

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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Eric J. Holcomb

Brian C. Rockensuess

Commissioner

September 17, 2024

Ms. Debra Shore Regional Administrator U.S. Environmental Protection Agency Region 5 77 West Jackson Boulevard Chicago, IL 60604-3950

> Re: Technical Clarification for the Huntington, Indiana (IN) 2010 Primary 1-Hour Sulfur Dioxide (SO₂) Nonattainment Area (Huntington Township in Huntington County)

Dear Ms. Shore:

The Indiana Department of Environmental Management (IDEM) is providing a technical clarification for the Huntington, Indiana (IN) 2010 Primary 1-Hour Sulfur Dioxide (SO₂) Nonattainment Area (Huntington Township in Huntington County) to demonstrate USMPC Buyer, Inc. d/b/a Isolatek International (Isolatek) is complying with the SO₂ emission limitations and rates set forth in Commissioner's Order Air-2023-02 (the Order).

Commissioner's Order 2023-Air-02 serves as the basis for Indiana's attainment plan and technical support document and request for redesignation and maintenance plan submitted to United States Environmental Protection Agency (U.S. EPA) for review and approval on November 6, 2023 and July 30, 2024, respectively. Enclosed is a copy of an office memorandum from IDEM's Office of Air Quality Compliance Data Section dated August 9, 2024, regarding stack testing conducted by an independent environmental consulting firm for Isolatek on April 16, 2024. The purpose of this stack testing is to demonstrate Isolatek's compliance with the permanent and enforceable SO₂ emission limitations and rates established in the Order. The stack testing report and results demonstrate SO₂ emissions from Isolatek's cupolas (EU#1 and EU#2) and blowchambers (EU#3 and EU#4) are well below the emission limitations and rates established in the Order. IDEM has reviewed this report and concluded that the sampling procedures and results are acceptable to this office.

¹ On November 6, 2023, permanent and enforceable SO₂ emission limitations and rates were set forth in Commissioner's Order 2023-Air-01 for Isolatek for attainment of the 1-hour SO₂ standards in the area surrounding the facility. On February 12, 2024, Commissioner's Order 2023-Air 01 was amended and replaced by Commissioner's Order 2023-Air-02, which imposes additional compliance terms and conditions in addition to the established emission limits and conditions contained in Commissioner's Order 2023-Air-01.



Ms. Debra Shore Page 2 of 2

We remain available to answer any additional questions you may have concerning this matter. If you need additional information, please contact Brian Callahan, Chief, Air Quality Standards and Implementation Section, Office of Air Quality, at (317) 232-8244 or bcallaha@idem.IN.gov.

Sincerely,

Matt Stuckey

Assistant Commissioner Office of Air Quality

MS/sad/md/bc/gf/as

Enclosure:

August 9, 2024, Office Memorandum and April 16, 2024, Stack Test Results

cc: Doug Aburano, U.S. EPA Region 5 (no enclosure)
Sara Arra, U.S. EPA Region 5 (no enclosure)

Chris Panos, U.S. EPA Region 5 (no enclosure)

Elizabeth Selbst, U.S. EPA Region 5 (no enclosure)

Melissa Sheffer, U.S. EPA Region 5 (no enclosure)

Matt Stuckey, IDEM (no enclosure)

Scott Deloney, IDEM (no enclosure)

Brian Callahan, IDEM (no enclosure)

Mark Derf, IDEM (no enclosure)

Gale Ferris, IDEM (no enclosure)

Amy Smith, IDEM (w/ enclosure)

File Copy

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT Indianapolis

OFFICE MEMORANDUM

To:

Wyman Clark

Date: August 9, 2024

From:

Jarrod C. Fisher XF

Thru: Dave Cline PA

Subject:

USMPC Buyer Inc DBA Isolatek International

Source ID: 069-00021

Permit Number: # T069-44978-00021

City: Huntington Protocol Reviewer: JCF

County: Huntington Field Observer: JCF

Test Company: Environmental Quality Management, Inc.

The Compliance Data Section has reviewed this report and found the sampling procedures used and results obtained to be acceptable to this office. A copy of the test report is filed in the Virtual File Cabinet. The following is a summary of the test results.

Unit Tested: Two (2) Short Stack #1 and #2 Cupolas - EU#1 and EU#2

Date of test: April 16, 2024

Test Purpose: Commissioner's Order

Type of Fuel: Coke

Pollution Control Equipment: Baghouse CE#1

Permitted APCD Parameter Ranges: NA

APCD Parameters During Testing: BLDS in operation

Pollutants:

STATUS:

SO2

In Compliance (for SO2 at 84.8% maximum capacity)

Test methods:

1-4, 6C

Maximum Operating Rate:

10 TPH Average Operating Rate During Test: 8.48 TPH

SO2 Limit:

160.0 lb/hr

SO2 Emission Rate:

115.02 lb/hr

13.79 lb/ton*

Unit Tested: Two (2) Blowchambers - EU#3 and EU#4

Date of test: April 16, 2024

Test Purpose: Commissioner's Order

Type of Fuel: NA

Pollution Control Equipment: Screen Houses CE#3 and CE#4

Permitted APCD Parameter Ranges: NA APCD Parameters During Testing: NA

Pollutants:

SO2

Test methods:

1-4, 6C

Maximum Operating Rate:

10 TPH

Average Operating Rate During Test: 8.48 TPH

SO2 Limit:

20.0 lb/hr

SO2 Emission Rate:

0.60 lb/hr 0.07 lb/ton*

STATUS:

In Compliance (for SO2 at 84.8% maximum capacity)

*Note: The SO2 lb/ton emission factors are used in equations in Paragraph 6(c) of Commissioner's Order 2023-Air-02 to determine compliance (average hourly SO2 emissions) on a monthly basis.

Cc: Mark Derf-OAQ Programs Branch

#295068

#295067

SOURCE:	Isolatek	Method 2				Method 4					
NIT TESTED:	Cupolas	1		Point No.	Δp	ΔΔp	Stack Temp.	ΔН	√∆h	Meter in	Meter Ou
ESTING COMPANY:	EQM			1	0.71	0.8426	194	2	1.4142	60	
ATE OF TEST:	April 16, 2024			2	1.16	1.077	191		1. 7 1 74-	60	
UN NO.:	April 10, 2024	1		3	1.05	1.0247	189	200200000000000000000000000000000000000		61	
UN NO.:	<u></u>	j						200000000000000000000000000000000000000			
				4	1.06	1.0296	185			63	
rea of Stack (enter diamet				5	1.29	1.1358	180	95000		64	
rations stips between the L =	0			6	1.41	1.1874	174			66	
W=	0			7	1.3	1.1402	168				
diameter (in) =	58			8	1.3	1.1402	160			397723	7-12-12
No. of Stacks =	1	1		9	1.59	1.261	197	5000			
Area Stack (ft^2) =	18.348	1		10	141	1.1874	197	100000000000000000000000000000000000000			
/ Hod Oldon (It L)	10.010	J		11	0.93	0.9644	197				
Molecular Weight of Stack	Gas Day Pasis Md			12	1.42	1,1916	194				
		14-46-4 200								0.0000000000000000000000000000000000000	
%CO2 =		Method 3A?		13	1.17	1.0817	191	122772			
	18.79	No		14	1.28	1.1314	183	120,000		************	desire.
Md (g/gmol) =	29.04	jEquation 3-1		15	1 16	1.077	167				
				16	1 14	1.0677	156				
olume of Dry Gas Collecte	ed @ STD. COND., Vm			17							
Start Meter Volume (cf) =	0			18	12.5						
End Meter Volume (cf) =				19							
Vol. Int Leak Checks (cf) =	=======================================			20	100000000			100000000000000000000000000000000000000		100111111111	Line of the last
Vm (cf) =	22.4807	1		21							17441
	23.142	Counting E 4		22							
Vm (dscf) =	23.142	Equation 5-1			1-407017/25-404E275						
				23						3000001688	
	llected @ STD. COND., Vw			24	1986, 1989					1000	
Vic (mL) =	6.8			25	40.00			45.0			
Vw (scf) =	0.32	Equation 5-2		26				1250			1000
		-		27							
Moisture Content of Stack	Gas. Bws	Equation 5-3	Sat. Moist.	28						2500000	
Bws =	1.36%	1.36%	56.67%	29	100000000000000000000000000000000000000						
1-Bws =	98.64%	98.64%	43,33%	30						The state of	
1-DW5	1 30.04%	1 30.0476	43.3376	31							
					CONTRACTOR CONTRACTOR				ļ	STATE OF THE PARTY	
Molecular Weight of Stack		٦		32	150		Carrie	10000000			100000000000000000000000000000000000000
Ms (g/gmol) =	28.89	Equation 2-6		33	100			15000000			
				34				12000			
Absolute Pressure, Ps				35	10000000			1888			
Static (in H2O) =	-0.81			36							1000000
Ps (in Hg) =	29.33	1		37	100000000000000000000000000000000000000						
				38	Lista de				 		
Stack Gas Velocity, Vs				39							
	0.84			40							
tienisteranianiainia Cp =		텍			and the second section of the second	1					
Vs (fps) =	68,56	Equation 2-7		41	4:35		100000000000000000000000000000000000000	0005100500		100000000000000000000000000000000000000	
				42		1				1000000	
Stack Gas Flowrate, Qs		****		43				65,200,000			
Qs (acfm) =	75473.28			44							
				45					1.0		
Stack Gas Flowrate @ STD	D. COND., Dry Basis, Ostd			46							
Qstd (dscfh) =	3597256.11	Equation 2-8		47	52.00000	3				100000000000000000000000000000000000000	
Qstd (dscfm) =	59954.27	1-40000012-0		48		3					1
asia (ascini) –	1 39934,21				1200000	5			-	0.0000000000000000000000000000000000000	
				49	5444400000000000	8		100000000000000000000000000000000000000		Administration and a	
Velocity at the Nozzle, Vn		Area of Nozzle		50		78		100000000000000000000000000000000000000	4		
Dia. of Nozzle (in) =		An (ft^2) =	0	AVG	1.211	1.096	182.688	2.00	1.41	62.3	3333333
Time of Run (min) =	30					_					
Vn (fps) =	#DIV/0!			Delta H@	= 1.955	8					
		•		Pb (in Hg)							
% Isokinetic, %I				gamma		4					
% isokinetic, %i	#DIV/0!	#DIV/01		Post Test Ca		Pass					
Intermediate (%I) =	#DIV/0!	#DIV/01	Equation 5-8	% Deviation	-1.75%	o I					

SOURCE:	Isolatek				Meth	od 2			Me	thod 4	
JNIT TESTED:	Cupolas			Point No.	Δp	dΔV	Stack Temp.	ΔH	VΔh	Meter In	Meter Ou
ESTING COMPANY:	EQM			1	0.95	0.9747	195	2	1.4142		
DATE OF TEST:	April 16, 2024			2	1.09	1.044	195		1.7172	68	
				3	1.09	1.044	195			69	-
RUN NO.:	2	J									-
				4	1.56	1.249	195	100		71	2000
Area of Stack (enter diameter i				5	1.22	1.1045	194			73	
edenger energia systemic F. j=	0	j		6	1.11	1.0536	193	0000000		75	1996
W=	0]		7	0.66	0.8124	191				
diameter (in) =	58	1		8	1 53	1.2369	166			100	100
No. of Stacks =	1	1		9	1.03	1.0149	199			SALES OF	100
Area Stack (ft^2) =	18.348	1		10	1.12	1.0583	200				
7,104 01451 (11 27	70.010	J		11	1.32	1.1489					100000
Molecular Weight of Stack Gas	Dor Basis Md			12	1.48	1.2166				10000	
		1		13		1.257	199			SUMME	
%CO2 =					1.58					-	
%O2 =	18.86			14	1.37	1.1705		200			1
Md (g/gmol) =	29.03	J		15	1 11	1.0536				1000000	
				16	0.85	0.922	198			1.00	
Volume of Dry Gas Collected (n STD. COND., Vm			17							
Start Meter Volume (cf) =	0			18							
End Meter Volume (cf) =		1		19							
	AB//AI			20	102.00	l					
Vm (cf) =	22.727			21						200	
						ļ					
Vm (dscf) =	23.036	Equation 5-1		22	COLDSTRUCTURE	ļ	20020000-0180000-00-00-00-00	- Company Conditions			
				23			10.000				
Volume of Water Vapor Collec		_		24			100				
Vic (mL) =	7			25			5,245,650,650	14.0			
Vw (scf) =	0.33	Equation 5-2		26	STATE OF						
		-		27							
Moisture Content of Stack Gas	s. Rws	Equation 5-3	Sat. Moist.	28	E000120					1000000	
Bws =	1.41%	1.41%	73.79%	29	828263						
1-Bws =	98.59%	98.59%	26.21%	30				25025000			
1-DW5 =	96,5976	90.5970	20.2170	31	Table 1	ļ			-		
						<u> </u>		200000000000000000000000000000000000000	<u> </u>	C311200000000000	
Molecular Weight of Stack Ga		.		32				1000000	1		
Ms (g/gmol) =	28.87	Equation 2-6		33			100000000000000000000000000000000000000				
				34					A E		
Absolute Pressure, Ps				35							
Static (in H2O) =	-0.81			36					i i		
Ps (in Hg) =	29.33	1		37	SERVICE SERVICES				Ē		
		_		38				1000000	è		
Charle Can Valanite Va				39		-			2		
Stack Gas Velocity, Vs	0.64	3		40				9885 WWW.000		1200000000	
Cp =		4 <u></u>						100000000000000000000000000000000000000		30002555514053	
Vs (fps) =	68.53	_Equation 2-7		41			0.000	100000	8	1100000	
				42						200 miles	
Stack Gas Flowrate, Qs		_		43					ž.		
Qs (acfm) =	75437.67			44				400000		33/30/17/35	
				45						10000000	Control of
Stack Gas Flowrate @ STD. C	OND Dry Basis Ostd			46	120000	1					
Qstd (dscfh) =	3526663.08	Equation 2-8		47	100000000000000000000000000000000000000					150200000000000000000000000000000000000	
	58777.72	Yualion 2-0		48	-		2000		3	100000	+
Qstd (dscfm) =	56/11.12	_1			***********				3	90 PG 90 PG 90 PG	
				49				1201200100000000		200000000	
Velocity at the Nozzle, Vn		Area of Nozzl		50		4	2 F 1 F 2 F 1 F 1 F 1		13	HELEKE	
Dia. of Nozzle (in) =	0	An (ft^2) =	0	AVG	1.192	1.085	194.938	2.00	1.41		70.5
Time of Run (min) =	30	4									
Vn (fps) =	#DIV/0!	7		Delta H@	= 1,955	8					
· · · · · · · · · · · · · · · · · · ·		_		Pb (in Hg)							
% Isokinetic, %I				gamma							
	#DIV/0!	#DIM (IC)	1								
%1 =	72.17.51	#DIV/01 #DIV/01		Post Test Ca							
Intermediate (%I) =	#DIV/0!		Equation 5-8	% Deviation	1 -2.049	- 1					

OURCE:	Isolatek				Meth	od 2				hod 4	
INIT TESTED:	Cupolas			Point No.	Δρ	QΔV	Stack Temp.	ΔH	√∆h	Meter In	Meter C
ESTING COMPANY:	EQM			1	0.6	0.7746	219	2	1.4142	75	
ATE OF TEST:	April 16, 2024			2	0.64	0.8	218			75	
RUN NO.:	3			3	0.96	0.9798	215			75	
ON NO	9	J		4	1.05	1.0247	211			75	
				5							
rea of Stack (enter diameter in i		1			1.13	1.063	202		ļ	75	
	0	1		6	1.29	1.1358	188	2000		75	100000
W=	0]		7	1.13	1.063	178				
diameter (in) =	58	j		8	1.16	1.077	159				
No. of Stacks =	1)		9	0.79	0.8888	217				
Area Stack (ft^2) =	18,348	1		10	0.86	0.9274	221				
		•		11	0.92	0.9592	222				
Molecular Weight of Stack Gas, D	In Racie Md			12	1.21	1.1	222	5.0504650		100	
%CO2 =	2.30	1		13	1.12	1.0583	220				
%O2 =	18.50			14	1.44	1.2	218				
		1		15	1.34		216				
Md (g/gmol) =	29.11	J				1.1576				-200	
				16	0.72	0.8485	214				20000000
olume of Dry Gas Collected @ 5		_		17							
Start Meter Volume (cf) =	6	1		18			100000000000000000000000000000000000000			12000	
End Meter Volume (cf) =	22,9081			19							
Vol. Int. Leak Checks (cf) =				20							
Vm (cf) =	22.9081	1		21							
Vm (dscf) =	23.024	Equation 5-1		22				3,600,600		22.000000	100000
VIII (ddci) -	20.024] Equation 5-1		23							
/	LO OTO COND. VI			24	0.000					0.000	0.0000000000000000000000000000000000000
Volume of Water Vapor Collected		9			600 E 100 E	§	-		5	200000000000000000000000000000000000000	
Vic (mL) =				25		8	0.000				
Vw (scf) =	0.34	Equation 5-2		26		20		2000		1242-0012	
				27							
Moisture Content of Stack Gas, I	3ws	Equation 5-3	Sat. Moist.	28							
Bws =	1,47%	1.47%	98,09%	29						5155 444	
1-Bws =	98,53%	98.53%	1.91%	30						COMMENS.	
				31				0.00000			
Molecular Weight of Stack Gas, I	He.			32	00000000	2	1.00				
	28.94	75		33				.0000000000000000000000000000000000000	1	Transcription.	
Ms (g/gmol) =	28,94	Equation 2-6				<u> </u>		2224020000	-	200000000000000000000000000000000000000	0.0000000000000000000000000000000000000
				34					8		
Absolute Pressure, Ps		-		35			27/25/2019				
Static (in H2O) =	-0.81			36	300 BER 100		44.0				
Ps (in Hg) =	29.33	1		37		85					
		-		38		ā			50		
Stack Gas Velocity, Vs				39	100000			7000		E 8 8 8 8	
Cp =1	0.84	3		40	100000000000000000000000000000000000000					To a second	122020
Vs (fps) =	63.97	Equation 2-7		41	1000				# }		
vs (ips) -	03.51	_ =quation 2-7		42	20022000	8			3	Miles to the book of the	
					200000000000000000000000000000000000000			0000000000	4	000000000000000000000000000000000000000	4
Stack Gas Flowrate, Qs		_		43		<u> </u>		10000000	<u> </u>		
Qs (acfm) =	70417.48			44		<u> </u>					
				45		9					
Stack Gas Flowrate @ STD. CO		_		46					3		
Qstd (dscfh) =	3222008.37	Equation 2-8		47				1000000	4		
Qstd (dscfm) =	53700.14	7 ' - '		48	Territoria.						
		_		49	100000			2030000			
Velocity at the Nozzle, Vn		Area of Nozz	le An	50	5000000000				88	A CONTRACTOR	
	0			AVG	1.023	1.004	C02001010000000000000000000000000000000	2.00	1.41	+ acremental gibbs	75
Dia of Nozzle (in) =		An (ft^2) =		LAVG	1.023	1.004	200,700] [1 1.41		10
Time of Run (min) =	30	8			Terrena de la constante de la						
Vn (fps) =	#DIV/0!			Delta H@							
				Pb (in Hg)	= 29.39	#					
% Isokinetic, %I				gamma	= 1.032						
% Isokinetic, %I %I =	#DIV/0!	#DIV/01	1	gamma Post Test Ca		2 Pass					

SOURCE:	Isolatek
UNIT TESTED:	Cupolas
TESTING COMPANY:	EQM
DATE OF TEST:	April 16, 2024
METHODS:	1-4

Average Stack Temperature, Ts (F)		195.46
Average Stack Gas Velocity, Vs, fps		67.02
Average Stack Gas Flowrate, Qs, acfm		73776.14
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfm)		57477.38
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfh)		3448642.52
Average % Isokinetic, %I	#DIV/0!	#DIV/0!
Average % Isokinetic measured from intermediate values, %I	#DIV/0!	#DIV/0!
Average Post Test Cal (2-run)	Pass	1.013
Average Post Test Cal (3-run)	Pass	1.011

SOURCE:	Isolatek
UNIT TESTED:	Cupolas
TESTING COMPANY:	EQM
METHOD:	3A
DATE OF TEST:	April 16, 2024

O2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	O2 RM Monitor Span =	21.70	%	Drift Ass	essment
				Must be wit	hin 3.0 %
	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail
No.	Raw (%)	Low Gas	Low Gas	(Eq 7E-4)	
1	18.93	0.04	0.05	0.05%	Pass
2	19.00	0.05	80.0	0.14%	Pass
3	18.84	0.08	0.09	0.05%	Pass
			Drift Asse	ssment	
	(Cm)i	(Cm)f	Must be wit	hin 3.0 %	
	Initial	Final	Upscale Gas	Up-Drift	
Run	Upscale	Upscale	Drift	Pass/Fail	
No.			(Eq 7E-4)		
1	21.83	21.89	0.28%	Pass	
2	21.89	21.83	0.28%	Pass	
3	21.83	21.85	0.09%	Pass	

	(Cma)		(Cgas)	
	Upscale	Percent	Corrected	Corrected
Run	Calibration Gas	Moisture	Dry Basis	Wet Basis
No.	%	(%)	(%)	(%)
1	21.70	#DIV/0!	18.79	#DIV/0!
2	21.70	#DIV/0!	18.86	#DIV/0!
3	21.70	#DIV/0!	18.71	#DIV/0!

where:

40 CFR 60 Appendix A-4 Method 7E Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

Cgas = Average effluent gas concentration adjusted for bias, %

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %

Co = Average of initial and final system cal. bias check responses from the low-level calibration gas, % Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %

Cma = Actual concentration of the upscale calibration gas, %

< 20% of	40-60% of
Span	Span
0	8.68
4.34	13.02

Analyzer Calibration Error Check (ACE)								
Lin	Linearity Check (Must be within 2.0%)							
	'Low'	'Ups	cale'					
	Low-Level	Mid-Level	High-Level					
	Gas	Gas	Gas					
Serial #								
Tag (Cv)	0.00	11.90	21.70					
Monitor (Cdir)	0.02	11.87	21.82					
Diff. (Cdir-Cv)	0.02	-0.03	0.12					
ACE (Eq 7E-1)	0.09%	-0.14%	0.55%					
	Pass	Pass	Pass					

System Bias (SB) Low-Level Gas (Must be within 5.0%)								
Run	Low	Final Low	Low Gas	Low-Bias				
No.	Linearity	Gas	SB	Pass/Fail				
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)					
Initial	0.02	0.04	0.09%	Pass				
1	0.02	0.05	0.14%	Pass				
2	0.02	0.08	0.28%	Pass				
3	0.02	0.09	0.32%	Pass				

System Bias (SB) Upscale Gas (Must be within 5.0%) Upscale Final Upscale Upscale Gas Upsc

	Upscale	Final Upscale	Upscale Gas	Upscale-Bias
	Linearity	Gas	SB	Pass/Fail
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)	
Initial	11.87	21.83	45.90%	Fail
1	11.87	21.89	46.18%	Fail
2	11.87	21.83	45.90%	Fail
3	11.87	21.85	45.99%	Fail

SOURCE:	Isolatek
UNIT TESTED:	Cupolas
TESTING COMPANY:	EQM
METHOD:	3A
DATE OF TEST:	April 16, 2024

CO2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	CO2 RM Monitor Span =	17.60	%	Drift Ass	essment
				Must be wi	thin 3.0%
	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail
No.	Raw (%)	Low Gas	Low Gas	(Eq 7E-4)	
1	1.85	0.05	0.02	0.17%	Pass
2	1.77	0.02	0.09	0.40%	Pass
3	1.91	0.09	0.02	0.40%	Pass
	(Cm)i	(Cm)f	Drift Asses Must be with		
	Initial	Final	Upscale Gas	Up-Drift	
Run	Upscale	Upscale	Drift	Pass/Fail	
No.			(Eq 7E-4)		
1	17.69	17.75	0.34%	Pass	
2	17.75	17.83	0.45%	Pass	
3	17.83	17.84	0.06%	Pass	

	(Cma)		(Cgas)	
	Upscale	Percent	Corrected	Corrected
Run	Calibration Gas	Moisture	Dry Basis	Wet Basis
No.	%	. (%)	(%)	(%)
1	17.60	#DIV/0!	1.81	#DIV/0!
2	17.60	#DIV/0!	1.70	#DIV/0!
3	17.60	#DIV/0!	1.84	#DIV/0!

where:

40 CFR 60 Appendix A-4 Method 7E Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

Cgas = Average effluent gas concentration adjusted for bias, %

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %

Co = Average of initial and final system cal. bias check responses from the low-level calibration gas, % Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %

10.11

Cma = Actual concentration of the upscale calibration gas, %

< 20% of	40-60% of
Span	Span
0	7.04
3.52	10.56

	0.02	10.00				
Analyzer Calibration Error Check (ACE)						
Lin	Linearity Check (Must be within 2.0%)					
	'Low' 'Upscale'					
	Low-Level	Mid-Level High-Leve				
	Gas	Gas	Gas			
Serial #						
Tag (Cv)	0.00	10.10	17.60			
Monitor (Cdir)	0.00	10.11	17.64			
Diff. (Cdir-Cv)	0.00	0.01	0.04			
ACE (Eq 7E-1)	0.00%	0.06%	0.23%			
	Pass	Pass	Pass			

System Bias (SB) Low-Level Gas (Must be within 5.0%)						
Run	Low	Final Low	Low Gas	Low-Bias		
No.	Linearity	Gas	SB	Pass/Fail		
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)			
Initial	0.00	0.05	0.28%	Pass		
1	0.00	0.02	0.11%	Pass		
2	0.00	0.09	0.51%	Pass		
3	0.00	0.02	0.11%	Pass		
System Bias (SB) Upscale Gas (Must be within 5.0%)						
	Upscale	Final Upscale	Upscale Gas	Upscale-Bias		
	Linearity	Gas	SB	Pass/Fail		
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)			
Initial	10.11	17.69	43.07%	Fail		
1	10.11	17.75	43.41%	Fail		
2	10.11	17.83	43.86%	Fail		

17.84

43.92%

Fail

SOURCE:	Isolatek
UNIT TESTED:	Cupolas
TESTING COMPANY:	EQM
METHOD:	6C
DATE OF TEST:	April 16, 2024

SO2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	SO2 RM Monitor Span =	447.00 F	PPM	Drift Ass	essment
				Must be wit	hin 3.0 %
}	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail
No.	Raw (ppm)	Low Gas	Low Gas	(Eq 7E-4)	
1	208.62	3,50	7.20	0.83%	Pass
2	201,16	7.20	7.90	0.16%	Pass
3	208.40	7.90	8.10	0.04%	Pass
	(Cm)i	(Cm)f	Drift Assess Must be withi		
	Initial	Final	Upscale Gas	Up-Drift	
Run	Upscale	Upscale	Drift	Pass/Fail	
No.			(Eq 7E-4)		
1	452.60	453,90	0.29%	Pass	
2	453,90	445,10	1.97%	Pass	
3	445.10	450,10	1.12%	Pass	

	(Cma)		(Cgas)	
	Upscale	Percent	Corrected	Corrected
Run	Calibration Gas	Moisture	Dry Basis	Wet Basis
No.	ppm	(%)	(ppm)	(ppm)
1	447.00	1.36%	202.86	200.10
2	447.00	1.41%	195.82	193.06
3	447.00	1.47%	203.78	200.78

40 CFR 60 Appendix A-4 Method 7E

Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

Cgas = Average effluent gas concentration adjusted for bias, ppmv

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, ppmv

Co = Average of initial and final system cal. bias check responses from the low-level calibraiton gas, ppmv Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, ppmv

Cma = Actual concentration of the upscale calibration gas, ppmv

	Flowrate	SO2	SO2	SO2	Production
Run#	dscfh	ppmdv	lb/dscf	lb/hr	TPH
1	3597256.11	202.86	0.000034	121.24	9.87
2	3526663.08	195.82	0.000033	114.73	7.04
3	3222008.37	203.78	0.000034	109.08	8.53
Average	3448642.52	200.82	0.000033	115.02	8.48

where:

< 20% of	40-60% of
Span	Span
0	178.8
89.4	268.2

Analyzer Calibration Error Check (ACE)					
	Linearity Check	(Must be within 2.0	%)		
'Low' 'Upscale'					
	Low-Level Mid-Level High-Level				
	Gas	Gas	Gas		
Serial #					
Tag (Cv)	0.00	191.00	447.00		
Monitor (Cdir)	3.00	192.00	449,90		
Diff. (Cdir-Cv)	3.00	1,00	2.90		
ACE (Eq 7E-1)	0.67%	0.22%	0.65%		
Pass Pass Pass					

Run	Low	Final Low	Low Gas	Low-Bias
No.	Linearity	Gas	SB	Pass/Fail
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)	
Initial	3.00	3.50	0.11%	Pass
1	3.00	7.20	0.94%	Pass
2	3.00	7.90	1.10%	Pass
3	3.00	8.10	1.14%	Pass

System Bias (SB) Upscale Gas (Must be within 5.0%)

Upscale	Final Upscale	Upscale Gas	Upscale-Bias
Linearity	Gas	SB	Pass/Fail
Gas (Cdir)	Rige (Ce)	(Eq. 7E-2)	

	Opscale	i illai Opscale	Opscale Gas	Opscale-blas
	Linearity	Gas	SB	Pass/Fail
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)	
Initial	449.90	452.60	0.60%	Pass
1	449.90	453.90	0.89%	Pass
2	449.90	445.10	-1.07%	Pass
3	449.90	450.10	0.04%	Pass

SO2	
lb/ton	
12.28	
16.30	
12.79	
13.79	

OURCE:	Isolatek				Meth	od 2				thod 4	
JNIT TESTED:	Blowchamber/Screenhouse			Point No.	Δp	VΔD	Stack Temp.	<u>ΔH</u>	<u>√∆h</u>		Meter Out
ESTING COMPANY:	EQM			11	- 1	1	136	2	1.4142	65	
DATE OF TEST:	April 16, 2024			2	1.11	1.0536	136			64	
RUN NO.:				3	1.19	1.0909	136			87	
		•'		4	1.22	1.1045	136			70	
Area of Stack (enter diamete	er in inches), As			5	1.16	1.077	137			73	
L=1	"· 0			6	1.14	1.0677	137			74	140
W=	0			7	1.04	1.0198	137	Wis designed			Continues
diameter (in) =	90			8	1.34	1.1576	137		<u> </u>		
No. of Stacks =	1	ì		9	0.88	0.9381	136		-	05000	
Area Stack (ft^2) =	44.179	1		10	111	1.0488	136		 		
		1		11	1.02	1.01	135			660.000	1
Molecular Weight of Stack G	ae Dry Racie Md			12	1.22	1,1045	136				
%CO2 =	0.02	Method 3A?		13	0.83	0.911	134			1000000000000	
%O2 =	21.01	No No		14	0.95	0.9747	134	-			
Md (g/gmol) =	28.84	Equation 3-1		15	0.73	0.8544	134				-
wid (grginor) =	28.04	Jednation 3-1		16	0.74	0.8544	134		 	ESTABLE SAN	
/	1 0 070 00ND N				1.74	0.8602		-	 	POSSESSES	
Volume of Dry Gas Collecte		1		17		ļ	100000000000000000000000000000000000000				100000000000000000000000000000000000000
Start Meter Volume (cf) =	0			18		ļ			<u> </u>	100000000	100000000000000000000000000000000000000
End Meter Volume (cf) =	22 769			19							
Vol. Int. Leak Checks (cf) =	Carlos and Carlos and Carlos and			20							
Vm (cf) =	22.769	ļ		21	10000					100000	
Vm (dscf) =	22.859	Equation 5-1		22							1
				23	100			1000			3 34 33
Volume of Water Vapor Coll	ected @ STD. COND., Vw	_		24				4970			
Vic (mL) =	4,6			25	October 1				6		
Vw (scf) =	0.22	Equation 5-2		26				100			. Industrial
		•		27							
Moisture Content of Stack G	Bas, Bws	Equation 5-3	Sat. Moist.	28							
Bws =	0.94%	0.94%	17.96%	29							10000000
1-Bws =	99.06%	99.06%	82.04%	30							
	00:0070	1 00.00 /0 1	<u> </u>	31	1004000000			***************************************		500000000	
Molecular Weight of Stack (Con No			32							
Ms (g/gmol) =	28.74	Equation 2-6		33	200					10000000	
wis (g/gillol) -	20.74] Equation 2-6		34	170000000000000000000000000000000000000					***************************************	-
									5	102/01/01/01	
Absolute Pressure, Ps	A - 2	3		35	Strong School Str	1			8	1000000000	
Static (in H2O) =	-0.12			36							
Ps (in Hg) =	29.38			37		8			9	100000000	
				38	1256						
Stack Gas Velocity, Vs		77		39						10.000	
Cp =	0.84	4		40		4				100	
Vs (fps) =	61.34	Equation 2-7		41				10000	6		
				42							
Stack Gas Flowrate, Qs		_		43				4.50			
Qs (acfm) =	162607.80	1		44							
				45							
Stack Gas Flowrate @ STD.	. COND., Dry Basis, Qstd			46		â			3		
Qstd (dscfh) =	8411563.34	Equation 2-8		47							
Qstd (dscfm) =	140192.72	1 7		48						100000	
7		_		49	2013 Acres 1971				6	12222	
Velocity at the Nozzle, Vn		Area of Nozzle	Δn	50	100000000000000000000000000000000000000	1					1
Dia. of Nozzle (in) =		An (ft^2) =	0	AVG	1.042	1.017	135,750	2.00	1.41	60 0	33333333
	30	MI (II:2) =	L	AVG	1.042	1 1.017	1 130,700	2.00	1.41	1,60	0000000
Time of Run (min) =		4		D-15-10-0	. 1	3					
Vn (fps) =	#DIV/0!	J		Delta H@							
				Pb (in Hg)							
% Isokinetic, %I			•	gamma							
%I =	#DIV/0!	#DIV/01		Post Test Ca		Pass					
Intermediate (%I) =	#DIV/0!	#DIV/01	Equation 5-8	% Deviation	0.839	<i>t</i> I					

SOURCE:	Isolatek				Meth	od 2			Met	hod 4	
JNIT TESTED:	Blowchamber/Screenhouse			Point No.	Δρ	VΔp	Stack Temp.	ΔH	√∆h	Meter In	Meter O
ESTING COMPANY:	EQM			1	0.35	0.5916	147	2	1.4142	- 60	
DATE OF TEST:	April 16, 2024			2	0.44	0.6633	146		1.7112	79	
RUN NO.:	2			3	0.65	0.8062	148	504280555		80	50400000000
KON NO.:		l		4	0.63	0.7937	147			80	
								100000000000000000000000000000000000000			
Area of Stack (enter diameter in		1		5	0.42	0.6481	145			82	
11 12 11 11 11 11 11 11 11 11 11 11 11 1	0	Į.		6	0,25	0.5	147			- 63	
W =	0	Į		7	0.44	0.6633	148			100 House 100 House	400
diameter (in) =	90]		8	0.27	0.5196	148	5.5			
No. of Stacks =	1]		9	0.63	0.7937	147				1000000000
Area Stack (ft^2) =	44.179	}		10	0.65	0.8062	147				
		•		11	0.9	0.9487	148				
Molecular Weight of Stack Gas,	Dry Basis, Md			12	0.7	0.8367	148				
%CO2 =	0.04	1		13	0.84	0.9165	148				
%O2 =	21.37			14	0,92	0.9592	148			450000000	2000
Md (g/gmol) =	28.86	1		15	0,63	0.7937	148				
Hid (g/gillol) =	20.00	1		16	0.39	0.6245	148				i
Volume of Dry Gas Collected @	STD COND V			17	0,00	0.0243	170	400000000000000000000000000000000000000		Garage and	
Start Meter Volume (cf) =	51D, COND., Vm	7		18		 					
										100000000000000000000000000000000000000	
End Meter Volume (cf) =	23.494			19	5272309309C5000				ļ		
Vol. Int. Leak Checks (cf) =				20							
Vm (cf) =	23.494]		21			100000000000000000000000000000000000000				
Vm (dscf) =	23.071	Equation 5-1		22						THE RE	
				23	2002		100000000000000000000000000000000000000				
Volume of Water Vapor Collecte	ed @ STD. COND., Vw			24				2,45		200000000	
Vic (mL) =	4,3			25							
Vw (scf) =	0.20	Equation 5-2		26							
				27							
Moisture Content of Stack Gas,	Rws	Equation 5-3	Sat. Moist.	28							Charles .
Bws =	0.87%	0.87%	24.25%	29							
1-Bws =	99.13%	99.13%	75.75%	30						50000	
1-01131	33.10%	00.1070	70.1070	31		 					
Malaanian Malabé of Charle Con	14-			32						2222 TO TOTAL	
Molecular Weight of Stack Gas, Ms (g/gmol) =	ms 28.77	7		33					1		+
MS (g/gmoi) =	20.11	Equation 2-6			100000000000000000000000000000000000000					100000000000000000000000000000000000000	
				34						100000000000000000000000000000000000000	
Absolute Pressure, Ps		79		35				15,000	9		_
Static (in H2O) =	-0.12			36							and the second
Ps (in Hg) =	29.38	_		37				100000000			
				38					9	220000	
Stack Gas Velocity, Vs		_		39							
Cp =	0.84			40					8		
Vs (fps) =	45.15	Equation 2-7		41		9					
				42			101010111111111111111111111111111111111			0047878700000	
Stack Gas Flowrate, Qs				43							
Qs (acfm) =	119674.30	7		44							
				45					9		
Stack Gas Flowrate @ STD, CO	ND Dry Basis Ostd			46							1
Qstd (dscfh) =	6075118.52	Equation 2-8		47	SERVICE STREET			100000000000000000000000000000000000000	E .	1200000	
Qstd (dscfm) =	101251.98	1-40000011 2-0		48	1						
Gatu (Gacilli) -	101231.50	_		49	142120000			100000000000000000000000000000000000000	8	100000000000000000000000000000000000000	
Valanity at the Namela V-		Aron of Ma		50	100000000000000000000000000000000000000	1	+	100000000000000000000000000000000000000			1
Velocity at the Nozzle, Vn		Area of Nozzle			0.500	0.7/5	447.000	National Property of the Party	(H	1000000	100000
Dia. of Nozzle (in) =	0	An (ft^2) =	0	AVG	0,569	0.742	147.500	2.00	1.41	1 80.6	6666667
Time of Run (min) =	30	3				31					
Vn (fps) =	#DIV/0!	J		Delta H@							
				Pb (in Hg) =							
% Isokinetic, %I				gamma :							
%1=	#DIV/0!	#DIV/01		Post Test Ca	1.0066	Pass					
707	#DIV/0!	#DIV/01									

SOURCE:	Isolatek			Method 2		Method 4					
JNIT TESTED:	Blowchamber/Screenhouse			Point No.	Δр	VΔp	Stack Temp.	ΔH	√∆h	Meter In	Meter O
ESTING COMPANY:	EQM			1	0.41	0.6403	161	2	1.4142	80	
DATE OF TEST:	April 16, 2024			2	0.55	0.7416	161			81	1223
RUN NO.:	April 10, 2024			3	0.62	0.7874	161			81	STORY TO STATE
ROW NO.;		I		4	0.52	0.7681	162			62	
							163	0.0000000000000000000000000000000000000		82	
Area of Stack (enter diameter in inc		1		5	0.35	0.5916					
A CONTRACTOR OF THE STATE OF TH	O			6	0.48	0.6928	163			82	
W =	0			7	0.28	0.5292	164				
diameter (in) =	90			8	0,2	0.4472	164	200			
No. of Stacks =	1	j		9	0.42	0.6481	164	2502000			
Area Stack (ft^2) =	44.179			10	0.48	0.6928	163				
				11	0.59	0.7681	164				
Molecular Weight of Stack Gas, Dr	y Basis, Md			12	0.76	0.8718	164				
%CO2 =	0.04	1		13	0.9	0.9487	163				
%O2 =	21 87			14	0.72	0.8485	163				
Md (g/gmol) =	28.86	i		15	0.65	0.8062	163				
(9.5)		,		16	0.42	0.6481	163			BEAR	
Volume of Dry Gas Collected @ S1	ID COND Vm			17		0.0401	100	200000000000000000000000000000000000000			
Start Meter Volume (cf) =	D. COND., VIII	1		18		1				100000	
	23.572			19		1					
End Meter Volume (cf) =	20.012			20		1	10.000				
Vol. Int. Leak Checks (cf) =	00.570	1									
Vm (cf) =	23,572			21	1.4						
Vm (dscf) =	23.119	Equation 5-1		22		1					
				23							
Volume of Water Vapor Collected		-		24	50000000		850 FEE 18	13.5			1,585
Vic (mL) =	4.5			25	100000000000000000000000000000000000000		15250 1505				
Vw (scf) =	0.21	Equation 5-2		26				500000000000000000000000000000000000000			100000
				27	A Property						
Moisture Content of Stack Gas, By	vs	Equation 5-3	Sat. Moist.	28							
Bws =	0.91%	0.91%	35.23%	29	the same						
1-Bws =	99.09%	99.09%	64.77%	30						19. 20. 500	
		*		31							
Molecular Weight of Stack Gas, M	8			32		8				2000000000	
Ms (g/gmol) =	28.76	Equation 2-6		33		\$					
1810 (9/9/1/01) - 1] Education 5 o		34	300						
Absolute Pressure, Ps				35	250 (0.00)	8		10233455656		200000000000000000000000000000000000000	
	-0.12			36		20					
Static (in H2O) =	29.38	4		37	0.000000000000000000000000000000000000	-			1	\$4000000000000000000000000000000000000	-
Ps (in Hg) =	29.30				200000000000000000000000000000000000000	7		1		100000000000000000000000000000000000000	
				38	SALES AND ADDRESS OF THE PARTY	8					W. 100 (20 cm)
Stack Gas Velocity, Vs		-		39				4-1000000000000000000000000000000000000		100000000000000000000000000000000000000	
Cρ =	0.84			40	1000000	2					
Vs (fps) =	44.04	_]Equation 2-7		41					<u></u>		40000
				42	Herange	3					
Stack Gas Flowrate, Qs				43							
Qs (acfm) =	116749.46			44							
				45							
Stack Gas Flowrate @ STD. CONI	D., Dry Basis, Qstd			46							
Qstd (dscfh) =	5778122.46	Equation 2-8		47							
Qstd (dscfm) =	96302.04	1 '		48		9					
		-		49	To the same					COLUMN	
Velocity at the Nozzle, Vn		Area of Nozzl	e An	50		20			1		
	0	An (ft^2) =	0	AVG	0.526	0.714	162.875	2.00	1.41	84.5	3333333
	30	An (II5) =		LAVO	1 0.526	1 0.714	1 102.010	1 2.00	1.41	1 01.3	,,,,,,,,,,,
Time of Run (min) =		4-00		D-11- 110	- 4 666	aga.					
Vn (fps) =	#DIV/0!	نـ		Delta H@							
				Pb (in Hg)							
% Isokinetic, %I		· · · · · · · · · · · · · · · · · · ·	•	gamma							
%l =	#DIV/0!	#DIV/0!	1	Post Test Ca	1 1.0039	Pass					
Intermediate (%I) =	#DIV/0!	#DIV/0!	Equation 5-8	% Deviation							

SOURCE:	Isolatek
UNIT TESTED:	Blowchamber/Screenhouse
TESTING COMPANY:	EQM
DATE OF TEST:	April 16, 2024
METHODS:	1-4

METHODS: 1-4		
Average Stack Temperature, Ts (F)		148,71
Average Stack Gas Velocity, Vs, fps		50.18
Average Stack Gas Flowrate, Qs, acfm		133010.52
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfm)		112582.25
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfh)		6754934.77
Average % Isokinetic, %I	#DIV/0!	#DIV/0!
Average % Isokinetic measured from intermediate values, %I	#DIV/0!	#DIV/0!
Average Post Test Cal (2-run)	Pass	1.017
Average Post Test Cal (3-run)	Pass	1.013

SOURCE:	Isolatek
UNIT TESTED:	Blowchamber/Screenhouse
TESTING COMPANY:	EQM
METHOD:	3A
DATE OF TEST:	January 12, 2023

O2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	O2 RM Monitor Span =	21.70	%	Drift Ass	sessment		
				Must be wit	hin 3.0 %		
	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift		
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail		
No.	Raw (%)	Low Gas	Low Gas	(Eq 7E-4)			
1	20.89	-0.05	0.07	0.55%	Pass		
2	20.97	0.07	0.00	0.32%	Pass		
3	20.96	0.00	0.01	0.05%	Pass		
	(Cm)i	(Cm)f		Drift Assessment Must be within 3.0%			
ľ	Initial	Final	Upscale Gas	Up-Drift			
Run	Upscale	Upscale	Drift	Pass/Fail			
No.			(Eq 7E-4)				
1	11.98	11.70	1.29%	Pass			
2	: "::: 11.70 ::- :: :: :	11.68	0.09%	Pass			
3	11.68	11.69	0.05%	Pass			

	(Cma)		(Cgas)		
	Upscale	Percent	Corrected	Corrected	
Run	Calibration Gas	Moisture	Dry Basis	Wet Basis	
No.	%	(%)	(%)	(%)	
1		#DIV/0!	21.01	#DIV/0!	
2	11.90 · · · · · · · · · · · · · · · · · · ·	#DIV/0!	21.37	#DIV/0!	
3	11.90	#DIV/0!	21.35	#DIV/0!	

40 CFR 60 Appendix A-4 Method 7E Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

Cgas = Average effluent gas concentration adjusted for bias, %

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %

Co = Average of initial and final system cal. bias check responses from the low-level calibration gas, % Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %

Cma = Actual concentration of the upscale calibration gas, %

< 20% of	40-60% of
Span	Span
0	8.68
4.34	13.02

Anai	Analyzer Calibration Error Check (ACE)					
Lin	Linearity Check (Must be within 2.0%)					
	'Low' 'Upscale'					
	Low-Level	Mid-Level	High-Level			
ļ	Gas	Gas	Gas			
Serial #						
Tag (Cv)	0.00	11.90	21.70			
Monitor (Cdir)	0.00	11.93	21.70			
Diff. (Cdir-Cv)	0.00	0.03	0.00			
ACE (Eq 7E-1)	0.00%	0.14%	0.00%			
	Pass	Pass	Pass			

s	System Bias (SB) Low-Level Gas (Must be within 5.0%)					
Run	Low	Final Low	Low Gas	Low-Bias		
No.	Linearity	Gas	SB	Pass/Fail		
	Gas (Cdir)	Bias (Cs)_	(Eq 7E-2)			
Initial	0.00	-0.05	-0.23%	Pass		
1	0.00	0.07	0.32%	Pass		
2	0.00	0.00	0.00%	Pass		
3	0.00	0.01	0.05%	Pass		

System Bias (SB) Upscale Gas (Must be within 5.0%)

	Upscale Linearity	Final Upscale Gas	Upscale Gas SB	Upscale-Bias Pass/Fail
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)	
Initial	11.93	11.98	0.23%	Pass
1	11.93	11.70	-1.06%	Pass
2	11.93	11.68	-1.15%	Pass
3	11.93	11.69	-1.11%	Pass

SOURCE:	Isolatek
UNIT TESTED:	Blowchamber/Screenhouse
TESTING COMPANY:	EQM
METHOD:	3A
DATE OF TEST:	January 12, 2023

CO2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	CO2 RM Monitor Span =	17.60	%	Drift Ass	essment
				Must be wi	thin 3.0 %
	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail
No.	Raw (%)	Low Gas	Low Gas	(Eq 7E-4)	
1	0.06	0.06	0.01	0.28%	Pass
2	0.06	0.01	0.03	0.11%	Pass
3	0.09	0.03	0.02	0.06%	Pass
	(Cm)i	(Cm)f	Drift Asses Must be with	-	
	Initial	Final	Upscale Gas	Up-Drift	
Run	Upscale	Upscale	Drift	Pass/Fail	
No.			(Eq 7E-4)		
1	10.08	10.07	0.06%	Pass	
2	10.07	10.29	1.25%	Pass	
3	10.29	10.34	0.28%	Pass	

	(Cma)		(Cgas)	
	Upscale	Percent	Corrected	Corrected
Run	Calibration Gas	Moisture	Dry Basis	Wet Basis
No.	%	(%)	(%)	(%)
1	et et seen om et en 111-10.10 in saas en en 1 sekk s	#DIV/0!	0.02	#DIV/0!
2	10.10	#DIV/0!	0.04	#DIV/0!
3	10.10	#DIV/0!	0.06	#DIV/0!

where:

40 CFR 60 Appendix A-4 Method 7E Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

 $\label{eq:Cgas} \textit{Cgas} = \textit{Average effluent gas concentration adjusted for bias}, \, \%$

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %

Co = Average of initial and final system cal. bias check responses from the low-level calibration gas, % Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %

1

2

10.06

10.06

10.06

Cma = Actual concentration of the upscale calibration gas, %

< 20% of	40-60% of
Span	Span
0	7.04
3.52	10.56

Analyzer Calibration Error Check (ACE)					
Lir	earity Check (N	/lust be within 2.0	0%)		
'Low' 'Upscale'					
	Low-Level	Mid-Level	High-Level		
	Gas	Gas	Gas		
Serial #			0.00		
Tag (Cv)	0.00	10.10	17.60		
Monitor (Cdir)	0.00	10.06	17.60		
Diff. (Cdir-Cv)	0.00	-0.04	0.00		
ACE (Eq 7E-1)	0.00%	-0.23%	0.00%		
	Pass	Pass	Pass		

•	System Bias (SB) Low-Level Gas (Must be within 5.0%)					
Run	Low	Final Low	Low Gas	Low-Bias		
No.	Linearity	Gas	SB	Pass/Fail		
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)			
Initial	0.00	0.06	0.34%	Pass		
1	0.00	0.01	0.06%	Pass		
2	0.00	0.03	0.17%	Pass		
3	0.00	0.02	0.11%	Pass		
System Bias (SB) Upscale Gas (Must be within 5.0%)						
	Upscale	Final Upscale	Upscale Gas	Upscale-Bias		
	Linearity	Gas	SB	Pass/Fail		
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)			
Initial	10.06	10.08	0.11%	Pass		

10.07

10.29

10.34

0.06%

1.31%

1.59%

Pass

Pass

Pass

SOURCE:	Isolatek
UNIT TESTED:	Blowchamber/Screenhouse
TESTING COMPANY:	EQM
METHOD:	6C
DATE OF TEST:	January 12, 2023

SO2 Reference Method Analyzer Sampling System Bias Check and Measured Value Correction

	SO2 RM Monitor Span =	447.00	PPM	Drift Ass	essment
				Must be wit	hin 3.0 %
	(Cavg)	(Co)i	(Co)f	Low Gas	Low-Drift
Run	Ave. Measured	Initial	Final	Drift	Pass/Fail
No.	Raw (ppm)	Low Gas	Low Gas	(Eq 7E-4)	
1	1.95	1.80	1.20	0.13%	Pass
2	0.71	1.20	0.03	0.26%	Pass
3	1.13	0.03	0.04	0.00%	Pass
	(Cm)i	(Cm)f	Drift Assess Must be within		
	Initial	Final	Upscale Gas	Up-Drift	
Run	Upscale	Upscale	Drift	Pass/Fail	
No.			(Eq 7E-4)		
1	185.00	185.40	0.09%	Pass	
2	185.40	189.40	0.89%	Pass	
3	189.40	189.20	0.04%	Pass	

	(Cma)		(Cgas)	
	Upscale	Percent	Corrected	Corrected
Run	Calibration Gas	Gas Moisture		Wet Basis
No.	ppm	(%)	(ppm)	(ppm)
1	191.00	0.94%	0.47	0.46
2	191.00	0.87%	0.10	0.10
3	191.00	0.91%	1.11	1.10

40 CFR 60 Appendix A-4 Method 7E

Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

Cgas = Average effluent gas concentration adjusted for bias, ppmv

Cavg = Average unadjusted gas concentration indicated data recorder for the test run, ppmv

Co = Average of initial and final system cal. bias check responses from the low-level calibraiton gas, ppmv Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, ppmv

Cma = Actual concentration of the upscale calibration gas, ppmv

	Flowrate	SO2	SO2	SO2	Produc
Run#	dscfh	ppmdv	lb/dscf	lb/hr	TPH
1 [8411563.34	0.47	0.000000	0.65	9.87
2	6075118.52	0.10	0.000000	0.10	7.04
3	5778122.46	1.11	0.000000	1.06	8.53
Average	6754934.77	0.56	0.000000	0.60	8.48

where:

< 20% of	40-60% of
Span	Span
0	178.8
89.4	268.2

	03.4	200.2			
Analyzer Calibration Error Check (ACE)					
	Linearity Check (Must be within 2.0%)				
	'Low'	'Upso	ale'		
	Low-Level	Mid-Level	High-Level		
	Gas	Gas	Gas		
Serial #	Local design				
Tag (Cv)	0.00	191.00	447.00		
Monitor (Cdir)	0.00	187.30	447.00		
Diff. (Cdir-Cv)	0.00	-3.70	0.00		
ACE (Eq 7E-1)	0.00%	-0.83%	0.00%		
	Pass	Pass	Pass		

System Bias (SB) Low-Level Gas (Must be within 5.0%)					
Run	Low	Final Low	Low Gas	Low-Bias	
No.	Linearity	Gas	SB	Pass/Fail	
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)		
Initial	0.00	1.80	0.40%	Pass	
1	0.00	1.20	0.27%	Pass	
2	0.00	0.03	0.01%	Pass	
3	0.00	0.04	0.01%	Pass	
System Bias (SB) Upscale Gas (Must be within 5.0%)					
	Upscale	Final Upscale	Upscale Gas	Upscale-Bias	
	Linearity	Gas	SB	Pass/Fail	
	Gas (Cdir)	Bias (Cs)	(Eq 7E-2)		
Initial	187.30	185.00	-0.51%	Pass	
1	187.30	185.40	-0.43%	Pass	
2	187.30	189.40	0.47%	Pass	

189.20

0.43%

Pass

SO2	
lb/ton	
0.07	
0.01	
0.12	
0.07	

187.30