time: 1041
 Starting Vol.: 300
 Final Vol.: 307
 Flask: 126
 Console: 955
 Stack Diameter: _____

BP 2855
 DN 1310
 CP .85654
 MF 1.0079
 Moist. 2%
 PM 28.66
 AS _____
 Ko .6628
 Pitot 301
 Port _____
 Static -09
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		
0	21		
0	21		
0	21		

Duct Diameters
 Up-Stream _____
 Duct Diameters
 Downstream _____
 Mean Yaw Angle _____

Personnel: CB KS NA

Leakage Rate @ 15 inches Start: .005 Finish: .006

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.15	1.75	72	69	69	79.50	2	270	iced	
11	.17	2.01	86	69	68	81.26				
10	.16	1.91	88	69	65	83.16				
9	.15	1.81	90	70	61	84.86				
8	.14	1.71	94	71	57	86.65				
7	.17	1.72	95	72	56	88.37				
6	.13	1.60	98	73	55	90.19	2			
5	.15	1.86	99	73	52	91.93				
4	.14	1.74	100	73	53	93.67				
3	.17	1.47	94	73	56	95.36				
2	.16	1.95	94	74	57	97.03				
1	.18	2.20	95	74	57	98.82				
B12	.16	1.96	97	75	58	100.74	2			
11	.17	2.08	98	75	58	102.66				
10	.14	1.72	98	76	57	104.57				
9	.13	1.60	98	76	58	106.32				
8	.15	1.85	98	77	57	108.05				
7	.14	1.72	99	78	60	109.78				
6	.11	1.35	100	78	61	111.50	2			
5	.12	1.47	101	79	61	113.11				
4	.17	1.48	100	79	59	114.77				
3	.13	1.60	101	80	59	116.31				
2	.14	1.73	100	80	58	118.07				
1	.15	1.85	99	80	57	119.76				
						121.54				

Client Name: Draw Williams Lake
 Process: Drter Stack 1
 Test Number: 3
 Date: Mar 15 2024
 Start Time: 1045
 Finish Time: 1149
 Starting Vol.: 300
 Final Vol.: 309
 Flask: 127
 Console: 955
 Stack Diameter: _____

BP 28.55
 DN .310
 CP .85654
 MF 1.0079
 Moist. 2%
 PM 28.66
 AS _____
 Ko .6628
 Pitot 301
 Port _____
 Static -.09
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Duct Diameters
 Up-Stream _____
 Duct Diameters
 Downstream _____

Personnel: CB KS MA

Mean Yaw Angle _____

Leakage Rate @ 15 inches _____

Start: 1006 Finish: 1105

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
412	.17	1.98	81	79	79	22.57	1	270	100	
11	.18	2.16	96	81	77	24.41				
10	.16	1.94	98	80	67	26.79				
9	.15	1.82	97	79	64	28.09				
8	.14	1.71	96	78	62	29.99				
7	.13	1.58	96	78	63	31.79				
6	.11	1.33	97	78	65	33.52	2			
5	.12	1.46	97	78	63	35.10				
4	.15	1.83	98	78	63	36.70				
3	.14	1.71	99	78	63	38.44				
2	.12	1.46	97	78	62	40.27				
1	.15	1.77	95	77	62	41.90	1			
BK	.18	2.18	94	77	64	43.57				
11	.16	1.95	99	76	63	45.40				
10	.15	1.81	93	75	63	47.45				
9	.14	1.69	97	75	63	49.23				
8	.17	1.45	91	74	62	51.04				
7	.11	1.33	90	73	62	52.71				
6	.14	1.69	90	73	62	54.32	1			
5	.15	1.81	91	73	61	55.96				
4	.16	1.92	90	71	63	57.81				
3	.15	1.81	90	71	62	59.81				
2	.14	1.68	89	71	62	61.51				
1	.15	1.80	89	71	63	63.24				
						64.87				

Client Name: Dray Williams Lake
 Process: Dryer Stack 2
 Test Number: 1
 Date: Mar. 15/24
 Start Time: 847
 Finish Time: 949
 Starting Vol.: 300
 Final Vol.: 327
 Flask: I19
 Console: 1021
 Stack Diameter

BP 28.55
 DN 0.310
 CP 0.83867
 MF 1.0175
 Moist. 2%
 PM 28.66
 AS
 Ko 0.6646
 Pitot 217
 Port
 Static -0.10
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Duct Diameters
 Up-Stream
 Duct Diameters
 Downstream

Personnel: NA/KS/CB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .004 Finish: .003

Load: 1

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A 12	.14	1.46	52	52	86	98.01	1	270	ICED	
11	.16	1.68	57	52	84	99.56		↓	↓	
10	.15	1.58	61	53	83	101.25		↓	↓	
9	.16	1.70	65	54	83	102.89				
8	.17	1.81	67	55	82	104.61				
7	.18	1.92	68	56	82	106.40				
6	.17	1.83	70	58	81	108.27				
5	.15	1.62	72	59	81	110.08	1			
4	.15	1.62	74	60	82	111.78				
3	.13	1.41	76	63	83	113.46				
2	.13	1.41	79	66	83	115.00				
1	.13	1.42	81	69	84	116.57				
B 12	.19	2.08	83	71	84	118.13				
11	.17	1.86	85	72	85	120.09	1			
10	.16	1.77	87	74	83	121.88				
9	.15	1.66	88	75	83	123.57				
8	.17	1.89	89	77	82	125.28				
7	.17	1.90	90	79	81	127.10				
6	.19	2.12	90	80	82	128.92				
5	.20	2.23	91	81	82	130.84				
4	.18	2.01	92	82	83	132.91				
3	.15	1.67	92	83	84	134.82	1			
2	.14	1.56	93	84	85	136.58				
1	.14	1.57	94	85	85	138.25				
						139.96				

Client Name: Drax
Williams Lk.
 Process: Dryer Stack 2
 Test Number: 2
 Date: Mar. 15/24
 Start Time: 951
 Finish Time: 1053
 Starting Vol.: 300
 Final Vol.: 322
 Flask: I 20
 Console: 1021
 Stack Diameter

BP 28.55
 DN 0.310
 CP 0.83867
 MF 1.0175
 Moist. 3.1.
 PM 28.66
 AS
 Ko 0.6646
 Pitot 217
 Port
 Static -0.10
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Duct Diameters
Up-Stream
 Duct Diameters
Downstream

Personnel: NA/KS/CB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .005 Finish: -003

Load:

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A-12	.13	1.41	80	80	82	40.69	1	270	ICED	
11	.15	1.62	80	78	83	42.30		↓	↓	
10	.15	1.63	81	78	83	44.01				
9	.17	1.84	81	79	84	45.72				
8	.18	1.95	82	79	84	47.49				
7	.18	1.95	83	79	85	49.37				
6	.15	1.63	83	79	84	51.20				
5	.14	1.52	83	79	84	52.92				
4	.13	1.41	84	79	85	54.60	1			
3	.13	1.41	84	80	85	56.18				
2	.12	1.30	85	80	85	57.76				
1	.14	1.52	85	80	84	59.31				
B-12	.18	1.95	85	80	85	61.00				
11	.18	1.95	86	80	86	62.89				
10	.17	1.85	86	81	86	64.71	1			
9	.15	1.63	86	81	86	66.53				
8	.17	1.85	87	81	85	68.25				
7	.18	1.96	87	82	86	70.10				
6	.16	1.74	88	82	86	71.98				
5	.16	1.74	88	82	87	73.75				
4	.15	1.63	89	82	87	75.52				
3	.14	1.53	89	83	86	77.20	1			
2	.13	1.42	89	83	86	78.86				
1	.13	1.42	89	83	86	80.47				
						82.06				

Client Name: Drax
Williams Lk.
 Process: Dryer Stack 2
 Test Number: 3
 Date: Mar. 15/24
 Start Time 1056
 Finish Time 1158
 Starting Vol. 300
 Final Vol. 330
 Flask: I 21
 Console: 1021
 Stack Diameter _____

BP 28.55
 DN 0.310
 CP 0.83867
 MF 1.0175
 Moist. 3%
 PM 28.66
 AS _____
 Ko 0.6646
 Pitot 217
 Port _____
 Static -0.10
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Duct Diameters
Up-Stream

 Duct Diameters
Downstream

 Mean Yaw Angle

Personnel: NA/KS/CB

Leakage Rate @ 15 inches

Start: .004 Finish: -007

Load:

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A-12	.14	1.53	86	86	86	82.67	1	270	ICED	
11	.15	1.64	89	86	87	84.36				
10	.17	1.86	92	87	87	86.10				
9	.17	1.86	93	87	88	88.00				
8	.19	2.08	94	87	89	89.86				
7	.20	2.20	95	88	88	91.81				
6	.18	1.98	95	88	87	93.83				
5	.16	1.76	95	88	87	95.73				
4	.16	1.76	96	89	87	97.55	1			
3	.14	1.55	96	89	86	99.31				
2	.13	1.43	96	89	87	101.02				
1	.13	1.43	96	89	86	102.64				
B-12	.16	1.77	96	89	85	104.23				
11	.16	1.77	96	89	84	106.10				
10	.18	1.99	96	89	84	107.91	1			
9	.20	2.22	97	89	85	109.83				
8	.19	2.10	97	90	86	111.86				
7	.17	1.89	97	90	84	113.80				
6	.17	1.89	98	91	84	115.70				
5	.18	2.00	98	91	85	117.57				
4	.16	1.78	99	92	85	119.50				
3	.16	1.78	99	92	86	121.33				
2	.14	1.55	99	93	86	123.14	1			
1	.13	1.45	100	93	85	124.78				
						126.38				

Client Name: Drax
Williams lake
 Process: Dryer Stack 3
 Test Number: 1
 Date: Mar 15 2004
 Start Time: 1203
 Finish Time: 106
 Starting Vol.: 300
 Final Vol.: 313
 Flask: 728
 Console: 955
 Stack Diameter: _____

BP 28.55
 DN 300 ²⁷⁵
 CP 85654
 MF 1.0079
 Moist. 2%
 PM 28.66
 AS _____
 Ko 6828
 Pitot 301
 Port _____
 Static -12
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	20.9		
0	21		
0	21		
0	21		

Duct Diameters
Up-Stream

 Duct Diameters
Downstream

 Mean Yaw Angle

Personnel: CB KS NA

Leakage Rate @ 15 inches
 Start: 1004 Finish: 1005

Load: _____

.13 - .21

83

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A 12	.12	6.19	62	64	80	66.03	2	270	1000	
11	.13	6.30	70	63	79	67.44				
10	.11	6.10	74	62	80	69.06				
9	.12	6.20	76	62	79	70.46				
8	.11	6.10	78	61	78	71.95				
7	.10	6.01	83	61	77	73.23				
6	.13	6.31	80	61	77	74.61	2			
5	.15	6.51	82	61	77	76.18				
4	.17	6.72	82	61	77	77.70				
3	.19	6.92	83	62	78	79.43				
2	.17	6.72	84	62	77	81.21				
1	.16	6.62	86	62	78	82.96				
B 12	.13	6.31	85	61	78	84.64	2			
11	.14	6.42	84	63	78	86.23				
10	.13	6.31	84	63	79	87.83				
9	.12	6.21	84	63	78	89.33				
8	.11	6.11	85	63	79	90.82				
7	.14	6.41	85	63	79	92.29				
6	.16	6.62	86	64	79	93.87	2			
5	.17	6.72	86	64	79	95.45				
4	.19	6.93	87	64	79	97.19				
3	.18	6.83	87	65	79	98.95				
2	.16	6.62	88	65	79	100.77				
1	.16	6.62	88	65	80	102.54				
						104.20				

Client Name: Drat
Williams Lake
 Process: Dryer Stack 3
 Test Number: 2
 Date: Mar 15 2024
 Start Time 112
 Finish Time 215
 Starting Vol. 300
 Final Vol. 312
 Flask: 129
 Console: 455
 Stack Diameter _____

BP 28.55
 DN .300
 CP .85654
 MF 1.0079
 Moist. 27%
 PM 28.66
 AS _____
 Ko .6628
 Pitot 301
 Port _____
 Static -.12
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		
0	21		
0	21		
0	21		

Duct Diameters
 Up-Stream _____
 Duct Diameters
 Downstream _____
 Mean Yaw Angle _____

Personnel: CB KS NA

Leakage Rate @ 15 inches Start: .007 Finish: 1.003

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.13	1.29	68	64	80	4.94	2	270	1ced	
11	.14	1.41	80	65	80	6.48				
10	.12	1.21	83	65	78	8.19				
9	.13	1.33	85	65	75	9.58				
8	.11	1.13	87	65	73	11.10				
7	.10	1.03	87	66	71	12.54				
6	.14	1.45	89	67	70	13.88	3			
5	.15	1.55	89	67	71	15.44				
4	.18	1.86	90	68	71	17.19				
3	.19	1.96	90	68	73	18.88				
2	.18	1.86	90	68	72	20.64				
1	.15	1.55	90	69	74	22.58				
B12	.12	1.24	92	69	75	24.15	3			
11	.14	1.44	94	70	77	25.62				
10	.14	1.43	93	70	79	27.27				
9	.11	1.13	91	70	78	28.92				
8	.10	1.03	91	71	75	30.44				
7	.14	1.45	91	71	72	31.82				
6	.15	1.55	92	71	73	33.45	3			
5	.18	1.88	93	72	69	35.12				
4	.19	1.98	94	72	69	36.92				
3	.18	1.89	94	73	68	38.70				
2	.15	1.58	94	73	68	40.55				
1	.16	1.68	95	74	69	42.29				
						44.06				

Client Name: Draft
Williams Lake
 Process: Dryer Stack 3
 Test Number: 3
 Date: Mar 15 2024
 Start Time: 216
 Finish Time: 320
 Starting Vol.: 366
 Final Vol.: 314
 Flask: I30
 Console: 955
 Stack Diameter: _____

BP 2855
 DN .300
 CP .85654
 MF 1.0079
 Moist. 2%
 PM 2866
 AS _____
 Ko .6678
 Pitot 301
 Port _____
 Static -.12
 PS 2854

CO ₂	O ₂	CO	N ₂
0	21		
0	21		
0	21		
0	21		

Duct Diameters
 Up-Stream _____
 Duct Diameters
 Downstream _____
 Mean Yaw Angle _____

Personnel: CB NH KS

Leakage Rate @ 15 inches Start: .009 Finish: .004

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.11	1.10	76	72	83	46.64	2	270	1602	
11	.14	1.42	90	72	84	48.09				
10	.13	1.32	92	72	86	49.66				
9	.12	1.23	92	73	80	51.24				
8	.11	1.13	92	73	78	52.73				
7	.12	1.26	93	73	69	54.17				
6	.13	1.37	93	73	65	55.59	2			
5	.16	1.68	94	73	69	57.16				
4	.17	1.78	94	73	70	58.92				
3	.19	1.97	94	73	74	60.68				
2	.18	1.87	95	73	73	62.50				
1	.17	1.78	95	73	71	64.38				
B12	.13	1.36	95	74	69	66.20	2			
11	.13	1.37	94	74	66	67.74				
10	.12	1.27	95	74	66	69.44				
9	.11	1.16	95	74	66	70.90				
8	.15	1.58	94	77	67	72.44				
7	.16	1.69	95	74	67	74.19				
6	.17	1.80	95	74	66	75.90	2			
5	.17	1.79	96	75	68	77.84				
4	.18	1.89	95	75	69	79.61				
3	.19	1.99	95	74	71	81.36				
2	.17	1.77	95	74	73	83.19				
1	.16	1.66	94	74	74	85.07				
						86.70				

Client Name: Drax
Williams Lk.
 Process: Dryer Stack 4
 Test Number: 1
 Date: Mar. 15/24
 Start Time: 1227
 Finish Time: 130
 Starting Vol.: 300
 Final Vol.: 312
 Flask: I22
 Console: 1021
 Stack Diameter: _____

BP 28.55
 DN 0.310
 CP 0.83867
 MF 1.0175
 Moist. 1%
 PM 28.66
 AS _____
 Ko 0.6646
 Pitot 217
 Port _____
 Static +0.11
 PS 28.54

CO ₂	O ₂	CO	N ₂
<u>0</u>	<u>21</u>		

Duct Diameters
Up-Stream

 Duct Diameters
Downstream

Personnel: MM/KS/CB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .004 Finish: .006

Load:

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A-12	.12	1.31	79	79	97	27.19	1	270	ICED	
11	.12	1.31	82	78	96	28.71		↓	↓	
10	.13	1.42	83	78	96	30.22				
9	.13	1.43	85	79	97	31.78				
8	.14	1.54	85	79	96	33.35				
7	.14	1.54	86	80	95	35.02				
6	.15	1.66	87	81	94	36.68				
5	.15	1.66	88	82	94	38.40	1			
4	.16	1.77	90	82	95	40.08				
3	.14	1.56	91	83	94	41.92				
2	.12	1.34	93	84	94	43.60				
1	.11	1.23	93	85	93	45.13				
B-12	.14	1.57	94	86	93	46.66				
11	.14	1.58	96	88	93	48.28	1			
10	.17	1.91	96	89	93	49.93				
9	.18	2.03	97	89	94	51.80				
8	.15	1.69	98	90	94	53.74				
7	.14	1.58	98	92	95	55.47				
6	.14	1.58	99	92	95	57.19				
5	.15	1.70	100	93	94	58.89				
4	.15	1.70	101	94	96	60.60				
3	.16	1.81	102	94	96	62.33	1			
2	.14	1.58	102	95	97	64.15				
1	.12	1.36	103	96	97	65.84				
						67.38				

Client Name: Drax Williams Lk.
 Process: Dryer Stack 4
 Test Number: 2
 Date: Mar. 15/24
 Start Time: 132
 Finish Time: 234
 Starting Vol.: 300
 Final Vol.: 323
 Flask: I 23
 Console: 1021
 Stack Diameter

BP 28.55
 DN .310
 CP 0.83867
 MF 1.0175
 Moist. 2.1.
 PM 28.66
 AS
 Ke 0.6646
 Pitot 217
 Port
 Static -0.11
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Personnel: NA/KS/CB

Leakage Rate @ 15 inches

Load:

Duct Diameters
 Up-Stream

Duct Diameters
 Downstream

Mean Yaw Angle

Start: -003 Finish: .003

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A-12	.11	1.22	96	96	96	68.04	1	270	ICEP	
11	.13	1.44	98	96	96	69.53		↓	↓	
10	.14	1.55	100	95	97	71.14				
9	.14	1.55	100	95	97	72.80				
8	.15	1.66	101	96	98	74.51				
7	.17	1.89	101	96	97	76.27	1			
6	.16	1.78	102	96	97	78.11				
5	.15	1.67	102	97	96	79.95				
4	.12	1.34	102	97	96	81.72				
3	.12	1.34	103	98	96	83.27				
2	.11	1.23	104	99	95	84.80				
1	.11	1.23	104	100	96	86.26				
3-12	.17	1.90	104	100	97	87.78	1			
11	.16	1.79	105	101	97	89.62				
10	.14	1.57	105	101	96	91.46				
9	.12	1.35	106	101	95	93.16				
8	.14	1.58	106	102	95	94.71				
7	.16	1.80	107	102	96	96.43				
6	.16	1.80	107	102	97	98.28				
5	.17	1.91	107	102	97	100.10				
4	.19	2.13	106	103	98	101.93				
3	.20	2.24	106	103	98	103.88	1			
2	.17	1.91	107	104	98	105.92				
1	.13	1.46	107	104	97	107.82				
						109.45				

Client Name: Drax
Williams Lake
 Process: Dryer Stack 4
 Test Number: 3
 Date: Mar. 15/24
 Start Time: 237
 Finish Time: 339
 Starting Vol.: 300
 Final Vol.: 323
 Flask: I24
 Console: 1021
 Stack Diameter

BP 28.55
 DN .310
 CP 0.83867
 MF 1.0175
 Moist. 3%
 PM 28.66
 AS
 Ko 0.6646
 Pitot 217
 Port
 Static -0.11
 PS 28.54

CO ₂	O ₂	CO	N ₂
0	21		

Duct Diameters
Up-Stream

Duct Diameters
Downstream

Personnel: NA/KS/CB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .006 Finish: .002

Load:


Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A-12	.12	1.32	102	102	97	10.20	1	270	ICED	
11	.12	1.32	103	101	97	11.74		↓	↓	
10	.15	1.65	104	101	97	13.33				
9	.17	1.88	104	101	96	15.06				
8	.17	1.88	104	101	96	16.94				
7	.19	2.09	104	102	98	18.80				
6	.16	1.76	105	102	98	20.79				
5	.13	1.43	105	102	97	22.60				
4	.12	1.32	104	101	96	24.24	1			
3	.11	1.21	104	101	96	25.79				
2	.12	1.33	105	102	95	27.30				
1	.16	1.77	105	102	95	28.87				
B-12	.14	1.55	105	102	95	30.65				
11	.14	1.55	106	102	96	32.36	1			
10	.13	1.44	106	102	96	34.08				
9	.15	1.66	106	103	97	35.72				
8	.18	1.99	107	102	96	37.49				
7	.18	1.99	107	102	96	39.41				
6	.20	2.22	107	103	95	41.35				
5	.17	1.88	107	103	96	43.38				
4	.16	1.77	108	103	96	45.26	1			
3	.15	1.66	108	103	98	47.04				
2	.15	1.66	109	103	97	48.77				
1	.12	1.33	109	103	97	50.59				
						52.08				



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
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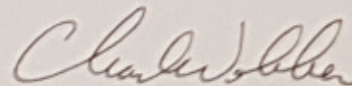
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Stack Sampling Seminar

35 Hours / 2017

June 23, 2017

Date



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Certificate of Completion

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October 2022

Date



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