pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Erie Coke
Non-Compliant NOx

MEMO

TO Daniel D. Brophy
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FROM Rick Szekeres, M.S.
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THROUGH Charles J. Zadakis, P.E.
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DATE May 11, 2016

RE Source Test Review
Erie Coke Corp.
Coke Oven Batteries, underfiring system (ID 805)
Erie, Erie County
TVOP 25-00029
eFACTS: 2350662 PFID: 50751
eFACTS Inspection Result: PEND

MESSAGE:
Erie Coke Corporation operates two coke oven batteries (ID: 805) – Battery A (Ovens 1-23) and Battery B (Ovens 24-58), for the production of foundry coke. The coke, formed by the batch heating of pulverized bituminous coal to ~2000°F for 14-36 hours in a reducing atmosphere, is used to melt iron that is to be processed into iron castings. Emissions from the batteries are controlled by a hydrogen sulfide (H_2S) adsorber (ID: C805A), prior to being discharged to the atmosphere via the combustion stack (ID: S805A) with an inner diameter of 142".

On December 10-11, 2014, Air/Compliance Consultants, Inc. (ACCI) and Enthalpy Analytical conducted testing pursuant to a consent decree to determine the combined emissions of the following target pollutants from the combustion stack for Batteries A & B.

Target Pollutants
- filterable particulate matter – Method 5
- sulfur dioxide – Method 6C
- nitrogen oxides – Method 7
- carbon monoxide – Method 10
- non-methane organic compounds – Method 25

- hazardous air pollutants, specified below
  - benzene (CAS #71-43-2)
  - chlorine (CAS #7782-50-5)
  - coke oven gas
  - hydrogen chloride (CAS #7647-01-0)
  - chloromethane (CAS #74-87-3)
  - methanol (CAS #67-56-1)
  - toluene (CAS #108-88-3)
  - xylenes (CAS #1330-20-7)
  - phenol (CAS# 108-95-2)
  - 1,3-butadiene (CAS #106-99-0); added after 7/2011 Method 18 presurvey
  - naphthalene (CAS #91-20-3); added after 7/2011 Method 18 presurvey
  - styrene (CAS #100-42-5); added after 7/2011 Method 18 presurvey

The test runs were conducted in accordance with the test protocol, approved on August 24, 2011, and EPA Methods 1-4, 5, 6C, 7E, 10, 18, 25, 26, and 315. The test results are acceptable to the Department as a credible representation of the actual emissions under the operating conditions during testing and may be used for compliance or other regulatory purposes. Major rebuilding of the battery oven walls was done from 2010 to 2013. Prior to the ongoing modifications, the maximum normal number of ovens pushed per day was 42-48; the rated capacity is 54 per day. Erie Coke agreed to push an average of 14 ovens per shift during sampling, a level which was not achieved on the 2nd day of testing (12/11/2014).

The following tables summarize the data from the test report.

Process Data Summary

Date	Shift	Ovens		
		Scheduled	Pushed	Charged
12/09/2014	0000-0800	11	10	10
	0800-1600	12	12	11
	1600-2400	11	12	13
	Total	34	34	34
12/10/2014	0000-0800	10	10	10
	0800-1600	14	14	14
	1600-2400	11	11	11
	Total	35	35	35
12/11/2014	0000-0800	10	8	8
	0800-1600	12	12	12
	1600-2400	9	9	9
	Total	31	29	29
12/12/2014	0000-0800	10	10	9
	0800-1600	11	11	12
	1600-2400	11	9	8
	Total	32	30	29

Emissions Summary – Table 1

Run No.	1	2	3	Averages	Standard
Test Date	12/11/2014	12/11/2014	12/11/2014		
Flow Rate [dscfm]	34,000	33,800	33,200	33,700	
FPM (Method 5)					
[gr./dscf]	0.038	0.030	0.040	0.036	≤0.040
[lbs./hour]	11.0	8.74	11.3	10.4	
[TPY]	48.3	38.3	49.4	45.3	
SO_2 (Method 6C)					
[ppmvd as SO_2]	82	102	103	96	
[lbs/hour as SO_2]	27.8	34.2	34.2	32.1	
[TPY]	122	150	150	*141***	
NO_x (Method 7E)					
[ppmvd as NO_2]	82	86	94	87	
[lbs/hour as NO_2]	*19.9*	*20.9*	*22.3*	*21.0***	≤19.9
[TPY]	87.2	91.5	97.7	92.0	
CO (Method 10)					
[ppmvd]	36	23	33	31	
[lbs/hour]	5.37	3.43	4.83	4.54	
[TPY]	23.5	15.0	21.2	19.9	
NMOCs (Method 25)					
[ppmvd as C_3H_8]	18	26	19	21	
[lbs/hour]	4.3	6.1	4.4	4.9	
[TPY]	18.7	26.7	19.3	21.6	
COG (Method 315)*					
[gr./dscf]	0.002	0.002	0.002	0.002	
[lbs./hour]	0.45	0.43	0.65	0.51	
[TPY]	1.98	1.88	2.86	2.24	

* Suggested by Ron Myers of the USEPA as a measurement procedure for coke oven gas (COG).

** Results appear to be higher than the emission standard.

*** Results appear to be above the major source threshold.

Emissions Summary – Table 2

Run No.	1	2	3	Averages	Standard
Test Date	12/10/2014	12/10/2014	12/10/2014		
Flow Rate [dscfm]	34,100	32,400	32,800	33,100	
HCl (Method 26)					
[ppmvd]	5	6	5	5	
[lbs./hour]	0.97	1.02	0.94	0.98	
[TPY]	4.26	4.45	4.12	4.28	
Cl_2 (Method 26)					
[ppmvd]	<0.1	<0.1	<0.1	<0.1	
[lbs./hour]	<0.003	<0.003	<0.003	<0.003	
[TPY]	<0.01	<0.01	<0.01	<0.01	

Emissions Summary – Table 3

Run No.	1	2	3	Averages	Standard
Test Date	12/10/2014	12/10/2014	12/10/2014		
Flow Rate [dscfm]	34,100	32,400	32,800	33,100	
Benzene (Method 18)					
[ppmvd]	1.2	1.2	1.1	1.2	
[lbs/hour]	0.52	0.50	0.50	0.51	
[TPY]	2.27	2.20	2.19	2.22	
Toluene (Method 18)					
[ppmvd]	0.2	0.2	<0.2	<0.2	
[lbs/hour]	0.13	0.13	<0.09	<0.12	
[TPY]	0.56	0.55	<0.40	<0.50	
Methanol (Method 18)					
[ppmvd]	0.6	<0.5	0.5	<0.5	
[lbs/hour]	0.10	<0.08	0.09	<0.09	
[TPY]	0.45	<0.36	0.41	<0.41	
Chloromethane (Meth. 18)					
[ppmvd]	0.5	<0.5	<0.5	<0.5	
[lbs/hour]	0.15	<0.13	<0.13	<0.13	
[TPY]	0.65	<0.56	<0.56	<0.59	
o-Xylene (Method 18)					
[ppmvd]	<0.2	<0.2	<0.2	<0.2	
[lbs/hour]	<0.11	<0.10	<0.10	<0.10	
[TPY]	<0.47	<0.45	<0.45	<0.46	
m,p-Xylene (Method 18)					
[ppmvd]	<0.2	<0.2	<0.2	<0.2	
[lbs/hour]	<0.11	<0.10	<0.10	<0.10	
[TPY]	<0.46	<0.45	<0.45	<0.45	
1,3-Butadiene (Meth. 18)					
[ppmvd]	0.3	<0.3	<0.3	<0.3	
[lbs/hour]	0.09	<0.08	<0.08	<0.08	
[TPY]	0.38	<0.36	<0.36	<0.37	
Phenol (Method 18)					
[ppmvd]	0.0	<0.2	<0.1	<0.1	
[lbs/hour]	0.01	<0.06	<0.07	<0.05	
[TPY]	0.02	<0.28	<0.32	<0.21	
Styrene (Method 18)					
[ppmvd]	0.0	0.0	0.0	0.0	
[lbs/hour]	0.01	0.01	0.01	0.01	
[TPY]	0.04	0.04	0.04	0.04	
Naphthalene (Method 18)					
[ppmvd]	0.0	0.0	0.0	0.0	
[lbs/hour]	0.02	0.02	0.02	0.02	
[TPY]	0.07	0.07	0.08	0.07	

Emissions Summary – Table 4

Test Date	2010	2011	2012	2013	2014
FPM [TPY]	34.1	17.4	8.6	7.1	45.3
SO_2 [TPY]	147	78.0	10.5	30.2	141
NO_x [TPY]	73.0	66.6	59.1	59.6	92.0
CO [TPY]	79.9	61.3	28.9	9.6	19.9
HAPs [TPY]					
Benzene	13.1	9.96	3.71	1.59	2.22
Toluene	1.40	1.56	1.23	0.62	<0.50
Methanol	1.06	<0.20	<0.24	0.35	<0.41
Chloromethane	0.66	<1.03	<0.38	<0.43	<0.59
Xylenes	2.48	<1.10	<0.87	<0.73	<0.91
1,3-Butadiene	N/A	<0.28	<0.21	0.24	<0.37
Carbon Disulfide	<0.20	N/A	N/A	N/A	N/A
Phenol	<0.34	N/A	N/A	N/A	<0.21
Styrene	N/A	0.19	0.11	<0.10	0.04
Naphthalene	N/A	1.12	0.22	0.11	0.07
HCl	8.15	6.14	4.52	5.99	4.28
Cl_2	0.01	0.01	0.01	0.08	<0.01
COG	6.14	3.80	1.43	3.93	2.24
∑ HAPs [TPY]	<33.6	<25.4	<12.9	<14.2	<11.9
NMOCs [TPY]	94.3	52.1	32.3	14.6	21.6

Cc: James Hagedorn, EPA Region III
EPA/AKB
AIMS/AKB
Reading File, Source Testing Section