Environment and Sustainable Resource Development

**Operations Division**
Air Monitoring and Audit Center
4946 89 Street N.W.
Edmonton, Alberta T6E-5K1
Canada
Telephone: 780-427-7888
www.alberta.ca

Date: October 18, 2013 File No(s). 2011 – 270A / 292A

Mr. Darren Morissette
Executive Director
Peace Airshed Zone Associtaion (Paza)
P.O. Box 21135
Grande Prairie, AB T8V 6W7

Dear Mr. Morissette:

Please see attached audit summary for all audit findings from the audits recently conducted on the Paza ambient air monitoring stations.

Please note that the $H_2S$ failure at Valleyview was addressed immediately following the audit. A review of the data and calibration documents is required to see when the change occurred. The contractor's system was compared to ESRD's and found to only differ by 2% lower compared to ESRD audit results. The analyzer was re-calibrated immediately following the audit.

The Falher station sample manifold requires updating:

- The sample lines do not extend into the ½" tubing.
- The air flow passing through the manifold does exceed the 3 times the total flow of all analyzers. The flow was measured at 1300 sccm and the total flow of the analyzers was 1345 sccm.
- The ½" tubing does extend past the opening of the stainless steel manifold cane. It also does not have a protective covering over the opening of the sample cane.

ESRD recommends a glass sample manifold be installed to ensure samples lines are in the sample flow, that there is adequate flow to meet the excess flow requirement as stated in the AMD and that a proper sample cane with a protective cover be installed outside the shelter. See attached photos.

An unsafe condition was noted at the Falher station. The one side of the station does not have the wheels touching the ground or any support blocking. The station is being held in the air by the stabilizer jacks. These jacks are not designed to work in this fashion. ESRD recommends that at minimum, support blocking be placed under the wheels to prevent any damage occurring. See attached photos.

The Sunset House station experienced a power failure a couple of days prioir to the audit. As a result of this power failure only 2 of the analyzers were functioning upon arrival. A power bar

that supplied power to the Oxides of Nitrogen, Ozone and Particulate analyzers had tripped and they were not operational upon arrival. The power bar was reset and the analyzers allowed to warmup before commencing an audit of these analyzers. Only the Oxide of Nitrogen analyzer was not fully stable therefore the analyzer will not be considered audited this trip.

The Teom particulate analyzer at Sunset House did not have the transducer $K_o$ value in the control unit software but did contain a lower calibrated $K_o$ value. This lower calibrated $K_o$ value did not pass the audit. This unit requires further servicing to ensure proper data collection of particulate mass.

No wind system calibration records were readily available upon request. Only estimates of when the system was serviced or calibrated. Please ensure proper wind system calibration records are available on site.

Please indicate in writing what actions will or have been taken to address the audit findings noted above by November 22, 2013. If you have any further questions please contact the undersigned at 780-427-7888.

Sincerely,

Al Clark
Monitoring Systems Auditor
Monitoring Programs & Validation

Attachment(s): Audit Summary; Field Sheets and Pictures from Falher

cc: Glen Gache: Regional Approvals Manager
Lorie Paulovich: Regional Compliance Manager
Marilyn Albert: Industrial Monitoring Assessment Technologist
Janine Ross: Ambient Air Support Tech
Shelley Morris: Acting Monitoring Manager

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Valleyview | | |
| Auditor | Al Clark | | |
| Audit Date | October 7, 2013 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | | X | Slope (0.85 - 1.15) |
| $SO_2$ | √ | | |
| TRS | | | |
| NO / $NO_2$ / $NO_X$ | | | |
| $O_3$ | | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |
| **Inspection Items** | **OK** | **Need for Improvement** | |
| Sample pump venting/scrubbing | √ | | |
| Heating / Air Conditioning | √ | | |
| Manifold | √ | | |
| Sample Lines | √ | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Safety | √ | | |
| Site Conditions | √ | | |
| **Non-critical** | **OK** | **Opportunity for Improvement** | |
| RH | √ | | |
| Station Temperature | √ | | |
| Ambient Temperature | √ | | |
| Solar Radiation | | | |
| TEOM 'Pump On' test | | | |
| Station Condition | √ | | |
| Station Documentation | √ | | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Beaverlodge | | |
| Auditor | Al Clark | | |
| Audit Date | October 8, 2013 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | | | |
| $SO_2$ | √ | | |
| TRS | | | |
| NO / $NO_2$ / $NO_X$ | √ | | |
| $O_3$ | √ | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |
| **Inspection Items** | **OK** | **Need for Improvement** | |
| Sample pump venting/scrubbing | √ | | |
| Heating / Air Conditioning | √ | | |
| Manifold | √ | | |
| Sample Lines | √ | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Safety | √ | | |
| Site Conditions | √ | | |
| **Non-critical** | **OK** | **Opportunity for Improvement** | |
| RH | √ | | |
| Station Temperature | √ | | |
| Ambient Temperature | √ | | |
| Solar Radiation | | | |
| TEOM 'Pump On' test | | | |
| Station Condition | √ | | |
| Station Documentation | √ | | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Evergreen | | |
| Auditor | Al Clark | | |
| Audit Date | October 8, 2013 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | | | |
| $SO_2$ | √ | | |
| TRS | √ | | |
| NO / $NO_2$ / $NO_X$ | | | |
| $O_3$ | | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | √ | | Heads very dusty |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |

| **Inspection Items** | **OK** | **Need for Improvement** | |
|---|---|---|---|
| Sample pump venting/scrubbing | √ | | |
| Heating / Air Conditioning | √ | | |
| Manifold | √ | | |
| Sample Lines | √ | | |
| TEOM/BAM $PM_{2.5}$ | √ | | |
| Safety | √ | | |
| Site Conditions | √ | | |

| **Non-critical** | **OK** | **Opportunity for Improvement** | |
|---|---|---|---|
| RH | √ | | |
| Station Temperature | √ | | |
| Ambient Temperature | √ | | |
| Solar Radiation | | | |
| TEOM 'Pump On' test | √ | | |
| Station Condition | √ | | |
| Station Documentation | √ | | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Henry Pirker | | |
| Auditor | Al Clark | | |
| Audit Date | October 9, 2013 | | |
| **Critical** | **Pass** | | **Fail** |
| $H_2S$ | | | |
| $SO_2$ | √ | | |
| TRS | √ | | |
| NO / $NO_2$ / $NO_X$ | √ | | |
| $O_3$ | √ | | |
| CO | √ | | |
| THC | √ | | |
| NMHC | √ | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |
| **Inspection Items** | **OK** | | **Need for Improvement** |
| Sample pump venting/scrubbing | √ | | |
| Heating / Air Conditioning | √ | | |
| Manifold | √ | | |
| Sample Lines | √ | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Safety | √ | | |
| Site Conditions | √ | | |
| **Non-critical** | **OK** | | **Opportunity for Improvement** |
| RH | √ | | |
| Station Temperature | √ | | |
| Ambient Temperature | √ | | |
| Solar Radiation | √ | | |
| TEOM 'Pump On' test | | | |
| Station Condition | √ | | |
| Station Documentation | √ | | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Falher | | |
| Auditor | Al Clark | | |
| Audit Date | October 10, 2010 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | √ | | |
| $SO_2$ | √ | | |
| TRS | | | |
| NO / $NO_2$ / $NO_X$ | | | |
| $O_3$ | | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |
| **Inspection Items** | **OK** | **Need for Improvement** | |
| Sample pump venting/scrubbing | √ | | |
| Heating / Air Conditioning | √ | | |
| Manifold | √ | | |
| Sample Lines | √ | | |
| TEOM/BAM $PM_{2.5}$ | | | |
| Safety | | X | Unsafe condition at trailer |
| Site Conditions | √ | | |
| **Non-critical** | **OK** | **Opportunity for Improvement** | |
| RH | | | |
| Station Temperature | √ | | |
| Ambient Temperature | √ | | |
| Solar Radiation | | | |
| TEOM 'Pump On' test | | | |
| Station Condition | √ | | |
| Station Documentation | √ | | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Smokey Heights | | |
| Auditor | Al Clark | | |
| Audit Date | October 10, 2010 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | | | |
| $SO_2$ | √ | | |
| TRS | √ | | |
| NO / $NO_2$ / $NO_X$ | | | |
| $O_3$ | | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | √ | | Heads very dusty |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |

| **Inspection Items** | **OK** | **Need for Improvement** |
|---|---|---|
| Sample pump venting/scrubbing | √ | |
| Heating / Air Conditioning | √ | |
| Manifold | √ | |
| Sample Lines | √ | |
| TEOM/BAM $PM_{2.5}$ | √ | |
| Safety | √ | |
| Site Conditions | √ | |

| **Non-critical** | **OK** | **Opportunity for Improvement** |
|---|---|---|
| RH | | |
| Station Temperature | √ | |
| Ambient Temperature | √ | |
| Solar Radiation | | |
| TEOM 'Pump On' test | | |
| Station Condition | √ | |
| Station Documentation | √ | |

Not monitored/audited at this location

# Audit Summary



| | |
|---|---|
| Facility / Zone | Paza |
| Total # of parameters that passed | 22 |
| Total # of parameters audited in the network | 24 |
| Date(s) of the audit | October 7-11, 2013 |
| Issue Date of Audit Summary | October 18, 2013 |

| | | | |
|---|---|---|---|
| Station Name | Sunset House | | |
| Auditor | Al Clark | | |
| Audit Date | October 11, 2013 | | |
| **Critical** | **Pass** | **Fail** | |
| $H_2S$ | | | |
| $SO_2$ | √ | | |
| TRS | √ | | |
| NO / $NO_2$ / $NO_X$ | | | |
| $O_3$ | √ | | |
| CO | | | |
| THC | | | |
| NMHC | | | |
| $NH_3$ | | | |
| TEOM/BAM $PM_{2.5}$ | | X | KO out of tolerance. |
| Wind Speed / Wind Direction | √ | | |
| Wind head Orientation | √ | | |
| Manifold Fan | √ | | |
| Zero/Span Systems Operational | √ | | |

| **Inspection Items** | **OK** | **Need for Improvement** |
|---|---|---|
| Sample pump venting/scrubbing | √ | |
| Heating / Air Conditioning | √ | |
| Manifold | √ | |
| Sample Lines | √ | |
| TEOM/BAM $PM_{2.5}$ | √ | |
| Safety | √ | |
| Site Conditions | √ | |

| **Non-critical** | **OK** | **Opportunity for Improvement** |
|---|---|---|
| RH | | |
| Station Temperature | √ | |
| Ambient Temperature | √ | |
| Solar Radiation | | |
| TEOM 'Pump On' test | √ | |
| Station Condition | √ | |
| Station Documentation | √ | |

Not monitored/audited at this location

# STATION AUDIT

File No. 2013 - 270A / 271A

Date: October 7, 2013 Performed by: Al Clark

## Station

Name: Valleyview Location: Valleyview

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Location

Latitude N 54° 56' 24.8"
Longitude W 117° 12' 55.5"
Elevation 649 m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 4.0 kph / 186 deg | 0-5 kph / SW |
| Station Temperature | 20.8 C | 20.0 C |
| Relative Humidity | 72% | 70% |
| Ambient Temperature | 13.5 C | 13.7 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

2 ports appear to be damaged - covered with electrical tape. 1 port on a slight angle.
Amb Tmp/RH taken in shade at ground level. Sensor at 10m level.

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 270A

Date: October 7, 2013 Performed by: Al Clark

## Station

Name: Valleyview Location: Valleyview

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Monitor

Make/Model: Teco 45C Serial No: 45C-57531-313

Inlet flow (sccm): 546 Full Scale Range ppm: 0.5

Last cal. Date: Sep 12/13 Old Correction Factor: 1.0017

Zero/Bkg 60.3

Span Coef 1.047

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5094 | 0.0 | 5094 | 0.0000 | -0.0005 | | |
| 5111 | 38.5 | 5149 | 0.3813 | 0.3928 | 3% | ± 15% |
| 5118 | 17.3 | 5135 | 0.1718 | 0.1777 | 4% | ± 15% |
| 5083 | 8.1 | 5091 | 0.0811 | 0.0831 | 3% | ± 15% |
| | | | | Absolute Average Percent Difference | 3% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0316 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.0628 | **± 3% F.S.** |

**Remarks:**

Alberta
Freedom To Create. Spirit To Achieve.

# $H_2S$ ANALYZER AUDIT

File No. 2013 - 271A

Date: October 7, 2013 Performed by: Al Clark

## Station

Name: Valleyview Location: Valleyview

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Monitor

Make/Model: Teco 43i Serial No: 0701120010

Inlet flow (sccm): 394 Full Scale Range ppm: 0.1

Last cal. Date: Sep 12/13 Old Correction Factor: 0.9772

Zero/Bkg 8.0

Span Coef 1.031

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5094 | 0.0 | 5094 | 0.0000 | 0.0001 | | |
| 5111 | 38.5 | 5149 | 0.0748 | 0.0865 | **16%** | ± 15% |
| 5117 | 17.7 | 5135 | 0.0345 | 0.0405 | **17%** | ± 15% |
| 5082 | 8.9 | 5091 | 0.0175 | 0.0202 | 15% | ± 15% |
| | | | | Absolute Average Percent Difference | 16% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | **1.1565** | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.1863 | **± 3% F.S.** |

**Remarks:**

H2S internal pump dead - external pump plumbed in. Internal pump left on and very hot to the touch. GC test came in 2% lower (14% high) on his high pt compared ESRD high pt of 16% high. GC recalibrated analyzer after audit. No repairs done.

GC = Grover Christenson

# Station Performance Audit Summary

Company: Paza  Facility Name: Valleyview

Approval No.: N/A  Site Name: Valleyview

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $H_2S$ | X | $SO_2$ | X | $NO_X$ | | $NH_3$ | | $O_3$ | |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | X | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | YES | NO | N/A |
|---|---|---|---|
| *GENERAL* | | | |
| 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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 7, 2013

# STATION AUDIT

File No. 2013 - 289A / 291A

Date: October 11, 2013 Performed by: Al Clark

## Station

Name: Sunset House Location: Sunset House

Facility/Zone: Paza Operator: Focus

Temp: 17.0 C Barometric Press: 691 mmhg

## Location

Latitude N 55° 04' 56.7"
Longitude W 116° 52' 17.6"
Elevation 811 m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 11 kph / 292 deg | 10-15 kph / W |
| Station Temperature | 22.6 C | 22.4 C |
| Relative Humidity | N/A | N/A |
| Ambient Temperature | 9.0 C | 9.3 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 289A

Date: October 11, 2013 Performed by: Al Clark

## Station

Name: Sunset House Location: Sunset House

Facility/Zone: Paza Operator: Focus

Temp: 17.0 C Barometric Press: 691 mmhg

## Monitor

Make/Model: Teco 43C Serial No: 0609716239

Inlet flow (sccm): 484 Full Scale Range ppm: 0.5

Last cal. Date: Sep 11/13 Old Correction Factor: 0.9684

Zero/Bkg 25.0

Span Coef 1.062

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5086 | 0.0 | 5086 | 0.0000 | 0.0037 | | |
| 5102 | 38.7 | 5141 | 0.3839 | 0.3970 | 2% | ± 15% |
| 5098 | 17.3 | 5115 | 0.1725 | 0.1816 | 3% | ± 15% |
| 5069 | 8.1 | 5077 | 0.0814 | 0.0879 | 3% | ± 15% |
| | | | | Absolute Average Percent Difference | 3% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0238 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.8612 | **± 3% F.S.** |

**Remarks:**

Alberta
Freedom To Create. Spirit To Achieve.

# TRS ANALYZER AUDIT

File No. 2013 - 290A

Date: October 11, 2013 Performed by: Al Clark

## Station

Name: Sunset House Location: Sunset House

Facility/Zone: Paza Operator: Focus

Temp: 17.0 C Barometric Press: 691 mmhg

## Monitor

Make/Model: Teco 43C Serial No: 0609716238

Inlet flow (sccm): 443 Full Scale Range ppm: 0.1

Last cal. Date: Sep 11/13 Old Correction Factor: 0.9901

Zero/Bkg 15.8

Span Coef 1.015

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5086 | 0.0 | 5086 | 0.0000 | -0.0002 | | |
| 5102 | 38.7 | 5141 | 0.0753 | 0.0773 | 3% | ± 15% |
| 5097 | 17.7 | 5115 | 0.0346 | 0.0365 | 6% | ± 15% |
| 5068 | 8.9 | 5077 | 0.0175 | 0.0178 | 3% | ± 15% |
| | | | | Absolute Average Percent Difference | 4% | |

**Linear Regression Analysis:**

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

| | | LIMITS |
|---|---|---|
| Correlation Coeff.= | 0.9999 | **≥ 0.995** |
| m (Slope)= | 1.0307 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.0194 | **± 3% F.S.** |

**Remarks:**

# $O_3$ ANALYZER AUDIT

File No. 2013 - 291A

Date: October 11, 2013 Performed by: Al Clark

## Station

Name: Sunset House Location: Sunset House

Facility/Zone: Paza Operator: Focus

Temp: 17.0 C Barometric Press: 691 mmhg

## Monitor

Make/Model: API 400A Serial No: 436

Inlet flow (sccm): 674 Full Scale Range ppm: 0.5

Last cal. Date: Sep 12/13 Old Correction Factor: 1.0085

Zero/Bkg -2.8

Span Coeff. 1.008

## Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU # : 1808

NO cylinder # : N/A NO concentration ppm: N/A

| Ozone Setting | Calibrator Flow (sccm) Air | Gas | Total | Calculated Conc. (ppm) | Indicated Conc. (ppm) | % Difference vs Audit Gas | % Difference Limits |
|---|---|---|---|---|---|---|---|
| 0.000 | 0 | | 0 | 0.0000 | 0.0004 | | |
| 0.400 | 0 | | 0 | 0.4000 | 0.3867 | -3% | ± 15% |
| 0.200 | 0 | | 0 | 0.2000 | 0.1922 | -4% | ± 15% |
| 0.100 | 0 | | 0 | 0.1000 | 0.0963 | -4% | ± 15% |
| | | | | Absolute Average Percent Difference | | 4% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9659 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.0280 | **± 3% F.S.** |

**Remarks:**

# TEOM AUDIT

File #: 2013 - 292A
Date: October 11, 2013 Performed by: Al Clark

**Station**

| | | | |
|---|---|---|---|
| Name: | Sunset House | Location: | Sunset House |
| Facility/Zone: | Paza | Operator: | Focus |
| Temperature: | 21.5 C | Barometric Press. | 692 mmhg |

**Audit Transfer Standard**

| | | | |
|---|---|---|---|
| Make/Model: | DeltaCal | Cell s/n: | 1002 |
| Serial Number: | AMU 1858 | | |

**Sampler Set-up and Current Readings**

| | | | |
|---|---|---|---|
| Make/Model | R&P 1400a | F-Main Set Pt (l/min) | 3.00 |
| Unit # | PM2.5 | F-Aux Set Pt (l/min) | 13.67 |
| Control unit s/n | 140AB215519705 | Filter Load (%) | 22 |
| Transducer s/n | 140AB215519705 | $K_O$ Factor | 10124 / 9224 |
| | | Temp (°C) | 7.9 |
| | | Press (ATM) | 0.912 |
| | | FAdj Main | N/A |
| | | FAdj Aux | N/A |

**Conversion from mm Hg or " Hg to ATM (Atmospheres)**

ATM = (mm Hg) X ($1.316 \times 10^{-3}$) or ATM = ("Hg) X ($3.34207 \times 10^{-2}$)

Note: Tolerances are noted as **BOLD** in Brackets

**Zero Flow**

| **Pump Off** | | **Pump On (Time to reach set points)** | |
|---|---|---|---|
| F-Main (l/min) | 0.15 | **(45-60 Sec)** | 29 |
| F-Aux (l/min) | 0.09 | **(45-60 Sec)** | 50 |

**Temperature/Pressure**

| | | | |
|---|---|---|---|
| Measured Temp **(± 2 °C)** | 7.9 | **Δ°C** | 0.00 |
| Measured Press **(± 1.5% ATM)** | 0.911 | **Δ% ATM** | -0.11% |

**Flow Audit**

| | | | **Δ% of Measured Flow from Set-point** | | |
|---|---|---|---|---|---|
| Indicated Main/Aux Flow (l/min) | 2.99 | 13.68 | **(± 2%)** | -0.3% | 0.1% |
| Total Flow = Main + Aux (l/min) | 16.67 | | **(± 2%)** | 0.0% | |
| | | | **Δ of Measured Flow from Indicated** | | |
| Measured Total Flow (l/min) | 17.25 | | **(± 1.00 l/min)** | 0.58 | |
| Measured Main Flow (l/min) | 3.38 | | **(± 0.20 l/min.)** | **0.39** | |

**Leak Check**

| | | **Actual leakage = Pump On – Pump Off** |
|---|---|---|
| Main **(< 0.15 l/min)** | 0.16 | 0.01 |
| Aux **(< 0.65 l/min)** | 0.14 | 0.05 |

**$K_O$ Factor**

| | |
|---|---|
| Measured | 9224 |
| $K_O$ % Difference **(± 2.5%)** | **4.79** |

**Remarks:**

10124 on transducer. 9224 is value in control unit.
Power off for ~ 2 days. Tripped power bar. Let unit warm up and stabilize for 3 hours before audit.

# Station Performance Audit Summary

Company: Paza  Facility Name: Sunset House

Approval No.: N/A  Site Name: Sunset House

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRS | X | $SO_2$ | X | $NO_X$ | X | $NH_3$ | | $O_3$ | X |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | X | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | X | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| *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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 11, 2013

Alberta
Freedom To Create. Spirit To Achieve.

# STATION AUDIT

File No. 2013 - 286A / 288A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Smokey Heights Location: Smokey Heights

Facility/Zone: Paza Operator: Focus

Temp: 19.5 C Barometric Press: 698 mmhg

## Location

Latitude N 55° 24" 10.4"
Longitude W 118° 16" 53.0"
Elevation 645 m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 27 kph / 254 deg | 20-25 kph / WSW |
| Station Temperature | 21.6 C | 21.5 C |
| Relative Humidity | N/A | N/A |
| Ambient Temperature | 10.0 C | 10.1 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 286A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Smokey Heights Location: Smokey Heights

Facility/Zone: Paza Operator: Focus

Temp: 19.5 C Barometric Press: 698 mmhg

## Monitor

Make/Model: Teco 43i Serial No: 0701120009

Inlet flow (sccm): 442 Full Scale Range ppm: 0.5

Last cal. Date: Sep 30/13 Old Correction Factor: 1.0252

Zero/Bkg 11.2

Span Coef 0.952

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5076 | 0.0 | 5076 | 0.0000 | 0.0004 | | |
| 5100 | 38.5 | 5138 | 0.3822 | 0.3814 | 0% | ± 15% |
| 5134 | 17.5 | 5151 | 0.1733 | 0.1742 | 0% | ± 15% |
| 5107 | 8.2 | 5115 | 0.0818 | 0.0836 | 2% | ± 15% |
| | | | | Absolute Average Percent Difference | 1% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9956 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.2626 | **± 3% F.S.** |

**Remarks:**

# TRS ANALYZER AUDIT

File No. 2013 - 287A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Smokey Heights Location: Smokey Heights

Facility/Zone: Paza Operator: Focus

Temp: 19.5 C Barometric Press: 698 mmhg

## Monitor

Make/Model: Teco 43C Serial No: 0436610004

Inlet flow (sccm): 627 Full Scale Range ppm: 0.1

Last cal. Date: Sep 30/13 Old Correction Factor: 1.0114

Zero/Bkg 17.2

Span Coef 0.952

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5076 | 0.0 | 5076 | 0.0000 | 0.0004 | | |
| 5100 | 38.5 | 5138 | 0.0749 | 0.0771 | 2% | ± 15% |
| 5133 | 17.8 | 5151 | 0.0346 | 0.0354 | 1% | ± 15% |
| 5106 | 9.0 | 5115 | 0.0176 | 0.0184 | 2% | ± 15% |
| | | | | Absolute Average Percent Difference | 2% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0233 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.3136 | **± 3% F.S.** |

**Remarks:**

# TEOM AUDIT

File #: 2013 - 288A
Date: October 10, 2013 Performed by: Al Clark

## Station

| | | | |
|---|---|---|---|
| Name: | Smokey Heights | Location: | Smokey Heights |
| Facility/Zone: | Paza | Operator: | Focus |
| Temperature: | 19.5 C | Barometric Press. | 698 mmhg |

## Audit Transfer Standard

| | | | |
|---|---|---|---|
| Make/Model: | Delta Cal | Cell s/n: | 1002 |
| Serial Number: | AMU 1858 | | |

## Sampler Set-up and Current Readings

| | | | |
|---|---|---|---|
| Make/Model | R&P 1400a | F-Main Set Pt (l/min) | 3.00 |
| Unit # | PM2.5 | F-Aux Set Pt (l/min) | 13.67 |
| Control unit s/n | 140AB246340305 | Filter Load (%) | 22 |
| Transducer s/n | 140AB246340305 | $K_O$ Factor | 12122 |
| | | Temp (°C) | 12.2 |
| | | Press (ATM) | 0.918 |
| | | FAdj Main | N/A |
| | | FAdj Aux | N/A |

## Conversion from mm Hg or " Hg to ATM (Atmospheres)

ATM = (mm Hg) X ($1.316 \times 10^{-3}$) or ATM = ("Hg) X ($3.34207 \times 10^{-2}$)

Note: Tolerances are noted as **BOLD** in Brackets

### Zero Flow

| Pump Off | | Pump On (Time to reach set points) | |
|---|---|---|---|
| F-Main (l/min) | 0.01 | **(45-60 Sec)** | 29 |
| F-Aux (l/min) | -0.09 | **(45-60 Sec)** | 54 |

### Temperature/Pressure

| | | | |
|---|---|---|---|
| Measured Temp **(± 2 °C)** | 12.8 | **Δ°C** | 0.60 |
| Measured Press **(± 1.5% ATM)** | 0.919 | **Δ% ATM** | 0.11% |

### Flow Audit

| | | | Δ% of Measured Flow from Set-point | | |
|---|---|---|---|---|---|
| Indicated Main/Aux Flow (l/min) | 3.00 | 13.69 | **(± 2%)** | 0.0% | 0.1% |
| Total Flow = Main + Aux (l/min) | 16.69 | | **(± 2%)** | 0.1% | |
| | | | **Δ of Measured Flow from Indicated** | | |
| Measured Total Flow (l/min) | 17.31 | | **(± 1.00 l/min)** | 0.62 | |
| Measured Main Flow (l/min) | 3.10 | | **(± 0.20 l/min.)** | 0.10 | |

### Leak Check

| | | Actual leakage = Pump On – Pump Off |
|---|---|---|
| Main **(< 0.15 l/min)** | 0.02 | 0.01 |
| Aux **(< 0.65 l/min)** | -0.02 | 0.07 |

### $K_O$ Factor

| | |
|---|---|
| Measured | 12303 |
| $K_O$ % Difference **(± 2.5%)** | 1.49 |

## Remarks:

Heads very dusty.

# Station Performance Audit Summary

Company: Paza  Facility Name: Smokey Heights

Approval No.: N/A  Site Name: Smokey Heights

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRS | X | $SO_2$ | X | $NO_X$ | | $NH_3$ | | $O_3$ | |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | X | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | *YES* | *NO* | *N/A* |
|---|---|---|---|
| *GENERAL* | | | |
| 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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 10, 2013

# STATION AUDIT

File No. 2013 - 278A / 283A

Date: October 9, 2013 Performed by: Al Clark

## Station

Name: Henry Pirker Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp: 21.5 C Barometric Press: 965 mmhg

## Location

Latitude N 55° 10' 35.6"
Longitude W 118° 48' 27.8"
Elevation 661m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 8 kph / 196 deg | 5-10 kph / S |
| Station Temperature | 24.5 C | 23.6 C |
| Relative Humidity | 53.7% | 49.9% |
| Ambient Temperature | 8.4 C | 8.8 C |
| Solar Radiation | 55 mw2 | cloudy @ 1243MST |
| Precipitation | N/A | N/A |

**Remarks:**

# CO ANALYZER AUDIT

File No. 2013 - 278A

Date: October 9, 2013 Performed by: Al Clark

## Station

Name: Henry Pirker Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 24.0 C Barometric Press. 697 mmhg

## Monitor

Make/Model: Teco 48 CTL Serial No: 0508011062

Inlet flow (sccm): 1115 Full Scale Range ppm: 50.0

Last cal. Date: Sep 10/13 Old Correction Factor: 1.0363

Zero/Bkg. -0.551

Span Coeff. 1.005

## Calibrator

Calibration Method: Gas Dilution

Make/Model: Sabio 2010 AMU # : 1778

CO cylinder # : CLM001990 CO concentration ppm: 2521

| Calibrator Flow (sccm) | | | Calculated Conc. | Indicated Concentration | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | (ppm) | (ppm) | vs Audit Gas | Limits |
| 4957 | 0.0 | 4957 | 0.00 | -0.14 | | |
| 4955 | 80.4 | 5035 | 40.26 | 39.63 | -1% | ± 15% |
| 4984 | 40.2 | 5024 | 20.17 | 19.66 | -2% | ± 15% |
| 4976 | 20.0 | 4996 | 10.09 | 9.81 | -1% | ± 15% |
| | | | | Absolute Average Percent Difference | 1% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9877 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.3475 | **± 3% F.S.** |

**Remarks:**

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 279A

Date: October 9, 2013 Performed by: Al Clark

## Station

Name: Henry Pirker Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 21.5 C Barometric Press. 695 mmhg

## Monitor

Make/Model: Teco 43C Serial No: 0610816292

Inlet flow (sccm): 491 Full Scale Range ppm: 0.5

Last cal. Date: Sep 12/13 Old Correction Factor: 1.0260

Zero/Bkg 9.4

Span Coef 0.780

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5111 | 0.0 | 5111 | 0.0000 | 0.0000 | | |
| 5117 | 38.5 | 5155 | 0.3809 | 0.3770 | -1% | ± 15% |
| 5125 | 17.3 | 5142 | 0.1716 | 0.1713 | 0% | ± 15% |
| 5080 | 8.1 | 5088 | 0.0812 | 0.0809 | 0% | ± 15% |
| | | | | Absolute Average Percent Difference | 1% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9895 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.1090 | **± 3% F.S.** |

**Remarks:**

# TRS ANALYZER AUDIT

File No. 2013 - 280A

Date: October 9, 2013 Performed by: Al Clark

## Station

Name: Henry Pirker Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 21.5 C Barometric Press. 695 mmhg

## Monitor

Make/Model: Teco 45C Serial No: 0630718528

Inlet flow (sccm): 452 Full Scale Range ppm: 0.1

Last cal. Date: Sep 10/13 Old Correction Factor: 1.0111

Zero/Bkg 11.4

Span Coef 1.1128

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5111 | 0.0 | 5111 | 0.0000 | 0.0001 | | |
| 5117 | 38.5 | 5155 | 0.0747 | 0.0771 | 3% | ± 15% |
| 5124 | 17.8 | 5142 | 0.0346 | 0.0368 | 6% | ± 15% |
| 5079 | 9.0 | 5088 | 0.0177 | 0.0189 | 6% | ± 15% |
| | | | | Absolute Average Percent Difference | 5% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 0.9999 | **≥ 0.995** |
| m (Slope)= | 1.0294 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.5453 | **± 3% F.S.** |

**Remarks:**

# Non Methane Analyzer Audit

File No. 2013 - 281A

Date: October 9, 2013 Performed by: Al Clark

**Station:** Name: H. Pirker Location: Grande Prairie Operator: Focus
Facility/Zone: Paza Temp. 25.0 C BP: 699 mmhg

**Monitor:** Make/Model: Teco 55i Serial No. 1134650658
Inlet flow (sccm): N/A $CH_4$ Range ppm: 20
Last cal. Date: Sep 10/13 Non $CH_4$ Range ppm: 20
THC Range ppm: 40
Old Correction Factor: $CH_4$: 0.9992
Non $CH_4$: 0.9859
THC: 0.9924

**Calibration Method:** Gas Dilution
**Calibrator:** Make/Model Sabio 2010 AMU# 1778

HC cylinder # FF27932 $CH_4$ conc. (ppm) 500 $CH_4$ Equiv (Propane only) (ppm) 550
Propane conc. (ppm) 200 Total $CH_4$ Equiv. (ppm) 1050

| Calibrator Flows | | | Calc. Conc. | | | Indicated Concentration | | | % Difference vs Audit Gas | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $CH_4$ | Non $CH_4$ | THC | $CH_4$ | Non $CH_4$ | THC | Limit ± 15% | | |
| Air | Gas | Total | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | (ppm) | $CH_4$ | Non $CH_4$ | THC |
| 3442 | 0.0 | 3442 | 0.00 | 0.00 | 0.00 | 0.09 | 0.02 | 0.10 | | | |
| 3456 | 59.5 | 3515 | 8.46 | 9.31 | 17.77 | 8.19 | 9.13 | 17.31 | -4% | -2% | -3% |
| 3478 | 29.9 | 3508 | 4.26 | 4.69 | 8.95 | 4.18 | 4.68 | 8.84 | -4% | -1% | -2% |
| 3492 | 15.0 | 3507 | 2.14 | 2.35 | 4.49 | 2.14 | 2.29 | 4.43 | -4% | -4% | -4% |
| | | | | | | | | Absolute Average Percent Difference | 4% | 2% | 3% |

**Linear Regression Analysis:** *y=mx+b (where x=calculated concentration, y=indicated concentration)*

| | **$CH_4$** | **Non $CH_4$** | **THC** | **LIMITS** |
|---|---|---|---|---|
| Correlation Coeff.= | 1.0000 | 0.9999 | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9571 | 0.9806 | 0.9691 | **0.85-1.15** |
| b (Intercept as % of FS)= | 0.4680 | 0.1085 | 0.2683 | **± 3% F.S.** |

**Remarks:**

A point below 2 ppm was used and the non-methane reading was out by 34% low. Air carrier is currently being used. Possibly a nitrogen carrier with additional scrubbing may correct the low non-methane reading seen.

# NO-NOx-NO2 Analyzer Audit

File No. 2013 - 282A

Date: October 9, 2013 Performed by: Al Clark

**Station:** Name: Henry Pirker Location: Grande Prairie Operator: Focus
Facility/Zone: Paza Temp. 21.5 C BP: 699 mmhg

**Monitor:** Make/Model: Teco 42C Serial No. 0508011073
Inlet flow (sccm): 712 Range ppm: 0.5
Last cal. Date: Sep 12/13 Old Correction Factor: NO: 1.0027
NOx: 1.0048
NO2: 0.9919

NO Bkg 14.4
NOx Bkg 14.7
NO Coef 1.096
NOx Coef 0.999
NO2 Coef 1.000

**Calibration Method:** Gas Dilution / GPT
**Calibrator:** Make/Model: Sabio 2010 AMU# 1749
NO cylinder # CAL7849 NO conc. ppm 50.2 NOx conc. ppm 50.2

| Calibrator Flows | | | Calc. Conc. | | Indicated Concentration | | % Difference vs Audit Gas | |
|---|---|---|---|---|---|---|---|---|
| Air | Gas | Total | NO (ppm) | NOx (ppm) | NO (ppm) | NOx (ppm) | NO | NOx |
| 4943 | 0.0 | 4943 | 0.0000 | 0.0000 | -0.0001 | 0.0004 | Limit ± 15% | |
| 4925 | 39.4 | 4964 | 0.3984 | 0.3984 | 0.4087 | 0.4173 | 3% | 5% |
| 4936 | 19.6 | 4956 | 0.1985 | 0.1985 | 0.2058 | 0.2120 | 4% | 7% |
| 4938 | 9.4 | 4947 | 0.0954 | 0.0954 | 0.0948 | 0.0990 | -1% | 3% |
| | | | | | | Absolute Average Percent Difference | 2% | 5% |

**Linear Regression Analysis:** *y=mx+b (where x=calculated concentration, y=indicated concentration)*

| | NO | NOx | $NO_2$ | LIMITS |
|---|---|---|---|---|
| Correlation Coeff.= | 0.9999 | 0.9999 | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0293 | 1.0485 | 0.9921 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.1714 | 0.1373 | 0.1329 | **± 3% F.S.** |

| $O_3$ Setting | Flow Rate | Indicated Conc. (ppm) | | | NO Decrease | $NO_2$ Increase | % Difference vs Audit Gas | |
|---|---|---|---|---|---|---|---|---|
| | | NO | NOx | $NO_2$ | | | | |
| 0.000 V | 4964 | 0.4077 | 0.4178 | 0.0099 | | | | %Dif Limit |
| 0.580 V | 4964 | 0.1133 | 0.4163 | 0.3031 | 0.2944 | 0.2932 | 0% | ± 15% |
| 0.390 V | 4964 | 0.2393 | 0.4158 | 0.1766 | 0.1684 | 0.1667 | -1% | ± 15% |
| 0.230 V | 4964 | 0.3388 | 0.4183 | 0.0795 | 0.0689 | 0.0696 | 1% | ± 15% |
| | | | | | | Absolute Average Percent Difference | 0% | |

**Converter Efficiency**
Average Converter Efficiency 99.9%

**Remarks:**

# $O_3$ ANALYZER AUDIT

File No. 2013 - 283A

Date: October 9, 2013 Performed by: Al Clark

## Station

Name: Henry Pirker Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 21.5 C Barometric Press. 699 mmhg

## Monitor

Make/Model: Teco 49C Serial No: 0607415761

Inlet flow (sccm): 717 / 721 Full Scale Range ppm: 0.5

Last cal. Date: Sep 12/13 Old Correction Factor: 0.9974

Zero/Bkg -0.2

Span Coeff. 0.994

## Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU # : 1808

NO cylinder # : N/A NO concentration ppm: N/A

| Ozone Setting | Calibrator Flow (sccm) Air | Gas | Total | Calculated Conc. (ppm) | Indicated Conc. (ppm) | % Difference vs Audit Gas | % Difference Limits |
|---|---|---|---|---|---|---|---|
| 0.0000 | 0 | | 0 | 0.0000 | 0.0004 | | |
| 0.4000 | 0 | | 0 | 0.4000 | 0.4023 | 0% | ± 15% |
| 0.2000 | 0 | | 0 | 0.2000 | 0.2014 | 0% | ± 15% |
| 0.1000 | 0 | | 0 | 0.1000 | 0.1009 | 1% | ± 15% |
| | | | | Absolute Average Percent Difference | | 0% | |

**Linear Regression Analysis:**

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

| | | LIMITS |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0047 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.0840 | **± 3% F.S.** |

**Remarks:**

# Station Performance Audit Summary

Company: Paza  Facility Name: Grande Prairie

Approval No.: N/A  Site Name: Henry Pirker

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRS | X | $SO_2$ | X | $NO_X$ | X | $NH_3$ | | $O_3$ | X |
| CO | X | $CH_4$ | X | NonCH4 | X | THC | X | Ethylene | |
| $PM_{2.5}$ | X | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | X | Solar Radiation | X |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | YES | NO | N/A |
|---|---|---|---|
| *GENERAL* | | | |
| 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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 9, 2013

# STATION AUDIT

File No. 2013 - 284A / 285A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Falher Location: Falher

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 702 mmhg

## Location

Latitude N 55° 44' 20.9"
Longitude W 117° 14' 47.5"
Elevation 581 m
Status of Site Documentation On site - electronic version OK

Manifold Material Teflon tubing with Tee fittings.
Manifold Condition OK see remarks.

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 40 kph / 229 deg | 35-40 kph / SW |
| Station Temperature | 20.0 C | 20.0 C |
| Relative Humidity | N/A | N/A |
| Ambient Temperature | 8.2 C | 8.3 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

Sample manifold flow measured at 1300 sccm. Total flow of analyzers are 1335 sccm. Flows should be > 3000 sccm for proper operation of the manifold. Sample lines do not extend into 1/2" manifold tubing.

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 284A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Falher Location: Falher

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 702 mmhg

## Monitor

Make/Model: Teco 43i Serial No: 1207452008

Inlet flow (sccm): 415 Full Scale Range ppm: 0.5

Last cal. Date: Sep 28/13 Old Correction Factor: 1.0154

Zero/Bkg 6.4

Span Coef 0.903

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5086 | 0.0 | 5086 | 0.0000 | 0.0006 | | |
| 5109 | 38.4 | 5147 | 0.3805 | 0.3814 | 0% | ± 15% |
| 5109 | 17.3 | 5126 | 0.1721 | 0.1734 | 0% | ± 15% |
| 5077 | 8.1 | 5085 | 0.0812 | 0.0827 | 1% | ± 15% |
| | | | | Absolute Average Percent Difference | 1% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0001 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.2080 | **± 3% F.S.** |

**Remarks:**

# $H_2S$ ANALYZER AUDIT

File No. 2013 - 285A

Date: October 10, 2013 Performed by: Al Clark

## Station

Name: Falher Location: Falher

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 702 mmhg

## Monitor

Make/Model: Teco 450i Serial No: 1207452006

Inlet flow (sccm): 920 Full Scale Range ppm: 0.1

Last cal. Date: Sep 28/13 Old Correction Factor: 0.9696

Zero/Bkg 12.8

Span Coef 1.169

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5086 | 0.0 | 5086 | 0.0000 | 0.0008 | | |
| 5109 | 38.5 | 5147 | 0.0748 | 0.0786 | 4% | ± 15% |
| 5108 | 17.7 | 5126 | 0.0345 | 0.0365 | 3% | ± 15% |
| 5076 | 9.0 | 5085 | 0.0177 | 0.0191 | 3% | ± 15% |
| | | | | Absolute Average Percent Difference | 4% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0404 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.7095 | **± 3% F.S.** |

**Remarks:**

> 2 ppb noise on high pt and > 1ppb noise on baseline.

# Station Performance Audit Summary

Company: Paza  Facility Name: Falher

Approval No.: N/A  Site Name: Falher

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $H_2S$ | X | $SO_2$ | X | $NO_X$ | | $NH_3$ | | $O_3$ | |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | YES | NO | N/A |
|---|---|---|---|
| *GENERAL* | | | |
| 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: Unknown | | | |

*COMMENTS:* Sample cane extends outside but is not protected by an inverted funnel. Tubing used in manifold does not extend to the end of the cane. Not visible from station roof top or ground level.

*AUDITOR:* Al Clark  *DATE:* October 10, 2013

# STATION AUDIT

File No. 2013 - 275A / 277A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Evergreen Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp: 19.0 C Barometric Press: 702 mmhg

## Location

Latitude N 55° 07' 02.6"
Longitude W 118° 45' 54.1"
Elevation 647 m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 24 kph / 292 deg | 20-25 kph / NW |
| Station Temperature | 21.4 C | 20.9 C |
| Relative Humidity | 66.2 % | 66.3% |
| Ambient Temperature | 4.7 C | 5.3 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 275A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Evergreen Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 19.0 C Barometric Press. 702 mmhg

## Monitor

Make/Model: Teco 43i Serial No: 0701120008

Inlet flow (sccm): 451 Full Scale Range ppm: 0.5

Last cal. Date: Sep 27/13 Old Correction Factor: 1.0214

Zero/Bkg 11.5

Span Coef 1.203

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL9745 $SO_2$ Concentration PPM: 51.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5075 | 0.0 | 5075 | 0.0000 | 0.0005 | | |
| 5094 | 38.3 | 5132 | 0.3806 | 0.3851 | 1% | ± 15% |
| 5114 | 17.3 | 5131 | 0.1720 | 0.1739 | 1% | ± 15% |
| 5090 | 8.2 | 5098 | 0.0820 | 0.0820 | -1% | ± 15% |
| | | | | Absolute Average Percent Difference | 0% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0117 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.0276 | **± 3% F.S.** |

**Remarks:**

# TRS ANALYZER AUDIT

File No. 2013 - 276A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Evergreen Location: Grande Prairie

Facility/Zone: Paza Operator: Focus

Temp. 19.0 C Barometric Press. 702 mmhg

## Monitor

Make/Model: Teco 43C Serial No: 0319990000000491

Inlet flow (sccm): 584 Full Scale Range ppm: 0.1

Last cal. Date: Sep 27/13 Old Correction Factor: 1.0454

Zero/Bkg 36.1

Span Coef 1.014

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : FF15602 $H_2S$ Concentration PPM: 10.0

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5075 | 0.0 | 5075 | 0.0000 | 0.0003 | | |
| 5094 | 38.3 | 5132 | 0.0746 | 0.0738 | -2% | ± 15% |
| 5113 | 17.7 | 5131 | 0.0345 | 0.0341 | -2% | ± 15% |
| 5089 | 9.0 | 5098 | 0.0177 | 0.0177 | -1% | ± 15% |
| | | | | Absolute Average Percent Difference | 2% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9846 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.2668 | **± 3% F.S.** |

**Remarks:**

# TEOM AUDIT

File #: 2013 - 277A
Date: October 8, 2013 Performed by: Al Clark

## Station

| | | | |
|---|---|---|---|
| Name: | Evergreen | Location: | Grande Prairie |
| Facility/Zone: | Paza | Operator: | Focus |
| Temperature: | 19.0 C | Barometric Press. | 292 mmhg |

## Audit Transfer Standard

| | | | |
|---|---|---|---|
| Make/Model: | DeltaCal | Cell s/n: | 1002 |
| Serial Number: | AMU 1858 | | |

## Sampler Set-up and Current Readings

| | | | |
|---|---|---|---|
| | | F-Main Set Pt (l/min) | 3.00 |
| Make/Model | Teom 1400a | F-Aux Set Pt (l/min) | 13.67 |
| Unit # | PM2.5 | Filter Load (%) | 20 |
| Control unit s/n | 140AB215519705 | $K_O$ Factor | 16147 |
| Transducer s/n | 140AB215519705 | Temp (°C) | 5.2 |
| | | Press (ATM) | 0.923 |
| | | FAdj Main | N/A |
| | | FAdj Aux | N/A |

## Conversion from mm Hg or " Hg to ATM (Atmospheres)

ATM = (mm Hg) X ($1.316 \times 10^{-3}$) or ATM = ("Hg) X ($3.34207 \times 10^{-2}$)

Note: Tolerances are noted as **BOLD** in Brackets

| **Zero Flow** | | | |
|---|---|---|---|
| **Pump Off** | | **Pump On (Time to reach set points)** | |
| F-Main (l/min) | 0.00 | **(45-60 Sec)** | 30 |
| F-Aux (l/min) | 0.06 | **(45-60 Sec)** | 45 |

| **Temperature/Pressure** | | | |
|---|---|---|---|
| Measured Temp **(± 2 °C)** | 5.8 | **Δ°C** | 0.60 |
| Measured Press **(± 1.5% ATM)** | 0.924 | **Δ% ATM** | 0.11% |

| **Flow Audit** | | | **Δ% of Measured Flow from Set-point** | |
|---|---|---|---|---|
| Indicated Main/Aux Flow (l/min) | 2.99 | 13.66 | **(± 2%)** | -0.3% -0.1% |
| Total Flow = Main + Aux (l/min) | 16.65 | | **(± 2%)** | -0.1% |
| | | | **Δ of Measured Flow from Indicated** | |
| Measured Total Flow (l/min) | 17.49 | | **(± 1.00 l/min)** | 0.84 |
| Measured Main Flow (l/min) | 3.16 | | **(± 0.20 l/min.)** | 0.17 |

| **Leak Check** | | **Actual leakage = Pump On – Pump Off** |
|---|---|---|
| Main **(< 0.15 l/min)** | 0.07 | 0.07 |
| Aux **(< 0.65 l/min)** | 0.07 | 0.01 |

## $K_O$ Factor

| | |
|---|---|
| Measured | 16265 |
| $K_O$ % Difference **(± 2.5%)** | 0.73 |

**Remarks:** Both heads very dusty - PM10 a lot more dusty than PM2.5

# Station Performance Audit Summary

Company: Paza  Facility Name: Grande Prairie

Approval No.: N/A  Site Name: Evergreen

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRS | X | $SO_2$ | X | $NO_X$ | | $NH_3$ | | $O_3$ | |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | X | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | | RH | X | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | YES | NO | N/A |
|---|---|---|---|
| *GENERAL* | | | |
| 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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 8, 2013

# STATION AUDIT

File No. 2013 - 272A / 274A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Beaverlodge Location: Beaverlodge

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Location

Latitude N 55° 11' 46.6"
Longitude W 119° 23' 50.4"
Elevation 750 m
Status of Site Documentation On site - electronic version OK

Manifold Material Glass
Manifold Condition Good

## Meteorological

| | Observed | Audit Value |
|---|---|---|
| Wind Speed Direction | 20.2 kph / 297 deg | 25-30 kph / WNW |
| Station Temperature | 19.9 C | 20.6 C |
| Relative Humidity | 90% | 82.5% |
| Ambient Temperature | 2.8 C | 2.9 C |
| Solar Radiation | N/A | N/A |
| Precipitation | N/A | N/A |

**Remarks:**

# $SO_2$ ANALYZER AUDIT

File No. 2013 - 272A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Bearverlodge Location: Beaverlodge

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Monitor

Make/Model: Teco 43i TLE Serial No: 0713021137

Inlet flow (sccm): 478 Full Scale Range ppm: 0.1

Last cal. Date: Sep26/13 Old Correction Factor: 1.0106

Zero/Bkg 2.39

Span Coef 1.042

## Calibrator

Calibration Method: GAS DILUTION

Make/Model: R&R MFC 201 AMU # : 1691

Cylinder # : CAL12569 $SO_2$ Concentration PPM: 9.93

| Calibrator Flow (sccm) | | | Calculated Conc. (ppm) | Indicated Concentration (ppm) | % Difference | |
|---|---|---|---|---|---|---|
| Air | Gas | Total | | | vs Audit Gas | Limits |
| 5058 | 0.0 | 5058 | 0.0000 | 0.0002 | | |
| 5043 | 38.1 | 5081 | 0.0745 | 0.0754 | 1% | ± 15% |
| 5080 | 17.2 | 5097 | 0.0335 | 0.0343 | 2% | ± 15% |
| 5062 | 8.1 | 5070 | 0.0159 | 0.0161 | 0% | ± 15% |
| | | | | Absolute Average Percent Difference | 1% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0107 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.2089 | **± 3% F.S.** |

**Remarks:**

# NO-NOx-NO2 Analyzer Audit

File No. 2013 - 273A

Date: October 8, 2013 Performed by: Al Clark

**Station:** Name: Beaverlodge Location: Beaverlodge Operator: Focus
Facility/Zone: PAZA Temp. 18.5 C BP: 692 mmhg

**Monitor:** Make/Model: Teco 42i Serial No. 0906535068
Inlet flow (sccm): 716 Range ppm: 0.5
Last cal. Date: Sep 23/13 Old Correction Factor: NO: 1.0136
NOx: 1.0126
NO2: 0.9995

NO Bkg 2.4
NOx Bkg 2.7
NO Coef 1.161
NOx Coef 0.999
NO2 Coef 1.000

**Calibration Method:** Gas Dilution / GPT
**Calibrator:** Make/Model: Sabio 2010 AMU# 1749
NO cylinder # CAL7849 NO conc. ppm 50.2 NOx conc. ppm 50.2

| Calibrator Flows | | | Calc. Conc. | | Indicated Concentration | | % Difference vs Audit Gas | |
|---|---|---|---|---|---|---|---|---|
| Air | Gas | Total | NO (ppm) | NOx (ppm) | NO (ppm) | NOx (ppm) | NO | NOx |
| 4986 | 0.0 | 4986 | 0.0000 | 0.0000 | -0.0003 | 0.0002 | Limit ± 15% | |
| 4984 | 39.7 | 5024 | 0.3967 | 0.3967 | 0.3756 | 0.3860 | -5% | -3% |
| 5007 | 20.1 | 5027 | 0.2007 | 0.2007 | 0.1864 | 0.1931 | -7% | -4% |
| 5001 | 10.0 | 5011 | 0.1002 | 0.1002 | 0.0920 | 0.0965 | -8% | -4% |
| | | | | | | Absolute Average Percent Difference | 7% | 4% |

**Linear Regression Analysis:** *y=mx+b (where x=calculated concentration, y=indicated concentration)*

| | NO | NOx | $NO_2$ | LIMITS |
|---|---|---|---|---|
| Correlation Coeff.= | 0.9999 | 1.0000 | 1.0000 | **≥ 0.995** |
| m (Slope)= | 0.9488 | 0.9728 | 1.0074 | **0.85-1.15** |
| b (Intercept as % of full scale)= | -0.4085 | -0.1415 | -0.3480 | **± 3% F.S.** |

| $O_3$ Setting | Flow Rate | Indicated Conc. (ppm) NO | NOx | $NO_2$ | NO Decrease | $NO_2$ Increase | % Difference vs Audit Gas | |
|---|---|---|---|---|---|---|---|---|
| 0.000 V | 5024 | 0.3771 | 0.3885 | 0.0108 | | | | %Dif Limit |
| 0.580 V | 5024 | 0.1161 | 0.3892 | 0.2722 | 0.2610 | 0.2614 | 0% | ± 15% |
| 0.390 V | 5024 | 0.2248 | 0.3874 | 0.1620 | 0.1523 | 0.1512 | -1% | ± 15% |
| 0.230 V | 5024 | 0.3129 | 0.3873 | 0.0740 | 0.0642 | 0.0632 | -2% | ± 15% |
| | | | | | | Absolute Average Percent Difference | -1% | |

**Converter Efficiency**
Average Converter Efficiency 99.3%

**Remarks:**

# $O_3$ ANALYZER AUDIT

File No. 2013 - 274A

Date: October 8, 2013 Performed by: Al Clark

## Station

Name: Bearverlodge Location: Beaverlodge

Facility/Zone: Paza Operator: Focus

Temp: 18.5 C Barometric Press: 692 mmhg

## Monitor

Make/Model: Teco 49i Serial No: 1136451236

Inlet flow (sccm): 609 / 597 Full Scale Range ppm: 0.5

Last cal. Date: Sep 23/13 Old Correction Factor: 1.0024

Zero/Bkg -1.1

Span Coeff. 1.012

## Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU # : 1808

NO cylinder # : N/A NO concentration ppm: N/A

| Ozone Setting | Calibrator Flow (sccm) Air | Gas | Total | Calculated Conc. (ppm) | Indicated Conc. (ppm) | % Difference vs Audit Gas | Limits |
|---|---|---|---|---|---|---|---|
| 0.0000 | 0 | | 0 | 0.0000 | 0.0014 | | |
| 0.4000 | 0 | | 0 | 0.4000 | 0.4015 | 0% | ± 15% |
| 0.2000 | 0 | | 0 | 0.2000 | 0.2016 | 0% | ± 15% |
| 0.1000 | 0 | | 0 | 0.1000 | 0.1018 | 0% | ± 15% |
| | | | | Absolute Average Percent Difference | | 0% | |

**Linear Regression Analysis:**

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

| | | **LIMITS** |
|---|---|---|
| Correlation Coeff.= | 1.0000 | **≥ 0.995** |
| m (Slope)= | 1.0000 | **0.85-1.15** |
| b (Intercept as % of full scale)= | 0.3160 | **± 3% F.S.** |

**Remarks:**

# TEOM AUDIT

File #: _____
Date: _____ Performed by: _____

**Station**

Name: _____ Location: _____
Facility/Zone: _____ Operator: _____
Temperature: _____ Barometric Press. _____

**Audit Transfer Standard**

Make/Model: _____ Cell s/n: _____
Serial Number: _____

**Sampler Set-up and Current Readings**

Make/Model _____ F-Main Set Pt (l/min) _____
Unit # _____ F-Aux Set Pt (l/min) _____
Control unit s/n _____ Filter Load (%) _____
Transducer s/n _____ $K_O$ Factor _____
Temp (°C) _____
Press (ATM) _____
FAdj Main _____
FAdj Aux _____

**Conversion from mm Hg or " Hg to ATM (Atmospheres)**

ATM = (mm Hg) X ($1.316 \times 10^{-3}$) or ATM = ("Hg) X ($3.34207 \times 10^{-2}$)

Note: Tolerances are noted as **BOLD** in Brackets

**Zero Flow**

| **Pump Off** | | **Pump On (Time to reach set points)** | |
|---|---|---|---|
| F-Main (l/min) | | **(45-60 Sec)** | |
| F-Aux (l/min) | | **(45-60 Sec)** | |

**Temperature/Pressure**

| | | | |
|---|---|---|---|
| Measured Temp **(± 2 °C)** | | **Δ°C** | 0.00 |
| Measured Press **(± 1.5% ATM)** | | **Δ% ATM** | #DIV/0! |

**Flow Audit**

| | | | | |
|---|---|---|---|---|
| | | | **Δ% of Measured Flow from Set-point** | |
| Indicated Main/Aux Flow (l/min) | | | **(± 2%)** #DIV/0! | #DIV/0! |
| Total Flow = Main + Aux (l/min) | 0 | | **(± 2%)** | #DIV/0! |
| | | | **Δ of Measured Flow from Indicated** | |
| Measured Total Flow (l/min) | | | **(± 1.00 l/min)** | 0.00 |
| Measured Main Flow (l/min) | | | **(± 0.20 l/min.)** | 0.00 |

**Leak Check**

| | | **Actual leakage = Pump On – Pump Off** |
|---|---|---|
| Main **(< 0.15 l/min)** | | 0 |
| Aux **(< 0.65 l/min)** | | 0 |

**$K_O$ Factor**

Measured _____
$K_O$ % Difference **(± 2.5%)** _____

**Remarks:** Did not audit due to inclement weather.

# Station Performance Audit Summary

Company: Paza  Facility Name: Beaverlodge

Approval No.: N/A  Site Name: Beaverlodge

AENV Region: Northern  AENV District: Grande Prairie

Parameters audited:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $H_2S$ | | $SO_2$ | X | $NO_X$ | X | $NH_3$ | | $O_3$ | X |
| CO | | $CH_4$ | | NonCH4 | | THC | | Ethylene | |
| $PM_{2.5}$ | X | $PM_{10}$ | | TSP | | BTEX | | Wind Speed | X |
| Wind Dir | X | Amb. Temp | X | Stn.Temp | X | RH | X | Solar Radiation | |
| Rainfall | | Precip | | VWS | | Other | | | |
| All parameters monitored as per approval: Yes_____ No _____ N/A_____ | | | | | | | | | |

| | *YES* | *NO* | *N/A* |
|---|---|---|---|
| ***GENERAL*** | | | |
| 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: Unknown | | | |

*COMMENTS:* _____

*AUDITOR:* Al Clark  *DATE:* October 8, 2013

Alberta
Freedom To Create. Spirit To Achieve.