AGRIUM/CONDA
Document Production Index
in Response to 8/31/05 EPA Info. Request

BATES PREFIX	BEG BATES	END BATES	DATE	DOC TYPE	AUTHOR	RECIPIENT	DESCRIPTION
AGR	009830	009830		File Cover			File cover sheet, "Fluoride Comp Test, Superphos. Acid Plant." (documents located at AGR 009830-
AGR	009831	009833	5/11/2005	Letter	Elkins, Richard; State of Idaho Division of Environmental Quality	Ross, Charlie: Agrium Conda Phosphate	Annual Fluoride Performance Test on Superphosphoric Acid Process
AGR	009834	009873	4/20/2005	Report	TETCO	Nu-West Industries	Fluoride Compliance Tests Conducted on Superphosphoric Acid
AGR	009874	009874		File Cover			File cover sheet, "2005 Stack Testing." (documents located at AGR
AGR	009875	009876	5/10/2005	Letter with attachment	Olson, Eric; Antec Environmental	Johnson, Monty; Agrium Conda Phosphate	Granulator Compliance Report Tested 4/15/2005 and invoice for emission testing
AGR	009877	009877	5/13/2005	Letter	Ross, Charlie: Agrium Conda Phosphate	Elkins, Rick; Idaho Division of Environmental Quality	Compliance Test Reports
AGR	009878	009879	5/13/2005	Letter	Johnson, Monty; Agrium Conda Phosphate	Elkins, Rick; Idaho Division of Environmental Quality	Compliance Test Reports
AGR	009880	009887	4/8/2005	Facsimile with attachments	Gentry, Clay; Agrium Conda Phosphate	Elkins, Rick; Idaho Division of Environmental Quality	Attached correspondence and information re: Annual Compliance Test on Granulation Plant
AGR	009888	009888	3/31/2005	Email	Kennedy, John	Gentry, Clay; Agrium Conda Phosphate	TK 47
AGR	009889	009889		Stack Tests	Agrium Conda Phosphate		Stack testing data
AGR	009890	009890	4/1/2005	Letter	Johnson, Monty; Agrium Conda Phosphate	Elkins, Rick; Idaho Division of Environmental Quality	Notice of Intent to Test- Rescheduled Compliance Test on Granulation Plant
AGR	009891	009891	4/15/2005	Stack Tests		Agrium Conda Phosphate	Granulator EPA 1-4
AGR	009892	009893	5/10/2005	Letter with attachment	Olson, Eric; Antec Environmental	Johnson, Monty; Agrium Conda Phosphate	Granulator Compliance Report Tested 4/15/2005 and invoice for emission testing
AGR	009894	009894		File Cover			File cover sheet, "2005 {hos & SPA Stack Tests, Supplements 1&2" (documents located at AGR 009894-
AGR	009895	009920	3/30/2005	Stack Tests	TETCO	Nu-West Industries	Supplements 1&2 to Agrium CPO/-Nu-Wests Ind. Annual Source Testing 2005 (Supplemental Information for tests performed by TETCO; Test dates: 3/30/05 to 3/31/05. Also includes related sampling results and
AGR	009921	009921		File Cover			File cover sheet, "Agrium Emission Verification Report" (documents located at AGR 009921-010087)

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AGR	009922	009923	7/20/2005	Letter with attachment	Olson, Eric; Antec Environmental	Johnson, Monty; Agrium Conda Phosphate	B5 Broiler Report and invoice for work
AGR	009924	009979	6/22/2005	Report	Antec Environmental	Nu-West Industries	Emission Verification Report- B5 Boiler
AGR	009980	010035	6/22/2005	Report	Antec Environmental	Nu-West Industries	Emission Verification Report- B5 Boiler
AGR	0010036	010087	6/22/2005	Report	Antec Environmental	Nu-West Industries	Emission Verification Report- B5 Boiler
AGR	010088	010088	2005	File Cover			File cover sheet, "2005 Stack Testing Const." (documents located at AGR 010088-010115)
AGR	010089	010096	8/1/2005	Facsimile with attachmen	Johnson, Monty; Agrium Conda Phosphate	Kitchen, Dean; TETCO	SO2 Relative Accuracy Test Audit (Rata) and Performance Test Protocol- East Sulfuric Acid Plant
AGR	010097	010115	8/4/2005	Letter with attachments	Johnson, Monty; Agrium Conda Phosphate	Elkins, Rick; Idaho Division of Environmental Quality	Notice of Intent to Test and Stack Test Protocol. Attachment: SO2 Relative Accuracy Test Audit (RATA) and Performance Test Protocol, East Sulfuric Acid Plant.

Floride Comp. Test
Superphos. Acid Plant

AGR_009830

SMEAD®
No. 2-153L
UPC 10334

HASTINGS, MN

MINIMUM RECYCLED CONTENT

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

444 Hospital Way #300 • Pocatello, Idaho 83201 • (208) 236-6160

Dirk Kempthorne, Governor
Toni Hardesty, Director

May 11, 2005

Certified Mail No. 7004 1350 0001 1692 9510

Mr. Charles H. Ross
General Manager
Nu-West Industries, Inc.; Agrium Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Subject: Annual Fluoride Performance Test on the Superphosphoric Acid Process; AIRS No. 029-00003

Dear Mr. Ross:

On April 29, 2005, the Department of Environmental Quality (DEQ) received a performance test report for the annual fluoride performance test on the superphosphoric acid process scrubber (Unit A-Pb-1) at Nu-West Industries, Inc., Agrium Conda Phosphate Operations (Agrium's) Soda Springs facility. TETCO conducted a fluoride performance test in accordance with the Environmental Protection Agency's Method 13B on March 31, 2005. The test was conducted to satisfy Permit Condition 6.17 of Tier I Operating Permit No. T1-030319, September 23, 2003, and Section 63.606(a)(1) of Subpart AA of Part 63 of Title 40 of the Code of Federal Regulations (40 CFR 63, Subpart AA). The performance test was conducted in accordance with a protocol previously approved by DEQ for the 2004 annual test.

Permit Condition 6.2 of Tier I Operating Permit No. T1-030319, September 23, 2003, establishes a fluoride emission limit for the superphosphoric acid process in accordance with 40 CFR 63.603(b). The emissions limit is 0.00870 pound per ton of equivalent phosphorous pentoxide (P_2O_5) feed. The measured emissions was 0.00464 pound per ton of equivalent P_2O_5 feed.

Based on a review of the submitted test report, DEQ has determined that the Method 13B test on the superphosphoric acid process scrubber successfully demonstrated compliance with the emissions limits listed in Permit Condition 6.2 of Tier I Operating Permit No. T1-030319, September 23, 2003, and 40 CFR 63.603(b) during the test period. **DEQ accepts the testing as a demonstration of compliance for this emission source when the superphosphoric acid process and associated scrubber are operated in accordance with the Tier I operating permit and Subpart AA of 40 CFR 63.**

Permit Condition 6.35 of Tier I Operating Permit No. T1-030319, September 23, 2003, states, "The maximum allowable operating rate shall be limited to 120% of the average operating rate attained during any performance test period, for which a test protocol has been granted prior approval by DEQ, unless (1) the test demonstrates noncompliance; (2) a more restrictive operating limit is specified elsewhere in this

permit; or (3) at such an operating rate, emissions would exceed any emissions limit(s) set forth in this permit." The average operating rate achieved during this performance test was 32.2 tons of equivalent P_2O_5 feed per hour. **Therefore, the maximum allowable operating rate shall be limited to 38.6 tons of equivalent P_2O_5 feed per hour.** Please note this hourly operating limit does not relieve Agrium from complying with the annual equivalent P_2O_5 feed limit to the superphosphoric acid process line of 225,000 tons per any consecutive 12-month period established in Permit Condition 6.7.

Permit Condition 6.14 of Tier I Operating Permit No. T1-030319, September 23, 2003, and 40 CFR 63.605(d) require Agrium to indicate whether the allowable ranges for operating parameters for the scrubber liquid flow rate and pressure drop on the new performance test or the previously established range. In a letter to DEQ dated May 9, 2005, Agrium requested the previously established set of operational ranges be retained for the Superphosphoric Acid Production Process scrubber, based on operating data recorded during the March 14, 2002 source test. During the 2002 test period, the scrubber liquid flow rate was 553 gallons per minute and the pressure drop across the scrubber was 7.8 inches water column. **Therefore, the allowable range for the scrubber liquid flow rate is 443 to 663 gallons per minute, and the allowable range for the pressure drop across the scrubber is 6.2 to 9.4 inches water column.**

Please call me at (208) 236-6160 if you have any questions regarding this performance test evaluation.

Sincerely,

R W Elk

Richard Elkins
Air Quality Analyst

c: Michael Stambulis, Technical Services
Air Quality Stationary Source Program File
PRO Source File

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY
444 Hospital Way #300
Pocatello, ID 83201

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MAY 11 2005

Nu-West Industries, Inc
Agrium Conda Phosphate Operations
Mr. Charles H. Ross - General Manager
3010 Conda Road
Soda Springs, Idaho 83276

AGR_009833

FLUORIDE COMPLIANCE TESTS CONDUCTED ON THE SUPERPHOSPHORIC ACID PLANT STACK

FOR NU-WEST INDUSTRIES, INC.
AGRIUM CONDA PHOSHPATE OPERATIONS

SODA SPRINGS, IDAHO

March 31, 2005

by:

TETCO
90 East Main
Lehi, UT 84043
Phone: 801 768-0973
Fax: 801 768-0880

Prepared for:

Nu-West Industries, Inc., Agrium
3010 Conda Road
Soda Springs, ID 83276

Date of Report:

April 20, 2005

CERTIFICATION OF REPORT INTEGRITY

I hereby certify that the tests detailed in this report were accomplished in accordance with IDAPA 58.01.01.123 (*Rules and Regulations for the Control of Air Pollution in Idaho, Sampling and Analytical Procedures*) and the *Procedures Manual for Air Pollution Control*. The results submitted herein are accurate and true to the best of my knowledge.

Dean A. Kitchen

Reviewer: Dean A Kitchen

Date: 4-20-05

Paul R. Kitchen

Reviewer: Paul R Kitchen

Date: 4-21-05

AGR_009835

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AGR_009837

INTRODUCTION

Test Purpose and Location

This test was conducted as part of Nu-West Industries, Inc., Agrium's (Agrium) stack testing requirements as specified in the facility's State of Idaho Tier I Operating Permit, Permit No. T1-030319, dated September 23, 2003. Those requirements call for annual fluoride testing at the Superphosphoric Acid Plant Stack (SPA). Emissions are expressed in terms of pounds per dry standard cubic foot (lb/dscf), milligrams per dry standard cubic foot (mg/dscf), and pounds per hour (lb/hr). Pounds of fluoride per ton of 100 percent equivalent phosphoric pentoxide (P_2O_5) feed will be submitted by Agrium.

Test Dates

Three test runs were completed on the SPA stack March 31, 2005.

Pollutants Tested and Methods Applied

Fluoride emissions were made according to EPA Method 13B.

Test Participants

Test Facility	Agrium	Monty Johnson Clay Gentry
State Agency		None
Testing Contractor	TETCO	Dean Kitchen Mike Ransom

Deviations From EPA Methods

None.

Quality Assurance

Testing procedures and sample recovery techniques were according to those outlined in the Federal Register and the *Quality Assurance Handbook for Air Pollution Measurement Systems.*

SUMMARY OF RESULTS

Emission Results

Table I shows the fluoride emission results. Table IV in Appendix A has more detailed testing data.

Table I Measured Fluoride Emissions

	lb/dscf	mg/dscf	lb/hr
1	9.46E-08	4.29E-02	0.056
2	2.63E-07	1.19E-01	0.157
3	4.05E-07	1.84E-01	0.235
AVE	**2.54E-07**	**1.15E-01**	**0.149**

Allowable Emissions

The allowable fluoride emissions for the Superphosphoric Acid Plant Stack are 0.00870 lb/ton equivalent P_2O_5 feed as found in 40 CFR 63.603 (b).

Process Data

The process was operated according to standard procedures. All pertinent process information was available for recording by agency personnel. Production data will be submitted by Agrium personnel.

Discussion of Errors or Irregularities

None.

Percent Isokinetic Sampling

The Method 13B test runs were isokinetic within the ±10% of 100% criterion specified in the Federal Register. Isokinetic values for each test run are presented in Table II.

TABLE II Percent Isokinetic Sampling

Run #	Percent Isokinetics
1	99
2	99
3	101

SOURCE OPERATION

Process Control Devices Operation

All control devices operated normally.

Process Representativeness

The facility was operated normally. Production data will be submitted by Agrium personnel.

SAMPLING AND ANALYTICAL PROCEDURES

Sampling Port Location

The SPA stack inside diameter was 36 inches. Two, four-inch diameter ports were available for testing. These ports were located approximately 8.0 diameters (24 feet) downstream from the last disturbance and 2.2 diameters (6.5 feet) upstream from the next disturbance.

Figure 1 in Appendix E schematically depicts this source.

Sampling Point Location

Table III shows the distance of each sampling point from the inside wall according to EPA Method 1. Each point is marked and identified with a glass tape wrapping and numbered. Sample point position is determined by measuring the distance from the inside wall and adding the reference (port) measurement.

TABLE III Sampling Point Location

Sample Point	Distance (in. from inside wall)
1	1.58
2	5.26
3	10.66
4	25.34
5	30.74
6	34.42

Sampling Train Description

All sampling trains were made of inert materials, (Teflon, stainless steel and glass) to prevent interference of the sampled gas and particulate. The stack analyzers used to conduct these tests are constructed to meet the specifications outlined in the CFR. The temperature sensors are K-type thermocouples. Heater, vacuum and pitot line connections have been designed to be interchangeable with all units used by the tester. A stainless steel probe liner was used for all tests. Figure 2 in

AGR_009842

Appendix F is a sketch of the Method 13B sampling train. Sample boxes were prepared for testing by following the prescribed procedure outlined in Method 13B.

Sampling and Analytical Procedures

All sampling and analytical test procedures employed were as specified in 40 CFR 60 Appendix A, Method 13B and as specified in the test protocol.

Quality Assurance

All equipment set-up, sampling procedures, sample recovery and equipment calibrations were carried out according to the procedures specified in 40 CFR 60, Appendix A, Method 13B, as specified in the test protocol, and the *Quality Assurance Handbook for Air Pollution Measurement Systems.*

AGR_009843

APPENDIX

A: Complete Results and Sample Calculations
B: Raw Field Data
C: Laboratory Data and Chain of Custody
D: Summary Formats
E: Raw Production Data
F: Calibration Procedures and Results
G: Related Correspondence

AGR_009844

APPENDIX A

Table IV Complete Results
Nomenclature
Sample Equations

AGR_009845

TABLE VI
COMPLETE RESULTS
AGRIUM
SUPERPHOSPHORIC ACID PLANT SCRUBBER (SPA)

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/31/05	3/31/05	3/31/05	
Begin	Time Test Began		8:43	10:20	11:48	
End	Time Test Ended		9:47	11:24	12:51	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	24.28	24.28	24.28	
ΔH	Orifice Pressure Drop	In. H_2O	1.725	1.783	1.725	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	51.681	52.998	53.124	
T_m	Avg Meter Temperature	°F	70.3	78.3	82.7	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.4644	0.4705	0.4604	
Wt_{wc}	Weight Water Collected	Grams	13.3	18.6	21.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.3080	0.3080	0.3080	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	42.647	43.095	42.836	
Vw	Volume Water Vapor	scf	0.627	0.877	0.995	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.014	0.020	0.023	
X_d	Fraction of Dry Gas	Fraction	0.986	0.980	0.977	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.68	28.62	28.59	
%I	Percent Isokinetic	Percent	98.5	98.9	100.9	AVG
T_s	Avg Stack Temperature	°F	65.8	68.5	70.2	68
A_s	Stack Cross Sectional Area	Sq. Ft.	7.069	7.069	7.069	
P_G	Stack Static Pressure	In. H_2O	-0.09	-0.09	-0.09	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	24.24	24.24	24.24	
P_s	Stack Pressure	In. Hg. Abs	24.233	24.233	24.233	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	9.86E+03	9.92E+03	9.67E+03	**9.82E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	1.23E+04	1.25E+04	1.23E+04	**1.24E+04**
V_s	Velocity of Stack Gas	fpm	1.74E+03	1.77E+03	1.74E+03	**1.75E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
C_F	Concentration of Fluoride	lb / dscf	9.460E-08	2.629E-07	4.045E-07	**2.540E-07**
C_F	Concentration of Fluoride	mg/dscf	4.291E-02	1.193E-01	1.835E-01	**1.152E-01**
ER_F	Emission Rate of Fluoride	lb / hr	0.056	0.157	0.235	**0.149**

M5 13B Nomenclature

%I = percent isokinetic, percent

A_s = stack cross-sectional area (ft^3)

ASΔP = see $\sqrt{\Delta P}$

Btu = unit heat value (British thermal unit)

B_{ws} = fraction of water in stack gas

C_B = concentration of particulate matter, back half (gr/dscf,lb/dscf, etc.)

CB_{back} = concentration of pollutant in back half blank (i.e., mg). "Back" may be replaced with "water" or "acetone", etc.

CB_{front} = concentration of pollutant in front half blank (i.e., mg)

C_f = concentration of particulate matter, front half (gr/dscf,lb/dscf, etc.)

C_{metal} = concentration of metals (ppm, $\mu g/ft^3$, etc.) atomic symbol replaces "metal"

CO_2 = percent carbon dioxide in the stack gas

C_p = pitot tube coefficient (0.84)

CX_{back} = concentration of pollutant in back half, species identifier replaces "X" (lb/dscf)

CX_{front} = concentration of pollutant in front half, species identifier replaces "X" (lb/dscf)

$C_{X\ (avg)}$ = species symbol replaces x.

$C_{X\ (corr)}$ = actual gas concentration corrected to required percent O_2

ΔH = orifice pressure drop (inches H_2O)

$\Delta H_@$ = orifice pressure (inches H_2O)

ΔP = stack flow pressure differential (inches H_2O)

D_s = diameter of the stack (feet)

D_n = nozzle diameter (inches)

EA = percent excess air

ER_B = emission rate of back half particulate (lb/hr)

ER_F = emission rate of front half particulate (lb/hr)

ER_{mmBtu} = emission rate per mmBtu or ton of fuel etc.

ER_X = emission rate of compound which replaces x

ERX_{front} = front half emission rate of compount which replaces "X"

ERX_{back} = back half emission rate of compount which replaces "X"

k-fact = multiplier of test point ΔP to determine test point ΔH

L = length of rectangular stack (inches)

mBtu = thousand Btu

MB_{front} = mass of pollutant in front half blank (i.e., mg)

MB_{back} = mass of pollutant in back half blank (i.e., mg)

M_d = molecular weight of stack gas, dry basis (lb/lb-mol)

M_F = mass of particulate on filter (mg)

M_{FP} = mass of particulate matter on filter and probe (mg)

mmBtu = million Btu

M_P = mass of particulate matter in probe (mg)

M_s = molecular weight of stack gas, wet basis (g/gmol)

M_{Xfront} = mass of pollutant in front half before applying blank, species symbol replaces "X" (mg)

MX_{front} = total mass of pollutant in front half, species symbol replaces "X" (mg)

M_{Xback} = mass of pollutant in back half before applying blank, species symbol replaces "X" (mg)

MX_{back} = total mass of pollutant in back half, species symbol replaces "X" (mg)

N_2 = percent nitrogen in the stack gas

O_2 = percent oxygen in the stack gas

$\sqrt{\Delta P}$ = average of the square roots of ΔP (may also be referred to as ASΔP)

M5 13B Nomenclature

Pb_m = absolute barometric pressure at the dry gas meter (inches Hg)
Pb_p = absolute barometric pressure at the sample location (inches Hg)
P_G = stack static pressure (inches H_2O)
P_s = absolute stack pressure (inches Hg)
P_{std} = absolute pressure at standard conditions (29.92 inches Hg.)
θ = time of test (minutes)
Q_a = stack gas volumetric flow rate (acfm)
Q_s = stack gas volumetric flow rate (dscfm)
Q_W = wet stack gas std. volumetric flow (ft^3/min, wscfm)
T_s = stack temperature (^oF)
T_{std} = absolute temperature at standard conditions (528^oR)
Tt = see θ
u_m = mean molecular speed (cm/s)
Vm = sample volume (ft^3) at meter conditions
Vm_{std} = volume standard (dscf), sample volume adjusted to 68^oF and 29.92 inches Hg.
V_s = velocity of stack gas (fpm)
V_{wc} = volume water vapor (scf) at 68^oF and 29.92 inches Hg.
W = Width of rectangular stack (inches)
Wt_{wc} = weight of the condensed water collected (grams)
X_d = fraction of dry gas
Y = meter calibration Y-factor (dimensionless)

Method 5 13B Equations

$$\%I = Vm_{std} \cdot (T_s + 460) \cdot 1039 / (\theta \cdot V_s \cdot P_s \cdot X_d \cdot D_n^2)$$

$$A_s = Ds^2 / 4 \cdot \pi$$

$$B_{ws} = V_w / (Vm_{std} + V_w)$$

$$C_B = M_B \cdot 0.01543 / Vm_{std}$$

$$C_f = M_{fp} \cdot 0.01543 / Vm_{std}$$

$$CX_{front} = MX_{front} / (Vm_{std} \cdot 1000 \cdot 453.6)$$

$$CX_{back} = MX_{back} / (Vm_{std} \cdot 1000 \cdot 453.6)$$

$$C_{X\,(corr)} = C_{X\,(avg)} \cdot (20.9 - \text{desired } \%O_2) / (20.9 - \text{actual } \%O_2)$$

$$D_{eq} = 2 \cdot L \cdot W / (L + W)$$

$$EA = (\%O_2 - 0.5\ \%CO) / [0.264\ \%N_2 - (\%O_2 - 0.5\ \%CO)]$$

$$ER_B = C_B \cdot Q_s \cdot 0.00857$$

$$ER_F = C_f \cdot Q_s \cdot 0.00857$$

$$ER_{mmBtu} = ER_X / (mmBtu / hr)$$

$$ERX_{front} = CX_{front} \cdot Q_s \cdot 60$$

$$ERX_{back} = CX_{back} \cdot Q_s \cdot 60$$

$$K\text{-fact} = 846.72 \cdot Dn^4 \cdot \Delta H_@ \cdot C_p^2 \cdot X_d^2 \cdot M_d \cdot P_s \cdot (T_m + 460) / [M_s \cdot (T_s + 460) \cdot (Pb_m + \Delta H / 13.6)]$$

$$M_d = CO_2 \cdot 0.44 + O_2 \cdot 0.32 + N_2 \cdot 0.28$$

$$M_s = (M_d \cdot X_d) + (18 \cdot B_{ws})$$

$$P_s = Pb_p + (P_G / 13.6)$$

$$Q_a = V_s \cdot A_s$$

$$Q_s = Qa \cdot Xd \cdot Ps \cdot T_{std} / [(Ts + 460) \cdot P_{std}]$$

$$Q_W = Q_s / X_d$$

$$Vm_{std} = Vm \cdot Y \cdot T_{std} \cdot (Pb_m + \Delta H / 13.6) / [P_{std} \cdot (T_m + 460)]$$

$$V_s = 85.49 \cdot 60 \cdot Cp \cdot \sqrt{\Delta P} \cdot \sqrt{[(T_s + 460) / (P_s \cdot M_s)]}$$

$$V_{wc} = Wt_{wc} \cdot 0.04715$$

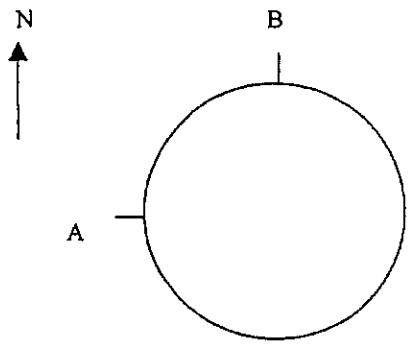
$$X_d = 1 - B_{ws}$$

APPENDIX B

SPA

Preliminary Velocity Traverse and Sampling Point Location Data
Method 13B Field Data Sheets

Preliminary



Stack Dia. 36" Reference: 6"

Ports are 6.5' Upstream from next disturbance

Ports are 24' Downstream from last disturbance

Facility Agrium, Conda Phosphate Operations

Stack Identification Super Phosphoric Acid Plant Scrubber

Date 3-31-05

Barometric Pressure

Pb_m _____ in Hg Pb_p _____ in Hg

Static Pressure (P_G) -.09 in H_2O

Estimated Moisture (Bw_s) 2.5 %

Sample Height from Ground 35-40 ~~70~~ 84 feet

Comments:

Traverse Point	Percent Diameter	Distance From: ID	Distance From: Reference	Ports A	B	C	D	E	F
1	4.4	1.58	7.58	7	6				
2	14.6	5.26	11.26	5	4				
3	29.6	10.66	16.66	7	9				
4	70.4	25.34	31.34	7	3				
5	85.4	30.74	36.74	5	5				
6	95.6	34.42	40.42	6	8				

Averages:

T_s _____ ∠ Flow _____

ΔP _____ √ΔP _____

KEY => T_s ∠ Flow ΔP

13 D Field Data Sheet

TETCO

Filter Paper Sample Box D

Page 1 of 1 Run # 1

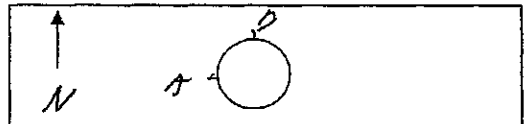
Plant: Agrium

Date: 3-31-05

Location: SPA

Operator: D. Kitchen

Traverse Point	Time Clock	Time Min (θ)	DGM (ft³)	ΔP (in H₂O)	ΔH (in H₂O) Desired	ΔH (in H₂O) Actual	Vacuum (in Hg)	Temperatures (°F) Stack (T_s)	Probe	Probe Out	Filter	Effluent	DGM Temp (T_m) Out	In
1	843	0	7.528	.16	1.28	1.28	4	60	118			30	56	55
2		5	11.240	.21	1.67	1.67	5	64	117			33	56	57
3		10	15.470	.24	1.91	1.91	5	66	115			36	59	62
4		15	19.890	.24	1.91	1.91	5	67	114			39	60	68
5		20	24.300	.23	1.83	1.83	5	68	114			38	64	74
6		25	28.750	.23	1.83	1.83	5	69	117			38	67	79
1	917	30	32.207	.16	1.28	1.28	4	61	116			33	70	78
2		35	37.040	.20	1.59	1.59	5	63	116			34	70	80
3		40	41.240	.24	1.91	1.91	6	66	115			36	72	82
4		45	45.775	.23	1.83	1.83	6	68	118			35	73	84
5		50	50.240	.23	1.83	1.83	6	69	119			34	74	86
6		55	54.740	.23	1.83	1.83	6	69	124			35	75	87
	947	60	59.209											
Total			51.681	5.5731	70.70			790					1688	
Average				0.4644	1.725			65.8					70.3	



Stack Diameter 36" Port Reference 6"

Ports are 6.5' Upstream from next disturbance

Ports are 24' Downstream from last disturbance

Assumed Moisture 2.0 %

Probe 386 Cp 0.84

Nozzle Calibration

.308 .309 .308 .307

Avg D_n .3080 inches

Gas Bag Amb. Air

Console 5

Y-Factor 1.016

$\Delta H_@$ 1.578 in H_2O

Barometric Pressures

Pb_m 29.28 in Hg

Pb_o 29.2 in Hg

P_G -.09 in H_2O

Leak Check:	Pre	Post
ft³/min	.006	.001
vac in Hg	20.0	6.0
Pitot Rate	0.0	0.0
in H_2O	7.0	7.0

Water Collected 12.3 g

Time Sampled 60 min

Review

K = 7.95 @T_m

K = @T_m

Comments:

AGR_009852

13 B Field Data Sheet

TETCO

Filter Paper Sample Box E

Page 1 of 1 Run # 2

Plant: Agrium, Conda Phosphate

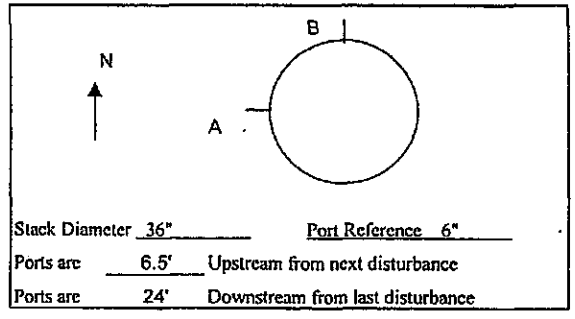
Date: 3-31-05

Location: Super Phosphoric Acid Plant

Operator: O. Kitchen

Traverse Point	Time Clock	Time Min (θ)	DGM (ft³)	ΔP (in H₂O)	ΔH (in H₂O) Desired	ΔH (in H₂O) Actual	Vacuum (in Hg)	Temperatures (°F) Stack (T_s)	Probe	Probe out	Oven	Effluent	DGM Temp (T_m) Out	In
1	1020	0	59.730	.16	1.28	1.28	4	64	117			35	69	69
2		5	63.550	.23	1.83	1.83	5	67	116			37	69	70
3		10	68.065	.25	1.99	1.99	5	68	120			36	70	74
4		15	72.725	.25	1.99	1.99	5	70	124			37	71	78
5		20	77.410	.24	1.93	1.93	5	70	127			39	73	82
6		25	82.075	.24	1.93	1.93	5	70	129			39	74	85
1	1054	30	86.670	.16	1.29	1.29	4	64	129			37	77	83
2		35	90.470	.21	1.69	1.69	5	65	121			38	78	83
3		40	94.795	.23	1.83	1.83	5	70	116			38	79	85
4		45	99.340	.23	1.83	1.83	5	70	117			40	81	87
5		50	103.890	.23	1.85	1.85	5	72	115			40	82	88
6		55	108.345	.24	1.95	1.95	5	72	116			39	82	89
	1124	60	112.728											
Total			52.998	5.6463	21.39			872					1878	
Average				.4705	1.7825			68.5					78.25	

884



Stack Diameter 36" Port Reference 6"

Ports are 6.5' Upstream from next disturbance

Ports are 24' Downstream from last disturbance

Assumed Moisture 3%

Probe 38-6 Cp 0.84

Nozzle Calibration

.308 .309 .308 .307

Avg D_n .3080 inches

Gas Bag Amb. Air

Console 5

Y-Factor 1.016

$\Delta H_@$ 1.578 in H_2O

Barometric Pressures

Pb_m 24.28 in Hg

Pb_p 29.24 in Hg

P_G -.09 in H_2O

Leak Check:	Pre	Post
ft³/min	.007	.000
vac in Hg	20.0	6.0
Pitot Rate	0.0	0.0
In H_2O	7.0	7.0

Water Collected 18.6 g

Time Sampled 60 min

Flow Rate ΔH@ cc/min

K = @T_m

K = @T_m

Comments:

AGR_009853

13 B Field Data Sheet

TETCO

Filter Paper Sample Box F

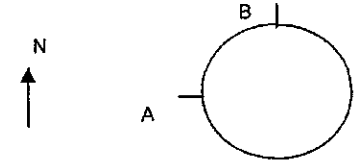
Page 1 of 1 Run # 3

Plant: Agrium, Conda Phosphate

Date: 3-31-05

Location: Super Phosphoric Acid Plant

Operator: D. Kitchen



Stack Diameter 36" Port Reference 6"

Ports are 6.5' Upstream from next disturbance

Ports are 24' Downstream from last disturbance

Traverse Point	Time Clock	Time Min (θ)	DGM (ft³)	ΔP (in H₂O)	ΔH (in H₂O) Desired	ΔH (in H₂O) Actual	Vacuum (in Hg)	Temperatures (°F) Stack (T_s)	Probe	Probe out	Oven	Effluent	DGM Temp (T_m) Out	In
A 1	1148	0	13.322	.16	1.30	1.30	4	64	124			41	75	76
2		5	17.180	.23	1.85	1.85	5	69	140			43	75	76
3		10	21.775	.23	1.85	1.85	5	70	142			40	76	79
4		15	26.380	.23	1.85	1.85	5	70	140			40	78	82
5		20	30.925	.22	1.80	1.80	5	71	138			42	79	85
6		25	35.550	.22	1.80	1.80	5	71	125			43	81	87
B 1	1221	30	40.126	.18	1.45	1.45	5	68	150			38	82	86
2		35	44.100	.22	1.80	1.80	5	70	145			37	83	87
3	*	40	48.860	.22	1.80	1.80	5	72	138			36	82	89
4		45	48.553.130	.22	1.80	1.80	5	72	133			37	83	90
5		50	57.650	.21	1.70	1.70	5	72	131			37	84	91
6		55	62.070	.21	1.70	1.70	5	73	129			37	85	92
	1251	60	66.446											

Total 53.124 ✓ 5.5747 70.70 842 ~~525~~ 1984

Average ✓ .4604✓ 1.7205 70.2✓ 82.67✓

Comments: * 48.860

Assumed Moisture 3%

Probe 28-6 Cp 0.84

Nozzle Calibration

.308 .308 .309 .307

Avg D_n .308 inches

Gas Bag Amb Air

Console 5

Y-Factor 1.016

$\Delta H_@$ 1.518 in H_2O

Barometric Pressures

Pb_m 24.28 in Hg

Pb_p 24.24 in Hg

P_G -.09 in H_2O

Leak Check:	Pre	Post
ft³/min	.007	.001
vac in Hg	20.0	6.0
Pitot Rate	0.0	0.0
In H_2O	7.0	7.0

Water Collected 21.1 g

Time Sampled 60 min

Flow Rate ΔH@ cc/min

K = @T_m

K = @T_m

AGR_009854

APPENDIX C

Laboratory Data

SPA

- Sample Recovery Sheets
- Gas Analysis Data (Ambient Air)

Fluoride Analysis Information

Chain of Custody

Impinger Field Sheet

Facility: Agrium

Stack Identification: 5 PH

Date: 3-31-05

Method: 13B

IMPINGERS

Run: 1

Sample Box: D

Filter Number: Paper

	Impinger Number 1	2	3	4	5	6	Initials
Initial Volume of liquid (H_2O) in impingers, (ml)	100	100	0	56			DJL
Final (g)	627.1	622.2	593.6	919.1			PRK
Initial (g)	619.9	621.6	593.4	914.8			
Net (g)	2.2	1.6	0.2	4.3			

Total (g) 13.3

RINSES

H_2O		CH_2Cl_2	
Final	1104 g	Final	g
Initial	104 g	Initial	g
Net	g	Net	g ÷ 1.32 g/ml = ml

DH

IMPINGERS

Run: 2

Sample Box: E

Filter Number: Paper

	Impinger Number 1	2	3	4	5	6	Initials
Initial Volume of liquid (H_2O) in impingers, (ml)	100	100	–	56			DJL
Final (g)	713.4	607.7	551.5	992.0			PRK
Initial (g)	705.1	605.2	550.9	984.8			
Net (g)	8.3	2.5	0.6	7.2			

Total (g) 18.6

RINSES

H_2O		CH_2Cl_2	
Final	1103 g	Final	g
Initial	103 g	Initial	g
Net	g	Net	g ÷ 1.32 g/ml = ml

DH

IMPINGERS

Run: 3

Sample Box: ~~4~~ F

Filter Number: Paper

	Impinger Number 1	2	3	4	5	6	Initials
Initial Volume of liquid (H_2O) in impingers, (ml)	100	100	–	56			DJL
Final (g)	718.9	611.6	535.2	874.5			PRK
Initial (g)	711.1	607.5	534.0	866.5			
Net (g)	7.8	4.1	1.2	8.0			

Total (g) 21.1

RINSES

H_2O		CH_2Cl_2	
Final	g	Final	g
Initial	g	Initial	g
Net	g	Net	g ÷ 1.32 g/ml = ml

DH

AGR_009856

Timpview Analytical Laboratories

1165 North 1600 West, Orem, Utah, 84057 (801) 229-2282

Certificate of Analysis

TETCO
Dean Kitchen
90 East Main
Lehi, UT 84043
Phone: 768-0973
Fax: 768-0880

Work Order #: 25288
Customer PO #:
Date / Time Received: 4/1/05 15:49
Date Reported: 4/15/05

Sample Name: Agrium PPA Run 1 **Lab ID:** D504-008
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.314	mg

Sample Name: Agrium PPA Run 2 **Lab ID:** D504-009
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.312	mg

Sample Name: Agrium PPA Run 3 **Lab ID:** D504-010
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.227	mg

Sample Name: Agrium Phosphoric Acid Run 1 **Lab ID:** D504-011
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.588	mg

Sample Name: Agrium Phosphoric Acid Run 2 **Lab ID:** D504-012
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.301	mg

Sample Name: Agrium Phosphoric Acid Run 3 **Lab ID:** D504-013
Date / Time Sampled: 3/30/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	0.293	mg

Sample Name: Agrium SPA Run 1 **Lab ID:** D504-014

Date / Time Sampled: 3/31/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	1.83	mg

Sample Name: Agrium SPA Run 2 **Lab ID:** D504-015

Date / Time Sampled: 3/31/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	5.14	mg

Sample Name: Agrium SPA Run 3 **Lab ID:** D504-016

Date / Time Sampled: 3/31/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	7.86	mg

Sample Name: Field Blank **Lab ID:** D504-017

Date / Time Sampled: 3/31/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	< 0.1	mg

Sample Name: Audit FI-0508 **Lab ID:** D504-018

Date / Time Sampled: 3/31/05 0:00 **Sample Type (Matrix):** Liquid

Parameter	Analysis Method	Analysis Date	Result	Units
Fluoride	EPA 13B	4/15/05	5.92	mg

Comments:
No ash fusion or distillation performed prior to sample analysis.

Reviewed by: _____
Ryan Freeman, Manager / QA Officer

Dean Kitchen

From: "Ryan Freeman" <rfreeman@timpview.com>
To: <tetco@mindspring.com>
Sent: Tuesday, April 19, 2005 9:54 AM
Subject: FW: Fluoride Audit 4/15/05

-----Original Message-----
From: MICHAEL STAMBULIS [mailto:mstambul@deq.idaho.gov]
Sent: Tuesday, April 19, 2005 8:41 AM
To: rfreeman@timpview.com
Subject: Re: Fluoride Audit 4/15/05

Concentration Results

Compound	Measured Concentration	Pass/Fail
fluoride	5.92 mg	
PASS		

Audit Sampling Dates
Audit Starting Date: 04/15/2005
Audit Ending Date: 04/15/2005

Collection Firm
Collection Firm Name: TETCO
Street Address: 90 East Main
City: Lehi
State: UT
ZIP: 84043
Office Telephone No.: 801-768-0973

Analyzing Laboratory
Laboratory Name: Timpview Analytical Laboratori Street Address: 1165 N Geneva
City: Orem
State: Utah
ZIP: 84057
Telephone No.: 801-229-2282

Audit Test Site Information
Audit Site Name: J.R. Simplot
Street Address: 1150 W Highway 30
City: Pocatello
State: ID
ZIP: 83204

>>> "Ryan Freeman" <rfreeman@timpview.com> 04/15/05 04:53PM >>>
Fluoride Audit Sample # Fl-0508

Result = 5.92 mg

Analysis Date = 4/15/05

Source = Agrium

Thanks,
Ryan Freeman
Timpview Analytical
(801) 229-2282

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TETCO Stack Emission Analysis
Accurate • Reliable • Qualified

90 East Main, Lehi, Utah 84043 • 801-768-0973 • FAX 801-768-0880

Chain of Custody

Sample Identification	Method of Analysis	Recovery Date	Sample Description
Agrium PPA Run 1	EPA Method 13 B	3/30/05	Impinger Catch & Rinse
Run 2	EPA Method 13 B		Impinger Catch & Rinse
Run 3	EPA Method 13 B		Impinger Catch & Rinse
Agrium Phosphoric Acid		3/30/05	
Run 1	EPA Method 13 B		Impinger Catch & Rinse (2 bottles)
Run 2	EPA Method 13 B		Impinger Catch & Rinse (2 bottles)
Run 3	EPA Method 13 B		Impinger Catch & Rinse (2 bottles)
Agrium SPA Run 1	EPA Method 13 B	3/31/05	Impinger Catch & Rinse
Run 2	EPA Method 13 B		Impinger Catch & Rinse
Run 3	EPA Method 13 B		Impinger Catch & Rinse
Field Blank	EPA Method 13B		Field Blank 55 mm filter

Sampled By: Paul R Kitchen Date(s): 3/30-31/05

Transported To: TETCO

Custodian: Paul R Kitchen Date: 3/31/05

Received By: Date:

Transported To:

Custodian: Date:

Received By: Date:

Transported To: Timp View

Custodian: Paul R Kitchen Date: 4/1/05

Received By: Joyce Applegate Date: 4-1-5

Unless otherwise indicated, all samples are transported to Timpview Analytical Laboratories (TAL). All samples are logged onto a TAL *Sample Submittal and Chain of Custody Form.*

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Chain of Custody

Sample Identification	Method of Analysis	Recovery Date	Sample Description
Audit Sample	EPA Method 13 B		EPA Audit Sample
Fl-0508			

Transported To: Timpview Analytical Laboratories
Custodian: Paul R Kitchen 4-1-05
Received By: Joyce Applegate 4-1-05

Transported To:
Custodian:
Received By:

Transported To:
Custodian:
Received By:

Unless otherwise indicated, all samples are transported to Timpview Analytical Laboratories (TAL). All samples are logged onto a TAL *Sample Submittal and Chain of Custody Form.*

APPENDIX D

Summary Format
SPA

AGR_009863

Summary Format for Fluoride Tests, Methods 1-4, 13B

Company Name: Agrium

Location (City): Soda Springs, Idaho

Source Sampled: SPA

Description	units	Run #1	Run #2	Run #3
Sample Date:		3/31/05	3/31/05	3/31/05
Barometric Pressure:	(in Hg)	24.28	24.28	24.28
DGM Calibration Factor:	(Y)	1.016		
Pitot Calibration Factor	(Cp)	0.84		
	units	*Run #1*	*Run #2*	*Run #3*
Nozzle Diameter	(in)	0.3080	0.3080	0.3080
No. of Sample Ports	N / A	2		
No. Sample Points per Diameter	N / A	6		
	units	*Run #1*	*Run #2*	*Run #3*
Total Sampling Time	(min)	60	60	60
H_2O Collected in Implingers	(ml)	13.3	18.6	21.1
CO_2 (Ambient Air)	(%)	0.0	0.0	0.0
O_2 (Ambient Air)	(%)	20.9	20.9	20.9
Static Pressure	(in H_2O)	-0.09	-0.09	-0.09
Fluoride in Sample	(mg)	1.83	5.14	7.86

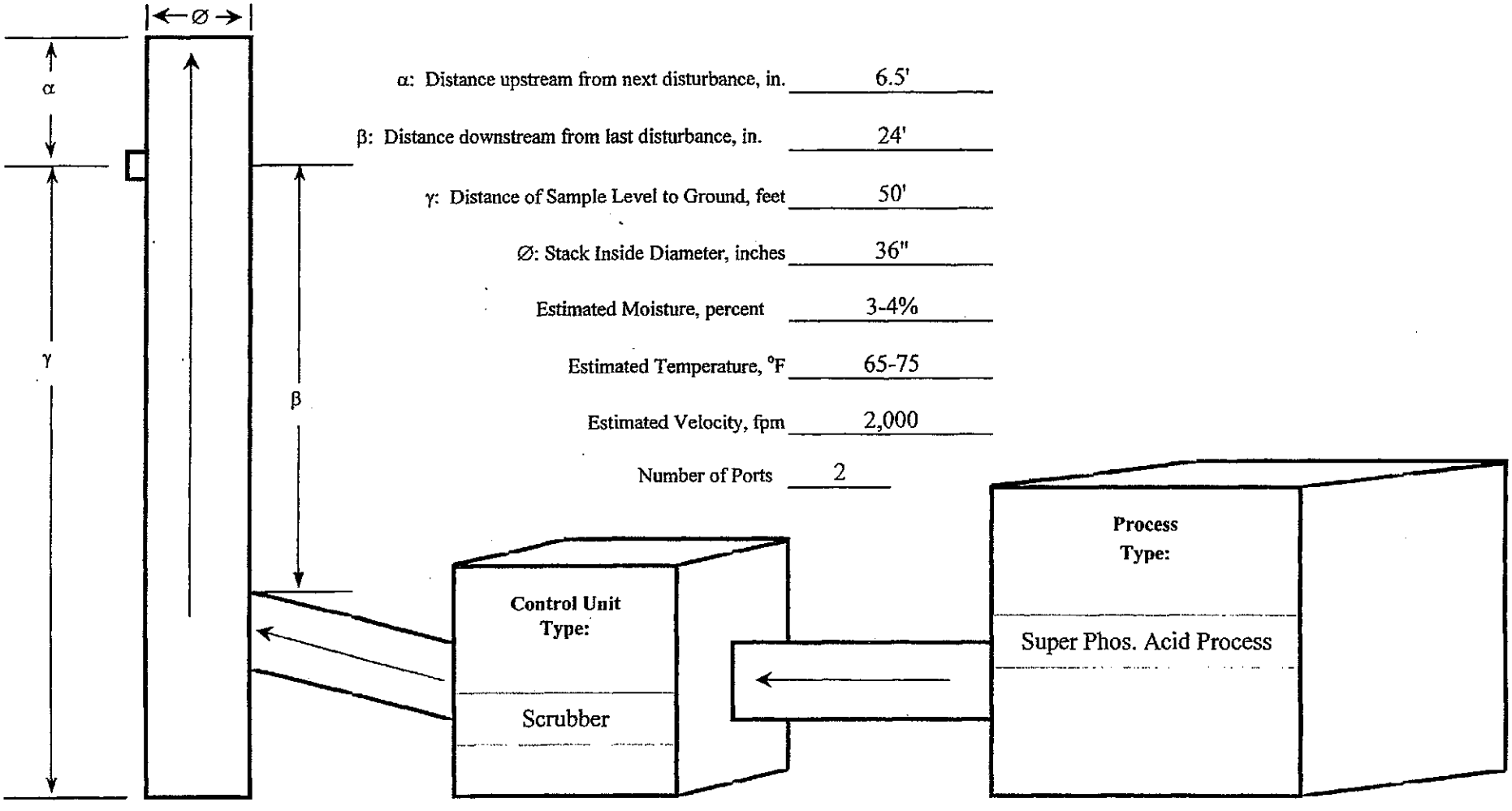
APPENDIX E

Figure 1. Facility Schematic Representation
Raw Production Data (submitted by Agrium personnel)

AGR_009865

Facility: Agrium

Stack Identification: SPA



α: Distance upstream from next disturbance, in. 6.5'

β: Distance downstream from last disturbance, in. 24'

γ: Distance of Sample Level to Ground, feet 50'

Ø: Stack Inside Diameter, inches 36"

Estimated Moisture, percent 3-4%

Estimated Temperature, °F 65-75

Estimated Velocity, fpm 2,000

Number of Ports 2

Figure 1. Facility Schematic Representation

AGR_009866

APPENDIX F

Calibration of the console dry gas meter(s), pitot tubes, nozzles diameters, and temperature sensors were carried out in accordance with the procedures outlined in the Quality Assurance Handbook. The appropriate calibration data are presented in the following pages. The nozzle calibrations are recorded on the first page of the field data sheets.

Figure 2. Schematic of Method 13B Sampling Train
Meter Box Calibration Data and Calculations Forms
Post-test Dry Gas Meter Calibration Data Forms
Type S Pitot Tube Inspection Data (Pre- and Post- Test)
Sample Box Temperature Sensor Calibration

AGR_009867

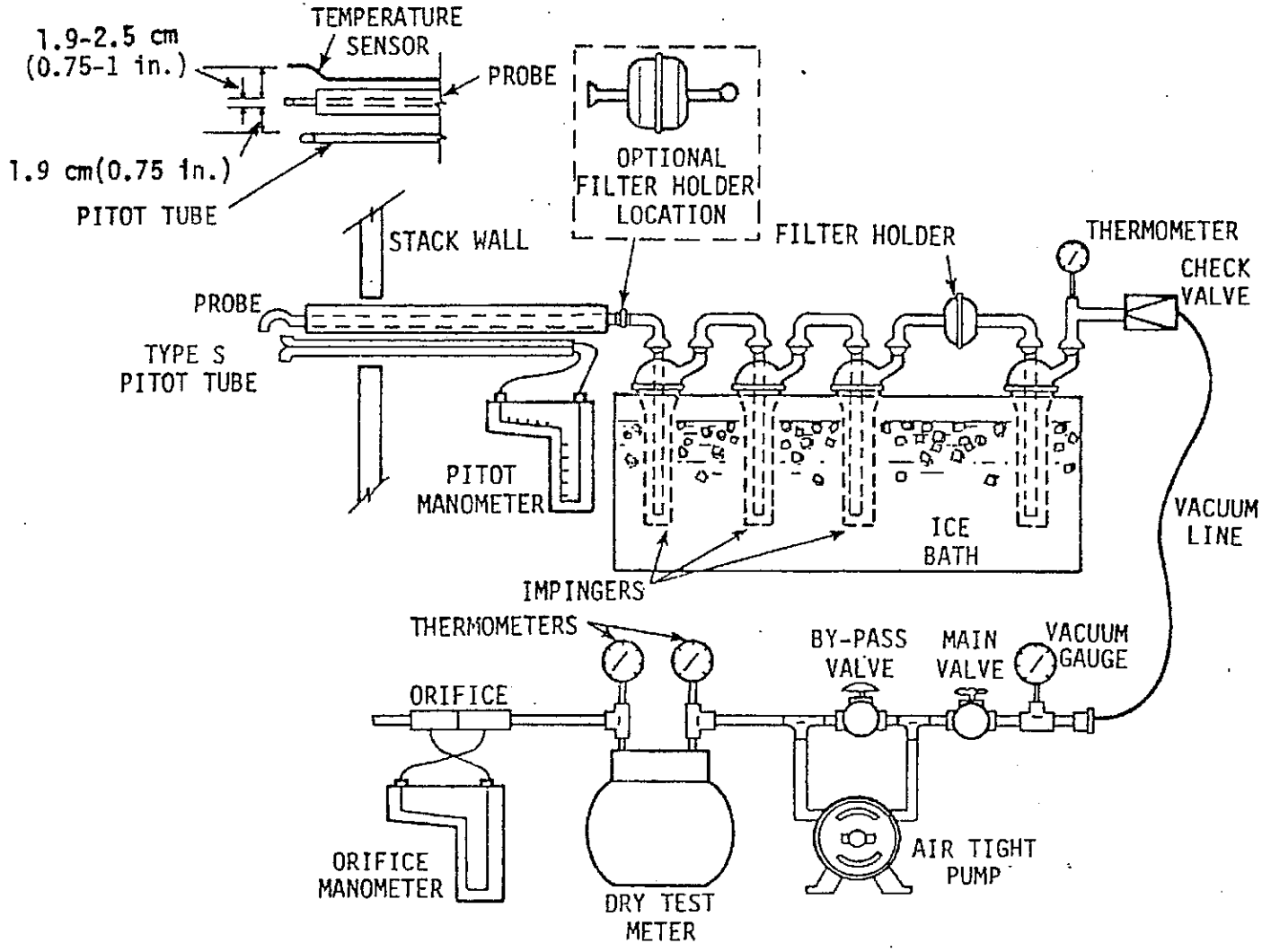


Figure 2. Schematic of Method 13B Sampling Train

Pretest--Console / Dry Gas Meter Calibration Sheet

Date: December 27, 2004 P_b: 25.43 Console #: 5 Vacuum: 5 Technician: Alex Moore

Line #	Meter Orifice Setting in. H_2O ΔH	Volume: Wet Test Meter ft³ Vm_w	Volume: Dry Gas Meter ft³ Vm_d	Temperature: Wet Test Meter: Measured °F T_w	Temperature: Wet Test Meter: Average °F Tw_{avg}	Temperature: Dry Gas Meter: Meter Inlet °F Tm_i	Temperature: Dry Gas Meter: Meter Outlet °F Tm_o	Temperature: Dry Gas Meter: Average °F Tm_{avg}	Time (mm ss ss) (mm mm) θ	$\Delta H_@$ in H_2O $\Delta H_@$	Y-Factor Dimensionless Y
1	.45	5.003	5.028	65 65 65	65.0	74 76 77	74 75 75	75.2	11.016	1.401	1.013
2	.85	5.004	5.018	65 65 65	65.0	78 80 81	76 77 77	78.2	8.177	1.449	1.020
3	1.45	5.008	5.012	65 65 65	65.0	81 81 83	77 77 77	79.3	6.420	1.518	1.022
4	2.05	5.028	5.003	65 65 65	65.0	73 74 76	73 73 74	73.8	5.454	1.553	1.016
5	2.65	5.026	5.009	65 65 65	65.0	74 77 78	73 73 74	74.8	4.844	1.581	1.014
6	3.25	5.023	5.006	65 65 65	65.0	72 75 76	73 73 73	73.7	4.398	1.604	1.011
									Average =>	1.518	1.016

Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature: Reference (°F)	Temperature: Sensor (°F)	Temperature Difference (°F)
Meter In Tm_i	Air	70	70	0
	Continuity			Pass
Meter Out Tm_o	Air	70	70	0
	Continuity			Pass

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460)}$$

$$\Delta H_@ = \frac{0.0317 \cdot \Delta H}{P_b \cdot (Tm_{avg} + 460)} \cdot \left[\frac{\theta \cdot (Tw_{avg} + 460)}{Vm_w} \right]^2$$

AGR_009869

Post Test – Console / Dry Gas Meter Calibration Sheet

Facility SPA & PPA

Date 4/4/05 P_b 25.24 Console # 5 Technician [illegible]

Line #	Meter Orifice Setting in H_2O	Volume		Temperature					Time	Vacuum	Y- Factor
				Wet Test Meter		Dry Gas Meter					
		Wet Test Meter ft^3	Dry Gas Meter ft^3	Measured °F	Average °F	Meter Inlet °F	Meter Outlet °F	Average °F		in Hg	Dimensionless
	ΔH	Vm_s	Vm_d	T_w	Tw_{avg}	Tm_i	Tm_o	Tm_{avg}	θ	P_{vac}	Y
1	1.67	5.005	5.217	65 65 65	65	91 92 92	80 81 81	86.2	6:08	6	.993
2	1.67	5.006	5.228	65 65 65	65	92 90 90	81 81 81	85.8	6:08	6	.991
3	1.67	5.005	5.217	65 65 65	65	90 89 90	81 81 81	85.3	6:08	6	.992
4											
5											
6											
										Average ⇒	.992

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460}$$

Pre test Y Factor 1.016

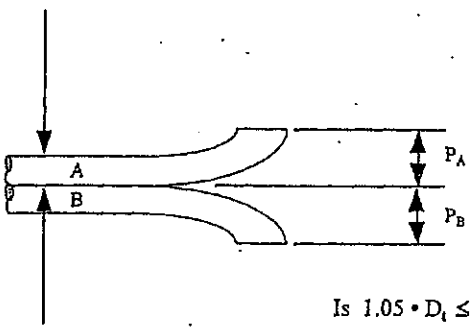
AGR_009870

Type S Pitot Tube Inspection Data

Date: 1/5/2005

Pitot Tube Identification: 98 Gloss

Technician: Mike Ronsom / Brendan Goss



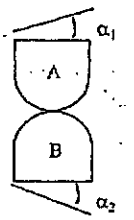
D_t = .376 in.

P_A = .475 in.

P_B = .475 in.

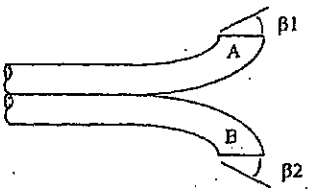
Is $P_A = P_B$? ✓

Is $1.05 \cdot D_t \le D_t \le 1.50 \cdot D_t$? ✓



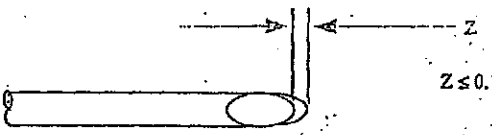
$\alpha_1 < 10°$ α_1 = 1 °

$\alpha_2 < 10°$ α_2 = 0 °

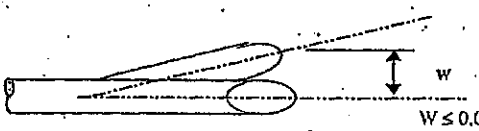


$\beta_1 < 5°$ β_1 = 1 °

$\beta_2 < 5°$ β_2 = 1 °



$Z \le 0.125$ in. Z = .009 in.



$W \le 0.03125$ in. W = .018 in.

The pitot tube meets the specifications for a calibration factor of 0.84? ✓

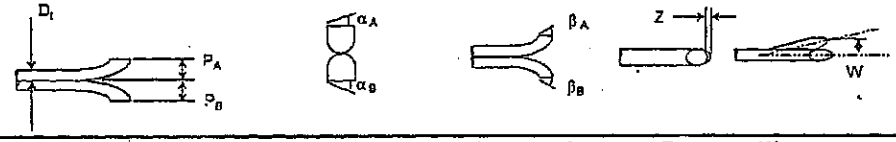
Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature Reference (°F)	Temperature Sensor (°F)	Temperature Difference (°F)
Probe	Air	66	68	2
	Continuity	Check	—	✓
Stack	Air	67	66	1
	Continuity	Check	—	✓

AGR_009871

Pitot Tube Dia (D_t): .376



Continuity check: Cause a change in the thermocouple reading—by applying heat or ice to the sensor. Did the temperature reading fluctuate appropriately?

Date	Initial	P_A	P_B	$P_A = P_B$	α_A	α_B	β_A	β_B	Z	W	Meet 0.84 C_p Specs?	T_S Stack	T_R Reference	ΔT	Temp. Accuracy	Continuity Check	Action / Comments
		$1.05 \cdot D_t < P_A < 1.50 \cdot D_t$		—	< 10°	< 10°	< 5°	< 5°	Z ≤ 0.125	W ≤ 0.03125				± 2°			
		inches	inches	Y / N	degrees	degrees	degrees	degrees	inches	inches	Y / N	°F	°F	°F	P / F	P / F	
9/24/03	MR	.476	.476	Y	2	3	1	1	.011	.018	Y	66	66	0	P	P	
8/19/04	SG	.534	.534	Y	1	2	5	7	.011	.016	Y	88	87	1	P	P	
9/22/04	AGM	.480	.480	Y	0	0	0	1	.009	.005	Y	68	69	1	P	P	
2/2/05	[illegible]	.480	.480	Y	1	2	0	0	.002	.004	Y	68	67	1	P	P	
2/10/05	[illegible]	.480	.480	Y	1	1	1	2	.004	.004	Y	79	81	2	P	P	
1/17/05	[illegible]	.478	.478	Y	1	1	1	1	.004	.004	Y	71	71	0	P	P	
12/5/05	BG	.477	.477	Y	1	2	1	2	.003	.006	Y	68	67	1	P	P	
1/19/05	BG	.477	.477	Y	1	2	2	2	.003	.006	Y	69	70	1	P	P	

Page _____ of _____

Pitot ID: 38-G

AGR_009872

APPENDIX G

Test was conducted according to the protocol followed for the 2004 testing project.

AGR_009873

2005 Black Testing

AGR_009874

SMEAD®

No. 2-153L
UPC 10334

HASTINGS, MN

MINIMUM RECYCLED CONTENT
10% POST-CONSUMER

Antec
Environmental
Services

PO Box 2117
North Bend, Washington 98045
Office: (425) 888-2202
Fax: (425) 888-2321
Mobile: (425) 785-8261
E-mail: antec@earthlink.net

May 10, 2005

Nu-West Industries, Inc.
Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Attention: Mr. Monty Johnson

Dear Monty,

Enclosed are three copies of the *Granulator Compliance Report Tested April 15, 2005* and the invoice for the emission testing.

If you have questions or require additional information please give us a call at 425 888-2202.

Thanks for the Business,

Eric Olson
President
Antec Environmental Services

Invoice for Agrium/Nu-West Emission Testing

May 10, 2005

Conda Phosphate Operations - Agrium
Nu-West Industries, Inc.
Mr. Monty Johnson
Environmental Manager

AES Invoice No. AES5041

Antec Environmental Services

PO Box 2117 North Bend
North Bend, WA 98045
(425) 888-2202

Travel Date 4/4/05
Test Dates 4/5-15/2005

Emission Testing					
Item	Granulator Engineering 4-5-05	Reference Method	Runs	Cost/Run	Cost/Item
1	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	2	$ 525.00	$ 1,050.00
				Section Sub -Total:	*$ 1,050.00*

Emission Testing					
Item	Granulator Engineering 4-6-05	Reference Method	Runs	Cost/Run	Cost/Item
2	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

Emission Testing					
Item	Granulator Engineering 4-7-05	Reference Method	Runs	Cost/Run	Cost/Item
3	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

Emission Testing					
Item	Granulator Engineering 4-8-05	Reference Method	Time	Cost/hr	Cost/Item
4	Standby/Source Test Plan/Opacity PPA	N/A	8	$ 100.00	$ 800.00
				Section Sub -Total:	*$ 800.00*

Emission Testing					
Item	Inlets to Granulator Engineering 4-9-05	Reference Method	Runs	Cost/Run	Cost/Item
	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
5	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

Emission Testing					
Item	Granulator Engineering 4-11-05, 4-12-05	Reference Method	Time	Cost/hr	Cost/Item
6	Standby Offsite	N/A	16	$ 81.25	$ 1,300.00
				Section Sub -Total:	*$ 1,300.00*

Emission Testing					
Item	Granulator Engineering 4-13-05	Reference Method	Runs	Cost/Run	Cost/Item
7	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

Emission Testing					
Item	Granulator Engineering 4-14-05	Reference Method	Runs	Cost/Run	Cost/Item
8	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	2	$ 525.00	$ 1,050.00
				Section Sub -Total:	*$ 1,050.00*

Emission Testing					
Item	Granulator Compliance 4-15-05	Reference Method	Runs	Cost/Run	Cost/Item
9	Fluoride Emission Test, Outside Lab	EPA 1-4, 13B	3	$ 650.00	$ 1,950.00
				Section Sub -Total:	*$ 1,950.00*

Item	Test Team Description	Rate	Units	Qty	Cost/Item
10	Compliance QA & Compliance Report Generation & Shipping	$ 500.00	1	1	$ 500.00
11	Travel Rate cost +5%, No labor charges	$ 660.64	N/A	N/A	$ 660.64
12	Per Diem 2 men 13 days	$ 105.00	2	13	$ 2,730.00
				Section Sub -Total:	*$ 3,890.64*

Payment Terms Net 30	Estimated Total	$ 16,340.64

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

May 13, 2005

File No.: EN-04-064

FedEx Tracking # 792922272195

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Compliance Test Reports

Dear Mr. Elkins,

Please find enclosed two (2) copies of our annual compliance report for a source test conducted at our facility April 15, 2005 by Antec Environmental Services. Attached to the report is Supplements 1, which contains an emission summary and monitored data.

In accordance with IDAPA 58.01.01.123, and "based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete."

Sincerely,

for

Charles H. Ross
General Manager

CHR:mj
Enc. (2) copies of test report + (2) copies of Supplements 1

* A Registered Name of Nu-West Industries, Inc.

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

May 13, 2005

File No.: EN-04-064

FedEx Tracking # 792922272195

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Compliance Test Reports

Dear Mr. Elkins,

Please find enclosed two (2) copies of reports for annual source testing conducted at our facility April 15, 2005 by Antec Environmental Services, a Northbend, Washington testing company. The stack test was conducted at worst-case normal conditions, as described at IDAPA 58.01.01.157.02.a. The report includes test data for the following source at our Conda facility, listed with applicable Tier I Operating Permit 029-00003 sections limiting emissions:

Phosphate Fertilizer Production Process ("Granulation Plant") - Section 2.10

In addition to the reports produced by Antec, I have included operational monitored data and calculations demonstrating compliance/non-compliance for each test. This information is included with this letter as Supplement 1 to Antec's report. A summary of data and emission calculations appear below:

Phosphate Fertilizer Production Process ("Granulation Plant") - Section 2.10

Test date: April 15, 2005

Permitted fluoride emissions:	0.058 lb/Ton P_2O_5 feed
Fluoride emissions during test:	0.049 lb/Ton P_2O_5 feed [In compliance]
P_2O_5 feed to process during test:	44.36 tons/hr
Pressure drop across granulator scrubber:	18.6 inches H_2O
Pressure drop across dryer scrubber:	16.6 inches H_2O
Granulator scrubber flow rate:	375 gpm
Dryer scrubber flow rate:	725 gpm

* A Registered Name of Nu-West Industries, Inc.

As indicated by the sampling data provided by Antec and the summary above, the source test and calculations demonstrated compliance to permit limitations.

Opacity readings were performed during the test and observations are included.

It is our pleasure and opportunity to provide you with this source test information. We appreciate DEQ's assistance in helping us maintain compliance with state and federal air quality regulations.

If you have any questions concerning this letter or the enclosed Compliance Report by Antec, please call me at (208) 547-4381 extension 263.

Sincerely,

Monty Johnson
Environmental Manager

Attachments: Supplement 1 to Antec Report
Enclosures: two (2) copies of Antec report for April 15, 2005

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs
Idaho
83276
208-547-4381 Tel
208-547-2550 Fax

Facsimile

Date:	4/8/2005		
To:	Richard Elkins	From:	Clay Gentry
Company:	Idaho DEQ	Company:	Agrium CPO
Fax #:	236-6168	Fax #:	(208) 547-2550

Total Pages (including cover): 8

If fax is not received in good order, please contact Clay Gentry at (208) 547-4381 Ext. 234

Rick,

Here is the information you requested

Thanks,
Clay

This communication is intended to be received only by the individual or entity to whom or to which it is addressed and contains information that is or may be privileged, confidential exempt from disclosure under law or subject to copyright. If you are not the intended recipient, any use copying, review or disclosure is strictly prohibited. Please notify the sender immediately if you have received this communication in error and return the original to us by return mail. Thank you for your assistance and cooperation.

* A Registered Name of Nu-West Industries, Inc.

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

April 8, 2005

File No.: EN-05-035

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Annual Compliance Test on Granulation Plant

Dear Mr. Elkins,

As discussed by phone with Monty Johnson we intend to use Antec Environmental Services on the upcoming compliance test scheduled for April 15, 2005 on the Granulation plant. Please find attached the Source Test Protocol from Antec Environmental Services previously approved by the Idaho DEQ in 2003.

If you have any questions concerning this letter, please call me at (208) 547-4381.

Sincerely,

Clay Gentry
Environmental Specialist/Technician

* A Registered Name of Nu-West Industries, Inc.

Antec Environmental Services

PO Box 2117
North Bend, WA 98045
Office: 425 888-2202
FAX: 425 888-2321

April 8, 2005

Mr. Richard Elkins
Department of Environmental Quality
224 South Arthur
Pocatello, Idaho 83204-3202

RE: Source Test Plan for Compliance Emission Test.
Of the Granulation Plant

Dear Mr. Elkins,

The propose of this letter is to notify the Idaho Department of Environmental Quality (IDEQ) of a pending emission source test, scheduled for Friday the 15th of April 2005, at the Agrium Conda Phosphate Operations facility located near Soda Springs, Idaho. The purpose of the testing is to satisfy the test requirements of IDEQ Operating Permit, No. T1-030319.

1.) *Name and Location of Source:*
Agrium Conda Phosphate Operations
3010 Conda Rd
Soda Springs, Idaho 83276

2.) *Source site personnel:*
Agrium CPO
Mr. Monty Johnson
Environmental Manager
(208) 547-4381

3.) *Source Test Personnel:*
Antec Environmental Services
PO Box 2117
North Bend, WA 98045

Mr. Eric E. Olson - Project Manager (425) 888-2202
Mr. Brian Johnson – Field Test Technician

4.) *Date and Time of Emission Test:*

April 15, 2005; Conduct Granulation Plant emission test.

5.) *Description of the Processes*:
Granulation Plant

6.) *Pollutant parameters to be determined:*
The emission parameters to be measured at the Granulation Plant include total fluorides (*F*).

7.) *Test Methods to be followed, number of replicates*:

Granulation Plant	Total Fluoride	EPA Method 13b	Three runs, 72 minutes min., 30.0 dscf minimum	lbs/hr, lbs/ton of product processed

Granulation Plant

Total Fluoride emissions (*F*) will be determined following *EPA Method 13b*. Three, 72 minute sample runs will be performed collecting at a minimum 30.0 dry standard cubic feet of stack gas per run. Fluoride emissions will be reported in pounds per hour (lbs/hr), and pounds per ton of P_2O_5 feed to the process (lbs/ton).

Fluoride analysis will follow the method as described in 40 CFR, part 63, section 6.2.6(c)(2), which omits the sample digestion process during sample preparation.

Cyclonic flow is present in the exhaust stack of the Granulation Plant, Fluoride and volume flow rate measurements will follow the *Alignment Method* as described in the attached EPA Guidance Document, GD-008.

8.) *Applicable Process Information: Operating Load during emission testing:*

Process parameters will be monitored and recorded by Agrium facility operators and will include, scrubber differential pressures (ΔP) as inches of water, scrubber water flow rates (gpm). The P_2O_5 feed to the process will be documented during each test run.

Plant Process Parameters

The processes will be operated to maximum achievable capacity. Required data will be recorded concurrently with the performance test runs

Method-specific quality assurance / quality control procedures will be performed to ensure that the data is valid for determining source compliance. Documentation of the procedures and results will be presented in the final source test report for review.

The Department will be notified of any changed in the source test plan prior to testing.

Source test reports will be submitted to the Agency within thirty days of the test date. Agrium CPO will send two (2) copy of the completed source test report to the IDEQ, Pocatello Regional office.

If you have any questions please give us a call. (425) 888-2202

Eric E. Olson
Antec Environmental Services
Project Manager

cc: M. Johnson, Agrium

EMISSION MEASUREMENT CENTER
GUIDELINE DOCUMENT

PARTICULATE SAMPLING IN CYCLONIC FLOW

SUMMARY

Particulate emission sampling in stacks or ducts with cyclonic flow patterns presents significant problems in obtaining representative measurements of concentrations and flow rates. Difficulties also arise in establishing the correct velocity for determining the isokinetic sampling rate. Sections 2.4 and 2.5 of Method 1 describe procedures for verifying the absence of cyclonic or other flow patterns not parallel to the stack or duct axis. These sections also specify limits of acceptability for the angles of flow using the described procedures. The purpose of this guideline is to determine options for consider when the acceptable limits of angular or cyclonic flow are exceeded. Following are three options and recommendations for each for addressing the measurement of particulate emissions when cyclonic or nonparallel flow patterns exist.

RECOMMENDATIONS

1. Find another location.

In many situations, sampling can be conducted downstream of the original location at a point exhibiting less cyclonic flow tendencies. For example, moving from a duct immediately downstream of a venturi scrubber exit to a location in a stack multiple equivalent diameters downstream of the duct-stack intersection can often solve a cyclonic flow situation. Extra cost is sometimes incurred in such a move (e.g., new ports and sampling platforms); however, this option is often less costly or disruptive to the process operation and produces more reliable emission measurement data than do other options described below.

2. Install flow straightening vanes upstream of the sampling location.

Flow straightening vanes, such as are described in Figure 5D-1 of Method 5D, Appendix A of 40 CFR Part 60, may be used. Note that the criteria for locating the measurement site downstream of the straightening vanes are based on the average equivalent diameter of the straightening vane openings rather than the stack diameter (Section 4.1.1, Method 5D). However, straightening vanes may disrupt the process and may affect control efficiency.

Other means of straightening gas flow, such as addition of stack extensions tangential to the stack axis, may suffice.

3. Apply one of the modified sampling procedures.

The Alignment Approach

This approach involves turning the sampling nozzle into the direction of
gas flow assuming essentially tangential flow and ignoring the radial flow vector. The procedure is as follows:

Conduct a preliminary velocity traverse of the stack to establish the angle of flow at each sample point located as defined in Method 1. Using an unobstructed type-S pitot (i.e., no nozzle attached), rotate the pitot until a null reading is obtained and determine the flow angle relative to the stack axis from corrected protractor readings. Conduct the sampling isokinetically at each point rotating the sampling nozzle to point into the gas flow and using the velocity values determined during the preliminary velocity traverse. Conduct a post-test velocity traverse in the same manner as the preliminary traverse to verify the velocity (within 5 percent) and angle values (within 5 °). Calculate the stack velocity by determining the velocity vector parallel to the axis using the velocity values measured at each sampling point and the cosines of the measured angles.

The potential bias resulting from the use of this approach relative to a
sample result from a location with acceptable flow conditions is affected by particle size and degree of cyclonic flow formation. The particulate concentration measurement (e.g., gm/m^3, ng/J) bias may be from -15 to 0 percent. The particulate concentration bias will approach zero with a decrease in average particle size. The stack flow rate measurement (e.g., m^3/min) bias may be from -10 to 0 percent. The resulting mass emission rate measurement (e.g., g/hr) will reflect a negative bias of about -20 to 0 percent.

Time-Weighted Alignment Method (Texas ACB Procedure)

The time-weighted approach is a refinement of the alignment method in which a compensation is made in the sampling time at each point by adjusting the dwell time proportional to the cosine of the angle of flow at that point. The purpose of the adjustment is to account for the stratification of particulate matter caused by the centrifugal action of the cyclonic flow. The gas velocities, flow angles, and stack

flow rate are calculated as described for the alignment method. The sampling is conducted isokinetically in the same manner as described above except for the adjusted sample time at each traverse point.

The potential biases that result form the use of the time-weighted alignment method relative to a sample result from an acceptable sampling location may be affected by the sampling time adjustments. The particulate concentration (e.g., g/m^3, ng/J) measurement may be from 0 to +25 percent. The stack flow rate measurement (m^3/min) is conducted in the same manner as for the alignment method and the potential bias will be similar (i.e., -10 to 0 percent). The resulting mass emission rate measurement (e.g., g/hr) will reflect a bias range of about -10 to +25 percent with a tendency toward an overall positive bias.

REFERENCES

1. Peeler, James, Isokinetic Particulate Sampling in Non-Parallel Flow Systems-Cyclonic Flow, Entropy Environmentalists, Inc, RTP, NC, 1977.

2. Stack Sampling Cyclonic Flow, Appendix H, Texas Air Control Board Sampling Procedures Manual, Texas Air Control Board, 6330 Hwy 290 East, Austin, TX 78723, Revised July 1985.

2. Westlin, P.R., and K. Alexander, Evaluation of Particulate Sampling Methods for Cyclonic Flow, EPA memorandum, EPA MD-19, RTP, NC, 27711, August 1979.

From: John Kennedy
To: Clay Gentry
Date: 3/31/2005 11:55:12 AM
Subject: TK 47

Tank 47 Grab

P2O5 = 58.15

SPG = 1.790

HCl
0.2419

Agrium

CONTROL LABORATORY

Date _____

#1S 0600	#2S0600	1152WS	PHR24HR	Gyp WI ~~LOI~~	LOI ~~Gyp WI~~
1/ 0.5932	2/ 0.5811	1.0237	0.2721	3.3639	1.1173
25.6370	25.7269	25.3470	23.5627	27.3326	8.9971
1/25.1268	2/25.2249	3/24.7204	4/23.2959	5/27.1737	8.9388
68.97	69.27	49.08	31.45	0.758	5.22
0.6934	0.7836				
21.20	24.15				
50.16	51.56				1.790
27.3	25.6				SPC ~~17.9~~
F:1T0900	KWTX1297	UTLX12021	T/C57	T/C58	T547 VI
					10:00
3/ 0.7964	4/ 0.6076	5/ 0.5894	41.4381	40.1033	0.5727
					27.4238
	27.7399	28.6130	1/22.4724	4/22.6263	9/27.0085
	6/27.2083	7/28.0992	22.7060	23.0983	
	70.16	69.90	0.56	1.18	58.15
	0.8971				
	28.55				
	54.38				
11-57-0	#1S1400	#2S1400	UTLX13896	UTLX110056	UTLX110042
FA 11:00					
	2/ 0.4998	3/ 0.4694	4/ 0.5720	5/ 0.5228	6/ 0.4953
0.4840					
	25.5579	25.6290	25.2191	23.7494	27.6019
24.9292	1/25.1260	2/25.2246	3/24.7198	4/23.2946	5/27.1727
0/24.6637					
43.99	69.29	69.08	69.99	69.76	69.65
1.596					
	0.7116	0.7051			
	21.10	21.55			
	48.61	50.27			
	29.8	27.2			

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

April 1, 2005

File No.: EN-05-046

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Notice of Intent to Test – Rescheduled Compliance Test on Granulation Plant

Dear Mr. Elkins,

Due to operational and mechanical problems with our Granulation Plant this week, we were unable to complete the scheduled source compliance test on the Granulation Plant. Stiff winds blowing across the top of the stack, which requires alternative method adjustment for cyclonic flow, also contributed to adverse testing conditions.

We have rescheduled the source compliance test tentatively between April 15 and April 30, 2005 on the Granulation Plant and we are submitting this letter today as 15-day Notice of Intent to Test. As we discussed this morning, a more precise date will be forwarded via e-mail.

If you have any questions, please call.

Sincerely,

Monty Johnson
Environmental Manager

* A Registered Name of Nu-West Industries, Inc.

Granulator EPA 1-4

Client: Agrium
Location: Soda Springs, ID
Source: Granulator
Date: April 15, 2005
Project No.: AES5041

		Run #1	Run #2	Run #3	
		4/15/05	4/15/05	4/15/05	
		754	1018	1220	
		913	1131	1344	**Averages**
Q:	Total sample time[1]:	72	72	72	**72**
Vm:	(Volume,dry gas meter,cf)	39.510	41.975	41.599	**41.028**
Y:	(Dry gas meter calibration factor)	0.997	0.997	0.997	**0.997**
Pbar:	(Barometric pressure,in.Hg)	24.50	24.50	24.50	**24.50**
ΔH:	(Avg. differential pressure,in.H2O)	1.04	1.14	1.11	**1.10**
Tm:	(Avg. meter temperature,°F)	41.4	48.6	48.9	**46.3**
Vm(std.):	(Std.* sample gas volume, DSCF)	34.059	35.682	35.339	**35.027**
Vlc:	(Liquid volume collected,ml)	279.8	232.3	323.3	**278.5**
Vw(std):	(Std.* water vapor volume,scf)	13.170	10.934	15.218	**13.107**
SVP:	(Saturated H_2O vapor pressure, in. Hg	6.92	6.95	6.97	**6.945**
Bwsat:	(Saturated Moisture @ Ts)	0.282	0.283	0.284	**0.283**
Bwsvol	(Volumemetric Moisture content)	0.279	0.235	0.301	**0.272**
Bws:	(SCF H_2O / SCF Total)[2]	0.279	0.235	0.284	**0.266**
$\%CO_2$:	(Carbon Dioxide,% by volume,dry)	0.50	0.50	0.50	**0.50**
$\%O_2$:	(Oxygen,% by volume,dry)	20.10	20.20	20.00	**20.10**
$\%N_2$:	(Nitrogen,% by volume,dry)	79.40	79.30	79.50	**79.40**
Md:	(Molecular Weight,lb/lb-mole,dry)	28.88	28.89	28.88	**28.88**
Mw:	(Molecular Weight,lb/lb-mole,wet)	25.84	26.33	25.79	**25.99**
D:	(Duct diameter, in.)	118.00	118.00	118.00	**118.00**
A:	(Duct area, sq. ft.)	75.95	75.95	75.95	**75.95**
Ts:	(Stack temperature, °F)	146.2	146.4	146.5	**146.4**
Dn:	(Nozzle diameter, in.)	0.380	0.380	0.380	***0.380***
An:	(Nozzle area, ft2)	7.88E-04	7.88E-04	7.88E-04	***7.88E-04***
Pg:	(Static pressure of flue gas, in. H_2O)	0.2	0.2	0.2	**0.20**
Ps:	(Absolute stack gas pressure, in. Hg)	24.51	24.51	24.51	**24.51**
Cp:	(Pitot tube coefficient)	0.84	0.84	0.84	**0.84**
ΔP:	(Average velocity head, in. H_2O)	0.0740	0.078	0.080	**0.077**
Vs:	(Gas velocity, ft./second)	19.1	19.4	19.9	**19.5**
ACFM:	(Actual cubic feet/min., wet)	87039	88406	90684	**88710**
SCFM	(Std. cubic ft/min., wet)	62149	63104	64720	**63324**
SDCFM:	(Std.* cubic feet/min., dry)	44776	48239	46305	**46440**
% Iso:	(Isokinetic variation)	101.9	99.1	102.3	***101.1***

1) 12.8F 90.5% 2) 6.94F 50.5% 3) 19.6F 138.3%

Antec
Environmental
Services

PO Box 2117
North Bend, Washington 98045
Office: (425) 888-2202
Fax: (425) 888-2321
Mobile: (425) 785-8261
E-mail: antec@earthlink.net

May 10, 2005

Nu-West Industries, Inc.
Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Attention: Mr. Monty Johnson

Dear Monty,

Enclosed are three copies of the *Granulator Compliance Report Tested April 15, 2005* and the invoice for the emission testing.

If you have questions or require additional information please give us a call at 425 888-2202.

Thanks for the Business,

Eric Olson
President
Antec Environmental Services

Rec. #
10621388

Invoice for Agrium/Nu-West Emission Testing

May 10, 2005

Conda Phosphate Operations - Agrium
Nu-West Industries, Inc.
Mr. Monty Johnson
Environmental Manager

AES Invoice No. AES5041

Antec Environmental Services

PO Box 2117 North Bend
North Bend, WA 98045
(425) 888-2202

Travel Date 4/4/05
Test Dates 4/5-15/2005

	Emission Testing				
Item	Granulator Engineering 4-5-05	Reference Method	Runs	Cost/Run	Cost/Item
1	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	2	$ 525.00	$ 1,050.00
				Section Sub -Total:	*$ 1,050.00*

	Emission Testing				
Item	Granulator Engineering 4-6-05	Reference Method	Runs	Cost/Run	Cost/Item
2	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

	Emission Testing				
Item	Granulator Engineering 4-7-05	Reference Method	Runs	Cost/Run	Cost/Item
3	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

	Emission Testing				
Item	Granulator Engineering 4-8-05	Reference Method	Time	Cost/hr	Cost/Item
4	Standby/Source Test Plan/Opacity PPA	N/A	8	$ 100.00	$ 800.00
				Section Sub -Total:	*$ 800.00*

	Emission Testing				
Item	Inlets to Granulator Engineering 4-9-05	Reference Method	Runs	Cost/Run	Cost/Item
	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
5	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

	Emission Testing				
Item	Granulator Engineering 4-11-05, 4-12-05	Reference Method	Time	Cost/hr	Cost/Item
6	Standby Offsite	N/A	16	$ 81.25	$ 1,300.00
				Section Sub -Total:	*$ 1,300.00*

	Emission Testing				
Item	Granulator Engineering 4-13-05	Reference Method	Runs	Cost/Run	Cost/Item
7	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	3	$ 525.00	$ 1,575.00
				Section Sub -Total:	*$ 1,575.00*

	Emission Testing				
Item	Granulator Engineering 4-14-05	Reference Method	Runs	Cost/Run	Cost/Item
8	Fluoride Emission Test, Inhouse Lab	EPA 1-4, 13B	2	$ 525.00	$ 1,050.00
				Section Sub -Total:	*$ 1,050.00*

	Emission Testing				
Item	Granulator Compliance 4-15-05	Reference Method	Runs	Cost/Run	Cost/Item
9	Fluoride Emission Test, Outside Lab	EPA 1-4, 13B	3	$ 650.00	$ 1,950.00
				Section Sub -Total:	*$ 1,950.00*

Item	Test Team Description	Rate	Units	Qty	Cost/Item
10	Compliance QA & Compliance Report Generation & Shipping	$ 500.00	1	1	$ 500.00
11	Travel Rate cost +5%, No labor charges	$ 660.64	N/A	N/A	$ 660.64
12	Per Diem 2 men 13 days	$ 105.00	2	13	$ 2,730.00
				Section Sub -Total:	*$ 3,890.64*

Payment Terms Net 30	Estimated Total	$ 16,340.64

2005 Phase SPA Slack
Tests Supplements
1 & 2

SMEAD®

No. 2-153L
UPC 10334

HASTINGS, MN

MINIMUM RECYCLED CONTENT

AGR_009894

AGR_009895

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

Agrium - Monty

Postage	$ 5.30
Certified Fee	2.30
Return Receipt Fee (Endorsement Required)	1.75
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 9.35

Postmark Here

Sent To Rick Elkins DEQ
Street, Apt. No. or PO Box No. 444 Hospital Way #300
City, State, ZIP+4 Pocatello ID 83201

PS Form 3800, January 2001 See Reverse for Instructions

7001 0320 0003 0613 6822

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Rick Elkins
DEQ
444 Hospital Way # 300
Pocatello ID 83201

COMPLETE THIS SECTION ON DELIVERY

A. Signature
x Cindy Steed ☑ Agent ☐ Addressee

B. Received by (Printed Name) Cindy Steed

C. Date of Delivery 4/29

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number
(Transfer from service label) 7001 0320 0003 0613 6822

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

Nu-west Industries, Inc.
d.b.a. Agrium Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Fluoride Emission Calculation (40 CFR 63.606(c)(1):

$$E = \left(\sum_{i=1}^{N} C_{Si} Q_{sdi} \right) / (PK)$$

Where:
E = emission rate of total fluorides, (lb/ton) of equivalent P2O5 feed
Csi = concentration of total fluorides from emission point "i". (mg/dscf)
Qsdi = volumetric flow rate of effluent gas from emission point "i". (dscf/hr)
N = number of emission points associated with the affected facility.
P = equivalent P2O5 feed rate. (ton/hr)
K = conversion factor. (453.600 mg/lb)

	Phos lbs F/hr	CVA lbs F/hr	Total lbs F/hr
Run 1	0.1326	0.0080	
Run 2	0.0669	0.0080	
Run 3	0.0650	0.0060	
Averages	0.0882	0.0073	0.0955
Average P2O5 feed T	66.1240		
Average Total Fluoride Emission rate		0.0014	lbs F/ton P2O5
% of Standard =		10.7%	

Run #1 Phos Acid 03/30/04

Csi =	0.588	mg F/	38.361	DSCF
Qsdi =	65400	DSCFM	4E+06	DSCFH
N =	1			
P =	717	gpm	1.81	SPG
	67.82	% solids	0.2503	gpm-tph
	31.22	% P2O5	P=	68.76 tons P2O5/hr
K = conversion factor			453600	mg/lb

E = 0.0019 lbs F/ton P2O5 Emission limit = 0.0135 lbs F/ton P2O5
% of Standard = 14.3

Run #2 Phos Acid 03/30/04

Csi =	0.301	mg F/	38.943	DSCF
Qsdi =	65700	DSCFM	4E+06	DSCFH
N =	1			
P =	697	gpm	1.81	SPG
	67.82	% solids	0.2503	gpm-tph
	31.22	% P2O5	P=	66.86 tons P2O5/hr
K = conversion factor			453600	mg/lb

E = 0.001 lbs F/ton P2O5 Emission limit = 0.0135 lbs F/ton P2O5
% of Standard = 7.4

Run #3 Phos Acid 03/30/04

Csi =	0.293	mg F/	38.972	DSCF
Qsdi =	65400	DSCFM	4E+06	DSCFH
N =	1			
P =	654	gpm	1.81	SPG
	67.82	% solids	0.2503	gpm-tph
	31.22	% P2O5	P=	62.73 tons P2O5/hr
K = conversion factor			453600	mg/lb

E = 0.001 lbs F/ton P2O5 Emission limit = 0.0135 lbs F/ton P2O5
% of Standard = 7.7

% of Std. Ave. = 9.8

CV Scrubber data 03/30/05	Run 1	Run 2	Run 3		
Fluoride Emissions rate lb/hr	0.008	0.008	0.006	Average	0.0073

Prepared by: Monty Johnson

Generic Any Materials
Default Subreport 1

			ITY+SOLIDS(PH		GRAVIMETRIC P2O5	SITY,SOLIDS,&:	
			Density	Solids	Grav P2O5	Density	Solids
			G / Ml	%	wt.%	G / Ml	%
Sample Date/Time	User Sample ID	Sample ID	(AVG)	(AVG)	(AVG)	(AVG)	(AVG)
3/30/2005 6:00	PHR24HR	200107194			31.22	1.81	67.82

Supplements 1&2

Agrium CPO/Nu-West Ind.
Annual Source Testing 2005

Supplemental Information for tests performed by:
TETCO
Test Dates: March 30, 2005 & March 31, 2005

Supplement to TETCO Source Test Report
Phosphoric Acid Process Line
Test date: March 30, 2005

Nu-west Industries, Inc.
d.b.a. Agrium Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Fluoride Emission Calculation (40 CFR 63.606(c)(1)):

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

Where:
E = emission rate of total fluorides. (lb/ton) of equivalent P2O5 feed
Csi = concentration of total fluorides from emission point "i". (mg/dscf)
Qsdi = volumetric flow rate of effluent gas from emission point "i". (dscf/hr)
N = number of emission points associated with the affected facility.
P = equivalent P2O5 feed rate. (ton/hr)
K = conversion factor. (453.600 mg/lb)

	Phos lbs F/hr	CVA lbs F/hr	Total lbs F/hr
Run 1	0.1326	0.0080	
Run 2	0.0669	0.0080	
Run 3	0.0650	0.0080	
Averages	0.0882	0.0073	0.0955
Average P2O5 feed T	66.1240		
Average Total Fluoride Emission rate		0.0014 lbs F/ton P2O5	
% of Standard =		10.7%	

Run #1 Phos Acid 03/30/04

Csi =	0.588 mg F/	38.361 DSCF	
Qsdi =	65400 DSCFM	4E+06 DSCFH	
N =	1		
P =	717 gpm	1.81 SPG	
	67.82 % solids	0.2503 gpm-tph	
	31.22 % P2O5	P=	68.78 tons P2O5/hr
K = conversion factor		453600 mg/lb	

E = 0.0019 lbs F/ton P2O5 Emission limit = 0.0135 lbs F/ton P2O5
% of Standard = 14.3

Run #2 Phos Acid 03/30/04

Csi =	0.301 mg F/	38.943 DSCF	
Qsdi =	65700 DSCFM	4E+06 DSCFH	
N =	1		
P =	697 gpm	1.81 SPG	
	67.82 % solids	0.2503 gpm-tph	
	31.22 % P2O5	P=	66.[illegible]
K = conversion factor		453600 mg/lb	

E = 0.001 lbs F/ton P2O5 Emission limit = 0.01[illegible]
% of Standard = 7

717 gpm * 1.81 SPG * (67.82/100) * 0.2503 * (31.22/100)
= 68.78 tons P_2O_5/hr.

Run #3 Phos Acid 03/30/04

Csi =	0.293 mg F/	38.972 DSCF	
Qsdi =	65400 DSCFM	4E+06 DSCFH	
N =	1		
P =	654 gpm	1.81 SPG	
	67.82 % solids	0.2503 gpm-tph	
	31.22 % P2O5	P=	62.[illegible]
K = conversion factor		453600 mg/lb	

E = 0.001 lbs F/ton P2O5 Emission limit = 0.01[illegible]
% of Standard = 7

% of Std. Ave. = 9

CV Scrubber data 03/30/05	Run 1	Run 2	Run 3		
Fluoride Emissions rate lb/hr	0.008	0.008	0.006	Average	0.0073

Prepared by: Monty Johnson

TABLE IV
COMPLETE RESULTS
AGRIUM
PHOSPHORIC ACID PLANT SCRUBBER EXHAUST

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.65	23.65	23.65	
ΔH	Orifice Pressure Drop	In. H_2O	1.679	1.755	1.743	
Y	Meter Calibration Y Factor	dimensionless	1.004	1.004	1.004	
Vm	Volume Gas Sampled–Meter Conditions	cf	49.170	50.256	49.981	
T_m	Avg Meter Temperature	°F	79.9	83.7	80.3	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.6460	0.6483	0.6457	
Wt_{wc}	Weight Water Collected	Grams	37.9	36.8	39.0	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2545	0.2545	0.2545	
CO_2	Volume % Carbon Dioxide	Percent	1.80	1.80	1.60	
O_2	Volume % Oxygen	Percent	20.20	20.40	20.80	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	78.00	77.80	77.60	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	38.361	38.943	38.972	
Vw	Volume Water Vapor	scf	1.787	1.735	1.839	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.045	0.043	0.045	
X_d	Fraction of Dry Gas	Fraction	0.955	0.957	0.955	
M_d	Molecular Wt. Dry Gas	lb/lbmol	29.10	29.10	29.09	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.60	28.63	28.59	
%I	Percent Isokinetic	Percent	99.0	100.0	100.7	AVG
T_s	Avg Stack Temperature	°F	82.8	83.5	83.3	83
A_s	Stack Cross Sectional Area	Sq. Ft.	35.785	35.785	35.785	
P_G	Stack Static Pressure	In. H_2O	-0.21	-0.21	-0.21	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.59	23.59	23.59	
P_s	Stack Pressure	In. Hg. Abs	23.575	23.575	23.575	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	6.54E+04	6.57E+04	6.54E+04	**6.55E+04**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	8.94E+04	8.97E+04	8.94E+04	**8.95E+04**
V_s	Velocity of Stack Gas	fpm	2.50E+03	2.51E+03	2.50E+03	**2.50E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.588	0.301	0.293	
C_F	Concentration of Fluoride	lb / dscf	3.38E-08	1.70E-08	1.66E-08	**2.25E-08**
C_F	Concentration of Fluoride	mg/dscf	1.533E-02	7.729E-03	7.518E-03	**1.019E-02**
ER_F	Emission Rate of Fluoride	lb / hr	0.133	0.067	0.065	**0.088**

TABLE V
COMPLETE RESULTS
AGRIUM CONDA PHOSPHATE
CONDITIONING VENT SCRUBBER

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/30/05	3/30/05	3/30/05	
Begin	Time Test Began		13:32	15:16	16:45	
End	Time Test Ended		14:34	16:19	17:47	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
ΔH	Orifice Pressure Drop	In. H_2O	1.501	1.618	1.676	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled–Meter Conditions	cf	49.460	51.812	52.519	
T_m	Avg Meter Temperature	°F	71.0	72.8	80.8	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.8337	0.8645	0.8806	
Wt_{wc}	Weight Water Collected	Grams	20.5	16.9	22.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.2220	0.2220	0.2220	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	39.881	41.651	41.603	
Vw	Volume Water Vapor	scf	0.967	0.797	1.042	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.023	0.019	0.022	
X_d	Fraction of Dry Gas	Fraction	0.977	0.981	0.978	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.59	28.63	28.59	
%I	Percent Isokinetic	Percent	100.0	100.3	98.7	AVG
T_s	Avg Stack Temperature	°F	60.9	60.5	60.6	61
A_s	Stack Cross Sectional Area	Sq. Ft.	3.142	3.142	3.142	
P_G	Stack Static Pressure	In. H_2O	-0.49	-0.49	-0.49	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	23.77	23.77	23.77	
P_s	Stack Pressure	In. Hg. Abs	23.734	23.734	23.734	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	7.77E+03	8.09E+03	8.21E+03	**8.02E+03**
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	9.89E+03	1.02E+04	1.04E+04	**1.02E+04**
V_s	Velocity of Stack Gas	fpm	3.15E+03	3.26E+03	3.32E+03	**3.24E+03**
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	0.314	0.312	0.227	
C_F	Concentration of Fluoride	lb / dscf	1.74E-08	1.65E-08	1.20E-08	**1.53E-08**
C_F	Concentration of Fluoride	mg/dscf	7.873E-03	7.491E-03	5.456E-03	**6.940E-03**
ER_F	Emission Rate of Fluoride	lb / hr	0.008	0.008	0.006	**0.007**

Generic Any Materials
Default Subreport 1

			ITY SOLIDS(PH		GRAVIMETRIC P2O5	SITY SOLIDS &	
			Density	Solids	Grav P2O5	Density	Solids
			G / Ml	%	wt.%	G / Ml	%
Sample Date/Time	User Sample ID	Sample ID	(AVG)	(AVG)	(AVG)	(AVG)	(AVG)
3/30/2005 6:00	PHR24HR	200107194			31.22	1.81	67.82

PHOSPHORIC ACID LOGSHEET **REACTOR**

30-Mar-05 Data shows average for each hour

Wednesday

TAG	ROCK FEED						SULFURIC FEED					RECYCLE ACID		TEMPERATURE			C 5				C 7
	Phos Tk level	RATE				Actual	Request	RATE				Flow gpm		Reactor	FC Temp Drop		SLURRY	M.L.	%	%	%
TIME	%	tpd P2O5	lb/min	SG	gpm	ratio	ratio	lb/min	C2 gpm	C1 gpm	C6 gpm	C2	C1	°F	#1	#2	SG	SG	Solids	Sulfate	Level
0:00	23.2	1200	6039	1.839	565	0.80833	0.806	4875	238	80	0	506	732	180	4.6	5.9	1.472	1.296	27.1	1.9	61
1:00	23.2	1200	6047	1.841	564	0.81676	0.809	4948	242	81	0	467	702	180	5.1	6.1	1.467	1.294	26.6	1.8	74
2:00	23.8	1051	5308	1.845	494	0.83333	0.813	4398	215	72	0	289	436	180	5.3	5.8	1.460	1.288	26.5	1.8	86
3:00	24.9	954	4810	1.845	447	0.83384	0.816	4006	196	66	0	233	348	180	4.8	5.2	1.470	1.290	27.7	1.8	64
4:00	26.1	950	4788	1.847	444	0.83319	0.820	3993	195	66	0	239	351	180	4.5	5.3	1.472	1.290	27.8	1.8	70
5:00	27.1	930	4659	1.848	432	0.83173	0.824	3880	189	63	0	329	489	180	3.7	5.1	1.478	1.292	28.4	1.9	64
6:00	27.3	1250	6298	1.850	582	0.83123	0.823	5241	256	86	0	329	555	180	5.2	6.5	1.478	1.294	28.2	2.1	80
7:00	27.1	1164	5884	1.849	545	0.82365	0.821	4838	236	78	0	298	499	180	5.3	6.3	1.472	1.285	28.4	2.3	72
8:00	26.7	1450	7305	1.850	675	0.82102	0.818	6002	293	98	0	322	548	179	7.1	7.1	1.470	1.282	28.6	2.4	76
9:00	26.5	1492	7508	1.848	695	0.81891	0.816	6140	300	101	0	307	517	179	7.1	6.8	1.482	1.289	29.2	2.2	77
10:00	26.4	1430	7225	1.848	669	0.8252	0.815	5925	291	98	0	276	465	179	6.3	6.4	1.486	1.292	29.5	2.1	64
11:00	26.6	1221	6148	1.846	571	0.81829	0.815	5047	247	83	0	264	446	179	4.5	5.5	1.486	1.292	29.5	2.1	67
12:00	26.6	1315	6621	1.846	615	0.82031	0.815	5444	266	89	0	275	457	179	5.3	6.0	1.486	1.290	29.7	1.9	77
13:00	26.3	1476	7426	1.846	690	0.81515	0.815	6099	297	98	0	305	495	180	6.2	6.5	1.473	1.283	28.8	1.9	260
14:00	26.0	1527	7698	1.843	717	0.8225	0.817	6321	309	104	0	301	478	180	6.9	6.5	1.470	1.282	28.6	1.9	79
15:00	25.9	1481	7463	1.841	697	0.82501	0.819	6132	301	101	0	298	464	180	6.4	6.2	1.470	1.287	27.9	1.9	82
16:00	26.0	1412	7115	1.839	665	0.83103	0.822	5912	289	97	0	290	443	180	5.8	5.9	1.470	1.285	28.3	1.7	85
17:00	26.1	1387	6991	1.840	654	0.83426	0.824	5819	284	96	0	300	434	180	5.9	6.0	1.469	1.286	27.9	1.7	85
18:00	26.2	1304	6576	1.839	616	0.83763	0.824	5477	269	90	0	311	440	180	5.5	5.7	1.466	1.286	27.5	1.9	256
19:00	26.3	1300	6552	1.839	613	0.82679	0.823	5425	266	89	0	323	442	180	5.3	5.7	1.460	1.288	26.5	2.1	78
20:00	26.5	1057	5326	1.839	498	0.83224	0.821	4414	216	73	0	351	518	180	4.4	5.5	1.454	1.286	25.9	2.1	88
21:00	26.4	1157	5826	1.839	545	0.82805	0.820	4825	236	79	0	376	601	180	4.8	5.9	1.454	1.286	25.9	1.9	95
22:00	26.2	1200	6045	1.839	566	0.82847	0.820	5007	244	82	0	344	550	180	5.5	6.3	1.444	1.284	24.8	1.9	96
23:00	26.0	1200	6046	1.837	568	0.82681	0.820	5008	244	82	0	332	517	180	5.5	6.3	1.440	1.280	24.8	2.1	91
0:00																					
Average	26	1254	6321	1.843	589	0.82599	0.818	5216	255	86	0	319	497	180	5.4	6.0	1.469	1.288	27.7	2.0	93
High	27	1600	8072	1.860	744	0.99555	0.825	6460	315	109	0	698	887	181	7.4	7.6	1.486	1.302	29.7	2.4	1149
Low	23	800	4003	1.827	369	0.68812	0.805	3298	162	46	0	156	232	179	2.4	4.6	1.440	1.280	24.8	1.7	35

09FI0110/AI1/PV.CV

Average #10 well flow 1157.103 gpm

Average #1 well flow 33.16111 gpm

Total Raw Water flow 1190.265 gpm

09FQI0101/CALC1/OUT1.CV

5E+07

5E+07

Total #1 well flow 47752 gallons

AGR_009903

Phos Scrubber Flow and Pressure Drop Data

15min		GPM	Pressure Drop in. H20
3/30/2005	30-Mar-05 00:00:00	1158	9.30
3/30/2005	30-Mar-05 00:15:00	1156	9.33
	30-Mar-05 00:30:00	1152	9.30
	30-Mar-05 00:45:00	1153	9.30
	30-Mar-05 01:00:00	1156	9.31
	30-Mar-05 01:15:00	1156	9.29
	30-Mar-05 01:30:00	1156	9.33
	30-Mar-05 01:45:00	1157	9.34
	30-Mar-05 02:00:00	1157	9.34
	30-Mar-05 02:15:00	1155	9.32
	30-Mar-05 02:30:00	1156	9.33
	30-Mar-05 02:45:00	1154	9.33
	30-Mar-05 03:00:00	1160	9.30
	30-Mar-05 03:15:00	1159	9.34
	30-Mar-05 03:30:00	1155	9.40
	30-Mar-05 03:45:00	1152	9.36
	30-Mar-05 04:00:00	1153	9.37
	30-Mar-05 04:15:00	1159	9.41
	30-Mar-05 04:30:00	1158	9.42
	30-Mar-05 04:45:00	1157	9.40
	30-Mar-05 05:00:00	1160	9.40
	30-Mar-05 05:15:00	1161	9.42
	30-Mar-05 05:30:00	1158	9.37
	30-Mar-05 05:45:00	1151	9.39
	30-Mar-05 06:00:00	1156	9.43
	30-Mar-05 06:15:00	1160	9.43
	30-Mar-05 06:30:00	1155	9.36
	30-Mar-05 06:45:00	1157	9.32
	30-Mar-05 07:00:00	1159	9.33
	30-Mar-05 07:15:00	1142	9.31
	30-Mar-05 07:30:00	1169	9.30
	30-Mar-05 07:45:00	1162	9.33
	30-Mar-05 08:00:00	1152	9.34
	30-Mar-05 08:15:00	1161	9.35
	30-Mar-05 08:30:00	1163	9.34
	30-Mar-05 08:45:00	1161	9.38
	30-Mar-05 09:00:00	1162	9.34
	30-Mar-05 09:15:00	1160	9.32
	30-Mar-05 09:30:00	1175	9.33
	30-Mar-05 09:45:00	1204	9.30
	30-Mar-05 10:00:00	1205	9.31
	30-Mar-05 10:15:00	1198	9.26
	30-Mar-05 10:30:00	1201	9.25
	30-Mar-05 10:45:00	1199	9.27
	30-Mar-05 11:00:00	1199	9.31
	30-Mar-05 11:15:00	1208	9.34

30-Mar-05 11:30:00	1208		9.35	
30-Mar-05 11:45:00	1207		9.36	
30-Mar-05 12:00:00	1204		9.35	
30-Mar-05 12:15:00	1201		9.40	
30-Mar-05 12:30:00	1207		9.39	
30-Mar-05 12:45:00	1207		9.35	
30-Mar-05 13:00:00	1205		9.35	
30-Mar-05 13:15:00	1203		9.33	
30-Mar-05 13:30:00	1199		9.26	
30-Mar-05 13:45:00	1198		9.19	
30-Mar-05 14:00:00	1200		9.23	
30-Mar-05 14:15:00	1202		9.25	
30-Mar-05 14:30:00	1201	1200	9.27	9.24
30-Mar-05 14:45:00	1200		9.27	
30-Mar-05 15:00:00	1200		9.25	
30-Mar-05 15:15:00	1200		9.26	
30-Mar-05 15:30:00	1202		9.25	
30-Mar-05 15:45:00	1201		9.27	
30-Mar-05 16:00:00	1201		9.29	
30-Mar-05 16:15:00	1201	1201	9.30	9.27
30-Mar-05 16:30:00	1200		9.28	
30-Mar-05 16:45:00	1197		9.25	
30-Mar-05 17:00:00	1197		9.22	
30-Mar-05 17:15:00	1201		9.18	
30-Mar-05 17:30:00	1204		9.27	
30-Mar-05 17:45:00	1204	1201	9.30	9.24
30-Mar-05 18:00:00	1203		9.29	
30-Mar-05 18:15:00	1202	**Average**	9.30	**Average**
30-Mar-05 18:30:00	1201	**1201**	9.31	**9.25**
30-Mar-05 18:45:00	1200		9.31	
30-Mar-05 19:00:00	1201		9.29	
30-Mar-05 19:15:00	1202		9.30	
30-Mar-05 19:30:00	1202		9.34	
30-Mar-05 19:45:00	1202		9.35	
30-Mar-05 20:00:00	1202		9.34	
30-Mar-05 20:15:00	1199		9.36	
30-Mar-05 20:30:00	1208		9.38	
30-Mar-05 20:45:00	1209		9.41	
30-Mar-05 21:00:00	1207		9.43	
30-Mar-05 21:15:00	1208		9.45	
30-Mar-05 21:30:00	1205		9.46	
30-Mar-05 21:45:00	1206		9.46	
30-Mar-05 22:00:00	1209		9.44	
30-Mar-05 22:15:00	1204		9.42	
30-Mar-05 22:30:00	1201		9.38	
30-Mar-05 22:45:00	1203		9.37	
30-Mar-05 23:00:00	1203		9.41	
30-Mar-05 23:15:00	1196		9.39	
30-Mar-05 23:30:00	1200		9.34	
30-Mar-05 23:45:00	1197		9.29	

Conditioning Vent Scrubber Flow and Pressure Drop

		36FI8108/AI1/PV.CV VENT SCRB RECIRC FLOW GPM	36PDI1108/AI1/PV.CV VENT SCRB DIFF PRES inH2O (68°F)
15 min			
3/30/2005	30-Mar-05 00:00:00	216	2.2
3/31/2005	30-Mar-05 00:15:00	216	2.2
	30-Mar-05 00:30:00	216	2.2
	30-Mar-05 00:45:00	216	2.2
	30-Mar-05 01:00:00	216	2.2
	30-Mar-05 01:15:00	216	2.2
	30-Mar-05 01:30:00	216	2.2
	30-Mar-05 01:45:00	216	2.2
	30-Mar-05 02:00:00	216	2.2
	30-Mar-05 02:15:00	216	2.2
	30-Mar-05 02:30:00	216	2.2
	30-Mar-05 02:45:00	216	2.2
	30-Mar-05 03:00:00	216	2.2
	30-Mar-05 03:15:00	216	2.2
	30-Mar-05 03:30:00	216	2.2
	30-Mar-05 03:45:00	216	2.2
	30-Mar-05 04:00:00	216	2.3
	30-Mar-05 04:15:00	216	2.3
	30-Mar-05 04:30:00	216	2.3
	30-Mar-05 04:45:00	216	2.3
	30-Mar-05 05:00:00	216	2.3
	30-Mar-05 05:15:00	216	2.3
	30-Mar-05 05:30:00	216	2.3
	30-Mar-05 05:45:00	216	2.3
	30-Mar-05 06:00:00	216	2.3
	30-Mar-05 06:15:00	216	2.3
	30-Mar-05 06:30:00	216	2.3
	30-Mar-05 06:45:00	216	2.3
	30-Mar-05 07:00:00	216	2.3
	30-Mar-05 07:15:00	216	2.3
	30-Mar-05 07:30:00	216	2.3
	30-Mar-05 07:45:00	216	2.3
	30-Mar-05 08:00:00	216	2.3
	30-Mar-05 08:15:00	216	2.3
	30-Mar-05 08:30:00	216	2.3
	30-Mar-05 08:45:00	216	2.3
	30-Mar-05 09:00:00	216	2.3
	30-Mar-05 09:15:00	216	2.3
	30-Mar-05 09:30:00	216	2.3
	30-Mar-05 09:45:00	216	2.3
	30-Mar-05 10:00:00	216	2.3
	30-Mar-05 10:15:00	216	2.3
	30-Mar-05 10:30:00	216	2.3
	30-Mar-05 10:45:00	216	2.3

30-Mar-05 11:00:00	216			2.3		
30-Mar-05 11:15:00	216			2.3		
30-Mar-05 11:30:00	216			2.3		
30-Mar-05 11:45:00	216			2.3		
30-Mar-05 12:00:00	216			2.3		
30-Mar-05 12:15:00	216			2.3		
30-Mar-05 12:30:00	216			2.3		
30-Mar-05 12:45:00	216			2.3		
30-Mar-05 13:00:00	216			2.3		
30-Mar-05 13:15:00	216			2.3		
30-Mar-05 13:30:00	216			2.3		
30-Mar-05 13:45:00	216			2.3		
30-Mar-05 14:00:00	216			2.3		
30-Mar-05 14:15:00	216			2.3		
30-Mar-05 14:30:00	216	216		2.3	2.3	
30-Mar-05 14:45:00	216			2.3		
30-Mar-05 15:00:00	216			2.3		
30-Mar-05 15:15:00	216			2.3		
30-Mar-05 15:30:00	216			2.3		
30-Mar-05 15:45:00	216			2.3		
30-Mar-05 16:00:00	216			2.3		
30-Mar-05 16:15:00	216	216		2.3	2.3	
30-Mar-05 16:30:00	216			2.3		
30-Mar-05 16:45:00	216			2.3		
30-Mar-05 17:00:00	216			2.3		
30-Mar-05 17:15:00	216			2.3		
30-Mar-05 17:30:00	216			2.3		
30-Mar-05 17:45:00	216	216		2.3	2.3	
30-Mar-05 18:00:00	216			2.3		
30-Mar-05 18:15:00	216	Average =	216	2.3	Average =	2.3
30-Mar-05 18:30:00	216			2.3		
30-Mar-05 18:45:00	216			2.3		
30-Mar-05 19:00:00	216			2.3		
30-Mar-05 19:15:00	216			2.3		
30-Mar-05 19:30:00	216			2.3		
30-Mar-05 19:45:00	216			2.3		
30-Mar-05 20:00:00	216			2.3		
30-Mar-05 20:15:00	216			2.3		
30-Mar-05 20:30:00	216			2.3		
30-Mar-05 20:45:00	216			2.3		
30-Mar-05 21:00:00	216			2.3		
30-Mar-05 21:15:00	216			2.3		
30-Mar-05 21:30:00	216			2.2		
30-Mar-05 21:45:00	216			2.2		
30-Mar-05 22:00:00	216			2.2		
30-Mar-05 22:15:00	216			2.2		
30-Mar-05 22:30:00	216			2.2		
30-Mar-05 22:45:00	216			2.2		
30-Mar-05 23:00:00	216			2.2		
30-Mar-05 23:15:00	216			2.2		
30-Mar-05 23:30:00	216			2.2		
30-Mar-05 23:45:00	216			2.2		

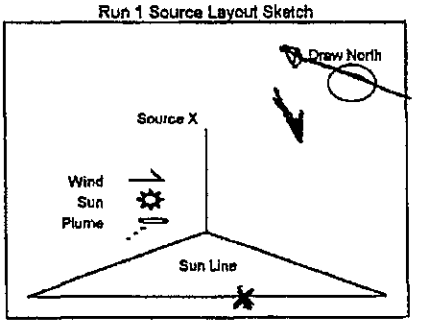
EPA Method 9 Opacity

Client: Agrium
Location: Soda Springs
Site: PPA
Date: 4-14-05

Process Equipment: Conditioning Vent scrubber
Control Equipment: Scrubber
Facility Type: Phos Acid Plant
Observed by: [illegible]

Observation Conditions	Run 1	Run 2	Run 3
Sky Condition:	clear/Few clouds	Clear / Few clouds	Clear/Few clouds
Background/Color:	Blue	Blue	Blue
Wind Speed:	10-15	10-15	10-15
Wind Direction:	~~NW~~ SE	~~N~~ SE	SE
Ambient Temp:	41°	41°	41°
Relative Humidity:	46%	46%	46%
Height of Discharge Point:	180	180	180
Height of Observation Point:	20 ft	20 ft	20 ft
Distance & Direction from Plume:	300 yds SW	300 yds SW	300 yds SW
Plume Color:	None	None	None
Plume Type(attached/detached):	NA	NA	NA
Viewing Angle:	25°	25°	25°

Run 1 Source Layout Sketch



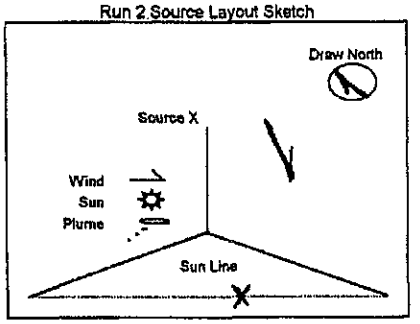
Run 1

Start 1417 Stop 1427

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 2 Source Layout Sketch



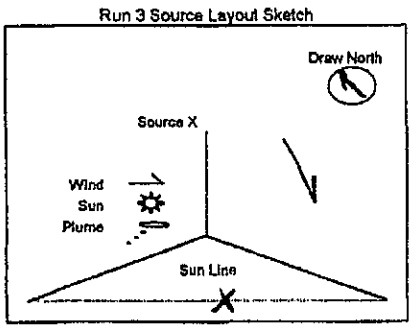
Run 2

Start 1432 Stop 1442

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 3 Source Layout Sketch



Run 3

Start 1447 Stop 1457

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

NORTHWEST OPACITY CERTIFICATION
CERTIFICATE OF COMPLETION
PLUME EVALUATION TRAINING

BRIAN JOHNSON

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO NW-F04-040

EXPIRATION DATE 4/25/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

NORTHWEST OPACITY CERTIFICATION
CERTIFICATE OF COMPLETION
PLUME EVALUATION TRAINING

ERIC E OLSON

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO WA-S98-16

EXPIRATION DATE 4/25/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
Visible Emission Observation Form

Source Name	Nu-West Agrium CPO
Address	3010 Conda Rd
City	Soda Springs
State	ID
Zip	83276
Phone	(208) 547-4381
Source ID Number	
Process Equipment	Phos Acid
Operating Mode	
Control Equipment	Scrubber
Operating Mode	
Describe Emission Point	Start Phos Acid STACK Stop Phos Acid STACK
Height Above Ground Level	Start 60' Stop 60'
Height Relative to Observer	Start 60' Stop 60'
Distance From Observer	Start 2H Stop 2H
Direction from Observer	Start East Stop East
Describe Emissions	Start Contin. Stop Contin.
Emission Color	Start Wht Stop Wht
Plume Type Continuous / Fugitive / Intermittent	
Water Droplets Present	No / Yes
If Water Droplet Plume	Attached / Detached
Point in the Plume at which Opacity Was Determined	Start After Steam Stop After Steam
Describe Background	Start Blue Scattered Stop Blue Scattered
Background Color	Start Blue Stop Blue
Sky Conditions	Start Scattered Stop Scattered
Wind Speed	Start Nil Stop Nil
Wind Direction	Start N/A Stop N/A
Ambient Temp	Start Stop
Wet Bulb Temp.	
PH. Percent	

Observation Date: 4/6/05 Start Time: 16:28 Stop Time: 17:28

Min-Sec	0	15	30	45	Min-Sec	0	15	30	45
1	0	5	0	0	31	5	0	0	5
2	0	0	0	0	32	0	0	5	0
3	0	5	5	0	33	0	0	0	5
4	0	0	0	0	34	0	5	5	0
5	0	5	0	0	35	0	0	0	0
6	0	0	5	0	36	0	5	0	0
7	0	0	0	0	37	0	0	0	5
8	0	5	0	0	38	5	0	0	0
9	0	0	0	5	39	0	0	0	0
10	5	0	0	0	40	5	0	0	0
11	0	0	5	0	41	0	0	0	0
12	0	5	0	0	42	5	0	0	5
13	0	5	0	0	43	0	0	0	0
14	0	0	0	5	44	0	0	0	0
15	0	0	5	0	45	5	0	0	5
16	0	5	0	5	46	0	5	0	0
17	5	5	0	0	47	0	0	0	0
18	0	0	0	5	48	0	5	0	0
19	0	0	0	0	49	0	0	5	0
20	0	5	0	0	50	0	0	0	0
21	0	0	5	0	51	0	5	5	0
22	0	0	0	5	52	0	5	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	5	5	54	5	0	0	5
25	0	5	0	0	55	0	0	0	0
26	0	0	0	5	56	0	5	0	0
27	0	5	0	0	57	5	0	0	0
28	5	0	0	0	58	0	0	0	0
29	5	5	0	0	59	0	0	0	0
30	0	0	5	0	60	0	0	0	5

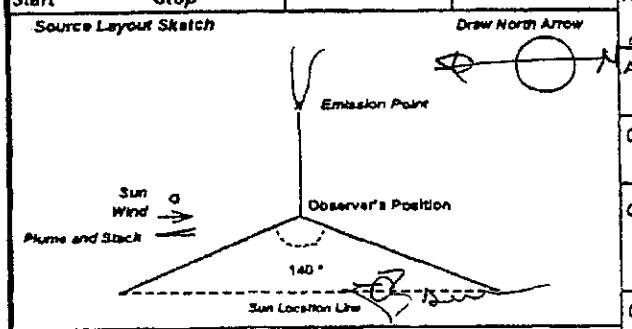
Number of Readings Above: 20% was 0

Number of Minutes Above: 20% was 0

Average of Readings Above: 20% was 0

Range of Readings Above: % was to

Source Layout Sketch



Observer's Name: Clay Gentry

Observer's Signature: Clay Gentry Date: 4/6/05

Certified By: ETA Date: 10/7/04

Verified By: Date:

Comments

I Have Received a Copy of These Opacity Observations

Signature

Title Date

White Copy: DEQ File Yellow Copy: AIRS Copy Pink Copy: Facility Copy 09/21/2000

Nu-west Industries, Inc.
d.b.a. Agrium Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Fluoride Emission Calculation (40 CFR 63.606(c)(1):

$$E = \left(\sum_{i=1}^{N} C_{Si} Q_{sdi} \right) / (PK)$$

Where:
E = emission rate of total fluorides, (lb/ton) of equivalent P_2O_5 feed
C_{si} = concentration of total fluorides from emission point "i", (mg/dscf)
Q_{sdi} = volumetric flow rate of effluent gas from emission point "i", (dscf/hr)
N = number of emission points associated with the affected facility.
P = equivalent P_2O_5 feed rate, (ton/hr)
K = conversion factor, (453,600 mg/lb)

Run #1 **SPA 3/31/05**

Csi =	1.83 mg F/	42.647 DSCF			
Q_{sdi} =	9860 DSCFM		591600 DSCFH		
N =	1				
P =	121 gpm	1.798 SPG			
	59.06 % P2O5	0.2503 gpm-tph		P=	32.13 tons P2O5/hr
K = conversion factor		453600 mg/lb			
E =	0.001742 lbs F/ton P2O5		Emission limit =		0.0087 lbs F/ton P2O5
			% of Standard =		**20.0**

Run #2 **SPA 3/31/05**

Csi =	5.14 mg F/	43.095 DSCF			
Q_{sdi} =	9920 DSCFM		595200 DSCFH		
N =	1				
P =	121 gpm	1.798 SPG			
	59.06 % P2O5	0.2503 gpm-tph		P=	32.16 tons P2O5/hr
K = conversion factor		453600 mg/lb			
E =	0.004866 lbs F/ton P2O5		Emission limit =		0.0087 lbs F/ton P2O5
			% of Standard =		**55.9**

Run #3 **SPA 3/31/05**

Csi =	7.86 mg F/	42.836 DSCF			
Q_{sdi} =	9670 DSCFM		580200 DSCFH		
N =	1				
P =	121 gpm	1.798 SPG			
	59.06 % P2O5	0.2503 gpm-tph		P=	32.16 tons P2O5/hr
K = conversion factor		453600 mg/lb			
E =	0.007298 lbs F/ton P2O5		Emission limit =		0.0087 lbs F/ton P2O5
			% of Standard =		**83.9**
			% of Std. Ave. =		**53.3**

Prepared by: Monty Johnson

TABLE VI
COMPLETE RESULTS
AGRIUM
SUPERPHOSPHORIC ACID PLANT SCRUBBER (SPA)

Symbol	Description	Dimensions	Run #1	Run #2	Run #3	
Date			3/31/05	3/31/05	3/31/05	
Begin	Time Test Began		8:43	10:20	11:48	
End	Time Test Ended		9:47	11:24	12:51	
Pb_m	Meter Barometric Pressure	In. Hg. Abs	24.28	24.28	24.28	
ΔH	Orifice Pressure Drop	In. H_2O	1.725	1.783	1.725	
Y	Meter Calibration Y Factor	dimensionless	1.016	1.016	1.016	
Vm	Volume Gas Sampled--Meter Conditions	cf	51.681	52.998	53.124	
T_m	Avg Meter Temperature	°F	70.3	78.3	82.7	
$\sqrt{\Delta P}$	Sq Root Velocity Head	Root In. H_2O	0.4644	0.4705	0.4604	
Wt_{wc}	Weight Water Collected	Grams	13.3	18.6	21.1	
T_t	Duration of Test	Minutes	60	60	60	
C_p	Pitot Tube Coefficient	Dimensionless	0.84	0.84	0.84	
D_n	Nozzle Diameter	Inches	0.3080	0.3080	0.3080	
CO_2	Volume % Carbon Dioxide	Percent	0.00	0.00	0.00	
O_2	Volume % Oxygen	Percent	20.90	20.90	20.90	
N_2 & CO	Volume % Nitrogen and Carbon Monoxide	Percent	79.10	79.10	79.10	
Vm_{std}	Volume Gas Sampled (Standard)	dscf	42.647	43.095	42.836	
Vw	Volume Water Vapor	scf	0.627	0.877	0.995	
Bw_s	Fraction H_2O in Stack Gas	Fraction	0.014	0.020	0.023	
X_d	Fraction of Dry Gas	Fraction	0.986	0.980	0.977	
M_d	Molecular Wt. Dry Gas	lb/lbmol	28.84	28.84	28.84	
M_s	Molecular Wt. Stack Gas	lb/lbmol	28.68	28.62	28.59	
%I	Percent Isokinetic	Percent	98.5	98.9	100.9	AVG
T_s	Avg Stack Temperature	°F	65.8	68.5	70.2	68
A_s	Stack Cross Sectional Area	Sq. Ft.	7.069	7.069	7.069	
P_G	Stack Static Pressure	In. H_2O	-0.09	-0.09	-0.09	
Pb_p	Sample Port Barometric Pressure	In. Hg. Abs	24.24	24.24	24.24	
P_s	Stack Pressure	In. Hg. Abs	24.233	24.233	24.233	
Q_s	Stack Gas Volumetric Flow Rate (Std)	dscfm	9.86E+03	9.92E+03	9.67E+03	9.82E+03
Q_a	Stack Gas Volumetric Flow Rate (Actual)	cfm	1.23E+04	1.25E+04	1.23E+04	1.24E+04
V_s	Velocity of Stack Gas	fpm	1.74E+03	1.77E+03	1.74E+03	1.75E+03
$M_{F\ Gross}$	Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
$M_{F\ Blank}$	Mass of Fluoride in Sample Blank	mg	0.00	0.00	0.00	
$M_{F\ Net}$	Net Mass of Fluoride in Sample	mg	1.83	5.14	7.86	
C_F	Concentration of Fluoride	lb / dscf	9.460E-08	2.629E-07	4.045E-07	2.540E-07
C_F	Concentration of Fluoride	mg/dscf	4.291E-02	1.193E-01	1.835E-01	1.152E-01
ER_F	Emission Rate of Fluoride	lb / hr	0.056	0.157	0.235	0.149

		Total Water Flow to SPA Scrubber		Pressure Drop Across Scrubber	
		GPM		in. H2O	
15min					
3/31/2005	31-Mar-05 00:00:00	581		7.0	
4/1/2005	31-Mar-05 00:15:00	582		7.0	
	31-Mar-05 00:30:00	581		7.0	
	31-Mar-05 00:45:00	581		7.0	
	31-Mar-05 01:00:00	579		7.0	
	31-Mar-05 01:15:00	579		7.0	
	31-Mar-05 01:30:00	579		7.0	
	31-Mar-05 01:45:00	578		7.0	
	31-Mar-05 02:00:00	577		7.0	
	31-Mar-05 02:15:00	578		7.0	
	31-Mar-05 02:30:00	577		7.0	
	31-Mar-05 02:45:00	578		7.0	
	31-Mar-05 03:00:00	578		7.0	
	31-Mar-05 03:15:00	578		7.0	
	31-Mar-05 03:30:00	578		7.0	
	31-Mar-05 03:45:00	579		7.0	
	31-Mar-05 04:00:00	578		7.0	
	31-Mar-05 04:15:00	571		7.0	
	31-Mar-05 04:30:00	580		7.0	
	31-Mar-05 04:45:00	580		7.0	
	31-Mar-05 05:00:00	580		7.0	
	31-Mar-05 05:15:00	580		7.0	
	31-Mar-05 05:30:00	580		7.0	
	31-Mar-05 05:45:00	580		7.0	
	31-Mar-05 06:00:00	580		7.0	
	31-Mar-05 06:15:00	580		7.0	
	31-Mar-05 06:30:00	579		7.0	
	31-Mar-05 06:45:00	579		7.0	
	31-Mar-05 07:00:00	578		7.0	
	31-Mar-05 07:15:00	569		7.0	
	31-Mar-05 07:30:00	570		7.0	
	31-Mar-05 07:45:00	572		7.0	
	31-Mar-05 08:00:00	575		7.0	
	31-Mar-05 08:15:00	578		7.0	
	31-Mar-05 08:30:00	574		7.0	
	31-Mar-05 08:45:00	574		7.0	
	31-Mar-05 09:00:00	573		7.0	
	31-Mar-05 09:15:00	579		7.0	
	31-Mar-05 09:30:00	579		7.0	
	31-Mar-05 09:45:00	577	576	7.0	7.0
	31-Mar-05 10:00:00	580		7.0	
	31-Mar-05 10:15:00	582		7.0	
	31-Mar-05 10:30:00	580		7.0	
	31-Mar-05 10:45:00	573		7.0	
	31-Mar-05 11:00:00	567		7.0	
	31-Mar-05 11:15:00	565		7.0	

31-Mar-05 11:30:00	564	570	7.0	7.0
31-Mar-05 11:45:00	557		6.9	
31-Mar-05 12:00:00	556		6.9	
31-Mar-05 12:15:00	557		6.9	
31-Mar-05 12:30:00	561		7.0	
31-Mar-05 12:45:00	562		7.0	
31-Mar-05 13:00:00	561	559	7.0	6.9
31-Mar-05 13:15:00	561		7.0	
31-Mar-05 13:30:00	571	Average	7.0	Average
31-Mar-05 13:45:00	577	568	7.0	7.0
31-Mar-05 14:00:00	572		7.0	
31-Mar-05 14:15:00	572		7.0	
31-Mar-05 14:30:00	569		6.9	
31-Mar-05 14:45:00	564		6.9	
31-Mar-05 15:00:00	561		6.9	
31-Mar-05 15:15:00	560		6.9	
31-Mar-05 15:30:00	563		7.0	
31-Mar-05 15:45:00	562		7.0	
31-Mar-05 16:00:00	566		7.0	
31-Mar-05 16:15:00	569		7.0	
31-Mar-05 16:30:00	580		7.0	
31-Mar-05 16:45:00	582		7.0	
31-Mar-05 17:00:00	584		7.0	
31-Mar-05 17:15:00	579		7.0	
31-Mar-05 17:30:00	582		7.0	
31-Mar-05 17:45:00	581		7.0	
31-Mar-05 18:00:00	581		7.0	
31-Mar-05 18:15:00	583		7.0	
31-Mar-05 18:30:00	582		7.0	
31-Mar-05 18:45:00	582		7.0	
31-Mar-05 19:00:00	583		7.0	
31-Mar-05 19:15:00	583		7.1	
31-Mar-05 19:30:00	582		7.0	
31-Mar-05 19:45:00	582		7.0	
31-Mar-05 20:00:00	582		7.0	
31-Mar-05 20:15:00	575		7.0	
31-Mar-05 20:30:00	577		7.0	
31-Mar-05 20:45:00	580		7.0	
31-Mar-05 21:00:00	568		7.0	
31-Mar-05 21:15:00	554		6.9	
31-Mar-05 21:30:00	557		7.0	
31-Mar-05 21:45:00	558		7.0	
31-Mar-05 22:00:00	574		7.0	
31-Mar-05 22:15:00	583		7.0	
31-Mar-05 22:30:00	585		7.0	
31-Mar-05 22:45:00	583		7.1	
31-Mar-05 23:00:00	584		7.0	
31-Mar-05 23:15:00	583		7.0	
31-Mar-05 23:30:00	583		7.0	
31-Mar-05 23:45:00	584		7.1	

Generic Any Materials
Default Subreport 1

			GRAVIMETRIC H2O	SPECIFIC GRAVITY	VOL % SLUDGE OR
			GRAV H2O	SPECIFIC GRAVITY	% VOL SLUDGE
			wt.%	none	%
Sample Date/Time	User Sample ID	Sample ID	(AVG)	(AVG)	(AVG)
3/30/2005 23:50	TK47-24	200107221	59.06	1.798	0.7

SPA Units Feed Acid Flows

		06FIC400/PID #1 SPA FEED ACID GPM	06FIC401/PID1/PV.C #2 SPA FEED ACID GPM	
1 hr				
3/31/2005	31-Mar-05 00:00:00	70.56	31-Mar-05 00:00:00	63.17
4/1/2005	31-Mar-05 01:00:00	64.33	31-Mar-05 01:00:00	57.57
	31-Mar-05 02:00:00	69.19	31-Mar-05 02:00:00	64.50
	31-Mar-05 03:00:00	66.98	31-Mar-05 03:00:00	63.13
	31-Mar-05 04:00:00	66.32	31-Mar-05 04:00:00	62.40
	31-Mar-05 05:00:00	65.57	31-Mar-05 05:00:00	61.46
	31-Mar-05 06:00:00	64.77	31-Mar-05 06:00:00	61.50
	31-Mar-05 07:00:00	64.13	31-Mar-05 07:00:00	60.53
	31-Mar-05 08:00:00	62.08	31-Mar-05 08:00:00	58.86
	31-Mar-05 09:00:00	62.16	31-Mar-05 09:00:00	59.05
	31-Mar-05 10:00:00	61.92	31-Mar-05 10:00:00	58.89
	31-Mar-05 11:00:00	61.78	31-Mar-05 11:00:00	58.64
	31-Mar-05 12:00:00	62.05	31-Mar-05 12:00:00	59.32
	31-Mar-05 13:00:00	62.25	31-Mar-05 13:00:00	59.25
	31-Mar-05 14:00:00	62.50	31-Mar-05 14:00:00	59.59
	31-Mar-05 15:00:00	62.46	31-Mar-05 15:00:00	59.55
	31-Mar-05 16:00:00	62.84	31-Mar-05 16:00:00	59.46
	31-Mar-05 17:00:00	62.62	31-Mar-05 17:00:00	59.66
	31-Mar-05 18:00:00	62.85	31-Mar-05 18:00:00	60.50
	31-Mar-05 19:00:00	63.84	31-Mar-05 19:00:00	61.76
	31-Mar-05 20:00:00	64.43	31-Mar-05 20:00:00	61.94
	31-Mar-05 21:00:00	65.51	31-Mar-05 21:00:00	63.02
	31-Mar-05 22:00:00	66.26	31-Mar-05 22:00:00	63.80
	31-Mar-05 23:00:00	65.95	31-Mar-05 23:00:00	63.28

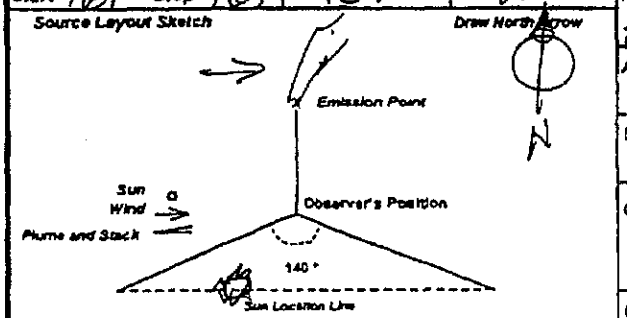
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
Visible Emission Observation Form

Source Name	Nu-West Agrium
Address	3010 Conda Rd.
City	Soda Springs
State	ID.
Zip	83276
Phone	(208) 547-4381
Source ID Number	
Process Equipment	SPA Super Phosphoric Acid
Operating Mode	Running
Control Equipment	Scrubber
Operating Mode	Running
Describe Emission Point	Start STACK Stop STACK
Height Above Ground Level	Start 30' Stop 30'
Height Relative to Observer	Start 30' Stop 30'
Distance From Observer	Start 34 Stop 34
Direction from Observer	Start NNE Stop NNE
Describe Emissions	Start Continuous Stop Continuous
Emission Color	Start Gry/Wht Stop Gry/Wht
Plume Type	Continuous / Fugitive / Intermittent
Water Droplets Present	(No) Yes
If Water Droplet Plume	Attached / Detached
Point in the Plume at which Opacity Was Determined	Start After Stream Stop After Stream
Describe Background	Start Overcast Sky Stop Overcast Sky
Background Color	Start Wht Stop Wht
Sky Conditions	Start OC Stop OC
Wind Speed	Start 3-6 Stop 3-6
Wind Direction	Start East Stop East
Ambient Temp	Start 46°F Stop 46°F
Wet Bulb Temp.	43°F
PH. Percent	78%

Observation Date	Start Time	Stop Time
4/4/05	13:55	14:55

Min-Sec	0	15	30	45	Min-Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	5
2	0	5	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	5	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	5	37	0	0	0	0
8	0	0	5	0	38	0	0	0	0
9	0	0	0	0	39	0	5	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	5	0	0	0	42	0	0	5	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	5	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	5	0	5	0
20	0	0	0	0	50	0	0	0	0
21	5	0	5	0	51	0	0	0	0
22	0	0	0	0	52	0	5	0	0
23	0	0	0	0	53	0	5	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	5	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch



Number of Readings Above	20% was 0
Number of Minutes Above	20% was 0
Average of Readings Above	20% was 0
Range of Readings Above	% was to
Observer's Name	Clay Gentry
Observer's Signature	Clay Gentry
Date	4/4/05
Certified By	ETA
Date	10/7/04
Verified By	
Date	

Comments RATE AND CONDITIONS SAME AS 3/30/04

I Have Received a Copy of These Opacity Observations

Signature

Title Date

White Copy: DEQ File Yellow Copy: AIRS Copy Pink Copy: Facility Copy 09/21/2000

From: Debbie Scalise <d.scalise@eta-is-opacity.com>
To: "Gentry, Clay" <cgentry@agrium.com>
Date: 4/20/2005 7:42:21 AM
Subject: Certification Confirmation

Eastern Technical Associates
*PO Box 1009 *
*Garner, NC 27529 *
www.eta-is-opacity.com
1-919-878-3188 Voice

This is to confirm that Clay Gentry, Agrium, certified in Boise, Idaho on October 6, 2004 with Eastern Technical Associates. Your certificate expired on April 7, 2005.

Please let me know if you have any questions.

* Thank You!*

* Debbie Scalise*
* Registrar / Customer Support*
* Eastern Technical Associates*

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

May 9, 2005

File No.: EN-04-062

CERTIFIED MAIL #7001 0320 0003 0613 6815

Michael Stambulis, P.E.
Staff Engineer
Idaho Department of Environmental Quality
Technical Services Division
1410 N. Hilton
Boise, Idaho 83706

RE: MACT Compliance Test Reports for Phosphoric Acid Production Process and Superphosphoric Acid Production Process

Dear Mr. Stambulis,

As per our conversation today, this letter is to confirm our intentions of establishing a new set of operating parameter ranges for the Phosphoric Acid Production Process scrubbers and retaining the operating parameter ranges for the Superphosphoric Acid Production Process scrubber.

Please refer to the reports for annual source testing conducted at our facility March 30, 2005 and March 31, 2005 by TETCO, a Lehi, Utah testing company. These reports were forwarded to the Technical Services Division from the Pocatello Regional Office [DEQ].

The information below was included in Supplements 1 & 2 to TETCO's report:

Wet Process Phosphoric Acid Process Line (Section 6.1 and 6.26)

Test date: March 30, 2005

Permitted fluoride emissions:	0.0135 lb/Ton P_2O_5 feed
Fluoride emissions during test:	0.0014 lb/Ton P_2O_5 feed [In compliance]
P_2O_5 feed to process during test:	66.12 tons/hr
Pressure drop across Phos scrubber:	9.3 inches H_2O
Pressure drop across CV scrubber:	2.3 inches H_2O
Phos scrubber flow rate:	1201 gpm
CV scrubber flow rate:	216 gpm

* A Registered Name of Nu-West Industries, Inc.

Superphosphoric Acid Production Process Line (Section 6.2 and 6.26)

Test date: March 31, 2005	
Permitted fluoride emissions:	0.0087 lb/Ton P_2O_5 feed
Fluoride emissions during test:	0.0046 lb/Ton P_2O_5 feed [In-compliance]
P_2O_5 feed to process during test:	32.15 tons/hr
Pressure drop across SPA scrubber:	7.0 inches H_2O
SPA scrubber flow rate:	576 gpm

Agrium requests that a new set of operational ranges be established for the operating parameter ranges for the Phosphoric Acid Production Process scrubbers, based on operating data recorded during the March 30, 2005 source test. The new established ranges will be:

Pressure drop across Phos scrubber:	7.4 to 11.2 inches H_2O
Pressure drop across CV scrubber:	1.8 to 2.8 inches H_2O
Phos scrubber flow rate:	961 to 1,441 gpm
CV scrubber flow rate:	173 to 259 gpm

Agrium requests that the previously established set of operational ranges be retained for the Superphosphoric Acid Production Process scrubber, based on operating data recorded during the March 14, 2002 source test. Pressure drop was 7.8 inches H_2O and scrubber flow was 553 gpm. The established ranges are:

Pressure drop across SPA scrubber:	6.2 to 9.4 inches H_2O
SPA scrubber flow rate:	443 to 663 gpm

If you have any questions concerning this letter, please call me at (208) 547-4381 extension 263.

Sincerely,

Monty Johnson
Environmental Manager

Aquum emission
Verification Report

BJ Briley

AGR_009921

Invoice for Agrium/Nu-West Emission Testing

July 20, 2005

Conda Phosphate Operations - Agrium
Nu-West Industries, Inc.
Mr. Monty Johnson
Environmental Manager

AES Invoice No. AES5041

Antec Environmental Services

PO Box 2117 North Bend
North Bend, WA 98045
(425) 888-2202

Travel Date 6/21/05
Test Dates 6/22-23/2005

P.O. # 4800 008305

	Emission Testing				
Item	B5 Boiler 6/22/05	Reference Method	Runs	Cost/Run	Cost/Item
1	Gaseous Emissions NOx, CO, NMVOC	EPA 3a, 7, 10, 25a	5	$ 650.00	$ 3,250.00
2	Particulate Matter Filterable & Condensible	EPA 5/202	3	$ 950.00	$ 2,850.00
3	Opacity	EPA 9	3	N/C	N/C
					$ -
				Section Sub -Total:	*$ 6,100.00*

Item	Test Team Description	Rate	Units	Qty	Cost/Item
4	Compliance QA & Compliance Report Generation & Shipping	$ 500.00	1	1	$ 500.00
5	Test Team Standby $50/man/hr	$ 100.00	1	4	$ 400.00
6	Mobile Laboritory Standby $75/hr	$ 75.00	1	4	$ 300.00
7	Travel Rate cost +5%, No labor charges	$ 706.90	N/A	N/A	$ 706.90
8	Per Diem 2 men 4 days	$ 105.00	2	4	$ 840.00
				Section Sub -Total:	*$ 2,746.90*

Payment Terms 2% Net 10	Total	$ 8,669.96
Payment Terms Net 30	Total	$ 8,846.90

Please pay this amt.
7/28/05
Monty Johnson

Agrium 6-05

AGR_009922

Antec
Environmental
Services

PO Box 2117
North Bend, Washington 98045
Office: (425) 888-2202
Fax: (425) 888-2321
Mobile: (425) 785-8261
E-mail: antec@earthlink.net

July 20, 2005

Nu-West Industries, Inc.
Conda Phosphate Operations
3010 Conda Road
Soda Springs, Idaho 83276

Attention: Mr. Monty Johnson

Dear Monty,

Enclosed are three copies of the *B5 Boiler Report* and the invoice for the work.

If you have questions or require additional information please give us a call at 425 888-2202.

Thank you,

EEOlson

Eric Olson
President
Antec Environmental Services

Agrium CPO/Nu-West Ind.
Conda Facility
Emission Verification Report

B5 Boiler

Determination of Particulate Matter
Determination of Oxides of Nitrogen
Determination of Carbon Monoxide
Determination of Sulfur Dioxide
Determination of Non-Methane Volatile Organic Compounds
Determination of Opacity

Test Dates:
June 22, 2005
to
June 23, 2005

Project Number: AES5063

Tested By:

Antec Environmental Services

PO Box 2117
North Bend, WA 98045
(425) 888-2202
antec@earthlink.net

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Source Test Certification

Emission Source Owner: Agrium CPO/Nu-West Ind.
3010 Conda Road
Soda Springs, Idaho

Contact: Mr. Monty Johnson
Title: Environmental Manager
Phone: (208) 547-4381
E-mail: mrjohnso@agrium.com

Permit No.: 029-0003

Date Tested	Emission Units Tested
June 22, 2005	B5 Boiler

Project Number: AES5063

Testing Firm: Antec Environmental Services
Address: PO Box 2117
CityStateZip: North Bend, WA 98045
E-Mail: antec@earthlink.net
Phone: (425) 888-2202
Fax: (425) 888-2321

The data and results presented in this report are, to the best of my knowledge, accurate and complete:

By: _____
Eric E. Olson
Project Manager

Introduction

On June 22, 2005, Antec Environmental Services(AES) performed an emission verification test for Agrium Conda Phosphate Operations, located in Soda Springs, Idaho. The purpose of the testing was to quantify gaseous and particulate emissions from the B5 natural gas fired boiler. Three runs were taken, while the boiler was operating at maximum steam production and one run, gaseous emissions only, was performed at normal steaming rates. Table 1 contains the emission parameters and the methods used in the sampling.

Personnel

Participants involved in the testing program are listed below with their affiliation:

Agrium CPO/Nu-West Ind.	Antec Environmental Services
Mr. Monty Johnson Environmental Manager (208) 547-4381 E-mail:mrjohnso@agrium.com	Eric E. Olson Project Manager (425) 888-2202 E-mail:antec@earthlink.net

Sources & Emission Parameters

Table 1 Source	Date Tested	Test Methods	Emission Parameters	# of Runs & Time
B5 Boiler	06/22/05	EPA 5/202	Filterable and Condensible Particulate Matter	Three 2 hour Runs
B5 Boiler	06/22/05	EPA 7e	Oxides of Nitrogen	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 10 mod	Carbon Monoxide	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 25a	Volatile Organic Compounds	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 9	Visible Emissions	Three, Ten min Runs

Summary of Results

B5 Boiler Max Load

June 22, 2005	Run 1	Run 2	Run 3	Three Run Average
Start Time	1024	1242	1501	
End Time	1124	1342	1601	
Opacity No. minutes above 10%	0.0	0.0	0.0	**0.0**
% Oxygen	4.14	4.12	4.13	**4.13**
Dry Standard Cubic ft./min(DSCFM)	36,839	39,107	38,487	**38,144**
CO ppm,dry	34.2	35.6	38.0	**35.9**
CO ppm @ 3% O_2	36.5	38.0	40.6	**38.4**
CO lbs/hr	5.50	6.08	6.38	**5.99**
CO lbs/mmBtu	0.0270	0.0281	0.0300	**0.0284**
NOx ppm,dry	44.3	44.1	45.3	**44.6**
NOx ppm @ 3% O_2	47.3	47.0	48.4	**47.6**
NOx lbs/hr	11.70	12.36	12.50	**12.19**
NOx lbs/mmBtu	0.0575	0.0572	0.0588	**0.0578**
NMVOC ppm as Propane,dry	1.1	0.9	1.2	**1.1**
NMVOC ppm as Propane @ 3% O_2	1.2	1.0	1.3	**1.1**
NMVOC as Propane lbs/hr	0.28	0.24	0.32	**0.28**
NMVOC ppm as Propane lbs/mmBtu	0.0014	0.0011	0.0015	**0.0013**
Particulate Matter *Start Time*	911	1158	1427	
End Time	1115	1401	1630	
Particulate grains/dry std. Cu. Ft.(grdscf)	0.0025	0.0017	0.0013	**0.0018**
Particulate (grdscf) @ 3% O_2	0.0026	0.0018	0.0014	**0.0019**
Particulate lbs/hr	0.79	0.57	0.43	**0.60**
Particulate lbs/mmBtu	0.0039	0.0027	0.0021	**0.0029**

B5 Boiler Normal Operating Load

June 23, 2005	Run 1
Start Time	1223
End Time	1323
% Oxygen	6.82
Dry Standard Cubic ft./min(DSCFM)	25,090
CO ppm,dry	24.3
CO ppm @ 3% O_2	30.9
CO lbs/hr	2.66
CO lbs/mmBtu	0.0229
NOx ppm,dry	37.0
NOx ppm @ 3% O_2	47.0
NOx lbs/hr	6.65
NOx lbs/mmBtu	0.0572
NMVOC ppm as Propane,dry	0.4
NMVOC ppm as Propane @ 3% O_2	0.5
NMVOC as Propane lbs/hr	0.07
NMVOC ppm as Propane lbs/mmBtu	0.0006
Opacity No. minutes above 20%	0.0

Methodology

The following EPA reference methods were used during the emission testing project. The respective summaries outline each method and any deviations encountered. Supporting data can be found in the appendices of the report.

EPA 1-4

EPA Methods 1 and 2 are used to measure volumetric flow rates. EPA Method 1 is used to locate the representative sample points within the stack area. The cross-sectional area of the stack is divided into a number of equal areas. Sample traverse points are then located within each of these equal areas. EPA Method 2 is used to measure average stack gas velocity using a calibrated type "S" pitot tube connected to an incline oil manometer. Stack temperature is measured simultaneously using a calibrated type "K" thermocouple. A sample of the gas stream is extracted, dried, and gas volume metered using an EPA Method 5/202 sample train. The weight gain of condensed moisture is then measured by volume. The percentage of moisture is used to calculate the dry molecular weight of the stack gas and correct wet volume measurements to a dry volume basis.

EPA 5/202

A series of preliminary measurements was made prior to conducting the particulate test. EPA Methods 1, 2, 3, and ODEQ 4 (Tw/Td) were performed to determine location and number of traverse points, average gas velocity and pressure, and gas molecular weight. The percentage of water was measured by a preliminary wet-bulb dry-bulb test. The results of these measurements were entered into the field computer and an appropriate nozzle size for isokinetic sampling was determined.

The sample system consisted of a probe, heated filter, and impinger train. The probe consisted of a type "S" pitot tube, sample nozzle, and thermocouple. Sample gas was collected through a stainless steel probe/nozzle, filtered, and dried in a series of chilled impingers, with a back-up filter placed between the third and fourth impinger. The volume of sample gas collected was measured using a dry-gas meter and calibrated-restriction orifice.
Sample apparatus was prepared on-site in the mobile laboratory. The absorption train was charged with 100 milliliters of distilled water in each of the first two impingers while the third impinger remained empty, weighed on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe was brushed out and rinsed with acetone and the filter holder charged. The sampling apparatus was assembled and leak tested at ten inches of vacuum. Probe and filter heaters were set at 248 degrees Fahrenheit. The probe was placed at the first traverse point of the stack sample port. The vacuum pump was started immediately and adjusted to obtain an isokinetic sample rate.

Eight traverse points were sampled at 7.5 minutes each for a minimum of 60 minutes. A minimum of 31.8 standard cubic feet was collected or the amount specified in the applicable subpart, whichever was greater. Duct conditions (temperature, differential pressure) and sampling conditions (meter temperature; volume and pressure; probe, filter, sample line and impinger temperatures; and absorption trains vacuums) were monitored and recorded regularly for each traverse sample point. Upon completion of sampling, a final leak check was performed on the sampling apparatus at a vacuum greater than the highest observed vacuum during the test.

The filter and any loose particulate were carefully removed from the filter holder with forceps. It was then placed in a labeled petri dish for transportation to the laboratory. The nozzle, probe, and filter top housings were rinsed and brushed six times with acetone. The absorption train was inspected for abnormalities and disassembled. The impingers were weighed on a digital balance for use in determining percent moisture. The sample fractions were combined, bottled, labeled, and fluid-level marked for transportation to the laboratory. . The back-up filter was recovered and placed in a glass petri dish. Aliquots of acetone and deionzed water were similarly treated for blank analysis.
The filters (front-half and back-half) were transferred to a desiccator for 24 hours. The filters were weighed on a digital balance to the nearest 0.1 milligrams. Additional six-hour desiccation and weightings were performed until the difference between consecutive weightings was less than 0.5 milligram or one percent of the total filtrate weight (weighed to a constant weight). The nozzle/probe/filter top/impinger acetone wash was then evaporated at a laboratory temperature and pressure. The dish and wash residue were then desiccated and weighed to a constant weight. The net weight of particulate was calculated from the two fractions. The back-half catch was analyzed for organic and inorganic condensable particulate matter.

The procedure followed was that as described in EPA method 202. The impinger catch was washed with dichloromethane three times, the water fraction (inorganic) and dichloromethane (organic) was separated using a separatory funnel, dried, and weighed to a constant weight (+0.5 mg). Particulate concentration (gr./dscf) and emission rates (lb/hr) are then calculated and reported. No method deviations were encountered during the performance test program.

Molecular Weight, EPA Method 3a

A sample was continuously extracted from the effluent stream, dried and conveyed to an instrumental analyzer for determination of O_2 concentration. A three point linearity check (calibration error check) was performed using a zero reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 7e/20 - Oxides of Nitrogen Emissions

These methods are applicable to the determination of nitrogen oxides (NOx) concentrations in emissions from stationary sources. A sample is continuously extracted from the effluent stream, dried and conveyed to an instrumental chemiluminescent analyzer for determination of NOx concentration. A three point(7e) or a four point(20) linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas(20 only), a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 10 - Determination of Carbon Monoxide Emissions

A continuous gas sample was extracted from a sampling point and analyzed for carbon monoxide (CO) content using a non-dispersive infrared analyzer (NDIR). A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Interference Test

The gaseous components Carbon Monoxide(500+/-50ppm), Sulfur Dioxide(200+/-20ppm), Carbon Dioxide(10+/-1 %), and Oxygen(20.9+/-1 %) are introduced into the measurement system separately, or as gas mixtures. The total interference output response of the system to these components is determined in concentration units and the values are recorded. If the sum of the interference responses of the test gases for either the NOx or diluent analyzers is greater than 2 percent of the applicable span value, corrective measures on the measurement system must be taken.

Total Hydrocarbons EPA 25a

This method applies to the measurement of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon. A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip. The sample gas is extracted in the same manner as described in the following section with the following modifications. Prior to the electronic moisture removal system, a slip steam (approximately 1 liter per minute) is routed, via heated line maintained at 250 F, to the VOC analyzer and is analyzed on a wet basis. A methane cutter in conjunction with a FID was used to determine the methane fraction of the volatile organic compounds.

Continuous Emission Monitoring
EPA Methods 3a, 6c, 10, 7e/20, and 25a:

The gaseous parameters, O_2, CO, NOx, SO2, and VOC's were determined using the continuous instrumentation methods EPA 3a for Oxygen, EPA 10 for CO, EPA 7e/20 for NOx, EPA 6c for SO2, EPA, and EPA 25a for VOC. A gas sample was extracted from the stack through a heated (250° ± 5° F) stainless steel probe/filter assembly that is approximately 2 meters in length. A calibration gas purge valve was fitted upstream of the probe's particulate filter. The sample gas was then transported from the sample site to the mobile CEMS van through a heated (250° ± 5° F) Teflon flex line that measured 100 feet in length. At the CEMS van, the sample was then drawn through a moisture removal system. This system consisted of 2 chilled knockout traps (250 cubic centimeters (cc) each) connected in series and maintained at 38° ± 3° F with electronic cooling. Condensate was continuously removed from the moisture traps with a dual-head, peristaltic pump at 50 cc per minute. A finish filter removes particulate matter to less than 0.2 microns in diameter.

The sample gas was then divided simultaneously to each analyzer through a series of stainless-steel metering valves and glass flow meters. System Response Time was developed by timing out the amount of time required for the measurement system to display 95 percent of a step-change in gas concentration on the data recorder and by observing the time required to achieve a stable response for both the zero and upscale gases. After twice the response time of the measurement system has elapsed, sample collection is begun by positioning the sampling probe at the measurement point, and extracting effluent gas at the same flow rate as used during the sampling system bias check and maintaining constant rate sampling(i.e., ±10 percent) during the entire run.

Instrumentation used to analyze the gaseous pollutant parameters:

Parameter	Manufacturer	Model	Technology
O2	Siemens	Oxymat 5E	Paramagnetic
CO2	Siemens	Ultramat 5E	NDIR
CO	Siemens	Ultramat 5E	NDIR
NOx	Ecophysics	70s	Chemlum.
SO2	Bovar	721M	UV

The data recorder consists of a Parametric Systems digital data acquisition system. The Parametric system is a fully automated reference test method data recording and report generating software/hardware package.

Prior to beginning the test series, a 3-point, analyzer linearity check was performed. Each analyzer was challenged with a high- (90 to 80 percent of span), mid- (60 to 50 percent of span), and a low- (30 to 20 percent) calibration gas. Analyzer response was within 2 percent of the gas cylinder value. Initial zero and span are performed at the manifold with zero grade nitrogen and the appropriate EPA protocol number 1 calibration gas. Calibration gases used were blended following EPA Method 205, with an Environics Series 4000 precision gas divider. The field verification audit was performed prior to the use of the gas divider. Sample system bias checks were performed at the beginning and end of each test series. When performing a sample-system bias check, zero gas is introduced to the calibration-gas purge valve.

The sample system bias response was within 5 percent of the calibration gas cylinder value. The average, sample system bias response (initial and final) was used to calculate the final gas concentration for the run. The response time and analyzer value recorded. This procedure was followed for the upscale response using the appropriate calibrated gas and the longer of the two response times noted. The sample probe was positioned at the sample point and a sample rate of 6 liters per minute was maintained at plus or minus 10 percent during the entire test run. The test run was started after twice the response time has elapsed.

references

Handbook for Air Pollution Measurement Systems US Environmental Protection Agency. Publication EPA-600/4-77-0276
Quality Assurance Handbook for Air Pollution Measurement Systems US Environmental Protection Agency EPA 600/4-77-
US Environmental Protection Agency. 1996. 40 CFR Part 60, Appendix A, *Federal Register*(July 1).

AGR_009933

B5 Boiler

Sample & Traverse Point Determination

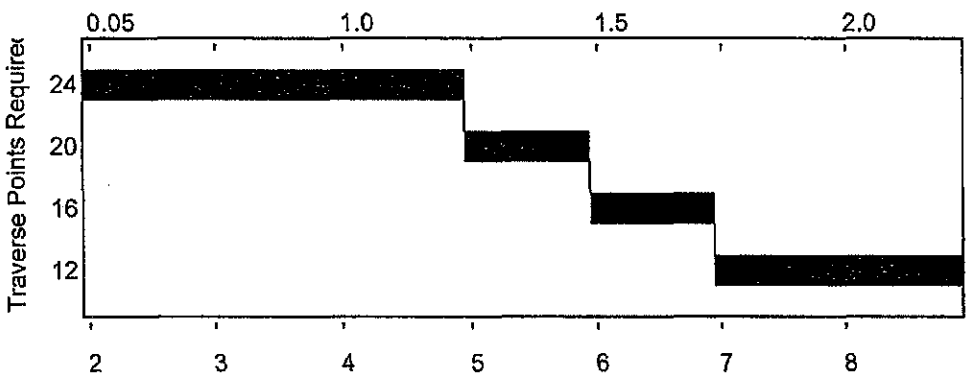
Minimum Number of Traverse Points for Particulate Traverses

EPA Method 1

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 6/22/05
Project No.: AES5063

Stack Diameter(in.): 64
Points Required: 24
Distance A(in.): 160.0
Distance A(dia.): 2.5
Distance B: 128.0
Distance B(dia.): 2.0

Sample Port Location
Duct Diameters upstream from flow disturbance (distance A)



Sample Port Location
Duct Diameters downstream from flow disturbance (distance B)

Traverse Point No.	Number of Traverse Points on a Diameter					***Sample Points***
	4	6	8	10	12	
1	6.7	4.4	3.2	2.6	2.1	***1.3***
2	25.0	14.6	10.5	8.2	6.7	***4.3***
3	75.0	29.6	19.4	14.6	11.8	***7.6***
4	93.3	70.4	32.2	22.6	17.7	***11.3***
5		85.5	67.7	34.2	25	***16.0***
6		95.6	80.6	65.8	35.6	***22.8***
7			89.5	77.4	64.4	***41.2***
8			96.8	85.4	75	***48.0***
9				91.8	82.3	***52.7***
10				97.4	88.2	***56.4***
11					93.3	***59.7***
12					97.9	***62.7***

B5 Boiler EPA 1-4

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

		Run #1	Run #2	Run #3	
		6/22/2005	6/22/2005	6/22/2005	
	Start	911	1158	1427	
	End	1115	1401	1630	Averages
Q:	Total sample time[1]:	120	120	120	**120**
Vm:	(Volume,dry gas meter,cf)	90.587	88.545	86.213	**88.448**
Y:	(Dry gas meter calibration factor)	0.995	0.995	0.995	**0.995**
Pbar:	(Barometric pressure,in.Hg)	24.40	24.40	24.40	**24.40**
ΔH:	(Avg. differential pressure,in.H2O)	1.30	1.25	1.20	**1.25**
Tm:	(Avg. meter temperature,°F)	89.9	100.0	96.6	**95.5**
Vm(std.):	(Std.* sample gas volume, DSCF)	70.826	67.970	66.575	**68.457**
Vlc:	(Liquid volume collected,ml)	305.4	276.4	261.2	**281.0**
Vw(std):	(Std.* water vapor volume,scf)	14.375	13.010	12.295	**13.227**
SVP:	(Saturated H_2O vapor pressure, in. Hg	162.91	170.93	169.44	**167.76**
Bwsat:	(Saturated Moisture @ Ts)	6.685	7.014	6.952	**6.884**
Bwsvol	(Volumemetric Moisture content)	0.169	0.161	0.156	**0.162**
Bws:	(SCF H_2O / SCF Total)[2]	0.169	0.161	0.156	**0.162**
$\%CO_2$:	(Carbon Dioxide,% by volume,dry)	9.76	9.75	9.79	**9.77**
$\%O_2$:	(Oxygen,% by volume,dry)	4.14	4.12	4.13	**4.13**
$\%N_2$:	(Nitrogen,% by volume,dry)	86.10	86.13	86.08	**86.10**
Md:	(Molecular Weight,lb/lb-mole,dry)	29.73	29.72	29.73	**29.73**
Mw:	(Molecular Weight,lb/lb-mole,wet)	27.75	27.83	27.90	**27.83**
D:	(Duct diameter, in.)	64.00	64.00	64.00	**64.00**
A:	(Duct area, sq. ft.)	22.34	22.34	22.34	**22.34**
Dn:	(Nozzle diameter, in.)	0.246	0.246	0.246	***0.246***
An:	(Nozzle area, ft2)	3.30E-04	3.30E-04	3.30E-04	***3.30E-04***
Ts:	(Stack temperature, °F)	350.1	355.0	354.1	**353.1**
Pg:	(Static pressure of flue gas, in. H_2O)	-0.41	-0.41	-0.41	**-0.41**
Ps:	(Absolute stack gas pressure, in. Hg)	24.37	24.37	24.37	**24.37**
Cp:	(Pitot tube coefficient)	0.84	0.84	0.84	**0.84**
ΔP:	(Average velocity head, in. H_2O)	0.629	0.701	0.672	**0.667**
Vs:	(Gas velocity, ft./second)	62.3	65.9	64.4	**64.2**
ACFM:	(Actual cubic feet/min., wet)	83507	88332	86322	**86054**
SCFM	(Std. cubic ft/min., wet)	44349	46630	45619	**45533**
SDCFM:	(Std.* cubic feet/min., dry)	36839	39107	38487	**38144**
% Iso:	Isokinetic variation)	108.5	98.1	97.6	***101.4***

[1] - Total sample time does not include port change.

[2] - If the Volumetric moisture exceeds the calculated saturated moisture, the calculated saturated moisture is used.

B5 Boiler EPA 5/202 Particulate Results

Client: Agrium CPO/Nu-West Inc
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Summary

Emission Units	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Front-half Average:	**0.0005**	**0.16**	**0.0005**	**0.0008**
Back-half Average:	**0.0013**	**0.44**	**0.0014**	**0.0021**
Test Average:	**0.0018**	**0.60**	**0.0019**	**0.0029**

RUN #1

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	2.8	0.0006	0.19	0.0006	0.0009
Filter	0.6	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	7.3	0.0016	0.51	0.0017	0.0025
Back-Half MeCl	0.9	0.0002	0.06	0.0002	0.0003
Front-half:	**3.4**	**0.0007**	**0.22**	**0.0007**	**0.0011**
Back-half:	**8.2**	**0.0018**	**0.57**	**0.0019**	**0.0028**
Total:	**11.6**	**0.0025**	**0.79**	**0.0026**	**0.0039**

RUN #2

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.2	0.0003	0.10	0.0003	0.0005
Filter	0.5	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	5.6	0.0013	0.44	0.0014	0.0020
Back-Half MeCl	0.1	0.0000	0.00	0.0000	0.0000
Front-half:	**1.7**	**0.0004**	**0.13**	**0.0004**	**0.0007**
Back-half:	**5.7**	**0.0013**	**0.44**	**0.0014**	**0.0020**
Total:	**7.4**	**0.0017**	**0.57**	**0.0018**	**0.0027**

RUN #3

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.3	0.0003	0.10	0.0003	0.0005
Filter	0.3	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	3.9	0.0009	0.30	0.0010	0.0014
Back-Half MeCl	0.2	0.0000	0.00	0.0000	0.0000
Front-half:	**1.6**	**0.0004**	**0.13**	**0.0004**	**0.0007**
Back-half:	**4.1**	**0.0009**	**0.30**	**0.0010**	**0.0014**
Total:	**5.7**	**0.0013**	**0.43**	**0.0014**	**0.0021**

Production Data

Run	Time start	Time finish	Effluent O_2	F_d
1	911	1115	4.14	8710
2	1158	1401	4.12	8710
3	1427	1630	4.13	8710

B5 Boiler Laboratory Results

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Front Half

FILTER

	Run #1	Run #2	Run #3
Tare Weight, g	0.3455	0.3470	0.3457
Final Weight , g	0.3461	0.3475	0.3460
Final filter Weight, mg	*0.6*	*0.5*	*0.3*

PROBE & NOZZLE

	Run #1	Run #2	Run #3
Sample volume, ml	150	150	150
Acetone Blank mg	0.3	0.3	0.3
Beaker tare weight, g	103.7934	101.5734	105.9804
Beaker final weight , g	103.7965	101.5749	105.9820
Total Residue, mg	3.1	1.5	1.6
Total Residue less Blank, mg	*2.8*	*1.2*	*1.3*

ACETONE BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Back-Half

Inorganic Fraction

Imp. catch less organic matter

	Run #1	Run #2	Run #3
Sample volume, ml	200	200	200
Water Blank mg	0.4	0.4	0.4
Beaker tare weight, g	106.8792	102.5267	104.5500
Beaker final weight , g	106.8869	102.5327	104.5543
Total Residue, mg	7.7	6.0	4.3
Total Residue less Blank, mg	*7.3*	*5.6*	*3.9*

WATER BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Organic Fraction

Imp. H_2O $MeCl_2$ wash

	Run #1	Run #2	Run #3
Sample volume, ml	60	60	60
$MeCl_2$ Blank mg	0.5	0.5	0.5
Beaker tare weight, g	100.8110	96.1870	99.6518
Beaker final weight , g	100.8124	96.1876	99.6525
Total Residue, mg	1.4	0.6	0.7
Total Residue less Blank, mg	*0.9*	*0.1*	*0.2*

$MeCl_2$ BLANK

Blank volume, ml	60
Residue, mg	0.5
Blank mg/ml	0.008

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.02 %	-0.02
12.50 percent O2	12.40 %	12.38 %	12.39
0.0 ppm NOX	0.0 ppm	0.0 ppm	0.03
55.0 ppm NOX	54.7 ppm	54.9 ppm	54.78
0.00 percent CO2	0.05 %	0.04 %	0.04
9.98 percent CO2	10.12 %	10.11 %	10.12
0.0 ppm CO	-0.2 ppm	0.0 ppm	-0.13
55.6 ppm CO	55.6 ppm	55.4 ppm	55.52
0.0 ppm Methane	-0.1 ppm	0.1 ppm	0.00
25.0 ppm Methane	24.7 ppm	24.8 ppm	24.75
0.0 ppm THC	0.3 ppm	0.2 ppm	0.22
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	Corrected Results:	Basis:
4.09 percent O2	**4.14** percent O2	DRY
44.1 ppm NOX	**44.3** ppm NOX	DRY
9.90 percent CO2	**9.76** percent CO2	DRY
34.1 ppm CO	**34.2** ppm CO	DRY
5.6 ppm THC	**5.4** ppm THC	WET
4.5 ppm Methane	**4.5** ppm Methane	WET
16.9 % Moisture	**0.9** ppm NMVOC	WET
	1.1 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Calibration Gas Value	Initial Calibratio	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.03 %	-0.03
12.50 percent O2	12.38 %	12.42 %	12.40
0.0 ppm NOX	0.0 ppm	0.1 ppm	0.06
55.0 ppm NOX	54.9 ppm	54.9 ppm	54.91
0.00 percent CO2	0.04 %	0.03 %	0.03
9.98 percent CO2	10.11 %	10.11 %	10.11
0.0 ppm CO	0.0 ppm	-0.1 ppm	-0.05
55.6 ppm CO	55.4 ppm	55.2 ppm	55.27
0.0 ppm Methane	0.1 ppm	0.2 ppm	0.15
25.0 ppm Methane	24.8 ppm	24.9 ppm	24.85
0.0 ppm THC	0.2 ppm	0.3 ppm	0.23
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	Corrected Results:	Basis:
4.07 percent O2	**4.12** percent O2	DRY
44.1 ppm NOX	**44.1** ppm NOX	DRY
9.88 percent CO2	**9.75** percent CO2	DRY
35.4 ppm CO	**35.6** ppm CO	DRY
6.3 ppm THC	**6.2** ppm THC	WET
5.5 ppm Methane	**5.4** ppm Methane	WET
16.1 % Moisture	**0.8** ppm NMVOC	WET
	0.9 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.03 %	-0.03 %	-0.03
12.50 percent O2	12.42 %	12.39 %	12.40
0.0 ppm NOX	0.1 ppm	0.4 ppm	0.24
55.0 ppm NOX	54.9 ppm	54.8 ppm	54.86
0.00 percent CO2	0.03 %	0.04 %	0.03
9.98 percent CO2	10.11 %	9.96 %	10.04
0.0 ppm CO	-0.1 ppm	0.4 ppm	0.18
55.6 ppm CO	55.2 ppm	55.7 ppm	55.42
0.0 ppm Methane	0.2 ppm	0.1 ppm	0.15
25.0 ppm Methane	24.9 ppm	24.8 ppm	24.85
0.0 ppm THC	0.3 ppm	0.3 ppm	0.30
25.0 ppm THC	24.9 ppm	24.8 ppm	24.85

Mean Reference Values:	**Corrected Results:**	**Basis:**
4.08 percent O2	**4.13** percent O2	DRY
45.2 ppm NOX	**45.3** ppm NOX	DRY
9.85 percent CO2	**9.79** percent CO2	DRY
37.9 ppm CO	**38.0** ppm CO	DRY
6.8 ppm THC	**6.6** ppm THC	WET
5.7 ppm Methane	**5.6** ppm Methane	WET
15.6 % Moisture	**1.0** ppm NMVOC	WET
	1.2 ppm NMVOC	DRY

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.02 %	-0.04 %	0.00 %
O2	12.41 %	12.40 %	-0.04 %	12.38 %	-0.12 %	-0.08 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
NOX	54.7 ppm	54.7 ppm	0.00 %	54.9 ppm	0.20 %	0.20 %
CO2	0.02 %	0.05 %	0.15 %	0.04 %	0.10 %	-0.05 %
CO2	10.05 %	10.12 %	0.35 %	10.11 %	0.30 %	-0.05 %
CO	0.0 ppm	-0.2 ppm	-0.07 %	0.0 ppm	0.00 %	0.07 %
CO	55.3 ppm	55.6 ppm	0.10 %	55.4 ppm	0.03 %	-0.07 %
Methane	0.2 ppm	-0.1 ppm	-0.60 %	0.1 ppm	-0.20 %	0.40 %
Methane	25.0 ppm	24.7 ppm	-0.60 %	24.8 ppm	-0.40 %	0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.2 ppm	0.00 %	-0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.03 %	-0.08 %	-0.04 %
O2	12.41 %	12.38 %	-0.12 %	12.42 %	0.04 %	0.16 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.1 ppm	0.10 %	0.10 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.9 ppm	0.20 %	0.00 %
CO2	0.02 %	0.04 %	0.10 %	0.03 %	0.05 %	-0.05 %
CO2	10.05 %	10.11 %	0.30 %	10.11 %	0.30 %	0.00 %
CO	0.0 ppm	0.0 ppm	0.00 %	-0.1 ppm	-0.03 %	-0.03 %
CO	55.3 ppm	55.4 ppm	0.03 %	55.2 ppm	-0.03 %	-0.07 %
Methane	0.2 ppm	0.1 ppm	-0.20 %	0.2 ppm	0.00 %	0.20 %
Methane	25.0 ppm	24.8 ppm	-0.40 %	24.9 ppm	-0.20 %	0.20 %
THC	0.2 ppm	0.2 ppm	0.00 %	0.3 ppm	0.20 %	0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.03 %	-0.08 %	-0.03 %	-0.08 %	0.00 %
O2	12.41 %	12.42 %	0.04 %	12.39 %	-0.08 %	-0.12 %
NOX	0.0 ppm	0.1 ppm	0.10 %	0.4 ppm	0.40 %	0.30 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.8 ppm	0.10 %	-0.10 %
CO2	0.02 %	0.03 %	0.05 %	0.04 %	0.10 %	0.05 %
CO2	10.05 %	10.11 %	0.30 %	9.96 %	-0.45 %	-0.75 %
CO	0.0 ppm	-0.1 ppm	-0.03 %	0.4 ppm	0.13 %	0.17 %
CO	55.3 ppm	55.2 ppm	-0.03 %	55.7 ppm	0.13 %	0.17 %
Methane	0.2 ppm	0.2 ppm	0.00 %	0.1 ppm	-0.20 %	-0.20 %
Methane	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.3 ppm	0.20 %	0.00 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %

Analyzer Calibration Error

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Oxygen Monitor

Method 3A

Full Scale: 25.00 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.00 %	-0.01 %	-0.01 %	-0.04 %
CC53983/cg3	12.50 %	12.41 %	-0.09 %	-0.36 %
CC109878/cg2	22.50 %	22.45 %	-0.05 %	-0.20 %

Nitrogen Oxides Monitor

Method 7E

Full Scale: 100.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg2	55.0 ppm	54.7 ppm	-0.3 ppm	-0.30 %
/dg3	91.7 ppm	91.5 ppm	-0.2 ppm	-0.19 %

Carbon Dioxide Monitor

Method 20

Full Scale: 20.00 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.00 %	0.02 %	0.02 %	0.10 %
CC53983/cg3	9.98 %	10.05 %	0.07 %	0.35 %
CC109878/cg2	19.00 %	19.02 %	0.02 %	0.10 %

Carbon Monoxide Monitor

Method 10

Full Scale: 300.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg8	90.0 ppm	89.5 ppm	-0.5 ppm	-0.17 %
/dg7	170.0 ppm	169.7 ppm	-0.3 ppm	-0.10 %
/dg4	280.0 ppm	280.4 ppm	0.4 ppm	0.13 %

Analyzer Calibration Error

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Methane Hydrocarbon Monitor

Method 25A & Jum Cutter

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

Total Hydrocarbon Monitor

Method 25A

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
1	6/22/2005	10:24:00	3.80	10.04	43.7	72.6	6.3	5.1
1	6/22/2005	10:25:00	3.98	9.98	44.3	33.3	5.6	4.4
1	6/22/2005	10:26:00	4.02	9.96	45.0	33.8	4.7	3.5
1	6/22/2005	10:27:00	4.03	9.95	44.9	33.5	4.2	4.0
1	6/22/2005	10:28:00	3.99	9.97	44.3	34.4	3.1	1.9
1	6/22/2005	10:29:00	4.02	9.95	44.3	36.3	3.3	2.1
1	6/22/2005	10:30:00	3.96	9.99	44.2	33.5	3.1	1.9
1	6/22/2005	10:31:00	3.97	9.98	44.7	34.3	3.2	2.0
1	6/22/2005	10:32:00	4.07	9.92	45.6	33.4	2.7	1.5
1	6/22/2005	10:33:00	3.98	9.96	45.3	34.6	2.8	1.5
1	6/22/2005	10:34:00	3.98	9.97	44.9	33.9	3.5	2.3
1	6/22/2005	10:35:00	4.02	9.94	44.9	32.8	3.0	1.8
1	6/22/2005	10:36:00	4.02	9.94	44.5	32.9	4.1	2.9
1	6/22/2005	10:37:00	4.04	9.93	44.3	33.2	3.7	2.5
1	6/22/2005	10:38:00	3.96	9.98	44.1	33.9	3.7	2.5
1	6/22/2005	10:39:00	4.02	9.94	44.3	33.8	4.9	3.7
1	6/22/2005	10:40:00	4.03	9.94	44.0	33.0	4.8	3.6
1	6/22/2005	10:41:00	4.00	9.95	44.0	33.4	4.1	2.9
1	6/22/2005	10:42:00	4.00	9.95	44.1	33.9	5.0	3.8
1	6/22/2005	10:43:00	3.97	9.98	44.0	32.8	4.7	3.5
1	6/22/2005	10:44:00	3.97	9.96	44.2	32.8	5.7	4.5
1	6/22/2005	10:45:00	4.05	9.91	45.1	32.5	6.1	4.9
1	6/22/2005	10:46:00	4.06	9.93	45.2	33.8	6.9	5.7
1	6/22/2005	10:47:00	4.05	9.91	45.3	34.7	6.1	4.9
1	6/22/2005	10:48:00	4.04	9.93	44.5	33.9	5.6	4.4
1	6/22/2005	10:49:00	4.10	9.88	45.0	33.8	6.5	5.3
1	6/22/2005	10:50:00	4.09	9.89	44.8	35.5	6.6	5.4
1	6/22/2005	10:51:00	3.94	9.99	44.1	36.3	5.7	4.5
1	6/22/2005	10:52:00	3.99	9.95	44.5	34.6	6.0	4.8
1	6/22/2005	10:53:00	3.98	9.96	44.3	34.1	5.7	4.5
1	6/22/2005	10:54:00	4.02	9.93	44.3	32.7	6.0	4.8
1	6/22/2005	10:55:00	3.97	9.96	43.9	33.2	6.6	5.4
1	6/22/2005	10:56:00	3.98	9.95	44.1	34.1	6.5	5.3
1	6/22/2005	10:57:00	4.15	9.84	46.0	35.3	6.2	5.0
1	6/22/2005	10:58:00	4.02	9.94	44.8	35.4	6.4	5.2
1	6/22/2005	10:59:00	3.93	9.98	44.1	35.9	5.1	3.9
1	6/22/2005	11:00:00	3.95	9.97	43.9	34.1	6.5	5.3
1	6/22/2005	11:01:00	3.96	9.96	44.4	33.4	6.3	5.1
1	6/22/2005	11:02:00	4.01	9.93	44.5	33.2	6.5	5.3
1	6/22/2005	11:03:00	4.00	9.95	44.3	32.4	5.4	4.2
1	6/22/2005	11:04:00	7.28	8.07	36.9	27.5	5.3	4.1
1	6/22/2005	11:05:00	4.39	9.81	45.1	36.2	6.8	5.6
1	6/22/2005	11:06:00	4.02	9.93	44.2	37.0	6.0	4.8
1	6/22/2005	11:07:00	4.08	9.89	43.7	35.3	6.2	5.0
1	6/22/2005	11:08:00	4.06	9.91	43.3	36.2	6.1	4.9
1	6/22/2005	11:09:00	4.03	9.93	43.3	34.4	5.0	3.8
1	6/22/2005	11:10:00	4.07	9.90	43.2	34.1	6.3	5.1
1	6/22/2005	11:11:00	4.05	9.91	43.3	34.2	7.1	5.9
1	6/22/2005	11:12:00	4.04	9.92	43.5	33.4	6.8	5.6
1	6/22/2005	11:13:00	4.11	9.87	44.1	33.2	7.1	5.9
1	6/22/2005	11:14:00	4.05	9.92	44.1	34.2	6.1	4.9
1	6/22/2005	11:15:00	4.08	9.90	44.3	34.3	6.6	5.4
1	6/22/2005	11:16:00	4.16	9.83	44.5	34.7	7.6	6.4
1	6/22/2005	11:17:00	4.13	9.88	43.7	36.8	7.4	6.2
1	6/22/2005	11:18:00	4.07	9.89	43.3	35.2	7.0	5.8
1	6/22/2005	11:19:00	4.15	9.86	43.8	36.0	6.9	5.7
1	6/22/2005	11:20:00	4.05	9.92	43.3	36.1	7.4	6.2
1	6/22/2005	11:21:00	4.04	9.92	43.1	34.3	7.3	6.1
1	6/22/2005	11:22:00	4.06	9.90	43.1	35.0	6.9	5.7
1	6/22/2005	11:23:00	4.07	9.89	43.3	34.3	7.1	5.9
1	6/22/2005	11:24:00	4.24	9.79	44.8	36.1	8.0	6.8
		Raw Averages:	4.09	9.90	44.1	34.8	5.6	4.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
2	6/22/2005	12:42:00	4.20	9.81	44.8	37.6	4.0	3.2
2	6/22/2005	12:43:00	4.06	9.89	44.1	36.2	4.8	4.0
2	6/22/2005	12:44:00	4.06	9.89	43.8	36.7	5.8	5.0
2	6/22/2005	12:45:00	4.03	9.90	43.7	35.6	3.7	2.9
2	6/22/2005	12:46:00	4.04	9.90	44.1	35.3	5.8	5.0
2	6/22/2005	12:47:00	4.06	9.89	44.0	35.9	4.7	3.9
2	6/22/2005	12:48:00	4.16	9.83	44.8	37.0	6.0	5.2
2	6/22/2005	12:49:00	4.10	9.89	44.6	35.8	5.4	4.6
2	6/22/2005	12:50:00	4.08	9.88	44.3	35.5	5.5	4.7
2	6/22/2005	12:51:00	4.05	9.90	44.1	35.7	3.0	2.2
2	6/22/2005	12:52:00	4.15	9.85	44.6	36.0	5.6	4.8
2	6/22/2005	12:53:00	4.07	9.89	44.1	35.6	5.0	4.2
2	6/22/2005	12:54:00	4.07	9.89	44.1	35.6	4.2	3.4
2	6/22/2005	12:55:00	4.08	9.89	43.6	35.1	5.7	4.9
2	6/22/2005	12:56:00	4.11	9.86	44.1	34.9	5.3	4.5
2	6/22/2005	12:57:00	4.13	9.85	44.5	36.2	4.9	4.1
2	6/22/2005	12:58:00	4.06	9.90	44.0	36.2	5.0	4.2
2	6/22/2005	12:59:00	4.07	9.88	44.1	34.7	3.6	2.8
2	6/22/2005	13:00:00	4.07	9.89	44.2	36.1	4.4	3.6
2	6/22/2005	13:01:00	4.10	9.86	44.3	35.7	5.1	4.3
2	6/22/2005	13:02:00	4.14	9.84	44.6	36.1	4.2	3.4
2	6/22/2005	13:03:00	4.05	9.91	44.0	36.2	4.9	4.1
2	6/22/2005	13:04:00	4.05	9.89	43.8	35.6	4.3	3.5
2	6/22/2005	13:05:00	4.03	9.91	43.7	35.5	6.0	5.2
2	6/22/2005	13:06:00	4.04	9.90	43.9	35.6	6.5	5.7
2	6/22/2005	13:07:00	4.11	9.86	44.2	35.6	7.0	6.2
2	6/22/2005	13:08:00	4.06	9.89	43.9	36.4	7.2	6.4
2	6/22/2005	13:09:00	4.08	9.88	44.0	35.5	5.4	4.7
2	6/22/2005	13:10:00	4.03	9.91	44.0	35.3	6.6	5.8
2	6/22/2005	13:11:00	4.02	9.91	44.1	35.0	4.4	3.6
2	6/22/2005	13:12:00	4.04	9.89	44.1	34.6	4.6	3.8
2	6/22/2005	13:13:00	4.05	9.89	44.1	35.4	4.1	3.3
2	6/22/2005	13:14:00	4.06	9.89	44.0	35.1	5.9	5.1
2	6/22/2005	13:15:00	4.02	9.91	44.0	35.8	5.9	5.1
2	6/22/2005	13:16:00	4.05	9.88	43.8	35.9	6.6	5.9
2	6/22/2005	13:17:00	4.07	9.87	43.9	34.8	7.5	6.7
2	6/22/2005	13:18:00	4.04	9.90	43.4	35.7	6.7	5.9
2	6/22/2005	13:19:00	4.06	9.88	43.6	35.4	6.7	5.9
2	6/22/2005	13:20:00	4.03	9.89	43.8	34.4	5.5	4.8
2	6/22/2005	13:21:00	4.13	9.85	44.7	36.5	5.4	4.6
2	6/22/2005	13:22:00	4.02	9.91	43.9	35.9	7.1	6.3
2	6/22/2005	13:23:00	4.07	9.87	44.6	34.9	6.1	5.3
2	6/22/2005	13:24:00	4.03	9.90	44.5	35.1	7.8	7.0
2	6/22/2005	13:25:00	4.06	9.89	44.9	35.7	9.5	8.7
2	6/22/2005	13:26:00	4.05	9.89	44.5	36.1	11.0	8.8
2	6/22/2005	13:27:00	4.06	9.88	43.9	34.2	11.0	9.0
2	6/22/2005	13:28:00	4.06	9.88	43.9	33.8	10.8	8.9
2	6/22/2005	13:29:00	4.03	9.90	43.6	33.3	10.5	9.7
2	6/22/2005	13:30:00	4.05	9.89	43.6	34.1	9.4	8.6
2	6/22/2005	13:31:00	4.07	9.87	43.8	34.7	8.5	7.7
2	6/22/2005	13:32:00	4.12	9.84	44.1	34.5	5.6	4.8
2	6/22/2005	13:33:00	4.05	9.89	43.8	35.2	8.7	7.9
2	6/22/2005	13:34:00	4.06	9.88	43.8	34.2	6.4	5.6
2	6/22/2005	13:35:00	4.06	9.86	43.7	34.5	11.2	9.9
2	6/22/2005	13:36:00	4.03	9.90	43.3	35.5	9.8	9.0
2	6/22/2005	13:37:00	4.07	9.85	43.5	33.0	7.2	6.4
2	6/22/2005	13:38:00	4.16	9.83	43.9	35.2	7.9	7.1
2	6/22/2005	13:39:00	4.05	9.88	43.4	35.3	7.7	6.9
2	6/22/2005	13:40:00	4.05	9.88	44.0	35.2	7.5	6.7
2	6/22/2005	13:41:00	4.11	9.84	45.2	34.4	7.7	6.5
		Raw Averages:	4.07	9.88	44.1	35.4	6.4	5.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
3	6/22/2005	15:01:00	4.09	9.85	45.3	36.0	7.6	6.5
3	6/22/2005	15:02:00	4.07	9.86	45.2	39.0	6.9	5.8
3	6/22/2005	15:03:00	4.16	9.78	46.0	39.0	7.5	6.4
3	6/22/2005	15:04:00	4.12	9.83	46.2	40.5	9.0	7.9
3	6/22/2005	15:05:00	4.14	9.81	46.0	40.0	8.6	7.5
3	6/22/2005	15:06:00	4.04	9.87	45.4	41.2	10.5	9.4
3	6/22/2005	15:07:00	4.09	9.84	45.5	39.8	7.2	6.1
3	6/22/2005	15:08:00	4.04	9.85	45.4	40.0	8.6	7.5
3	6/22/2005	15:09:00	4.06	9.85	45.8	40.3	7.8	6.7
3	6/22/2005	15:10:00	4.04	9.85	45.8	39.0	10.5	9.4
3	6/22/2005	15:11:00	4.07	9.83	46.2	39.1	9.0	7.9
3	6/22/2005	15:12:00	4.07	9.85	46.0	40.5	8.7	7.6
3	6/22/2005	15:13:00	4.03	9.87	45.6	40.4	8.1	7.0
3	6/22/2005	15:14:00	4.06	9.84	45.8	39.8	6.5	5.4
3	6/22/2005	15:15:00	4.07	9.84	45.7	39.6	7.9	6.8
3	6/22/2005	15:16:00	4.01	9.88	45.2	39.2	8.3	7.2
3	6/22/2005	15:17:00	4.06	9.84	45.6	39.0	8.9	7.8
3	6/22/2005	15:18:00	4.04	9.87	45.6	40.3	5.9	4.8
3	6/22/2005	15:19:00	3.96	9.91	45.0	38.0	7.1	6.0
3	6/22/2005	15:20:00	4.10	9.84	45.1	38.2	7.0	5.9
3	6/22/2005	15:21:00	4.01	9.89	44.9	36.7	6.1	5.0
3	6/22/2005	15:22:00	4.01	9.87	44.8	35.9	5.6	4.5
3	6/22/2005	15:23:00	4.10	9.83	45.3	37.8	8.2	7.1
3	6/22/2005	15:24:00	4.10	9.84	45.3	39.1	6.4	5.3
3	6/22/2005	15:25:00	4.14	9.81	45.7	39.4	8.1	7.0
3	6/22/2005	15:26:00	4.09	9.84	45.5	38.8	6.8	5.7
3	6/22/2005	15:27:00	4.14	9.81	46.3	39.9	8.1	7.0
3	6/22/2005	15:28:00	4.09	9.84	46.3	41.3	6.9	5.8
3	6/22/2005	15:29:00	6.23	8.65	41.2	35.1	5.6	4.5
3	6/22/2005	15:30:00	4.43	9.81	45.6	37.4	4.1	3.0
3	6/22/2005	15:31:00	4.00	9.90	45.9	37.3	5.1	4.0
3	6/22/2005	15:32:00	3.98	9.91	45.7	37.5	3.9	2.8
3	6/22/2005	15:33:00	3.93	9.94	45.0	36.6	4.7	3.6
3	6/22/2005	15:34:00	3.97	9.92	45.2	34.5	3.9	2.8
3	6/22/2005	15:35:00	3.98	9.90	45.4	35.8	5.7	4.6
3	6/22/2005	15:36:00	4.04	9.86	46.0	36.5	4.3	3.2
3	6/22/2005	15:37:00	4.02	9.90	45.6	37.3	4.3	3.2
3	6/22/2005	15:38:00	4.00	9.89	45.4	37.5	4.4	3.3
3	6/22/2005	15:39:00	4.07	9.85	45.9	36.5	5.5	4.4
3	6/22/2005	15:40:00	4.08	9.85	46.0	37.3	5.2	4.1
3	6/22/2005	15:41:00	3.96	9.93	45.2	38.2	3.0	1.9
3	6/22/2005	15:42:00	4.00	9.89	45.3	35.9	4.0	2.9
3	6/22/2005	15:43:00	4.01	9.90	45.1	36.8	3.7	2.6
3	6/22/2005	15:44:00	3.93	9.95	44.7	38.2	5.2	4.1
3	6/22/2005	15:45:00	4.01	9.88	45.0	34.6	8.9	7.8
3	6/22/2005	15:46:00	4.05	9.88	44.9	35.8	5.2	4.1
3	6/22/2005	15:47:00	4.02	9.89	44.9	36.6	7.5	6.4
3	6/22/2005	15:48:00	4.03	9.88	45.0	37.2	4.2	3.1
3	6/22/2005	15:49:00	4.00	9.91	44.7	38.5	8.7	7.6
3	6/22/2005	15:50:00	4.00	9.90	44.3	36.3	4.7	3.6
3	6/22/2005	15:51:00	4.01	9.90	44.4	36.3	8.5	7.4
3	6/22/2005	15:52:00	3.98	9.92	44.4	37.0	5.0	3.9
3	6/22/2005	15:53:00	4.01	9.90	44.4	37.3	8.9	7.8
3	6/22/2005	15:54:00	4.06	9.86	44.7	36.1	3.9	2.8
3	6/22/2005	15:55:00	4.04	9.89	44.6	37.0	5.9	4.8
3	6/22/2005	15:56:00	3.98	9.91	44.5	36.7	9.1	8.0
3	6/22/2005	15:57:00	4.03	9.89	45.1	36.4	6.1	5.0
3	6/22/2005	15:58:00	3.96	9.94	44.5	36.9	12.7	11.6
3	6/22/2005	15:59:00	3.96	9.93	44.7	37.9	15.2	14.1
3	6/22/2005	16:00:00	4.04	9.88	45.0	36.7	5.8	4.7
		Raw Averages:	4.08	9.85	45.2	37.9	6.8	5.7

Quality Assurance

ANTEC SE 59108

MATHESON TRI·GAS

CERTIFICATE OF ANALYSIS - EPA PROTOCOL MIXTURE

1650 Enterprise Parkway, Twinsburg, Ohio 44087 • 215-648-4000

Customer: Matheson Tri-Gas Inc. 133 Portland
Cylinder Number: SX-36316
Cylinder pressure. 2000
Last Analysis date 8/6/2004
Expiration Date: 8/6/07

Protocol:	Reference #	Lot #
G1		109-46-38005

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 150 PSIG

REPLICATE RESPONSES

	Date: 8/6/2004	Date:
Component: Propane	83.3 PPM	
Certified Conc: 83.1 PPM ± 1%	83.1 PPM	
Requested Conc: 80 ppm	82.9 PPM	

BALANCE GAS: Nitrogen

REFERENCE STANDARDS

Component: Propane
SRM #: SRM-1668b
Cylinder #: XF-004135B
Concentration; 98.9 ppm

CERTIFICATION INSTRUMENTS

Component: Propane
Make/Model: Varian 3800 GC
Serial Number: LR-92489
Measurement Principle: TC, FID
Last Calibration: 8/6/2004

Notes: T50256 P.O. XC 006055

This certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards September 1997, using procedure G1 and/or G2.

Analyst Philip D. Mad Date 8/9/2004

AGR_009951

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC100723	1667 PSIG	SFS62634
Assay Date:	**Expiration Date:**	**Document Number:**
2/27/2004	2/27/2006	12992017
Customer:	**P.O. Number:**	**Item Number:**
AIR LIQUIDE	SE004013	
TACOMA, WA		

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	4959	ppm	5080	±	70	ppm
Sulfur Dioxide	4910	ppm	4820	±	70	ppm
Carbon Monoxide	4660	ppm	4760	±	70	ppm
NOx			5080	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.3, Procedure : G-2

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS Concentration				Component	Balance	SRM, GMIS Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
5050	±	50	ppm	Nitric Oxide	Nitrogen	CC 67671	SFS42116	03/27/04	JW	GMIS
5030	±	50	ppm	Sulfur Dioxide	Nitrogen	CC 55197	L99-022	01/08/06	MJ	GMIS
4980	±	50	ppm	Carbon Monoxide	Nitrogen	AL-1927	12223	05/19/05	BY	GMIS

Nitric Oxide
GAS ANALYZER EMPLOYED

Manufacturer:	Beckman
Model Number:	951A
Serial Number:	00100506
MPR Last Calibrated:	02/27/04
Analytical Principle:	Chemiluminescent

Sulfur Dioxide
GAS ANALYZER EMPLOYED

Manufacturer:	Horiba
Model Number:	CMA-331A
Serial Number:	56674503
MPR Last Calibrated:	02/12/04
Analytical Principle:	NDIR

Carbon Monoxide
GAS ANALYZER EMPLOYED

Manufacturer:	Rosemount Analytical CO
Model Number:	880Z-16
Serial Number:	2000224
MPR Last Calibrated	02/20/04
Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	-3	-3	-3	Vdc
Reference	504	504	504	Vdc
Candidate	507	507	507	Vdc
Result	5060	5080	5060	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				5069 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	-3	-3	-3	Vdc
Reference	505	505	505	Vdc
Candidate	509	509	509	Vdc
Result	5090	5090	5090	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				5090 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	507	506	505	Area
Candidate	487	486	486	Area
Result	4832	4831	4831	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				4831 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	506	504	504	Area
Candidate	484	483	483	Area
Result	4811	4820	4820	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				4817 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	502	501	501	Vdc
Candidate	479	479	479	Vdc
Result	4752	4761	4761	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				4758 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	500	500	501	Vdc
Candidate	478	478	479	Vdc
Result	4751	4761	4761	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				4761 ppm

Analyst:

Approved by:

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC12901	2000PSIG	SFS62633
Assay Date:	Expiration Date:	Document Number:
2/27/2004	2/27/2006	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT: Name	REQUESTED: Concentration		ASSAY: Concentration			
Nitric Oxide	480	ppm	488	±	7	ppm
Sulfur Dioxide	480	ppm	483	±	7	ppm
Carbon Monoxide	480	ppm	479	±	6	ppm
NOx			488	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No: 2.2, Procedure : G-1

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration				Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
483	±	5	ppm	Nitric Oxide	Nitrogen	CC 61908	SFS44299	09/04/04	LT	GMIS
745	±	8	ppm	Sulfur Dioxide	Nitrogen	CC 60854	L99-044	01/06/05	LM	GMIS
500	±	4	ppm	Carbon Monoxide	Nitrogen	CC 150327	SFS48669	04/02/05	LU	GMIS

Nitric Oxide

GAS ANALYZER EMPLOYED

Manufacturer:	Beckman
Model Number:	951A
Serial Number:	00100508
MPR Last Calibrated:	02/16/04
Analytical Principle:	Chemiluminescent

Sulfur Dioxide

GAS ANALYZER EMPLOYED

Manufacturer:	Rosemount Analytical
Model Number:	880192
Serial Number:	1000130
MPR Last Calibrated:	02/15/04
Analytical Principle:	Ultraviolet

Carbon Monoxide

GAS ANALYZER EMPLOYED

Manufacturer:	Rosemount Analytical CO
Model Number:	880Z-16
Serial Number:	2000224
MPR Last Calibrated:	02/20/04
Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	477	477	477	Vdc
Candidate	480	481	481	Vdc
Result	486.0	487.1	487.1	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 486.7 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	484	485	485	Vdc
Candidate	490	490	491	Vdc
Result	489.0	488.0	489.0	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 488.6 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	728	728	728	Area
Candidate	472	472	472	Area
Result	483.0	483.0	483.0	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 483.0 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	745	745	745	Area
Candidate	482	482	483	Area
Result	482.0	482.0	483.0	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 482.3 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	500	499	499	Vdc
Candidate	479	479	479	Vdc
Result	479.0	480.0	480.0	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 479.6 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	504	503	503	Vdc
Candidate	483	482	482	Vdc
Result	479.2	479.1	479.1	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 479.1 ppm

Analyst:

Approved by:

AIR LIQUIDE

8832 DICE ROAD, SANTA FE SPRINGS, CALIFORNIA 90670 (562) 9451383

EPA Protocol

Section No. 2.2, Procedure G-1

DOC. NUMBER	13261073
CUSTOMER	ALA-CYL-TACOMA
LOCATION	TACOMA, WA
P.O. NUMBER	
ITEM NUMBER	

SERIAL #	LOT #	CGA
CC36363	SFS71754	660

COMPONENT	CONCENTRATION			
Nitric Oxide	97.3	±	1.3	ppm
Sulfur Dioxide	97.5	±	1.4	ppm
Carbon Monoxide	98.4	±	1.4	ppm
NOx	97.3	ppm		
Nitrogen	Balance			

ASSAY	EXPIRATION	PRESSURE
08/20/04	08/20/06	2000PSIG

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC44569	2000PSIG	SFS62632
Assay Date:	**Expiration Date:**	**Document Number:**
2/27/2004	2/27/2006	12692017
Customer:	**P.O. Number:**	**Item Number:**
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	50	ppm	51.1	±	0.8	ppm
Sulfur Dioxide	50	ppm	48.9	±	0.8	ppm
Carbon Monoxide	50	ppm	50.3	±	0.8	ppm
NOx			51.1	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No.: 2.2, Procedure: G-1

Analyst: Thuan Tran
Approved by: Eric Barton

REFERENCE STANDARD EMPLOYED FOR ANALYSIS — SRM/GMIS

Concentration			Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
46.9	± 0.6	ppm	Nitric Oxide	Nitrogen	CC 66188	SFS40352	01/08/05	LP	GMIS
51.0	± 0.7	ppm	Sulfur Dioxide	Nitrogen	CC 71619	970803	01/08/06	MG	GMIS
51.8	± 0.6	ppm	Carbon Monoxide	Nitrogen	CC 103459	SFS51959	09/08/05	MV	GMIS

Nitric Oxide — GAS ANALYZER EMPLOYED		Sulfur Dioxide — GAS ANALYZER EMPLOYED		Carbon Monoxide — GAS ANALYZER EMPLOYED	
Manufacturer:	Beckman	Manufacturer:	Horiba	Manufacturer:	Rosemount Analytical CO
Model Number:	951A	Model Number:	CMA-331A	Model Number:	8802-16
Serial Number:	00100508	Serial Number:	56674503	Serial Number:	2000224
MPR Last Calibrated:	02/12/04	MPR Last Calibrated:	02/12/04	MPR Last Calibrated:	02/03/04
Analytical Principle:	Chemiluminescent	Analytical Principle:	NDIR	Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	456	457	456	Vdc
Candidate	496	496	497	Vdc
Result	51.01	50.90	51.12	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT				51.01 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	470	469	469	Vdc
Candidate	512	511	511	Vdc
Result	51.09	51.10	51.10	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				51.10 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	-2	-2	-2	Area
Reference	460	460	479	Area
Candidate	460	460	459	Area
Result	48.88	48.88	48.88	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.88 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	451	451	452	Area
Candidate	432	433	433	Area
Result	48.86	48.97	48.87	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.90 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	-1	-1	Vdc
Reference	515	515	515	Vdc
Candidate	498	498	498	Vdc
Result	50.09	50.09	50.09	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				50.09 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	-2	-2	-2	Vdc
Reference	512	512	512	Vdc
Candidate	498	499	498	Vdc
Result	50.39	50.49	50.39	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				50.42 ppm

Analyst:

Approved by:

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number: CC109232	Cyl. Pressure:* 2000PSIG	Lot Number: SFS62631
Assay Date: 2/23/2004	Expiration Date: 2/23/2007	Document Number: 12592017
Customer: AIR LIQUIDE TACOMA, WA	P.O. Number: SE004043	Item Number:

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Carbon Dioxide	19	%	19.0	±	0.3	%
Oxygen	22.5	%	22.5	±	0.3	%
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure : G-1

Analyst: Eric Barron
Approved by: David Connolly

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration				Component	Balance	Cyl. No.	SRM NTRM No.	Exp. Date	Sample No.	Type
18.0	±	0.2	%	Carbon Dioxide	Nitrogen	CC 103274	SFS31230	05/06/05	HS	GMIS
21.11	±	0.14	%	Oxygen	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS

Carbon Dioxide GAS ANALYZER EMPLOYED	
Manufacturer	Varian(B)
Model Number	3400
Serial Number:	2806
MPR Last Calibrated:	02/09/04
Analytical Principle:	FID & TCD

Oxygen GAS ANALYZER EMPLOYED	
Manufacturer:	Varian(B)
Model Number:	3400
Serial Number:	2806
MPR Last Calibrated:	02/12/04
Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	10971746	10976563	10953995	Area
Candidate	11534086	11539429	11583063	Area
Result	18.92	18.92	19.03	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				18.96 %

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	10328539	10393862	10363240	Area
Candidate	11036425	11049496	11086648	Area
Result	22.56	22.44	22.58	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				22.53 %

Analyst:	Approved by:
E J Barron	David Connolly

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC53983	2000PSIG	SFS62630
Assay Date:	Expiration Date:	Document Number:
3/1/2004	3/1/2007	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Carbon Dioxide	10	%	9.98	±	0.11	%
Oxygen	12.5	%	12.5	±	0.1	%
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure : G-1

REFERENCE STANDARD EMPLOYED FOR ANALYSIS Concentration			Component	Balance	Cyl. No.	SRM NTRM No.	Exp. Date	Sample No.	Type
5.006	± 0.026	%	Carbon Dioxide	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS
21.11	± 0.14	%	Oxygen	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS

Analyst: Eric Barron
Approved by: David Connolly

Carbon Dioxide GAS ANALYZER EMPLOYED	
Manufacturer	Varian(B)
Model Number:	3400
Serial Number	2606
MPR Last Calibrated	02/09/04
Analytical Principle:	FID & TCD

Oxygen GAS ANALYZER EMPLOYED	
Manufacturer:	Varian(B)
Model Number:	3400
Serial Number:	2806
MPR Last Calibrated	02/12/04
Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	1167802	1170948	1166504	Area
Candidate	2330227	2328930	2329212	Area
Result	9.989	9.957	10.00	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				9.981 %

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	3984344	3985538	3983177	Area
Candidate	2350860	2349521	2351992	Area
Result	12.45	12.44	12.47	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				12.45 %

Analyst:	Approved by:
E. Barron	David Connolly

Example Equations

Data is from B5 Boiler Run 1

Absolute pressure in the Stack(P_s)

Where P_{bar} = barometric pressure

P_g = static pressure of the stack

P_s: $P_{bar} + P_g/13.6$

P_s: 24.4+ (-0.41/13.6)

P_s: **24.37**

Volume of Metered Sample Gas @ Std. Conditions

Where V_m = Volume, Dry Gas Meter, cubic ft.

K_1 = 17.64 °R/in. Hg

Y = Dry gas meter calibration factor

P_{bar} = Barometric pressure

ΔH = Gas Meter average differential pressure, in. H_2O

T_m = Gas Meter average temperature, °F

$V_{m(std)}$: $K_1 * V_m * Y * (P_{bar} + (\Delta H/13.6))/(T_m + 460)$

$V_{m(std)}$: 17.64 * 90.587 * .995 * (24.4 + (1.3/13.6))/(89.9 + 460)

$V_{m(std)}$: **70.826**

Volume of Water@ Standard Conditions

Where V_{lc} = Impinger liquid volume collected, ml

$V_{w(std)}$: 0.04707 * V_{lc}

$V_{w(std)}$: 0.04707 * 305.4

$V_{w(std)}$: **14.375**

Moisture(Bws) Volumetric

Where $V_{w(std)}$ = Std. Water vapor volume, scf

$V_{m(std)}$ = Std. Sample gas volume,DSCF

Bws: $V_{w(std)} / (V_{w(std)} + V_{m(std)})$

Bws: 14.375 / (14.375 + 70.826)

Bws: **0.169**

Molecular Weight lb/lb - mole, Dry (M_d)

M_d: $((0.44*\%CO_2)+(0.32*\%O_2)+(0.28*\%N_2)$

M_d: ((0.44*9.76)+(0.32*4.14)+(0.28*86.1)

M_d: **29.73**

Molecular Weight lb/lb - mole, Wet (M_w)

M_w: (M_d * (1-Bws) + (18 * Bws)

M_w: (29.73 * (1-0.169) + (18 *0.169)

M_w: **27.75**

Gas Velocity(V_s)

Where C_p = pitot tube coefficient

T_s = temperature of the stack

M_w = molecular weight lb/lb - mole, wet

Ps = absolute pressure in the stack

V_s: (85.49 * C_p * SQRT(ΔP) * SQRT((T_s + 460)/(P_s * M_w))

V_s: (85.49 * 0.84 * SQRT(0.629) * SQRT((350.1 + 460)/(24.37 * 27.75))

V_s: **62.3**

Actual Cubic Feet/Minute (acfm)

Where A = area of the duct in square feet

V_s = Stack gas velocity, ft/sec

acfm: A * V_s * 60

acfm: 22.34 * 62.3* 60

acfm: **83,507**

Dry Standard Actual Cubic Feet/Minute (dscfm)

Where T_s = temperature of the stack

acfm = actual cubic ft/min

dscfm: (1-(Bws)) * acfm * (528/(T_s + 460)) * (P_s/(29.92))

dscfm: (1-(0.169)) * 83507 * (528/(350.1 + 460)) * (24.37/(29.92))

dscfm: **36,839**

Percent Isokinetic Variation

Where T_s = temperature of the stack

P_s = absolute pressure in the stack

$V_{m(std)}$ = Std. Sample gas volume,DSCF

V_s = Stack gas velocity, ft/sec

A_n = Nozzle area, ft^2

K_4 = 0.0945 constant from EPA method 5

θ = sample time in minutes

%Iso: K_4 * (T_s + 460) * $V_{m(std)}$ / (P_s * V_s * A_n * θ * (1- B_{ws}))

%Iso: 0.0945 * (350.1 + 460) * 70.826 / (24.37 * 62.3 * 3.30e-04* 1200 * (1-0.169)

%Iso: **108.5**

Grains per Dry Standard Cubic Feet

Where mg = milligrams particulate

$V_{m(std)}$ = Std. Sample gas volume,DSCF

gr/dscf: (0.0154*mg)/$V_{m(std)}$

gr/dscf: (0.0154*11.6)/70.826

gr/dscf: **0.0025**

Particulate pounds per Hour

Where gr/dscf = grains per dry standard cubic feet

DSCFM = Dry Standard Cubic Ft/min

lbs/hr: (gr/dscf * DSCFM *60)/7000

lbs/hr: (0.0025 * 36839 *60)/7000

lbs/hr: **0.79**

Particulate pounds per mmBtu

Where gr/dscf = grains per dry standard cubic feet

Fd = Fuel Factor for natural gas (8710 dscf/mmBtu)

O2 = effluent oxygen level

lbs/mmBtu: (gr/dscf * Fd/7000)*(20.9/(20.9-O2)
lbs/mmBtu: (0.0025 * 8710/7000)*(20.9/(20.9-4.14)
lbs/mmBtu: **0.0039**

Oxides of Nitrogen @ 3.0% Oxygen

Where Corr O_2 = percent oxygen corrected to
Eff O_2 = effluent oxygen content
ppm = parts per million dry basis NOx
NOx ppm @ 7% O_2: ppm *((20.9 - Corr O_2)/(20.9 - Eff O_2)
NOx ppm @ 7% O_2: 44.3 *((20.9 - 3.0)/(20.9 - 4.14)
NOx ppm @ 7% O_2: **47.3**

Oxides of Nitrogen pounds per mmBtu

Where M_w = Molecular weight of NO_2
Eff O2 = effluent oxygen content
F_d = 9780 dscf/mmBtu (Fuel factor from CFR 40)
ppm = parts per million dry basis NOx
NOx lbs/mmBtu: ((ppm * M_w)/ 385.1e6)) * (20.9/(20.9 - Eff O_2)) * F_d
NOx lbs/mmBtu: ((44.3 * 46.01)/ 385.1e6)) * (20.9/(20.9 - 4.14)) * 8710
NOx lbs/mmBtu: **0.0575**

Oxides of Nitrogen pounds per Hour

Where M_w = Molecular weight of NO_2
DSCFM = Dry Standard Cubic Ft/min
ppm = parts per million dry basis NOx
NOx lbs/hr: (ppm*Mw/385100000)*Dscfm*60
NOx lbs/hr: (44.3 * 46.01/385100000) * 36839 * 60
NOx lbs/hr: **11.70**

Environics Series 4000
Calibration Report

Calibration Date: January 5, 2005
Reference Gas: Nitrogen
Calibration Standard: DryCal (Model DC-Lite Primary Flow Meter)
Instrument Serial # : 2627

Mass Flow Controller 1	
Set Flow ccm	True Flow ccm
500.00	499
1000.00	1061
2000.00	2122
3000.00	3134
4000.00	4130
5000.00	5115
6000.00	6089
7000.00	7051
8000.00	8019
9000.00	9010
10000.00	10180

Mass Flow Controller 2	
Set Flow ccm	True Flow ccm
500.00	498
1000.00	1020
2000.00	2050
3000.00	3064
4000.00	4054
5000.00	5064
6000.00	6063
7000.00	7044
8000.00	8032
9000.00	9029
10000.00	10052

Mass Flow Controller 3	
Set Flow ccm	True Flow ccm
50.00	49.1
100.00	97.2
200.00	194.4
300.00	291.3
400.00	389.1
500.00	487.4
600.00	590.2
700.00	689.2
800.00	791.50
900.00	895.6
1000.00	1008

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC36363	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	97.3 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/7/2004
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/7/2005
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	6000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 2								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m Mass Flow Controller 1	Flow Rate, cc/m Mass Flow Controller 2	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value			Per Run	Average		
Lower	1	50.0	2917	3083	50.1		0.00 %	
Point	2	50.0	2917	3083	50.1	50.1	0.00 %	0.20 %
Injections	3	50.0	2917	3083	50.1		0.00 %	
Upper	1	80.0	1067	4933	79.9		0.00 %	
Point	2	80.0	1067	4933	79.8	79.9	-0.10 %	-0.10 %
Injections	3	80.0	1067	4933	79.9		0.00 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentralon	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.5	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:** 1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 2.
3. Maximum flow, controller 1: 10000 ccm
4. Maximum flow, controller 2: 10000 ccm

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC48625	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	491.0 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/3/2003
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/3/2004
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	5000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 3								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m Mass Flow Controller 1	Flow Rate, cc/m Mass Flow Controller 3	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value			Per Run	Average		
Lower	1	50.0	4491	509	49.8		-0.20 %	
Point	2	50.0	4491	509	49.9	49.9	0.00 %	-0.20 %
Injections	3	50.0	4491	509	49.9		0.00 %	
Upper	1	80.0	4185	815	80.0		0.00 %	
Point	2	80.0	4185	815	80.0	80.0	0.00 %	0.00 %
Injections	3	80.0	4185	815	80.1		0.10 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentraion	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.4	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:** 1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 3.
3. Maximum flow, controller 1: 10000 cc/m
4. Maximum flow, controller 3: 1000 cc/m

Interference Response Test

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 06/21/05
Project No.: AES5063

NOx Analyzer

Manufacturer: Eco-Physics
Model: CLD-70E
Serial No.: 83S0008
Date:

Range: 0-100ppm
Proceedure: Method 20 Section 5.4
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Monoxide	CC48625	485.0	0.0
Sulfur Dioxide	CC48625	200.0 (Blended)	0.0
Carbon Dioxide	CC04371	10.0	0.0
Oxygen(Zero Air)	CC83609	20.9	0.0

CO Analyzer

Manufacturer: Siemens
Model: Ultramat 5E
Serial No.: E4-778
Date:

Range: 0-100ppm
Proceedure: Method 10
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Dioxide	CC04371	10.0	0.1

Sampling System Response Time

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 21, 2005
Project No.: AES5063

Antec Environmental Services

Analyzer Type: EcoPhysics NOx
Model No.: CDL 70S
Serial No.: 83S0008

Span gas Concentration: 45.0
Analyzer range: 100.0

Length & Type of sample line used: 100 ft Heated, teflon lined

Upscale:

1). 65 seconds
2). 65 seconds
3). 65 seconds

Average upscale response: 65 seconds

Downscale:

1). 60 seconds
2). 60 seconds
3). 60 seconds

Average downscale response: 60 seconds

System Response time: 65 seconds

High Flow Meter Calibration

Meterbox No.: HF-1
Barometric Pressure: 29.10 (in. Hg)
Calibrated by: BWJ
Date: 4/1/2005

Leak Check: Zero
Leak Check @: 23.5 (in. H2O)

Meter Coefient: ***0.995***
ΔH@: ***1.614***

Point One

Critical Oriface Data

I.D. No.: K'-0.257
Orifice K': 0.2614
Rated cfm: 0.335

Test Results

Time: 15
DGM cfm.: 0.340
Ori. cfm.: 0.335
ΔH@: 1.587
Vm(std): 5.088
Vcr(std): 5.019
Y: 0.986

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	57.0	57.0	57.0	57.0
Meter Inlet Temp.:	57.0	58.0	58.0	57.7
Meter Outlet Temp.:	53.0	54.0	54.0	53.7
Meter Temp. Ave.:	55.0	56.0	56.0	55.7
Initial cu. ft.:	453.700	455.390	457.095	
Final cu. ft.:	455.390	457.095	458.807	
Total cu. ft.:	1.690	1.705	1.712	5.107
ΔH iv. H2O:	0.32	0.32	0.32	0.320
Vacuum(in.Hg):	20.5	20.5	20.5	20.5
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.607	1.582	1.571	1.587
Vcr(std):	1.673	1.673	1.673	5.019
Vm(std):	1.686	1.698	1.704	5.088
Y:	0.992	0.985	0.982	0.986

Point Two

Critical Oriface Data

I.D. No.: K'-0.385
Orifice K': 0.3979
Rated cfm: 0.510

Test Results

Time: 15
DGM cfm.: 0.511
Ori. cfm.: 0.510
ΔH@: 1.765
Vm(std): 7.675
Vcr(std): 7.647
Y: 0.996

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	56.0	56.0	56.0	56.0
Meter Inlet Temp.:	54.0	57.0	57.0	56.0
Meter Outlet Temp.:	51.0	52.0	52.0	51.7
Meter Temp. Ave.:	52.5	54.5	54.5	53.8
Initial cu. ft.:	445.700	448.235	450.810	
Final cu. ft.:	448.235	450.810	453.368	
Total cu. ft.:	2.535	2.575	2.558	7.668
ΔH iv. H2O:	0.81	0.81	0.81	0.81
Vacuum(in.Hg):	19.0	19.0	19.0	
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.787	1.742	1.766	1.765
Vcr(std):	2.549	2.549	2.549	7.647
Vm(std):	2.544	2.574	2.557	7.675
Y:	1.002	0.990	0.997	0.996

High Flow Meter Calibration

Meterbox No.: HF-1
Barometric Pressure: 29.1 (in. Hg)
Calibrated by: BWJ
Date: 04/01/05

Leak Check: Zero
Leak Check @: 23.0 (in. H2O)

Meter Coefient: ***0.995***
ΔH@: ***1.614***

Point Three

Critical Oriface Data	
I.D. No.:	K'-0.559
Orifice K':	0.5693
Rated cfm:	0.730

Test Results	
Time:	15
DGM cfm.:	0.733
Ori. cfm.:	0.730
ΔH@:	1.256
Vm(std):	11.070
Vcr(std):	10.954
Y:	0.989

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	54.0	55.0	55.0	54.7
Meter Inlet Temp.:	51.0	54.0	55.0	53.3
Meter Outlet Temp.:	49.0	49.0	50.0	49.3
Meter Temp. Ave.:	50.0	51.5	52.5	51.3
Initial cu. ft.:	434.500	438.175	441.840	
Final cu. ft.:	438.175	441.840	445.494	
Total cu. ft.:	3.675	3.665	3.654	10.994
ΔH w. H2O:	1.20	1.20	1.20	1.20
Vacuum(in.Hg):	17.0	17.0	17.0	17.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.240	1.259	1.269	1.256
Vcr(std):	3.654	3.650	3.650	10.954
Vm(std):	3.710	3.689	3.671	11.070
Y:	0.985	0.989	0.994	0.989

Point Four

Critical Oriface Data	
I.D. No.:	K'-0.821
Orifice K':	0.8424
Rated cfm:	1.077

Test Results	
Time:	15
DGM cfm.:	1.066
Ori. cfm.:	1.077
ΔH@:	1.848
Vm(std):	16.041
Vcr(std):	16.155
Y:	1.007

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	58.0	58.0	58.0	58.0
Meter Inlet Temp.:	58.0	58.0	58.0	58.0
Meter Outlet Temp.:	55.0	55.0	55.0	55.0
Meter Temp. Ave.:	56.5	56.5	56.5	56.5
Initial cu. ft.:	459.000	464.325	469.660	
Final cu. ft.:	464.325	469.660	474.990	
Total cu. ft.:	5.325	5.335	5.330	15.990
ΔH w. H2O:	3.70	3.70	3.70	3.70
Vacuum(in.Hg):	13.0	13.0	13.0	13.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.851	1.844	1.848	1.848
Vcr(std):	5.385	5.385	5.385	16.155
Vm(std):	5.342	5.352	5.347	16.041
Y:	1.008	1.006	1.007	1.007

High Flow Meter Post Test Calibration

Meterbox No.: HF-1
Company: Agrium CPO/Nu-West Inc
Source: B5 Boiler
Date: 6/27/2005
Job # AES5063

Leak Check: zero
Leak Check Pressure.: 6.0 (In. H_2O)
Barometric Pressure: 28.95 (In. Hg)
Calibrated by: BWJ
Quarterly Calibration date: 4/1/2005

Pretest Meter Coefient: *0.995*
Pretest ΔH@: *1.614*

Postest Meter Coefient: *0.998*
Postest ΔH@: *2.033*
Pass or Fail *Pass*

Critical Orifice Data

I.D. No.: 0.559
Orifice K': 0.5693
Rated cfm: 0.717

Test Results

Time: 15
DGM cfm.: 0.741
Ori. cfm.: 0.717
ΔH@: 2.033
Vm(std): 10.772
Vcr(std): 10.752
Y: 0.998

Test Point

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.	68.0	69.0	69.0	68.7
Meter Inlet Temp.	70.0	70.0	70.0	70.0
Meter Outlet Temp.	68.0	69.0	69.0	68.7
Meter Temp. Ave.	69.0	69.5	69.5	69.3
Initial cu. ft.:	900.500	904.205	907.910	
Final cu. ft.:	904.205	907.910	911.615	
Total cu. ft.:	3.705	3.705	3.705	11.115
ΔH in. H_2O:	1.800	1.800	1.800	1.800
Vacuum(in.Hg):	18.0	18.0	18.0	18.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	2.028	2.036	2.036	2.033
Vcr(std):	3.586	3.583	3.583	10.752
Vm(std):	3.593	3.590	3.590	10.772
Y:	0.998	0.998	0.998	0.998

PITOT TUBE POST TEST CALIBRATION

Pitot Tube ID No.: AESP6.1
Barometric Pressure: 28.95 (In. Hg)
Calibrated By: BWJ
Date: 6/27/2004

Std. Pitot ID: S-1
Cp(std): 0.99 (In. H20)

Pitot Tube Coefficient (Cp): 0.84

Pitot A-Side Calibration

ΔPstd	ΔPs	Cp (S) [a]
0.36	0.5	0.84

Pitot B-Side Calibration

ΔPstd	ΔPs	Cp (S) [a]
0.36	0.5	0.84

THERMOCOUPLE POST TEST CALIBRATION

Thermocouple ID No.: AESP4.1T
Calibrated By: BWJ
Date: 6/27/2004

Heat Source: Controlled Electric Furnace
Reference Thermometer: Extech 42312 Dig. Thermometer

Ref. Temp. F°	Equip. Temp. F°	% Diff.
350	349.4	0.074074

Field & Laboratory Data

Sample Recovery & Chain of Custody

Client: AGRIUM
Location: Soda Springs, ID
Source: Boiler B5
Date: 6-22-05
Project No.: AES5064

Antec Environmental Services

	RUN #: Filter #:			RUN #: Filter #:			RUN #: Filter #:		
	Filter tare weight, gms.:			Filter tare weight, gms.:			Filter tare weight, gms.:		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	860.5	568.9	291.6	801.8	558.8	243.0	855.5	574.9	276.6
H_2O	613.2	576.3	36.9	617.8	565.1	52.7	599.0	580.6	18.4
KO	481.2	476.9	4.9	459.9	454.2	5.7	455.5	451.1	4.4
Silica	756.9	734.9	22.0	769.3	744.3	25.0	768.90	757.0	11.8
LW			-50.0			-50			-50
	Vlc: (Liquid volume collected, ml)		305.4		Vlc:	276.4		Vlc:	261.2

Sample Description	Sample I.D. Number		
	Run #1	Run #2	Run #3
Front Half Filter	338	344	346
Back Half Filter	NA	→	→
Probe & Nozzle	PNR1AG	PNR2AG	PNR2AG
Impinger Catch H_2O	H_2OR1AG	H_2OR2AG	H_2OR3AG
MeCl Impinger Rinse	IRR1AG	IRR2AG	IRR2AG
Liquid Levels Marked	yes @ Cartel		
Samples Sealed and Stored/Location	Mobile Lab #1		
Date & Time Samples Sealed	Post Run1 Mobile Lab #1		6-22-05

Date Sampled: 6-22-05
Date & Time Recovered: 6-22-05 Post Run
Recovered by: E. Olson

Released by: E E Olson Date: 6-24-05 Received by: AES LAB
Released by: Date: Received by:
Released by: Date: Received by:

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: Fibrium
Sampling location:
Date: 6-22-05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	~~0~~	@ 3.5	(in)H_2O
Side B:	~~0~~	@ 3.7	(in)H_2O

Sample Train Leak Check			
Initial:	0.000 Cuft@	10.0	(in)Hg
Final:	0.000 Cuft@	10.0	(in)Hg

Run #: 1
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) 2.5 (D_n) 2.0
Assumed Moisture(%): 8 (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number	Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head $\Delta Ps(in)H_2O$	Corrected Head $\Delta Ps(in)H_2O$	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Metor Temp (°F) Inlet	Dry Gas Metor Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
	1 12	0	0911	1	349	0.35		0.70	611.100	80	79	240	249	48
	2 11	5		2	349	0.35		0.70	613.9	81	79	240	252	49
	3 10	10		2	350	0.35		0.70	616.6	82	80	238	250	50
	4 9	15		2	350	0.38		0.76	619.4	83	80	240	252	51
	5 8	20		2	350	0.40		0.80	622.3	85	81	239	250	52
	6 7	25		2	352	0.45		0.91	625.2	87	82	241	252	52
	7 6	30		3	352	0.70		1.4	628.4	89	83	240	253	53
	8 5	35		3	351	0.80		1.6	632.3	91	84	239	251	54
	9 4	40		4	350	0.95		1.9	636.6	92	85	240	250	55
	10 3	45		4	349	1.0		2.0	641.2	94	86	239	252	56
	11 2	50		4	349	1.0		2.0	645.9	95	87	238	250	52
	12 1	55		4	348	1.0		2.0	650.7	96	87	237	249	57
	13 12	60		4	350	0.75		1.5	655.5	94	88	238	250	58
	14 11	65		4	348	0.75		1.5	659.6	95	89	239	252	58
	15 10	70		4	349	0.75		1.5	663.7	96	89	238	254	59
	16 9	75		4	349	0.65		1.3	667.9	97	90	240	252	60
	17 8	80		3	350	0.50		1.0	671.7	98	90	238	250	61
	18 7	85		2	350	0.40		0.82	675.1	99	91	239	249	61
	19 6	90		3	352	0.55		1.1	678.2	98	91	238	251	62
	20 5	95		3	353	0.65		1.3	681.7	99	92	237	250	62
	21 4	100		4	352	0.78		1.6	685.6	99	92	238	251	63
	22 3	105		4	352	0.73		1.5	689.8	101	92	236	252	64
	23 2	110		3	349	0.65		1.3	693.9	101	93	238	251	64
	24 1	115		3	350	0.65		1.3	697.8	101	93	236	250	65
	END	120	1115	—	—	—		—	701.687	—	—	—	—	—
	Average				350.1	0.630		1.321	90.587		89.9			

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AGR_009971

DSCFM - 41017

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: AGRIUM
Sampling location:
Date: 6-22-05 Project #:
Operator: BWS
Meter Box #: HE-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check				
Side A:	-0-	@	3.8	(in)H_2O
Side B:	-0-	@	3.5	(in)H_2O

Sample Train Leak Check				
Initial:	0.000	Cuft@	10.0	(in)Hg
Final:	0.000	Cuft@	10.0	(in)Hg

Run #: 5
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) (D_a)
Assumed Moisture(%): (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

min./pt Traverse Pt. Number		Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F) Inlet	Dry Gas Meter Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
1	12	0	1158	4	351	0.90	1.5	703.900	94	93	238	249	48
2	11	5		4	352	0.85	1.5	708.0	96	93	236	250	49
3	10	10		5	353	0.80	1.4	712.1	98	93	237	251	50
4	9	15		5	354	0.70	1.2	716.0	98	94	237	254	51
5	8	20		3	355	0.50	0.85	719.6	100	94	239	255	53
6	7	25		3	356	0.45	0.77	722.7	101	95	238	253	54
7	6	30		4	357	0.65	1.1	725.7	101	96	239	255	55
8	5	35		5	357	0.80	1.4	729.2	102	96	238	254	56
9	4	40		5	358	0.85	1.5	733.1	104	96	240	255	57
10	3	45		5	357	0.85	1.5	737.2	104	97	239	256	57
11	2	50		5	354	0.75	1.3	741.3	104	97	238	254	58
12	1	55		4	352	0.70	1.2	745.1	104	98	239	249	59
13	12	60		2	354	0.35	0.60	748.8	102	98	237	250	60
14	11	65		2	354	0.35	0.60	751.4	104	98	238	252	61
15	10	70		2	355	0.35	0.60	754.0	103	99	237	254	63
16	9	75		3	357	0.38	0.65	756.6	103	99	239	256	63
17	8	80		3	358	0.45	0.77	759.3	104	99	237	254	64
18	7	85		5	358	0.80	1.4	762.3	104	99	236	252	64
19	6	90		5	357	0.75	1.3	766.2	105	99	239	255	64
20	5	95		5	357	0.90	1.6	770.1	106	100	237	254	65
21	4	100		5	356	1.0	1.7	774.3	106	100	236	255	65
22	3	105		5	354	1.0	1.7	778.7	107	100	238	255	65
23	2	110		5	352	1.1	1.9	783.1	107	101	236	252	65
24	1	115		6	352	1.1	1.9	787.8	107	101	237	253	65
END		120	1401	—	—	—	—	792.445	—	—	—	—	—
Average					355.0	0.701	1.242	88.545		99.9			

DSCFM - 39404

AGR_009972

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: AGRIUM
Sampling location:
Date: 6-22-05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	P	@ 3.5	(in)H_2O
Side B:	P	@ 3.7	(in)H_2O

Sample Train Leak Check			
Initial:	0.000 Cuft@	10.0	(in)Hg
Final:	0.000 Cuft@	10.0	(in)Hg

Run #: 3
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) (D_a)
Assumed Moisture(%): 16 (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: SS.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number	Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Corrected Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
	1 12	0	1427	1	355	0.35		0.60	795.400	96	97	237	250	48
	2 11	5		1	355	0.35		0.60	798.0	96	97	235	254	47
	3 10	10		1	355	0.35		0.60	800.6	97	96	236	252	49
	4 9	15		2	357	0.40		0.68	803.2	98	96	237	251	50
	5 8	20		2	358	0.40		0.68	805.9	99	96	236	252	51
	6 7	25		2	357	0.48		0.82	808.7	100	96	239	254	52
	7 6	30		3	356	0.75		1.3	811.7	101	96	238	252	53
	8 5	35		4	355	0.85		1.5	815.5	102	96	236	251	54
	9 4	40		4	353	1.0		1.7	819.6	101	95	234	254	54
	10 3	45		4	353	1.1		1.9	822.0	101	95	235	252	55
	11 2	50		4	350	1.1		1.9	828.6	101	94	236	253	56
	12 1	55		4	351	1.1		1.9	833.2	101	95	234	254	56
	13 12	60		3	351	0.75		1.3	837.8	98	93	236	251	56
	14 11	65		3	352	0.80		1.4	841.6	99	93	237	254	57
	15 10	70		3	352	0.75		1.3	845.5	99	93	236	252	58
	16 9	75		3	352	0.70		1.2	849.3	99	93	238	254	58
	17 8	80		3	353	0.60		1.0	853.0	99	93	234	253	59
	18 7	85		2	354	0.45		0.77	856.4	99	93	235	251	59
	19 6	90		3	356	0.55		0.94	859.3	98	92	237	249	60
	20 5	95		3	357	0.70		1.2	862.6	99	92	236	251	61
	21 4	100		3	355	0.80		1.4	866.2	99	92	235	252	61
	22 3	105		3	355	0.80		1.4	870.1	99	92	235	249	62
	23 2	110		3	353	0.75		1.3	874.0	98	92	236	251	62
	24 1	115		3	353	0.75		1.3	877.8	98	92	235	250	63
	END	120	1630	—	—	—	—	—	881.613	—	—	—	—	—
	Average				354.0	0.672		1.186	86.213		96.6			

DscFM-38600

AES Gravimetric Analysis Form

Client: AGRIUM
Proj. No.: AES5062
Analysist: BWJ

	Trial No. 1	Trial No. 2	Trial No. 3
Date:	7-8-05	7-9-05	7-10-05
Time:	1000	1000	1000
Lab Temp:	64	65	65
% RH:	66	66	66

Sample ID	Lab ID	Date/Time into Dessicator	Sample Medium	Sample Vol. (mls)	Audit Wt (gms)	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Average Final Weight (gms)	Average Initial Weight (gms)
P.N. R-1	222	7-7-05 0930	ACE	150	100.0000	103.7964	103.7965	103.7966	103.7965	103.7934
P.N. R-2	236	7-7-05 0930	ACE	150	100.0000	101.5750	101.5749	101.5748	101.5749	101.5734
P.N R-3	83	7-7-05 0930	ACE	150	100.0000	105.9819	105.9820	105.9820	105.9820	105.9804
MeCl R-1	6	7-7-05 0930	MeCl	60	50.0000	100.8124	100.8123	100.8124	100.8124	100.8110
MeCl R-2	42	7-7-05 0930	MeCl	60	50.0000	96.1876	96.1876	96.1876	96.1876	96.1870
MeCl R-3	49	7-7-05 0930	MeCl	60	50.0000	99.6525	99.6525	99.6525	99.6525	99.6518
H2O R-1	212	7-7-05 0930	H2O	200	100.0000	106.8867	106.8869	106.8870	106.8869	106.8792
H2O R-2	37	7-7-05 0930	H2O	200	100.0000	102.5326	102.5327	102.5327	102.5327	102.5267
H2O R-3	229	7-7-05 0930	H2O	200	100.0000	104.5543	104.5543	104.5544	104.5543	104.5500
H2O Blank	H2O	7-7-05 0930	H2O	100	100.0000	97.2363	97.2363	97.2364	97.2363	97.2361
MeCl Blank	254	7-7-05 0930	MeCl	60	100.0000	104.5592	104.5592	104.5592	104.5592	104.5587
Acetone Blank	132	7-7-05 0930	ACE	100	100.0000	98.9796	98.9797	98.9797	98.9797	98.9795

AES Final Filter Weight Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7.5.05	7.6.05	7.7.05
Proj. No.: AE55062	Time:	1005	0950	0945
Analysist: BWJ	Temp:	67	66	66
	RH:	61	61	60
	Audit Wt.:	0.5000	0.5000	0.5000
	Audit Wt. Reading:	0.5000	0.5000	0.5000
	Date/Time into Dessicator:	7.1.05 0930	7.1.05 0930	7.1.05 0930

Sample ID	Fliter No.	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Final Average Wt.(gms)	Tare Average Wt.(gms)
R-1	338	0.3461	0.3461	0.3461	0.3461	0.3455
R-2	344	0.3475	0.3475	0.3475	0.3475	0.3470
R-3	346	0.3460	0.3460	0.3460	0.3460	0.3457

AES Gravimetric Tare Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7·5·05	7·6·05	7·7·05
Proj. No.: AES5062	Time:	1000	1000	1000
Analysist: BWJ	Temp:	66°	65°	64°
	RH:	60%	60%	59%
	Audit Wt.:	100.0000	100.0000	100.0000
	Date/Time into Dessicator:	7·2·05/0950	7·2·05/0950	7·2·05/0950

Sample ID	Lab ID	Trial No. 1	Trial No. 2	Trial No. 3	Average
	212	106.8793	106.8792	106.8791	106.8792
	6	100.8110	100.8110	100.8110	100.8110
	118	104.1197	104.1195	104.1194	104.1195
	132	98.9796	98.9795	98.9794	98.9795
	116	103.9914	103.9914	103.9914	103.9914
	83	105.9804	105.9804	105.9803	105.9804
	222	103.7936	103.7934	103.7932	103.7934
	254	104.5589	104.5587	104.5587	104.5587
	37	102.5267	102.5267	102.5267	102.5267
	3	79.0515	79.0513	79.0511	79.0513
	229	104.5500	104.5500	104.5500	104.5500
	49	99.6519	99.6518	99.6517	99.6518
	42	96.1870	96.1870	96.1870	96.1870
	H_2O	97.2362	97.2361	97.2360	97.2361
	236	101.5735	101.5734	101.5734	101.5734

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 1-4
Company/Plant: AGHum
Sampling location: BS Boiler Normal OP
Date: 6.23.05 Project #: AES5064
Operator: EEO / BWT
Meter Box #: Meter Box H@:
Meter Box Calibration(Y):
Probe #: AESPG1 C_p: 0.846

Pitot Tube Leak Check			
Side A:	✓	@ 3.8	(in)H_2O
Side B:	✓	@ 3.6	(in)H_2O

Sample Train Leak Check			
Initial: 0.020	Cuft@		(in)Hg
Final:	Cuft@		(in)Hg

Run #: 1
Barometric Pressure(P_b): 24.45 (in)Hg
Duct Diameter(in): (D_b) (D_a)
Assumed Moisture(%): ~~2.5~~ (T_w): (T_d): 11.87
Nozzle Dia_{ave}: 1 2 3
Static Pressure("H_2O): -0.21
Probe & Nozzle Material:

min./pt Traverse Pt. Number	Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
8				310	0.32							
7				310	0.28							
6				310	0.25							
5				310	0.21							
4				310	0.22							
3				310	0.26							
2				310	0.32							
1				310	0.30							
8				312	0.18							
7				312	0.15							
6				312	0.16							
5				312	0.18							
4				312	0.20							
3				312	0.21							
2				312	0.38							
1				312	0.40							
Average	128			311	0.246							

WB

%H_2O 11.8 25090 DSCFM

52

AGR_009977

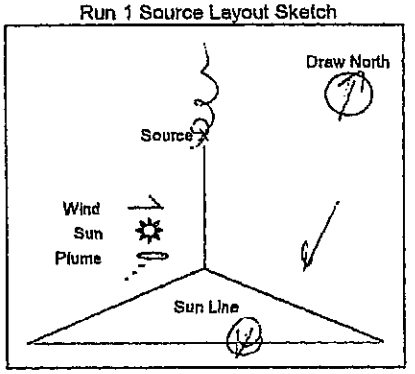
EPA Method 9 Opacity

Client: Agrium
Location: Soda Springs
Site: BG Boiler
Date: 6.22.05

Process Equipment: Nat Gas Boiler
Control Equipment: good combustion
Facility Type: Phosphate Plant
Observed by: [illegible]

Observation Conditions	Run 1	Run 2	Run 3
Sky Condition:	Clear	Clear	clear
Background/Color:	Blue	Blue	blue
Wind Speed:	0-5	0-5	0-5
Wind Direction:	S	S	S
Ambient Temp:	79	80	81
Relative Humidity:	36	36	36
Height of Discharge Point:	30"	30"	30"
Height of Observation Point:	ground	ground	ground
Distance & Direction from Plume:	200 yds	200 yds	200 yds
Plume Color:	none	none	none
Plume Type(attached/detached):	n/a	n/a	n/a
Viewing Angle:	L15	L15	L15

Run 1 Source Layout Sketch



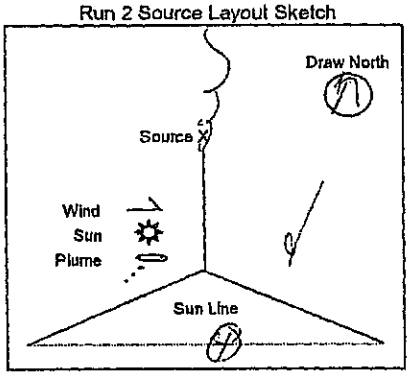
Run 1

Start 1040 Stop 1050

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 2 Source Layout Sketch



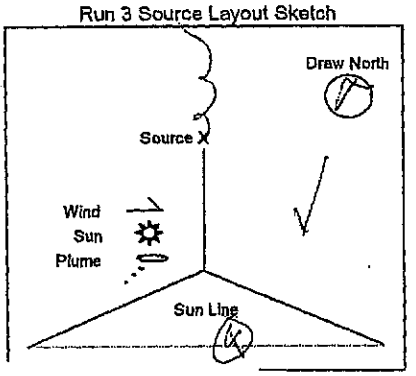
Run 2

Start 1252 Stop 1302

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 3 Source Layout Sketch



Run 3

Start 1520 Stop 1530

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from _____ to _____ % Opacity

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Brian Johnson
EPA REFERENCE METHOD 9 YES
CERTIFICATE NO NW-F04-040
EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE
PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Eric E Olson
EPA REFERENCE METHOD 9 YES
CERTIFICATE NO WA-S98-16
EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE
PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

Agrium CPO/Nu-West Ind.
Conda Facility
Emission Verification Report

B5 Boiler

Determination of Particulate Matter
Determination of Oxides of Nitrogen
Determination of Carbon Monoxide
Determination of Sulfur Dioxide
Determination of Non-Methane Volatile Organic Compounds
Determination of Opacity

Test Dates:
June 22, 2005
to
June 23, 2005

Project Number: AES5063

Tested By:

Antec Environmental Services

PO Box 2117
North Bend, WA 98045
(425) 888-2202
antec@earthlink.net

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Source Test Certification

Emission Source Owner: Agrium CPO/Nu-West Ind.
3010 Conda Road
Soda Springs, Idaho

Contact: Mr. Monty Johnson
Title: Environmental Manager
Phone: (208) 547-4381
E-mail: mrjohnso@agrium.com

Permit No.: 029-0003

Date Tested	Emission Units Tested
June 22, 2005	B5 Boiler

Project Number: AES5063

Testing Firm: Antec Environmental Services
Address: PO Box 2117
CityStateZip: North Bend, WA 98045
E-Mail: antec@earthlink.net
Phone: (425) 888-2202
Fax: (425) 888-2321

The data and results presented in this report are, to the best of my knowledge, accurate and complete:

By: _____
Eric E. Olson
Project Manager

Introduction

On June 22, 2005, Antec Environmental Services(AES) performed an emission verification test for Agrium Conda Phosphate Operations, located in Soda Springs, Idaho. The purpose of the testing was to quantify gaseous and particulate emissions from the B5 natural gas fired boiler. Three runs were taken, while the boiler was operating at maximum steam production and one run, gaseous emissions only, was performed at normal steaming rates. Table 1 contains the emission parameters and the methods used in the sampling.

Personnel

Participants involved in the testing program are listed below with their affiliation:

Agrium CPO/Nu-West Ind.	Antec Environmental Services
Mr. Monty Johnson Environmental Manager (208) 547-4381 E-mail:mrjohnso@agrium.com	Eric E. Olson Project Manager (425) 888-2202 E-mail:antec@earthlink.net

Sources & Emission Parameters

Table 1 Source	Date Tested	Test Methods	Emission Parameters	# of Runs & Time
B5 Boiler	06/22/05	EPA 5/202	Filterable and Condensible Particulate Matter	Three 2 hour Runs
B5 Boiler	06/22/05	EPA 7e	Oxides of Nitrogen	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 10 mod	Carbon Monoxide	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 25a	Volatile Organic Compounds	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 9	Visible Emissions	Three, Ten min Runs

Summary of Results

B5 Boiler Max Load

June 22, 2005	Run 1	Run 2	Run 3	Three Run Average
Start Time	1024	1242	1501	
End Time	1124	1342	1601	
Opacity No. minutes above 10%	0.0	0.0	0.0	**0.0**
% Oxygen	4.14	4.12	4.13	**4.13**
Dry Standard Cubic ft./min(DSCFM)	36,839	39,107	38,487	**38,144**
CO ppm,dry	34.2	35.6	38.0	**35.9**
CO ppm @ 3% O_2	36.5	38.0	40.6	**38.4**
CO lbs/hr	5.50	6.08	6.38	**5.99**
CO lbs/mmBtu	0.0270	0.0281	0.0300	**0.0284**
NOx ppm,dry	44.3	44.1	45.3	**44.6**
NOx ppm @ 3% O_2	47.3	47.0	48.4	**47.6**
NOx lbs/hr	11.70	12.36	12.50	**12.19**
NOx lbs/mmBtu	0.0575	0.0572	0.0588	**0.0578**
NMVOC ppm as Propane,dry	1.1	0.9	1.2	**1.1**
NMVOC ppm as Propane @ 3% O_2	1.2	1.0	1.3	**1.1**
NMVOC as Propane lbs/hr	0.28	0.24	0.32	**0.28**
NMVOC ppm as Propane lbs/mmBtu	0.0014	0.0011	0.0015	**0.0013**
Particulate Matter *Start Time*	911	1158	1427	
End Time	1115	1401	1630	
Particulate grains/dry std. Cu. Ft.(grdscf)	0.0025	0.0017	0.0013	**0.0018**
Particulate (grdscf) @ 3% O_2	0.0026	0.0018	0.0014	**0.0019**
Particulate lbs/hr	0.79	0.57	0.43	**0.60**
Particulate lbs/mmBtu	0.0039	0.0027	0.0021	**0.0029**

B5 Boiler Normal Operating Load

June 23, 2005	Run 1
Start Time	1223
End Time	1323
% Oxygen	6.82
Dry Standard Cubic ft./min(DSCFM)	25,090
CO ppm,dry	24.3
CO ppm @ 3% O_2	30.9
CO lbs/hr	2.66
CO lbs/mmBtu	0.0229
NOx ppm,dry	37.0
NOx ppm @ 3% O_2	47.0
NOx lbs/hr	6.65
NOx lbs/mmBtu	0.0572
NMVOC ppm as Propane,dry	0.4
NMVOC ppm as Propane @ 3% O_2	0.5
NMVOC as Propane lbs/hr	0.07
NMVOC ppm as Propane lbs/mmBtu	0.0006
Opacity No. minutes above 20%	0.0

Methodology

The following EPA reference methods were used during the emission testing project. The respective summaries outline each method and any deviations encountered. Supporting data can be found in the appendices of the report.

EPA 1-4

EPA Methods 1 and 2 are used to measure volumetric flow rates. EPA Method 1 is used to locate the representative sample points within the stack area. The cross-sectional area of the stack is divided into a number of equal areas. Sample traverse points are then located within each of these equal areas. EPA Method 2 is used to measure average stack gas velocity using a calibrated type "S" pitot tube connected to an incline oil manometer. Stack temperature is measured simultaneously using a calibrated type "K" thermocouple. A sample of the gas stream is extracted, dried, and gas volume metered using an EPA Method 5/202 sample train. The weight gain of condensed moisture is then measured by volume. The percentage of moisture is used to calculate the dry molecular weight of the stack gas and correct wet volume measurements to a dry volume basis.

EPA 5/202

A series of preliminary measurements was made prior to conducting the particulate test. EPA Methods 1, 2, 3, and ODEQ 4 (Tw/Td) were performed to determine location and number of traverse points, average gas velocity and pressure, and gas molecular weight. The percentage of water was measured by a preliminary wet-bulb dry-bulb test. The results of these measurements were entered into the field computer and an appropriate nozzle size for isokinetic sampling was determined.

The sample system consisted of a probe, heated filter, and impinger train. The probe consisted of a type "S" pitot tube, sample nozzle, and thermocouple. Sample gas was collected through a stainless steel probe/nozzle, filtered, and dried in a series of chilled impingers, with a back-up filter placed between the third and fourth impinger. The volume of sample gas collected was measured using a dry-gas meter and calibrated-restriction orifice.
Sample apparatus was prepared on-site in the mobile laboratory. The absorption train was charged with 100 milliliters of distilled water in each of the first two impingers while the third impinger remained empty, weighed on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe was brushed out and rinsed with acetone and the filter holder charged. The sampling apparatus was assembled and leak tested at ten inches of vacuum. Probe and filter heaters were set at 248 degrees Fahrenheit. The probe was placed at the first traverse point of the stack sample port. The vacuum pump was started immediately and adjusted to obtain an isokinetic sample rate.

Eight traverse points were sampled at 7.5 minutes each for a minimum of 60 minutes. A minimum of 31.8 standard cubic feet was collected or the amount specified in the applicable subpart, whichever was greater. Duct conditions (temperature, differential pressure) and sampling conditions (meter temperature; volume and pressure; probe, filter, sample line and impinger temperatures; and absorption trains vacuums) were monitored and recorded regularly for each traverse sample point. Upon completion of sampling, a final leak check was performed on the sampling apparatus at a vacuum greater than the highest observed vacuum during the test.

The filter and any loose particulate were carefully removed from the filter holder with forceps. It was then placed in a labeled petri dish for transportation to the laboratory. The nozzle, probe, and filter top housings were rinsed and brushed six times with acetone. The absorption train was inspected for abnormalities and disassembled. The impingers were weighed on a digital balance for use in determining percent moisture. The sample fractions were combined, bottled, labeled, and fluid-level marked for transportation to the laboratory. . The back-up filter was recovered and placed in a glass petri dish. Aliquots of acetone and deionzed water were similarly treated for blank analysis.
The filters (front-half and back-half) were transferred to a desiccator for 24 hours. The filters were weighed on a digital balance to the nearest 0.1 milligrams. Additional six-hour desiccation and weightings were performed until the difference between consecutive weightings was less than 0.5 milligram or one percent of the total filtrate weight (weighed to a constant weight). The nozzle/probe/filter top/impinger acetone wash was then evaporated at a laboratory temperature and pressure. The dish and wash residue were then desiccated and weighed to a constant weight. The net weight of particulate was calculated from the two fractions. The back-half catch was analyzed for organic and inorganic condensable particulate matter.

The procedure followed was that as described in EPA method 202. The impinger catch was washed with dichloromethane three times, the water fraction (inorganic) and dichloromethane (organic) was separated using a separatory funnel, dried, and weighed to a constant weight (+0.5 mg). Particulate concentration (gr./dscf) and emission rates (lb/hr) are then calculated and reported. No method deviations were encountered during the performance test program.

Molecular Weight, EPA Method 3a

A sample was continuously extracted from the effluent stream, dried and conveyed to an instrumental analyzer for determination of O_2 concentration. A three point linearity check (calibration error check) was performed using a zero reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 7e/20 - Oxides of Nitrogen Emissions

These methods are applicable to the determination of nitrogen oxides (NOx) concentrations in emissions from stationary sources. A sample is continuously extracted from the effluent stream, dried and conveyed to an instrumental chemiluminescent analyzer for determination of NOx concentration. A three point(7e) or a four point(20) linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas(20 only), a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 10 - Determination of Carbon Monoxide Emissions

A continuous gas sample was extracted from a sampling point and analyzed for carbon monoxide (CO) content using a non-dispersive infrared analyzer (NDIR). A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Interference Test

The gaseous components Carbon Monoxide(500+/-50ppm), Sulfur Dioxide(200+/-20ppm), Carbon Dioxide(10+/-1 %), and Oxygen(20.9+/-1 %) are introduced into the measurement system separately, or as gas mixtures. The total interference output response of the system to these components is determined in concentration units and the values are recorded. If the sum of the interference responses of the test gases for either the NOx or diluent analyzers is greater than 2 percent of the applicable span value, corrective measures on the measurement system must be taken.

Total Hydrocarbons EPA 25a

This method applies to the measurement of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon. A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip. The sample gas is extracted in the same manner as described in the following section with the following modifications. Prior to the electronic moisture removal system, a slip steam (approximately 1 liter per minute) is routed, via heated line maintained at 250 F, to the VOC analyzer and is analyzed on a wet basis. A methane cutter in conjunction with a FID was used to determine the methane fraction of the volatile organic compounds.

Continuous Emission Monitoring
EPA Methods 3a, 6c, 10, 7e/20, and 25a:

The gaseous parameters, O_2, CO, NOx, SO2, and VOC's were determined using the continuous instrumentation methods EPA 3a for Oxygen, EPA 10 for CO, EPA 7e/20 for NOx, EPA 6c for SO2, EPA, and EPA 25a for VOC. A gas sample was extracted from the stack through a heated (250° ± 5° F) stainless steel probe/filter assembly that is approximately 2 meters in length. A calibration gas purge valve was fitted upstream of the probe's particulate filter. The sample gas was then transported from the sample site to the mobile CEMS van through a heated (250° ± 5° F) Teflon flex line that measured 100 feet in length. At the CEMS van, the sample was then drawn through a moisture removal system. This system consisted of 2 chilled knockout traps (250 cubic centimeters (cc) each) connected in series and maintained at 38° ± 3° F with electronic cooling. Condensate was continuously removed from the moisture traps with a dual-head, peristaltic pump at 50 cc per minute. A finish filter removes particulate matter to less than 0.2 microns in diameter.

The sample gas was then divided simultaneously to each analyzer through a series of stainless-steel metering valves and glass flow meters. System Response Time was developed by timing out the amount of time required for the measurement system to display 95 percent of a step-change in gas concentration on the data recorder and by observing the time required to achieve a stable response for both the zero and upscale gases. After twice the response time of the measurement system has elapsed, sample collection is begun by positioning the sampling probe at the measurement point, and extracting effluent gas at the same flow rate as used during the sampling system bias check and maintaining constant rate sampling(i.e., ±10 percent) during the entire run.

Instrumentation used to analyze the gaseous pollutant parameters:

Parameter	Manufacturer	Model	Technology
O2	Siemens	Oxymat 5E	Paramagnetic
CO2	Siemens	Ultramat 5E	NDIR
CO	Siemens	Ultramat 5E	NDIR
NOx	Ecophysics	70s	Chemlum.
SO2	Bovar	721M	UV

The data recorder consists of a Parametric Systems digital data acquisition system. The Parametric system is a fully automated reference test method data recording and report generating software/hardware package.

Prior to beginning the test series, a 3-point, analyzer linearity check was performed. Each analyzer was challenged with a high- (90 to 80 percent of span), mid- (60 to 50 percent of span), and a low- (30 to 20 percent) calibration gas. Analyzer response was within 2 percent of the gas cylinder value. Initial zero and span are performed at the manifold with zero grade nitrogen and the appropriate EPA protocol number 1 calibration gas. Calibration gases used were blended following EPA Method 205, with an Environics Series 4000 precision gas divider. The field verification audit was performed prior to the use of the gas divider. Sample system bias checks were performed at the beginning and end of each test series. When performing a sample-system bias check, zero gas is introduced to the calibration-gas purge valve.

The sample system bias response was within 5 percent of the calibration gas cylinder value. The average, sample system bias response (initial and final) was used to calculate the final gas concentration for the run. The response time and analyzer value recorded. This procedure was followed for the upscale response using the appropriate calibrated gas and the longer of the two response times noted. The sample probe was positioned at the sample point and a sample rate of 6 liters per minute was maintained at plus or minus 10 percent during the entire test run. The test run was started after twice the response time has elapsed.

references

Handbook for Air Pollution Measurement Systems US Environmental Protection Agency. Publication EPA-600/4-77-0276
Quality Assurance Handbook for Air Pollution Measurement Systems US Environmental Protection Agency EPA 600/4-77-
US Environmental Protection Agency. 1996. 40 CFR Part 60, Appendix A, *Federal Register*(July 1).

AGR_009989

B5 Boiler

Sample & Traverse Point Determination

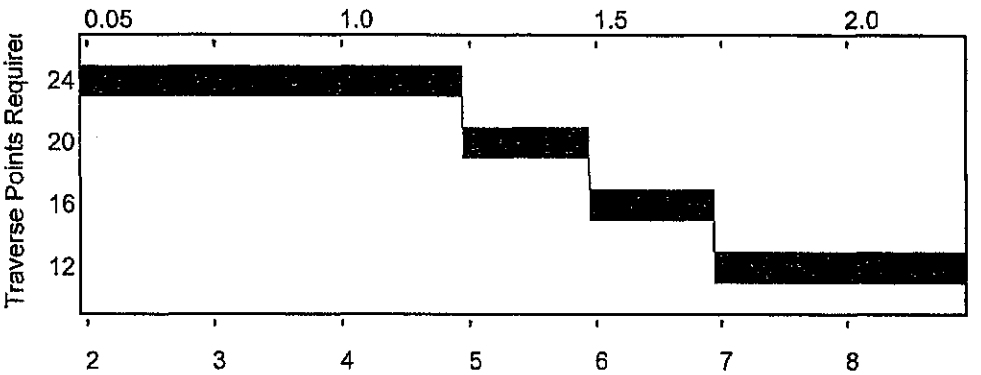
Minimum Number of Traverse Points for Particulate Traverses

EPA Method 1

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 6/22/05
Project No.: AES5063

Stack Diameter(in.): 64
Points Required: 24
Distance A(in.): 160.0
Distance A(dia.): 2.5
Distance B: 128.0
Distance B(dia.): 2.0

Sample Port Location
Duct Diameters upstream from flow disturbance (distance A)



Sample Port Location
Duct Diameters downstream from flow disturbance (distance B)

Traverse Point No.	Number of Traverse Points on a Diameter					***Sample Points***
	4	6	8	10	12	
1	6.7	4.4	3.2	2.6	2.1	***1.3***
2	25.0	14.6	10.5	8.2	6.7	***4.3***
3	75.0	29.6	19.4	14.6	11.8	***7.6***
4	93.3	70.4	32.2	22.6	17.7	***11.3***
5		85.5	67.7	34.2	25	***16.0***
6		95.6	80.6	65.8	35.6	***22.8***
7			89.5	77.4	64.4	***41.2***
8			96.8	85.4	75	***48.0***
9				91.8	82.3	***52.7***
10				97.4	88.2	***56.4***
11					93.3	***59.7***
12					97.9	***62.7***

B5 Boiler EPA 1-4

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

		Run #1	Run #2	Run #3	
		6/22/2005	6/22/2005	6/22/2005	
	Start	911	1158	1427	
	End	1115	1401	1630	**Averages**
Q:	Total sample time[1]:	120	120	120	**120**
Vm:	(Volume,dry gas meter,cf)	90.587	88.545	86.213	**88.448**
Y:	(Dry gas meter calibration factor)	0.995	0.995	0.995	**0.995**
Pbar:	(Barometric pressure,in.Hg)	24.40	24.40	24.40	**24.40**
ΔH:	(Avg. differential pressure,in.H2O)	1.30	1.25	1.20	**1.25**
Tm:	(Avg. meter temperature,°F)	89.9	100.0	96.6	**95.5**
Vm(std.):	(Std.* sample gas volume, DSCF)	70.826	67.970	66.575	**68.457**
Vlc:	(Liquid volume collected,ml)	305.4	276.4	261.2	**281.0**
Vw(std):	(Std.* water vapor volume,scf)	14.375	13.010	12.295	**13.227**
SVP:	(Saturated H_2O vapor pressure, in. Hg	162.91	170.93	169.44	**167.76**
Bwsat:	(Saturated Moisture @ Ts)	6.685	7.014	6.952	**6.884**
Bwsvol	(Volumemetric Moisture content)	0.169	0.161	0.156	**0.162**
Bws:	(SCF H_2O / SCF Total)[2]	0.169	0.161	0.156	**0.162**
%CO_2:	(Carbon Dioxide,% by volume,dry)	9.76	9.75	9.79	**9.77**
%O_2:	(Oxygen,% by volume,dry)	4.14	4.12	4.13	**4.13**
%N_2:	(Nitrogen,% by volume,dry)	86.10	86.13	86.08	**86.10**
Md:	(Molecular Weight,lb/lb-mole,dry)	29.73	29.72	29.73	**29.73**
Mw:	(Molecular Weight,lb/lb-mole,wet)	27.75	27.83	27.90	**27.83**
D:	(Duct diameter, in.)	64.00	64.00	64.00	**64.00**
A:	(Duct area, sq. ft.)	22.34	22.34	22.34	**22.34**
Dn:	(Nozzle diameter, in.)	0.246	0.246	0.246	***0.246***
An:	(Nozzle area, ft2)	3.30E-04	3.30E-04	3.30E-04	***3.30E-04***
Ts:	(Stack temperature, °F)	350.1	355.0	354.1	**353.1**
Pg:	(Static pressure of flue gas, in. H_2O)	-0.41	-0.41	-0.41	**-0.41**
Ps:	(Absolute stack gas pressure, in. Hg)	24.37	24.37	24.37	**24.37**
Cp:	(Pitot tube coefficient)	0.84	0.84	0.84	**0.84**
ΔP:	(Average velocity head, in. H_2O)	0.629	0.701	0.672	**0.667**
Vs:	(Gas velocity, ft./second)	62.3	65.9	64.4	**64.2**
ACFM:	(Actual cubic feet/min., wet)	83507	88332	86322	**86054**
SCFM	(Std. cubic ft/min., wet)	44349	46630	45619	**45533**
SDCFM:	(Std.* cubic feet/min., dry)	36839	39107	38487	**38144**
% Iso:	isokinetic variation)	108.5	98.1	97.6	***101.4***

[1] - Total sample time does not include port change.

[2] - If the Volumetric moisture exceeds the calculated saturated moisture, the calculated saturated moisture is used.

B5 Boiler EPA 5/202 Particulate Results

Client: Agrium CPO/Nu-West Inc
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Summary

Emission Units	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Front-half Average:	0.0005	0.16	0.0005	0.0008
Back-half Average:	0.0013	0.44	0.0014	0.0021
Test Average:	0.0018	0.60	0.0019	0.0029

RUN #1

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	2.8	0.0006	0.19	0.0006	0.0009
Filter	0.6	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	7.3	0.0016	0.51	0.0017	0.0025
Back-Half MeCl	0.9	0.0002	0.06	0.0002	0.0003
Front-half:	3.4	0.0007	0.22	0.0007	0.0011
Back-half:	8.2	0.0018	0.57	0.0019	0.0028
Total:	11.6	0.0025	0.79	0.0026	0.0039

RUN #2

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.2	0.0003	0.10	0.0003	0.0005
Filter	0.5	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	5.6	0.0013	0.44	0.0014	0.0020
Back-Half MeCl	0.1	0.0000	0.00	0.0000	0.0000
Front-half:	1.7	0.0004	0.13	0.0004	0.0007
Back-half:	5.7	0.0013	0.44	0.0014	0.0020
Total:	7.4	0.0017	0.57	0.0018	0.0027

RUN #3

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.3	0.0003	0.10	0.0003	0.0005
Filter	0.3	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	3.9	0.0009	0.30	0.0010	0.0014
Back-Half MeCl	0.2	0.0000	0.00	0.0000	0.0000
Front-half:	1.6	0.0004	0.13	0.0004	0.0007
Back-half:	4.1	0.0009	0.30	0.0010	0.0014
Total:	5.7	0.0013	0.43	0.0014	0.0021

Production Data

Run	Time start	Time finish	Effluent O_2	F_d
1	911	1115	4.14	8710
2	1158	1401	4.12	8710
3	1427	1630	4.13	8710

B5 Boiler Laboratory Results

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Front Half

FILTER

	Run #1	Run #2	Run #3
Tare Weight, g	0.3455	0.3470	0.3457
Final Weight , g	0.3461	0.3475	0.3460
Final filter Weight, mg	*0.6*	*0.5*	*0.3*

PROBE & NOZZLE

	Run #1	Run #2	Run #3
Sample volume, ml	150	150	150
Acetone Blank mg	0.3	0.3	0.3
Beaker tare weight, g	103.7934	101.5734	105.9804
Beaker final weight , g	103.7965	101.5749	105.9820
Total Residue, mg	3.1	1.5	1.6
Total Residue less Blank, mg	*2.8*	*1.2*	*1.3*

ACETONE BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Back-Half

Inorganic Fraction

Imp. catch less organic matter

	Run #1	Run #2	Run #3
Sample volume, ml	200	200	200
Water Blank mg	0.4	0.4	0.4
Beaker tare weight, g	106.8792	102.5267	104.5500
Beaker final weight , g	106.8869	102.5327	104.5543
Total Residue, mg	7.7	6.0	4.3
Total Residue less Blank, mg	*7.3*	*5.6*	*3.9*

WATER BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Organic Fraction

Imp. H_2O $MeCl_2$ wash

	Run #1	Run #2	Run #3
Sample volume, ml	60	60	60
$MeCl_2$ Blank mg	0.5	0.5	0.5
Beaker tare weight, g	100.8110	96.1870	99.6518
Beaker final weight , g	100.8124	96.1876	99.6525
Total Residue, mg	1.4	0.6	0.7
Total Residue less Blank, mg	*0.9*	*0.1*	*0.2*

$MeCl_2$ BLANK

Blank volume, ml	60
Residue, mg	0.5
Blank mg/ml	0.008

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Calibration Gas Value	Initial Calibratio	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.02 %	-0.02
12.50 percent O2	12.40 %	12.38 %	12.39
0.0 ppm NOX	0.0 ppm	0.0 ppm	0.03
55.0 ppm NOX	54.7 ppm	54.9 ppm	54.78
0.00 percent CO2	0.05 %	0.04 %	0.04
9.98 percent CO2	10.12 %	10.11 %	10.12
0.0 ppm CO	-0.2 ppm	0.0 ppm	-0.13
55.6 ppm CO	55.6 ppm	55.4 ppm	55.52
0.0 ppm Methane	-0.1 ppm	0.1 ppm	0.00
25.0 ppm Methane	24.7 ppm	24.8 ppm	24.75
0.0 ppm THC	0.3 ppm	0.2 ppm	0.22
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	**Corrected Results:**	**Basis:**
4.09 percent O2	**4.14** percent O2	DRY
44.1 ppm NOX	**44.3** ppm NOX	DRY
9.90 percent CO2	**9.76** percent CO2	DRY
34.1 ppm CO	**34.2** ppm CO	DRY
5.6 ppm THC	**5.4** ppm THC	WET
4.5 ppm Methane	**4.5** ppm Methane	WET
16.9 % Moisture	**0.9** ppm NMVOC	WET
	1.1 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.03 %	-0.03
12.50 percent O2	12.38 %	12.42 %	12.40
0.0 ppm NOX	0.0 ppm	0.1 ppm	0.06
55.0 ppm NOX	54.9 ppm	54.9 ppm	54.91
0.00 percent CO2	0.04 %	0.03 %	0.03
9.98 percent CO2	10.11 %	10.11 %	10.11
0.0 ppm CO	0.0 ppm	-0.1 ppm	-0.05
55.6 ppm CO	55.4 ppm	55.2 ppm	55.27
0.0 ppm Methane	0.1 ppm	0.2 ppm	0.15
25.0 ppm Methane	24.8 ppm	24.9 ppm	24.85
0.0 ppm THC	0.2 ppm	0.3 ppm	0.23
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	Corrected Results:	Basis:
4.07 percent O2	**4.12** percent O2	DRY
44.1 ppm NOX	**44.1** ppm NOX	DRY
9.88 percent CO2	**9.75** percent CO2	DRY
35.4 ppm CO	**35.6** ppm CO	DRY
6.3 ppm THC	**6.2** ppm THC	WET
5.5 ppm Methane	**5.4** ppm Methane	WET
16.1 % Moisture	**0.8** ppm NMVOC	WET
	0.9 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.03 %	-0.03 %	-0.03
12.50 percent O2	12.42 %	12.39 %	12.40
0.0 ppm NOX	0.1 ppm	0.4 ppm	0.24
55.0 ppm NOX	54.9 ppm	54.8 ppm	54.86
0.00 percent CO2	0.03 %	0.04 %	0.03
9.98 percent CO2	10.11 %	9.96 %	10.04
0.0 ppm CO	-0.1 ppm	0.4 ppm	0.18
55.6 ppm CO	55.2 ppm	55.7 ppm	55.42
0.0 ppm Methane	0.2 ppm	0.1 ppm	0.15
25.0 ppm Methane	24.9 ppm	24.8 ppm	24.85
0.0 ppm THC	0.3 ppm	0.3 ppm	0.30
25.0 ppm THC	24.9 ppm	24.8 ppm	24.85

Mean Reference Values:	Corrected Results:	Basis:
4.08 percent O2	**4.13** percent O2	DRY
45.2 ppm NOX	**45.3** ppm NOX	DRY
9.85 percent CO2	**9.79** percent CO2	DRY
37.9 ppm CO	**38.0** ppm CO	DRY
6.8 ppm THC	**6.6** ppm THC	WET
5.7 ppm Methane	**5.6** ppm Methane	WET
15.6 % Moisture	**1.0** ppm NMVOC	WET
	1.2 ppm NMVOC	DRY

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.02 %	-0.04 %	0.00 %
O2	12.41 %	12.40 %	-0.04 %	12.38 %	-0.12 %	-0.08 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
NOX	54.7 ppm	54.7 ppm	0.00 %	54.9 ppm	0.20 %	0.20 %
CO2	0.02 %	0.05 %	0.15 %	0.04 %	0.10 %	-0.05 %
CO2	10.05 %	10.12 %	0.35 %	10.11 %	0.30 %	-0.05 %
CO	0.0 ppm	-0.2 ppm	-0.07 %	0.0 ppm	0.00 %	0.07 %
CO	55.3 ppm	55.6 ppm	0.10 %	55.4 ppm	0.03 %	-0.07 %
Methane	0.2 ppm	-0.1 ppm	-0.60 %	0.1 ppm	-0.20 %	0.40 %
Methane	25.0 ppm	24.7 ppm	-0.60 %	24.8 ppm	-0.40 %	0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.2 ppm	0.00 %	-0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.03 %	-0.08 %	-0.04 %
O2	12.41 %	12.38 %	-0.12 %	12.42 %	0.04 %	0.16 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.1 ppm	0.10 %	0.10 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.9 ppm	0.20 %	0.00 %
CO2	0.02 %	0.04 %	0.10 %	0.03 %	0.05 %	-0.05 %
CO2	10.05 %	10.11 %	0.30 %	10.11 %	0.30 %	0.00 %
CO	0.0 ppm	0.0 ppm	0.00 %	-0.1 ppm	-0.03 %	-0.03 %
CO	55.3 ppm	55.4 ppm	0.03 %	55.2 ppm	-0.03 %	-0.07 %
Methane	0.2 ppm	0.1 ppm	-0.20 %	0.2 ppm	0.00 %	0.20 %
Methane	25.0 ppm	24.8 ppm	-0.40 %	24.9 ppm	-0.20 %	0.20 %
THC	0.2 ppm	0.2 ppm	0.00 %	0.3 ppm	0.20 %	0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.03 %	-0.08 %	-0.03 %	-0.08 %	0.00 %
O2	12.41 %	12.42 %	0.04 %	12.39 %	-0.08 %	-0.12 %
NOX	0.0 ppm	0.1 ppm	0.10 %	0.4 ppm	0.40 %	0.30 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.8 ppm	0.10 %	-0.10 %
CO2	0.02 %	0.03 %	0.05 %	0.04 %	0.10 %	0.05 %
CO2	10.05 %	10.11 %	0.30 %	9.96 %	-0.45 %	-0.75 %
CO	0.0 ppm	-0.1 ppm	-0.03 %	0.4 ppm	0.13 %	0.17 %
CO	55.3 ppm	55.2 ppm	-0.03 %	55.7 ppm	0.13 %	0.17 %
Methane	0.2 ppm	0.2 ppm	0.00 %	0.1 ppm	-0.20 %	-0.20 %
Methane	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.3 ppm	0.20 %	0.00 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %

Analyzer Calibration Error

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Oxygen Monitor

Method 3A

Full Scale: 25.00 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.00 %	-0.01 %	-0.01 %	-0.04 %
CC53983/cg3	12.50 %	12.41 %	-0.09 %	-0.36 %
CC109878/cg2	22.50 %	22.45 %	-0.05 %	-0.20 %

Nitrogen Oxides Monitor

Method 7E

Full Scale: 100.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg2	55.0 ppm	54.7 ppm	-0.3 ppm	-0.30 %
/dg3	91.7 ppm	91.5 ppm	-0.2 ppm	-0.19 %

Carbon Dioxide Monitor

Method 20

Full Scale: 20.00 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.00 %	0.02 %	0.02 %	0.10 %
CC53983/cg3	9.98 %	10.05 %	0.07 %	0.35 %
CC109878/cg2	19.00 %	19.02 %	0.02 %	0.10 %

Carbon Monoxide Monitor

Method 10

Full Scale: 300.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg8	90.0 ppm	89.5 ppm	-0.5 ppm	-0.17 %
/dg7	170.0 ppm	169.7 ppm	-0.3 ppm	-0.10 %
/dg4	280.0 ppm	280.4 ppm	0.4 ppm	0.13 %

Analyzer Calibration Error

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Methane Hydrocarbon Monitor

Method 25A & Jum Cutter

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

Total Hydrocarbon Monitor

Method 25A

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
1	6/22/2005	10:24:00	3.80	10.04	43.7	72.6	6.3	5.1
1	6/22/2005	10:25:00	3.98	9.98	44.3	33.3	5.6	4.4
1	6/22/2005	10:26:00	4.02	9.96	45.0	33.8	4.7	3.5
1	6/22/2005	10:27:00	4.03	9.95	44.9	33.5	4.2	4.0
1	6/22/2005	10:28:00	3.99	9.97	44.3	34.4	3.1	1.9
1	6/22/2005	10:29:00	4.02	9.95	44.3	36.3	3.3	2.1
1	6/22/2005	10:30:00	3.96	9.99	44.2	33.5	3.1	1.9
1	6/22/2005	10:31:00	3.97	9.98	44.7	34.3	3.2	2.0
1	6/22/2005	10:32:00	4.07	9.92	45.6	33.4	2.7	1.5
1	6/22/2005	10:33:00	3.98	9.96	45.3	34.6	2.8	1.5
1	6/22/2005	10:34:00	3.98	9.97	44.9	33.9	3.5	2.3
1	6/22/2005	10:35:00	4.02	9.94	44.9	32.8	3.0	1.8
1	6/22/2005	10:36:00	4.02	9.94	44.5	32.9	4.1	2.9
1	6/22/2005	10:37:00	4.04	9.93	44.3	33.2	3.7	2.5
1	6/22/2005	10:38:00	3.96	9.98	44.1	33.9	3.7	2.5
1	6/22/2005	10:39:00	4.02	9.94	44.3	33.8	4.9	3.7
1	6/22/2005	10:40:00	4.03	9.94	44.0	33.0	4.8	3.6
1	6/22/2005	10:41:00	4.00	9.95	44.0	33.4	4.1	2.9
1	6/22/2005	10:42:00	4.00	9.95	44.1	33.9	5.0	3.8
1	6/22/2005	10:43:00	3.97	9.98	44.0	32.8	4.7	3.5
1	6/22/2005	10:44:00	3.97	9.96	44.2	32.8	5.7	4.5
1	6/22/2005	10:45:00	4.05	9.91	45.1	32.5	6.1	4.9
1	6/22/2005	10:46:00	4.06	9.93	45.2	33.8	6.9	5.7
1	6/22/2005	10:47:00	4.05	9.91	45.3	34.7	6.1	4.9
1	6/22/2005	10:48:00	4.04	9.93	44.5	33.9	5.6	4.4
1	6/22/2005	10:49:00	4.10	9.88	45.0	33.8	6.5	5.3
1	6/22/2005	10:50:00	4.09	9.89	44.8	35.5	6.6	5.4
1	6/22/2005	10:51:00	3.94	9.99	44.1	36.3	5.7	4.5
1	6/22/2005	10:52:00	3.99	9.95	44.5	34.6	6.0	4.8
1	6/22/2005	10:53:00	3.98	9.96	44.3	34.1	5.7	4.5
1	6/22/2005	10:54:00	4.02	9.93	44.3	32.7	6.0	4.8
1	6/22/2005	10:55:00	3.97	9.96	43.9	33.2	6.6	5.4
1	6/22/2005	10:56:00	3.98	9.95	44.1	34.1	6.5	5.3
1	6/22/2005	10:57:00	4.15	9.84	46.0	35.3	6.2	5.0
1	6/22/2005	10:58:00	4.02	9.94	44.8	35.4	6.4	5.2
1	6/22/2005	10:59:00	3.93	9.98	44.1	35.9	5.1	3.9
1	6/22/2005	11:00:00	3.95	9.97	43.9	34.1	6.5	5.3
1	6/22/2005	11:01:00	3.96	9.96	44.4	33.4	6.3	5.1
1	6/22/2005	11:02:00	4.01	9.93	44.5	33.2	6.5	5.3
1	6/22/2005	11:03:00	4.00	9.95	44.3	32.4	5.4	4.2
1	6/22/2005	11:04:00	7.28	8.07	36.9	27.5	5.3	4.1
1	6/22/2005	11:05:00	4.39	9.81	45.1	36.2	6.8	5.6
1	6/22/2005	11:06:00	4.02	9.93	44.2	37.0	6.0	4.8
1	6/22/2005	11:07:00	4.08	9.89	43.7	35.3	6.2	5.0
1	6/22/2005	11:08:00	4.06	9.91	43.3	36.2	6.1	4.9
1	6/22/2005	11:09:00	4.03	9.93	43.3	34.4	5.0	3.8
1	6/22/2005	11:10:00	4.07	9.90	43.2	34.1	6.3	5.1
1	6/22/2005	11:11:00	4.05	9.91	43.3	34.2	7.1	5.9
1	6/22/2005	11:12:00	4.04	9.92	43.5	33.4	6.8	5.6
1	6/22/2005	11:13:00	4.11	9.87	44.1	33.2	7.1	5.9
1	6/22/2005	11:14:00	4.05	9.92	44.1	34.2	6.1	4.9
1	6/22/2005	11:15:00	4.08	9.90	44.3	34.3	6.6	5.4
1	6/22/2005	11:16:00	4.16	9.83	44.5	34.7	7.6	6.4
1	6/22/2005	11:17:00	4.13	9.86	43.7	36.8	7.4	6.2
1	6/22/2005	11:18:00	4.07	9.89	43.3	35.2	7.0	5.8
1	6/22/2005	11:19:00	4.15	9.86	43.8	36.0	6.9	5.7
1	6/22/2005	11:20:00	4.05	9.92	43.3	36.1	7.4	6.2
1	6/22/2005	11:21:00	4.04	9.92	43.1	34.3	7.3	6.1
1	6/22/2005	11:22:00	4.06	9.90	43.1	35.0	6.9	5.7
1	6/22/2005	11:23:00	4.07	9.89	43.3	34.3	7.1	5.9
1	6/22/2005	11:24:00	4.24	9.79	44.8	36.1	8.0	6.8
		Raw Averages:	4.09	9.90	44.1	34.8	5.6	4.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
2	6/22/2005	12:42:00	4.20	9.81	44.8	37.6	4.0	3.2
2	6/22/2005	12:43:00	4.06	9.89	44.1	36.2	4.8	4.0
2	6/22/2005	12:44:00	4.06	9.89	43.8	36.7	5.8	5.0
2	6/22/2005	12:45:00	4.03	9.90	43.7	35.6	3.7	2.9
2	6/22/2005	12:46:00	4.04	9.90	44.1	35.3	5.8	5.0
2	6/22/2005	12:47:00	4.06	9.89	44.0	35.9	4.7	3.9
2	6/22/2005	12:48:00	4.16	9.83	44.8	37.0	6.0	5.2
2	6/22/2005	12:49:00	4.10	9.89	44.6	35.8	5.4	4.6
2	6/22/2005	12:50:00	4.08	9.88	44.3	35.5	5.5	4.7
2	6/22/2005	12:51:00	4.05	9.90	44.1	35.7	3.0	2.2
2	6/22/2005	12:52:00	4.15	9.85	44.6	36.0	5.6	4.8
2	6/22/2005	12:53:00	4.07	9.89	44.1	35.6	5.0	4.2
2	6/22/2005	12:54:00	4.07	9.89	44.1	35.6	4.2	3.4
2	6/22/2005	12:55:00	4.08	9.89	43.6	35.1	5.7	4.9
2	6/22/2005	12:56:00	4.11	9.86	44.1	34.9	5.3	4.5
2	6/22/2005	12:57:00	4.13	9.85	44.5	36.2	4.9	4.1
2	6/22/2005	12:58:00	4.06	9.90	44.0	36.2	5.0	4.2
2	6/22/2005	12:59:00	4.07	9.88	44.1	34.7	3.6	2.8
2	6/22/2005	13:00:00	4.07	9.89	44.2	36.1	4.4	3.6
2	6/22/2005	13:01:00	4.10	9.86	44.3	35.7	5.1	4.3
2	6/22/2005	13:02:00	4.14	9.84	44.6	36.1	4.2	3.4
2	6/22/2005	13:03:00	4.05	9.91	44.0	36.2	4.9	4.1
2	6/22/2005	13:04:00	4.05	9.89	43.8	35.6	4.3	3.5
2	6/22/2005	13:05:00	4.03	9.91	43.7	35.5	6.0	5.2
2	6/22/2005	13:06:00	4.04	9.90	43.9	35.6	6.5	5.7
2	6/22/2005	13:07:00	4.11	9.86	44.2	35.6	7.0	6.2
2	6/22/2005	13:08:00	4.06	9.89	43.9	36.4	7.2	6.4
2	6/22/2005	13:09:00	4.08	9.88	44.0	35.5	5.4	4.7
2	6/22/2005	13:10:00	4.03	9.91	44.0	35.3	6.6	5.8
2	6/22/2005	13:11:00	4.02	9.91	44.1	35.0	4.4	3.6
2	6/22/2005	13:12:00	4.04	9.89	44.1	34.6	4.6	3.8
2	6/22/2005	13:13:00	4.05	9.89	44.1	35.4	4.1	3.3
2	6/22/2005	13:14:00	4.06	9.89	44.0	35.1	5.9	5.1
2	6/22/2005	13:15:00	4.02	9.91	44.0	35.8	5.9	5.1
2	6/22/2005	13:16:00	4.05	9.88	43.8	35.9	6.6	5.9
2	6/22/2005	13:17:00	4.07	9.87	43.9	34.8	7.5	6.7
2	6/22/2005	13:18:00	4.04	9.90	43.4	35.7	6.7	5.9
2	6/22/2005	13:19:00	4.06	9.88	43.6	35.4	6.7	5.9
2	6/22/2005	13:20:00	4.03	9.89	43.8	34.4	5.5	4.8
2	6/22/2005	13:21:00	4.13	9.85	44.7	36.5	5.4	4.6
2	6/22/2005	13:22:00	4.02	9.91	43.9	35.9	7.1	6.3
2	6/22/2005	13:23:00	4.07	9.87	44.6	34.9	6.1	5.3
2	6/22/2005	13:24:00	4.03	9.90	44.5	35.1	7.8	7.0
2	6/22/2005	13:25:00	4.06	9.89	44.9	35.7	9.5	8.7
2	6/22/2005	13:26:00	4.05	9.89	44.5	36.1	11.0	8.8
2	6/22/2005	13:27:00	4.06	9.88	43.9	34.2	11.0	9.0
2	6/22/2005	13:28:00	4.06	9.88	43.9	33.8	10.8	8.9
2	6/22/2005	13:29:00	4.03	9.90	43.6	33.3	10.5	9.7
2	6/22/2005	13:30:00	4.05	9.89	43.6	34.1	9.4	8.6
2	6/22/2005	13:31:00	4.07	9.87	43.8	34.7	8.5	7.7
2	6/22/2005	13:32:00	4.12	9.84	44.1	34.5	5.6	4.8
2	6/22/2005	13:33:00	4.05	9.89	43.8	35.2	8.7	7.9
2	6/22/2005	13:34:00	4.06	9.88	43.8	34.2	6.4	5.6
2	6/22/2005	13:35:00	4.06	9.86	43.7	34.5	11.2	9.9
2	6/22/2005	13:36:00	4.03	9.90	43.3	35.5	9.8	9.0
2	6/22/2005	13:37:00	4.07	9.85	43.5	33.0	7.2	6.4
2	6/22/2005	13:38:00	4.16	9.83	43.9	35.2	7.9	7.1
2	6/22/2005	13:39:00	4.05	9.88	43.4	35.3	7.7	6.9
2	6/22/2005	13:40:00	4.05	9.88	44.0	35.2	7.5	6.7
2	6/22/2005	13:41:00	4.11	9.84	45.2	34.4	7.7	6.5
		Raw Averages:	4.07	9.88	44.1	35.4	6.4	5.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
3	6/22/2005	15:01:00	4.09	9.85	45.3	36.0	7.6	6.5
3	6/22/2005	15:02:00	4.07	9.86	45.2	39.0	6.9	5.8
3	6/22/2005	15:03:00	4.16	9.78	46.0	39.0	7.5	6.4
3	6/22/2005	15:04:00	4.12	9.83	46.2	40.5	9.0	7.9
3	6/22/2005	15:05:00	4.14	9.81	46.0	40.0	8.6	7.5
3	6/22/2005	15:06:00	4.04	9.87	45.4	41.2	10.5	9.4
3	6/22/2005	15:07:00	4.09	9.84	45.5	39.8	7.2	6.1
3	6/22/2005	15:08:00	4.04	9.85	45.4	40.0	8.6	7.5
3	6/22/2005	15:09:00	4.06	9.85	45.8	40.3	7.8	6.7
3	6/22/2005	15:10:00	4.04	9.85	45.8	39.0	10.5	9.4
3	6/22/2005	15:11:00	4.07	9.83	46.2	39.1	9.0	7.9
3	6/22/2005	15:12:00	4.07	9.85	46.0	40.5	8.7	7.6
3	6/22/2005	15:13:00	4.03	9.87	45.6	40.4	8.1	7.0
3	6/22/2005	15:14:00	4.06	9.84	45.8	39.8	6.5	5.4
3	6/22/2005	15:15:00	4.07	9.84	45.7	39.6	7.9	6.8
3	6/22/2005	15:16:00	4.01	9.88	45.2	39.2	8.3	7.2
3	6/22/2005	15:17:00	4.06	9.84	45.6	39.0	8.9	7.8
3	6/22/2005	15:18:00	4.04	9.87	45.6	40.3	5.9	4.8
3	6/22/2005	15:19:00	3.96	9.91	45.0	38.0	7.1	6.0
3	6/22/2005	15:20:00	4.10	9.84	45.1	38.2	7.0	5.9
3	6/22/2005	15:21:00	4.01	9.89	44.9	36.7	6.1	5.0
3	6/22/2005	15:22:00	4.01	9.87	44.8	35.9	5.6	4.5
3	6/22/2005	15:23:00	4.10	9.83	45.3	37.8	8.2	7.1
3	6/22/2005	15:24:00	4.10	9.84	45.3	39.1	6.4	5.3
3	6/22/2005	15:25:00	4.14	9.81	45.7	39.4	8.1	7.0
3	6/22/2005	15:26:00	4.09	9.84	45.5	38.8	6.8	5.7
3	6/22/2005	15:27:00	4.14	9.81	46.3	39.9	8.1	7.0
3	6/22/2005	15:28:00	4.09	9.84	46.3	41.3	6.9	5.8
3	6/22/2005	15:29:00	6.23	8.65	41.2	35.1	5.6	4.5
3	6/22/2005	15:30:00	4.43	9.81	45.6	37.4	4.1	3.0
3	6/22/2005	15:31:00	4.00	9.90	45.9	37.3	5.1	4.0
3	6/22/2005	15:32:00	3.98	9.91	45.7	37.5	3.9	2.8
3	6/22/2005	15:33:00	3.93	9.94	45.0	36.6	4.7	3.6
3	6/22/2005	15:34:00	3.97	9.92	45.2	34.5	3.9	2.8
3	6/22/2005	15:35:00	3.98	9.90	45.4	35.8	5.7	4.6
3	6/22/2005	15:36:00	4.04	9.86	46.0	36.5	4.3	3.2
3	6/22/2005	15:37:00	4.02	9.90	45.6	37.3	4.3	3.2
3	6/22/2005	15:38:00	4.00	9.89	45.4	37.5	4.4	3.3
3	6/22/2005	15:39:00	4.07	9.85	45.9	36.5	5.5	4.4
3	6/22/2005	15:40:00	4.08	9.85	46.0	37.3	5.2	4.1
3	6/22/2005	15:41:00	3.96	9.93	45.2	38.2	3.0	1.9
3	6/22/2005	15:42:00	4.00	9.89	45.3	35.9	4.0	2.9
3	6/22/2005	15:43:00	4.01	9.90	45.1	36.8	3.7	2.6
3	6/22/2005	15:44:00	3.93	9.95	44.7	38.2	5.2	4.1
3	6/22/2005	15:45:00	4.01	9.88	45.0	34.6	8.9	7.8
3	6/22/2005	15:46:00	4.05	9.88	44.9	35.8	5.2	4.1
3	6/22/2005	15:47:00	4.02	9.89	44.9	36.6	7.5	6.4
3	6/22/2005	15:48:00	4.03	9.88	45.0	37.2	4.2	3.1
3	6/22/2005	15:49:00	4.00	9.91	44.7	38.5	8.7	7.6
3	6/22/2005	15:50:00	4.00	9.90	44.3	35.3	4.7	3.6
3	6/22/2005	15:51:00	4.01	9.90	44.4	36.3	8.5	7.4
3	6/22/2005	15:52:00	3.98	9.92	44.4	37.0	5.0	3.9
3	6/22/2005	15:53:00	4.01	9.90	44.4	37.3	8.9	7.8
3	6/22/2005	15:54:00	4.06	9.86	44.7	36.1	3.9	2.8
3	6/22/2005	15:55:00	4.04	9.89	44.6	37.0	5.9	4.8
3	6/22/2005	15:56:00	3.98	9.91	44.5	36.7	9.1	8.0
3	6/22/2005	15:57:00	4.03	9.89	45.1	36.4	6.1	5.0
3	6/22/2005	15:58:00	3.96	9.94	44.5	36.9	12.7	11.6
3	6/22/2005	15:59:00	3.96	9.93	44.7	37.9	15.2	14.1
3	6/22/2005	16:00:00	4.04	9.88	45.0	36.7	5.8	4.7
		Raw Averages:	4.08	9.85	45.2	37.9	6.8	5.7

Quality Assurance

ANTEC SE 59108

MATHESON TRI·GAS

CERTIFICATE OF ANALYSIS - EPA PROTOCOL MIXTURE

1650 Enterprise Parkway, Twinsburg, Ohio 44087 • 215-648-4000

Customer: Matheson Tri-Gas Inc. 133 Portland
Cylinder Number: SX-36316
Cylinder pressure: 2000
Last Analysis date 8/6/2004
Expiration Date. 8/6/07

Protocol: G1
Reference #
Lot # 109-46-38005

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 150 PSIG

REPLICATE RESPONSES

Component: Propane
Certified Conc: 83.1 PPM ± 1%
Requested Conc: 80 ppm

Date: 8/6/2004	Date:
83.3 PPM	
83.1 PPM	
82.9 PPM	

BALANCE GAS: Nitrogen

REFERENCE STANDARDS
Component: Propane
SRM #: SRM-1666b
Cylinder #: XF-004135B
Concentration; 98.9 ppm

CERTIFICATION INSTRUMENTS
Component: Propane
Make/Model: Varian 3800 GC
Serial Number: LR-92489
Measurement Principle: TC, FID
Last Calibration: 8/6/2004

Notes: T50256 P.O. XC 006055

This certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards September 1997, using procedure G1 and/or G2.

Analyst Philip D. Mat Date 8/9/2004

AGR_010007

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC100720	1667 PSIG	SFS62634
Assay Date:	Expiration Date:	Document Number:
2/27/2004	2/27/2006	12692017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE	SE004043	
TACOMA, WA		

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	4959	ppm	5080	±	70	ppm
Sulfur Dioxide	4910	ppm	4820	±	70	ppm
Carbon Monoxide	4660	ppm	4760	±	70	ppm
NOx			5080	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.3, Procedure : G-2

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration				Component	Balance	Cyl. No.	SRM, GMIS NTRM No.	Exp. Date	Sample No.	Type
5050	±	50	ppm	Nitric Oxide	Nitrogen	CC 67671	SFS42116	03/27/04	JW	GMIS
5030	±	50	ppm	Sulfur Dioxide	Nitrogen	CC 55197	L99-022	01/06/06	MJ	GMIS
4980	±	50	ppm	Carbon Monoxide	Nitrogen	AL-1927	12223	05/19/05	BY	GMIS

Nitric Oxide GAS ANALYZER EMPLOYED		Sulfur Dioxide GAS ANALYZER EMPLOYED		Carbon Monoxide GAS ANALYZER EMPLOYED	
Manufacturer:	Beckman	Manufacturer:	Horiba	Manufacturer:	Rosemount Analytical CO
Model Number:	951A	Model Number:	CMA-331A	Model Number:	880Z-16
Serial Number:	00100508	Serial Number:	56674503	Serial Number:	2000224
MPR Last Calibrated:	02/27/04	MPR Last Calibrated:	02/12/04	MPR Last Calibrated	02/20/04
Analytical Principle	Chemiluminescent	Analytical Principle:	NDIR	Analytical Principle	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	-3	-3	-3	Vdc
Reference	504	504	504	Vdc
Candidate	507	507	507	Vdc
Result	5090	5060	5060	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 5080 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	-3	-3	-3	Vdc
Reference	505	505	505	Vdc
Candidate	509	509	509	Vdc
Result	5090	5090	5090	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 5090 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	507	506	506	Area
Candidate	487	485	486	Area
Result	4832	4831	4831	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 4831 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	506	504	504	Area
Candidate	484	483	483	Area
Result	4811	4820	4820	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 4817 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	502	501	501	Vdc
Candidate	479	479	479	Vdc
Result	4752	4761	4761	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 4758 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	500	500	501	Vdc
Candidate	478	478	479	Vdc
Result	4761	4761	4761	ppm
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 4761 ppm

Analyst:

Approved by:

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC12901	2000PSIG	SFS62633
Assay Date:	Expiration Date:	Document Number:
2/27/2004	2/27/2006	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	480	ppm	488	±	7	ppm
Sulfur Dioxide	480	ppm	483	±	7	ppm
Carbon Monoxide	480	ppm	479	±	6	ppm
NOx			488	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No: 2.2, Procedure G-1

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration				Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
483	±	5	ppm	Nitric Oxide	Nitrogen	CC 61908	SFS44299	09/04/04	LT	GMIS
745	±	8	ppm	Sulfur Dioxide	Nitrogen	CC 60854	L99-044	01/06/05	LM	GMIS
500	±	4	ppm	Carbon Monoxide	Nitrogen	CC 150327	SFS48669	04/02/05	LU	GMIS

Nitric Oxide GAS ANALYZER EMPLOYED		Sulfur Dioxide GAS ANALYZER EMPLOYED		Carbon Monoxide GAS ANALYZER EMPLOYED	
Manufacturer	Beckman	Manufacturer:	Rosemount Analytical	Manufacturer:	Rosemount Analytical CO
Model Number:	951A	Model Number:	890192	Model Number:	8802-15
Serial Number:	00100508	Serial Number:	1000130	Serial Number:	2000224
MPR Last Calibrated:	02/16/04	MPR Last Calibrated:	02/19/04	MPR Last Calibrated:	02/20/04
Analytical Principle	Chemiluminescent	Analytical Principle:	Ultraviolet	Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	477	477	477	Vdc
Candidate	480	481	481	Vdc
Result	486.0	487.1	487.1	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				486.7 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	484	485	485	Vdc
Candidate	490	490	491	Vdc
Result	489.0	488.0	489.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				488.6 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	728	728	728	Area
Candidate	472	472	472	Area
Result	483.0	483.0	483.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				483.0 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	745	745	745	Area
Candidate	482	482	483	Area
Result	482.0	482.0	483.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				482.3 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	500	499	499	Vdc
Candidate	479	479	479	Vdc
Result	479.0	480.0	480.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				479.6 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	504	503	503	Vdc
Candidate	483	482	482	Vdc
Result	479.2	479.1	479.1	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				479.1 ppm

Analyst:	Approved by:

AGR_010009

AIR LIQUIDE

8832 DICE ROAD, SANTA FE SPRINGS, CALIFORNIA 90670 (562) 9451383

EPA Protocol

Section No. 2.2, Procedure : G-1

DOC. NUMBER	13261073
CUSTOMER	ALA-CYL-TACOMA
LOCATION	TACOMA, WA
P.O. NUMBER	
ITEM NUMBER	

SERIAL #	LOT #	CGA
CC36363	SFS71754	660

COMPONENT	CONCENTRATION			
Nitric Oxide	97.3	±	1.3	ppm
Sulfur Dioxide	97.5	±	1.4	ppm
Carbon Monoxide	98.4	±	1.4	ppm
NOx	97.3	ppm		
Nitrogen	Balance			

ASSAY	EXPIRATION	PRESSURE
08/20/04	08/20/06	2000PSIG

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC44509	2000PSIG	SFS62632
Assay Date:	Expiration Date:	Document Number:
2/27/2004	2/27/2006	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	50	ppm	51.1	±	0.8	ppm
Sulfur Dioxide	50	ppm	48.9	±	0.8	ppm
Carbon Monoxide	50	ppm	50.3	±	0.8	ppm
NOx			51.1	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure: G-1

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration				Component	Balance	Cyl. No.	SRM, GMIS NTRM No.	Exp. Date	Sample No.	Type
48.9	±	0.6	ppm	Nitric Oxide	Nitrogen	CC 66188	SFS49352	01/08/05	LP	GMIS
51.0	±	0.7	ppm	Sulfur Dioxide	Nitrogen	CC 71619	970803	01/09/06	MG	GMIS
51.6	±	0.6	ppm	Carbon Monoxide	Nitrogen	CC 103453	SFS51959	05/08/05	MV	GMIS

Nitric Oxide		Sulfur Dioxide		Carbon Monoxide	
GAS ANALYZER EMPLOYED		GAS ANALYZER EMPLOYED		GAS ANALYZER EMPLOYED	
Manufacturer:	Beckman	Manufacturer:	Horiba	Manufacturer:	Rosemount Analytical CO
Model Number:	951A	Model Number:	CMA-331A	Model Number:	880Z-16
Serial Number:	00100508	Serial Number:	56674503	Serial Number:	2000224
MPR Last Calibrated:	02/12/04	MPR Last Calibrated:	02/12/04	MPR Last Calibrated:	02/03/04
Analytical Principle:	Chemiluminescent	Analytical Principle:	NDIR	Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	456	457	456	Vdc
Candidate	496	496	497	Vdc
Result	51.01	50.90	51.12	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				51.01 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	470	469	469	Vdc
Candidate	512	511	511	Vdc
Result	51.09	51.10	51.10	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				51.10 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	-2	-2	-2	Area
Reference	480	480	479	Area
Candidate	460	460	459	Area
Result	48.86	48.86	48.88	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.88 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	451	451	452	Area
Candidate	432	433	433	Area
Result	48.86	48.97	48.87	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.90 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	-1	-1	Vdc
Reference	515	515	515	Vdc
Candidate	498	498	498	Vdc
Result	50.09	50.09	50.09	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				50.09 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	-2	-2	-2	Vdc
Reference	512	512	512	Vdc
Candidate	498	499	498	Vdc
Result	50.39	50.49	50.39	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT				50.42 ppm

Analyst: Thuan Tran

Approved by: E. Barron

AGR_010011

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC109232	2000PSIG	SFS62631
Assay Date:	Expiration Date:	Document Number:
2/23/2004	2/23/2007	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration	ASSAY Concentration
Carbon Dioxide	19 %	18.0 ± 0.3 %
Oxygen	22.5 %	22.5 ± 0.3 %
Nitrogen	Balance	Balance

EPA Protocol
Section No. 2.2, Procedure . G-1

Analyst: Eric Barron
Approved by: David Connolly

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration	Component	Balance	Cyl. No.	SRM NTRM No.	Exp. Date	Sample No.	Type
18.0 ± 0.2 %	Carbon Dioxide	Nitrogen	CC 103274	SFS31230	05/06/05	HS	GMIS
21.11 ± 0.14 %	Oxygen	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS

Carbon Dioxide

GAS ANALYZER EMPLOYED

Manufacturer	Varian(B)
Model Number:	3400
Serial Number:	2806
MPR Last Calibrated:	02/09/04
Analytical Principle:	FID & TCD

Oxygen

GAS ANALYZER EMPLOYED

Manufacturer:	Varian(B)
Model Number:	3400
Serial Number:	2806
MPR Last Calibrated:	02/12/04
Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	10971746	10976563	10953995	Area
Candidate	11534056	11539429	11583058	Area
Result	18.92	18.92	19.03	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				18.96 %

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	10328639	10393882	10363240	Area
Candidate	11036425	11049498	11086548	Area
Result	22.56	22.44	22.58	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				22.53 %

Analyst: E J Barron

Approved by: David Connolly

AGR_010012

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC53983	2000PSIG	SFS82630
Assay Date:	Expiration Date:	Document Number:
3/1/2004	3/1/2007	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Carbon Dioxide	10	%	9.98	±	0.11	%
Oxygen	12.5	%	12.5	±	0.1	%
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure G-1

REFERENCE STANDARD EMPLOYED FOR ANALYSIS Concentration			Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
5.005	± 0.026	%	Carbon Dioxide	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS
21.11	± 0.14	%	Oxygen	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS

Analyst: Eric Barron
Approved by: David Connolly

Carbon Dioxide GAS ANALYZER EMPLOYED		Oxygen GAS ANALYZER EMPLOYED	
Manufacturer	Varian(B)	Manufacturer:	Varian(B)
Model Number:	3400	Model Number:	3400
Serial Number	2806	Serial Number:	2806
MPR Last Calibrated	02/09/04	MPR Last Calibrated:	02/12/04
Analytical Principle:	FID & TCD	Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	1167802	1170848	1166504	Area
Candidate	2330227	2328930	2329212	Area
Result	9.989	9.957	10.00	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				9.981 %

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	3984344	3985538	3983177	Area
Candidate	2350660	2349521	2351892	Area
Result	12.45	12.44	12.47	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				12.45 %

Analyst:	Approved by:
E. Barron	David Connolly

Example Equations

Data is from B5 Boiler Run 1

Absolute pressure in the Stack(P_s)

Where P_{bar} = barometric pressure

P_g = static pressure of the stack

P_s: $P_{bar} + P_g/13.6$

P_s: 24.4+ (-0.41/13.6)

P_s: **24.37**

Volume of Metered Sample Gas @ Std. Conditions

Where V_m = Volume, Dry Gas Meter, cubic ft.

K_1 = 17.64 °R/in. Hg

Y = Dry gas meter calibration factor

P_{bar} = Barometric pressure

ΔH = Gas Meter average differential pressure, in. H_2O

T_m = Gas Meter average temperature, °F

$V_{m(std)}$: $K_1 * V_m * Y * (P_{bar} + (\Delta H/13.6))/(T_m + 460)$

$V_{m(std)}$: 17.64 * 90.587 * .995 * (24.4 + (1.3/13.6))/(89.9 + 460)

$V_{m(std)}$: **70.826**

Volume of Water@ Standard Conditions

Where V_{lc} = Impinger liquid volume collected, ml

$V_{w(std)}$: 0.04707 * V_{lc}

$V_{w(std)}$: 0.04707 * 305.4

$V_{w(std)}$: **14.375**

Moisture(Bws) Volumetric

Where $V_{w(std)}$ = Std. Water vapor volume, scf

$V_{m(std)}$ = Std. Sample gas volume,DSCF

Bws: $V_{w(std)} / (V_{w(std)} + V_{m(std)})$

Bws: 14.375 / (14.375 + 70.826)

Bws: **0.169**

Molecular Weight lb/lb - mole, Dry (M_d)

M_d: $((0.44*\%CO_2)+(0.32*\%O_2)+(0.28*\%N_2)$

M_d: ((0.44*9.76)+(0.32*4.14)+(0.28*86.1)

M_d: **29.73**

Molecular Weight lb/lb - mole, Wet (M_w)

M_w: (M_d * (1-Bws) + (18 * Bws)

M_w: (29.73 * (1-0.169) + (18 *0.169)

M_w: **27.75**

Gas Velocity(V_s)

Where C_p = pitot tube coefficient

T_s = temperature of the stack

M_w = molecular weight lb/lb - mole, wet

Ps = absolute pressure in the stack

V_s: (85.49 * C_p * SQRT(ΔP) * SQRT((T_s + 460)/(P_s * M_w))

V_s: (85.49 * 0.84 * SQRT(0.629) * SQRT((350.1 + 460)/(24.37 * 27.75))

V_s: **62.3**

Actual Cubic Feet/Minute (acfm)

Where A = area of the duct in square feet

V_s = Stack gas velocity, ft/sec

acfm: A * V_s * 60

acfm: 22.34 * 62.3* 60

acfm: **83,507**

Dry Standard Actual Cubic Feet/Minute (dscfm)

Where T_s = temperature of the stack

acfm = actual cubic ft/min

dscfm: (1-(Bws)) * acfm * (528/(T_s + 460)) * (P_s/(29.92))

dscfm: (1-(0.169)) * 83507 * (528/(350.1 + 460)) * (24.37/(29.92))

dscfm: **36,839**

Percent Isokinetic Variation

Where T_s = temperature of the stack

P_s = absolute pressure in the stack

$V_{m(std)}$ = Std. Sample gas volume,DSCF

V_s = Stack gas velocity, ft/sec

A_n = Nozzle area, ft^2

K_4 = 0.0945 constant from EPA method 5

θ = sample time in minutes

%Iso: K_4 * (T_s + 460) * $V_{m(std)}$ / (P_s * V_s * A_n * θ * (1- B_{ws}))

%Iso: 0.0945 * (350.1 + 460) * 70.826 / (24.37 * 62.3 * 3.30e-04* 1200 * (1-0.169)

%Iso: **108.5**

Grains per Dry Standard Cubic Feet

Where mg = milligrams particulate

$V_{m(std)}$ = Std. Sample gas volume,DSCF

gr/dscf: (0.0154*mg)/$V_{m(std)}$

gr/dscf: (0.0154*11.6)/70.826

gr/dscf: **0.0025**

Particulate pounds per Hour

Where gr/dscf = grains per dry standard cubic feet

DSCFM = Dry Standard Cubic Ft/min

lbs/hr: (gr/dscf * DSCFM *60)/7000

lbs/hr: (0.0025 * 36839 *60)/7000

lbs/hr: **0.79**

Particulate pounds per mmBtu

Where gr/dscf = grains per dry standard cubic feet

Fd = Fuel Factor for natural gas (8710 dscf/mmBtu)

O2 = effluent oxygen level

lbs/mmBtu: (gr/dscf * Fd/7000)*(20.9/(20.9-O2)
lbs/mmBtu: (0.0025 * 8710/7000)*(20.9/(20.9-4.14)
lbs/mmBtu: **0.0039**

Oxides of Nitrogen @ 3.0% Oxygen

Where Corr O_2 = percent oxygen corrected to
Eff O_2 = effluent oxygen content
ppm = parts per million dry basis NOx
NOx ppm @ 7% O_2: ppm *((20.9 - Corr O_2)/(20.9 - Eff O_2)
NOx ppm @ 7% O_2: 44.3 *((20.9 - 3.0)/(20.9 - 4.14)
NOx ppm @ 7% O_2: **47.3**

Oxides of Nitrogen pounds per mmBtu

Where M_w = Molecular weight of NO_2
Eff O2 = effluent oxygen content
F_d = 9780 dscf/mmBtu (Fuel factor from CFR 40)
ppm = parts per million dry basis NOx
NOx lbs/mmBtu: ((ppm * M_w)/ 385.1e6)) * (20.9/(20.9 - Eff O_2)) * F_d
NOx lbs/mmBtu: ((44.3 * 46.01)/ 385.1e6)) * (20.9/(20.9 - 4.14)) * 8710
NOx lbs/mmBtu: **0.0575**

Oxides of Nitrogen pounds per Hour

Where M_w = Molecular weight of NO_2
DSCFM = Dry Standard Cubic Ft/min
ppm = parts per million dry basis NOx
NOx lbs/hr: (ppm*Mw/385100000)*Dscfm*60
NOx lbs/hr: (44.3 * 46.01/385100000) * 36839 * 60
NOx lbs/hr: **11.70**

Environics Series 4000
Calibration Report

Calibration Date: January 5, 2005
Reference Gas: Nitrogen
Calibration Standard: DryCal (Model DC-Lite Primary Flow Meter)
Instrument Serial # : 2627

Mass Flow Controller 1	
Set Flow ccm	True Flow ccm
500.00	499
1000.00	1061
2000.00	2122
3000.00	3134
4000.00	4130
5000.00	5115
6000.00	6089
7000.00	7051
8000.00	8019
9000.00	9010
10000.00	10180

Mass Flow Controller 2	
Set Flow ccm	True Flow ccm
500.00	498
1000.00	1020
2000.00	2050
3000.00	3064
4000.00	4054
5000.00	5064
6000.00	6063
7000.00	7044
8000.00	8032
9000.00	9029
10000.00	10052

Mass Flow Controller 3	
Set Flow ccm	True Flow ccm
50.00	49.1
100.00	97.2
200.00	194.4
300.00	291.3
400.00	389.1
500.00	487.4
600.00	590.2
700.00	689.2
800.00	791.50
900.00	895.6
1000.00	1008

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC36363	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	97.3 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/7/2004
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/7/2005
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	6000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 2								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m Mass Flow Controller 1	Flow Rate, cc/m Mass Flow Controller 2	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value			Per Run	Average		
Lower	1	50.0	2917	3083	50.1		0.00 %	
Point	2	50.0	2917	3083	50.1	50.1	0.00 %	0.20 %
Injections	3	50.0	2917	3083	50.1		0.00 %	
Upper	1	80.0	1067	4933	79.9		0.00 %	
Point	2	80.0	1067	4933	79.8	79.9	-0.10 %	-0.10 %
Injections	3	80.0	1067	4933	79.9		0.00 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentraion	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.5	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:** 1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 2.
3. Maximum flow, controller 1: 10000 ccm
4. Maximum flow, controller 2: 10000 ccm

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC48625	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	491.0 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/3/2003
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/3/2004
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	5000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 3								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m Mass Flow Controller 1	Flow Rate, cc/m Mass Flow Controller 3	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value			Per Run	Average		
Lower	1	50.0	4491	509	49.8		-0.20 %	
Point	2	50.0	4491	509	49.9	49.9	0.00 %	-0.20 %
Injections	3	50.0	4491	509	49.9		0.00 %	
Upper	1	80.0	4185	815	80.0		0.00 %	
Point	2	80.0	4185	815	80.0	80.0	0.00 %	0.00 %
Injections	3	80.0	4185	815	80.1		0.10 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentraion	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.4	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:**
1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 3.
3. Maximum flow, controller 1: 10000 cc/m
4. Maximum flow, controller 3: 1000 cc/m

Interference Response Test

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 06/21/05
Project No.: AES5063

NOx Analyzer

Manufacturer: Eco-Physics
Model: CLD-70E
Serial No.: 83S0008
Date:

Range: 0-100ppm
Proceedure: Method 20 Section 5.4
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Monoxide	CC48625	485.0	0.0
Sulfur Dioxide	CC48625	200.0 (Blended)	0.0
Carbon Dioxide	CC04371	10.0	0.0
Oxygen(Zero Air)	CC83609	20.9	0.0

CO Analyzer

Manufacturer: Siemens
Model: Ultramat 5E
Serial No.: E4-778
Date:

Range: 0-100ppm
Proceedure: Method 10
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Dioxide	CC04371	10.0	0.1

Sampling System Response Time

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 21, 2005
Project No.: AES5063

Antec Environmental Services

Analyzer Type: EcoPhysics NOx
Model No.: CDL 70S
Serial No.: 83S0008

Span gas Concentration: 45.0
Analyzer range: 100.0

Length & Type of sample line used: 100 ft Heated, teflon lined

Upscale:

1). 65 seconds
2). 65 seconds
3). 65 seconds

Average upscale response: 65 seconds

Downscale:

1). 60 seconds
2). 60 seconds
3). 60 seconds

Average downscale response: 60 seconds

System Response time: 65 seconds

High Flow Meter Calibration

Meterbox No.: HF-1
Barometric Pressure: 29.10 (in. Hg)
Calibrated by: BWJ
Date: 4/1/2005

Leak Check: Zero
Leak Check @: 23.5 (in. H2O)

Meter Coefient: ***0.995***
ΔH@: ***1.614***

Point One

Critical Oriface Data	
I.D. No.:	K'-0.257
Orifice K':	0.2614
Rated cfm:	0.335

Test Results	
Time:	15
DGM cfm.:	0.340
Ori. cfm.:	0.335
ΔH@:	1.587
Vm(std):	5.088
Vcr(std):	5.019
Y:	0.986

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	57.0	57.0	57.0	57.0
Meter Inlet Temp.:	57.0	58.0	58.0	57.7
Meter Outlet Temp.:	53.0	54.0	54.0	53.7
Meter Temp. Ave.:	55.0	56.0	56.0	55.7
Initial cu. ft.:	453.700	455.390	457.095	
Final cu. ft.:	455.390	457.095	458.807	
Total cu. ft.:	1.690	1.705	1.712	5.107
ΔH w. H2O:	0.32	0.32	0.32	0.320
Vacuum(in.Hg):	20.5	20.5	20.5	20.5
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.607	1.582	1.571	1.587
Vcr(std):	1.673	1.673	1.673	5.019
Vm(std):	1.686	1.698	1.704	5.088
Y:	0.992	0.985	0.982	0.986

Point Two

Critical Oriface Data	
I.D. No.:	K'-0.385
Orifice K':	0.3979
Rated cfm:	0.510

Test Results	
Time:	15
DGM cfm.:	0.511
Ori. cfm.:	0.510
ΔH@:	1.765
Vm(std):	7.675
Vcr(std):	7.647
Y:	0.996

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	56.0	56.0	56.0	56.0
Meter Inlet Temp.:	54.0	57.0	57.0	56.0
Meter Outlet Temp.:	51.0	52.0	52.0	51.7
Meter Temp. Ave.:	52.5	54.5	54.5	53.8
Initial cu. ft.:	445.700	448.235	450.810	
Final cu. ft.:	448.235	450.810	453.368	
Total cu. ft.:	2.535	2.575	2.558	7.668
ΔH w. H2O:	0.81	0.81	0.81	0.81
Vacuum(in.Hg):	19.0	19.0	19.0	
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.787	1.742	1.766	1.765
Vcr(std):	2.549	2.549	2.549	7.647
Vm(std):	2.544	2.574	2.557	7.675
Y:	1.002	0.990	0.997	0.996

High Flow Meter Calibration

Meterbox No.:	HF-1		Leak Check:	Zero
Barometric Pressure:	29.1	(in. Hg)	Leak Check @:	23.0 (in. H2O)
Calibrated by:	BWJ			
Date:	04/01/05		***Meter Coefient:***	***0.995***
			ΔH@:	***1.614***

Point Three

Critical Oriface Data	
I.D. No.:	K'-0.559
Orifice K':	0.5693
Rated cfm:	0.730

Test Results	
Time:	15
DGM cfm.:	0.733
Ori. cfm.:	0.730
ΔH@:	1.256
Vm(std):	11.070
Vcr(std):	10.954
Y:	0.989

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	54.0	55.0	55.0	54.7
Meter Inlet Temp.:	51.0	54.0	55.0	53.3
Meter Outlet Temp.:	49.0	49.0	50.0	49.3
Meter Temp. Ave.:	50.0	51.5	52.5	51.3
Initial cu. ft.:	434.500	438.175	441.840	
Final cu. ft.:	438.175	441.840	445.494	
Total cu. ft.:	3.675	3.665	3.654	10.994
ΔH iv. H2O:	1.20	1.20	1.20	1.20
Vacuum(in.Hg):	17.0	17.0	17.0	17.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.240	1.259	1.269	1.256
Vcr(std):	3.654	3.650	3.650	10.954
Vm(std):	3.710	3.689	3.671	11.070
Y:	0.985	0.989	0.994	0.989

Point Four

Critical Oriface Data	
I.D. No.:	K'-0.821
Orifice K':	0.8424
Rated cfm:	1.077

Test Results	
Time:	15
DGM cfm.:	1.066
Ori. cfm.:	1.077
ΔH@:	1.848
Vm(std):	16.041
Vcr(std):	16.155
Y:	1.007

Metering System Data	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	58.0	58.0	58.0	58.0
Meter Inlet Temp.:	58.0	58.0	58.0	58.0
Meter Outlet Temp.:	55.0	55.0	55.0	55.0
Meter Temp. Ave.:	56.5	56.5	56.5	56.5
Initial cu. ft.:	459.000	464.325	469.660	
Final cu. ft.:	464.325	469.660	474.990	
Total cu. ft.:	5.325	5.335	5.330	15.990
ΔH iv. H2O:	3.70	3.70	3.70	3.70
Vacuum(in.Hg):	13.0	13.0	13.0	13.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.851	1.844	1.848	1.848
Vcr(std):	5.385	5.385	5.385	16.155
Vm(std):	5.342	5.352	5.347	16.041
Y:	1.008	1.006	1.007	1.007

High Flow Meter Post Test Calibration

Meterbox No.: HF-1
Company: Agrium CPO/Nu-West Inc
Source: B5 Boiler
Date: 6/27/2005
Job # AES5063

Leak Check: zero
Leak Check Pressure.: 6.0 (in. H_2O)
Barometric Pressure: 28.95 (in. Hg)
Calibrated by: BWJ
Quarterly Calibration date: 4/1/2005

Pretest Meter Coefient: *0.995*
Pretest ΔH@: *1.614*

Postest Meter Coefient: *0.998*
Postest ΔH@: *2.033*
Pass or Fail *Pass*

Critical Orifice Data

I.D. No.: 0.559
Orifice K': 0.5693
Rated cfm: 0.717

Test Results

Time: 15
DGM cfm.: 0.741
Orl. cfm.: 0.717
ΔH@: 2.033
Vm(std): 10.772
Vcr(std): 10.752
Y: 0.998

Test Point

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.	68.0	69.0	69.0	68.7
Meter Inlet Temp.	70.0	70.0	70.0	70.0
Meter Outlet Temp.	68.0	69.0	69.0	68.7
Meter Temp. Ave.	69.0	69.5	69.5	69.3
Initial cu. ft.:	900.500	904.205	907.910	
Final cu. ft.:	904.205	907.910	911.615	
Total cu. ft.:	3.705	3.705	3.705	11.115
ΔH in. H_2O:	1.800	1.800	1.800	1.800
Vacuum(in.Hg):	18.0	18.0	18.0	18.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	2.028	2.036	2.036	2.033
Vcr(std):	3.586	3.583	3.583	10.752
Vm(std):	3.593	3.590	3.590	10.772
Y:	0.998	0.998	0.998	0.998

PITOT TUBE POST TEST CALIBRATION

Pitot Tube ID No.: AESP6.1
Barometric Pressure: 28.95 (in. Hg)
Calibrated By: BWJ
Date: 6/27/2004

Std. Pitot ID: S-1
Cp(std): 0.99 (in. H20)

Pitot Tube Coefficient (Cp): 0.84

Pitot A-Side Calibration

ΔP_{std}	ΔP_s	$Cp_{(S)}$ [a]
0.36	0.5	0.84

Pitot B-Side Calibration

ΔP_{std}	ΔP_s	$Cp_{(S)}$ [a]
0.36	0.5	0.84

THERMOCOUPLE POST TEST CALIBRATION

Thermocouple ID No.: AESP4.1T
Calibrated By: BWJ
Date: 6/27/2004

Heat Source: Controlled Electric Furnace
Reference Thermometer: Extech 42312 Dig. Thermometer

Ref. Temp. F°	Equip. Temp. F°	% Diff.
350	349.4	0.074074

Field & Laboratory Data

Sample Recovery & Chain of Custody

Client: AGRIUM
Location: Soda Springs, ID
Source: Boiler B5
Date: 6-22-05
Project No.: AES5064

Antec Environmental Services

	RUN #: Filter #:			RUN #: Filter #:			RUN #: Filter #:		
	Filter tare weight, gms.:			Filter tare weight, gms.:			Filter tare weight, gms.:		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	860.5	568.9	291.6	801.8	558.8	243.0	855.5	574.9	276.6
H_2O	613.2	576.3	36.9	617.8	565.1	52.7	599.0	580.6	18.4
KO	481.2	476.9	4.9	459.9	454.2	5.7	485.5	481.1	4.4
Silica	756.9	734.9	22.0	769.3	744.3	25.0	768.0	757.0	11.8
LW			-50.0			-50			-50
	Vlc: (Liquid volume collected, ml)		305.4		Vlc:	276.4		Vlc:	261.2

Sample Description	Sample I.D. Number		
	Run #1	Run #2	Run #3
Front Half Filter	338	344	346
Back Half Filter	NA	→	→
Probe & Nozzle	PNR1AG	PNR2AG	PNR2AG
Impinger Catch H_2O	H2OR1AG	H2OR2AG	H2OR3AG
MeCl Impinger Rinse	IRR1AG	IRR2AG	IRR2AG
Liquid Levels Marked	yes @ Labeled		
Samples Sealed and Stored/Location	Mobile Lab #1		
Date & Time Samples Sealed	Post Run	Mobile Lab #1	6-22-05

Date Sampled: 6-22-05
Date & Time Recovered: 6-22-05 Post Run
Recovered by: E. Olson

Released by: E E Olson Date: 6-24-05 Received by: AES Lab

Released by: Date: Received by:

Released by: Date: Received by:

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: Highlium
Sampling location:
Date: 6.22.05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	~~0~~	@ 3.5	(in)H_2O
Side B:	~~0~~	@ 3.7	(in)H_2O

Sample Train Leak Check				
Initial:	0.000	Cuft@	10.0	(in)Hg
Final:	0.000	Cuft@	10.0	(in)Hg

Run #: 1
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) 2.5 (D_n) 2.0
Assumed Moisture(%): 8 (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number		Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Corrected Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
	1	12	0	0911	1	349	0.35	~~0~~	0.70	611.100	80	79	240	249	48
	2	11	5		2	349	0.35		0.70	613.9	81	79	240	252	49
	3	10	10		2	350	0.35		0.70	616.6	82	80	238	250	50
	4	9	15		2	350	0.38		0.76	619.4	83	80	240	252	51
	5	8	20		2	350	0.40		0.80	622.3	85	81	239	250	52
	6	7	25		2	352	0.45		0.91	625.2	87	82	241	252	52
	7	6	30		3	352	0.70		1.4	628.4	89	83	240	253	53
	8	5	35		3	351	0.80		1.6	632.3	91	84	239	251	54
	9	4	40		4	350	0.95		1.9	636.6	92	85	240	250	55
	10	3	45		4	349	1.0		2.0	641.2	94	86	239	252	56
	11	2	50		4	349	1.0		2.0	645.9	95	87	238	250	52
	12	1	55		4	348	1.0		2.0	650.7	96	87	237	249	57
	13	12	60		4	350	0.75		1.5	655.5	94	88	238	250	58
	14	11	65		4	348	0.75		1.5	659.6	95	89	239	252	58
	15	10	70		4	349	0.75		1.5	663.7	96	89	238	254	59
	16	9	75		4	349	0.65		1.3	667.9	97	90	240	252	60
	17	8	80		3	350	0.50		1.0	671.7	98	90	238	250	61
	18	7	85		2	350	0.40		0.82	675.1	99	91	239	249	61
	19	6	90		3	352	0.55		1.1	678.2	98	91	238	251	62
	20	5	95		3	353	0.65		1.3	681.7	99	92	237	250	62
	21	4	100		4	352	0.78		1.6	685.6	99	92	238	251	63
	22	3	105		4	352	0.73		1.5	689.8	101	92	236	252	64
	23	2	110		3	349	0.65		1.3	693.9	101	93	238	251	64
	24	1	115		3	350	0.65		1.3	697.8	101	93	236	250	65
	END		120	1115	—	—	—		—	701.687	—	—	—	—	—
	Average					350.1	0.630		1.321	90.587		89.9			

DSCFM - 41017

AGR_010027

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: Agrium
Sampling location:
Date: 6-22-05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	⊖	@ 3.8	(in)H_2O
Side B:	⊖	@ 3.5	(in)H_2O

Sample Train Leak Check			
Initial:	0.000	Cuft@ 10.0	(in)Hg
Final:	0.000	Cuft@ 10.0	(in)Hg

Run #: 2
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) (D_a)
Assumed Moisture(%): (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

min./pt	Traverse Pt. Number	Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
1	12	0	1158	4	351	0.90	1.5	703.900	94	93	238	249	48
2	11	5		4	352	0.85	1.5	708.0	96	93	236	250	49
3	10	10		5	353	0.80	1.4	712.1	98	93	237	251	50
4	9	15		5	354	0.70	1.2	716.0	98	94	237	254	51
5	8	20		3	355	0.50	0.85	719.6	100	94	239	255	53
6	7	25		3	356	0.45	0.77	722.7	101	95	238	253	54
7	6	30		4	357	0.65	1.1	725.7	101	96	239	255	55
8	5	35		5	357	0.80	1.4	729.2	102	96	238	254	56
9	4	40		5	358	0.85	1.5	733.1	104	96	240	255	57
10	3	45		5	357	0.85	1.5	737.2	104	97	239	256	57
11	2	50		5	354	0.75	1.3	741.3	104	97	238	254	58
12	1	55		4	352	0.70	1.2	745.1	104	98	239	249	59
13	12	60		2	354	0.35	0.60	748.8	102	98	237	250	60
14	11	65		2	354	0.35	0.60	751.4	104	98	238	252	61
15	10	70		2	355	0.35	0.60	754.0	103	99	237	254	63
16	9	75		3	357	0.38	0.65	756.6	103	99	239	256	63
17	8	80		3	358	0.45	0.77	759.3	104	99	237	254	64
18	7	85		5	358	0.80	1.4	762.3	104	99	236	252	64
19	6	90		5	357	0.75	1.3	766.2	105	99	239	255	64
20	5	95		5	357	0.90	1.6	770.1	106	100	237	254	65
21	4	100		5	356	1.0	1.7	774.3	106	100	236	255	65
22	3	105		5	354	1.0	1.7	778.7	107	100	238	255	65
23	2	110		5	352	1.1	1.9	783.1	107	101	236	252	65
24	1	115		6	352	1.1	1.9	787.8	107	101	237	253	65
END		120	1401	—	—	—	—	792.445	—	—	—	—	—
Average					355.0	0.701	1.242	88.545		99.9			

DSCFM - 39404

AGR_010028

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202

Company/Plant: Agrium

Sampling location:

Date: 6-22-05 Project #:

Operator: BWJ

Meter Box #: HF-1 Meter Box H@: 1.614

Meter Box Calibration(Y): 0.995

Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	D	@ 3.5	(in)H_2O
Side B:	D	@ 3.7	(in)H_2O

Sample Train Leak Check			
Initial:	0.000 Cuft@	10.0	(in)Hg
Final:	0.000 Cuft@	10.0	(in)Hg

Run #: 3

Barometric Pressure(P_b): 24.40 (in)Hg

Duct Diameter(in): 64 (D_b) (D_a)

Assumed Moisture(%): 16 (T_m): (T_d):

Nozzle Dia_{ave}: 0.243 1 2 3

Static Pressure("H_2O): -0.41

Probe & Nozzle Material: SS.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number		Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Corrected Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F) Inlet	Dry Gas Meter Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
	1	12	0	1427	1	355	0.35	—	0.60	795.400	96	97	237	250	48
	2	11	5		1	355	0.35		0.60	798.0	96	97	235	254	47
	3	10	10		1	355	0.35		0.60	800.6	97	96	236	252	49
	4	9	15		2	357	0.40		0.68	803.2	98	96	237	251	50
	5	8	20		2	358	0.40		0.68	805.9	99	96	236	252	51
	6	7	25		2	357	0.48		0.82	808.7	100	96	239	254	52
	7	6	30		3	356	0.75		1.3	811.7	101	96	238	252	53
	8	5	35		4	355	0.85		1.5	815.5	102	96	236	251	54
	9	4	40		4	353	1.0		1.7	819.6	101	95	234	254	54
	10	3	45		4	353	1.1		1.9	822.0	101	95	235	252	55
	11	2	50		4	350	1.1		1.9	828.6	101	94	236	253	56
	12	1	55		4	357	1.1		1.9	833.2	101	95	234	254	56
	13	12	60		3	351	0.75		1.3	837.8	98	93	236	251	56
	14	11	65		3	352	0.80		1.4	841.6	99	93	237	254	57
	15	10	70		3	352	0.75		1.3	845.5	99	93	236	252	58
	16	9	75		3	352	0.70		1.2	849.3	99	93	238	254	58
	17	8	80		3	353	0.60		1.0	853.0	99	93	237	253	59
	18	7	85		2	354	0.45		0.77	856.4	99	93	235	251	59
	19	6	90		3	356	0.55		0.94	859.3	98	92	237	249	60
	20	5	95		3	357	0.70		1.2	862.6	99	92	236	251	61
	21	4	100		3	355	0.80		1.4	866.2	99	92	235	252	61
	22	3	105		3	355	0.80		1.4	870.1	99	92	235	249	62
	23	2	110		3	353	0.75		1.3	874.0	98	92	236	251	62
	24	1	115		3	353	0.75		1.3	877.8	98	92	235	250	63
	END		120	1630	—	—	—	—	—	881.613	—	—	—	—	—
	Average					354.0	0.672		1.186	86.213		96.6			

DscFM-38600

AGR_010029

AES Gravimetric Analysis Form

Client: AGRIUM
Proj. No.: AES5062
Analysist: BWT

	Trial No. 1	Trial No. 2	Trial No. 3
Date:	7-8-05	7-9-05	7-10-05
Time:	1000	1000	1000
Lab Temp:	64	65	65
% RH:	66	66	66

Sample ID	Lab ID	Date/Time into Dessicator	Sample Medium	Sample Vol. (mls)	Audit Wt (gms)	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Average Final Weight (gms)	Average Initial Weight (gms)
P.N. R-1	222	7-7-05 0930	ACE	150	100.0000	103.7964	103.7965	103.7966	103.7965	103.7934
P.N. R-2	236	7-7-05 0930	ACE	150	100.0000	101.5750	101.5749	101.5748	101.5749	101.5734
P.N R-3	83	7-7-05 0930	ACE	150	100.0000	105.9819	105.9820	105.9820	105.9820	105.9804
MeCl R-1	6	7-7-05 0930	MeCl	60	50.0000	100.8124	100.8123	100.8124	100.8124	100.8110
MeCl R-2	42	7-7-05 0930	MeCl	60	50.0000	96.1876	96.1876	96.1876	96.1876	96.1870
MeCl R-3	49	7-7-05 0930	MeCl	60	50.0000	99.6525	99.6525	99.6525	99.6525	99.6518
H2O R-1	212	7-7-05 0930	H2O	200	100.0000	106.8867	106.8869	106.8870	106.8869	106.8792
H2O R-2	37	7-7-05 0930	H2O	200	100.0000	102.5326	102.5327	102.5327	102.5327	102.5267
H2O R-3	229	7-7-05 0930	H2O	200	100.0000	104.5543	104.5543	104.5544	104.5543	104.5500
H2O Blank	H2O	7-7-05 0930	H2O	100	100.0000	97.2363	97.2363	97.2364	97.2363	97.2361
MeCl Blank	254	7-7-05 0930	MeCl	60	100.0000	104.5592	104.5592	104.5592	104.5592	104.5587
Acetone Blank	132	7-7-05 0930	ACE	100	100.0000	98.9796	98.9797	98.9797	98.9797	98.9795

AGR_010030

AES Final Filter Weight Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7.5.05	7.6.05	7.7.05
Proj. No.: AE55062	Time:	1005	0950	0945
Analysist: BWJ	Temp:	67	66	66
	RH:	61	61	60
	Audit Wt.:	0.5000	0.5000	0.5000
	Audit Wt. Reading:	0.5000	0.5000	0.5000
	Date/Time Into Dessicator:	7.1.05 0930	7.1.05 0930	7.1.05 0930

Sample ID	Filter No.	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Final Average Wt.(gms)	Tare Average Wt.(gms)
R-1	338	0.3461	0.3461	0.3461	0.3461	0.3455
R-2	344	0.3475	0.3475	0.3475	0.3475	0.3470
R-3	346	0.3460	0.3460	0.3460	0.3460	0.3457

AES Gravimetric Tare Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7.5.05	7.6.05	7.7.05
Proj. No.: AES5062	Time:	1000	1000	1000
Analysist: BWJ	Temp:	66°	65°	64°
	RH:	60%	60%	59%
	Audit Wt.:	100.0000	100.0000	100.0000
	Date/Time into Dessicator:	7.2.05/0950	7.2.05/0950	7.2.05/0950

Sample ID	Lab ID	Trial No. 1	Trial No. 2	Trial No. 3	Average
	212	106.8793	106.8792	106.8791	106.8792
	6	100.8110	100.8110	100.8110	100.8110
	118	104.1197	104.1195	104.1194	104.1195
	132	98.9796	98.9795	98.9794	98.9795
	116	103.9914	103.9914	103.9914	103.9914
	83	105.9804	105.9804	105.9803	105.9804
	222	103.7936	103.7934	103.7932	103.7934
	254	104.5589	104.5587	104.5587	104.5587
	37	102.5267	102.5267	102.5267	102.5267
	3	79.0515	79.0513	79.0511	79.0513
	229	104.5500	104.5500	104.5500	104.5500
	49	99.6519	99.6518	99.6517	99.6518
	42	96.1870	96.1870	96.1870	96.1870
	H_2O	97.2362	97.2361	97.2360	97.2361
	236	101.5735	101.5734	101.5734	101.5734

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 1-4

Company/Plant: AGRIUM

Sampling location: BS Boiler Normal OP

Date: 6.23.05 Project #: AES5064

Operator: EEO / BWT

Meter Box #: Meter Box H@:

Meter Box Calibration(Y):

Probe #: AES Pitot 1 C_p: 0.846

Pitot Tube Leak Check			
Side A:	✓	@ 3.8	(in)H_2O
Side B:	✓	@ 3.6	(in)H_2O

Sample Train Leak Check			
Initial: 0.020	Cuft@		(in)Hg
Final:	Cuft@		(in)Hg

Run #: 1

Barometric Pressure(P_b): 24.45 (in)Hg

Duct Diameter(in): (D_b) (D_a)

Assumed Moisture(%): ~~[illegible]~~ (T_w): (T_d): 11.87

Nozzle Dia_{ave}: 1 2 3

Static Pressure("H_2O): -0.21

Probe & Nozzle Material:

min./pt Traverse Pt. Number	Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
8				310	0.32							
7				310	0.28							
6				310	0.25							
5				310	0.21							
4				310	0.22							
3				310	0.26							
2				310	0.32							
1				310	0.30							
8				312	0.18							
7				312	0.15							
6				312	0.16							
5				312	0.18							
4				312	0.20							
3				312	0.21							
2				312	0.38							
1				312	0.40							
Average	128			311	0.246							

mB

%O_2 11.8 25090 DSCFM

AGR_010033

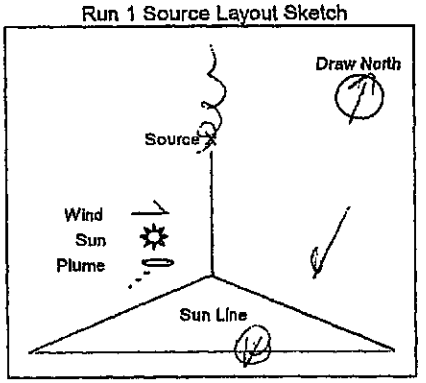
EPA Method 9 Opacity

Client: Agrium
Location: Soda Springs
Site: BG Boiler
Date: 6.22.05

Process Equipment: Nat Gas Boiler
Control Equipment: none combustion
Facility Type: Phosphate Plant
Observed by: [illegible]

Observation Conditions	Run 1	Run 2	Run 3
Sky Condition:	clear	Clear	clear
Background/Color:	Blue	Blue	Blue
Wind Speed:	0-5	0-5	0-5
Wind Direction:	S	S	S
Ambient Temp:	74	80	81
Relative Humidity:	36	36	36
Height of Discharge Point:	30"	30"	30"
Height of Observation Point:	ground	ground	ground
Distance & Direction from Plume:	200 yds	200 yds	200 yds
Plume Color:	none	none	none
Plume Type(attached/detached):	n/a	n/a	n/a
Viewing Angle:	∠15	∠15	∠15

Run 1 Source Layout Sketch



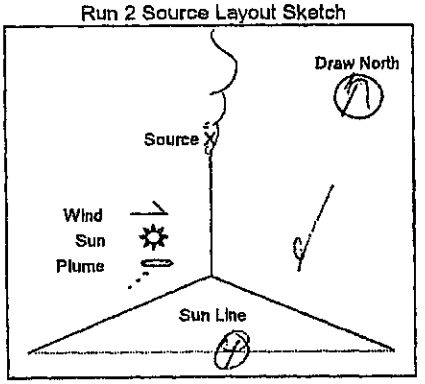
Run 1

Start 1040 Stop 1050

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 2 Source Layout Sketch



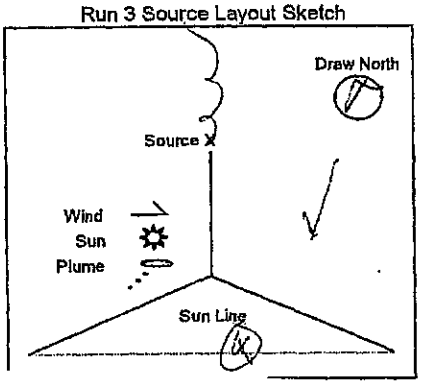
Run 2

Start 1452 Stop 1502

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from 0 to 0 % Opacity

Run 3 Source Layout Sketch



Run 3

Start 1520 Stop 1530

	0	15	30	45
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0

Readings Ranged from _____ to _____ % Opacity

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Brian Johnson

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO NW-F04-040

EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Eric E Olson

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO WA-S98-16

EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

Agrium CPO/Nu-West Ind.
Conda Facility
Emission Verification Report

B5 Boiler

Determination of Particulate Matter
Determination of Oxides of Nitrogen
Determination of Carbon Monoxide
Determination of Sulfur Dioxide
Determination of Non-Methane Volatile Organic Compounds
Determination of Opacity

Test Dates:
June 22, 2005
to
June 23, 2005

Project Number: AES5063

Tested By:

Antec Environmental Services

PO Box 2117
North Bend, WA 98045
(425) 888-2202
antec@earthlink.net

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Source Test Certification

Emission Source Owner: Agrium CPO/Nu-West Ind.
3010 Conda Road
Soda Springs, Idaho

Contact: Mr. Monty Johnson
Title: Environmental Manager
Phone: (208) 547-4381
E-mail: mrjohnso@agrium.com

Permit No.: 029-0003

Date Tested	Emission Units Tested
June 22, 2005	B5 Boiler

Project Number: AES5063

Testing Firm: Antec Environmental Services
Address: PO Box 2117
CityStateZip: North Bend, WA 98045
E-Mail: antec@earthlink.net
Phone: (425) 888-2202
Fax: (425) 888-2321

The data and results presented in this report are, to the best of my knowledge, accurate and complete:

By: _____
Eric E. Olson
Project Manager

Introduction

On June 22, 2005, Antec Environmental Services(AES) performed an emission verification test for Agrium Conda Phosphate Operations, located in Soda Springs, Idaho. The purpose of the testing was to quantify gaseous and particulate emissions from the B5 natural gas fired boiler. Three runs were taken, while the boiler was operating at maximum steam production and one run, gaseous emissions only, was performed at normal steaming rates. Table 1 contains the emission parameters and the methods used in the sampling.

Personnel

Participants involved in the testing program are listed below with their affiliation:

Agrium CPO/Nu-West Ind.	Antec Environmental Services
Mr. Monty Johnson Environmental Manager (208) 547-4381 E-mail:mrjohnso@agrium.com	Eric E. Olson Project Manager (425) 888-2202 E-mail:antec@earthlink.net

Sources & Emission Parameters

Table 1 Source	Date Tested	Test Methods	Emission Parameters	# of Runs & Time
B5 Boiler	06/22/05	EPA 5/202	Filterable and Condensible Particulate Matter	Three 2 hour Runs
B5 Boiler	06/22/05	EPA 7e	Oxides of Nitrogen	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 10 mod	Carbon Monoxide	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 25a	Volatile Organic Compounds	Three, 1 hour Runs
B5 Boiler	06/22/05	EPA 9	Visible Emissions	Three, Ten min Runs

Summary of Results

B5 Boiler Max Load

June 22, 2005	Run 1	Run 2	Run 3	Three Run Average
Start Time	1024	1242	1501	
End Time	1124	1342	1601	
Opacity No. minutes above 10%	0.0	0.0	0.0	**0.0**
% Oxygen	4.14	4.12	4.13	**4.13**
Dry Standard Cubic ft./min(DSCFM)	36,839	39,107	38,487	**38,144**
CO ppm,dry	34.2	35.6	38.0	**35.9**
CO ppm @ 3% O_2	36.5	38.0	40.6	**38.4**
CO lbs/hr	5.50	6.08	6.38	**5.99**
CO lbs/mmBtu	0.0270	0.0281	0.0300	**0.0284**
NOx ppm,dry	44.3	44.1	45.3	**44.6**
NOx ppm @ 3% O_2	47.3	47.0	48.4	**47.6**
NOx lbs/hr	11.70	12.36	12.50	**12.19**
NOx lbs/mmBtu	0.0575	0.0572	0.0588	**0.0578**
NMVOC ppm as Propane,dry	1.1	0.9	1.2	**1.1**
NMVOC ppm as Propane @ 3% O_2	1.2	1.0	1.3	**1.1**
NMVOC as Propane lbs/hr	0.28	0.24	0.32	**0.28**
NMVOC ppm as Propane lbs/mmBtu	0.0014	0.0011	0.0015	**0.0013**
Particulate Matter *Start Time*	911	1158	1427	
End Time	1115	1401	1630	
Particulate grains/dry std. Cu. Ft.(grdscf)	0.0025	0.0017	0.0013	**0.0018**
Particulate (grdscf) @ 3% O_2	0.0026	0.0018	0.0014	**0.0019**
Particulate lbs/hr	0.79	0.57	0.43	**0.60**
Particulate lbs/mmBtu	0.0039	0.0027	0.0021	**0.0029**

B5 Boiler Normal Operating Load

June 23, 2005	Run 1
Start Time	1223
End Time	1323
% Oxygen	6.82
Dry Standard Cubic ft./min(DSCFM)	25,090
CO ppm,dry	24.3
CO ppm @ 3% O_2	30.9
CO lbs/hr	2.66
CO lbs/mmBtu	0.0229
NOx ppm,dry	37.0
NOx ppm @ 3% O_2	47.0
NOx lbs/hr	6.65
NOx lbs/mmBtu	0.0572
NMVOC ppm as Propane,dry	0.4
NMVOC ppm as Propane @ 3% O_2	0.5
NMVOC as Propane lbs/hr	0.07
NMVOC ppm as Propane lbs/mmBtu	0.0006
Opacity No. minutes above 20%	0.0

Methodology

The following EPA reference methods were used during the emission testing project. The respective summaries outline each method and any deviations encountered. Supporting data can be found in the appendices of the report.

EPA 1-4

EPA Methods 1 and 2 are used to measure volumetric flow rates. EPA Method 1 is used to locate the representative sample points within the stack area. The cross-sectional area of the stack is divided into a number of equal areas. Sample traverse points are then located within each of these equal areas. EPA Method 2 is used to measure average stack gas velocity using a calibrated type "S" pitot tube connected to an incline oil manometer. Stack temperature is measured simultaneously using a calibrated type "K" thermocouple. A sample of the gas stream is extracted, dried, and gas volume metered using an EPA Method 5/202 sample train. The weight gain of condensed moisture is then measured by volume. The percentage of moisture is used to calculate the dry molecular weight of the stack gas and correct wet volume measurements to a dry volume basis.

EPA 5/202

A series of preliminary measurements was made prior to conducting the particulate test. EPA Methods 1, 2, 3, and ODEQ 4 (Tw/Td) were performed to determine location and number of traverse points, average gas velocity and pressure, and gas molecular weight. The percentage of water was measured by a preliminary wet-bulb dry-bulb test. The results of these measurements were entered into the field computer and an appropriate nozzle size for isokinetic sampling was determined.

The sample system consisted of a probe, heated filter, and impinger train. The probe consisted of a type "S" pitot tube, sample nozzle, and thermocouple. Sample gas was collected through a stainless steel probe/nozzle, filtered, and dried in a series of chilled impingers, with a back-up filter placed between the third and fourth impinger. The volume of sample gas collected was measured using a dry-gas meter and calibrated-restriction orifice.
Sample apparatus was prepared on-site in the mobile laboratory. The absorption train was charged with 100 milliliters of distilled water in each of the first two impingers while the third impinger remained empty, weighed on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe was brushed out and rinsed with acetone and the filter holder charged. The sampling apparatus was assembled and leak tested at ten inches of vacuum. Probe and filter heaters were set at 248 degrees Fahrenheit. The probe was placed at the first traverse point of the stack sample port. The vacuum pump was started immediately and adjusted to obtain an isokinetic sample rate.

Eight traverse points were sampled at 7.5 minutes each for a minimum of 60 minutes. A minimum of 31.8 standard cubic feet was collected or the amount specified in the applicable subpart, whichever was greater. Duct conditions (temperature, differential pressure) and sampling conditions (meter temperature; volume and pressure; probe, filter, sample line and impinger temperatures; and absorption trains vacuums) were monitored and recorded regularly for each traverse sample point. Upon completion of sampling, a final leak check was performed on the sampling apparatus at a vacuum greater than the highest observed vacuum during the test.

The filter and any loose particulate were carefully removed from the filter holder with forceps. It was then placed in a labeled petri dish for transportation to the laboratory. The nozzle, probe, and filter top housings were rinsed and brushed six times with acetone. The absorption train was inspected for abnormalities and disassembled. The impingers were weighed on a digital balance for use in determining percent moisture. The sample fractions were combined, bottled, labeled, and fluid-level marked for transportation to the laboratory. . The back-up filter was recovered and placed in a glass petri dish. Aliquots of acetone and delonzed water were similarly treated for blank analysis.
The filters (front-half and back-half) were transferred to a desiccator for 24 hours. The filters were weighed on a digital balance to the nearest 0.1 milligrams. Additional six-hour desiccation and weightings were performed until the difference between consecutive weightings was less than 0.5 milligram or one percent of the total filtrate weight (weighed to a constant weight). The nozzle/probe/filter top/impinger acetone wash was then evaporated at a laboratory temperature and pressure. The dish and wash residue were then desiccated and weighed to a constant weight. The net weight of particulate was calculated from the two fractions. The back-half catch was analyzed for organic and inorganic condensable particulate matter.

The procedure followed was that as described in EPA method 202. The impinger catch was washed with dichloromethane three times, the water fraction (inorganic) and dichloromethane (organic) was separated using a separatory funnel, dried, and weighed to a constant weight (+0.5 mg). Particulate concentration (gr./dscf) and emission rates (lb/hr) are then calculated and reported. No method deviations were encountered during the performance test program.

Molecular Weight, EPA Method 3a

A sample was continuously extracted from the effluent stream, dried and conveyed to an instrumental analyzer for determination of O_2 concentration. A three point linearity check (calibration error check) was performed using a zero reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 7e/20 - Oxides of Nitrogen Emissions

These methods are applicable to the determination of nitrogen oxides (NOx) concentrations in emissions from stationary sources. A sample is continuously extracted from the effluent stream, dried and conveyed to an instrumental chemiluminescent analyzer for determination of NOx concentration. A three point(7e) or a four point(20) linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas(20 only), a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Method 10 - Determination of Carbon Monoxide Emissions

A continuous gas sample was extracted from a sampling point and analyzed for carbon monoxide (CO) content using a non-dispersive infrared analyzer (NDIR). A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip.

Interference Test

The gaseous components Carbon Monoxide(500+/-50ppm), Sulfur Dioxide(200+/-20ppm), Carbon Dioxide(10+/-1 %), and Oxygen(20.9+/-1 %) are introduced into the measurement system separately, or as gas mixtures. The total interference output response of the system to these components is determined in concentration units and the values are recorded. If the sum of the interference responses of the test gases for either the NOx or diluent analyzers is greater than 2 percent of the applicable span value, corrective measures on the measurement system must be taken.

Total Hydrocarbons EPA 25a

This method applies to the measurement of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon. A four point linearity check (calibration error check) was performed using a zero reference gas, a low-point reference gas, a mid-point reference gas, and a high-range reference gas. Before and after each test run, system bias and drift are determined by injecting the applicable calibration gas at the probe tip. The sample gas is extracted in the same manner as described in the following section with the following modifications. Prior to the electronic moisture removal system, a slip steam (approximately 1 liter per minute) is routed, via heated line maintained at 250 F, to the VOC analyzer and is analyzed on a wet basis. A methane cutter in conjunction with a FID was used to determine the methane fraction of the volatile organic compounds.

Continuous Emission Monitoring
EPA Methods 3a, 6c, 10, 7e/20, and 25a:

The gaseous parameters, O_2, CO, NOx, SO2, and VOC's were determined using the continuous instrumentation methods EPA 3a for Oxygen, EPA 10 for CO, EPA 7e/20 for NOx, EPA 6c for SO2, EPA, and EPA 25a for VOC. A gas sample was extracted from the stack through a heated (250° ± 5° F) stainless steel probe/filter assembly that is approximately 2 meters in length. A calibration gas purge valve was fitted upstream of the probe's particulate filter. The sample gas was then transported from the sample site to the mobile CEMS van through a heated (250° ± 5° F) Teflon flex line that measured 100 feet in length. At the CEMS van, the sample was then drawn through a moisture removal system. This system consisted of 2 chilled knockout traps (250 cubic centimeters (cc) each) connected in series and maintained at 38° ± 3° F with electronic cooling. Condensate was continuously removed from the moisture traps with a dual-head, peristaltic pump at 50 cc per minute. A finish filter removes particulate matter to less than 0.2 microns in diameter.

The sample gas was then divided simultaneously to each analyzer through a series of stainless-steel metering valves and glass flow meters. System Response Time was developed by timing out the amount of time required for the measurement system to display 95 percent of a step-change in gas concentration on the data recorder and by observing the time required to achieve a stable response for both the zero and upscale gases. After twice the response time of the measurement system has elapsed, sample collection is begun by positioning the sampling probe at the measurement point, and extracting effluent gas at the same flow rate as used during the sampling system bias check and maintaining constant rate sampling(i.e., ±10 percent) during the entire run.

Instrumentation used to analyze the gaseous pollutant parameters:

Parameter	Manufacturer	Model	Technology
O2	Siemens	Oxymat 5E	Paramagnetic
CO2	Siemens	Ultramat 5E	NDIR
CO	Siemens	Ultramat 5E	NDIR
NOx	Ecophysics	70s	Chemlum.
SO2	Bovar	721M	UV

The data recorder consists of a Parametric Systems digital data acquisition system. The Parametric system is a fully automated reference test method data recording and report generating software/hardware package.

Prior to beginning the test series, a 3-point, analyzer linearity check was performed. Each analyzer was challenged with a high- (90 to 80 percent of span), mid- (60 to 50 percent of span), and a low- (30 to 20 percent) calibration gas. Analyzer response was within 2 percent of the gas cylinder value. Initial zero and span are performed at the manifold with zero grade nitrogen and the appropriate EPA protocol number 1 calibration gas. Calibration gases used were blended following EPA Method 205, with an Environics Series 4000 precision gas divider. The field verification audit was performed prior to the use of the gas divider. Sample system bias checks were performed at the beginning and end of each test series. When performing a sample-system bias check, zero gas is introduced to the calibration-gas purge valve.

The sample system bias response was within 5 percent of the calibration gas cylinder value. The average, sample system bias response (initial and final) was used to calculate the final gas concentration for the run. The response time and analyzer value recorded. This procedure was followed for the upscale response using the appropriate calibrated gas and the longer of the two response times noted. The sample probe was positioned at the sample point and a sample rate of 6 liters per minute was maintained at plus or minus 10 percent during the entire test run. The test run was started after twice the response time has elapsed.

references

Handbook for Air Pollution Measurement Systems US Environmental Protection Agency. Publication EPA-600/4-77-0276
Quality Assurance Handbook for Air Pollution Measurement Systems US Environmental Protection Agency EPA 600/4-77-
US Environmental Protection Agency. 1996. 40 CFR Part 60, Appendix A, *Federal Register*(July 1).

B5 Boiler

Sample & Traverse Point Determination

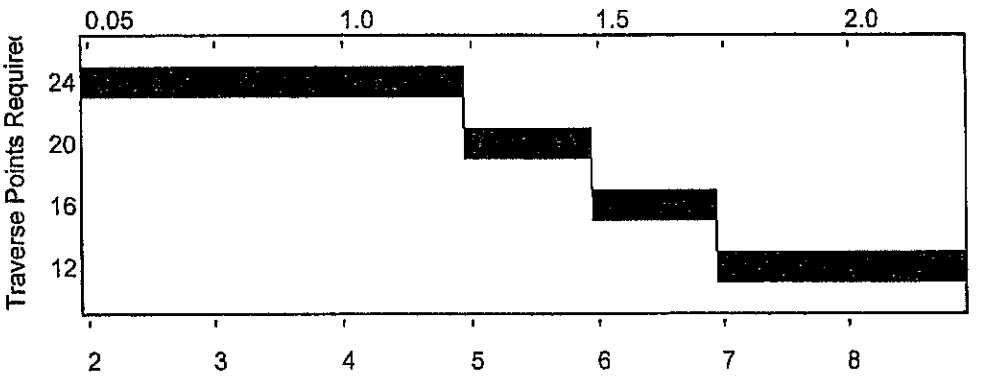
Minimum Number of Traverse Points for Particulate Traverses

EPA Method 1

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 6/22/05
Project No.: AES5063

Stack Diameter(in.): 64
Points Required: 24
Distance A(in.): 160.0
Distance A(dia.): 2.5
Distance B: 128.0
Distance B(dia.): 2.0

Sample Port Location
Duct Diameters upstream from flow disturbance (distance A)



Sample Port Location
Duct Diameters downstream from flow disturbance (distance B)

Traverse Point No.	Number of Traverse Points on a Diameter					*Sample Points*
	4	6	8	10	12	
1	6.7	4.4	3.2	2.6	2.1	***1.3***
2	25.0	14.6	10.5	8.2	6.7	***4.3***
3	75.0	29.6	19.4	14.6	11.8	***7.6***
4	93.3	70.4	32.2	22.6	17.7	***11.3***
5		85.5	67.7	34.2	25	***16.0***
6		95.6	80.6	65.8	35.6	***22.8***
7			89.5	77.4	64.4	***41.2***
8			96.8	85.4	75	***48.0***
9				91.8	82.3	***52.7***
10				97.4	88.2	***56.4***
11					93.3	***59.7***
12					97.9	***62.7***

B5 Boiler EPA 1-4

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

		Run #1	Run #2	Run #3	
		6/22/2005	6/22/2005	6/22/2005	
	Start	911	1158	1427	
	End	1115	1401	1630	**Averages**
Q:	Total sample time[1]:	120	120	120	**120**
Vm:	(Volume,dry gas meter,cf)	90.587	88.545	86.213	**88.448**
Y:	(Dry gas meter calibration factor)	0.995	0.995	0.995	**0.995**
Pbar:	(Barometric pressure,in.Hg)	24.40	24.40	24.40	**24.40**
ΔH:	(Avg. differential pressure,in.H2O)	1.30	1.25	1.20	**1.25**
Tm:	(Avg. meter temperature,°F)	89.9	100.0	96.6	**95.5**
Vm(std.):	(Std.* sample gas volume, DSCF)	70.826	67.970	66.575	**68.457**
Vlc:	(Liquid volume collected,ml)	305.4	276.4	261.2	**281.0**
Vw(std):	(Std.* water vapor volume,scf)	14.375	13.010	12.295	**13.227**
SVP:	(Saturated H_2O vapor pressure, in. Hg	162.91	170.93	169.44	**167.76**
Bwsat:	(Saturated Moisture @ Ts)	6.685	7.014	6.952	**6.884**
Bwsvol	(Volumemetric Moisture content)	0.169	0.161	0.156	**0.162**
Bws:	(SCF H_2O / SCF Total)[2]	0.169	0.161	0.156	**0.162**
$\%CO_2$:	(Carbon Dioxide,% by volume,dry)	9.76	9.75	9.79	**9.77**
$\%O_2$:	(Oxygen,% by volume,dry)	4.14	4.12	4.13	**4.13**
$\%N_2$:	(Nitrogen,% by volume,dry)	86.10	86.13	86.08	**86.10**
Md:	(Molecular Weight,lb/lb-mole,dry)	29.73	29.72	29.73	**29.73**
Mw:	(Molecular Weight,lb/lb-mole,wet)	27.75	27.83	27.90	**27.83**
D:	(Duct diameter, in.)	64.00	64.00	64.00	**64.00**
A:	(Duct area, sq. ft.)	22.34	22.34	22.34	**22.34**
Dn:	(Nozzle diameter, in.)	0.246	0.246	0.246	***0.246***
An:	(Nozzle area, ft2)	3.30E-04	3.30E-04	3.30E-04	***3.30E-04***
Ts:	(Stack temperature, °F)	350.1	355.0	354.1	**353.1**
Pg:	(Static pressure of flue gas, in. H_2O)	-0.41	-0.41	-0.41	**-0.41**
Ps:	(Absolute stack gas pressure, in. Hg)	24.37	24.37	24.37	**24.37**
Cp:	(Pitot tube coefficient)	0.84	0.84	0.84	**0.84**
ΔP:	(Average velocity head, in. H_2O)	0.629	0.701	0.672	**0.667**
Vs:	(Gas velocity, ft./second)	62.3	65.9	64.4	**64.2**
ACFM:	(Actual cubic feet/min., wet)	83507	88332	86322	**86054**
SCFM	(Std. cubic ft/min., wet)	44349	46630	45619	**45533**
SDCFM:	(Std.* cubic feet/min., dry)	36839	39107	38487	**38144**
% Iso:	Isokinetic variation)	108.5	98.1	97.6	***101.4***

[1] - Total sample time does not include port change.

[2] - If the Volumetric moisture exceeds the calculated saturated moisture, the calculated saturated moisture is used.

B5 Boiler EPA 5/202 Particulate Results

Client: Agrium CPO/Nu-West Inc
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Summary

Emission Units	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Front-half Average:	0.0005	0.16	0.0005	0.0008
Back-half Average:	0.0013	0.44	0.0014	0.0021
Test Average:	0.0018	0.60	0.0019	0.0029

RUN #1

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	2.8	0.0006	0.19	0.0006	0.0009
Filter	0.6	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	7.3	0.0016	0.51	0.0017	0.0025
Back-Half MeCl	0.9	0.0002	0.06	0.0002	0.0003
Front-half:	3.4	0.0007	0.22	0.0007	0.0011
Back-half:	8.2	0.0018	0.57	0.0019	0.0028
Total:	11.6	0.0025	0.79	0.0026	0.0039

RUN #2

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.2	0.0003	0.10	0.0003	0.0005
Filter	0.5	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	5.6	0.0013	0.44	0.0014	0.0020
Back-Half MeCl	0.1	0.0000	0.00	0.0000	0.0000
Front-half:	1.7	0.0004	0.13	0.0004	0.0007
Back-half:	5.7	0.0013	0.44	0.0014	0.0020
Total:	7.4	0.0017	0.57	0.0018	0.0027

RUN #3

	net mg	gr/dscf	lbs/hr	gr/dscf @ 3% O_2	lbs/MMbtu
Probe & Nozzle	1.3	0.0003	0.10	0.0003	0.0005
Filter	0.3	0.0001	0.03	0.0001	0.0002
Back-Half H_2O	3.9	0.0009	0.30	0.0010	0.0014
Back-Half MeCl	0.2	0.0000	0.00	0.0000	0.0000
Front-half:	1.6	0.0004	0.13	0.0004	0.0007
Back-half:	4.1	0.0009	0.30	0.0010	0.0014
Total:	5.7	0.0013	0.43	0.0014	0.0021

Production Data

Run	Time start	Time finish	Effluent O_2	F_d
1	911	1115	4.14	8710
2	1158	1401	4.12	8710
3	1427	1630	4.13	8710

B5 Boiler Laboratory Results

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 22, 2005
Project No.: AES5063

Antec Environmental Services

Front Half

FILTER

	Run #1	Run #2	Run #3
Tare Weight, g	0.3455	0.3470	0.3457
Final Weight , g	0.3461	0.3475	0.3460
Final filter Weight, mg	*0.6*	*0.5*	*0.3*

PROBE & NOZZLE

	Run #1	Run #2	Run #3
Sample volume, ml	150	150	150
Acetone Blank mg	0.3	0.3	0.3
Beaker tare weight, g	103.7934	101.5734	105.9804
Beaker final weight , g	103.7965	101.5749	105.9820
Total Residue, mg	3.1	1.5	1.6
Total Residue less Blank, mg	*2.8*	*1.2*	*1.3*

ACETONE BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Back-Half

Inorganic Fraction

Imp. catch less organic matter

	Run #1	Run #2	Run #3
Sample volume, ml	200	200	200
Water Blank mg	0.4	0.4	0.4
Beaker tare weight, g	106.8792	102.5267	104.5500
Beaker final weight , g	106.8869	102.5327	104.5543
Total Residue, mg	7.7	6.0	4.3
Total Residue less Blank, mg	*7.3*	*5.6*	*3.9*

WATER BLANK

Blank volume, ml	100
Residue, mg	0.2
Blank mg/ml	0.002

Organic Fraction

Imp. H_2O $MeCl_2$ wash

	Run #1	Run #2	Run #3
Sample volume, ml	60	60	60
$MeCl_2$ Blank mg	0.5	0.5	0.5
Beaker tare weight, g	100.8110	96.1870	99.6518
Beaker final weight , g	100.8124	96.1876	99.6525
Total Residue, mg	1.4	0.6	0.7
Total Residue less Blank, mg	*0.9*	*0.1*	*0.2*

$MeCl_2$ BLANK

Blank volume, ml	60
Residue, mg	0.5
Blank mg/ml	0.008

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.02 %	-0.02
12.50 percent O2	12.40 %	12.38 %	12.39
0.0 ppm NOX	0.0 ppm	0.0 ppm	0.03
55.0 ppm NOX	54.7 ppm	54.9 ppm	54.78
0.00 percent CO2	0.05 %	0.04 %	0.04
9.98 percent CO2	10.12 %	10.11 %	10.12
0.0 ppm CO	-0.2 ppm	0.0 ppm	-0.13
55.6 ppm CO	55.6 ppm	55.4 ppm	55.52
0.0 ppm Methane	-0.1 ppm	0.1 ppm	0.00
25.0 ppm Methane	24.7 ppm	24.8 ppm	24.75
0.0 ppm THC	0.3 ppm	0.2 ppm	0.22
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	**Corrected Results:**	**Basis:**
4.09 percent O2	**4.14** percent O2	DRY
44.1 ppm NOX	**44.3** ppm NOX	DRY
9.90 percent CO2	**9.76** percent CO2	DRY
34.1 ppm CO	**34.2** ppm CO	DRY
5.6 ppm THC	**5.4** ppm THC	WET
4.5 ppm Methane	**4.5** ppm Methane	WET
16.9 % Moisture	**0.9** ppm NMVOC	WET
	1.1 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Calibration Gas Value	Initial Calibratio	Final Calibratior	Average
0.00 percent O2	-0.02 %	-0.03 %	-0.03
12.50 percent O2	12.38 %	12.42 %	12.40
0.0 ppm NOX	0.0 ppm	0.1 ppm	0.06
55.0 ppm NOX	54.9 ppm	54.9 ppm	54.91
0.00 percent CO2	0.04 %	0.03 %	0.03
9.98 percent CO2	10.11 %	10.11 %	10.11
0.0 ppm CO	0.0 ppm	-0.1 ppm	-0.05
55.6 ppm CO	55.4 ppm	55.2 ppm	55.27
0.0 ppm Methane	0.1 ppm	0.2 ppm	0.15
25.0 ppm Methane	24.8 ppm	24.9 ppm	24.85
0.0 ppm THC	0.2 ppm	0.3 ppm	0.23
25.0 ppm THC	24.9 ppm	24.9 ppm	24.92

Mean Reference Values:	**Corrected Results:**	**Basis:**
4.07 percent O2	**4.12** percent O2	DRY
44.1 ppm NOX	**44.1** ppm NOX	DRY
9.88 percent CO2	**9.75** percent CO2	DRY
35.4 ppm CO	**35.6** ppm CO	DRY
6.3 ppm THC	**6.2** ppm THC	WET
5.5 ppm Methane	**5.4** ppm Methane	WET
16.1 % Moisture	**0.8** ppm NMVOC	WET
	0.9 ppm NMVOC	DRY

Calculation of Average Emissions

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Calibration Gas Value	Initial Calibratior	Final Calibratior	Average
0.00 percent O2	-0.03 %	-0.03 %	-0.03
12.50 percent O2	12.42 %	12.39 %	12.40
0.0 ppm NOX	0.1 ppm	0.4 ppm	0.24
55.0 ppm NOX	54.9 ppm	54.8 ppm	54.86
0.00 percent CO2	0.03 %	0.04 %	0.03
9.98 percent CO2	10.11 %	9.96 %	10.04
0.0 ppm CO	-0.1 ppm	0.4 ppm	0.18
55.6 ppm CO	55.2 ppm	55.7 ppm	55.42
0.0 ppm Methane	0.2 ppm	0.1 ppm	0.15
25.0 ppm Methane	24.9 ppm	24.8 ppm	24.85
0.0 ppm THC	0.3 ppm	0.3 ppm	0.30
25.0 ppm THC	24.9 ppm	24.8 ppm	24.85

Mean Reference Values:	**Corrected Results:**	**Basis:**
4.08 percent O2	**4.13** percent O2	DRY
45.2 ppm NOX	**45.3** ppm NOX	DRY
9.85 percent CO2	**9.79** percent CO2	DRY
37.9 ppm CO	**38.0** ppm CO	DRY
6.8 ppm THC	**6.6** ppm THC	WET
5.7 ppm Methane	**5.6** ppm Methane	WET
15.6 % Moisture	**1.0** ppm NMVOC	WET
	1.2 ppm NMVOC	DRY

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.02 %	-0.04 %	0.00 %
O2	12.41 %	12.40 %	-0.04 %	12.38 %	-0.12 %	-0.08 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
NOX	54.7 ppm	54.7 ppm	0.00 %	54.9 ppm	0.20 %	0.20 %
CO2	0.02 %	0.05 %	0.15 %	0.04 %	0.10 %	-0.05 %
CO2	10.05 %	10.12 %	0.35 %	10.11 %	0.30 %	-0.05 %
CO	0.0 ppm	-0.2 ppm	-0.07 %	0.0 ppm	0.00 %	0.07 %
CO	55.3 ppm	55.6 ppm	0.10 %	55.4 ppm	0.03 %	-0.07 %
Methane	0.2 ppm	-0.1 ppm	-0.60 %	0.1 ppm	-0.20 %	0.40 %
Methane	25.0 ppm	24.7 ppm	-0.60 %	24.8 ppm	-0.40 %	0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.2 ppm	0.00 %	-0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 2

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.02 %	-0.04 %	-0.03 %	-0.08 %	-0.04 %
O2	12.41 %	12.38 %	-0.12 %	12.42 %	0.04 %	0.16 %
NOX	0.0 ppm	0.0 ppm	0.00 %	0.1 ppm	0.10 %	0.10 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.9 ppm	0.20 %	0.00 %
CO2	0.02 %	0.04 %	0.10 %	0.03 %	0.05 %	-0.05 %
CO2	10.05 %	10.11 %	0.30 %	10.11 %	0.30 %	0.00 %
CO	0.0 ppm	0.0 ppm	0.00 %	-0.1 ppm	-0.03 %	-0.03 %
CO	55.3 ppm	55.4 ppm	0.03 %	55.2 ppm	-0.03 %	-0.07 %
Methane	0.2 ppm	0.1 ppm	-0.20 %	0.2 ppm	0.00 %	0.20 %
Methane	25.0 ppm	24.8 ppm	-0.40 %	24.9 ppm	-0.20 %	0.20 %
THC	0.2 ppm	0.2 ppm	0.00 %	0.3 ppm	0.20 %	0.20 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.9 ppm	-0.20 %	0.00 %

Sampling System Bias and Drift

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 3

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O2	-0.01 %	-0.03 %	-0.08 %	-0.03 %	-0.08 %	0.00 %
O2	12.41 %	12.42 %	0.04 %	12.39 %	-0.08 %	-0.12 %
NOX	0.0 ppm	0.1 ppm	0.10 %	0.4 ppm	0.40 %	0.30 %
NOX	54.7 ppm	54.9 ppm	0.20 %	54.8 ppm	0.10 %	-0.10 %
CO2	0.02 %	0.03 %	0.05 %	0.04 %	0.10 %	0.05 %
CO2	10.05 %	10.11 %	0.30 %	9.96 %	-0.45 %	-0.75 %
CO	0.0 ppm	-0.1 ppm	-0.03 %	0.4 ppm	0.13 %	0.17 %
CO	55.3 ppm	55.2 ppm	-0.03 %	55.7 ppm	0.13 %	0.17 %
Methane	0.2 ppm	0.2 ppm	0.00 %	0.1 ppm	-0.20 %	-0.20 %
Methane	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %
THC	0.2 ppm	0.3 ppm	0.20 %	0.3 ppm	0.20 %	0.00 %
THC	25.0 ppm	24.9 ppm	-0.20 %	24.8 ppm	-0.40 %	-0.20 %

Analyzer Calibration Error

Test Performed For:
Agrium
Soda Springs
B5 Boiler
O2, CO2, NOx, CO, THC
Date:6/22/05

Test Performed By:
AES
Field Test
Trailer #1

Run 1

Methane Hydrocarbon Monitor

Method 25A & Jum Cutter

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

Total Hydrocarbon Monitor

Method 25A

Full Scale: 50.0 ppm

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
Nitrogen Zero/cg1	0.0 ppm	0.0 ppm	0.0 ppm	0.00 %
/dg9	15.0 ppm	14.9 ppm	-0.1 ppm	-0.20 %
/dg10	25.0 ppm	24.9 ppm	-0.1 ppm	-0.20 %
/dg5	45.0 ppm	44.9 ppm	-0.1 ppm	-0.20 %

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
1	6/22/2005	10:24:00	3.80	10.04	43.7	72.6	6.3	5.1
1	6/22/2005	10:25:00	3.98	9.98	44.3	33.3	5.6	4.4
1	6/22/2005	10:26:00	4.02	9.96	45.0	33.8	4.7	3.5
1	6/22/2005	10:27:00	4.03	9.95	44.9	33.5	4.2	4.0
1	6/22/2005	10:28:00	3.99	9.97	44.3	34.4	3.1	1.9
1	6/22/2005	10:29:00	4.02	9.95	44.3	36.3	3.3	2.1
1	6/22/2005	10:30:00	3.96	9.99	44.2	33.5	3.1	1.9
1	6/22/2005	10:31:00	3.97	9.98	44.7	34.3	3.2	2.0
1	6/22/2005	10:32:00	4.07	9.92	45.6	33.4	2.7	1.5
1	6/22/2005	10:33:00	3.98	9.96	45.3	34.6	2.8	1.5
1	6/22/2005	10:34:00	3.98	9.97	44.9	33.9	3.5	2.3
1	6/22/2005	10:35:00	4.02	9.94	44.9	32.8	3.0	1.8
1	6/22/2005	10:36:00	4.02	9.94	44.5	32.9	4.1	2.9
1	6/22/2005	10:37:00	4.04	9.93	44.3	33.2	3.7	2.5
1	6/22/2005	10:38:00	3.96	9.98	44.1	33.9	3.7	2.5
1	6/22/2005	10:39:00	4.02	9.94	44.3	33.8	4.9	3.7
1	6/22/2005	10:40:00	4.03	9.94	44.0	33.0	4.8	3.6
1	6/22/2005	10:41:00	4.00	9.95	44.0	33.4	4.1	2.9
1	6/22/2005	10:42:00	4.00	9.95	44.1	33.9	5.0	3.8
1	6/22/2005	10:43:00	3.97	9.98	44.0	32.8	4.7	3.5
1	6/22/2005	10:44:00	3.97	9.96	44.2	32.8	5.7	4.5
1	6/22/2005	10:45:00	4.05	9.91	45.1	32.5	6.1	4.9
1	6/22/2005	10:46:00	4.06	9.93	45.2	33.8	6.9	5.7
1	6/22/2005	10:47:00	4.05	9.91	45.3	34.7	6.1	4.9
1	6/22/2005	10:48:00	4.04	9.93	44.5	33.9	5.6	4.4
1	6/22/2005	10:49:00	4.10	9.88	45.0	33.8	6.5	5.3
1	6/22/2005	10:50:00	4.09	9.89	44.8	35.5	6.6	5.4
1	6/22/2005	10:51:00	3.94	9.99	44.1	36.3	5.7	4.5
1	6/22/2005	10:52:00	3.99	9.95	44.5	34.6	6.0	4.8
1	6/22/2005	10:53:00	3.98	9.96	44.3	34.1	5.7	4.5
1	6/22/2005	10:54:00	4.02	9.93	44.3	32.7	6.0	4.8
1	6/22/2005	10:55:00	3.97	9.96	43.9	33.2	6.6	5.4
1	6/22/2005	10:56:00	3.98	9.95	44.1	34.1	6.5	5.3
1	6/22/2005	10:57:00	4.15	9.84	46.0	35.3	6.2	5.0
1	6/22/2005	10:58:00	4.02	9.94	44.8	35.4	6.4	5.2
1	6/22/2005	10:59:00	3.93	9.98	44.1	35.9	5.1	3.9
1	6/22/2005	11:00:00	3.95	9.97	43.9	34.1	6.5	5.3
1	6/22/2005	11:01:00	3.96	9.96	44.4	33.4	6.3	5.1
1	6/22/2005	11:02:00	4.01	9.93	44.5	33.2	6.5	5.3
1	6/22/2005	11:03:00	4.00	9.95	44.3	32.4	5.4	4.2
1	6/22/2005	11:04:00	7.28	8.07	36.9	27.5	5.3	4.1
1	6/22/2005	11:05:00	4.39	9.81	45.1	36.2	6.8	5.6
1	6/22/2005	11:06:00	4.02	9.93	44.2	37.0	6.0	4.8
1	6/22/2005	11:07:00	4.08	9.89	43.7	35.3	6.2	5.0
1	6/22/2005	11:08:00	4.06	9.91	43.3	36.2	6.1	4.9
1	6/22/2005	11:09:00	4.03	9.93	43.3	34.4	5.0	3.8
1	6/22/2005	11:10:00	4.07	9.90	43.2	34.1	6.3	5.1
1	6/22/2005	11:11:00	4.05	9.91	43.3	34.2	7.1	5.9
1	6/22/2005	11:12:00	4.04	9.92	43.5	33.4	6.8	5.6
1	6/22/2005	11:13:00	4.11	9.87	44.1	33.2	7.1	5.9
1	6/22/2005	11:14:00	4.05	9.92	44.1	34.2	6.1	4.9
1	6/22/2005	11:15:00	4.08	9.90	44.3	34.3	6.6	5.4
1	6/22/2005	11:16:00	4.16	9.83	44.5	34.7	7.6	6.4
1	6/22/2005	11:17:00	4.13	9.88	43.7	36.8	7.4	6.2
1	6/22/2005	11:18:00	4.07	9.89	43.3	35.2	7.0	5.8
1	6/22/2005	11:19:00	4.15	9.86	43.8	36.0	6.9	5.7
1	6/22/2005	11:20:00	4.05	9.92	43.3	36.1	7.4	6.2
1	6/22/2005	11:21:00	4.04	9.92	43.1	34.3	7.3	6.1
1	6/22/2005	11:22:00	4.06	9.90	43.1	35.0	6.9	5.7
1	6/22/2005	11:23:00	4.07	9.89	43.3	34.3	7.1	5.9
1	6/22/2005	11:24:00	4.24	9.79	44.8	36.1	8.0	6.8
		Raw Averages:	4.09	9.90	44.1	34.8	5.6	4.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
2	6/22/2005	12:42:00	4.20	9.81	44.8	37.6	4.0	3.2
2	6/22/2005	12:43:00	4.06	9.89	44.1	36.2	4.8	4.0
2	6/22/2005	12:44:00	4.06	9.89	43.8	36.7	5.8	5.0
2	6/22/2005	12:45:00	4.03	9.90	43.7	35.6	3.7	2.9
2	6/22/2005	12:46:00	4.04	9.90	44.1	35.3	5.8	5.0
2	6/22/2005	12:47:00	4.06	9.89	44.0	35.9	4.7	3.9
2	6/22/2005	12:48:00	4.16	9.83	44.8	37.0	6.0	5.2
2	6/22/2005	12:49:00	4.10	9.89	44.6	35.8	5.4	4.6
2	6/22/2005	12:50:00	4.08	9.88	44.3	35.5	5.5	4.7
2	6/22/2005	12:51:00	4.05	9.90	44.1	35.7	3.0	2.2
2	6/22/2005	12:52:00	4.15	9.85	44.6	36.0	5.6	4.8
2	6/22/2005	12:53:00	4.07	9.89	44.1	35.6	5.0	4.2
2	6/22/2005	12:54:00	4.07	9.89	44.1	35.6	4.2	3.4
2	6/22/2005	12:55:00	4.08	9.89	43.6	35.1	5.7	4.9
2	6/22/2005	12:56:00	4.11	9.86	44.1	34.9	5.3	4.5
2	6/22/2005	12:57:00	4.13	9.85	44.5	36.2	4.9	4.1
2	6/22/2005	12:58:00	4.06	9.90	44.0	36.2	5.0	4.2
2	6/22/2005	12:59:00	4.07	9.88	44.1	34.7	3.6	2.8
2	6/22/2005	13:00:00	4.07	9.89	44.2	36.1	4.4	3.6
2	6/22/2005	13:01:00	4.10	9.86	44.3	35.7	5.1	4.3
2	6/22/2005	13:02:00	4.14	9.84	44.6	36.1	4.2	3.4
2	6/22/2005	13:03:00	4.05	9.91	44.0	36.2	4.9	4.1
2	6/22/2005	13:04:00	4.05	9.89	43.8	35.6	4.3	3.5
2	6/22/2005	13:05:00	4.03	9.91	43.7	35.5	6.0	5.2
2	6/22/2005	13:06:00	4.04	9.90	43.9	35.6	6.5	5.7
2	6/22/2005	13:07:00	4.11	9.86	44.2	35.6	7.0	6.2
2	6/22/2005	13:08:00	4.06	9.89	43.9	36.4	7.2	6.4
2	6/22/2005	13:09:00	4.08	9.88	44.0	35.5	5.4	4.7
2	6/22/2005	13:10:00	4.03	9.91	44.0	35.3	6.6	5.8
2	6/22/2005	13:11:00	4.02	9.91	44.1	35.0	4.4	3.6
2	6/22/2005	13:12:00	4.04	9.89	44.1	34.6	4.6	3.8
2	6/22/2005	13:13:00	4.05	9.89	44.1	35.4	4.1	3.3
2	6/22/2005	13:14:00	4.06	9.89	44.0	35.1	5.9	5.1
2	6/22/2005	13:15:00	4.02	9.91	44.0	35.8	5.9	5.1
2	6/22/2005	13:16:00	4.05	9.88	43.8	35.9	6.6	5.9
2	6/22/2005	13:17:00	4.07	9.87	43.9	34.8	7.5	6.7
2	6/22/2005	13:18:00	4.04	9.90	43.4	35.7	6.7	5.9
2	6/22/2005	13:19:00	4.06	9.88	43.6	35.4	6.7	5.9
2	6/22/2005	13:20:00	4.03	9.89	43.8	34.4	5.5	4.8
2	6/22/2005	13:21:00	4.13	9.85	44.7	36.5	5.4	4.6
2	6/22/2005	13:22:00	4.02	9.91	43.9	35.9	7.1	6.3
2	6/22/2005	13:23:00	4.07	9.87	44.6	34.9	6.1	5.3
2	6/22/2005	13:24:00	4.03	9.90	44.5	35.1	7.8	7.0
2	6/22/2005	13:25:00	4.06	9.89	44.9	35.7	9.5	8.7
2	6/22/2005	13:26:00	4.05	9.89	44.5	36.1	11.0	8.8
2	6/22/2005	13:27:00	4.06	9.88	43.9	34.2	11.0	9.0
2	6/22/2005	13:28:00	4.06	9.88	43.9	33.8	10.8	8.9
2	6/22/2005	13:29:00	4.03	9.90	43.6	33.3	10.5	9.7
2	6/22/2005	13:30:00	4.05	9.89	43.6	34.1	9.4	8.6
2	6/22/2005	13:31:00	4.07	9.87	43.8	34.7	8.5	7.7
2	6/22/2005	13:32:00	4.12	9.84	44.1	34.5	5.6	4.8
2	6/22/2005	13:33:00	4.05	9.89	43.8	35.2	8.7	7.9
2	6/22/2005	13:34:00	4.06	9.88	43.8	34.2	6.4	5.6
2	6/22/2005	13:35:00	4.06	9.86	43.7	34.5	11.2	9.9
2	6/22/2005	13:36:00	4.03	9.90	43.3	35.5	9.8	9.0
2	6/22/2005	13:37:00	4.07	9.85	43.5	33.0	7.2	6.4
2	6/22/2005	13:38:00	4.16	9.83	43.9	35.2	7.9	7.1
2	6/22/2005	13:39:00	4.05	9.88	43.4	35.3	7.7	6.9
2	6/22/2005	13:40:00	4.05	9.88	44.0	35.2	7.5	6.7
2	6/22/2005	13:41:00	4.11	9.84	45.2	34.4	7.7	6.5
		Raw Averages:	4.07	9.88	44.1	35.4	6.4	5.5

RM One Minute Data

Run No.	Date	Time	2 O2-1	1 CO2-1	4 NOx	3 CO	6 THC	7 Meth
3	6/22/2005	15:01:00	4.09	9.85	45.3	36.0	7.6	6.5
3	6/22/2005	15:02:00	4.07	9.86	45.2	39.0	6.9	5.8
3	6/22/2005	15:03:00	4.16	9.78	46.0	39.0	7.5	6.4
3	6/22/2005	15:04:00	4.12	9.83	46.2	40.5	9.0	7.9
3	6/22/2005	15:05:00	4.14	9.81	46.0	40.0	8.6	7.5
3	6/22/2005	15:06:00	4.04	9.87	45.4	41.2	10.5	9.4
3	6/22/2005	15:07:00	4.09	9.84	45.5	39.8	7.2	6.1
3	6/22/2005	15:08:00	4.04	9.85	45.4	40.0	8.6	7.5
3	6/22/2005	15:09:00	4.06	9.85	45.8	40.3	7.8	6.7
3	6/22/2005	15:10:00	4.04	9.85	45.8	39.0	10.5	9.4
3	6/22/2005	15:11:00	4.07	9.83	46.2	39.1	9.0	7.9
3	6/22/2005	15:12:00	4.07	9.85	46.0	40.5	8.7	7.6
3	6/22/2005	15:13:00	4.03	9.87	45.6	40.4	8.1	7.0
3	6/22/2005	15:14:00	4.06	9.84	45.8	39.8	6.5	5.4
3	6/22/2005	15:15:00	4.07	9.84	45.7	39.6	7.9	6.8
3	6/22/2005	15:16:00	4.01	9.88	45.2	39.2	8.3	7.2
3	6/22/2005	15:17:00	4.06	9.84	45.6	39.0	8.9	7.8
3	6/22/2005	15:18:00	4.04	9.87	45.6	40.3	5.9	4.8
3	6/22/2005	15:19:00	3.96	9.91	45.0	38.0	7.1	6.0
3	6/22/2005	15:20:00	4.10	9.84	45.1	38.2	7.0	5.9
3	6/22/2005	15:21:00	4.01	9.89	44.9	36.7	6.1	5.0
3	6/22/2005	15:22:00	4.01	9.87	44.8	35.9	5.6	4.5
3	6/22/2005	15:23:00	4.10	9.83	45.3	37.8	8.2	7.1
3	6/22/2005	15:24:00	4.10	9.84	45.3	39.1	6.4	5.3
3	6/22/2005	15:25:00	4.14	9.81	45.7	39.4	8.1	7.0
3	6/22/2005	15:26:00	4.09	9.84	45.5	38.8	6.8	5.7
3	6/22/2005	15:27:00	4.14	9.81	46.3	39.9	8.1	7.0
3	6/22/2005	15:28:00	4.09	9.84	46.3	41.3	6.9	5.8
3	6/22/2005	15:29:00	6.23	8.65	41.2	35.1	5.6	4.5
3	6/22/2005	15:30:00	4.43	9.81	45.6	37.4	4.1	3.0
3	6/22/2005	15:31:00	4.00	9.90	45.9	37.3	5.1	4.0
3	6/22/2005	15:32:00	3.98	9.91	45.7	37.5	3.9	2.8
3	6/22/2005	15:33:00	3.93	9.94	45.0	36.6	4.7	3.6
3	6/22/2005	15:34:00	3.97	9.92	45.2	34.5	3.9	2.8
3	6/22/2005	15:35:00	3.98	9.90	45.4	35.8	5.7	4.6
3	6/22/2005	15:36:00	4.04	9.86	46.0	36.5	4.3	3.2
3	6/22/2005	15:37:00	4.02	9.90	45.6	37.3	4.3	3.2
3	6/22/2005	15:38:00	4.00	9.89	45.4	37.5	4.4	3.3
3	6/22/2005	15:39:00	4.07	9.85	45.9	36.5	5.5	4.4
3	6/22/2005	15:40:00	4.08	9.85	46.0	37.3	5.2	4.1
3	6/22/2005	15:41:00	3.96	9.93	45.2	38.2	3.0	1.9
3	6/22/2005	15:42:00	4.00	9.89	45.3	35.9	4.0	2.9
3	6/22/2005	15:43:00	4.01	9.90	45.1	36.8	3.7	2.6
3	6/22/2005	15:44:00	3.93	9.95	44.7	38.2	5.2	4.1
3	6/22/2005	15:45:00	4.01	9.88	45.0	34.6	8.9	7.8
3	6/22/2005	15:46:00	4.05	9.88	44.9	35.8	5.2	4.1
3	6/22/2005	15:47:00	4.02	9.89	44.9	36.6	7.5	6.4
3	6/22/2005	15:48:00	4.03	9.88	45.0	37.2	4.2	3.1
3	6/22/2005	15:49:00	4.00	9.91	44.7	38.5	8.7	7.6
3	6/22/2005	15:50:00	4.00	9.90	44.3	36.3	4.7	3.6
3	6/22/2005	15:51:00	4.01	9.90	44.4	36.3	8.5	7.4
3	6/22/2005	15:52:00	3.98	9.92	44.4	37.0	5.0	3.9
3	6/22/2005	15:53:00	4.01	9.90	44.4	37.3	8.9	7.8
3	6/22/2005	15:54:00	4.06	9.86	44.7	36.1	3.9	2.8
3	6/22/2005	15:55:00	4.04	9.89	44.6	37.0	5.9	4.8
3	6/22/2005	15:56:00	3.98	9.91	44.5	36.7	9.1	8.0
3	6/22/2005	15:57:00	4.03	9.89	45.1	36.4	6.1	5.0
3	6/22/2005	15:58:00	3.96	9.94	44.5	36.9	12.7	11.6
3	6/22/2005	15:59:00	3.96	9.93	44.7	37.9	15.2	14.1
3	6/22/2005	16:00:00	4.04	9.88	45.0	36.7	5.8	4.7
		Raw Averages:	4.08	9.85	45.2	37.9	6.8	5.7

ANTEC SE 59108

MATHESON TRI·GAS

CERTIFICATE OF ANALYSIS - EPA PROTOCOL MIXTURE

1650 Enterprise Parkway, Twinsburg, Ohio 44087 • 215-648-4000

Customer: Matheson Tri-Gas Inc. 133 Portland
Cylinder Number: SX-36316
Cylinder pressure: 2000
Last Analysis date: 8/6/2004
Expiration Date: 8/6/07

Protocol:	Reference #	Lot #
G1		109-46-38005

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 150 PSIG

REPLICATE RESPONSES

Date:	8/6/2004	Date:
	83.3 PPM	
	83.1 PPM	
	82.9 PPM	

Component: Propane

Certified Conc: 83.1 PPM ± 1%

Requested Conc: 80 PPM

BALANCE GAS: Nitrogen

REFERENCE STANDARDS

Component: Propane
SRM #: SRM-1668b
Cylinder #: XF-004135B
Concentration; 98.9 ppm

CERTIFICATION INSTRUMENTS

Component: Propane
Make/Model: Varian 3800 GC
Serial Number: LR-92489
Measurement Principle: TC, FID
Last Calibration: 8/6/2004

Notes: T50256

P.O. XC 006055

This certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards September 1997, using procedure G1 and/or G2.

Analyst Philip D. Mat Date 8/9/2004

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC12901	2000PSIG	SFS62633
Assay Date:	Expiration Date:	Document Number:
2/27/2004	2/27/2006	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	480	ppm	488	±	7	ppm
Sulfur Dioxide	480	ppm	483	±	7	ppm
Carbon Monoxide	480	ppm	479	±	6	ppm
NOx			488	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2; Procedure : G-1

Analyst: Thuan Tran
Approved by: Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS — SRM, GMIS

Concentration				Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
483	±	5	ppm	Nitric Oxide	Nitrogen	CC 61908	SFS44299	09/04/04	LT	GMIS
745	±	8	ppm	Sulfur Dioxide	Nitrogen	CC 60854	L99-044	01/06/06	LM	GMIS
500	±	4	ppm	Carbon Monoxide	Nitrogen	CC 150327	SFS48669	04/02/05	LU	GMIS

Nitric Oxide — GAS ANALYZER EMPLOYED		Sulfur Dioxide — GAS ANALYZER EMPLOYED		Carbon Monoxide — GAS ANALYZER EMPLOYED	
Manufacturer:	Beckman	Manufacturer:	Rosemount Analytical	Manufacturer:	Rosemount Analytical CO
Model Number:	951A	Model Number:	890192	Model Number:	880-16
Serial Number:	00100508	Serial Number:	1000130	Serial Number:	2000224
MPR Last Calibrated:	02/16/04	MPR Last Calibrated:	02/19/04	MPR Last Calibrated:	02/20/04
Analytical Principle:	Chemiluminescent	Analytical Principle:	Ultraviolet	Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	477	477	477	Vdc
Candidate	480	481	481	Vdc
Result	486.0	487.1	487.1	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				486.7 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	484	485	485	Vdc
Candidate	490	490	491	Vdc
Result	489.0	488.0	489.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				488.6 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	728	728	728	Area
Candidate	472	472	472	Area
Result	483.0	483.0	483.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				483.0 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	745	745	745	Area
Candidate	482	482	483	Area
Result	482.0	482.0	483.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				482.3 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	500	499	499	Vdc
Candidate	479	479	479	Vdc
Result	479.0	480.0	480.0	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				479.6 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	0	0	0	Vdc
Reference	504	503	503	Vdc
Candidate	483	482	482	Vdc
Result	479.2	479.1	479.1	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				479.1 ppm

Analyst:

Approved by:

AIR LIQUIDE

8632 DICE ROAD, SANTA FE SPRINGS, CALIFORNIA 90670 (562) 9451383

EPA Protocol

Section No. 2.2, Procedure G-1

DOC. NUMBER	13261073
CUSTOMER	ALA-CYL-TACOMA
LOCATION	TACOMA, WA
P.O. NUMBER	
ITEM NUMBER	

SERIAL #	LOT #	CGA
CC36363	SFS71754	660

COMPONENT	CONCENTRATION			
Nitric Oxide	97.3	±	1.3	ppm
Sulfur Dioxide	97.5	±	1.4	ppm
Carbon Monoxide	98.4	±	1.4	ppm
NOx	97.3	ppm		
Nitrogen	Balance			

ASSAY	EXPIRATION	PRESSURE
08/20/04	08/20/06	2000PSIG

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC44509	2000PSIG	SFS62632
Assay Date:	**Expiration Date:**	**Document Number:**
2/27/2004	2/27/2006	12592017
Customer:	**P.O. Number:**	**Item Number:**
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Nitric Oxide	50	ppm	51.1	±	0.8	ppm
Sulfur Dioxide	50	ppm	48.9	±	0.8	ppm
Carbon Monoxide	50	ppm	50.3	±	0.8	ppm
NOx			51.1	ppm		
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure : G-1

Analyst:	Thuan Tran
Approved by:	Eric Barron

REFERENCE STANDARD EMPLOYED FOR ANALYSIS												SRM, GMIS		
Concentration				Component	Balance	Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
46.9	±	0.6	ppm	Nitric Oxide	Nitrogen	CC 66188	SFS49352	01/08/05	LP	GMIS
51.0	±	0.7	ppm	Sulfur Dioxide	Nitrogen	CC 71619	970803	01/06/05	MG	GMIS
51.8	±	0.6	ppm	Carbon Monoxide	Nitrogen	CC 103453	SFS51959	09/08/05	MV	GMIS

Nitric Oxide	
GAS ANALYZER EMPLOYED	
Manufacturer:	Beckman
Model Number:	951A
Serial Number:	001C0508
MPR Last Calibrated:	02/12/04
Analytical Principle:	Chemiluminescent

Sulfur Dioxide	
GAS ANALYZER EMPLOYED	
Manufacturer:	Horiba
Model Number:	CMA-331A
Serial Number:	56574503
MPR Last Calibrated:	02/12/04
Analytical Principle:	NDIR

Carbon Monoxide	
GAS ANALYZER EMPLOYED	
Manufacturer:	Rosemount Analytical CO
Model Number:	8802-16
Serial Number:	2000224
MPR Last Calibrated:	02/03/04
Analytical Principle:	NDIR

ANALYSIS SUMMARY

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	456	457	456	Vdc
Candidate	496	498	497	Vdc
Result	51.01	50.90	51.12	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				51.01 ppm

	2/27/2004 Triad 4	2/27/2004 Triad 5	2/27/2004 Triad 6	Nitric Oxide Units
Zero	0	0	0	Vdc
Reference	470	469	469	Vdc
Candidate	512	511	511	Vdc
Result	51.09	51.10	51.10	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				51.10 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Sulfur Dioxide Units
Zero	-2	-2	-2	Area
Reference	460	460	479	Area
Candidate	460	460	459	Area
Result	48.88	48.88	48.88	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.88 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Sulfur Dioxide Units
Zero	0	0	0	Area
Reference	451	451	452	Area
Candidate	432	433	433	Area
Result	48.86	48.97	48.87	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				48.90 ppm

	2/20/2004 Triad 1	2/20/2004 Triad 2	2/20/2004 Triad 3	Carbon Monoxide Units
Zero	0	-1	-1	Vdc
Reference	515	515	515	Vdc
Candidate	499	498	498	Vdc
Result	50.09	50.09	50.09	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				50.09 ppm

	2/27/2004 Triad 1	2/27/2004 Triad 2	2/27/2004 Triad 3	Carbon Monoxide Units
Zero	-2	-2	-2	Vdc
Reference	512	512	512	Vdc
Candidate	498	499	498	Vdc
Result	50.39	50.49	50.39	ppm
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT				50.42 ppm

Analyst:	Approved by:

AGR_010064

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number: CC109232	Cyl. Pressure:* 2000PSIG	Lot Number: SFS62631
Assay Date: 2/23/2004	Expiration Date: 2/23/2007	Document Number: 12592017
Customer: AIR LIQUIDE TACOMA, WA	P.O. Number: SE004043	Item Number:

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration	ASSAY Concentration
Carbon Dioxide	19 %	19.0 ± 0.3 %
Oxygen	22.5 %	22.5 ± 0.3 %
Nitrogen	Balance	Balance

EPA Protocol
Section No. 2.2, Procedure : G-1

Analyst: Eric Barron
Approved by: David Connolly

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration	Component	Balance	SRM Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
18.0 ± 0.2 %	Carbon Dioxide	Nitrogen	CC 103274	SFS31230	05/08/05	HS	GMIS
21.11 ± 0.14 %	Oxygen	Nitrogen	CC 62252	090808	06/27/05	MF	GMIS

Carbon Dioxide
GAS ANALYZER EMPLOYED

Manufacturer	Varian(B)
Model Number	3400
Serial Number:	2806
MPR Last Calibrated:	02/09/04
Analytical Principle	FID & TCD

Oxygen
GAS ANALYZER EMPLOYED

Manufacturer:	Varian(B)
Model Number.	3400
Serial Number:	2806
MPR Last Calibrated:	02/12/04
Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	10971746	10976563	10953995	Area
Candidate	11534088	11539429	11583069	Area
Result	18.92	18.92	19.03	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				18.98 %

	2/23/2004 Triad 1	2/23/2004 Triad 2	2/23/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	10328639	10393882	10353240	Area
Candidate	11030425	11049496	11085648	Area
Result	22.56	22.44	22.58	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT				22.53 %

Analyst:	Approved by:
E A Barron	David Connolly

AGR_010065

AIR LIQUIDE

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC53983	2000PSIG	SFS62630
Assay Date:	Expiration Date:	Document Number:
3/1/2004	3/1/2007	12592017
Customer:	P.O. Number:	Item Number:
AIR LIQUIDE TACOMA, WA	SE004043	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration		ASSAY Concentration			
Carbon Dioxide	10	%	9.98	±	0.11	%
Oxygen	12.5	%	12.5	±	0.1	%
Nitrogen	Balance		Balance			

EPA Protocol
Section No. 2.2, Procedure : G-1

Analyst:	Eric Barron
Approved by:	David Connolly

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration			Component	Balance	SRM Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
5.006	± 0.026	%	Carbon Dioxide	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS
21.11	± 0.14	%	Oxygen	Nitrogen	CC 62252	990808	06/27/05	MF	GMIS

Carbon Dioxide GAS ANALYZER EMPLOYED		Oxygen GAS ANALYZER EMPLOYED	
Manufacturer	Varian(B)	Manufacturer:	Varian(B)
Model Number:	3400	Model Number:	3400
Serial Number	2806	Serial Number:	2806
MPR Last Calibrated	02/09/04	MPR Last Calibrated:	02/12/04
Analytical Principle:	FID & TCD	Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Carbon Dioxide Units
Zero	0	0	0	Area
Reference	1167802	1170848	1166504	Area
Candidate	2330227	2328930	2328212	Area
Result	9.989	9.957	10.00	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				9.981 %

	3/1/2004 Triad 1	3/1/2004 Triad 2	3/1/2004 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	3984344	3985538	3983177	Area
Candidate	2350860	2349521	2351992	Area
Result	12.45	12.44	12.47	%
Evaluation	VALID	VALID	VALID	
MEAN ANALYTICAL RESULT:				12.45 %

Analyst:	Approved by:
E. Barron	David Connolly

Example Equations

Data is from B5 Boiler Run 1

Absolute pressure in the Stack(P_s)

Where P_{bar} = barometric pressure

P_g = static pressure of the stack

P_s: $P_{bar} + P_g/13.6$

P_s: 24.4+ (-0.41/13.6)

P_s: **24.37**

Volume of Metered Sample Gas @ Std. Conditions

Where V_m = Volume, Dry Gas Meter, cubic ft.

K_1 = 17.64 °R/in. Hg

Y = Dry gas meter calibration factor

P_{bar} = Barometric pressure

ΔH = Gas Meter average differential pressure, in. H_2O

T_m = Gas Meter average temperature, °F

$V_{m(std)}$: $K_1 * V_m * Y * (P_{bar} + (\Delta H/13.6))/(T_m + 460)$

$V_{m(std)}$: 17.64 * 90.587 * .995 * (24.4 + (1.3/13.6))/(89.9 + 460)

$V_{m(std)}$: **70.826**

Volume of Water@ Standard Conditions

Where V_{lc} = Impinger liquid volume collected, ml

$V_{w(std)}$: 0.04707 * V_{lc}

$V_{w(std)}$: 0.04707 * 305.4

$V_{w(std)}$: **14.375**

Moisture(Bws) Volumetric

Where $V_{w(std)}$ = Std. Water vapor volume, scf

$V_{m(std)}$ = Std. Sample gas volume,DSCF

Bws: $V_{w(std)} / (V_{w(std)} + V_{m(std)})$

Bws: 14.375 / (14.375 + 70.826)

Bws: **0.169**

Molecular Weight lb/lb - mole, Dry (M_d)

M_d: $((0.44*\%CO_2)+(0.32*\%O_2)+(0.28*\%N_2)$

M_d: ((0.44*9.76)+(0.32*4.14)+(0.28*86.1)

M_d: **29.73**

Molecular Weight lb/lb - mole, Wet (M_w)

M_w: (M_d * (1-Bws) + (18 * Bws)

M_w: (29.73 * (1-0.169) + (18 *0.169)

M_w: **27.75**

Gas Velocity(V_s)

Where C_p = pitot tube coefficient

T_s = temperature of the stack

M_w = molecular weight lb/lb - mole, wet

Ps = absolute pressure in the stack

V_s: (85.49 * C_p * SQRT(ΔP) * SQRT((T_s + 460)/(P_s * M_w))

V_s: (85.49 * 0.84 * SQRT(0.629) * SQRT((350.1 + 460)/(24.37 * 27.75))

V_s: **62.3**

Actual Cubic Feet/Minute (acfm)

Where A = area of the duct in square feet

V_s = Stack gas velocity, ft/sec

acfm: A * V_s * 60

acfm: 22.34 * 62.3* 60

acfm: **83,507**

Dry Standard Actual Cubic Feet/Minute (dscfm)

Where T_s = temperature of the stack

acfm = actual cubic ft/min

dscfm: (1-(Bws)) * acfm * (528/(T_s + 460)) * (P_s/(29.92))

dscfm: (1-(0.169)) * 83507 * (528/(350.1 + 460)) * (24.37/(29.92))

dscfm: **36,839**

Percent Isokinetic Variation

Where T_s = temperature of the stack

P_s = absolute pressure in the stack

$V_{m(std)}$ = Std. Sample gas volume,DSCF

V_s = Stack gas velocity, ft/sec

A_n = Nozzle area, ft^2

K_4 = 0.0945 constant from EPA method 5

θ = sample time in minutes

%Iso: K_4 * (T_s + 460) * $V_{m(std)}$ / (P_s * V_s * A_n * θ * (1- B_{ws}))

%Iso: 0.0945 * (350.1 + 460) * 70.826 / (24.37 * 62.3 * 3.30e-04* 1200 * (1-0.169)

%Iso: **108.5**

Grains per Dry Standard Cubic Feet

Where mg = milligrams particulate

$V_{m(std)}$ = Std. Sample gas volume,DSCF

gr/dscf: (0.0154*mg)/$V_{m(std)}$

gr/dscf: (0.0154*11.6)/70.826

gr/dscf: **0.0025**

Particulate pounds per Hour

Where gr/dscf = grains per dry standard cubic feet

DSCFM = Dry Standard Cubic Ft/min

lbs/hr: (gr/dscf * DSCFM *60)/7000

lbs/hr: (0.0025 * 36839 *60)/7000

lbs/hr: **0.79**

Particulate pounds per mmBtu

Where gr/dscf = grains per dry standard cubic feet

Fd = Fuel Factor for natural gas (8710 dscf/mmBtu)

O2 = effluent oxygen level

lbs/mmBtu: (gr/dscf * Fd/7000)*(20.9/(20.9-O2)
lbs/mmBtu: (0.0025 * 8710/7000)*(20.9/(20.9-4.14)
lbs/mmBtu: **0.0039**

Oxides of Nitrogen @ 3.0% Oxygen

Where Corr O_2 = percent oxygen corrected to
Eff O_2 = effluent oxygen content
ppm = parts per million dry basis NOx
NOx ppm @ 7% O_2: ppm *((20.9 - Corr O_2)/(20.9 - Eff O_2)
NOx ppm @ 7% O_2: 44.3 *((20.9 - 3.0)/(20.9 - 4.14)
NOx ppm @ 7% O_2: **47.3**

Oxides of Nitrogen pounds per mmBtu

Where M_w = Molecular weight of NO_2
Eff O2 = effluent oxygen content
F_d = 9780 dscf/mmBtu (Fuel factor from CFR 40)
ppm = parts per million dry basis NOx
NOx lbs/mmBtu: ((ppm * M_w)/ 385.1e6)) * (20.9/(20.9 - Eff O_2)) * F_d
NOx lbs/mmBtu: ((44.3 * 46.01)/ 385.1e6)) * (20.9/(20.9 - 4.14)) * 8710
NOx lbs/mmBtu: **0.0575**

Oxides of Nitrogen pounds per Hour

Where M_w = Molecular weight of NO_2
DSCFM = Dry Standard Cubic Ft/min
ppm = parts per million dry basis NOx
NOx lbs/hr: (ppm*Mw/385100000)*Dscfm*60
NOx lbs/hr: (44.3 * 46.01/385100000) * 36839 * 60
NOx lbs/hr: **11.70**

Environics Series 4000
Calibration Report

Calibration Date: January 5, 2005
Reference Gas: Nitrogen
Calibration Standard: DryCal (Model DC-Lite Primary Flow Meter)
Instrument Serial # : 2627

Mass Flow Controller 1	
Set Flow ccm	True Flow ccm
500.00	499
1000.00	1061
2000.00	2122
3000.00	3134
4000.00	4130
5000.00	5115
6000.00	6089
7000.00	7051
8000.00	8019
9000.00	9010
10000.00	10180

Mass Flow Controller 2	
Set Flow ccm	True Flow ccm
500.00	498
1000.00	1020
2000.00	2050
3000.00	3064
4000.00	4054
5000.00	5064
6000.00	6063
7000.00	7044
8000.00	8032
9000.00	9029
10000.00	10052

Mass Flow Controller 3	
Set Flow ccm	True Flow ccm
50.00	49.1
100.00	97.2
200.00	194.4
300.00	291.3
400.00	389.1
500.00	487.4
600.00	590.2
700.00	689.2
800.00	791.50
900.00	895.6
1000.00	1008

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC36363	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	97.3 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/7/2004
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/7/2005
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	6000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 2								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m Mass Flow Controller 1	Flow Rate, cc/m Mass Flow Controller 2	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value			Per Run	Average		
Lower	1	50.0	2917	3083	50.1		0.00 %	
Point	2	50.0	2917	3083	50.1	50.1	0.00 %	0.20 %
Injections	3	50.0	2917	3083	50.1		0.00 %	
Upper	1	80.0	1067	4933	79.9		0.00 %	
Point	2	80.0	1067	4933	79.8	79.9	-0.10 %	-0.10 %
Injections	3	80.0	1067	4933	79.9		0.00 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentraion	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.5	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:** 1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 2.
3. Maximum flow, controller 1: 10000 ccm
4. Maximum flow, controller 2: 10000 ccm

EPA METHOD 205a

Mass Flow Controller Verification

Company:	Agrium CPO/Nu-West Ind.	Analyzer Mfg.:	EcoPhysics
Date:	06/21/05	Model:	CDL 70S
Site Location:	B5 Boiler	Serial No.:	83S0008
Technician's Name:	Eric Olson	Analyzer Type:	NOx
Gas Tracibility:	EPA Protocol 1	Analyzer Range:	0-100 ppm
High-Level Supply Gas ID:	CC48625	Dilution Mfg.:	Environics, Inc.
High-Level Supply Gas Value:	491.0 ppm	Model:	Series 4040
Mid-Level Supply Gas ID:	CC44509	S/N:	2627
Mid-Level Supply Gas Value:	51.1 ppm	Blender Calibration Date:	1/3/2003
Upper Dilution Target:	80 ppm	Next Calibration Due:	1/3/2004
Lower Dilution Target:	50 ppm	Total Flow Fate, cc/m:	5000

STATUS OF TEST: PASSED

Mass Flow Controller Verification 1 & 3								
Diluted Calibration Points	Target Concentration		Flow Rate, cc/m	Flow Rate, cc/m	Analyzer Reading		Run vs Average Error	Target vs Average Error
	Run	Value	Mass Flow Controller 1	Mass Flow Controller 3	Per Run	Average		
Lower	1	50.0	4491	509	49.8		-0.20 %	
Point	2	50.0	4491	509	49.9	49.9	0.00 %	-0.20 %
Injections	3	50.0	4491	509	49.9		0.00 %	
Upper	1	80.0	4185	815	80.0		0.00 %	
Point	2	80.0	4185	815	80.0	80.0	0.00 %	0.00 %
Injections	3	80.0	4185	815	80.1		0.10 %	

All dilution points must be within ± 2% of analyzer reading

STATUS OF TEST: PASSED

Mid-level Supply Gas Verification				
Mid-Level Supply Gas Injections	Mid-level Supply Gas Concentraion	Analyzer Reading		Mid-Level vs Average Error
		Per Run	Average	
1	51.1	51.4		
2	51.1	51.4	51.4	0.60 %
3	51.1	51.4		

Mid-level Supply Gas must be within ± 2% of analyzer reading

***Notes:** 1. A Reference Method Analyzer was used to perform this test.
2. This test verifies Mass flow controllers 1 and 3.
3. Maximum flow, controller 1: 10000 cc/m
4. Maximum flow, controller 3: 1000 cc/m

Interference Response Test

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: 06/21/05
Project No.: AES5063

NOx Analyzer

Manufacturer: Eco-Physics
Model: CLD-70E
Serial No.: 83S0008
Date:

Range: 0-100ppm
Proceedure: Method 20 Section 5.4
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Monoxide	CC48625	485.0	0.0
Sulfur Dioxide	CC48625	200.0 (Blended)	0.0
Carbon Dioxide	CC04371	10.0	0.0
Oxygen(Zero Air)	CC83609	20.9	0.0

CO Analyzer

Manufacturer: Siemens
Model: Ultramat 5E
Serial No.: E4-778
Date:

Range: 0-100ppm
Proceedure: Method 10
Operator: EEO
Test Result: **Passed**

Interference Test Gas Type	Interference Gas Cylinder No.	Concentration (ppm or %)	Analyzer Response (ppm)
Carbon Dioxide	CC04371	10.0	0.1

Sampling System Response Time

Client: Agrium CPO/Nu-West Ind.
Location: Soda Springs, ID
Source: B5 Boiler
Date: June 21, 2005
Project No.: AES5063

Antec Environmental Services

Analyzer Type: EcoPhysics NOx
Model No.: CDL 70S
Serial No.: 83S0008

Span gas Concentration: 45.0
Analyzer range: 100.0

Length & Type of sample line used: 100 ft Heated, teflon lined

Upscale:

1). 65 seconds
2). 65 seconds
3). 65 seconds

Average upscale response: 65 seconds

Downscale:

1). 60 seconds
2). 60 seconds
3). 60 seconds

Average downscale response: 60 seconds

System Response time: 65 seconds

High Flow Meter Calibration

Meterbox No.: HF-1
Barometric Pressure: 29.10 (in. Hg)
Calibrated by: BWJ
Date: 4/1/2005

Leak Check: Zero
Leak Check @: 23.5 (in. H2O)

Meter Coefient: ***0.995***
ΔH@: ***1.614***

Point One

Critical Oriface Data

I.D. No.: K'-0.257
Orifice K': 0.2614
Rated cfm: 0.335

Test Results

Time: 15
DGM cfm.: 0.340
Ori. cfm.: 0.335
ΔH@: 1.587
Vm(std): 5.088
Vcr(std): 5.019
Y: 0.986

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	57.0	57.0	57.0	57.0
Meter Inlet Temp.:	57.0	58.0	58.0	57.7
Meter Outlet Temp.:	53.0	54.0	54.0	53.7
Meter Temp. Ave.:	55.0	56.0	56.0	55.7
Initial cu. ft.:	453.700	455.390	457.095	
Final cu. ft.:	455.390	457.095	458.807	
Total cu. ft.:	1.690	1.705	1.712	5.107
ΔH iv. H2O:	0.32	0.32	0.32	0.320
Vacuum(in.Hg):	20.5	20.5	20.5	20.5
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.607	1.582	1.571	1.587
Vcr(std):	1.673	1.673	1.673	5.019
Vm(std):	1.686	1.698	1.704	5.088
Y:	0.992	0.985	0.982	0.986

Point Two

Critical Oriface Data

I.D. No.: K'-0.385
Orifice K': 0.3979
Rated cfm: 0.510

Test Results

Time: 15
DGM cfm.: 0.511
Ori. cfm.: 0.510
ΔH@: 1.765
Vm(std): 7.675
Vcr(std): 7.647
Y: 0.996

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	56.0	56.0	56.0	56.0
Meter Inlet Temp.:	54.0	57.0	57.0	56.0
Meter Outlet Temp.:	51.0	52.0	52.0	51.7
Meter Temp. Ave.:	52.5	54.5	54.5	53.8
Initial cu. ft.:	445.700	448.235	450.810	
Final cu. ft.:	448.235	450.810	453.368	
Total cu. ft.:	2.535	2.575	2.558	7.668
ΔH iv. H2O:	0.81	0.81	0.81	0.81
Vacuum(in.Hg):	19.0	19.0	19.0	
Time:	5.0	5.0	5.0	15.0
ΔH@:	1.787	1.742	1.766	1.765
Vcr(std):	2.549	2.549	2.549	7.647
Vm(std):	2.544	2.574	2.557	7.675
Y:	1.002	0.990	0.997	0.996

High Flow Meter Calibration

Meterbox No.: HF-1
Barometric Pressure: 29.1 (in. Hg)
Calibrated by: BWJ
Date: 04/01/05

Leak Check: Zero
Leak Check @: 23.0 (in. H2O)

Meter Coefient: ***0.995***
ΔH≅: ***1.614***

Point Three

Critical Oriface Data

I.D. No.: K'-0.559
Orifice K': 0.5693
Rated cfm: 0.730

Test Results

Time: 15
DGM cfm.: 0.733
Ori. cfm.: 0.730
ΔH≅: 1.256
Vm(std): 11.070
Vcr(std): 10.954
Y: 0.989

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	54.0	55.0	55.0	54.7
Meter Inlet Temp.:	51.0	54.0	55.0	53.3
Meter Outlet Temp.:	49.0	49.0	50.0	49.3
Meter Temp. Ave.:	50.0	51.5	52.5	51.3
Initial cu. ft.:	434.500	438.175	441.840	
Final cu. ft.:	438.175	441.840	445.494	
Total cu. ft.:	3.675	3.665	3.654	10.994
ΔH w. H2O:	1.20	1.20	1.20	1.20
Vacuum(in.Hg):	17.0	17.0	17.0	17.0
Time:	5.0	5.0	5.0	15.0
ΔH≅:	1.240	1.259	1.269	1.256
Vcr(std):	3.654	3.650	3.650	10.954
Vm(std):	3.710	3.689	3.671	11.070
Y:	0.985	0.989	0.994	0.989

Point Four

Critical Oriface Data

I.D. No.: K'-0.821
Orifice K': 0.8424
Rated cfm: 1.077

Test Results

Time: 15
DGM cfm.: 1.066
Ori. cfm.: 1.077
ΔH≅: 1.848
Vm(std): 16.041
Vcr(std): 16.155
Y: 1.007

Metering System Data

	Trial No. 1	2	3	Ave./Total
Ambient Temp.:	58.0	58.0	58.0	58.0
Meter Inlet Temp.:	58.0	58.0	58.0	58.0
Meter Outlet Temp.:	55.0	55.0	55.0	55.0
Meter Temp. Ave.:	56.5	56.5	56.5	56.5
Initial cu. ft.:	459.000	464.325	469.660	
Final cu. ft.:	464.325	469.660	474.990	
Total cu. ft.:	5.325	5.335	5.330	15.990
ΔH w. H2O:	3.70	3.70	3.70	3.70
Vacuum(in.Hg):	13.0	13.0	13.0	13.0
Time:	5.0	5.0	5.0	15.0
ΔH≅:	1.851	1.844	1.848	1.848
Vcr(std):	5.385	5.385	5.385	16.155
Vm(std):	5.342	5.352	5.347	16.041
Y:	1.008	1.006	1.007	1.007

High Flow Meter Post Test Calibration

Meterbox No.: HF-1
Company: Agrium CPO/Nu-West Inc
Source: B5 Boiler
Date: 6/27/2005
Job # AES5063

Leak Check: zero
Leak Check Pressure.: 6.0 (in. H_2O)
Barometric Pressure: 28.95 (In. Hg)
Calibrated by: BWJ
Quarterly Calibration date: 4/1/2005

Pretest Meter Coefient: *0.995*
Pretest ΔH@: *1.614*

Postest Meter Coefient: *0.998*
Postest ΔH@: *2.033*
Pass or Fail *Pass*

Critical Orifice Data

I.D. No.: 0.559
Orifice K': 0.5693
Rated cfm: 0.717

Test Results

Time: 15
DGM cfm.: 0.741
Ori. cfm.: 0.717
ΔH@: 2.033
Vm(std): 10.772
Vcr(std): 10.752
Y: 0.998

Test Point

	Metering System Data			
	Trial No.			
	1	2	3	Ave./Total
Ambient Temp.:	68.0	69.0	69.0	68.7
Meter Inlet Temp.	70.0	70.0	70.0	70.0
Meter Outlet Temp.	68.0	69.0	69.0	68.7
Meter Temp. Ave.	69.0	69.5	69.5	69.3
Initial cu. ft.:	900.500	904.205	907.910	
Final cu. ft.:	904.205	907.910	911.615	
Total cu. ft.:	3.705	3.705	3.705	11.115
ΔH in. H_2O:	1.800	1.800	1.800	1.800
Vacuum(in.Hg):	18.0	18.0	18.0	18.0
Time:	5.0	5.0	5.0	15.0
ΔH@:	2.028	2.036	2.036	2.033
Vcr(std):	3.586	3.583	3.583	10.752
Vm(std):	3.593	3.590	3.590	10.772
Y:	0.998	0.998	0.998	0.998

PITOT TUBE POST TEST CALIBRATION

Pitot Tube ID No.: AESP6.1
Barometric Pressure: 28.95 (In. Hg)
Calibrated By: BWJ
Date: 6/27/2004

Std. Pitot ID: S-1
Cp(std): 0.99 (In. H20)

Pitot Tube Coefficient (Cp): 0.84

Pitot A-Side Calibration

ΔPstd	ΔPs	Cp (s) [a]
0.36	0.5	0.84

Pitot B-Side Calibration

ΔPstd	ΔPs	Cp (s) [a]
0.36	0.5	0.84

THERMOCOUPLE POST TEST CALIBRATION

Thermocouple ID No.: AESP4.1T
Calibrated By: BWJ
Date: 6/27/2004

Heat Source: Controlled Electric Furnace
Reference Thermometer: Extech 42312 Dig. Thermometer

Ref. Temp. F°	Equip. Temp. F°	% Diff.
350	349.4	0.074074

Field & Laboratory Data

Sample Recovery & Chain of Custody

Client: AGRIUM
Location: Soda Springs, ID
Source: Boiler B5
Date: 6-22-05
Project No.: AES5064

Antec Environmental Services

	RUN #: Filter #:			RUN #: Filter #:			RUN #: Filter #:		
	Filter tare weight, gms.:			Filter tare weight, gms.:			Filter tare weight, gms.:		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	860.5	568.9	291.6	801.8	558.8	243.0	855.5	574.9	276.6
H_2O	613.2	576.3	36.9	617.8	565.1	52.7	599.0	580.6	18.4
KO	481.2	476.4	4.9	459.9	454.2	5.7	485.5	481.1	4.4
Silica	756.9	734.9	22.0	769.3	744.3	25.0	768.9	757.0	11.8
LW			-50.0			-50			-50
	Vlc: (Liquid volume collected, ml)		305.4		Vlc:	276.4		Vlc:	261.2

Sample Description	Sample I.D. Number Run #1	Run #2	Run #3
Front Half Filter	338	344	346
Back Half Filter	NA →		
Probe & Nozzle	PNR1AG	PNR2AG	PNR2AG
Impinger Catch H_2O	H2OR1AG	H2OR2AG	H2OR3AG
MeCl Impinger Rinse	IRR1AG	IRR2AG	IRR2AG
Liquid Levels Marked	yes @ Label		
Samples Sealed and Stored/Location	Mobile Lab #1		
Date & Time Samples Sealed	Post Run1 Mobile Lab #1		6-22-05

Date Sampled: 6-22-05
Date & Time Recovered: 6-22-05 Post Run
Recovered by: E. Olson

Released by: E E Olson Date: 6-24-05 Received by: AES LAB
Released by: Date: Received by:
Released by: Date: Received by:

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 1-4

Company/Plant: AGrium

Sampling location: B5 Boiler Normal OP

Date: 6.23.05 Project #: AES5064

Operator: EEO / BWT

Meter Box #: Meter Box H@:

Meter Box Calibration(Y):

Probe #: AES Pbu1 C_p: 0.846

Pitot Tube Leak Check			
Side A:	✓	@ 3.8	(in)H_2O
Side B:	✓	@ 3.6	(in)H_2O

Sample Train Leak Check			
Initial: 0.020	Cuft@		(in)Hg
Final:	Cuft@		(in)Hg

Run #: 1

Barometric Pressure(P_b): 24.45 (in)Hg

Duct Diameter(in): (D_b) (D_a)

Assumed Moisture(%): ~~2.5~~ (T_m): (T_s): 11.87

Nozzle Dia_{ave}: 1 2 3

Static Pressure("H_2O): −0.21

Probe & Nozzle Material:

min./pt Traverse Pt. Number	Time: Sampling Time	Time: Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp K (°F)	Velocity Head P_s ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F): Inlet	Dry Gas Meter Temp (°F): Outlet	Sample Probe Temps(°F): Probe	Sample Probe Temps(°F): Filter	Exit Gas Temp(°F)
8				310	0.32							
7				310	0.28							
6				310	0.25							
5				310	0.21							
4				310	0.22							
3				310	0.26							
2				310	0.32							
1				310	0.30							
8				312	0.18							
7				312	0.15							
6				312	0.16							
5				312	0.18							
4				312	0.20							
3				312	0.21							
2				312	0.38							
1				312	0.40							
Average	128			311	0.246							

WB

%H_2O 11.8 25090 DSCFM

AGR_010080

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: Helium
Sampling location:
Date: 6-22-05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AES86.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	Ø	@ 3.5	(in)H_2O
Side B:	Ø	@ 3.7	(in)H_2O

Sample Train Leak Check			
Initial:	0.000 Cuft@	10.0	(in)Hg
Final:	0.000 Cuft@	10.0	(in)Hg

Run #: 1
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) 2.8 (D_d) 2.0
Assumed Moisture(%): 8 (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number		Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Corrected Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F) Inlet	Dry Gas Meter Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
	1	12	0	0911	1	349	0.35	Ø	0.70	611.100	80	79	240	249	48
	2	11	5		2	349	0.35		0.70	613.9	81	79	240	252	49
	3	10	10		2	350	0.35		0.70	616.6	82	80	238	250	50
	4	9	15		2	350	0.38		0.76	619.4	83	80	240	252	51
	5	8	20		2	350	0.40		0.80	622.3	85	81	239	250	52
	6	7	25		2	352	0.45		0.91	625.2	87	82	241	252	52
	7	6	30		3	352	0.70		1.4	628.4	89	83	240	253	53
	8	5	35		3	351	0.80		1.6	632.3	91	84	239	251	54
	9	4	40		4	350	0.95		1.9	636.6	92	85	240	250	55
	10	3	45		4	349	1.0		2.0	641.2	94	86	239	252	56
	11	2	50		4	349	1.0		2.0	645.9	95	87	238	250	52
	12	1	55		4	348	1.0		2.0	650.7	96	87	237	249	57
	13	12	60		4	350	0.75		1.5	655.5	94	88	238	250	58
	14	11	65		4	348	0.75		1.5	659.6	95	89	239	252	58
	15	10	70		4	349	0.75		1.5	663.7	96	89	238	254	59
	16	9	75		4	349	0.65		1.3	667.9	97	90	240	252	60
	17	8	80		3	350	0.50		1.0	671.7	98	90	238	250	61
	18	7	85		2	350	0.40		0.82	675.1	99	91	239	249	61
	19	6	90		3	352	0.55		1.1	678.2	98	91	238	251	62
	20	5	95		3	353	0.65		1.3	681.7	99	92	237	250	62
	21	4	100		4	352	0.78		1.6	685.6	99	92	238	251	63
	22	3	105		4	352	0.73		1.5	689.8	101	92	236	252	64
	23	2	110		3	349	0.65		1.3	693.9	101	93	238	251	64
	24	1	115		3	350	0.65		1.3	697.8	101	93	236	250	65
	END		120	1115	—	—	—		—	701.687	—	—	—	—	—
	Average					350.1	0.630		1.321	90.587		89.9			

DSCFM - 41017

AGR_010081

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: AGRIUM
Sampling location:
Date: 6-22-05 Project #:
Operator: BWS
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	0	@ 3.8	(in)H_2O
Side B:	0	@ 3.5	(in)H_2O

Sample Train Leak Check				
Initial:	0.000	Cuft@	10.0	(in)Hg
Final:	0.000	Cuft@	10.0	(in)Hg

Run #: 5
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) (D_a)
Assumed Moisture(%): (T_w): (T_d):
Nozzle Dia_{avg}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: S.S.

min./pt Traverse Pt. Number		Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F) Inlet	Dry Gas Meter Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
1	12	0	1158	4	351	0.90	1.5	703.900	94	93	238	249	48
2	11	5		4	352	0.85	1.5	708.0	96	93	236	250	49
3	10	10		5	353	0.80	1.4	712.1	98	93	237	251	50
4	9	15		5	354	0.70	1.2	716.0	98	94	237	254	51
5	8	20		3	355	0.50	0.85	719.6	100	94	239	255	53
6	7	25		3	356	0.45	0.77	722.7	101	95	238	253	54
7	6	30		4	357	0.65	1.1	725.7	101	96	239	255	55
8	5	35		5	357	0.80	1.4	729.2	102	96	238	254	56
9	4	40		5	358	0.85	1.5	733.1	104	96	240	255	57
10	3	45		5	357	0.85	1.5	737.2	104	97	239	256	57
11	2	50		5	354	0.75	1.3	741.3	104	97	238	254	58
12	1	55		4	352	0.70	1.2	745.1	104	98	239	249	59
13	12	60		2	354	0.35	0.60	748.8	102	98	237	250	60
14	11	65		2	354	0.35	0.60	751.4	104	98	238	252	61
15	10	70		2	355	0.35	0.60	754.0	103	99	237	254	63
16	9	75		3	357	0.38	0.65	756.6	103	99	239	256	63
17	8	80		3	358	0.45	0.77	759.3	104	99	237	254	64
18	7	85		5	358	0.80	1.4	762.3	104	99	236	252	64
19	6	90		5	357	0.75	1.3	766.2	105	99	239	255	64
20	5	95		5	357	0.90	1.6	770.1	106	100	237	254	65
21	4	100		5	356	1.0	1.7	774.3	106	100	236	255	65
22	3	105		5	354	1.0	1.7	778.7	107	100	238	255	65
23	2	110		5	352	1.1	1.9	783.1	107	101	236	252	65
24	1	115		6	352	1.1	1.9	787.8	107	101	237	253	65
END		120	1401	—	—	—	—	792.445	—	—	—	—	—
Average					355.0	0.701	1.242	88.545		99.9			

DSCFM - 39404

AGR_010082

High Flow/Isokinetics Data Sheet

Antec Environmental Services

Method: EPA 5 / 202
Company/Plant: AGRIUM
Sampling location:
Date: 6-22-05 Project #:
Operator: BWJ
Meter Box #: HF-1 Meter Box H@: 1.614
Meter Box Calibration(Y): 0.995
Probe #: AESP6.1 C_p: 0.84

Pitot Tube Leak Check			
Side A:	D	@ 3.5	(in)H_2O
Side B:	D	@ 3.7	(in)H_2O

Sample Train Leak Check			
Initial:	0.000 Cuft@	10.0	(in)Hg
Final:	0.000 Cuft@	10.0	(in)Hg

Run #: 3
Barometric Pressure(P_b): 24.40 (in)Hg
Duct Diameter(in): 64 (D_b) (D_e)
Assumed Moisture(%): 16 (T_w): (T_d):
Nozzle Dia_{ave}: 0.243 1 2 3
Static Pressure("H_2O): -0.41
Probe & Nozzle Material: SS.

Cyclonic Angle Degrees	min./pt Traverse Pt. Number		Time Sampling Time	Time Clock (24 hr.)	Sample Vacuum (in)Hg.	Stack Temp (°F)	Velocity Head ΔPs(in)H_2O	Corrected Head ΔPs(in)H_2O	Pressure Differential ΔH (in) H_2O	Gas sample Volume (Vm) (Cuft)	Dry Gas Meter Temp (°F) Inlet	Dry Gas Meter Temp (°F) Outlet	Sample Probe Temps(°F) Probe	Sample Probe Temps(°F) Filter	Exit Gas Temp(°F)
	1	12	0	1427	1	355	0.35		0.60	795.400	96	97	237	250	48
	2	11	5		1	355	0.35		0.60	798.0	96	97	235	254	47
	3	10	10		1	355	0.35		0.60	800.6	97	96	236	252	49
	4	9	15		2	357	0.40		0.68	803.2	98	96	237	251	50
	5	8	20		2	358	0.40		0.68	805.9	99	96	236	252	51
	6	7	25		2	357	0.48		0.82	808.7	100	96	239	254	52
	7	6	30		3	356	0.75		1.3	811.7	101	96	238	252	53
	8	5	35		4	355	0.85		1.5	815.5	102	96	236	251	54
	9	4	40		4	353	1.0		1.7	819.6	101	95	234	254	54
	10	3	45		4	353	1.1		1.9	822.0	101	95	235	252	55
	11	2	50		4	350	1.1		1.9	828.6	101	94	236	253	56
	12	1	55		4	351	1.1		1.9	833.2	101	95	234	254	56
	13	12	60		3	351	0.75		1.3	837.8	98	93	236	251	56
	14	11	65		3	352	0.80		1.4	841.6	99	93	237	254	57
	15	10	70		3	352	0.75		1.3	845.5	99	93	236	252	58
	16	9	75		3	352	0.70		1.2	849.3	99	93	238	254	58
	17	8	80		3	353	0.60		1.0	853.0	99	93	237	253	59
	18	7	85		2	354	0.45		0.77	856.4	99	93	235	251	59
	19	6	90		3	356	0.55		0.94	859.3	98	92	237	249	60
	20	5	95		3	357	0.70		1.2	862.6	99	92	236	251	61
	21	4	100		3	355	0.80		1.4	866.2	99	92	235	252	61
	22	3	105		3	355	0.80		1.4	870.1	99	92	235	249	62
	23	2	110		3	353	0.75		1.3	874.0	98	92	236	251	62
	24	1	115		3	353	0.75		1.3	877.8	98	92	235	250	63
	END		120	1630	—	—	—		—	881.613	—	—	—	—	—
	Average					354.0	0.672		1.186	86.213		96.6			

DscFM-38600

AGR_010083

AES Gravimetric Analysis Form

Client: AGRIUM
Proj. No.: AES5062
Analysist: BWJ

	Trial No. 1	Trial No. 2	Trial No. 3
Date:	7-8-05	7-9-05	7-10-05
Time:	1000	1000	1000
Lab Temp:	64	65	65
% RH:	66	66	66

Sample ID	Lab ID	Date/Time into Dessicator	Sample Medium	Sample Vol. (mls)	Audit Wt (gms)	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Average Final Weight (gms)	Average Initial Weight (gms)
P.N. R-1	222	7-7-05 0930	ACE	150	100.0000	103.7964	103.7965	103.7966	103.7965	103.7934
P.N. R-2	236	7-7-05 0930	ACE	150	100.0000	101.5750	101.5749	101.5748	101.5749	101.5734
P.N R-3	83	7-7-05 0930	ACE	150	100.0000	105.9819	105.9820	105.9820	105.9820	105.9804
MeCl R-1	6	7-7-05 0930	MeCl	60	50.0000	100.8124	100.8123	100.8124	100.8124	100.8110
MeCl R-2	42	7-7-05 0930	MeCl	60	50.0000	96.1876	96.1876	96.1876	96.1876	96.1870
MeCl R-3	49	7-7-05 0930	MeCl	60	50.0000	99.6525	99.6525	99.6525	99.6525	99.6518
H2O R-1	212	7-7-05 0930	H2O	200	100.0000	106.8867	106.8869	106.8870	106.8869	106.8792
H2O R-2	37	7-7-05 0930	H2O	200	100.0000	102.5326	102.5327	102.5327	102.5327	102.5267
H2O R-3	229	7-7-05 0930	H2O	200	100.0000	104.5543	104.5543	104.5544	104.5543	104.5500
H2O Blank	H2O	7-7-05 0930	H2O	100	100.0000	97.2363	97.2363	97.2364	97.2363	97.2361
MeCl Blank	254	7-7-05 0930	MeCl	60	100.0000	104.5592	104.5592	104.5592	104.5592	104.5587
Acetone Blank	132	7-7-05 0930	ACE	100	100.0000	98.9796	98.9797	98.9797	98.9797	98.9795

AGR_010084

AES Final Filter Weight Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7.5.05	7.6.05	7.7.05
Proj. No.: AE55062	Time:	1005	0950	0945
Analysist: BWJ	Temp:	67	66	66
	RH:	61	61	60
	Audit Wt.:	0.5000	0.5000	0.5000
	Audit Wt. Reading:	0.5000	0.5000	0.5000
	Date/Time into Dessicator:	7.1.05 0930	7.1.05 0930	7.1.05 0930

Sample ID	Filter No.	Trial No. 1 (gms)	Trial No. 2 (gms)	Trial No. 3 (gms)	Final Average Wt.(gms)	Tare Average Wt.(gms)
R-1	338	0.3461	0.3461	0.3461	0.3461	0.3455
R-2	344	0.3475	0.3475	0.3475	0.3475	0.3470
R-3	346	0.3460	0.3460	0.3460	0.3460	0.3457

AES Gravimetric Tare Form

		Trial No. 1	Trial No. 2	Trial No. 3
Client: AGRIUM	Date:	7·5·05	7·6·05	7·7·05
Proj. No.: AES5062	Time:	1000	1000	1000
Analysist: BWJ	Temp:	66°	65°	64°
	RH:	60%	60%	59%
	Audit Wt.:	100.0000	100.0000	100.0000
	Date/Time Into Dessicator:	7·2·05/0950	7·2·05/0950	7·2·05/0950

Sample ID	Lab ID	Trial No. 1	Trial No. 2	Trial No. 3	Average
	212	106.8793	106.8792	106.8791	106.8792
	6	100.8110	100.8110	100.8110	100.8110
	118	104.1197	104.1195	104.1194	104.1195
	132	98.9796	98.9795	98.9794	98.9795
	116	103.9914	103.9914	103.9914	103.9914
	83	105.9804	105.9804	105.9803	105.9804
	222	103.7936	103.7934	103.7932	103.7934
	254	104.5589	104.5587	104.5587	104.5587
	37	102.5267	102.5267	102.5267	102.5267
	3	79.0515	79.0513	79.0511	79.0513
	229	104.5500	104.5500	104.5500	104.5500
	49	99.6519	99.6518	99.6517	99.6518
	42	96.1870	96.1870	96.1870	96.1870
	H_2O	97.2362	97.2361	97.2360	97.2361
	236	101.5735	101.5734	101.5734	101.5734

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Brian Johnson

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO NW-F04-040

EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

NORTHWEST OPACITY CERTIFICATION
Certificate of Completion • Plume Evaluation Training

Eric E Olson

EPA REFERENCE METHOD 9 YES

CERTIFICATE NO WA-S98-16

EXPIRATION DATE 10/19/2005

BEARER'S SIGNATURE

PROGRAM COORDINATOR
NORTHWEST OPACITY CERTIFICATION

2005 Stack
Testing Conv.

AGR_010088

SMEAD®

No. 2-153L
UPC 10334

HASTINGS, MN

PREMIUM RECYCLED

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs
Idaho
83276
208-547-4381 Tel
208-547-4948 Fax

Facsimile

Date:

To: Dean Kitchen

From: Monty Johnson

Company: TETCO

Company: Agrium

Fax #: 801-768-0880

Fax #:

Total Pages (including cover): 7

If fax is not received in good order, please contact: Monty

Dean,

Please make appropriate changes.

Thanks!

(NOTE: ONLY THE PAGES w/ CHANGES ARE INCLUDED IN THIS FAX.)

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MEMORY TRANSMISSION REPORT

TIME : AUG-01-05 07:10AM
TEL NUMBER :
NAME :

FILE NUMBER	:	065
DATE	:	AUG-01 07:08AM
TO	:	918017680880
DOCUMENT PAGES	:	07
START TIME	:	AUG-01 07:08AM
END TIME	:	AUG-01 07:10AM
SENT PAGES	:	07
STATUS	:	OK

FILE NUMBER : 065 *** SUCCESSFUL TX NOTICE ***

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs
Idaho
83276
208-547-4381 Tel
208-547-4948 Fax

Facsimile

Date:
To: Dean Kitchens
Company: TETCO
Fax #: 801-768-0880
From: Monty Johnson
Company: Agrium
Fax #:
Total Pages (including cover): 7
If fax is not received in good order, please contact: Monty

Dean,
Please make appropriate changes.
Thanks!
Mj

(NOTE: ONLY THE PAGES W/ CHANGES ARE INCLUDED IN THIS FAX.)

This communication is intended to be received only by the individual or entity to whom or to which it is addressed and contains information that is or may be privileged, confidential exempt from disclosure under law or subject to copyright. If you are not the intended recipient, any use copying, review or disclosure is strictly prohibited. Please notify the sender immediately if you have received this communication in error and return the original to us by return mail. Thank you for your assistance and cooperation.

* A Registered Name of Nu-West Industries, Inc.

SO_2 RELATIVE ACCURACY TEST AUDIT (RATA)
AND PERFORMANCE TEST PROTOCOL
NU-WEST INDUSTRIES, INC.
AGRIUM CONDA PHOSPHATE OPERATIONS
SODA SPRINGS, IDAHO

EAST SULFURIC ACID PLANT

Project Organization and Responsibility

The following personnel and the testing contractor are presently anticipated to be involved in the testing program. Idaho Division of Environmental Quality (IDEQ) and the Environmental Protection Agency (EPA) may have their own personnel or contractor to observe all phases including the process.

Testing Contractor:	TETCO 90 East Main Lehi, UT 84043	
Contacts:	Dean Kitchen Paul R. Kitchen	801-768-0973 801-768-0880 FAX
Facility:	Nu-West Industries, Inc., Agrium 3010 Conda Road Soda Spring, ID 83276	
Contact:	Monty Johnson or Clay Gentry	208-547-4381

During these tests only Nu-West Industries, (Agrium) personnel listed above or assigned personnel from the operating department are authorized to answer or obtain answers to pertinent questions on the process conditions or the test protocol.

Test Schedule

It is planned complete this test project November 1-2, 2005. If desired, EPA, IDEQ, or Agrium representatives may schedule a pretest meeting.

T1-040308

Project Description

Testing for this source is specified in the Air Quality Tier I Operating Permit, Permit No. ~~T1-030319~~, section 4. In summary, this source requires performance emission tests for sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4). In addition, a relative accuracy test audit (RATA) is to be completed for sulfur dioxide (SO_2) concentrations.

Testing procedures will include accumulating process data and testing for SO_2, sulfuric acid mist (H_2SO_4), and the SO_2 RATA using EPA Methods 3, or 3A, and 8.

Any, required visual emission observations (VEO's) will be conducted by a qualified observer according to EPA Method 9.

Performance Test Procedures

The performance emission tests will be conducted utilizing the Reference Methods listed below: Reference Methods are found in 40 CFR 60, Appendix A, unless otherwise specified.

SO_2— EPA Reference Method 8 will be performed. A total of at least 3 runs will be made. Emissions for SO_2 will be calculated using the equation in 40 CFR 60, paragraph 60.84 (d). This equation presents the results in terms of pounds of either SO_2 or sulfuric acid mist per ton of sulfuric acid produced.

H_2SO_4— EPA Reference Method 8 will be performed. A total of at least 3 runs will be completed. Emissions for sulfuric acid mist will be calculated using the equation in 40 CFR 60, paragraph 60.84 (d). This equation presents the results in terms of pounds of either SO_2 or sulfuric acid mist per ton of sulfuric acid produced.

VEO— 40 CFR 60, Appendix A, Reference Method 9 will be performed. A total of at least 24 observations (6 minutes) will be made (Tier I permit condition 4.7.3).

Specific procedures are as follows:

Designed 2 stack

1. The stack inside diameter is 90 inches. Two sample ports are located 45 feet downstream and ~~135~~ 180 inches upstream from any flow disturbance. The sample points will be chosen after EPA Method 1.

2. EPA Method 2 will be performed to determine stack gas velocity.

   Cyclonic flow will be checked during preliminary measurements. If cyclonics exist, straightening vanes or other arrangements agreeable to IDEQ will be made. A 0-10 inch vertical/inclined manometer with graduations of 0.01 inches of water will be used. If needed, a more sensitive manometer with graduations of 0.005 inches of water may be used.

3. Test run time will be at least 60 minutes.

4. Method 3, or Method 3A, will be used to determine the gas stream dry molecular weight. For Method 3, an integrated flue gas will be taken from the exhaust line after the dry gas meter orifice during each test run and analyzed at the completion of the test with an Orsat to determine the molecular weight of the effluent gas stream.

   Oxygen concentrations may be measured according to EPA Method 3A which utilizes a gaseous analyzer to measure the O_2 concentrations during the emissions test project for SO_2.

5. The gas stream moisture content may be considered to be zero (40 CFR 60, Subpart H, section 60.85. The principles of EPA Method 4 may also be followed to determine the gas stream moisture content.

6. The minimum sample volume will be at least 40.6 dscf as stated in 4.10.2(2) of the Tier I Operating Permit and in accordance with 40 CFR 60, Subpart H.

7. Probe liners will be borosilicate or quartz glass for the Method 8 tests.

8. The Method 8 impinger sequence shall be as follows: First and third shall be of the Greenburg-Smith design, the second and fourth of the modified Greenburg-Smith design with the tip removed. The first impinger shall be charged with 100 ml of 80 percent isopropanol. The second and third impingers shall each be charged with 100 ml of 3 percent hydrogen peroxide. The fourth impinger shall contain approximately 200 g of silica gel.

9. The glass fiber filters used for Method 8 will meet the EPA requirements.

10. The barometric pressure will be measured with a barometer, which is periodically checked against a mercury barometer. The barometer will be checked prior to testing to assure an accurate barometric pressure.

11. All current calibration data is submitted with this protocol, except nozzle calibration, which will be done at the test site. Nozzle calibration will be included on the first page of each set of run sheets for each respective test run. Any calibration that is not current will be re-calibrated prior to the test dates.

12. Any necessary preparation and clean up by the contractor will be performed in the contractor's sampling trailer. The laboratory work and analysis will be done as soon as possible after the test project.

13. ~~Verbal results will be reported to Monty Johnson of Agrium.~~ ~~The~~ A written report will ~~follow~~ be submitted to DEQ by Agrium within 30 days following the completion of the sample analysis.

14. If maintenance or operating problems arise during the test, the test may be stopped. ~~This determination will be made by Agrium representatives and operating personnel in consultation with IDEQ representatives.~~
IDEQ will be notified of test reschedule, if necessary

Rata Test Procedures

The acid plant exhaust SO_2 analyzer is connected to the DAS Delta V system which stores data on the OSI PI Historian. The data recorded on OSI PI Historian will be used to determine the relative accuracy. Values will be reported in terms of concentration, i.e., pounds per dry standard cubic foot (lb/dscf), or ppm, SO_2.

Specific items regarding the RATA test are listed below.

1. RATA testing will follow EPA Performance Specification 2 according to 40 CFR 60.

2. At least nine test runs will be conducted to determine the system relative accuracy. Three test runs may be taken from three performance test runs that have a sample time and sample volume of at least 60 minutes and 40.6 dscf. All other test runs will have a sample time of at least 21 minutes and will traverse at least three sample points at 16.7, 50.0, and 83.3 percent of the stack diameter as required by Performance Specification 2.

3. The Method 8/RATA sampling train components will be the same as the performance tests.

4. Analysis will be performed according to EPA Method 8 but only on the SO_2 portion of the sample.

5. ~~Verbal results will be reported to Monty Johnson of Agrium~~. ~~The~~ A written report will ~~follow~~ be submitted to DEQ by Agrium within 30 days following the completion of sample analysis.

6. If maintenance or operating problems arise during the test, the test may be stopped. ~~This determination will be made by Agrium representatives and operating personnel in consultation with IDEQ representatives.~~
IDEQ will be notified of test reschedule, if necessary

Operational Data and Instrumentation

Agrium personnel will monitor operational data during each test run.

Test Area

The test area shall include control rooms, instrument rooms, stack areas and the area around the contractor's trailer.

Access to Sample Site

Sample site is accessible via, ladder. Hard-hat, safety shoes, safety glasses and hearing protection are required.

Potential Hazards

Hot Equipment	Yes
Moving Equipment	Yes
Chemical	Yes, acid
Other	Noise, Elevated Work

Sample Equations

Sample equations and nomenclature are included with the calibration data.

Quality Assurance

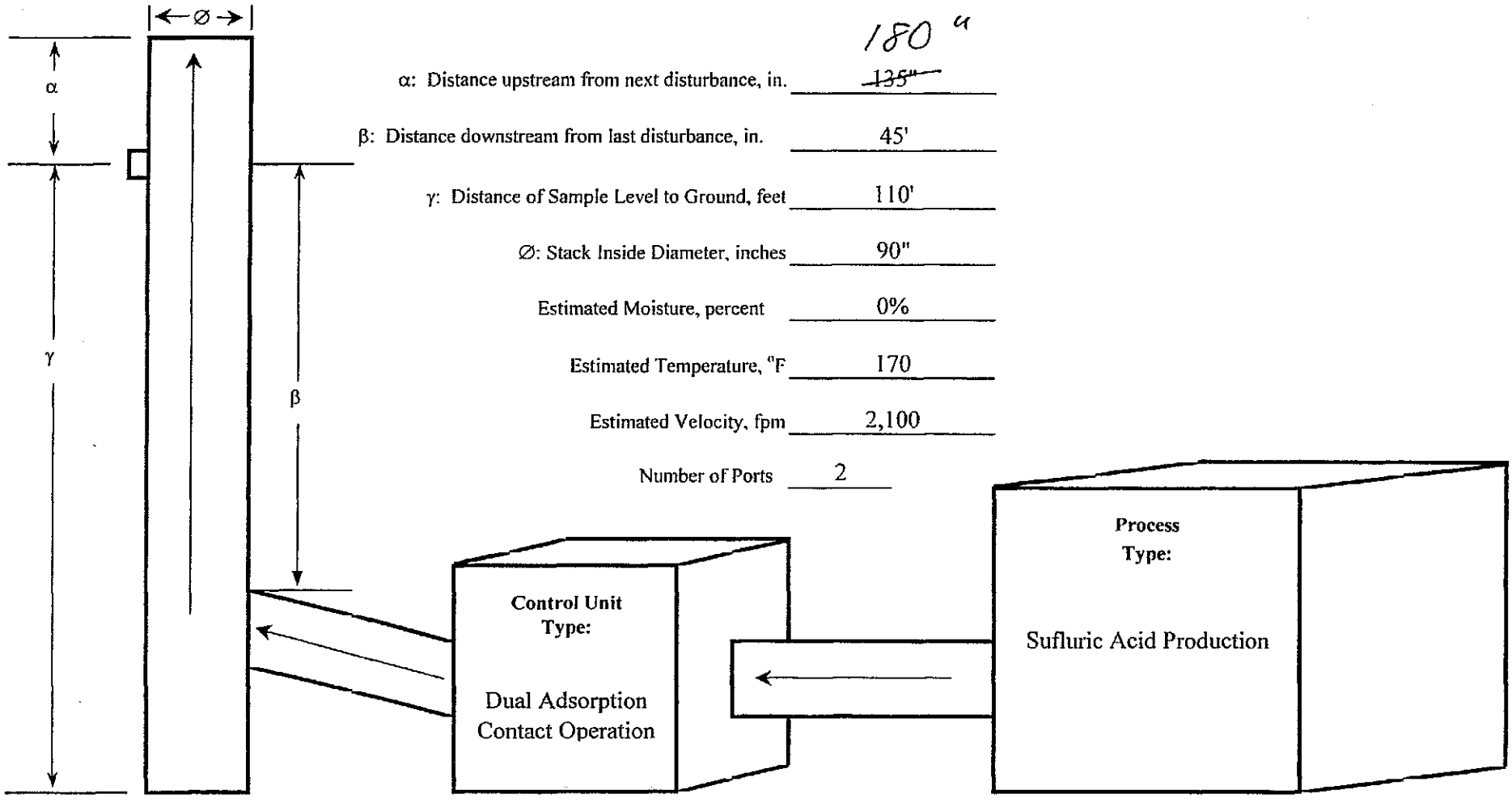
All testing and analysis in these audits and tests will be conducted according to 40 CFR 60, Appendix A, 40 CFR 63, Subpart H, as discussed in this protocol, and appropriate sections of the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems Vol. III.*

Reporting

The written report will be submitted to Agrium following completion of the test project. The report will be prepared by the testing contractor according to EPA Quality Assurance Guidelines. Complete copies of raw data, calculations, summary of test, and process and production data will be included in the reports. Agrium will submit the written report to IDEQ.

Facility: Agrium

Stack Identification: East Sulfuric Acid Plant



α: Distance upstream from next disturbance, in.	~~135"~~ 180"
β: Distance downstream from last disturbance, in.	45'
γ: Distance of Sample Level to Ground, feet	110'
∅: Stack Inside Diameter, inches	90"
Estimated Moisture, percent	0%
Estimated Temperature, °F	170
Estimated Velocity, fpm	2,100
Number of Ports	2

Figure 1. Facility Schematic Representation

AGR_010096

Agrium

Agrium Conda Phosphate Operations*
3010 Conda Road
Soda Springs, ID 83276
Tel: 208-547-4381
Fax: 208-547-2550

August 4, 2005

File No.: EN-05-089

Air Quality Permit Compliance
Department of Environmental Quality
Pocatello Regional Office
444 Hospital Way #300
Pocatello, Idaho 83201

Attn: Richard Elkins

RE: Notice of Intent to Test and Stack Test Protocol

Dear Mr. Elkins,

Please be informed that we intend to conduct annual compliance testing on our East Sulfuric Acid Plant on November 1-2, 2005. EPA Method 8 will be used to determine SO_2 and SO_3/acid mist and a Relative Accuracy Test Audit (RATA) will be performed simultaneously. TETCO, the third-party contractor that performed stack testing on our other processes earlier this year, will conduct the east Plant tests. An updated stack testing protocol is attached to this letter.

If you have any questions concerning this letter or associated enclosure, please call me at (208) 547-4381 extension 263.

Sincerely,

Monty Johnson
Environmental Manager

Enclosure: Compliance Test and RATA Protocol; 2 copies

* A Registered Name of Nu-West Industries, Inc.

SO_2 RELATIVE ACCURACY TEST AUDIT (RATA) AND PERFORMANCE TEST PROTOCOL NU-WEST INDUSTRIES, INC. AGRIUM CONDA PHOSPHATE OPERATIONS SODA SPRINGS, IDAHO

EAST SULFURIC ACID PLANT

Project Organization and Responsibility

The following personnel and the testing contractor are presently anticipated to be involved in the testing program. Idaho Division of Environmental Quality (IDEQ) and the Environmental Protection Agency (EPA) may have their own personnel or contractor to observe all phases including the process.

Testing Contractor:	TETCO 90 East Main Lehi, UT 84043	
Contacts:	Dean Kitchen Paul R. Kitchen	801-768-0973 801-768-0880 FAX
Facility:	Nu-West Industries, Inc., Agrium 3010 Conda Road Soda Spring. ID 83276	
Contact:	Monty Johnson Clay Gentry	208-547-4381 208 547-4381

During these tests only Nu-West Industries, (Agrium) personnel listed above or assigned personnel from the operating department are authorized to answer or obtain answers to pertinent questions on the process conditions or the test protocol.

Test Schedule

It is planned complete this test project November 1-2, 2005. If desired, EPA, IDEQ, or Agrium representatives may schedule a pretest meeting.

Project Description

Testing for this source is specified in the Air Quality Tier I Operating Permit, Permit No. T1- 040308, section 4. In summary, this source requires performance emission tests for sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4). In addition, a relative accuracy test audit (RATA) is to be completed for sulfur dioxide (SO_2) concentrations.

Testing procedures will include accumulating process data and testing for SO_2, sulfuric acid mist (H_2SO_4), and the SO_2 RATA using EPA Methods 3, or 3A, and 8.

Any, required visual emission observations (VEO's) will be conducted by a qualified observer according to EPA Method 9.

Performance Test Procedures

The performance emission tests will be conducted utilizing the Reference Methods listed below: Reference Methods are found in 40 CFR 60, Appendix A, unless otherwise specified.

- SO_2— EPA Reference Method 8 will be performed. A total of at least 3 runs will be made. Emissions for SO_2 will be calculated using the equation in 40 CFR 60, paragraph 60.84 (d). This equation presents the results in terms of pounds of either SO_2 or sulfuric acid mist per ton of sulfuric acid produced.
- H_2SO_4— EPA Reference Method 8 will be performed. A total of at least 3 runs will be completed. Emissions for sulfuric acid mist will be calculated using the equation in 40 CFR 60, paragraph 60.84 (d). This equation presents the results in terms of pounds of either SO_2 or sulfuric acid mist per ton of sulfuric acid produced.
- VEO— 40 CFR 60, Appendix A, Reference Method 9 will be performed. A total of at least 24 observations (6 minutes) will be made (Tier I permit condition 4.7.3).

Specific procedures are as follows:

1. The stack inside diameter is 90 inches. Two sample ports are located 45 feet downstream and 180 inches upstream from any flow disturbance. The sample points will be chosen after EPA Method 1.

2. EPA Method 2 will be performed to determine stack gas velocity.

   Cyclonic flow will be checked during preliminary measurements. If cyclonics exist, straightening vanes or other arrangements agreeable to IDEQ will be made. A 0-10 inch vertical/inclined manometer with graduations of 0.01 inches of water will be used. If needed, a more sensitive manometer with graduations of 0.005 inches of water may be used.

3. Test run time will be at least 60 minutes.

4. Method 3, or Method 3A, will be used to determine the gas stream dry molecular weight. For Method 3, an integrated flue gas will be taken from the exhaust line after the dry gas meter orifice during each test run and analyzed at the completion of the test with an Orsat to determine the molecular weight of the effluent gas stream.

   Oxygen concentrations may be measured according to EPA Method 3A which utilizes a gaseous analyzer to measure the O_2 concentrations during the emissions test project for SO_2.

5. The gas stream moisture content may be considered to be zero (40 CFR 60, Subpart H, section 60.85. The principles of EPA Method 4 may also be followed to determine the gas stream moisture content.

6. The minimum sample volume will be at least 40.6 dscf as stated in 4.10.2(2) of the Tier I Operating Permit and in accordance with 40 CFR 60, Subpart H.

7. Probe liners will be borosilicate or quartz glass for the Method 8 tests.

8. The Method 8 impinger sequence shall be as follows: First and third shall be of the Greenburg-Smith design, the second and fourth of the modified Greenburg-Smith design with the tip removed. The first impinger shall be charged with 100 ml of 80 percent isopropanol. The second and third impingers shall each be charged with 100 ml of 3 percent hydrogen peroxide. The fourth impinger shall contain approximately 200 g of silica gel.

9. The glass fiber filters used for Method 8 will meet the EPA requirements.

10. The barometric pressure will be measured with a barometer, which is periodically checked against a mercury barometer. The barometer will be checked prior to testing to assure an accurate barometric pressure.

11. All current calibration data is submitted with this protocol, except nozzle calibration, which will be done at the test site. Nozzle calibration will be included on the first page of each set of run sheets for each respective test run. Any calibration that is not current will be re-calibrated prior to the test dates.

12. Any necessary preparation and clean up by the contractor will be performed in the contractor's sampling trailer. The laboratory work and analysis will be done as soon as possible after the test project.

13. A written report will be submitted to IDEQ by Agrium within 30 days following the completion of the sample analysis.

14. If maintenance or operating problems arise during the test, the test may be stopped. IDEQ will be notified of a test reschedule, if necessary.

Rata Test Procedures

The acid plant exhaust SO_2 analyzer is connected to the DAS Delta V system which stores data on the OSI PI Historian. The data recorded on OSI PI Historian will be used to determine the relative accuracy. Values will be reported in terms of concentration, i.e., pounds per dry standard cubic foot (lb/dscf), or ppm, SO_2.

Specific items regarding the RATA test are listed below.

1. RATA testing will follow EPA Performance Specification 2 according to 40 CFR 60.

2. At least nine test runs will be conducted to determine the system relative accuracy. Three test runs may be taken from three performance test runs that have a sample time and sample volume of at least 60 minutes and 40.6 dscf. All other test runs will have a sample time of at least 21 minutes and will traverse at least three sample points at 16.7, 50.0, and 83.3 percent of the stack diameter as required by Performance Specification 2.

3. The Method 8/RATA sampling train components will be the same as the performance tests.

4. Analysis will be performed according to EPA Method 8 but only on the SO_2 portion of the sample.

5. A written report will be submitted to IDEQ by Agrium within 30 days following the completion of sample analysis.

6. If maintenance or operating problems arise during the test, the test may be stopped. IDEQ will be notified of a test reschedule, if necessary.

Operational Data and Instrumentation

Agrium personnel will monitor operational data during each test run.

Test Area

The test area shall include control rooms, instrument rooms, stack areas and the area around the contractor's trailer.

Access to Sample Site

Sample site is accessible via, stairs and ladders. Hard-hat, safety shoes, safety glasses and hearing protection are required.

Potential Hazards

Hot Equipment	Yes
Moving Equipment	Yes
Chemical	Yes, acid
Other	Noise, Elevated Work

Sample Equations

Sample equations and nomenclature are included with the calibration data.

Quality Assurance

All testing and analysis in these audits and tests will be conducted according to 40 CFR 60, Appendix A, 40 CFR 63, Subpart H, as discussed in this protocol, and appropriate sections of the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems Vol. III.*

Reporting

The written report will be submitted to Agrium following completion of the test project. The report will be prepared by the testing contractor according to EPA Quality Assurance Guidelines. Complete copies of raw data, calculations, summary of test, and process and production data will be included in the reports. Agrium will submit the written report to IDEQ.

Appendix A

Calibration Data

AGR_010103

Pretest--Console / Dry Gas Meter Calibration Sheet

Date: January 10, 2005 P_b: 25.29 Console #: 3 Vacuum: 5 Technician: Alex Moore

Line #	Meter Orifice Setting in. H_2O ΔH	Volume: Wet Test Meter ft^3 Vm_w	Volume: Dry Gas Meter ft^3 Vm_d	Temperature: Wet Test Meter: Measured °F T_w	Temperature: Wet Test Meter: Average °F Tw_{avg}	Temperature: Dry Gas Meter: Meter Inlet °F Tm_i	Temperature: Dry Gas Meter: Meter Outlet °F Tm_o	Temperature: Dry Gas Meter: Average °F Tm_{avg}	Time (mm:ss ss) (mm mm) θ	$\Delta H_@$ in H_2O $\Delta H_@$	Y-Factor Dimensionless Y
1	.40	5.003	5.097	66 66 67	66.3	81 83 85	81 83 85	83.0	12.731	1.656	1.011
2	1.70	5.006	5.230	66 66 67	66.3	87 89 90	86 86 87	87.5	6.478	1.806	.991
3	3.00	5.010	5.331	66 66 66	66.0	92 91 91	88 88 87	89.5	4.984	1.874	.973
4											
5											
6											
									Average =>	1.779	.992

Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature: Reference (°F)	Temperature: Sensor (°F)	Temperature Difference (°F)
Meter In Tm_i	Air	64	63	1
	Continuity			Pass
Meter Out Tm_o	Air	65	64	1
	Continuity			Pass

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460)}$$

$$\Delta H_@ = \frac{0.0317 \cdot \Delta H}{P_b \cdot (Tm_{avg} + 460)} \cdot \left[\frac{\theta \cdot (Tw_{avg} + 460)}{Vm_w} \right]^2$$

AGR_010104

Pretest--Console / Dry Gas Meter Calibration Sheet

Date: January 4, 2005 P_b: 25.19 Console #: 4 Vacuum: 5 Technician: Alex Moore

Line #	Meter Orifice Setting in. H_2O ΔH	Volume: Wet Test Meter ft^3 Vm_w	Volume: Dry Gas Meter ft^3 Vm_d	Temperature: Wet Test Meter Measured °F T_w	Temperature: Wet Test Meter Average °F Tw_{avg}	Temperature: Dry Gas Meter Meter Inlet °F Tm_i	Temperature: Dry Gas Meter Meter Outlet °F Tm_o	Temperature: Dry Gas Meter Average °F Tm_{avg}	Time (mm ss ss) (min min) θ	$\Delta H_@$ in H_2O $\Delta H_@$	Y-Factor Dimensionless Y
1	.45	5.072	5.002	68 68 69	68.3	71 69 68	72 71 71	70.3	11.209	1.456	1.016
2	.85	5.062	5.005	67 68 68	67.7	69 69 69	70 70 70	69.5	8.212	1.481	1.012
3	1.45	5.022	5.005	68 68 68	68.0	69 70 70	70 70 70	69.8	6.449	1.583	1.003
4	2.05	5.007	5.026	68 68 68	68.0	69 69 69	70 70 70	69.5	5.407	1.584	.993
5	2.65	5.010	5.077	67 68 68	67.7	69 69 69	70 70 70	69.5	4.760	1.583	.983
6	3.25	5.016	5.092	68 68 68	68.0	69 70 71	71 70 71	70.3	4.324	1.597	.980
									Average =>	1.547	.998

Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature: Reference (°F)	Temperature: Sensor (°F)	Temperature Difference (°F)
Meter In Tm_i	Air	70	71	1
	Continuity			Pass
Meter Out Tm_o	Air	71	71	0
	Continuity			Pass

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460)}$$

$$\Delta H_@ = \frac{0.0317 \cdot \Delta H}{P_b \cdot (Tm_{avg} + 460)} \cdot \left[\frac{\theta \cdot (Tw_{avg} + 460)}{Vm_w} \right]^2$$

AGR_010105

Pretest--Console / Dry Gas Meter Calibration Sheet

Date: December 27, 2009 P_b: 25.43 Console #: 5 Vacuum: .5 Technician: Alex Moore

Line #	Meter Orifice Setting in. H_2O ΔH	Volume: Wet Test Meter ft³ Vm_w	Volume: Dry Gas Meter ft³ Vm_d	Temperature: Wet Test Meter: Measured °F T_w	Temperature: Wet Test Meter: Average °F Tw_{avg}	Temperature: Dry Gas Meter: Meter Inlet °F Tm_i	Temperature: Dry Gas Meter: Meter Outlet °F Tm_o	Temperature: Dry Gas Meter: Average °F Tm_{avg}	Time (mm ss ss) (mm mm) θ	$\Delta H_@$ in H_2O $\Delta H_@$	Y-Factor Dimensionless Y
1	.45	5.003	5.028	65 65 65	65.0	74 76 77	74 75 75	75.2	11.016	1.401	1.013
2	.85	5.004	5.018	65 65 65	65.0	78 80 81	76 77 77	78.2	8.177	1.449	1.020
3	1.45	5.008	5.012	65 65 65	65.0	81 81 83	77 77 77	79.3	6.420	1.518	1.022
4	2.05	5.028	5.003	65 65 65	65.0	73 74 76	73 73 74	73.8	5.454	1.553	1.016
5	2.65	5.026	5.009	65 65 65	65.0	74 77 78	73 73 74	74.8	4.844	1.581	1.014
6	3.25	5.023	5.006	65 65 65	65.0	72 75 76	73 73 73	73.7	4.398	1.604	1.011
									Average =>	1.518	1.016

Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature: Reference (°F)	Temperature: Sensor (°F)	Temperature Difference (°F)
Meter In Tm_i	Air	70	70	0
	Continuity			Pass
Meter Out Tm_o	Air	70	70	0
	Continuity			Pass

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460)}$$

$$\Delta H_@ = \frac{0.0317 \cdot \Delta H}{P_b \cdot (Tm_{avg} + 460)} \cdot \left[\frac{\theta \cdot (Tw_{avg} + 460)}{Vm_w} \right]^2$$

AGR_010106

Pretest--Console / Dry Gas Meter Calibration Sheet

Date: December 27, 2004 P_b: 25.45 Console #: 6 Vacuum: 5 Technician: Alex Moore

Line #	Meter Orifice Setting in. H_2O ΔH	Volume: Wet Test Meter ft^3 Vm_w	Volume: Dry Gas Meter ft^3 Vm_d	Temperature: Wet Test Meter: Measured °F T_w	Temperature: Wet Test Meter: Average °F Tw_{avg}	Temperature: Dry Gas Meter: Meter Inlet °F Tm_i	Temperature: Dry Gas Meter: Meter Outlet °F Tm_o	Temperature: Dry Gas Meter: Average °F Tm_{avg}	Time (mm ss ss) (mm mm) θ	$\Delta H_@$ in H_2O $\Delta H_@$	Y-Factor Dimensionless Y
1	.45	5.004	5.013	65 65 65	65.0	76 78 81	71 72 74	75.3	11.601	1.551	1.017
2	.85	5.006	5.076	65 65 65	65.0	83 83 84	77 77 77	80.2	8.674	1.622	1.012
3	1.45	5.020	5.110	65 66 66	65.7	79 82 84	76 77 77	79.2	6.852	1.725	1.003
4	2.05	5.009	5.122	65 66 66	65.7	82 86 88	77 77 77	81.2	5.836	1.770	1.001
5	2.65	5.012	5.139	66 66 66	66.0	82 86 87	77 77 77	81.0	5.157	1.787	.995
6	3.25	5.011	5.041	65 65 65	65.0	71 76 78	67 68 68	71.3	4.674	1.827	.997
									Average =>	1.714	1.004

Temperature Sensor Calibration

Reference:

	Temperature Source (Medium)	Temperature: Reference (°F)	Temperature: Sensor (°F)	Temperature Difference (°F)
Meter In Tm_i	Air	75	75	0
	Continuity			Pass
Meter Out Tm_o	Air	75	75	0
	Continuity			Pass

$$Y = \frac{Vm_w \cdot P_b \cdot (Tm_{avg} + 460)}{Vm_d \cdot [P_b + \Delta H / 13.6] \cdot (Tw_{avg} + 460)}$$

$$\Delta H_@ = \frac{0.0317 \cdot \Delta H}{P_b \cdot (Tm_{avg} + 460)} \cdot \left[\frac{\theta \cdot (Tw_{avg} + 460)}{Vm_w} \right]^2$$

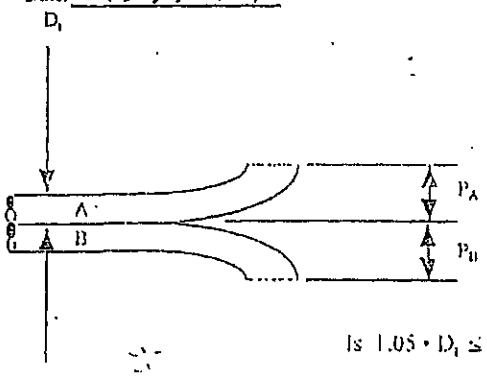
AGR_010107

Type S Pitot Tube Inspection Data

Date: 10-22-04

Pitot Tube Identification: 98-6

Technician: M. Ranson



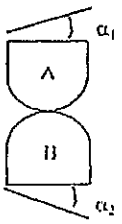
D_t .375 in.

P_A = .426 in.

P_B = .426 in.

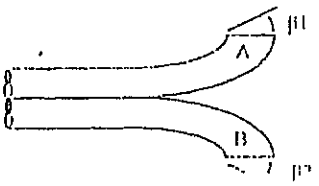
Is $P_A = P_B$? ✓

Is $1.05 \cdot D_t \le D_t \le 1.50 \cdot D_t$? ✓



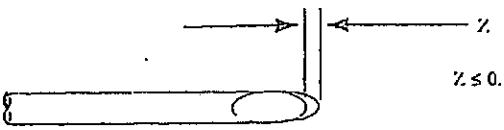
$\alpha_1 < 10°$ α_1 = 1 °

$\alpha_2 < 10°$ α_2 = 1 °

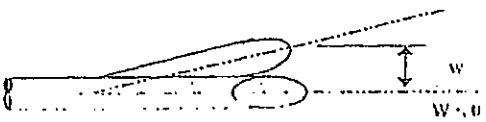


$\beta_1 < 5°$ β_1 = 0 °

$\beta_2 < 5°$ β_2 = 1 °



$Z \le 0.125$ in. Z = .011 in.



$W \le 0.0125$ in. W .007 in.

The pitot tube meets the specifications for a calibration factor of 0.84? ✓

Temperature Sensor Calibration					
Reference:					
	Temperature Source (Medium)	Temperature Reference (°F)	Temperature Sensor (°F)	Temperature Difference (°F)	Deflection
Probe	Air	70	69	1	Y
Stack	Air	70	70	0	Y

AGR_010108

TETCO

Sample Box Temperature Sensor Calibration

Date: 1/4/05 Calibrator: Doug Olson / Brenton Cocks Reference: NIST Tm

Unit ID	Thermocouple Location	Temperature Source (Medium)	Temperature Reference (°F)	Temperature Sensor (°F)	Temp. Diff. or Result (°F), P/F
A	Oven 4	Air	66	65	1
		Continuity	—	Increased	P
	Probe Out 3	Air	67	67	1
		Continuity	—	Increased	P
	Impinger Out 5	Air	70	69	1
		Continuity	—	Increased	P
B	Oven	Air	73	73	0
		Continuity	—	Increased	P
	Probe Out	Air	66	67	1
		Continuity	—	Increased	P
	Impinger Out	Air	68	67	1
		Continuity	—	Increased	P
C	Oven	Air	69	70	1
		Continuity	—	Increased	P
	Probe Out	Air	67	68	1
		Continuity	—	Increased	P
	Impinger Out	Air	62	61	1
		Continuity	—	Increased	
D	Oven	Air	68	69	0
		Continuity	—	Increased	P
	Probe Out	Air	67	68	1
		Continuity	—	Increased	P
	Impinger Out	Air	64	65	1
		Continuity	—	Increased	P
E	Oven	Air	66	67	1
		Continuity	—	Increased	P
	Probe Out	Air	66	67	1
		Continuity	—	Increased	P
	Impinger Out	Air	66	65	1
		Continuity	~~66~~ OK	~~65~~ Increased	P
F	Oven	Air	68	68	0
		Continuity	—	Increased	P
	Probe Out	Air	68	67	1
		Continuity	—	Increased	P
	Impinger Out	Air	63	61	2
		Continuity	—	Increased	P
	Impinger Out G	Air	64	63	1
		Continuity	—	Increased	P
	Impinger Out H	Air	64	64	0
		Continuity	—	Increased	P

OPACITEK
Environmental Services

This certifies that Todd L. Kitchen
has successfully completed the Visible Emissions Evaluation Course conducted by OPACITEK Environmental Services and has met the minimum requirements necessary to evaluate visible emissions according to EPA Methods

Manager

Valid until SEP 2 1 2005

☐ Sunglasses

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has successfully completed the Visible Emissions Evaluation Course conducted by OPACITEK Environmental Services and has met the minimum requirements necessary to evaluate visible emissions according to EPA Methods

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$\%I$ = percent isokinetic, percent
A = auxiliary fuel factor.
= 0.00 for no fuel [no factor given for sulfur as fuel].
A_s = stack cross-sectional area (ft^3)
$AS\Delta P$ = see $\sqrt{\Delta P}$
B_{ws} = fraction of water in stack gas
CO_2 = percent carbon dioxide in the stack gas
C_p = pitot tube coefficient (0.84)
$C_{SO2\ (lb/dscf)}$ = concentration of sulfur dioxide (lb / dscf)
$C_{SO2\ (ppmdv)}$ = concentration of sulfur dioxide (ppm)
$C_{H2SO4\ (lb/dscf)}$ = concentration of sulfuric acid mist (lb / dscf)
$C_{H2SO4\ (ppmdv)}$ = concentration of sulfuric acid mist (ppm)
ΔH = orifice pressure drop (inches H_2O)
$\Delta H_@$ = orifice pressure (inches H_2O)
D_n = nozzle diameter (inches)
ΔP = stack flow pressure differential (inches H_2O)
D_s = diameter of the stack (feet)
ER_{gas} = emission rate of a gas (lb/hr)
$E_{S.Y\ (lb/ton)}$ = emission rate of SO_2 or $H_2SO_{4\ mist}$ per 100 percent of H_2SO_4 produced (lb / ton).
M_d = molecular weight of stack gas, dry basis (lb/lb-mol)
M_s = molecular weight of stack gas, wet basis (g/gmol)
$M_{w,x}$ = molecular weight of gas species (g/gmol)
N_2 = percent nitrogen in the stack gas
N_{Ba} = normality of barium perchlorate solution
O_2 = percent oxygen in the stack gas
P = 100% sulfuric acid production rate (ton/hr)
$\sqrt{\Delta P}$ = average of the square roots of ΔP (may also be referred to as $AS\Delta P$)
Pb_m = absolute barometric pressure at the dry gas meter (inches Hg)
Pb_p = absolute barometric pressure at the sample location (inches Hg)
P_G = stack static pressure (inches H_2O)
P_s = absolute stack pressure (inches Hg)
P_{std} = absolute pressure at standard conditions (29.92 inches Hg.)
θ = time of test (minutes)
R = gas constant (8.31451 J/gmol-°K)
S = 11,800—acid production rate factor of 100 percent H_2SO_4 produced (dscf / ton).
T_s = stack temperature (°F)
T_{std} = absolute temperature at standard conditions (528°R)
Tt = see θ
V_a = volume of aloquit (ml)
Vm = sample volume (ft^3) at meter conditions
Vm_{std} = volume standard (dscf), sample volume adjusted to 68°F and 29.92 inches Hg.
V_s = velocity of stack gas (fpm)
V_{soln} = volume of solution (ml)
V_t = volume of titrant for sample (ml)
V_{tb} = volume of titrant for blank (ml)

V_{wc} = volume water vapor (scf) at 68°F and 29.92 inches Hg.

Wt_{wc} = weight of the condensed water collected (grams)

X_d = fraction of dry gas

X_{SO2} = subscript referring to sulfur dioxide, SO_2

X_{H2SO4} = subscript referring to sulfuric acid mist, H_2SO_2

Y = meter calibration Y-factor (dimensionless)

$$\%I = Vm_{std} \cdot (T_s + 460) \cdot 1039 / (\theta \cdot V_s \cdot P_s \cdot X_d \cdot D_n^2)$$

$$A_s = Ds^2 / 4 \cdot \pi$$

$$B_{ws} = V_w / (Vm_{std} + V_w)$$

$$C_{SO2\ (lb/dscf)} = [(7.061 \times 10^{-5}) \times (V_t - V_{tb}) \times N_{Ba} \times (V_{soln} / V_a)] / Vm_{std}$$

$$C_{SO2\ (ppmdv)} = [C_{SO_2\ (lb/dscf)}] / [64 \times 2.5953 \times 10^{-9}]$$

$$C_{H2SO4\ (lb/dscf)} = [(1.081 \times 10^{-4}) \times (V_t - V_{tb}) \times N_{Ba} \times (V_{soln} / V_a)] / Vm_{std}$$

$$C_{H2SO4\ (ppmdv)} = [C_{H2SO4\ (lb/dscf)}] / [80 \times 2.5953 \times 10^{-9}]$$

$$E_{S\ X\ (lb/ton)} = [C_X\ (lb/dscf) \cdot S] / [0.265 - (0.0126 \cdot \%O_2) - (A \cdot \%CO_2)]$$

$$ER_{X\ (lb/hr)} = Es_X \cdot P$$

$$M_d = CO_2 \cdot 0.44 + O_2 \cdot 0.32 + N_2 \cdot 0.28$$

$$M_s = (M_d \cdot X_d) + (18 \cdot B_{ws})$$

$$P_s = Pb_p + (P_G / 13.6)$$

$$Vm_{std} = Vm \cdot Y \cdot T_{std} \cdot (Pb_m + \Delta H / 13.6) / [P_{std} \cdot (T_m + 460)]$$

$$V_s = 85.49 \cdot 60 \cdot Cp \cdot \sqrt{\Delta P} \cdot \sqrt{[(T_s + 460) / (P_s \cdot M_s)]}$$

$$V_{wc} = Wt_{wc} \cdot 0.04715$$

$$X_d = 1 - B_{ws}$$

40 CFR 60, § 60.84 (d)

Calculate the SO_2 and H_2SO_4 emission rate as follows:

$$E_S = \frac{C_s \cdot S}{0.265 - (0.0126 \cdot \%O_2) - (A \cdot \%CO_2)}$$

where:

E_S = emission rate of SO_2 or H_2SO_4 per 100 percent of H_2SO_4 produced (lb / ton).

C_S = concentration of SO_2 or H_2SO_4 (lb / dscf).

S = 11,800—acid production rate factor of 100 percent H_2SO_4 produced (dscf / ton).

$\%O_2$ = oxygen concentration, percent dry basis.

A = auxiliary fuel factor.

= 0.00 for no fuel [no factor given for sulfur as fuel].

$\%CO_2$ = carbon dioxide concentration, percent dry basis.

$$E_R = E_S \cdot P$$

where:

E_S = emission rate of SO_2 or H_2SO_4 per 100 percent of H_2SO_4 produced (lb / ton).

P = production rate of 100% sulfuric acid (ton / hr)

E_R = emission rate of SO_2 or H_2SO_4 (lb / hr).

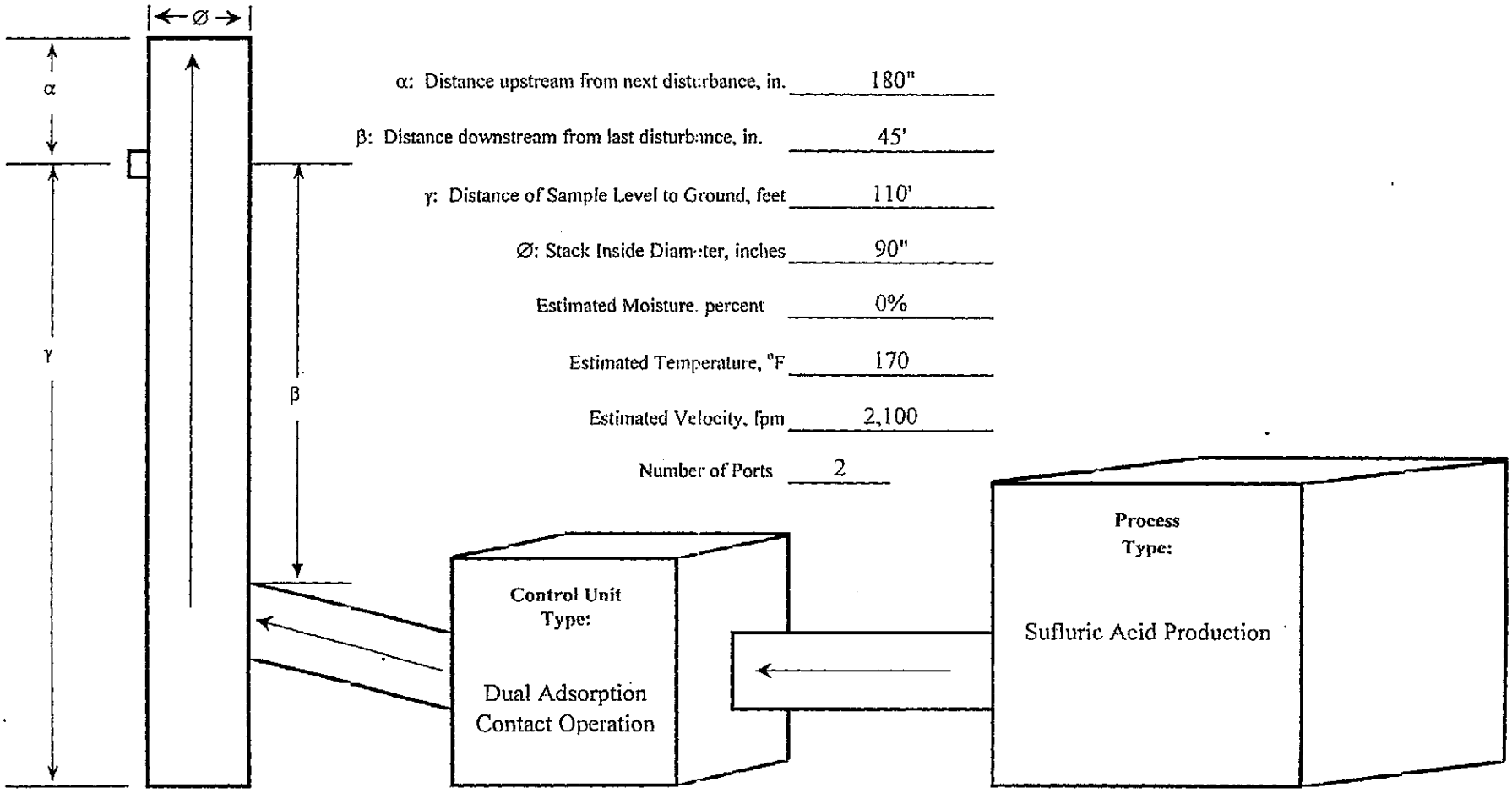
Appendix B

Facility Schematic Representation

AGR_010114

Facility: Agrium

Stack Identification: East Sulfuric Acid Plant



α: Distance upstream from next disturbance, in.	180"
β: Distance downstream from last disturbance, in.	45'
γ: Distance of Sample Level to Ground, feet	110'
Ø: Stack Inside Diameter, inches	90"
Estimated Moisture, percent	0%
Estimated Temperature, °F	170
Estimated Velocity, fpm	2,100
Number of Ports	2

Figure 1. Facility Schematic Representation

AGR_010115