Appendix C

Calibration Data

Analyzer Calibration

AECOM

Client	SMMI - Pogo	Cylinder #, Supplier, & Conc.	Analyzer	NOx	Model	TEI 42C
Location	Delta Junction, AK	CC403089 45.29 Nox 44.63 SO2 2	Full Scale	894.2	Serial #	
Source ID	Incinerator	CC187147 9.916 CO2 9.971 O2	Analyzer	CO	Model	TEI 48C
Operator	J Rosburg	CC239814 19.67 CO2 19.97 O2	Full Scale	604.8	Serial #	
Date	06/29/13	CC16184 604.8 CO 894.2 Nox	Analyzer		Model	
Initial Cal Time	0755-0816	CC99044	Full Scale		Serial #	
Final Cal Time		CC23276	Analyzer	SO2	Model	AMETEK 921
			Full Scale	90.0	Serial #	
			Analyzer	O2	Model	Sevomex1440
			Full Scale	19.97	Serial #	
			Analyzer	CO2	Model	Sevomex1440
			Full Scale	19.67	Serial #	

		Cylinder Value (ppm/%)	Analyzer Response (ppm/%)	Absolute Difference (ppm/%)	Percent Difference (% of span)	Percent Difference (Pass/Fail)
Analyzer NOx Initial Analyzer Response	Zero	0.0	1.8	1.8	0.2	Pass
	Mid-Range	450.0	441.9	8.1	0.9	Pass
	High-Range	894.2	887.0	7.2	0.8	Pass
Analyzer Response	Zero	0.0				
	Mid-Range	450.0				
	High-Range	894.2				
Analyzer CO Initial Analyzer Response	Zero	0.0	0.2	0.2	0.0	Pass
	Mid-Range	300.2	300.0	0.2	0.0	Pass
	High-Range	604.8	604.7	0.1	0.0	Pass
Analyzer Response	Zero	0.0				
	Mid-Range					
	Mid-Range	300.2				
	High-Range	604.8				
Analyzer SO2 Initial Analyzer Response	Zero	0.0	0.0	0.0	0.0	Pass
	Mid-Range	44.6	45.1	0.5	0.5	Pass
	High-Range	90.0	90.3	0.3	0.3	Pass
Analyzer Response	Zero	0.0				
	Mid-Range	44.6				
	High-Range	90.0				
Analyzer _____ Predicted ppm Initial Analyzer Response * Cal. through CEM system	Zero					
	Mid-Range					
	Mid-Range					
	High-Range					
Analyzer Response Predicted ppm * Cal. through CEM system	Zero					
	Mid-Range					
	Mid-Range					
	High-Range					
Analyzer O2 Initial Analyzer Response	Zero	0.00	0.01	0.0	0.1	Pass
	Mid-Range	9.97	10.03	0.1	0.3	Pass
	High-Range	19.97	20.03	0.1	0.3	Pass
Analyzer Response	Zero	0.00				
	Mid-Range	9.97				
	High-Range	19.97				
Analyzer CO2 Initial Analyzer Response	Zero	0.00	0.03	0.0	0.2	Pass
	Mid-Range	9.92	9.79	0.1	0.6	Pass
	High-Range	19.67	19.76	0.1	0.5	Pass
Analyzer Response	Zero	0.00				
	Mid-Range	9.92				
	High-Range	19.67				

Cal Error % =abs(CEM-Cylinder) / CS X 100
Allowable Calibration Error % = 2.0 for all analyzers except THC which is 5.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 1	Analyzer:		Span Value:	
Date:	06/29/13	Analyzer:	O2	Span Value:	19.97
Run Time:	0840-1125	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	(%)	(Pass/Fail)
Run 1 Zero	NOx	1.8	826	1.8	0.0	Pass	1133	2.8	0.1	Pass	0.1	Pass
Run 1 Span	NOx	441.9	831	428.0	-1.6	Pass	1140	402.0	-4.5	Pass	-2.9	Pass
Run 1 Zero	CO	0.2	826	-0.7	-0.1	Pass	1133	-5.6	-1.0	Pass	-0.8	Pass
Run 1 Span	CO	300.0	831	293.0	-1.2	Pass	1140	277.0	-3.8	Pass	-2.6	Pass
Run 1 Zero	SO2	0.0	826	-0.4	-0.4	Pass	1133	-1.0	-1.1	Pass	-0.7	Pass
Run 1 Span	SO2	45.1	838	43.4	-1.9	Pass	1145	41.1	-4.4	Pass	-2.6	Pass
Run 1 Zero												
Run 1 Span												
Run 1 Zero	O2	0.01	831	0.07	0.3	Pass	1140	0.57	2.8	Pass	2.5	Pass
Run 1 Span	O2	20.03	826	19.72	-1.6	Pass	1133	19.86	-0.9	Pass	0.7	Pass
Run 1 Zero	CO2	0.03	831	0.06	0.2	Pass	1140	0.03	0.0	Pass	-0.2	Pass
Run 1 Span	CO2	19.76	826	19.40	-1.8	Pass	1133	19.18	-2.9	Pass	-1.1	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 % Allowable = 3.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 2	Analyzer:		Span Value:	
Date:	06/29/13	Analyzer:	O2	Span Value:	19.97
Run Time:	1358-1458	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	(%)	(Pass/Fail)
Run 2 Zero	NOx	1.8	1347	3.3	0.2	Pass	1500	3.8	0.2	Pass	0.1	Pass
Run 2 Span	NOx	441.9	1351	457.0	1.7	Pass	1507	435.0	-0.8	Pass	-2.5	Pass
Run 2 Zero	CO	0.2	1347	0.2	0.0	Pass	1500	2.3	0.3	Pass	0.3	Pass
Run 2 Span	CO	300.0	1351	301.2	0.2	Pass	1507	304.0	0.7	Pass	0.5	Pass
Run 2 Zero	SO2	0.0	1347	0.5	0.6	Pass	1500	1.0	1.1	Pass	0.6	Pass
Run 2 Span	SO2	45.1	1351	46.1	1.1	Pass	1507	46.2	1.2	Pass	0.1	Pass
Run 2 Zero												
Run 2 Span												
Run 2 Zero	O2	0.01	1351	0.03	0.1	Pass	1507	0.02	0.1	Pass	-0.1	Pass
Run 2 Span	O2	20.03	1347	19.93	-0.5	Pass	1500	20.07	0.2	Pass	0.7	Pass
Run 2 Zero	CO2	0.03	1351	0.12	0.5	Pass	1507	0.11	0.4	Pass	-0.1	Pass
Run 2 Span	CO2	19.76	1347	19.65	-0.6	Pass	1500	19.61	-0.8	Pass	-0.2	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 3	Analyzer:		Span Value:	
Date:	06/29/13	Analyzer:	O2	Span Value:	19.97
Run Time:	1515-1615	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	(%)	(Pass/Fail)
Run 3 Zero	NOx	1.8	1500	3.8	0.2	Pass	1619	3.8	0.2	Pass	0.0	Pass
Run 3 Span	NOx	441.9	1507	435.0	-0.8	Pass	1622	445.8	0.4	Pass	1.2	Pass
Run 3 Zero	CO	0.2	1500	2.3	0.3	Pass	1619	1.3	0.2	Pass	-0.2	Pass
Run 3 Span	CO	300.0	1507	304.0	0.7	Pass	1622	301.9	0.3	Pass	-0.3	Pass
Run 3 Zero	SO2	0.0	1500	1.0	1.1	Pass	1619	1.2	1.3	Pass	0.2	Pass
Run 3 Span	SO2	45.1	1507	46.2	1.2	Pass	1625	45.3	0.2	Pass	-1.0	Pass
Run 3 Zero												
Run 3 Span												
Run 3 Zero	O2	0.01	1507	0.02	0.1	Pass	1622	0.05	0.2	Pass	0.2	Pass
Run 3 Span	O2	20.03	1500	20.07	0.2	Pass	1619	20.12	0.5	Pass	0.3	Pass
Run 3 Zero	CO2	0.03	1507	0.11	0.4	Pass	1622	0.09	0.3	Pass	-0.1	Pass
Run 3 Span	CO2	19.76	1500	19.61	-0.8	Pass	1619	19.58	-0.9	Pass	-0.2	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 4	Analyzer:		Span Value:	
Date:	06/29/13	Analyzer:	O2	Span Value:	19.97
Run Time:	1630-1730	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	(%)	(Pass/Fail)
Run 4 Zero	NOx	1.8	1619	3.8	0.2	Pass	1741	3.8	0.2	Pass	0.0	Pass
Run 4 Span	NOx	441.9	1622	445.8	0.4	Pass	1745	456.9	1.7	Pass	1.2	Pass
Run 4 Zero	CO	0.2	1619	1.3	0.2	Pass	1741	-0.7	-0.1	Pass	-0.3	Pass
Run 4 Span	CO	300.0	1622	301.9	0.3	Pass	1745	297.5	-0.4	Pass	-0.7	Pass
Run 4 Zero	SO2	0.0	1619	1.2	1.3	Pass	1741	0.4	0.4	Pass	-0.9	Pass
Run 4 Span	SO2	45.1	1625	45.3	0.2	Pass	1753	43.3	-2.0	Pass	-2.2	Pass
Run 4 Zero												
Run 4 Span												
Run 4 Zero	O2	0.01	1622	0.05	0.2	Pass	1745	0.04	0.2	Pass	-0.1	Pass
Run 4 Span	O2	20.03	1619	20.12	0.5	Pass	1741	20.09	0.3	Pass	-0.2	Pass
Run 4 Zero	CO2	0.03	1622	0.09	0.3	Pass	1745	0.08	0.3	Pass	-0.1	Pass
Run 4 Span	CO2	19.76	1619	19.58	-0.9	Pass	1741	19.35	-2.1	Pass	-1.2	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

Analyzer Calibration

AECOM

Client	SMMI - Pogo
Location	Delta Junction, AK
Source ID	Incinerator
Operator	J Rosburg
Date	06/30/13
Initial Cal Time	0732-0753
Final Cal Time	

Cylinder #, Supplier, & Conc.
CC403089 45.29 Nox 44.63 SO2 2
CC187147 9.916 CO2 9.971 O2
CC239814 19.67 CO2 19.97 O2
CC16184 604.8 CO 894.2 Nox
CC99044
CC23276

Analyzer	NOx	Model	TEI 42C
Full Scale	894.2	Serial #	
Analyzer	CO	Model	TEI 48C
Full Scale	604.8	Serial #	
Analyzer		Model	
Full Scale		Serial #	
Analyzer	SO2	Model	AMETEK 921
Full Scale	90.0	Serial #	
Analyzer	O2	Model	Sevomex1440
Full Scale	19.97	Serial #	
Analyzer	CO2	Model	Sevomex1440
Full Scale	19.67	Serial #	

		Cylinder Value (ppm/%)	Analyzer Response (ppm/%)	Absolute Difference (ppm/%)	Percent Difference (% of span)	Percent Difference (Pass/Fail)
Analyzer NOx Initial Analyzer Response	Zero	0.0	4.8	4.8	0.5	Pass
	Mid-Range	450.0	448.9	1.1	0.1	Pass
	High-Range	894.2	894.2	0.0	0.0	Pass
Analyzer Response	Zero	0.0				
	Mid-Range	450.0				
	High-Range	894.2				
Analyzer CO Initial Analyzer Response	Zero	0.0	1.3	1.3	0.2	Pass
	Mid-Range	300.2	301.9	1.7	0.3	Pass
	High-Range	604.8	607.0	2.2	0.4	Pass
Analyzer Response	Zero	0.0				
	Mid-Range	300.2				
	High-Range	604.8				
Analyzer SO2 Initial Analyzer Response	Zero	0.0	0.9	0.9	1.0	Pass
	Mid-Range	44.6	44.9	0.3	0.3	Pass
	High-Range	90.0	90.;8			
Analyzer Response	Zero	0.0				
	Mid-Range	44.6				
	High-Range	90.0				
Analyzer _____ Predicted ppm Initial Analyzer Response	Zero					
	Mid-Range					
	Mid-Range					
* Cal. through CEM system	High-Range					
Predicted ppm Analyzer Response	Zero					
	Mid-Range					
	Mid-Range					
* Cal. through CEM system	High-Range					
Analyzer O2 Initial Analyzer Response	Zero	0.00	0.07	0.1	0.4	Pass
	Mid-Range	9.97	10.09	0.1	0.6	Pass
	High-Range	19.97	20.06	0.1	0.5	Pass
Analyzer Response	Zero	0.00				
	Mid-Range	9.97				
	High-Range	19.97				
Analyzer CO2 Initial Analyzer Response	Zero	0.00	0.04	0.0	0.2	Pass
	Mid-Range	9.92	9.70	0.2	1.1	Pass
	High-Range	19.67	19.57	0.1	0.5	Pass
Analyzer Response	Zero	0.00				
	Mid-Range	9.92				
	High-Range	19.67				

Cal Error % =abs(CEM-Cylinder) / CS X 100

Allowable Calibration Error % = 2.0 for all analyzers except THC which is 5.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 5	Analyzer:		Span Value:	
Date:	06/30/13	Analyzer:	O2	Span Value:	19.97
Run Time:	0812-0932	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	(%)	(Pass/Fail)
Run 1 Zero	NOx	4.8	759	3.8	-0.1	Pass	935	2.8	-0.2	Pass	-0.1	Pass
Run 1 Span	NOx	448.9	805	441.0	-0.9	Pass	940	447.8	-0.1	Pass	0.8	Pass
Run 1 Zero	CO	1.3	759	0.2	-0.2	Pass	935	-2.8	-0.7	Pass	-0.5	Pass
Run 1 Span	CO	301.9	805	297.1	-0.8	Pass	940	291.1	-1.8	Pass	-1.0	Pass
Run 1 Zero	SO2	0.9	759	0.4	-0.6	Pass	935	0.0	-1.0	Pass	-0.4	Pass
Run 1 Span	SO2	44.9	809	43.6	-1.4	Pass	945	44.6	-0.3	Pass	1.1	Pass
Run 1 Zero												
Run 1 Span												
Run 1 Zero	O2	0.07	805	0.11	0.2	Pass	940	0.08	0.1	Pass	-0.2	Pass
Run 1 Span	O2	20.06	759	19.89	-0.9	Pass	935	19.86	-1.0	Pass	-0.2	Pass
Run 1 Zero	CO2	0.04	805	0.12	0.4	Pass	940	0.11	0.4	Pass	-0.1	Pass
Run 1 Span	CO2	19.57	759	19.52	-0.3	Pass	935	19.61	0.2	Pass	0.5	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 6	Analyzer:		Span Value:	
Date:	06/30/13	Analyzer:	O2	Span Value:	19.97
Run Time:	1000-1130	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	Calibration Bias (Pass/Fail)	(%)	(Pass/Fail)
Run 2 Zero	NOx	4.8	935	2.8	-0.2	Pass	1133	1.8	-0.3	Pass	-0.1	Pass
Run 2 Span	NOx	448.9	940	447.8	-0.1	Pass	1136	473.9	2.8	Pass	2.9	Pass
Run 2 Zero	CO	1.3	935	-2.8	-0.7	Pass	1133	-8.8	-1.7	Pass	-1.0	Pass
Run 2 Span	CO	301.9	940	291.1	-1.8	Pass	1136	280.3	-3.6	Pass	-1.8	Pass
Run 2 Zero	SO2	0.9	935	0	-1.0	Pass	1133	-0.5	-1.6	Pass	-0.6	Pass
Run 2 Span	SO2	44.9	945	44.6	-0.3	Pass	1141	44.4	-0.6	Pass	-0.2	Pass
Run 2 Zero												
Run 2 Span												
Run 2 Zero	O2	0.07	940	0.08	0.1	Pass	1136	0.08	0.1	Pass	0.0	Pass
Run 2 Span	O2	20.06	935	19.86	-1.0	Pass	1133	19.75	-1.6	Pass	-0.6	Pass
Run 2 Zero	CO2	0.04	940	0.11	0.4	Pass	1136	0.10	0.3	Pass	-0.1	Pass
Run 2 Span	CO2	19.57	935	19.61	0.2	Pass	1133	19.63	0.3	Pass	0.1	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

Analyzer Bias

AECOM

Client:	SMMI - Pogo	Analyzer:	NOx	Span Value:	894.2
Location:	Delta Junction, AK	Analyzer:	CO	Span Value:	604.8
Source ID:	Incinerator	Analyzer:	SO2	Span Value:	89.99
Run Number:	Run 7	Analyzer:		Span Value:	
Date:	06/30/13	Analyzer:	O2	Span Value:	19.97
Run Time:	1200-1300	Analyzer:	CO2	Span Value:	19.67

Run No.	Monitor ID	Analyzer Response (ppm)	Initial Values				Final Values				Calibration Drift	
			Initial Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	Final Time (military)	System Response (ppm)	Calibration Bias (%)	(Pass/Fail)	(%)	(Pass/Fail)
Run 3 Zero	NOx	4.8	1144	1.7	-0.3	Pass	1255	0.7	-0.5	Pass	-0.1	Pass
Run 3 Span	NOx	448.9	1150	448.7	0.0	Pass	1259	445.7	-0.4	Pass	-0.3	Pass
Run 3 Zero	CO	1.3	1144	0.2	-0.2	Pass	1255	-3.8	-0.8	Pass	-0.7	Pass
Run 3 Span	CO	301.9	1150	300.9	-0.2	Pass	1259	294.9	-1.2	Pass	-1.0	Pass
Run 3 Zero	SO2	0.9	1150	0.0	-1.0	Pass	1255	0.5	-0.4	Pass	0.6	Pass
Run 3 Span	SO2	44.9	1155	44.8	-0.1	Pass	1259	44.2	-0.8	Pass	-0.7	Pass
Run 3 Zero												
Run 3 Span												
Run 3 Zero	O2	0.07	1150	0.04	-0.2	Pass	1259	0.06	-0.1	Pass	0.1	Pass
Run 3 Span	O2	20.06	1144	19.80	-1.3	Pass	1255	19.75	-1.6	Pass	-0.3	Pass
Run 3 Zero	CO2	0.04	1150	0.04	0.0	Pass	1259	0.05	0.1	Pass	0.1	Pass
Run 3 Span	CO2	19.57	1144	19.63	0.3	Pass	1255	19.62	0.3	Pass	-0.1	Pass

System Cal Bias % = (System Cal Response - Analyzer Response) / CS X 100 — % Allowable = 5.0

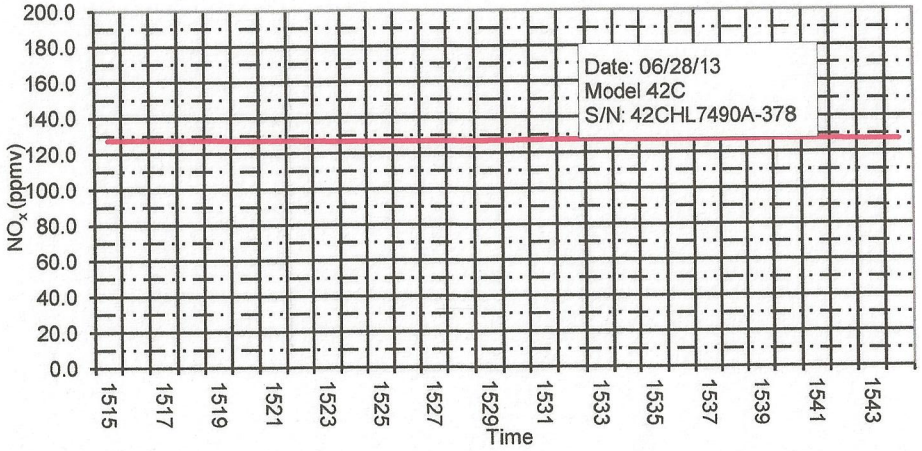
Calibration Drift = (Final System Response - Initial System Response) / CS X 100 — % Allowable = 3.0

NO_x Converter Efficiency Check

Plant: SMMI
Source: Incinerator
Parameter: NOx

Date: 06/28/13
Model : 42CHL
S/N : 42CHL74490A-378

Julian Day	Time	NO_x (ppmv)	Deviation (%)	Pt No.	
179	1515	127.2	0.2%	1	Start of Run
179	1516	127.2	0.2%	2	
179	1517	127.2	0.2%	3	
179	1518	127.4	0.0%	4	
179	1519	127.2	0.2%	5	
179	1520	126.9	0.4%	6	
179	1521	126.8	0.5%	7	
179	1522	126.8	0.5%	8	
179	1523	126.7	0.5%	9	
179	1524	126.6	0.6%	10	
179	1525	126.6	0.6%	11	
179	1526	126.6	0.6%	12	
179	1527	126.6	0.6%	13	
179	1528	126.6	0.6%	14	
179	1529	126.7	0.5%	15	
179	1530	126.9	0.4%	16	
179	1531	127.0	0.3%	17	
179	1532	127.0	0.3%	18	
179	1533	127.1	0.2%	19	
179	1534	127.1	0.2%	20	
179	1535	127.0	0.3%	21	
179	1536	127.0	0.3%	22	
179	1537	127.1	0.2%	23	
179	1538	127.0	0.3%	24	
179	1539	127.3	0.1%	25	
179	1540	127.4	0.0%	26	
179	1541	127.3	0.1%	27	
179	1542	127.3	0.1%	28	
179	1543	126.9	0.4%	29	
179	1544	126.8	0.5%	30	End of Run
	Peak Value	127.4	0.6%		

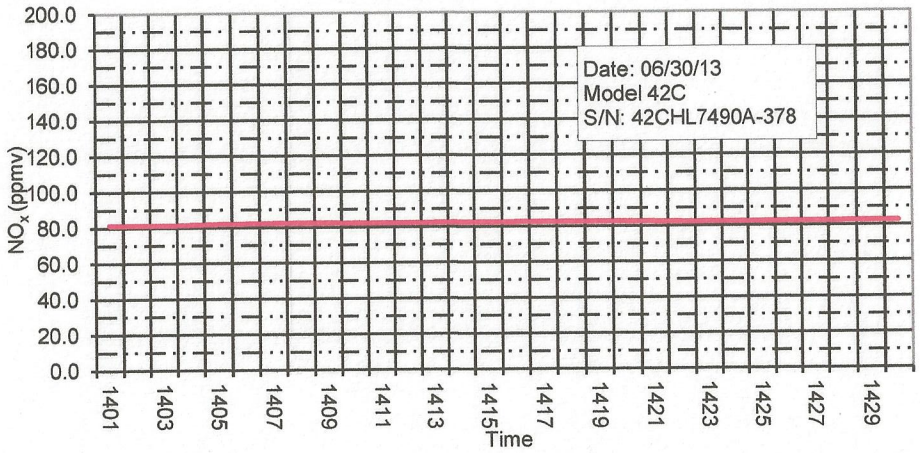


NO_x Converter Efficiency Check

Plant: SMMI
Source: Incinerator
Parameter: NOx

Date: 06/30/13
Model : 42CHL
S/N : 42CHL74490A-378

Julian Day	Time	NO_x (ppmv)	Deviation (%)	Pt No.	
181	1401	81.4	1.3%	1	Start of Run
181	1402	81.2	1.6%	2	
181	1403	81.1	1.7%	3	
181	1404	81.6	1.1%	4	
181	1405	81.9	0.7%	5	
181	1406	82.0	0.6%	6	
181	1407	82.3	0.2%	7	
181	1408	82.2	0.4%	8	
181	1409	82.4	0.1%	9	
181	1410	82.1	0.5%	10	
181	1411	82.0	0.6%	11	
181	1412	82.0	0.6%	12	
181	1413	82.2	0.4%	13	
181	1414	82.2	0.4%	14	
181	1415	82.2	0.4%	15	
181	1416	82.4	0.1%	16	
181	1417	82.4	0.1%	17	
181	1418	82.4	0.1%	18	
181	1419	82.5	0.0%	19	
181	1420	82.4	0.1%	20	
181	1421	82.4	0.1%	21	
181	1422	82.3	0.2%	22	
181	1423	82.1	0.5%	23	
181	1424	82.3	0.2%	24	
181	1425	82.1	0.5%	25	
181	1426	82.2	0.4%	26	
181	1427	82.3	0.2%	27	
181	1428	82.4	0.1%	28	
181	1429	82.4	0.1%	29	
181	1430	82.4	0.1%	30	End of Run
	Peak Value	82.5	1.7%		



Alternative RM-5 Post Test Calibration
SMMI - Pogo Mine
Particulate and Hydrogen Chloride Sample Runs
Incinerator
06/28/13

RUN #	METER BOX	RUN TIME (min)	dH@	M_d	P_b (in. Hg)	T_{dm} (°F)	T_{dm} (°R)	V_{dm} (acf)	dH_{avg} (in. H_2O)	$(SQRT\ dH)_{avg}$ SQRT (in. H_2O)	Y_{qa}
I5-1	Hawkeye	72	1.8962	29.45	28.60	74.5	534.5	54.010	1.57	1.25	0.9281
I5-2	Hawkeye	72	1.8962	29.63	28.55	84.3	544.3	61.528	2.00	1.41	0.9218
I5-3	Hawkeye	74	1.8962	29.63	28.50	92.4	552.4	62.455	1.96	1.39	0.9308
										Average	0.9269

Average Y_{dq}	Meter Y_d	% Difference
0.9269	0.9698	4.63%

The difference between the average Yqa for the three runs and the meter box Yd must be within five percent to pass the calibration

Reference: Roger T. Shigehara, P.G. Royals, and E.W. Steward, "Alternative Method 5 Post-Test Calibration", Entropy Inc.

Alternative RM-5 Post Test Calibration
SMMI - Pogo Mine
Dioxin and Furans Sample Runs
Incinerator
06/28/13

RUN #	METER BOX	RUN TIME (min)	dH@	M_d	P_b (in. Hg)	T_{dm} (°F)	T_{dm} (°R)	V_{dm} (acf)	dH_{avg} (in. H_2O)	$(SQRT\ dH)_{avg}$ SQRT (in. H_2O)	Y_{qa}
I23-1	Hawkeye	160	1.8962	29.54	28.60	84.6	544.6	122.129	1.68	1.30	0.9494
I23-2	Hawkeye	120	1.8962	29.59	28.55	77.8	537.8	92.270	1.67	1.28	0.9261
I23-3	Hawkeye	123	1.8962	29.61	28.50	94.4	554.4	106.195	2.05	1.42	0.9312
										Average	0.9356

Average Y_{dq}	Meter Y_d	% Difference
0.9356	0.9698	3.66%

The difference between the average Yqa for the three runs and the meter box Yd must be within five percent to pass the calibration

Reference: Roger T. Shigehara, P.G. Royals, and E.W. Steward, "Alternative Method 5 Post-Test Calibration", Entropy Inc.

Alternative RM-5 Post Test Calibration
SMMI - Pogo Mine
Metals Sample Runs
Incinerator
06/28/13

RUN #	METER BOX	RUN TIME (min)	dH@	M_d	P_b (in. Hg)	T_{dm} (^oF)	T_{dm} (^oR)	V_{dm} (acf)	dH_{avg} (in. H_2O)	$(SQRT\ dH)_{avg}$ SQRT (in. H_2O)	Y_{qa}
I29-1	Hawkeye	120	1.8962	29.41	28.60	91.1	551.1	90.798	1.56	1.25	0.9303
I29-2	Hawkeye	120	1.8962	29.59	28.55	93.5	553.5	101.451	1.94	1.39	0.9266
I29-3	Hawkeye	122	1.8962	29.59	28.50	73.7	533.7	99.766	1.81	1.34	0.9104
										Average	0.9224

Average Y_{dq}	Meter Y_d	% Difference
0.9224	0.9698	4.88%

The difference between the average Yqa for the three runs and the meter box Yd must be within five percent to pass the calibration

Reference: Roger T. Shigehara, P.G. Royals, and E.W. Steward, "Alternative Method 5 Post-Test Calibration", Entropy Inc.

AECOM

DRY GAS METER (DGM) CALIBRATION

DGM Serial Number: 5154319
DGM ID: Hawkeye

Standard Serial Number: 28629
Standard Y_d: 0.9999

Barometric Pressure: 25.0
Date: 9/7/2012

Standard				Dry Gas Meter (DGM)									
Initial Volume ft^3	Final Volume ft^3	Total Volume ft^3	Temperature ^oF	DH in. H_2O	Initial Volume ft^3	Final Volume ft^3	Total Volume ft^3	Temperature Inlet (^oF)	Outlet (^oF)	Average (^oF)	Time min.	DGM Coefficient Y_d	DH@ in. H_2O
579.255	583.394	4.139	71	0.5	303.890	308.139	4.249	76	77	77	10.0	0.9827	1.9454
583.394	587.526	4.132	72	0.5	308.139	312.385	4.246	75	77	76	10.0	0.9789	1.9612
587.526	591.758	4.232	72	0.5	312.385	316.747	4.362	75	77	76	10.3	0.9760	1.9706
592.274	597.652	5.377	72	1.0	317.266	322.818	5.552	75	78	77	9.0	0.9739	1.8737
597.652	603.032	5.379	72	1.0	322.818	328.372	5.554	76	79	78	9.0	0.9757	1.8688
603.032	608.412	5.379	73	1.0	328.372	333.915	5.543	76	79	78	9.0	0.9758	1.8759
620.190	625.948	5.757	73	1.5	346.007	352.057	6.050	75	79	77	8.0	0.9546	1.9427
625.948	631.692	5.743	73	1.5	352.057	357.999	5.942	75	79	77	8.0	0.9696	1.9522
631.692	637.584	5.891	69	1.5	357.999	364.041	6.042	70	71	71	8.0	0.9735	1.8500
637.845	643.804	5.958	70	2.0	364.307	370.438	6.131	71	72	72	7.0	0.9689	1.8498
643.804	649.736	5.931	70	2.0	370.438	376.540	6.102	71	71	71	7.0	0.9682	1.8685
649.736	655.648	5.911	70	2.0	376.540	382.633	6.093	71	71	71	7.0	0.9663	1.8811
656.806	663.046	6.239	71	3.0	383.831	390.264	6.433	72	72	72	6.0	0.9632	1.8644
663.046	669.295	6.248	72	3.0	390.264	396.73	6.466	72	73	73	6.0	0.9588	1.8643
669.295	675.525	6.229	72	3.0	396.730	403.166	6.436	73	73	73	6.0	0.9612	1.8739
											Average	0.9698	1.8962

METERBOX THERMOCOUPLE CALIBRATION FORM

METERBOX ID	Hawkeye
Date	9/7/2012
Barometric Pressure (in Hg)	25.00
Calibrator	D. Bopray
Ambient Temp.(^oF)	**73**
Temperature Reference S/N	**Traceable s/n 111976025**

Temperature Reference Point	Source	Reference Temperature (R)	Inlet Temp (R)	% Difference	Outlet Temp (R)	% Difference
(32^oF)	Ice Water	492	491	0.2	491	0.2
	Ambient	533	532	0.2	532	0.2
(212^oF)	Boiling Water	669.5	668	0.2	668	0.2

R= ^oF+460
Temperature Difference (%) <= 1.5%
Temperature Difference (%) = (Reference Temp.-Thermocouple temp.)/Reference temp.

APEX INSTRUMENTS REFERENCE METER VERIFICATION
USING WET-TEST METER #11AE6
2-POINT ENGLISH UNITS

Calibration Meter Information	
WTM Model #	AL20
WTM Serial #	11AE6
WTM Gamma	0.9999
Original 15Pt Gamma	0.9988

Calibration Conditions			
Date	Time	28-Aug-12	1:45
Barometric Pressure		29.95	in Hg
Calibration Tech		EW	
DGM Serial Number		T-110-28629	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	°R/in Hg

Calibration Data													Results		
Run Time	Metering Console						Calibration Meter						Dry Gas Meter		
													Calibration Factor		Flowrate
Elapsed	DGM Input Pressure	Volume Initial	Volume Final	Volume Sample	Outlet Temp Initial	Outlet Temp Final	Volume Initial	Volume Final	Volume Sample	Outlet Temp Initial	Outlet Temp Final		Previous	Current	Std & Corr
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(V_m)	(t_{mi})	(t_{mf})	(Vw_i)	(Vw_f)	(V_m)	(t_{wi})	(t_{wf})		(Y)	(Y)	($Q_{m(std)(corr)}$)
min	in H_2O	cubic feet	cubic feet	cubic feet	°F	°F	cubic feet	cubic feet	cubic feet	°F	°F				cfm
6.00	-4.7	468.360	474.408	6.048	76.0	76.0	901.810	907.730	5.920	76	76		0.9959	0.9903	0.973
												Variation	0.57%	must be less than 1.5%	
10.00	-2.7	474.408	480.081	5.673	76.0	76.0	907.730	913.370	5.640	76	76		1.0042	1.0008	0.556
												Variation	0.34%	must be less than 1.5%	

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, App A, Method 5, Paragraph 7.1.2.2, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature [illegible] Date 8/28/12

PROBE CALIBRATION FORM

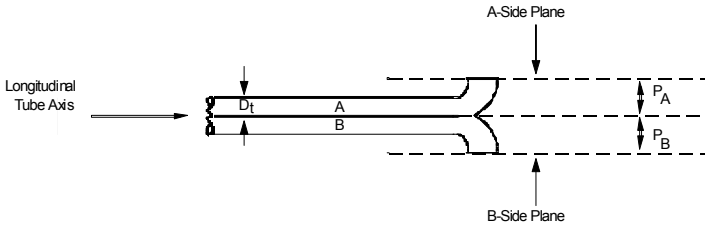
S-TYPE CALIBRATION DATA

Probe ID: 403 **Date:** 9/7/2012 **Technician:** D. Bopray

D_t = 0.375 in. $3/16 \leq D_t \leq 3/8$

P_A = 0.449 in. $1.05D_t \leq P \leq 1.50D_t$

P_B = 0.449 in. $P_A = P_B$

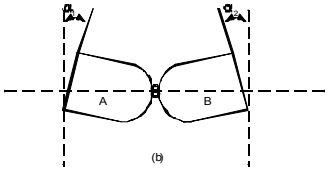


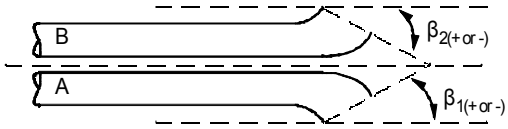
a_1 = 0 ° $a_1 \leq 10^o$

a_2 = 0 ° $a_1 \leq 10^o$

b_1 = 2 ° $b_2 \leq 5^o$

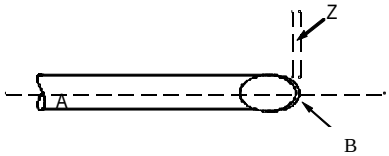
b_2 = 3 ° $b_2 \leq 5^o$

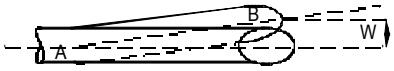




Z = 0.000 in. $Z \leq 0.125"$

W = 0.031 in. $W \leq 0.031"$





THERMOCOUPLE CALIBRATION DATA

Thermocouple ID#: 403 **Standard ID #:** Traceable S/N 111976025

Ambient Temp (F°): 76 **Barometric Pressure (in. Hg):** 25.3

Temperature Reference Point	Source	Reference Temperature R °	Thermocouple Potentiometer Temperature	Temperature Difference (%) ≤ 1.5 %
0 C° (32 F°)	Ice Water	492.4	493.9	-0.30
100 C° (212 F°)	Boiling Water	659.5	658	0.23
~25° C (~75°F)	Ambient	536	535	0.19
150-250 C° (300-500 F°)	Hot Oil	766	766	0.00

THERMOCOUPLE CALIBRATION FORM

Thermocouple ID IO-021
Date 9/8/2012
Barometric Pressure (in Hg) 25.3
Calibrator D. Bopray

Standard ID Traceable S/N 111976025
Ambient Temp.(^oF) 76

Temperature Reference Point	Source	Reference Temperature (R)	Thermocouple Potentiometer Temperature (R)	Temperature Difference (%)
(32°F)	Ice Water	492	493.7	-0.26
(75°F)	Ambient	536	538	-0.37
(212°F)	Boiling Water	660	657	0.38

R= ^{o}F+460
Temperature Difference (%) <= 1.5%
Temperature Difference (%) = (Reference Temp.-Thermocouple temp.)/Reference temp.

THERMOCOUPLE CALIBRATION FORM

Thermocouple ID IO-031
Date 9/8/2012
Barometric Pressure (in Hg) 25.3
Calibrator D. Bopray

Standard ID Traceable S/N 111976025
Ambient Temp.(^{o}F) 76

Temperature Reference Point	Source	Reference Temperature (R)	Thermocouple Potentiometer Temperature (R)	Temperature Difference (%)
(32°F)	Ice Water	493	493.8	-0.16
(75°F)	Ambient	536	537.3	-0.34
(212°F)	Boiling Water	660	659	0.17

R= ^{o}F+460
Temperature Difference (%) <= 1.5%
Temperature Difference (%) = (Reference Temp.-Thermocouple temp.)/Reference temp.

THERMOCOUPLE CALIBRATION FORM

Thermocouple ID IO-032
Date 9/8/2012
Barometric Pressure (in Hg) 25.3
Calibrator D. Bopray

Standard ID Traceable S/N 111976025
Ambient Temp.(^{o}F) 76

Temperature Reference Point	Source	Reference Temperature (R)	Thermocouple Potentiometer Temperature (R)	Temperature Difference (%)
(32°F)	Ice Water	494	494.2	0.04
(75°F)	Ambient	536	537.6	-0.26
(212°F)	Boiling Water	660	657	0.42

R= ^{o}F+460
Temperature Difference (%) <= 1.5%
Temperature Difference (%) = (Reference Temp.-Thermocouple temp.)/Reference temp.

THERMOCOUPLE CALIBRATION FORM

Thermocouple ID IO-033
Date 9/8/2012
Barometric Pressure (in Hg) 25.3
Calibrator D. Bopray

Standard ID Traceable S/N 111976025
Ambient Temp.(^{o}F) 76

Temperature Reference Point	Source	Reference Temperature (R)	Thermocouple Potentiometer Temperature (R)	Temperature Difference (%)
(32°F)	Ice Water	494	494.5	-0.16
(75°F)	Ambient	536	536.7	-0.17
(212°F)	Boiling Water	658	656	0.36

R= ^{o}F+460
Temperature Difference (%) <= 1.5%
Temperature Difference (%) = (Reference Temp.-Thermocouple temp.)/Reference temp.

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E04NI99E15A41D2	Reference Number:	54-124345113-1
Cylinder Number:	CC403089	Cylinder Volume:	144.4 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12012	Valve Outlet:	660
Gas Code:	SNC	Analysis Date:	Nov 26, 2012

Expiration Date: Nov 26, 2015

This cylinder has been analytically certified as directly traceable to NIST with a total analytical uncertainty as stated below with a confidence level of 95%, in accordance with Airgas ISO procedures. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder Below 150 psig. i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	45.00 PPM	45.29 PPM	G1	+/- 1% NIST Traceable
SULFUR DIOXIDE	45.00 PPM	44.63 PPM	G1	+/- 1% NIST Traceable
CARBON MONOXIDE	280.0 PPM	277.3 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		45.29 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/NO	10061118	CC283701	49.73 PPM NITRIC OXIDE/	Jul 23, 2016
NTRM/SO2	11060213	CC281044	49.67 PPM SULFUR DIOXIDE/	May 13, 2017
NTRM/CO	05120511	CC180018	495.8 PPM CARBON MONOXIDE/NITROGEN	Feb 02, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Nov 05, 2012
Nexus 470 AEP0000428	FTIR	Nov 05, 2012
Nexus 470 AEP0000428	FTIR	Nov 05, 2012

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Speciality Gases
12722 S. Wentworth Ave.
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI80E15A0138	Reference Number:	54-124290643-4
Cylinder Number:	CC187147	Cylinder Volume:	151 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	590
		Analysis Date:	Nov 14, 2011

Expiration Date: Nov 14, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	10.00 %	9.916 %	G1	+/- 1% NIST Traceable
OXYGEN	10.00 %	9.971 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	06120108	CC195599	9.898% OXYGEN/NITROGEN	Oct 02, 2012
NTRM/CO2	09060623	CC262373N	9.921% CARBON DIOXIDE/NITROGEN	Apr 10, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Oct 26, 2011
(O2-1)HORIBA MPA-510	Paramagnetic	Oct 26, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Speciality Gases
12722 S. Wentworth Ave.
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI60E15A0286	Reference Number:	54-124290643-3
Cylinder Number:	CC239814	Cylinder Volume:	160 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	590
		Analysis Date:	Nov 14, 2011

Expiration Date: Nov 14, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	20.00 %	19.67 %	G1	+/- 1% NIST Traceable
OXYGEN	20.00 %	19.97 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO2	06120403	CC185079	19.66% CARBON DIOXIDE/NITROGEN	May 01, 2016
NTRM/O2	06120209	CC195591	20.9% OXYGEN/NITROGEN	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Oct 26, 2011
(O2-1)HORIBA MPA-510	Paramagnetic	Oct 26, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773)785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A0807	Reference Number:	54-124220851-1
Cylinder Number:	CC16184	Cylinder Volume:	112.9 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	1575 PSIG
PGVP Number:	NONPGVP	Valve Outlet:	660
Gas Code:	CO,NO	Certification Date:	Jun 16, 2010

Expiration Date: Jun 16, 2018

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	600.0 PPM	604.8 PPM	G1	+/- 1% NIST Traceable	06/16/2010
NITRIC OXIDE	900.0 PPM	894.2 PPM	G1	+/- 1% NIST Traceable	06/16/2010
NITROGEN	Balance				
Total oxides of nitrogen		894.5 PPM		For Reference Only	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM/CO	GMIS	CC255392	1002.4 PPM CARBON MONOXIDE/NITROGEN		Apr 15, 2012
NTRM/NO	60602	CC255847	1025.3 PPM NITRIC OXIDE/NITROGEN		May 01, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO-1 HORIBA VIA-510 TKPPF7FG	NDIR	Jun 03, 2010
Nexus 470 AEP0000428	FTIR	Jun 14, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773)785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0239	Reference Number:	54-124253577-1
Cylinder Number:	CC99044	Cylinder Volume:	82.41 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	1150 PSIG
PGVP Number:	NONPGVP	Valve Outlet:	660
Gas Code:	SO2,BALN	Certification Date:	Feb 11, 2011

Expiration Date: Feb 11, 2019

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

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ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
SULFUR DIOXIDE	90.00 PPM	90.01 PPM	G1	+/- 1% NIST Traceable	02/11/2011
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM/SO2	08061529	CC255782	94.67 PPM SULFUR DIOXIDE/		Oct 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	Jan 31, 2011

Triad Data Available Upon Request

Notes:

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Chicago, IL 60628
(773)785-3000 Fax: (773) 785-1928
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CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A0806	Reference Number:	54-124252548-2
Cylinder Number:	CC23276	Cylinder Volume:	144.4 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	NONPGVP	Valve Outlet:	660
Gas Code:	CO,NO,BALN	Certification Date:	Feb 21, 2011

Expiration Date: Feb 21, 2019

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	300.0 PPM	300.2 PPM	G1	+/- 1% NIST Traceable	02/11/2011, 02/21/2011
NITRIC OXIDE	450.0 PPM	449.6 PPM	G1	+/- 1% NIST Traceable	02/11/2011, 02/21/2011
NITROGEN	Balance				
Total oxides of nitrogen		449.6 PPM		For Reference Only	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM/CO	09060404	CC274306	501.3 PPM CARBON MONOXIDE/NITROGEN		Feb 01, 2013
NTRM/NO	06120709	CC220039	476.8 PPM NITRIC OXIDE/	+/- 0.6%	Aug 03, 2016
NTRM/NO	10060423	CC268208	495.6 PPM NITRIC OXIDE/	+/- 0.5%	Feb 01, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	Jan 31, 2011
Nicolet 6700 AHR0801332	FTIR	Jan 31, 2011

Triad Data Available Upon Request

Notes:

Approved for Release