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"Your Regulatory Compliance Expert"

April 10, 2018

Mr. Joseph Ulfig
Manager, Environmental Health and Safety
STERIGENICS, INC.
2015 Spring Road, Suite 650
Oak Brook, Illinois 60523

Subject: **RESULTS OF ETHYLENE OXIDE SOURCE TESTING PERFORMED AT THE STERIGENICS FACILITY IN LOS ANGELES, CALIFORNIA**

Dear Mr. Ulfig:

Please find attached a presentation of the results of the ethylene oxide source testing and leak testing performed at your 49th Street and 50th Street facilities in Los Angeles, CA by ECSi, on Tuesday, April 10, 2018. These test results are to be kept with all records pertaining to SCAQMD-required testing of the EtO gas-sterilization system, and are to be made available upon request by the SCAQMD. A copy of all raw test data, complete with sample chromatograms and calibration data, will be maintained in our files, and will be made available upon request.

The test results indicate that you continue to operate the EtO sterilization and emission-control systems at both facilities in compliance with SCAQMD Rule 1405. I will follow up with you in approximately five months to let you know when your next semi-annual leak test is due, and in approximately eleven months to let you know when your next annual source test/leak test is due.

If you have any questions or comments regarding this submittal, please contact me at (949)400-9145. We thank you for the opportunity to serve your needs.

Respectfully Submitted:

Daniel P. Kremer
ECSi

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TABLE 1
ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (49TH ST ABATOR)
OPERATED BY STERIGENICS, INC.
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

CYCLE PHASE	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
Backvent(3)	943	97.8	0.01	99.9898
Backvent	944	28.7	0.01	99.9652
Backvent	945	6.12	0.01	99.8366
Backvent	946	4.46	0.01	99.7758
Backvent	947	3.24	0.01	99.6914
Backvent	949	5.22	0.01	99.8084
Backvent	950	2.55	0.01	99.6078
Backvent	952	3.29	0.01	99.6960
Backvent	953	2.14	0.01	99.5327
Backvent	954	32.2	0.01	99.9689
Backvent	955	7.54	0.01	99.8674
Backvent	956	2.61	0.01	99.6169
Backvent	957	2.45	0.01	99.5918
TIME-WEIGHTED AVERAGE:		**15.26**	**0.0100**	**99.7653**
		SCAQMD REQUIRED CONTROL EFFICIENCY:		**99.0**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - The backvent phase test run started at 9:42, ended at 9:57.
(4) - The average Abator catalyst bed temperature during the backvent phase test run was 285 degrees F.

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TABLE 2
ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (49TH ST ABATOR)
OPERATED BY STERIGENICS, INC.
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	836	3.56	0.01	99.7191
1	841	3.91	0.01	99.7442
1	846	3.09	0.01	99.6764
1	851	1.88	0.01	99.4681
1	856	1.92	0.01	99.4792
1	901	2.94	0.01	99.6599
1	906	2.76	0.01	99.6377
1	911	1.74	0.01	99.4253
1	916	2.47	0.01	99.5951
1	921	2.17	0.01	99.5392
1	926	2.45	0.01	99.5918
1	931	1.25	0.01	99.2000
2(4)	959	1.31	0.01	99.2366
2	1004	1.63	0.01	99.3865
2	1009	2.11	0.01	99.5261
2	1014	2.01	0.01	99.5025
2	1019	1.87	0.01	99.4652
2	1024	2.49	0.01	99.5984
2	1029	2.35	0.01	99.5745
2	1034	1.54	0.01	99.3506
2	1039	2.06	0.01	99.5146
2	1044	2.50	0.01	99.6000
2	1049	2.46	0.01	99.5935
2	1054	2.52	0.01	99.6032
3(5)	1059	1.81	0.01	99.4475
3	1104	2.15	0.01	99.5349
3	1109	2.46	0.01	99.5935
3	1114	2.05	0.01	99.5122
3	1119	3.14	0.01	99.6815
3	1124	2.44	0.01	99.5902
3	1129	2.15	0.01	99.5349
3	1134	2.69	0.01	99.6283
3	1139	3.63	0.01	99.7245
3	1144	2.23	0.01	99.5516
3	1149	2.83	0.01	99.6466
3	1154	2.96	0.01	99.6622
TIME-WEIGHTED AVERAGE:		**2.376**	**0.0100**	**99.5499**
		SCAQMD REQUIRED CONTROL EFFICIENCY:		**99.0%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Aeration Phase Test Run #1 started at 8:35, ended at 9:35.
(4) - Aeration Phase Test Run #2 started at 9:58, ended at 10:58.
(5) - Aeration Phase Test Run #3 started at 10:58, ended at 11:58.
(4) - The average catalyst bed temperature recorded during the test was 285 degrees F.

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TABLE 3
ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (50TH ST ABATOR)
OPERATED BY STERIGENICS, INC.
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

CYCLE PHASE	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
Backvent(3)	1406	22.1	0.01	99.9548
Backvent	1407	79.0	0.01	99.9873
Backvent	1408	21.3	0.01	99.9531
Backvent	1409	18.9	0.01	99.9471
Backvent	1410	18.3	0.11	99.3989
Backvent	1411	18.1	0.08	99.5580
Backvent	1413	18.4	0.07	99.6196
Backvent	1414	18.6	0.01	99.9462
Backvent	1415	19.1	0.01	99.9476
Backvent	1416	18.7	0.01	99.9465
Backvent	1417	17.9	0.01	99.9441
Backvent	1418	17.8	0.01	99.9438
Backvent	1419	18.9	0.01	99.9471
TIME-WEIGHTED AVERAGE:		**23.62**	**0.0277**	**99.8534**
		SCAQMD REQUIRED CONTROL EFFICIENCY:		**99.0**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - The backvent phase test run started at 14:05, ended at 14:20.
(4) - The average Abator catalyst bed temperature during the backvent phase test run was 288 degrees F.

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TABLE 4
ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (50TH ST ABATOR)
OPERATED BY STERIGENICS, INC.
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	1205	22.4	0.01	99.9554
1	1210	22.1	0.07	99.6833
1	1215	22.8	0.01	99.9561
1	1220	24.0	0.01	99.9583
1	1225	22.8	0.01	99.9561
1	1230	24.1	0.01	99.9585
1	1235	23.6	0.01	99.9576
1	1240	24.2	0.01	99.9587
1	1245	22.9	0.01	99.9563
1	1250	23.9	0.01	99.9582
1	1255	24.1	0.01	99.9585
1	1300	23.5	0.01	99.9574
2(4)	1305	24.6	0.01	99.9593
2	1310	23.5	0.01	99.9574
2	1315	22.5	0.01	99.9556
2	1320	22.5	0.01	99.9556
2	1325	22.2	0.01	99.9550
2	1330	23.4	0.01	99.9573
2	1335	23.9	0.11	99.5397
2	1340	22.6	0.14	99.3805
2	1345	23.4	0.01	99.9573
2	1350	22.6	0.01	99.9558
2	1355	22.2	0.01	99.9550
2	1400	21.8	0.12	99.4495
3(5)	1422	18.0	0.05	99.7222
3	1427	18.5	0.01	99.9459
3	1432	18.3	0.01	99.9454
3	1437	18.7	0.01	99.9465
3	1442	18.6	0.01	99.9462
3	1447	17.8	0.01	99.9438
3	1452	18.0	0.01	99.9444
3	1457	17.6	0.01	99.9432
3	1502	17.1	0.01	99.9415
3	1507	17.3	0.01	99.9422
3	1512	16.6	0.10	99.3976
3	1517	16.4	0.12	99.2683
TIME-WEIGHTED AVERAGE:		**21.35**	**0.0278**	**99.8633**
		SCAQMD REQUIRED CONTROL EFFICIENCY:		**99.0%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Aeration Phase Test Run #1 started at 12:04, ended at 13:04.
(4) - Aeration Phase Test Run #2 started at 13:04, ended at 14:04.
(5) - Aeration Phase Test Run #3 started at 14:21, ended at 15:21.
(4) - The average catalyst bed temperature recorded during the test was 288 degrees F.

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TABLE 5
ETHYLENE OXIDE LEAK TESTING
OF A GAS STERILIZATION SYSTEM (6 STERILIZERS)
OPERATED BY STERIGENICS, INC. (50TH ST PLANT)
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

COMPONENT GROUP TESTED	LEAKING COMPONENTS FOUND	CONCENTRATION
Supply Tanks / Load Station	None	<1.0 ppm (1)
Sterilizer Inlet / Inbleed Valve	None	<1.0 ppm
Door Seal	None	<1.0 ppm
Sterilizer Outlet / Chamber Drain	None	<1.0 ppm
Vacuum Pump / Floor Drain	None	<1.0 ppm
Emission Control Device Inlet	None	<1.0 ppm

Notes:
(1) - PPM = parts per million by volume

TABLE 6
ETHYLENE OXIDE LEAK TESTING
OF A GAS STERILIZATION SYSTEM (8 STERILIZERS)
OPERATED BY STERIGENICS, INC. (49TH ST PLANT)
IN LOS ANGELES, CALIFORNIA
ON APRIL 10, 2018

COMPONENT GROUP TESTED	LEAKING COMPONENTS FOUND	CONCENTRATION
Supply Tanks / Load Station	None	<1.0 ppm (1)
Sterilizer Inlet / Inbleed Valve	None	<1.0 ppm
Door Seal	None	<1.0 ppm
Sterilizer Outlet / Chamber Drain	None	<1.0 ppm
Vacuum Pump / Floor Drain	None	<1.0 ppm
Emission Control Device Inlet	None	<1.0 ppm

Notes:
(1) - PPM = parts per million by volume

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Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - 49th Street Plant - Los Angeles, California
4/10/18 - Backvent Phase Emissions

DeltaP	SqRtDeltaP	Temp (F)	ppm EtO
0.175	0.4183	200	0.01
0.175	0.4183	200	0.01
0.175	0.4183	200	0.01
0.175	0.4183	200	0.01
0.175	0.4183	200	0.01
0.175	0.4183	200	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
Average =			
0.175	0.4183	200.7	**0.0100**
	=	661	degR

mw =	28.51	
stack area =	7.07	
press =	29.70	
Tstd =	528	
Pstd =	29.92	
Cp =	0.99	
Kp =	85.49	
Velocity =	31.3	ft/sec
Flow =	**10209**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.0000076**	**lbs/min**
EtO Mass Flow =	**0.000453**	**lbs/hr**

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Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - 49th Street Plant - Los Angeles, California
4/10/18 - Aeration Emissions

DeltaP	SqRtDeltaP	Stack Temp (F)	ppm EtO
Run#1			
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
0.17	0.4123	200	0.01
Run#2			
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	203	0.01
0.17	0.4123	203	0.01
Run#3			
0.17	0.4123	203	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	202	0.01
0.17	0.4123	201	0.01
Average =			
0.17	0.4123	201.4	0.0100
	=	661	degR

mw =	28.51	
stack area =	7.07	
press =	29.70	
Tstd =	528	
Pstd =	29.92	
Cp =	0.99	
Kp =	85.49	
Velocity =	30.8	ft/sec
Flow =	**10056**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.0000115**	**lbs/min**
EtO Mass Flow =	**0.000690**	**lbs/hr**

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Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - 50th Street Plant - Los Angeles, California
4/10/18 - Backvent Phase Emissions

DeltaP	SqRtDeltaP	Temp (F)	ppm EtO
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.11
0.175	0.4183	203	0.08
0.175	0.4183	203	0.07
0.175	0.4183	203	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.01
0.175	0.4183	204	0.01
Average =			
0.175	0.4183	202.8	**0.0277**
	=	663	degR

mw =	28.51	
stack area =	7.07	
press =	29.70	
Tstd =	528	
Pstd =	29.92	
Cp =	0.99	
Kp =	85.49	
Velocity =	31.3	ft/sec
Flow =	**10192**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.0000209**	**lbs/min**
EtO Mass Flow =	**0.001253**	**lbs/hr**

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Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - 50th Street Plant - Los Angeles, California
4/10/18 - Aeration Emissions

DeltaP	SqRtDeltaP	Stack Temp (F)	ppm EtO
Run#1			
0.175	0.4183	201	0.01
0.175	0.4183	201	0.07
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
0.175	0.4183	202	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	202	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
Run#2			
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.11
0.175	0.4183	201	0.14
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.01
0.175	0.4183	201	0.12
Run#3			
0.175	0.4183	204	0.05
0.175	0.4183	205	0.01
0.175	0.4183	206	0.01
0.175	0.4183	206	0.01
0.175	0.4183	205	0.01
0.175	0.4183	205	0.01
0.175	0.4183	204	0.01
0.175	0.4183	204	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.01
0.175	0.4183	203	0.10
0.175	0.4183	202	0.12
Average =			
0.175	0.4183	202.2	0.0278
	=	662	degR

mw =	28.51	
stack area =	7.07	
press =	29.70	
Tstd =	528	
Pstd =	29.92	
Cp =	0.99	
Kp =	85.49	
Velocity =	31.3	ft/sec
Flow =	**10197**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.0000324**	**lbs/min**
EtO Mass Flow =	**0.001943**	**lbs/hr**