

**Pinnacle Renewable Energy Inc
Williams Lake, BC**

**Permit 17557
December 6, 2024**

Our Job Number: ME2425-134

Report Author: Matt McCall
McCall Environmental



Table Of Contents

Table Of Contents	Page 1
Cover Letter	Page 2
Summary Tables & Discussion	Page 3
Dryer Stack 1 Total Particulate	Page 4-9
Dryer Stack 2 Total Particulate	Page 10-15
Dryer Stack 3 Total Particulate	Page 16-21
Dryer Stack 4 Total Particulate	Page 22-27
Testing Methodology	Page 28-33
Calibrations	Page 34-49
Production Data	Page 50
Sample Site Diagram	Page 51
Lab Results	Page 52-57
Field Data Sheets	Page 58-69
Accreditations	Page 70-73



December 19, 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) – December 6, 2024
Permit – PA-17557
McCall File Number – ME2425-134

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: Dave Brandle, Chris Bodden, Kiefer Stauber 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 December 6, 2024

Average of Triplicate Tests Dryer Stacks 1-4

Parameter	Stack 1	Stack2	Stack 3	Stack 4	Avg /Total	Permit	27-Sep-24
Test Date	06-Dec-24	06-Dec-24	06-Dec-24	06-Dec-24	N/A		N/A
Gas Temperature (°C)	15.4	29.0	30.9	37.7	28.3		29.94
% Moisture	2.56	2.48	2.80	3.12	2.74		2.34
Velocity (m/sec)	7.94	9.87	7.97	6.58	8.09		7.26
ACFM	49210	61192	49399	40788	200590		180138
Std. Dry Flow Rate (m ³ /sec)	21.58	25.65	20.51	16.52	84.26	*132	74.70
Tot Part. Dry Basis ref. Cond. (mg/m ³)	6.25	5.26	6.61	7.40	6.26	15.00	7.19
Front Half Particulate (mg/m ³)	4.51	3.78	4.87	5.04	4.55		3.52
Back Half Condensables (mg/m ³)	1.74	1.48	1.74	2.36	1.83		3.84
Mass Emission Rate (kg/hr)	0.49	0.49	0.49	0.44	1.90	7.67	1.93

* Note: ACFM, m³/sec, and kg/hr, are combined as opposed to averaged.

* Permitted flow rate is 33.0 m³/sec per stack, combined flow rate of 132

* Standard reference conditions are on a dry basis, 20 deg C and pressure at sea level 29.92 inches Hg.

**Average Total Particulate across the four stacks is weighted against individual stack flow

Discussion Of Test Results

Test results are in compliance with permitted limits.

The last time this sources was tested was in September 2024. 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
06-Dec-24
Pinnacle Renewable Energy
Permit Number: RA-17557
Williams Lake, BC
AVERAGE OF AIR EMISSION TESTS 1 TO 3

Gas Temperature:	60 ° F	15 ° C
Moisture Content (by volume):	2.56 %	
Average Stack Gas Velocity:	26.04 ft/sec	7.94 m/sec
Total Actual Gas Flow Rate:	49210 ACFM	
Dry Gas flow Rate at Reference Conditions:	45724 SCFM	21.58 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	6.25 mg/m ³
Front Half Particulate	0.00 gr/ft ³	4.51 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.74 mg/m ³
Mass Emission Rate	1.07 lbs/hr	0.49 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	64 ° F	18 ° C
Moisture Content (by volume):	2.7 %	
Average Stack Gas Velocity:	26.3 ft/sec	8.0 m/sec
Total Actual Gas Flow Rate:	49775 ACFM	
Dry Gas flow Rate at Reference Conditions:	45797 SCFM	21.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	7.2 mg/m ³
Front Half Particulate	.002 gr/ft ³	5.4 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	1.24 lbs/hr	0.56 kg/hr

TEST 2:

Gas Temperature:	59 ° F	15 ° C
Moisture Content (by volume):	2.5 %	
Average Stack Gas Velocity:	25.9 ft/sec	7.9 m/sec
Total Actual Gas Flow Rate:	48972 ACFM	
Dry Gas flow Rate at Reference Conditions:	45609 SCFM	21.5 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.4 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.6 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.92 lbs/hr	0.42 kg/hr

TEST 3:

Gas Temperature:	56 ° F	13 ° C
Moisture Content (by volume):	2.5 %	
Average Stack Gas Velocity:	25.9 ft/sec	7.9 m/sec
Total Actual Gas Flow Rate:	48883 ACFM	
Dry Gas flow Rate at Reference Conditions:	45766 SCFM	21.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.2 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.5 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	1.06 lbs/hr	0.48 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 1
Permit Number: RA-17557
Job Number: ME2425-134
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
O99	P7	P11
06-Dec-24	06-Dec-24	06-Dec-24
12:09	13:29	15:00
13:11	14:31	16:02
60	60	60
CB/DB/KS	CB/DB/KS	CB/DB/KS
955	955	955
28.10	28.10	28.10
-0.19	-0.19	-0.19
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.290	0.290	0.290
0.9994	0.9994	0.9994
0.83867	0.83867	0.83867
31.5	31.5	31.5
18	16	16
5.5	5.9	6.1
0.0001	0.0001	0.0003
0.0060	0.0041	0.0049
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0081	0.0062	0.0072

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

06-Dec-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	0.29	2.18	51	51	84	11.60	0.93
A-11	0.28	2.16	52	47	69	13.44	0.95
A-10	0.26	2.03	59	48	68	15.32	0.93
A-9	0.27	2.12	65	49	67	17.11	0.96
A-8	0.27	2.15	71	51	63	18.99	0.96
A-7	0.20	1.61	75	53	62	20.91	1.07
A-6	0.17	1.37	78	55	63	22.75	0.96
A-5	0.15	1.22	80	56	62	24.28	1.00
A-4	0.16	1.30	81	57	63	25.79	0.98
A-3	0.18	1.47	86	59	64	27.32	1.00
A-2	0.19	1.56	90	62	63	28.99	1.02
A-1	0.18	1.48	93	64	64	30.74	0.99
B-12	0.25	2.07	94	66	63	32.41	0.99
B-11	0.24	2.00	96	69	62	34.37	1.01
B-10	0.18	1.50	96	69	62	36.34	1.10
B-9	0.17	1.41	94	70	62	38.20	0.97
B-8	0.17	1.41	94	70	63	39.80	1.00
B-7	0.21	1.74	94	71	62	41.45	1.00
B-6	0.21	1.75	94	71	62	43.28	1.02
B-5	0.19	1.58	96	72	64	45.15	1.03
B-4	0.19	1.59	99	74	64	46.94	1.00
B-3	0.20	1.68	102	75	62	48.69	1.05
B-2	0.20	1.69	101	76	59	50.59	0.98
B-1	0.21	1.78	99	76	59	52.37	0.99
						54.21	

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

06-Dec-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	0.30	2.41	65	67	74	54.76	1.02
A-11	0.27	2.21	75	68	68	56.91	1.02
A-10	0.25	2.08	79	67	61	58.97	1.02
A-9	0.26	2.18	82	67	59	60.98	0.99
A-8	0.27	2.27	86	67	59	62.98	1.01
A-7	0.21	1.78	90	68	58	65.06	1.03
A-6	0.16	1.37	94	69	57	66.95	1.06
A-5	0.15	1.28	93	70	55	68.66	0.99
A-4	0.16	1.38	94	71	54	70.20	0.92
A-3	0.17	1.46	94	71	56	71.68	1.00
A-2	0.18	1.53	94	71	59	73.35	1.01
A-1	0.18	1.53	96	72	63	75.07	1.06
B-12	0.24	2.04	98	72	63	76.87	0.97
B-11	0.20	1.70	99	73	64	78.78	1.04
B-10	0.17	1.45	99	74	61	80.66	1.03
B-9	0.18	1.54	99	74	59	82.38	1.01
B-8	0.17	1.47	99	75	56	84.12	1.06
B-7	0.20	1.74	100	75	54	85.89	1.00
B-6	0.21	1.83	100	76	53	87.71	1.06
B-5	0.18	1.56	98	75	52	89.69	1.02
B-4	0.19	1.65	98	75	52	91.45	1.06
B-3	0.20	1.76	100	76	57	93.33	1.03
B-2	0.21	1.80	100	76	60	95.20	1.06
B-1	0.20	1.71	101	76	61	97.16	1.03
						99.02	

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

06-Dec-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	0.28	2.33	72	72	60	99.24	1.01
A-11	0.28	2.34	75	67	57	101.35	1.01
A-10	0.27	2.26	78	67	57	103.45	1.06
A-9	0.26	2.18	84	69	61	105.62	1.05
A-8	0.23	1.95	87	70	56	107.74	0.99
A-7	0.20	1.70	90	69	57	109.64	1.02
A-6	0.16	1.36	92	70	58	111.47	1.05
A-5	0.17	1.44	93	71	58	113.15	1.05
A-4	0.18	1.54	95	72	56	114.89	1.03
A-3	0.17	1.46	97	74	55	116.65	1.07
A-2	0.19	1.63	98	74	56	118.44	1.06
A-1	0.18	1.55	98	74	55	120.31	1.05
B-12	0.24	2.07	99	75	55	122.12	1.00
B-11	0.20	1.73	99	75	55	124.11	1.07
B-10	0.18	1.55	99	76	57	126.05	1.05
B-9	0.17	1.46	99	76	58	127.86	1.06
B-8	0.17	1.46	98	76	56	129.64	1.02
B-7	0.19	1.64	98	76	54	131.35	0.99
B-6	0.20	1.78	99	76	53	133.10	1.08
B-5	0.21	1.82	100	76	53	135.07	1.01
B-4	0.19	1.64	100	76	55	136.96	1.10
B-3	0.20	1.72	98	76	56	138.91	0.97
B-2	0.19	1.64	98	76	56	140.68	0.99
B-1	0.20	1.72	97	76	56	142.44	0.95
						144.16	

Dryer Stack 1
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 0.995

Delta P:	0.207 "H₂O	Us avg:	26.34 ft/sec
Delta H:	1.702	ACFM:	49775 ft³/min
Tm avg:	534.0 °R	SDCFM:	45797 ft³/min
Ts avg:	524.0 °R	Vm std:	39.72 ft³
Bwo:	0.027	Vm corr:	42.58 ft³
Md:	28.96	Vm:	42.61 ft³
Ms:	28.66	MF:	0.9994
Pb:	28.10 "Hg	PCON:	7.20 mg/m³
Pm:	28.23 "Hg	ERAT:	0.56 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 1.021

Delta P:	0.203 "H₂O	Us avg:	25.91 ft/sec
Delta H:	1.739	ACFM:	48972 ft³/min
Tm avg:	540.8 °R	SDCFM:	45609 ft³/min
Ts avg:	519.0 °R	Vm std:	40.74 ft³
Bwo:	0.025	Vm corr:	44.23 ft³
Md:	28.96	Vm:	44.26 ft³
Ms:	28.69	MF:	0.9994
Pb:	28.10 "Hg	PCON:	5.37 mg/m³
Pm:	28.23 "Hg	ERAT:	0.42 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.031

Delta P:	0.203 "H₂O	Us avg:	25.86 ft/sec
Delta H:	1.749	ACFM:	48883 ft³/min
Tm avg:	543.4 °R	SDCFM:	45766 ft³/min
Ts avg:	516.3 °R	Vm std:	41.16 ft³
Bwo:	0.025	Vm corr:	44.89 ft³
Md:	28.96	Vm:	44.92 ft³
Ms:	28.69	MF:	0.9994
Pb:	28.10 "Hg	PCON:	6.18 mg/m³
Pm:	28.23 "Hg	ERAT:	0.48 kg/hr
Ps:	28.09 "Hg		

Gas Temperature:	84 ° F	29 ° C
Moisture Content (by volume):	2.48 %	
Average Stack Gas Velocity:	32.38 ft/sec	9.87 m/sec
Total Actual Gas Flow Rate:	61192 ACFM	
Dry Gas flow Rate at Reference Conditions:	54343 SCFM	25.65 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	5.26 mg/m ³
Front Half Particulate	0.00 gr/ft ³	3.78 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.48 mg/m ³
Mass Emission Rate	1.07 lbs/hr	0.49 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	87 ° F	31 ° C
Moisture Content (by volume):	2.6 %	
Average Stack Gas Velocity:	32.5 ft/sec	9.9 m/sec
Total Actual Gas Flow Rate:	61389 ACFM	
Dry Gas flow Rate at Reference Conditions:	54166 SCFM	25.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.2 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.5 mg/m ³
Mass Emission Rate	1.26 lbs/hr	0.57 kg/hr

TEST 2:

Gas Temperature:	82 ° F	28 ° C
Moisture Content (by volume):	2.3 %	
Average Stack Gas Velocity:	32.2 ft/sec	9.8 m/sec
Total Actual Gas Flow Rate:	60785 ACFM	
Dry Gas flow Rate at Reference Conditions:	54292 SCFM	25.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	4.4 mg/m ³
Front Half Particulate	.001 gr/ft ³	2.9 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.5 mg/m ³
Mass Emission Rate	0.90 lbs/hr	0.41 kg/hr

TEST 3:

Gas Temperature:	83 ° F	29 ° C
Moisture Content (by volume):	2.6 %	
Average Stack Gas Velocity:	32.5 ft/sec	9.9 m/sec
Total Actual Gas Flow Rate:	61402 ACFM	
Dry Gas flow Rate at Reference Conditions:	54573 SCFM	25.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.2 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.5 mg/m ³
Mass Emission Rate	1.06 lbs/hr	0.48 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 2
Permit Number: RA-17557
Job Number: ME2425-134
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
P12	P13	P14
06-Dec-24	06-Dec-24	06-Dec-24
12:09	13:27	15:00
13:11	14:28	16:01
60	60	60
CB/DB/KS	CB/DB/KS	CB/DB/KS
1039	1039	1039
28.10	28.10	28.10
-0.19	-0.19	-0.19
1.00	1.00	1.00
20.00	20.00	20.00
0.00	0.00	0.00
79.00	79.00	79.00
0.290	0.290	0.290
1.0052	1.0052	1.0052
0.83829	0.83829	0.83829
31.5	31.5	31.5
21	19	21
5.5	4.8	5.5
0.0002	0.0003	0.0003
0.0061	0.0037	0.0047
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0083	0.0060	0.0070

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

06-Dec-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	0.41	2.29	57	56	90	19.53	1.01
A-11	0.40	2.26	65	60	91	21.91	0.95
A-10	0.40	2.27	67	60	88	24.14	1.01
A-9	0.38	2.18	76	60	88	26.53	1.06
A-8	0.35	2.03	84	62	87	29.00	0.99
A-7	0.35	2.04	88	62	87	31.24	1.01
A-6	0.34	1.99	93	64	87	33.52	1.01
A-5	0.29	1.71	95	67	86	35.80	1.01
A-4	0.26	1.54	96	70	86	37.91	0.97
A-3	0.25	1.48	99	72	87	39.84	0.99
A-2	0.25	1.49	101	74	87	41.77	1.00
A-1	0.24	1.43	102	75	87	43.73	0.97
B-12	0.36	2.15	103	76	87	45.60	0.98
B-11	0.35	2.10	104	77	87	47.90	1.00
B-10	0.34	2.04	105	78	87	50.24	1.00
B-9	0.28	1.68	106	79	88	52.55	0.99
B-8	0.27	1.62	107	80	89	54.63	1.01
B-7	0.26	1.57	108	81	87	56.70	1.03
B-6	0.24	1.45	108	81	86	58.78	1.01
B-5	0.28	1.69	108	81	86	60.74	1.03
B-4	0.27	1.64	109	82	86	62.90	1.01
B-3	0.26	1.58	109	83	86	65.00	1.00
B-2	0.25	1.52	109	83	86	67.03	1.01
B-1	0.24	1.45	109	83	87	69.04	1.00
						70.99	

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

06-Dec-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	0.41	2.47	82	84	83	71.81	1.05
A-11	0.40	2.56	93	88	84	74.44	1.00
A-10	0.39	2.41	96	87	84	76.94	1.04
A-9	0.37	2.31	99	87	84	79.51	1.03
A-8	0.36	2.19	101	88	83	82.00	0.99
A-7	0.35	2.13	102	89	83	84.37	0.99
A-6	0.29	1.77	103	90	83	86.72	1.01
A-5	0.30	1.84	104	90	82	88.89	0.99
A-4	0.27	1.65	104	91	82	91.07	1.02
A-3	0.25	1.53	104	91	83	93.20	1.01
A-2	0.24	1.47	105	92	83	95.22	1.00
A-1	0.23	1.41	105	92	83	97.20	1.03
B-12	0.36	2.21	106	93	82	99.18	1.00
B-11	0.33	2.15	106	93	82	101.61	1.02
B-10	0.34	2.09	106	93	82	103.97	1.00
B-9	0.30	1.85	107	94	82	106.32	1.00
B-8	0.27	1.67	111	95	82	108.54	1.01
B-7	0.26	1.62	114	96	81	110.68	1.00
B-6	0.25	1.56	117	97	81	112.77	1.04
B-5	0.27	1.69	118	98	81	114.89	0.96
B-4	0.27	1.69	119	99	81	116.93	1.01
B-3	0.26	1.63	120	99	81	119.08	1.02
B-2	0.24	1.51	120	100	80	121.22	1.01
B-1	0.24	1.51	119	100	80	123.25	0.98
						125.22	

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

06-Dec-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	0.40	2.46	94	88	81	27.29	1.04
A-11	0.41	2.49	94	88	81	29.90	0.98
A-10	0.39	2.37	97	89	81	32.38	1.01
A-9	0.38	2.33	103	91	81	34.90	0.98
A-8	0.36	2.21	104	92	82	37.31	0.97
A-7	0.35	2.15	105	93	82	39.64	0.99
A-6	0.33	2.03	106	94	83	42.00	0.97
A-5	0.29	1.78	107	95	83	44.25	1.00
A-4	0.30	1.85	109	96	83	46.42	1.03
A-3	0.29	1.73	111	96	84	48.71	1.01
A-2	0.26	1.61	113	97	84	50.90	1.01
A-1	0.24	1.49	114	99	83	53.00	1.00
B-12	0.35	2.18	115	100	83	55.00	0.99
B-11	0.36	2.23	116	99	83	57.38	0.97
B-10	0.31	1.93	116	100	83	59.75	1.01
B-9	0.28	1.74	116	100	83	62.04	1.03
B-8	0.26	1.62	117	101	84	64.27	1.03
B-7	0.27	1.68	117	101	84	66.41	1.02
B-6	0.28	1.75	118	101	84	68.58	0.99
B-5	0.27	1.68	118	102	85	70.73	1.02
B-4	0.26	1.62	118	102	85	72.90	1.02
B-3	0.25	1.55	119	103	86	75.02	1.01
B-2	0.24	1.49	119	103	86	77.08	1.01
B-1	0.24	1.49	119	104	87	79.11	0.99
						81.10	

Dryer Stack 2
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 1.002

Delta P:	0.302 "H₂O	Us avg:	32.48 ft/sec
Delta H:	1.800	ACFM:	61389 ft³/min
Tm avg:	544.5 °R	SDCFM:	54166 ft³/min
Ts avg:	547.2 °R	Vm std:	47.33 ft³
Bwo:	0.026	Vm corr:	51.73 ft³
Md:	28.96	Vm:	51.46 ft³
Ms:	28.68	MF:	1.0052
Pb:	28.10 "Hg	PCON:	6.19 mg/m³
Pm:	28.23 "Hg	ERAT:	0.57 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 1.008

Delta P:	0.300 "H₂O	Us avg:	32.16 ft/sec
Delta H:	1.872	ACFM:	60785 ft³/min
Tm avg:	557.7 °R	SDCFM:	54292 ft³/min
Ts avg:	542.2 °R	Vm std:	47.97 ft³
Bwo:	0.023	Vm corr:	53.69 ft³
Md:	28.96	Vm:	53.41 ft³
Ms:	28.71	MF:	1.0052
Pb:	28.10 "Hg	PCON:	4.42 mg/m³
Pm:	28.24 "Hg	ERAT:	0.41 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.004

Delta P:	0.305 "H₂O	Us avg:	32.49 ft/sec
Delta H:	1.894	ACFM:	61402 ft³/min
Tm avg:	564.1 °R	SDCFM:	54573 ft³/min
Ts avg:	543.4 °R	Vm std:	47.78 ft³
Bwo:	0.026	Vm corr:	54.09 ft³
Md:	28.96	Vm:	53.81 ft³
Ms:	28.68	MF:	1.0052
Pb:	28.10 "Hg	PCON:	5.17 mg/m³
Pm:	28.24 "Hg	ERAT:	0.48 kg/hr
Ps:	28.09 "Hg		

Gas Temperature:	88 ° F	31 ° C
Moisture Content (by volume):	2.80 %	
Average Stack Gas Velocity:	26.14 ft/sec	7.97 m/sec
Total Actual Gas Flow Rate:	49399 ACFM	
Dry Gas flow Rate at Reference Conditions:	43466 SCFM	20.51 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	6.61 mg/m ³
Front Half Particulate	0.00 gr/ft ³	4.87 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	1.74 mg/m ³
Mass Emission Rate	1.08 lbs/hr	0.49 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	89 ° F	32 ° C
Moisture Content (by volume):	3.0 %	
Average Stack Gas Velocity:	25.9 ft/sec	7.9 m/sec
Total Actual Gas Flow Rate:	48976 ACFM	
Dry Gas flow Rate at Reference Conditions:	42878 SCFM	20.2 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	7.4 mg/m ³
Front Half Particulate	.002 gr/ft ³	5.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	1.19 lbs/hr	0.54 kg/hr

TEST 2:

Gas Temperature:	86 ° F	30 ° C
Moisture Content (by volume):	2.7 %	
Average Stack Gas Velocity:	26.2 ft/sec	8.0 m/sec
Total Actual Gas Flow Rate:	49514 ACFM	
Dry Gas flow Rate at Reference Conditions:	43776 SCFM	20.7 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.002 gr/ft ³	5.5 mg/m ³
Front Half Particulate	.002 gr/ft ³	3.8 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.91 lbs/hr	0.41 kg/hr

TEST 3:

Gas Temperature:	88 ° F	31 ° C
Moisture Content (by volume):	2.7 %	
Average Stack Gas Velocity:	26.3 ft/sec	8.0 m/sec
Total Actual Gas Flow Rate:	49708 ACFM	
Dry Gas flow Rate at Reference Conditions:	43743 SCFM	20.6 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.9 mg/m ³
Front Half Particulate	.002 gr/ft ³	5.2 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	1.13 lbs/hr	0.51 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 3
Permit Number: RA-17557
Job Number: ME2425-134
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
P8	P9	P10
06-Dec-24	06-Dec-24	06-Dec-24
12:15	13:40	14:53
13:15	14:42	15:55
60	60	60
CB/DB/KS	CB/DB/KS	CB/DB/KS
1021	1021	1021
28.10	28.10	28.10
-0.17	-0.17	-0.17
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
0.9945	0.9945	0.9945
0.84182	0.84182	0.84182
31.5	31.5	31.5
20	17	16
6.3	6.9	7.9
0.0002	0.0003	0.0004
0.0062	0.0041	0.0056
0.0020	0.0020	0.0020
0.0000	0.0000	0.0000
0.0084	0.0064	0.0080

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

06-Dec-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	0.25	2.33	69	62	83	55.91	0.97
A-11	0.17	1.58	72	63	87	57.88	1.01
A-10	0.17	1.57	72	64	85	59.59	1.05
A-9	0.15	1.38	74	65	87	61.37	1.07
A-8	0.14	1.30	77	66	86	63.07	0.98
A-7	0.15	1.40	78	68	86	64.58	0.97
A-6	0.17	1.59	82	70	88	66.14	1.02
A-5	0.18	1.68	84	72	90	67.88	1.02
A-4	0.20	1.87	86	74	90	69.68	1.00
A-3	0.22	2.07	88	76	90	71.54	0.98
A-2	0.23	2.17	89	78	90	73.47	1.01
A-1	0.21	1.99	90	79	89	75.51	1.02
B-12	0.25	2.37	91	80	89	77.48	0.99
B-11	0.22	2.09	92	81	89	79.56	0.96
B-10	0.22	2.09	93	82	90	81.46	0.95
B-9	0.20	1.89	93	83	92	83.35	1.02
B-8	0.21	2.00	95	84	91	85.28	0.95
B-7	0.18	1.72	97	86	90	87.12	1.04
B-6	0.15	1.44	99	86	89	89.00	1.01
B-5	0.16	1.53	99	86	89	90.68	0.98
B-4	0.18	1.73	99	87	90	92.36	0.97
B-3	0.17	1.63	100	88	91	94.11	1.00
B-2	0.18	1.72	100	89	92	95.88	0.99
B-1	0.23	2.20	101	90	93	97.68	0.95
						99.63	

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

06-Dec-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	0.25	2.40	82	82	88	1.12	1.03
A-11	0.22	2.11	84	81	90	3.28	0.94
A-10	0.18	1.73	86	83	89	5.14	1.08
A-9	0.17	1.64	87	84	88	7.08	0.99
A-8	0.16	1.55	89	84	85	8.81	1.02
A-7	0.17	1.65	92	85	87	10.54	0.98
A-6	0.17	1.66	95	86	86	12.26	1.05
A-5	0.18	1.77	96	87	85	14.12	1.04
A-4	0.21	2.06	97	87	85	16.01	0.99
A-3	0.22	2.17	98	89	84	17.96	0.95
A-2	0.23	2.27	99	90	85	19.88	0.97
A-1	0.21	2.08	100	92	84	21.88	1.02
B-12	0.26	2.58	101	93	84	23.91	0.93
B-11	0.23	2.29	103	94	84	25.97	0.96
B-10	0.22	2.19	104	94	84	27.98	0.97
B-9	0.20	2.00	104	94	84	29.96	1.00
B-8	0.20	1.99	103	94	85	31.91	1.00
B-7	0.19	1.90	104	95	85	33.86	1.01
B-6	0.15	1.50	105	94	85	35.78	1.07
B-5	0.16	1.60	105	95	84	37.58	0.99
B-4	0.18	1.80	106	95	84	39.31	1.00
B-3	0.17	1.70	106	95	85	41.16	1.02
B-2	0.18	1.80	105	96	86	43.00	1.02
B-1	0.21	2.09	106	96	87	44.88	0.93
						46.74	

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

06-Dec-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	0.26	2.46	82	83	97	47.78	0.97
A-11	0.21	2.01	84	82	91	49.85	1.02
A-10	0.19	1.83	87	83	89	51.81	1.04
A-9	0.18	1.74	88	84	88	53.72	1.07
A-8	0.15	1.46	89	84	87	55.64	1.03
A-7	0.16	1.56	89	85	87	57.33	1.01
A-6	0.16	1.56	90	86	87	59.05	0.97
A-5	0.19	1.85	91	88	88	60.71	1.03
A-4	0.22	2.14	91	87	89	62.63	1.02
A-3	0.23	2.26	92	87	98	64.66	1.01
A-2	0.24	2.35	93	88	87	66.71	0.99
A-1	0.20	1.96	94	88	88	68.79	1.02
B-12	0.27	2.65	96	89	82	70.75	0.97
B-11	0.22	2.16	97	88	88	72.91	0.99
B-10	0.21	2.07	98	87	86	74.90	0.98
B-9	0.21	2.07	99	88	85	76.83	0.99
B-8	0.19	1.88	101	88	85	78.78	1.02
B-7	0.18	1.78	102	89	86	80.69	1.01
B-6	0.16	1.58	103	89	86	82.54	1.00
B-5	0.15	1.49	104	90	87	84.27	1.01
B-4	0.17	1.68	105	91	88	85.96	0.96
B-3	0.18	1.78	106	92	89	87.68	1.02
B-2	0.19	1.88	107	93	90	89.55	1.00
B-1	0.22	2.20	108	93	87	91.45	0.99
						93.48	



Dryer Stack 3
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 0.997

Delta P:	0.190 "H₂O	Us avg:	25.91 ft/sec
Delta H:	1.806	ACFM:	48976 ft³/min
Tm avg:	542.9 °R	SDCFM:	42878 ft³/min
Ts avg:	549.0 °R	Vm std:	39.90 ft³
Bwo:	0.030	Vm corr:	43.48 ft³
Md:	28.96	Vm:	43.72 ft³
Ms:	28.63	MF:	0.9945
Pb:	28.10 "Hg	PCON:	7.43 mg/m³
Pm:	28.23 "Hg	ERAT:	0.54 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 0.999

Delta P:	0.196 "H₂O	Us avg:	26.20 ft/sec
Delta H:	1.939	ACFM:	49514 ft³/min
Tm avg:	552.3 °R	SDCFM:	43776 ft³/min
Ts avg:	545.5 °R	Vm std:	40.94 ft³
Bwo:	0.027	Vm corr:	45.37 ft³
Md:	28.96	Vm:	45.62 ft³
Ms:	28.66	MF:	0.9945
Pb:	28.10 "Hg	PCON:	5.52 mg/m³
Pm:	28.24 "Hg	ERAT:	0.41 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.005

Delta P:	0.196 "H₂O	Us avg:	26.30 ft/sec
Delta H:	1.933	ACFM:	49708 ft³/min
Tm avg:	551.6 °R	SDCFM:	43743 ft³/min
Ts avg:	548.1 °R	Vm std:	41.06 ft³
Bwo:	0.027	Vm corr:	45.45 ft³
Md:	28.96	Vm:	45.70 ft³
Ms:	28.67	MF:	0.9945
Pb:	28.10 "Hg	PCON:	6.88 mg/m³
Pm:	28.24 "Hg	ERAT:	0.51 kg/hr
Ps:	28.09 "Hg		

Gas Temperature:	100 ° F	38 ° C
Moisture Content (by volume):	3.12 %	
Average Stack Gas Velocity:	21.58 ft/sec	6.58 m/sec
Total Actual Gas Flow Rate:	40788 ACFM	
Dry Gas flow Rate at Reference Conditions:	34997 SCFM	16.52 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	0.00 gr/ft ³	7.40 mg/m ³
Front Half Particulate	0.00 gr/ft ³	5.04 mg/m ³
Back Half Condensibles	0.00 gr/ft ³	2.36 mg/m ³
Mass Emission Rate	0.97 lbs/hr	0.44 kg/hr

SUMMARY OF AIR EMISSION TESTS
TEST 1:

Gas Temperature:	112 ° F	44 ° C
Moisture Content (by volume):	3.5 %	
Average Stack Gas Velocity:	21.7 ft/sec	6.6 m/sec
Total Actual Gas Flow Rate:	40988 ACFM	
Dry Gas flow Rate at Reference Conditions:	34324 SCFM	16.2 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.004 gr/ft ³	9.8 mg/m ³
Front Half Particulate	.003 gr/ft ³	6.3 mg/m ³
Back Half Condensibles	.002 gr/ft ³	3.6 mg/m ³
Mass Emission Rate	1.27 lbs/hr	0.57 kg/hr

TEST 2:

Gas Temperature:	95 ° F	35 ° C
Moisture Content (by volume):	3.2 %	
Average Stack Gas Velocity:	21.5 ft/sec	6.5 m/sec
Total Actual Gas Flow Rate:	40550 ACFM	
Dry Gas flow Rate at Reference Conditions:	35091 SCFM	16.6 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	4.2 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.8 mg/m ³
Mass Emission Rate	0.78 lbs/hr	0.35 kg/hr

TEST 3:

Gas Temperature:	93 ° F	34 ° C
Moisture Content (by volume):	2.7 %	
Average Stack Gas Velocity:	21.6 ft/sec	6.6 m/sec
Total Actual Gas Flow Rate:	40827 ACFM	
Dry Gas flow Rate at Reference Conditions:	35576 SCFM	16.8 m ³ /sec
Total Particulate Concentration:		
Dry Basis Actual at Reference Conditions	.003 gr/ft ³	6.4 mg/m ³
Front Half Particulate	.002 gr/ft ³	4.7 mg/m ³
Back Half Condensibles	.001 gr/ft ³	1.7 mg/m ³
Mass Emission Rate	0.86 lbs/hr	0.39 kg/hr



Client: Pinnacle Renewable Energy
Plant Location: Williams Lake, BC
Process: Dryer Stack 4
Permit Number: RA-17557
Job Number: ME2425-134
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
P16	P17	P18
06-Dec-24	06-Dec-24	06-Dec-24
12:15	13:45	14:52
13:15	14:45	15:54
60	60	60
CB/DB/KS	CB/DB/KS	CB/DB/KS
980	980	980
28.10	28.10	28.10
-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
0.330	0.330	0.330
0.9980	0.9980	0.9980
0.83365	0.83365	0.83365
31.5	31.5	31.5
22	19	16
7.8	8.5	8.1
0.0001	0.0006	0.0006
0.0069	0.0041	0.0048
0.0040	0.0020	0.0020
0.0000	0.0000	0.0000
0.0110	0.0067	0.0074

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

06-Dec-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	1.52	68	69	108	81.88	0.99
A-11	0.14	1.42	75	68	112	83.71	0.97
A-10	0.13	1.32	78	68	112	85.45	1.02
A-9	0.12	1.23	81	69	110	87.22	0.98
A-8	0.12	1.23	88	70	110	88.87	1.07
A-7	0.10	1.06	87	71	111	90.68	0.95
A-6	0.11	1.13	88	72	111	92.14	1.05
A-5	0.10	1.03	90	73	111	93.84	1.09
A-4	0.12	1.24	92	74	112	95.53	1.07
A-3	0.14	1.45	96	76	114	97.34	1.02
A-2	0.18	1.87	101	77	116	99.21	1.06
A-1	0.21	2.18	102	79	117	101.43	0.94
B-12	0.13	1.35	100	81	119	103.56	1.00
B-11	0.15	1.56	101	83	119	105.34	1.05
B-10	0.13	1.35	102	83	117	107.36	0.98
B-9	0.11	1.15	101	90	116	109.12	0.90
B-8	0.12	1.25	100	84	115	110.61	1.09
B-7	0.11	1.16	102	85	113	112.48	1.09
B-6	0.10	1.05	101	85	110	114.29	1.00
B-5	0.12	1.27	102	86	109	115.87	1.08
B-4	0.12	1.28	105	87	107	117.74	0.94
B-3	0.13	1.39	109	88	106	119.39	1.09
B-2	0.15	1.63	110	89	101	121.38	1.06
B-1	0.16	1.73	104	89	101	123.48	0.92
						125.35	

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

06-Dec-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	1.68	83	83	106	26.70	0.94
A-11	0.15	1.57	89	82	107	28.56	1.05
A-10	0.13	1.37	94	82	105	30.58	0.99
A-9	0.11	1.17	93	81	102	32.37	1.09
A-8	0.12	1.28	94	80	99	34.18	0.98
A-7	0.11	1.18	94	81	97	35.88	1.03
A-6	0.10	1.07	94	82	98	37.60	1.03
A-5	0.10	1.08	96	82	94	39.24	1.00
A-4	0.13	1.41	98	82	94	40.84	1.02
A-3	0.14	1.53	102	84	92	42.70	1.00
A-2	0.17	1.86	103	85	93	44.60	1.01
A-1	0.18	1.98	106	85	91	46.73	0.99
B-12	0.14	1.53	107	87	94	48.88	1.09
B-11	0.15	1.66	108	88	89	50.97	1.06
B-10	0.17	1.33	109	89	87	53.09	0.90
B-9	0.11	1.22	108	89	88	55.00	1.03
B-8	0.12	1.32	105	89	90	56.76	0.92
B-7	0.11	1.22	105	90	89	58.40	1.00
B-6	0.09	1.00	106	90	89	60.11	0.95
B-5	0.12	1.32	102	92	91	61.58	0.99
B-4	0.12	1.33	108	91	91	63.34	1.07
B-3	0.13	1.43	108	92	95	65.25	1.07
B-2	0.15	1.69	109	92	97	67.24	0.98
B-1	0.17	1.87	109	94	97	69.18	0.92
						71.13	

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

06-Dec-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	1.82	91	88	98	71.83	1.05
A-11	0.16	1.72	102	85	100	74.02	1.02
A-10	0.14	1.52	98	84	94	76.10	1.08
A-9	0.11	1.16	96	85	93	78.16	1.03
A-8	0.12	1.30	96	85	91	79.90	0.97
A-7	0.11	1.20	97	85	91	81.61	1.07
A-6	0.10	1.09	99	84	89	83.42	0.91
A-5	0.10	1.09	97	85	90	84.90	1.05
A-4	0.12	1.21	101	85	91	86.60	1.07
A-3	0.15	1.64	99	85	91	88.49	1.01
A-2	0.17	1.86	104	87	92	90.48	0.94
A-1	0.20	2.19	102	86	92	92.47	0.94
B-12	0.15	1.64	106	87	93	94.61	1.01
B-11	0.15	1.64	104	88	93	96.62	1.00
B-10	0.12	1.31	105	88	95	98.60	0.97
B-9	0.11	1.22	104	89	96	100.32	0.99
B-8	0.12	1.30	104	88	98	102.01	1.08
B-7	0.11	1.19	102	89	97	103.92	1.00
B-6	0.10	1.08	101	89	97	105.62	0.97
B-5	0.13	1.42	101	89	95	107.19	0.99
B-4	0.14	1.53	105	89	94	109.02	1.01
B-3	0.13	1.43	106	89	91	110.97	1.08
B-2	0.15	1.65	104	89	90	112.98	0.93
B-1	0.18	2.00	106	90	89	114.84	1.01
						117.05	

Dryer Stack 4
Pinnacle Renewable Energy
Williams Lake, BC

Data for **TEST 1**

OVERALL ISOKINETICS - TEST 1 1.017

Delta P:	0.130 "H₂O	Us avg:	21.69 ft/sec
Delta H:	1.369	ACFM:	40988 ft³/min
Tm avg:	547.1 °R	SDCFM:	34324 ft³/min
Ts avg:	571.5 °R	Vm std:	39.47 ft³
Bwo:	0.035	Vm corr:	43.38 ft³
Md:	28.96	Vm:	43.47 ft³
Ms:	28.58	MF:	0.9980
Pb:	28.10 "Hg	PCON:	9.84 mg/m³
Pm:	28.20 "Hg	ERAT:	0.57 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 2**

OVERALL ISOKINETICS - TEST 2 1.005

Delta P:	0.131 "H₂O	Us avg:	21.45 ft/sec
Delta H:	1.421	ACFM:	40550 ft³/min
Tm avg:	551.9 °R	SDCFM:	35091 ft³/min
Ts avg:	554.8 °R	Vm std:	39.99 ft³
Bwo:	0.032	Vm corr:	44.34 ft³
Md:	28.96	Vm:	44.43 ft³
Ms:	28.61	MF:	0.9980
Pb:	28.10 "Hg	PCON:	5.92 mg/m³
Pm:	28.20 "Hg	ERAT:	0.35 kg/hr
Ps:	28.09 "Hg		

Data for **TEST 3**

OVERALL ISOKINETICS - TEST 3 1.008

Delta P:	0.134 "H₂O	Us avg:	21.60 ft/sec
Delta H:	1.467	ACFM:	40827 ft³/min
Tm avg:	554.1 °R	SDCFM:	35576 ft³/min
Ts avg:	553.3 °R	Vm std:	40.54 ft³
Bwo:	0.027	Vm corr:	45.13 ft³
Md:	28.96	Vm:	45.22 ft³
Ms:	28.66	MF:	0.9980
Pb:	28.10 "Hg	PCON:	6.45 mg/m³
Pm:	28.21 "Hg	ERAT:	0.39 kg/hr
Ps:	28.09 "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)

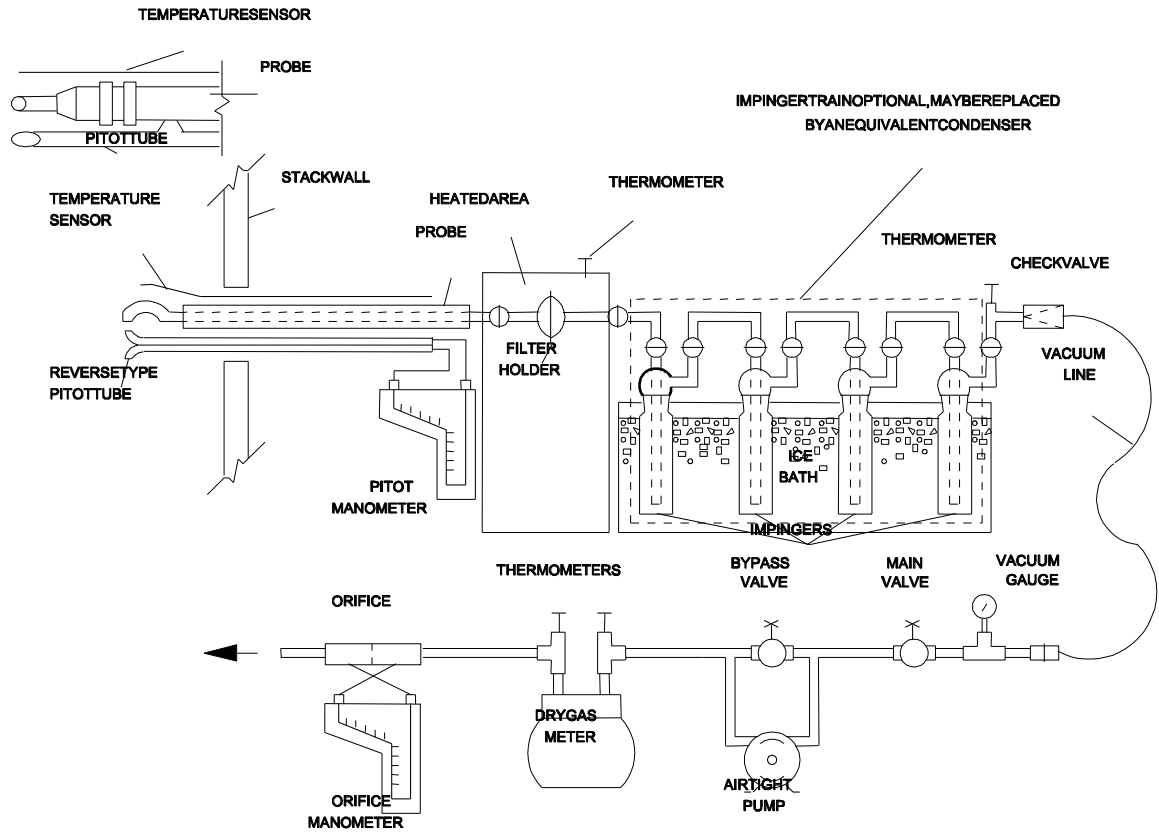
O₂, CO₂, and CO were found using either Fuji Analytical Analyzer by means of infrared and paramagnetic technology (EPA 3A) or by fyrite (EPA Method 3).

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.

$$V_{m(\text{std})} = V_m Y \left(\frac{T_{\text{std}}}{T_m} \right) \left[\frac{P_{\text{bar}} + \frac{\Delta H}{13.6}}{P_{\text{std}}} \right] \quad \text{Eq. 5-1}$$

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

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.

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

where:

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

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

Moisture Content.

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

Acetone Blank Concentration.

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

Acetone Wash Blank.

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

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

Particulate Concentration.

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

Conversion Factors:

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

Isokinetic Variation.

Calculation from Raw Data.

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

where:

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

Calculation from Intermediate Values.

$$I = \frac{100 T_s V_{m(\text{std})} P_{\text{std}}}{60 T_{\text{std}} v_s \theta A_n P_s (1 - B_{\text{ws}})} \quad \text{Eq.5-8}$$

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

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.

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

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).

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

- 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.: **200** *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>
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: 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):* 30.05
Pitot I.D.: **140** *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>
13.96	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: 10-Jan-24 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:



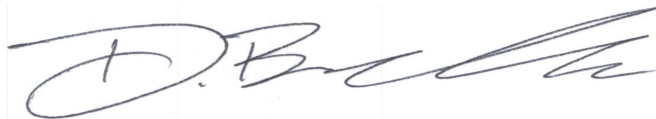
**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 02-Jul-24
 CONSOLE MANUF.: NAPP MODEL 31
 CONSOLE I.D.: C-955

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	68.0	68.0	68.0
P=Pres. Differential at WTM ("Hg)	0.0699	0.1250	0.1766
Pb= Atmospheric Pressure ("Hg)	28.15	28.15	28.15
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6900	0.6900	0.6900
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	89.0	90.0	95.0
To= Dry Test Meter Outlet Temp. (oF.)	72.0	71.0	73.0
Ri= Initial Dry Test volume (ft3)	21.33	14.44	27.23
Rf= Final Dry Test Volume (ft3)	26.23	19.38	32.15
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	28.0801	28.0250	27.9734
Pd= Pb + (^H/13.59) "Hg	28.2236	28.2972	28.3708
Tw= Ta +460 (oR.)	528.0	528.0	528.0
Td= [(Ti + To)/2] + 460 (oR.)	540.5	540.5	544.0
Bw= Pv/Pb ("Hg)	0.0245	0.0245	0.0245
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
(Calculated Y Value)(WTMF)	1.0059	0.9932	0.9992
Y (MEAN)(WTMF) =	0.9994		

MCCALL ENVIRONMENTAL

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 02-Jul-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	28.15	28.15	28.15
Y=gas meter factor	1.0059	1.0059	0.9932
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	35.2	37.5	40.8
Rf=final gas meter vol.	37.12	40.23	44.17
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/\sqrt{T(FT^3/MIN)}$	0.386266	0.549221	0.669417
To=meter outlet Temp (oF)	72	72	72
Tm=meter out temp. (oR)	532	532	532
$P_m=P_b + \Delta H$	28.18679	28.22358	28.26038
$SQRT(T_m/P_m \cdot H/M_d)$	0.570777	0.806674	0.987326
Ko=orifice const.	0.676737	0.680847	0.67801

Ko MEAN : 0.678531

$Ko \cdot 4 \cdot 144 = 390.8339$

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: 02-Jul-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	28.15	28.15	28.15
Y=gas meter factor	0.9932	0.9992	0.9992
Delta H=	2	2.5	3
Ri=int. gas meter vol.	44.8	49.6	54.9
Rf=final gas meter vol.	48.66	53.91	59.55
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.76675	0.86131	0.929256
Tm=meter out temp. (oF)	72	72	73
Tm=meter out temp. (oR.)	532	532	533
Pm=Pb + ^H	28.29717	28.33396	28.37075
SQRT(Tm/Pm*H/Md)	1.139325	1.272977	1.394881
Ko=orifice const.	0.672987	0.676611	0.66619

Ko MEAN : 0.671929

Ko*4*144= 387.0313

McCALL ENVIRONMENTAL LTD.

Calibrating Technician Signature:

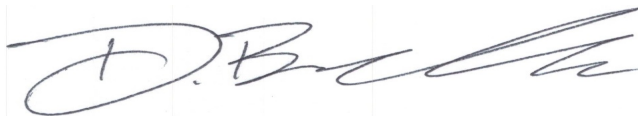


**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 03-Jul-24
 CONSOLE MANUF.: NAPP MODEL 31
 CONSOLE I.D.: C-980

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	68.0	68.0	68.0
P=Pres. Differential at WTM ("Hg)	0.0809	0.1471	0.2133
Pb= Atmospheric Pressure ("Hg)	28.25	28.25	28.25
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6900	0.6900	0.6900
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	91.0	93.0	98.0
To= Dry Test Meter Outlet Temp. (oF.)	77.0	77.0	78.0
Ri= Initial Dry Test volume (ft3)	26.34	15.50	34.24
Rf= Final Dry Test Volume (ft3)	31.30	20.45	39.21
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	28.1691	28.1029	28.0367
Pd= Pb + (^H/13.59) "Hg	28.3236	28.3972	28.4708
Tw= Ta +460 (oR.)	528.0	528.0	528.0
Td= [(Ti + To)/2] + 460 (oR.)	544.0	545.0	548.0
Bw= Pv/Pb ("Hg)	0.0244	0.0244	0.0244
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	0.9999	0.9988	0.9953
Y (MEAN)(WTMF) =	0.9980		

N.R. MCCALL & ASSOCIATES LTD.
 Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: July 3 2024

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	28.25	28.25	28.25
Y=gas meter factor	0.9999	0.9999	0.9988
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	42.3	45.4	49.4
Rf=final gas meter vol.	44.43	48.47	53.1
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.4259574	0.6139386	0.739112
To=meter outlet Temp (oF)	77	77	77
Tm=meter out temp. (oR)	537	537	537
Pm=Pb + ^H	28.286792	28.3235835	28.3603753
SQRT(Tm/Pm*H/Md)	0.5724381	0.80902377	0.9902048
Ko=orifice const.	0.7441108	0.75886349	0.74642337

Ko MEAN = 0.7497992

Ko*4*144= 431.88436

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: July 3 2024

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	28.25	28.25	28.25
Y=gas meter factor	0.9988	0.9953	0.9953
Delta H=	2	2.5	3
Ri=int. gas meter vol.	57.1	62.6	68.1
Rf=final gas meter vol.	61.33	67.31	73.25
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.8449848	0.9375726	1.025159
Tm=meter out temp. (oF)	78	78	78
Tm=meter out temp. (oR.)	538	538	538
Pm=Pb + ^H	28.397167	28.433959	28.470751
SQRT(Tm/Pm*H/Md)	1.1437125	1.2778819	1.3989447
Ko=orifice const.	0.7388087	0.7336927	0.7328088

Ko MEAN = 0.7351034

Ko*4*144= 423.41957

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.)	68.0	68.0	68.0
P=Pres. Differential at WTM ("Hg)	0.0699	0.1250	0.1839
Pb= Atmospheric Pressure ("Hg)	28.25	28.25	28.25
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6900	0.6900	0.6900
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	84.0	85.0	89.0
To= Dry Test Meter Outlet Temp. (oF.)	76.0	76.0	77.0
Ri= Initial Dry Test volume (ft3)	2.90	95.04	8.80
Rf= Final Dry Test Volume (ft3)	7.82	99.99	13.75
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	28.1801	28.1250	28.0661
Pd= Pb + (^H/13.59) "Hg	28.3236	28.3972	28.4708
Tw= Ta +460 (oR.)	528.0	528.0	528.0
Td= [(Ti + To)/2] + 460 (oR.)	540.0	540.5	543.0
Bw= Pv/Pb ("Hg)	0.0244	0.0244	0.0244
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
(Calculated Y Value)(WTMF)	1.0010	0.9913	0.9912
Y (MEAN)(WTMF) =	0.9945		

MCCALL ENVIRONMENTAL

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 03-Jul-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	28.25	28.25	28.25
Y=gas meter factor	1.001	1.0010	0.9913
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	14.4	16.6	19.8
Rf=final gas meter vol.	16.3	19.3	23.14
min. samp	5	5	5
Qm=Y(Rf-Ri)/^T(FT3/MIN)	0.38038	0.54054	0.6621884
To=meter outlet Temp (oF)	77	77	77
Tm=meter out temp. (oR)	537	537	537
Pm=Pb + ^H	28.286792	28.323584	28.360375
SQRT(Tm/Pm*H/Md)	0.5724381	0.8090238	0.9902048
Ko=orifice const.	0.664491	0.6681386	0.6687388

Ko MEAN = 0.6671228

Ko*4*144= 384.26275

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: 03-Jul-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	28.25	28.25	28.25
Y=gas meter factor	0.9913	0.9912	0.9912
Delta H=	2	2.5	3
Ri=int. gas meter vol.	23.5	27.8	32.7
Rf=final gas meter vol.	27.38	32.16	37.51
min. samp	5	5	5
$Q_m = Y(R_f - R_i) / \sqrt{T(FT^3/MIN)}$	0.7692488	0.8643264	0.9535344
To=meter outlet Temp (oF)	77	77	77
Tm=meter out temp. (oR)	537	537	537
$P_m = P_b + \Delta H$	28.397167	28.433959	28.470751
$SQRT(T_m / P_m * H / M_d)$	1.1426491	1.2766937	1.397644
Ko=orifice const.	0.6732153	0.6770037	0.6822441

Ko MEAN = 0.6774877

$Ko * 4 * 144 = 390.23292$

McCALL ENVIRONMENTAL LTD.



Calibrating Technician Signature:

**CALIBRATION CERTIFICATE
DRY GAS METER**

DATE: 02-Jul-24

CONSOLE MANUF.: NAPP MODEL 31

CONSOLE I.D.: C-1039

PARAMETER SUMMARY	RUN #1	RUN #2	RUN #3
Ta = Ambient (WTM) Temperature (oF.)	68.0	68.0	68.0
P=Pres. Differential at WTM ("Hg)	0.0883	0.1692	0.2354
Pb= Atmospheric Pressure ("Hg)	28.15	28.15	28.15
Pv= Vapour Pressure Water at Temp. Ta ("Hg)	0.6901	0.6901	0.6901
H=Pres. Differential at Orifice	1.0	2.0	3.0
Ti= Dry Test Meter Inlet Temp. (oF.)	99.0	98.0	104.0
To= Dry Test Meter Outlet Temp. (oF.)	84.0	84.0	85.0
Ri= Initial Dry Test volume (ft3)	71.66	64.71	77.64
Rf= Final Dry Test Volume (ft3)	76.66	69.66	82.63
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	28.0617	27.9808	27.9146
Pd= Pb + (^H/13.59) "Hg	28.2236	28.2972	28.3708
Tw= Ta +460 (oR.)	528.0	528.0	528.0
Td= [(Ti + To)/2] + 460 (oR.)	551.5	551.0	554.5
Bw= Pv/Pb ("Hg)	0.0245	0.0245	0.0245
WET TEST METER FACTOR (WTMF)	0.9922	0.9922	0.9922
ated Y Value)(WTMF)	1.0052	1.0088	1.0021

Y (MEAN)(WTMF) = 1.0054

MCCALL ENVIRONMENTAL

Calibrating Technician Signature:



ORIFICE METER CALIBRATION

DATE: 02-Jul-24

CONSOLE I.D. C-1039

	RUN 1	RUN 2	RUN 3
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.15	28.15	28.15
Y=gas meter factor	1.0052	1.0052	1.0088
Delta H=	0.5	1	1.5
Ri=int. gas meter vol.	85.6	88.2	91.9
Rf=final gas meter vol.	87.82	91.39	95.85
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/^T(FT^3/MIN)$	0.4463088	0.6413176	0.796952
Tm=meter out temp. (oF)	85	85	79
Tm=meter out temp. (oR.)	545	545	539
$P_m=P_b + ^H$	28.186792	28.223584	28.260375
$SQRT(T_m/P_m*H/M_d)$	0.5777084	0.8164703	0.9938007
Ko=orifice const.	0.7725503	0.7854757	0.8019234

Ko MEAN = 0.7866498

$Ko^4*144= 453.11028$

McCALL ENVIRONMENTAL



Calibrating Technician Signature:

ORIFICE METER CALIBRATION

DATE: 02-Jul-24

CONSOLE I.D. C-1039

	RUN 4	RUN 5	RUN 6
MD= mol. wt. dry air	28.967	28.967	28.967
Pb=bar. pressure "Hg	28.15	28.15	28.15
Y=gas meter factor	1.0088	1.0021	1.0021
Delta H=	2	2.5	3
Ri=int. gas meter vol.	96.5	1.7	7.3
Rf=final gas meter vol.	101.04	6.77	12.85
min. samp	5	5	5
$Q_m=Y(R_f-R_i)/^T(FT^3/MIN)$	0.9159904	1.0161294	1.112331
Tm=meter out temp. (oF)	86	87	87
Tm=meter out temp. (oR.)	546	547	547
$P_m=P_b + ^H$	28.297167	28.333959	28.370751
$SQRT(T_m/P_m*H/M_d)$	1.1542186	1.290798	1.4130812
Ko=orifice const.	0.7936022	0.7872102	0.7871671

Ko MEAN = 0.7893265

$Ko^4*144=$ 454.65206

McCALL ENVIRONMENTAL



Calibrating Technician Signature:



*Drax
Williams Lake*

Daily production rate Dec 6, 2024

21.4 MT/hr

Average for the previous calendar month

19.3 MT/hr

90th percentile production rate

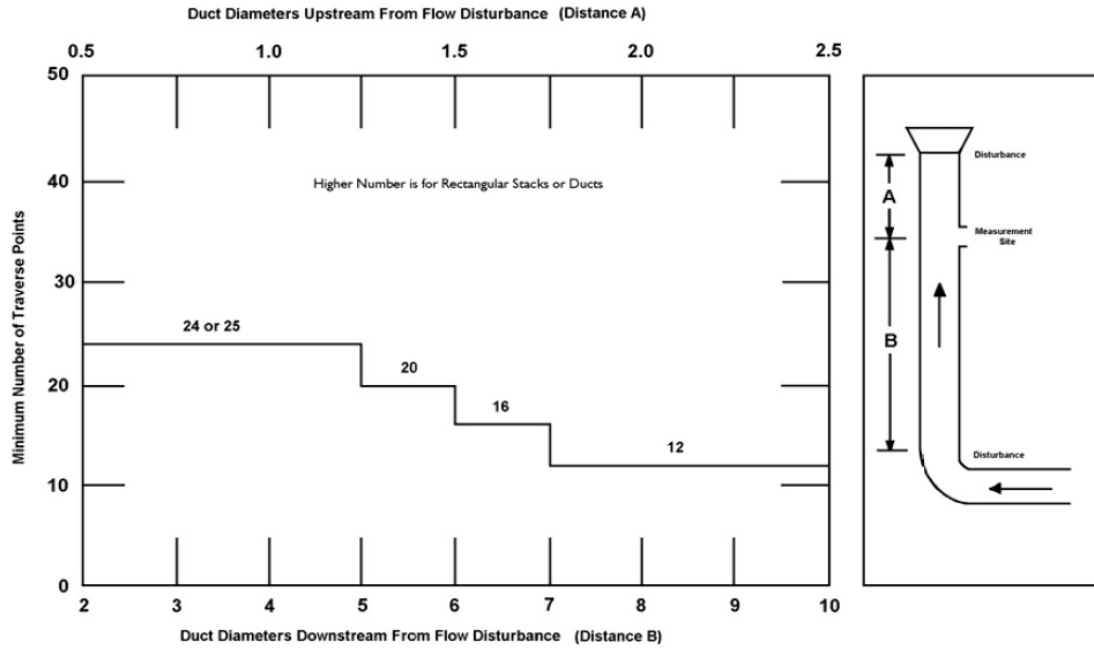
24.2 MT/hr

Average Dryer Fan 1 exit gas temperature
Average Dryer Fan 2 exit gas temperature
Average Dryer Fan 3 exit gas temperature
Average Dryer Fan 4 exit gas temperature
Average Cyclofilter exit gas temperature, [°C]
Volumetric emission flow rates, [m³/hour]
TPM, [mg/m³]
PM, [mg/m³]

Included in Stack Test
Included in Stack Test
Included in Stack Test
Included in Stack Test
Included in Stack Test
Included in Stack Test
Included in Stack Test
Included in Stack Test



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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable Sampled By: McCall Company: McCall	Proj. Acct. code:	

Reference Number	1782727-1	1782727-2	1782727-3
Sample Date	Dec 06, 2024	Dec 06, 2024	Dec 06, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Dryer Stack 1 Test 1 / Filter:O99 / 8.4 °C	Dryer Stack 1 Test 2 / Filter:P7 / 8.4 °C	Dryer Stack 1 Test 3 / Filter:P11 / 8.4 °C
Matrix	Water	Water	Water

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	309	310
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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable	Proj. Acct. code:	
Sampled By: McCall Company: McCall		

Reference Number	1782727-4	1782727-5	1782727-6
Sample Date	Dec 06, 2024	Dec 06, 2024	Dec 06, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Dryer Stack 2 Test 1 / Filter:P12 / 8.4 °C	Dryer Stack 2 Test 2 / Filter:P13 / 8.4 °C	Dryer Stack 2 Test 3 / Filter:P14 / 8.4 °C
Matrix	Water	Water	Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	322	317	331
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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable	Proj. Acct. code:	
Sampled By: McCall Company: McCall		

Reference Number	1782727-7	1782727-8	1782727-9
Sample Date	Dec 06, 2024	Dec 06, 2024	Dec 06, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Dryer Stack 3 Test 1 / Filter:P8 / 8.4 °C	Dryer Stack 3 Test 2 / Filter:P9 / 8.4 °C	Dryer Stack 3 Test 3 / Filter:P10 / 8.4 °C
Matrix	Water	Water	Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2	<2	2
Volume	Sample volume	mL	314	299	304
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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable Sampled By: McCall Company: McCall	Proj. Acct. code:	

Reference Number	1782727-10	1782727-11	1782727-12
Sample Date	Dec 06, 2024	Dec 06, 2024	Dec 06, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Dryer Stack 4 Test 1 / Filter:P16 / 8.4 °C	Dryer Stack 4 Test 2 / Filter:P17 / 8.4 °C	Dryer Stack 4 Test 3 / Filter:P18 / 8.4 °C
Matrix	Water	Water	Water


Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	4	2	<2
Volume	Sample volume	mL	311	309	310
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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable Sampled By: McCall Company: McCall	Proj. Acct. code:	

Reference Number 1782727-13
Sample Date Dec 06, 2024
Sample Time NA
Sample Location
Sample Description Water Blank / 8.4 °C
Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total	mg/sample	<2		2
Volume	Sample volume	mL	367		
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: Project Name: Drax Williams Lake Project Location: Drax WL LSD: P.O.:	Lot ID: 1782727 Control Number: Date Received: Dec 10, 2024 Date Reported: Dec 12, 2024 Report Number: 3088157 Report Type: Final Report
Attn: Accounts Payable Sampled By: McCall Company: McCall	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 <small>* Reference Method Modified</small>	Dec 10, 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.

Client Name: Drax
Williams Lake
 Process: Dryer Stack
 Test Number: 1
 Date: Dec 6 2024
 Start Time: 1209
 Finish Time: 11
 Starting Vol.: 300
 Final Vol.: 318
 Flask: 099
 Console: 955
 Stack Diameter: _____

BP 28.10
 DN 290 275
 CP 83867
 MF 9994
 Moist. 3%
 PM 28.21
 AS _____
 Ko 6785
 Pitot 217
 Port _____
 Static -1.19
 PS 28.09

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

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

Personnel: CB DB KS CB

Leakage Rate @ 15 inches _____ Start: 006 Finish: 008

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.29	2.18	51	51	84	11.60	1	270	1000	
11	.28	2.16	52	47	69	13.44				
10	.28	2.03	59	48	68	15.32				
9	.27	2.17	65	49	67	17.11				
8	.27	2.15	71	51	63	18.99				
7	.20	1.61	75	53	62	20.91				
6	.17	1.37	78	55	63	22.75	1			
5	.15	1.27	80	56	62	24.28				
4	.16	1.30	81	57	63	25.79				
3	.18	1.47	86	59	64	27.32				
2	.19	1.56	90	62	63	28.99				
1	.18	1.48	93	64	64	30.74				
B12	.25	2.07	94	66	63	32.41	1			
11	.24	2.00	96	69	62	34.37				
10	.18	1.50	96	69	62	36.34				
9	.17	1.41	94	70	62	38.20				
8	.17	1.41	94	70	63	39.80				
7	.21	1.74	94	71	62	41.45				
6	.21	1.75	94	71	62	43.28	1			
5	.19	1.58	96	72	64	45.15				
4	.19	1.59	99	74	64	46.94				
3	.20	1.68	102	75	62	48.69				
2	.20	1.69	101	76	59	50.59				
1	.21	1.78	94	76	59	52.37				
						54.21				

Client Name: Drax Williams Laid
 Process: Dryer Stack 1
 Test Number: 2
 Date: Dec 6 2024
 Start Time: 129
 Finish Time: 231
 Starting Vol.: 300
 Final Vol.: 3/6
 Flask: P7
 Console: 955
 Stack Diameter: _____

BP 28.10
 DN .290
 CP .83867
 MF .9994
 Moist. 27.
 PM 28.21
 AS _____
 Ko .6785
 Pitot 217
 Port _____
 Static -.19
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.4		
0	20.9		
0	20.9		
0	20.9		

Duct Diameters

Up-Stream

Duct Diameters

Downstream

Personnel: DB CB KS CL

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .008 Finish: _____

Load:

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.30	2.41	65	67	74	54.76	1	270	1000	
11	.27	2.21	75	68	68	56.91				
10	.25	2.08	79	67	61	58.97				
9	.26	2.18	82	67	59	60.98				
8	.27	2.27	86	67	59	62.98				
7	.21	1.78	90	68	58	65.06				
6	.16	1.37	94	69	57	66.95	1			
5	.15	1.28	93	70	55	68.66				
4	.16	1.38	94	71	54	70.20				
3	.17	1.46	94	71	56	71.68				
2	.18	1.53	94	71	59	73.35				
1	.18	1.53	96	72	63	75.07				
B12	.24	2.04	98	72	63	76.82	1			
11	.20	1.70	99	73	64	78.78				
10	.17	1.45	99	74	61	80.66				
9	.18	1.54	99	74	59	82.38				
8	.17	1.47	99	75	56	84.12	1			
7	.20	1.74	100	75	54	85.89				
6	.21	1.83	100	76	53	87.71				
5	.18	1.56	98	75	52	89.69				
4	.19	1.65	98	75	52	91.45				
3	.20	1.76	100	76	57	93.33				
2	.21	1.80	100	76	60	95.20				
1	.20	1.71	101	76	61	97.16				
						99.02				

Client Name: Drex Williams Lake
 Process: Dryer Stack 1
 Test Number: 3
 Date: Dec 6 2024
 Start Time: 3:00
 Finish Time: 4:02
 Starting Vol.: 300
 Final Vol.: 316
 Flask: P11
 Console: 455
 Stack Diameter: _____

BP 28.10
 DN: -290
 CP: 83867
 MF: 9994
 Moist.: 2%
 PM: 28.21
 AS: _____
 Ko: .6785
 Pitot: 217
 Port: _____
 Static: -.19
 PS: 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

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

Personnel: CB ks PB CB

Leakage Rate @ 15 inches

Start: 006 Finish: _____

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
112	.28	2.33	72	72	60	99.24	1	270	ICE	
11	.28	2.34	75	67	57	101.35				
10	.27	2.26	78	67	57	103.45				
9	.26	2.18	84	69	61	105.62				
8	.23	1.95	87	70	56	107.74				
7	.20	1.70	90	69	57	109.64	1			
6	.16	1.36	92	70	58	111.47				
5	.17	1.44	93	71	58	113.15				
4	.18	1.54	95	72	56	114.89				
3	.17	1.46	97	74	55	116.65				
2	.19	1.63	98	74	56	118.44	1			
1	.18	1.55	98	74	55	120.31				
112	.24	2.07	99	75	55	122.12				
11	.20	1.73	99	75	55	124.11				
10	.18	1.55	99	76	57	126.05				
9	.17	1.46	99	76	58	127.86				
8	.17	1.46	98	76	66	129.64				
7	.19	1.64	98	76	54	131.35	1			
6	.20	1.78	99	76	53	133.10				
5	.21	1.82	100	76	53	135.07				
4	.19	1.64	100	76	55	136.96				
3	.20	1.72	98	76	56	138.91				
2	.19	1.64	98	76	56	140.68				
1	.20	1.72	97	76	56	142.44				
						144.16				

Client Name: Drax
Williams Lake
 Process: Dry Stack 2
 Test Number: _____
 Date: Dec 6 2004
 Start Time 1209
 Finish Time 1:10
 Starting Vol. 300
 Final Vol. 321
 Flask: P12
 Console: 1039
 Stack Diameter _____

BP 28.10
 DN 290
 CP 83829
 MF 10052
 Moist. 31
 PM 28.21
 AS _____
 Ko 7866
 Pitot 140
 Port _____
 Static -19
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters
 Up-Stream _____
 Duct Diameters
 Downstream _____

Personnel: CB DB CB KC Mean Yaw Angle _____

Leakage Rate @ 15 inches Start: 010 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/2	.41	2.29	57	56	90	19.53	3	270	iced	
11	.40	2.26	65	60	91	21.91				
10	.40	2.27	67	60	88	24.14				
9	.38	2.18	76	60	88	26.93	3			
8	.35	2.03	84	62	87	29.00				
7	.35	2.04	88	62	87	31.24				
6	.34	1.99	93	64	87	33.92				
5	.29	1.71	95	67	86	35.80				
4	.26	1.54	96	70	86	37.91	3			
3	.25	1.48	99	72	87	39.84				
2	.25	1.49	101	74	87	41.77				
1	.24	1.43	102	75	87	43.73				
B/2	.38	2.15	103	76	87	45.60				
11	.35	2.10	104	77	87	47.90				
10	.34	2.04	105	78	87	50.24	3			
9	.28	1.68	106	79	88	52.55				
8	.27	1.62	107	80	89	54.63				
7	.26	1.57	108	81	87	56.70				
6	.24	1.45	108	81	86	58.78				
5	.28	1.69	108	81	86	60.74				
4	.27	1.64	109	82	86	62.90				
3	.26	1.58	109	83	86	65.00				
2	.25	1.52	109	83	86	67.03				
1	.24	1.45	109	83	87	69.04	3			
						70.99				

Client Name: Drax
Williams Lake
 Process: Dryer Stack?
 Test Number: 2
 Date: Dec 6 2024
 Start Time: 127
 Finish Time: 2:28
 Starting Vol.: 300
 Final Vol.: 319
 Flask: P13
 Console: 1039
 Stack Diameter: _____

BP 28.10
 DN .290
 CP .83829
 MF 1.0052
 Moist. 3%
 PM 28.21
 AS _____
 Ko .7866
 Pitot 140
 Port _____
 Static -.19
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters
Up-Stream

 Duct Diameters
Downstream

Personnel: CB DB KS CB Mean Yaw Angle _____

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

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.41	2.47	87	84	83	71.81	3	270	100	
11	.40	2.56	93	88	84	74.44				
10	.39	2.41	96	87	84	76.94				
9	.37	2.31	99	87	84	79.51				
8	.36	2.19	101	88	83	82.00				
7	.35	2.13	102	89	83	84.37				
6	.29	1.77	103	90	83	86.72				
5	.30	1.84	104	90	82	88.89				
4	.27	1.65	104	91	82	91.07				
3	.25	1.53	104	91	83	93.20				
2	.24	1.47	105	92	83	95.22				
1	.23	1.41	105	92	83	97.20				
B12	.36	2.21	106	93	82	79.18				
11	.33	2.15	106	93	82	101.61				
10	.34	2.09	106	93	82	103.97				
9	.30	1.85	107	94	82	106.32				
8	.27	1.67	111	95	82	108.54				
7	.26	1.62	114	96	81	110.68				
6	.25	1.56	117	97	81	112.77				
5	.27	1.69	118	98	81	114.89				
4	.27	1.69	119	99	81	116.93				
3	.26	1.63	120	99	81	119.08				
2	.24	1.51	120	100	80	121.22				
1	.24	1.51	119	100	80	123.25				
						125.22				

Client Name: Dura
Williams Lake
 Process: Dryer stack 2
 Test Number: 3
 Date: Dec 4 2024
 Start Time: 3:00
 Finish Time: 4:01
 Starting Vol.: 300
 Final Vol.: 321
 Flask: P14
 Console: 1039
 Stack Diameter

BP 28.10
 DN 290
 CP 83829
 MF 1.0052
 Moist. 3%
 PM 28.21
 AS
 Ko .7866
 Pitot 140
 Port
 Static -.19
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters
 Up-Stream
 Duct Diameters
 Downstream
 Mean Yaw Angle

Personnel: DB CB KS CB

Leakage Rate @ 15 inches Start: .004 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
A12	.40	2.46	94	88	81	27.29	0	270	ICE	
11	.41	2.49	94	88	81	29.90				
10	.39	2.37	97	89	81	32.38	1			
9	.38	2.33	103	91	81	34.90				
8	.36	2.21	104	92	82	37.31				
7	.35	2.15	105	93	82	39.64				
6	.33	2.03	106	94	83	42.00				
5	.29	1.78	107	95	83	44.25				
4	.30	1.85	109	96	83	46.42				
3	.28	1.73	111	96	84	48.71				
2	.26	1.61	113	97	84	50.90	1			
1	.24	1.49	114	99	83	53.00				
B12	.35	2.18	115	100	83	55.00				
11	.36	2.23	116	99	83	57.38				
10	.31	1.97	116	100	83	59.75				
9	.28	1.74	116	100	83	62.04				
8	.26	1.62	117	101	84	64.27				
7	.27	1.68	117	101	84	66.41				
6	.28	1.75	118	101	84	68.58				
5	.27	1.68	118	102	85	70.73				
4	.26	1.62	118	102	85	72.90	1			
3	.25	1.55	119	103	86	75.02				
2	.24	1.49	119	103	86	77.08				
1	.24	1.49	119	104	87	79.11	1	270	ICE	
						81.10				

Client Name: Drax
William's lake
 Process: dryer stack 3
 Test Number: 1
 Date: Dec 6/24
 Start Time: 12:15 pm
 Finish Time: 1:15 pm
 Starting Vol.: 300 mL
 Final Vol.: 320 mL
 Flask: P8
 Console: 1021
 Stack Diameter: 64

BP 28.10
 DN 300
 CPO 84182
 MF 0.910
 Moist. 3%
 PM 28.21
 AS
 Ko 0.6671
 Pitot 107
 Port
 Static -0.17
 PS 28.08

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters

Up-Stream

Duct Diameters

Downstream

Personnel: KS/LB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: 0.04 Finish: 0.06

Load:

016-20

79

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A 2	.25	2.33	69	62	82	55.91	3	270	LED	0
11	.17	1.58	72	63	87	57.83				2
10	.17	1.57	72	64	85	59.59				5
9	.15	1.38	74	65	87	61.39				7
8	.14	1.30	77	66	86	62.07				10
7	.15	1.40	78	68	86	64.58	4			12
6	.17	1.59	82	70	88	66.14				15
5	.18	1.68	84	72	90	67.88				17
4	.20	1.87	86	74	90	69.68				20
3	.22	2.07	88	76	90	71.54				22
2	.23	2.17	89	78	90	73.47				25
1	.21	1.99	90	79	89	75.51				27
B 12	.25	2.37	91	80	89	77.48				30
11	.22	2.09	92	81	89	79.56	2			32
10	.22	2.09	93	82	90	81.46				35
9	.20	1.89	93	83	92	83.35				37
8	.21	2.00	95	84	91	85.28				
7	.18	1.72	97	86	90	87.12				
6	.15	1.44	99	86	89	89.00				
5	.16	1.53	99	86	89	90.68				
4	.18	1.73	99	87	90	92.36				
3	.17	1.63	100	88	91	94.11				
2	.18	1.72	100	89	92	95.88				
1	.23	2.20	101	90	93	97.68				
						99.63				

Client Name: Drax
Williams lake
 Process: Dry Stack 3
 Test Number: 2
 Date: Apr 6 124
 Start Time: 1:40 pm
 Finish Time: 2:42
 Starting Vol.: 300
 Final Vol.: 317
 Flask: P9
 Console: 1021
 Stack Diameter

BP 28.05
 DN .300
 CPA 84182
 MF 0.9945
 Moist. 2%
 PM 28.21
 AS
 Ko 0.6671
 Pitot 107
 Port
 Static -17
 PS 28.08

CO ₂	O ₂	CO	N ₂

Duct Diameters
Up-Stream
 Duct Diameters
Downstream

Personnel: KS/LCB Mean Yaw Angle
 Leakage Rate @ 15 inches Start: .007 Finish: .009

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	.25	2.40	82	82	88	1.12	3	270	ILED	0
11	.22	2.11	84	81	90	3.28				2
10	.18	1.73	86	83	89	5.14				5
9	.17	1.64	87	84	88	7.08				7
8	.16	1.55	89	84	85	8.81				10
7	.17	1.65	92	85	87	10.54				12
6	.17	1.66	95	86	86	12.26	3			15
5	.18	1.77	96	87	85	14.12				17
4	.21	2.06	97	87	85	16.01				20
3	.22	2.17	98	89	84	17.96				22
2	.23	2.27	99	90	85	19.88				25
1	.21	2.08	100	92	87	21.88				27
B 12	.26	2.58	101	93	87	23.91	5			30
11	.23	2.29	103	94	87	25.97				32
10	.22	2.19	104	94	87	27.98				35
9	.20	2.00	104	94	87	29.96				37
8	.20	1.99	103	94	85	31.91				40
7	.19	1.90	104	95	85	33.86				42
6	.15	1.50	105	94	85	35.78				45
5	.16	1.60	105	95	84	37.58				47
4	.18	1.80	106	95	84	39.31				50
3	.17	1.70	106	95	85	41.16				52
2	.18	1.80	105	96	86	43.00				55
1	.21	2.09	106	96	87	44.88				57
						46.74				

Client Name: Drax
Williams lake
 Process: Dry br Stack 3
 Test Number: 3
 Date: Dec 6/24
 Start Time: 253
 Finish Time: 355
 Starting Vol.: 306
 Final Vol.: 316
 Flask: P10
 Console: 1021
 Stack Diameter

BP 28.10
 DN .300
 CPC: 84182
 MF 0.9945
 Moist. 27
 PM 28.21
 AS
 Ko 0.6671
 Pitot 107
 Port
 Static -17
 PS 28.08

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

Duct Diameters
Up-Stream

Duct Diameters
Downstream

Personnel: KS/CB

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: .008 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	.26	2.46	82	83	97	47.78	2	270	iced	
11	.21	2.01	84	82	97	49.85				
10	.19	1.83	87	83	89	51.81				
9	.18	1.74	88	84	88	53.72				
8	.15	1.46	89	84	87	55.64				
7	.16	1.56	89	85	86	57.33				
6	.16	1.56	90	86	87	59.05	1			
5	.19	1.85	91	86	88	60.71				
4	.22	2.14	91	87	89	62.63				
3	.23	2.26	92	87	85	64.66				
2	.24	2.35	93	88	87	66.71				
1	.20	1.96	94	88	88	68.79				
B 12	.27	2.65	96	89	87	70.75	1			
11	.22	2.16	97	88	88	72.91				
10	.21	2.07	98	87	86	74.90				
9	.21	2.07	99	88	85	76.83				
8	.19	1.88	101	88	85	78.78				
7	.18	1.78	102	89	86	80.69				
6	.16	1.58	103	89	86	82.54	1			
5	.15	1.49	104	90	87	84.27				
4	.17	1.68	105	91	88	85.96				
3	.18	1.78	106	92	89	87.68				
2	.19	1.88	107	93	90	89.55				
1	.22	2.20	108	95	87	91.45				
						93.48				

Client Name: Dugout
Williams Lake
 Process: Dryer Stack 4
 Test Number: 1
 Date: Dec 6/2024
 Start Time: 12:15pm
 Finish Time: 1:15pm
 Starting Vol.: 300
 Final Vol.: 322
 Flask: P/G
 Console: 980
 Stack Diameter: 6ft

BP 28.10
 DN .330
 CP 0.83365
 MF 0.9980
 Moist. 3%
 PM 28.21
 AS
 Ko 0.7497
 Pitot 200
 Port
 Static -0.10
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters
Up-Stream
 Duct Diameters
Downstream
 Mean Yaw Angle

Personnel: AS, CRB, DB, XS

Leakage Rate @ 15 inches Start: Finish:

Load:

10 - 21

95

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A 12	.15	1.52	68	69	108	81.88	0	270	Iced	0
11	.14	1.42	75	68	112	83.71				2.5
10	.13	1.32	78	68	112	85.95				5
9	.12	1.23	81	69	110	87.22				7.5
8	.12	1.23	88	70	110	88.87				10
7	.10	1.03	87	71	111	90.68				2.5
6	.11	1.13	88	72	111	92.14	2			15
5	.10	1.03	96	73	111	93.84				17.5
4	.12	1.24	97	74	112	95.53				20
3	.14	1.45	96	76	114	97.34				22.5
2	.18	1.87	101	77	116	99.21				25
1	.21	2.18	102	79	117	101.43				27.5
B 12	.13	1.35	100	81	119	103.56	2			30
11	.15	1.56	101	83	119	105.34				32.5
10	.13	1.35	102	83	117	107.35				35
9	.11	1.15	101	90	116	109.12				37.5
8	.12	1.25	100	84	115	110.67				40
7	.11	1.16	102	85	113	112.48				42.5
6	.10	1.05	101	85	110	114.29	2			45
5	.12	1.27	102	86	109	115.87				47.5
4	.12	1.28	105	87	107	117.74				50
3	.13	1.39	109	88	106	119.39				52.5
2	.15	1.63	110	89	101	121.38				55
1	.18	1.73	104	89	101	123.58	2			57.5
						125.35				60

Client Name: Dray
Williams Lake
 Process: Wyer Stack #1
 Test Number: 2
 Date: DEC 6 / 2024
 Start Time: 1:45 pm
 Finish Time: _____
 Starting Vol.: 300 mL
 Final Vol.: 319 mL
 Flask: P17
 Console: 980
 Stack Diameter: _____

BP 28.10
 DN .330
 CP 0.83365
 MF 0.9980
 Moist. 3%
 PM 28.21
 AS ✓
 Ko 0.7497
 Pitot 200
 Port ✓
 Static -.10
 PS 28.09

CO ₂	O ₂	CO	N ₂
0	20.9		

Duct Diameters
Up-Stream

Duct Diameters
Downstream

Personnel: CB, KS, CRB, DB

Mean Yaw Angle _____

Leakage Rate @ 15 inches Start: 0.05 Finish: 0.07

Load: _____

Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.16	1.68	83	83	106	26.75	0	270	Ice	0
11	.15	1.57	89	82	107	28.57				2.5
10	.13	1.27	94	82	105	30.58				5
9	.11	1.17	93	81	102	32.37				7.5
8	.12	1.28	94	80	99	34.18				10
7	.11	1.18	94	81	97	35.88				12.5
6	.10	1.07	94	82	98	37.60	3			15
5	.10	1.08	96	82	94	39.24				17.5
4	.13	1.41	98	82	94	40.84				20
3	.14	1.53	102	84	92	42.70				22.5
2	.17	1.86	103	85	93	44.60				25
1	.18	1.98	106	85	91	46.73				27.5
B12	0.14	1.53	107	87	94	48.88	3			30
11	0.15	1.66	108	88	89	50.97				32.5
10	0.12	1.33	109	89	87	53.09				35
9	0.11	1.22	108	89	88	55.00				37.5
8	.12	1.32	105	89	90	56.76				40
7	.11	1.22	105	90	89	58.40				42.5
6	.109	1.00	106	90	89	60.11	3			45
5	.112	1.32	102	92	91	61.58				47.5
4	.12	1.33	108	91	91	63.34				50
3	.13	1.43	108	92	95	65.25				52.5
2	.15	1.64	109	92	97	67.24				55
1	.17	1.87	109	94	97	69.18				57.5
						71.13	3			60

Client Name: Drax
Williams Lake
 Process: Oxy Stack 4
 Test Number: 3
 Date: Dec. 6 2024
 Start Time: 2:52 pm
 Finish Time: 3:54
 Starting Vol.: 300 mL
 Final Vol.: 316
 Flask: P18
 Console: 980
 Stack Diameter: _____

BP 28.10
 DN .330
 CP 0.83305
 MF .9980
 Moist. 3%
 PM 28.21
 AS ~
 Ko 0.7497
 Pitot 2.00
 Port ~
 Static -0.10
 PS 28.09

CO ₂	O ₂	CO	N ₂

Duct Diameters

Up-Stream

Duct Diameters

Downstream

Personnel: CB/CRB/OB/KS

Mean Yaw Angle

Leakage Rate @ 15 inches

Start: 0.05

Finish: 0.07

Load:

Test paused


Sample Points	Delta P	Delta H	Temp. In	Temp. Out	Stack Temp.	Gas Volume	Pump Vacuum	Box Temp.	Last Imp. Temp.	Points
A12	.17	1.82	91	88	98	71.83	0	270	Ice	0
11	.16	1.72	102	85	100	74.82				2.5
10	.14	1.52	98	84	94	76.10				5
9	.11	1.16	96	85	93	78.16				7.5
8	.12	1.30	96	85	91	79.90				10
7	.11	1.20	97	85	91	81.61				12.5
6	.10	1.09	99	84	89	83.42				15
5	.10	1.09	97	85	90	84.90				17.5
4	.12	1.31	101	85	91	86.60				20
3	.15	1.64	99	85	91	88.49				22.5
2	.17	1.86	104	87	92	90.48				25
1	.20	2.19	102	86	92	92.47				27.5
B12	0.15	1.64	106	87	93	94.61				30
11	0.15	1.64	104	88	93	96.62				32.5
10	.12	1.31	105	88	95	98.68				35
9	0.11	1.22	104	89	86	100.32				37.5
8	0.12	1.30	104	88	98	102.01				40
7	0.11	1.19	102	89	97	103.92				42.5
6	0.10	1.08	101	89	97	105.62				45
5	0.13	1.42	101	89	95	107.19				47.5
4	0.14	1.53	105	89	94	109.02				50
3	0.13	1.43	106	89	91	110.97				52.5
2	0.15	1.65	104	89	90	112.98				55
1	0.16	2.00	106	90	89	114.84				57.5
						117.05				60




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



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

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Chris Bodden

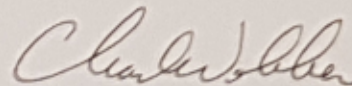
has successfully completed

Stack Sampling Seminar

35 Hours / 2017

June 23, 2017

Date



Dean

Faculty of Continuing Education and Extension



MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Kiefer Stauber

has successfully completed

Stack Sampling
Certificate of Completion

35 Hours / 2022

October 2022

Date



Dean

Faculty of Continuing Education and Extension