

January 25<sup>th</sup>, 2019

Karla Reesor  
Executive Director  
Peace River Air Monitoring Project  
Suite 91, 305-4625 Varsity Drive NW  
Calgary, Alberta  
T3A 0Z9

Ms. Reesor:

File Numbers: 2018-400A/408A

**Subject: Ambient Air Monitoring Station Audit Results for the Peace River Air Monitoring Project (PRAMP)**

Between the dates of January 15<sup>th</sup>, and 16<sup>th</sup> 2019 the Alberta Environment and Parks Ambient Air Monitoring Audit group conducted audits of the PRAMP ambient air monitoring stations. All continuous gas analyzers and meteorological sensors met audit criteria.

The following audit findings require action from PRAMP:

1. Based on observations and measurements made at the Reno station it appears that the wind speed and direction sensor siting does not meet AMD criteria found in Chapter 3 SS 2-G and Table 3/Figure 2. The wind sensor siting non-conformance was documented in the updated station site documents provided immediately following the audit. PRAMP is required to either site the wind sensor such that it meets AMD Chapter 3 siting requirements, or obtain written authorization from "The Director" to deviate from AMD siting requirements.
2. Based on observations and measurements made at the 986B station it appears that the wind speed and direction sensor siting does not meet AMD criteria found in Chapter 3 SS 2-G and Table 3/Figure 2. The wind sensor siting non-conformance was documented in the updated station site documents provided immediately following the audit. PRAMP is required to either site the wind sensor such that it meets AMD Chapter 3 siting requirements, or obtain written authorization from "The Director" to deviate from AMD siting requirements.

Upon receiving notification of this performance audit PRAMP was asked to provide the date of the most recent quality system audit as required by AMD Chapter 5 QS 4-A and QS 4-B(b). PRAMP indicated that the network QAP is currently in draft form. Additionally, PRAMP relies on Maxxam Analytics QAP which last underwent an internal audit March 30, 2018. The following action is required by PRAMP:

3. PRAMP must provide a timeline to finalize and implement a QAP that meets all requirements found in Chapter 5 of the Alberta AMD.

Please address the issues 1 through 3 noted above in writing as per AMD Chapter 8 *AUD 5-C* by February 25<sup>th</sup>, 2019 indicating what corrective actions have been taken and/or a timeline for completion. If you have any questions or comments, please contact the undersigned at 780-554-2238.

Yours truly,



Shea Beaton  
Monitoring Systems Auditor  
Phone: 403 351 0579  
Cell: 780 554-2238  
[shea.beaton@gov.ab.ca](mailto:shea.beaton@gov.ab.ca)

Attachments:

- Analyzer Audit Sheets
- PRAMP Audit Summary

CC: Al Clark – AEP/EMSD Ambient Air Monitoring Systems Auditor  
Marty Collins – AEP/EMSD Air Monitoring Manager  
Bob Myrick – AEP/EMSD Director of Airshed Sciences  
Madhan Selvaraj – AEP Air Quality Specialist  
Wally Qiu – AER Air Quality Specialist  
Lily Lin – PRAMP  
Mike Bisaga - PRAMP  
[air.reporting@gov.ab.ca](mailto:air.reporting@gov.ab.ca)

# Audit Summary

Form No. F-AA-018

Version 1.2

Page 1 of 3

Facility / Zone	PRAMP		
Total # of parameters that passed	9		
Total # of parameters audited in the network	9		
Date(s) of the audit	January 15 & 16, 2019		
Issue Date of Audit Summary	25-Jan-19		
Station Name	Reno		
Auditor	Shea Beaton		
Audit Date	15-Jan-19		
<b>Critical</b>	<b>Pass</b>	<b>Fail</b>	
SO <sub>2</sub>	X		
TRS	X		
NMHC	X		
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Zero/Span Systems Operational	X		
<b>Inspection Items</b>	<b>OK</b>	<b>Need for Improvement</b>	
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Safety	X		
Site Conditions		X	Does not meet AMD criteria
<b>Non-critical</b>	<b>OK</b>	<b>Opportunity for Improvement</b>	
RH	X		
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure	X		
Station Condition	X		
Station Documentation	X		

Not monitored at this location

# Audit Summary

Form No. F-AA-018

Version 1.2

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Facility / Zone	PRAMP		
Total # of parameters that passed	9		
Total # of parameters audited in the network	9		
Date(s) of the audit	January 15 & 16, 2019		
Issue Date of Audit Summary	25-Jan-19		
Station Name	842B		
Auditor	Shea Beaton		
Audit Date	16-Jan-19		
<b>Critical</b>	<b>Pass</b>	<b>Fail</b>	
SO <sub>2</sub>	X		
TRS	X		
NMHC	X		
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Zero/Span Systems Operational	X		
<b>Inspection Items</b>	<b>OK</b>	<b>Need for Improvement</b>	
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Safety	X		
Site Conditions	X		
<b>Non-critical</b>	<b>OK</b>	<b>Opportunity for Improvement</b>	
RH	X		
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure	X		
Station Condition	X		
Station Documentation	X		

Not monitored at this location

# Audit Summary

Form No. F-AA-018

Version 1.2

Page 3 of 3

Facility / Zone	PRAMP		
Total # of parameters that passed	9		
Total # of parameters audited in the network	9		
Date(s) of the audit	January 15 & 16, 2019		
Issue Date of Audit Summary	25-Jan-19		
Station Name	986B		
Auditor	Shea Beaton		
Audit Date	16-Jan-19		
<b>Critical</b>	<b>Pass</b>	<b>Fail</b>	
SO <sub>2</sub>	X		
TRS	X		
NMHC	X		
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Zero/Span Systems Operational	X		
<b>Inspection Items</b>	<b>OK</b>	<b>Need for Improvement</b>	
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Safety	X		
Site Conditions		X	Does not meet AMD criteria
<b>Non-critical</b>	<b>OK</b>	<b>Opportunity for Improvement</b>	
RH	X		
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure	X		
Station Condition	X		
Station Documentation	X		

Not monitored at this location

# STATION AUDIT

File No. 2018 - 406/408A

Date: January 16, 2019

Performed by: SB

## Station

Name: 986B

Location: Hwy 986

Facility/Zone: PRAMP

Operator: Maxxam

Temp: 26.6

Barometric Press: 713mmHg

## Location

Latitude N 56.376

Longitude W -116.9406

Elevation 600m

Status of Site Documentation Supplied electronically during audit

Status of Network Documentation Complete

Status of QAP In Draft

Manifold Material Glass

Manifold Condition Good

## Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>5.6km/h @ 355°</u>	<u>NNW 5-10</u>
Station Temperature	<u>24.3 C</u>	<u>24.1 C</u>
Relative Humidity	<u>74.1%</u>	<u>70%</u>
Ambient Temperature	<u>-18.2 C</u>	<u>-18.3 C</u>
Solar Radiation	<u>NA</u>	<u>NA</u>
Pressure	<u>952.1mBar (714mmHg)</u>	<u>713mmHg</u>

## Remarks:

- Trees to the East taller than tower - ~70m away from station and 13 to 16m tall  
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# SO<sub>2</sub> ANALYZER AUDIT

File No. 2018 - 407A

Date: January 16, 2019

Performed by: SB

## Station

Name: 986B

Location: Hwy 986

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 26.6

Barometric Press. 713mmHg

## Monitor

Make/Model: Thermo 43C Serial No: 43C-62339-335

Inlet flow (sccm): 707 Full Scale Range ppm: 0.5

Last cal. Date: December 12, 2019 Old Correction Factor: 1.000

Zero/Bkg 85.4

Span Coef 0.921

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0012544 AMU #: 2003

CGA Date: 11-Sep-18 SO<sub>2</sub> Concentration PPM: 51.1

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4985	0.0	4985	0.0000	0.0000		
4937	40.0	4977	0.4107	0.3966	-3%	± 10%
5014	20.0	5034	0.2030	0.1991	-2%	± 10%
5014	10.1	5024	0.1027	0.0984	-4%	± 10%
Absolute Average Percent Difference					3%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9672

b (Intercept as % of full scale)= 0.0598

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# TRS ANALYZER AUDIT

File No. 2018 - 406A

Date: January 16, 2019

Performed by: SB

## Station

Name: 986B

Location: Hwy 986

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 26.6

Barometric Press. 713mmHg

## Monitor

Make/Model: Thermo 43iTLE Serial No: 1152940011

Inlet flow (sccm): 487 Full Scale Range ppm: 0.1

Last cal. Date: December 12, 2018 Old Correction Factor: 1.000

Zero/Bkg 2.150

Span Coef 0.989

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0009231 AMU #: 2003

CGA Date: 11-Sep-18 H<sub>2</sub>S Concentration PPM: 9.99

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4985	0.0	4985	0.0000	0.0000		
4938	38.8	4977	0.0779	0.0802	3%	± 10%
5015	19.3	5034	0.0383	0.0403	5%	± 10%
5014	9.6	5024	0.0191	0.0193	1%	± 10%
Absolute Average Percent Difference					3%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 0.9999

m (Slope)= 1.0325

b (Intercept as % of full scale)= 0.0324

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# Non Methane Analyzer Audit

File No. 2018 - 408A

Date: January 16, 2019

Performed by: SB

**Station:**

Name: 986B Location: Hwy 986 Operator: Maxxam  
 Facility/Zone: PRAMP Temp. 26.6 BP: 713mmHg

**Monitor:**

Make/Model: Thermo 55i Serial No. 1022143392  
 Inlet flow (scm): NA CH<sub>4</sub> Range ppm: 20.0  
 Last cal. Date: December 12, 2019 Non CH<sub>4</sub> Range ppm: 20.0  
 THC Range ppm: 40.0  
 Old Correction Factor: CH<sub>4</sub>: 0.999  
 Non CH<sub>4</sub>: 1.000  
 THC: 0.999

**Calibration Method:**

Gas Dilution

**Calibrator:**

Make/Model Sabio 2010 AMU# 1778

HC cylinder # FF50232 CH<sub>4</sub> conc. (ppm) 1019.0 CH<sub>4</sub> Equiv (C3H8 only) (ppm) 970.8

CGA Date 12-Oct-17 C<sub>3</sub>H<sub>8</sub> conc. (ppm) 353.0 Total CH<sub>4</sub> Equiv. (ppm) 1989.8

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH <sub>4</sub>	Non CH <sub>4</sub>	THC
4980	0.0	4980	0.00	0.00	0.00	0.00	0.00	0.00	<del>4%</del>	<del>3%</del>	<del>3%</del>
4994	68.8	5063	13.85	13.19	27.04	14.45	13.53	27.98	4%	3%	3%
5036	34.2	5070	6.87	6.55	13.42	7.29	6.82	14.11	6%	4%	5%
5033	14.7	5048	2.97	2.83	5.79	3.12	2.91	6.02	5%	3%	4%
Absolute Average Percent Difference									5%	3%	4%

**Linear Regression Analysis:**

*y=mx+b (where x=calculated concentration, y=indicated concentration)*

	<b>CH<sub>4</sub></b>	<b>Non CH<sub>4</sub></b>	<b>THC</b>	<b>LIMITS</b>
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	<b>≥ 0.995</b>
m (Slope)=	<u>1.0439</u>	<u>1.0263</u>	<u>1.0355</u>	<b>0.90-1.10</b>
b (Intercept as % of FS)=	<u>0.1638</u>	<u>0.1241</u>	<u>0.1336</u>	<b>± 3% F.S.</b>

**Remarks:**

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### Station Performance Audit Summary

Company: PRAMP

Facility Name: NA

Approval No.: NA

Site Name: 986B

Region: Lower Peace

District: Peace River

Parameters audited:

H <sub>2</sub> S		SO <sub>2</sub>	X	NO <sub>x</sub>		NH <sub>3</sub>		O <sub>3</sub>	
CO		CH <sub>4</sub>	X	NonCH <sub>4</sub>	X	THC	X	TRS	X
PM <sub>2.5</sub>		PM <sub>10</sub>		TSP		BTEX		Wind Speed	X
Wind Dir	X	Amb. Temp	X	Stn. Temp	X	RH	X	Solar Radiation	
Rainfall		Precip		VWS		Other		BP	
All parameters monitored as per approval: Yes _____ No _____ N/A_X_____									

*GENERAL*

	YES	NO	N/A
Has the location remained unchanged from previous audit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is site secure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are station operating conditions adequate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*DATA ACQUISITION*

Are strip charts in use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is a telemetry system for data acquisition in use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*SYSTEM COMPONENTS*

Is a glass sampling manifold installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is sampling manifold clean?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is a manifold trap in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are spare manifold ports capped	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is manifold oriented so it is not exactly horizontal?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are manifold ports situated to prevent water entering monitors?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is manifold pump properly installed and operative?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do sample lines extend at least 3/4" into manifold?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitor sampling lines connected to manifold?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are sampling lines clean?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitors properly mounted and secure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitors properly exhausted from room or scrubbed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are zero and span systems operational?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*WIND EQUIPMENT*

Is wind sensor properly oriented?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does wind equipment appear to be functioning properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of last calibration.	Date:	<u>April 4, 2018</u>	

*COMMENTS:*

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AUDITOR: Shea Beaton

DATE: January 16, 2019



# STATION AUDIT

File No. 2018 - 403/405A

Date: January 16, 2019

Performed by: SB

## Station

Name: 842B

Location: TWP 842

Facility/Zone: PRAMP

Operator: Maxxam

Temp: 23.4

Barometric Press: 713mmHg

## Location

Latitude N 56°, 16', 26.9

Longitude W 116°, 58', 52.8"

Elevation 615m

Status of Site Documentation Update supplied following station audit

Status of Network Documentation Complete

Status of QAP In Draft

Manifold Material Glass

Manifold Condition Good

## Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>7.8km/h @ 356°</u>	<u>5 - 10km/h North</u>
Station Temperature	<u>21.0</u>	<u>21.5</u>
Relative Humidity	<u>80.6</u>	<u>72.0</u>
Ambient Temperature	<u>-18.9 C</u>	<u>-18.3 C</u>
Solar Radiation	<u>NA</u>	<u>NA</u>
Pressure	<u>951.8mBar(713.9mmHg)</u>	<u>713mmHg</u>

## Remarks:

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# SO<sub>2</sub> ANALYZER AUDIT

File No. 2018 - 404A

Date: January 16, 2019

Performed by: SB

## Station

Name: 842B

Location: TWP 842

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 23.4

Barometric Press. 713mmHg

## Monitor

Make/Model: Thernmo 43i Serial No: 83503373

Inlet flow (sccm): 409 Full Scale Range ppm: 0.5

Last cal. Date: January 8, 2019 Old Correction Factor: 1.000

Zero/Bkg 14.6

Span Coef 1.02

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0012544 AMU #: 2003

CGA Date: 11-Sep-18 SO<sub>2</sub> Concentration PPM: 51.1

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
5017	0.0	5017	0.0000	0.0001		
4972	39.8	5012	0.4058	0.4034	-1%	± 10%
5008	19.8	5028	0.2012	0.2017	0%	± 10%
5014	10.0	5024	0.1017	0.1014	0%	± 10%
Absolute Average Percent Difference					0%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9941

b (Intercept as % of full scale)= 0.1017

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# TRS ANALYZER AUDIT

File No. 2018 - 403A

Date: January 16, 2019

Performed by: SB

## Station

Name: 842B

Location: TWP 842

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 23.4

Barometric Press. 713mmHg

## Monitor

Make/Model: Thermo 43iTLE Serial No: 1162460023

Inlet flow (sccm): 409 Full Scale Range ppm: 0.1

Last cal. Date: January 8, 2019 Old Correction Factor: 1.000

Zero/Bkg 3.090

Span Coef 0.898

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0009231 AMU #: 2003

CGA Date: 11-Sep-18 H<sub>2</sub>S Concentration PPM: 9.99

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
5017	0.0	5017	0.0000	-0.0001		
4973	38.7	5012	0.0771	0.0782	2%	± 10%
5009	19.2	5028	0.0381	0.0391	3%	± 10%
5015	9.5	5024	0.0189	0.0192	2%	± 10%
Absolute Average Percent Difference					2%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 1.0152

b (Intercept as % of full scale)= 0.0468

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# Non Methane Analyzer Audit

File No. 2018 - 405A

Date: January 16, 2019

Performed by: SB

**Station:**

Name: 842 Location: TWP 842 Operator: Maxxam  
 Facility/Zone: PRAMP Temp. 23.4 BP: 713mmHg

**Monitor:**

Make/Model: Thermo 55i Serial No. 1433563261  
 Inlet flow (scm): NA CH<sub>4</sub> Range ppm: 20.0  
 Last cal. Date: January 9, 2018 Non CH<sub>4</sub> Range ppm: 20.0  
 THC Range ppm: 40.0  
 Old Correction Factor: CH<sub>4</sub>: 0.999  
 Non CH<sub>4</sub>: 0.999  
 THC: 0.999

**Calibration Method:**

Gas Dilution

**Calibrator:**

Make/Model Sabio 2010 AMU# 1778

HC cylinder # FF50232 CH<sub>4</sub> conc. (ppm) 1019.0 CH<sub>4</sub> Equiv (C<sub>3</sub>H<sub>8</sub> only) (ppm) 970.8

CGA Date 12-Oct-17 C<sub>3</sub>H<sub>8</sub> conc. (ppm) 353.0 Total CH<sub>4</sub> Equiv. (ppm) 1989.8

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH <sub>4</sub>	Non CH <sub>4</sub>	THC
5015	0.0	5015	0.00	0.00	0.00	0.00	0.00	0.00	<del>0%</del>	<del>-1%</del>	<del>0%</del>
5015	68.7	5084	13.77	13.12	26.89	13.78	13.04	26.82	0%	-1%	0%
5034	34.4	5068	6.92	6.59	13.51	6.92	6.61	13.53	0%	0%	0%
5030	14.6	5045	2.95	2.81	5.76	2.99	2.91	5.90	1%	4%	2%
Absolute Average Percent Difference									1%	1%	1%

**Linear Regression Analysis:**

*y=mx+b (where x=calculated concentration, y=indicated concentration)*

	<b>CH<sub>4</sub></b>	<b>Non CH<sub>4</sub></b>	<b>THC</b>	<b>LIMITS</b>
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	<b>≥ 0.995</b>
m (Slope)=	<u>0.9996</u>	<u>0.9912</u>	<u>0.9955</u>	<b>0.90-1.10</b>
b (Intercept as % of FS)=	<u>0.0787</u>	<u>0.3012</u>	<u>0.1899</u>	<b>± 3% F.S.</b>

**Remarks:**

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### Station Performance Audit Summary

Company: PRAMP

Facility Name: NA

Approval No.: NA

Site Name: 842B

Region: Lower Peace

District: Peace River

Parameters audited:

H <sub>2</sub> S		SO <sub>2</sub>	X	NO <sub>x</sub>		NH <sub>3</sub>		O <sub>3</sub>	
CO		CH <sub>4</sub>	X	NonCH <sub>4</sub>	X	THC	X	TRS	X
PM <sub>2.5</sub>		PM <sub>10</sub>		TSP		BTEX		Wind Speed	X
Wind Dir	X	Amb. Temp	X	Stn.Temp	X	RH	X	Solar Radiation	
Rainfall		Precip		VWS		Other	BP		
All parameters monitored as per approval: Yes _____ No _____ N/A ___X___									

*GENERAL*

	YES	NO	N/A
Has the location remained unchanged from previous audit?	X		
Is site secure?	X		
Are station operating conditions adequate?	X		

*DATA ACQUISITION*

Are strip charts in use?	X		
Is a telemetry system for data acquisition in use?	X		

*SYSTEM COMPONENTS*

Is a glass sampling manifold installed?	X		
Is sampling manifold clean?	X		
Is a manifold trap in place?	X		
Are spare manifold ports capped	X		
Is manifold oriented so it is not exactly horizontal?	X		
Are manifold ports situated to prevent water entering monitors?	X		
Is manifold pump properly installed and operative?	X		
Do sample lines extend at least 3/4" into manifold?	X		
Are monitor sampling lines connected to manifold?	X		
Are sampling lines clean?	X		
Are monitors properly mounted and secure?	X		
Are monitors properly exhausted from room or scrubbed?	X		
Are zero and span systems operational?	X		

*WIND EQUIPMENT*

Is wind sensor properly oriented?	X		
Does wind equipment appear to be functioning properly?	X		
Date of last calibration.	Date:	<u>August 22, 2018</u>	

*COMMENTS:*

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AUDITOR: Shea Beaton

DATE: January 16, 2019





# STATION AUDIT

File No. 2018 - 400A/402A

Date: January 15, 2019

Performed by: SB

## Station

Name: Reno

Location: Reno

Facility/Zone: PRAMP

Operator: Maxxam

Temp: 24.5

Barometric Press: 707mmHg

## Location

Latitude N 55°, 52', 10.7"

Longitude W 117°, 03', 27.1"

Elevation 641

Status of Site Documentation Supplied electronically during audit

Status of Network Documentation Complete

Status of QAP In Draft

Manifold Material Glass

Manifold Condition Good

## Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>7.7km/h @ 345°</u>	<u>NNW 5-10km/h</u>
Station Temperature	<u>20.3 C</u>	<u>20.5 C</u>
Relative Humidity	<u>77.2%</u>	<u>72.3%</u>
Ambient Temperature	<u>-12.2C</u>	<u>-11.8 C</u>
Solar Radiation	<u>NA</u>	<u>NA</u>
Pressure	<u>942.9mBar(707mmHg)</u>	<u>707 mmHg</u>

## Remarks:

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# SO<sub>2</sub> ANALYZER AUDIT

File No. 2018-401A

Date: January 15, 2019

Performed by: SB

## Station

Name: Reno

Location: Reno

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 24.5

Barometric Press. 707mmHg

## Monitor

Make/Model: API 100A Serial No: 841

Inlet flow (sccm): 661 Full Scale Range ppm: 0.5

Last cal. Date: January 10, 2019 Old Correction Factor: 1.000

Zero/Bkg 50.5

Span Coef 1.084

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0012544 AMU #: 2003

CGA Date: 11-Sep-18 SO<sub>2</sub> Concentration PPM: 51.1

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
5041	0.0	5041	0.0000	0.0003		
5006	40.3	5046	0.4081	0.4006	-2%	± 10%
5027	19.9	5047	0.2015	0.2000	-1%	± 10%
5036	10.1	5046	0.1023	0.0997	-3%	± 10%
Absolute Average Percent Difference					2%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9822

b (Intercept as % of full scale)= 0.0710

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# TRS ANALYZER AUDIT

File No. 2018-400A

Date: January 15, 2019

Performed by: SB

## Station

Name: Reno

Location: Reno

Facility/Zone: PRAMP

Operator: Maxxam

Temp. 24.5

Barometric Press. 707mmHg

## Monitor

Make/Model: Thermo 43iTLE Serial No: 1162460022

Inlet flow (sccm): 411 Full Scale Range ppm: 0.1

Last cal. Date: Jan 10, 2-19 Old Correction Factor: 1.000

Zero/Bkg 2.380

Span Coef 0.949

## Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010D

Cylinder #: EX0009231 AMU #: 2003

CGA Date: 11-Sep-18 H<sub>2</sub>S Concentration PPM: 9.99

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
5041	0.0	5041	0.0000	-0.0001		
5007	39.2	5046	0.0776	0.0791	2%	± 10%
5028	19.3	5047	0.0382	0.0394	3%	± 10%
5036	9.6	5046	0.0190	0.0195	3%	± 10%
Absolute Average Percent Difference					3%	

## Linear Regression Analysis:

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 1.0203

b (Intercept as % of full scale)= 0.0865

### LIMITS

≥ **0.995**

**0.90-1.10**

± **3% F.S.**

## Remarks:

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# Non Methane Analyzer Audit

File No. 2018-402A

Date: January 15, 2019

Performed by: SB

**Station:**

Name: Reno Location: Reno Operator: Maxxam  
 Facility/Zone: PRAMP Temp. 24.5 BP: 707mmHg

**Monitor:**

Make/Model: Thermo 55i Serial No. 1314057759  
 Inlet flow (scm): NA CH<sub>4</sub> Range ppm: 20.0  
 Last cal. Date: January 10, 2019 Non CH<sub>4</sub> Range ppm: 20.0  
 THC Range ppm: 40.0  
 Old Correction Factor: CH<sub>4</sub>: 0.998  
 Non CH<sub>4</sub>: 1.001  
 THC: 0.999

**Calibration Method:**

Gas Dilution

**Calibrator:**

Make/Model Sabio 2010 AMU# 1778

HC cylinder # FF50232 CH<sub>4</sub> conc. (ppm) 1019.0 CH<sub>4</sub> Equiv (C<sub>3</sub>H<sub>8</sub> only) (ppm) 970.8

CGA Date 12-Oct-17 C<sub>3</sub>H<sub>8</sub> conc. (ppm) 353.0 Total CH<sub>4</sub> Equiv. (ppm) 1989.8

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	CH <sub>4</sub> (ppm)	Non CH <sub>4</sub> (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH <sub>4</sub>	Non CH <sub>4</sub>	THC
5041	0.0	5041	0.00	0.00	0.00	0.00	0.00	0.00	<del> </del>	<del> </del>	<del> </del>
5047	69.0	5116	13.74	13.09	26.84	13.67	12.98	26.66	-1%	-1%	-1%
5060	34.9	5095	6.98	6.65	13.63	6.92	6.53	13.45	-1%	-2%	-1%
5060	14.9	5075	2.99	2.85	5.84	2.95	2.84	5.78	-1%	0%	-1%
Absolute Average Percent Difference									1%	1%	1%

**Linear Regression Analysis:**

$y=mx+b$  (where  $x$ =calculated concentration,  $y$ =indicated concentration)

	CH <sub>4</sub>	Non CH <sub>4</sub>	THC	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	<b>≥ 0.995</b>
m (Slope)=	<u>0.9952</u>	<u>0.9903</u>	<u>0.9933</u>	<b>0.90-1.10</b>
b (Intercept as % of FS)=	<u>-0.0751</u>	<u>-0.0297</u>	<u>-0.0674</u>	<b>± 3% F.S.</b>

**Remarks:**

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### Station Performance Audit Summary

Company: PRAMP

Facility Name: NA

Approval No.: NA

Site Name: Reno

Region: Upper Peace

District: Peace River

Parameters audited:

H <sub>2</sub> S		SO <sub>2</sub>	X	NO <sub>x</sub>		NH <sub>3</sub>		O <sub>3</sub>	
CO		CH <sub>4</sub>	X	NonCH <sub>4</sub>	X	THC	X	TRS	X
PM <sub>2.5</sub>		PM <sub>10</sub>		TSP		BTEX		Wind Speed	X
Wind Dir	X	Amb. Temp	X	Stn. Temp	X	RH	X	Solar Radiation	
Rainfall		Precip		VWS		Other		BP	
All parameters monitored as per approval: Yes _____ No _____ N/A ___X___									

*GENERAL*

	YES	NO	N/A
Has the location remained unchanged from previous audit?	X		
Is site secure?	X		
Are station operating conditions adequate?	X		

*DATA ACQUISITION*

Are strip charts in use?	X		
Is a telemetry system for data acquisition in use?	X		

*SYSTEM COMPONENTS*

Is a glass sampling manifold installed?	X		
Is sampling manifold clean?	X		
Is a manifold trap in place?	X		
Are spare manifold ports capped	X		
Is manifold oriented so it is not exactly horizontal?	X		
Are manifold ports situated to prevent water entering monitors?	X		
Is manifold pump properly installed and operative?	X		
Do sample lines extend at least 3/4" into manifold?	X		
Are monitor sampling lines connected to manifold?	X		
Are sampling lines clean?	X		
Are monitors properly mounted and secure?	X		
Are monitors properly exhausted from room or scrubbed?	X		
Are zero and span systems operational?	X		

*WIND EQUIPMENT*

Is wind sensor properly oriented?	X		
Does wind equipment appear to be functioning properly?	X		
Date of last calibration.	Date:	<u>April 5, 2018</u>	

*COMMENTS:*

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AUDITOR: Shea Beaton

DATE: January 15, 2019

### Station Site Documents Audit Checklist

<b>Station</b>	
Name: <u>          Reno          </u>	Location: <u>          Reno          </u>
Facility/Zone: <u>          PRAMP          </u>	Operator: <u>          Maxxam          </u>

**Required Elements of AMD Chapter 3 SS 4-B**

Do the Site Documents Contain the Following:

- (a) Name of Owner/ Approval Holder
- (b) Name of Operating Agency
- (c) Contact Information
- (d) Date the Site or Station was Established
- (e) Date the information was last updated
- (f) Location including Latitude and Longitude
- (g) Four Colour Photos Looking N, E, S, W From Manifold Inlet
- (h) Additional Photos/Sketches of AMD Standard Site Non-Conformance
- (i) List of Instruments Located at the Site
- (j) Site Description Including the following:
  - (i) Land Use By Sector
  - (ii) Site Elevation
  - (iii) Greatest Angle of Elevation & Direction to Nearby Buildings
  - (iv) Average Building height in the area
  - (v) Distance to Nearest Trees

Meets AMD		NA	Current	
YES	NO		YES	NO
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	

**Required Elements of AMD Chapter 3 SS 4-D**

Do the Station Site Documents Contain the Following:

- (a) Recent Area Map Covering Approximately 1Km<sup>2</sup>
- (b) Plan View Sketch
- (c) Cross-Sectional Sketch of Area Within 500 m Radius
- (d) Colour Photos Showing Sample Manifold/Inlet
- (e) Colour Photo of the Station
- (f) Additional Photos/Sketches of AMD Standard Station Non-Conformance

Meets AMD		NA	Current	
YES	NO		YES	NO
X			X	
X			X	
		X		
X			X	
X				X
X			X	

COMMENTS:           Site does not appear to meet AMD criteria - trees to South and West taller than 10m tower            
          - Siting non-conformance documented in newly updated site docs.          

AUDITOR:           Shea Beaton                                DATE:           January 15, 2019