In writeup, say no field data sheets. Need company to send data sheets

A

AP-42 Section 12.2
Reference
Report Sect. 4
Reference 162

# ERIE COKE CORPORATION
# ERIE, PENNSYLVANIA

**Report on**

## COKE QUENCH CAR
## COMPLIANCE DEMONSTRATION

**APRIL 1994**

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**Project No.:** 300321

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## EXECUTIVE SUMMARY

A compliance demonstration of the pushing emissions control for the coke batteries operated at Erie Coke Corporation was conducted on March 17 and 18, 1994. A quench car controls the particulate matter emissions which result from the pushing operations of the battery ovens. The purpose of the testing was to determine the particulate matter concentration and mass emissions rate from the exhaust of the quench car and compare the measured values with the allowable concentration or mass emissions rate promulgated by Pennsylvania Air Pollution Control Regulations. Testing was performed by Chester Environmental under the direction of Mr. Bill Wetzel of Erie Coke Corporation.

The results of the test program showed that the particulate matter concentrations determined in this test program (0.0186 gr/dscf and 0.0175 gr/dscf) were less than the PA DER allowable concentration (0.02 gr/dscf). The results of the test program also showed that the average particulate matter emissions rate determined in this test program (0.27 lb/hr) was less than PA DER allowable emission rate (2.20 lb/hr).

## 1.0 INTRODUCTION

A compliance demonstration of the pushing emissions control for the coke batteries operated at Erie Coke Corporation was conducted on March 17 and 18, 1994. A quench car controls the particulate matter emissions which result from the pushing operations of the battery ovens. The purpose of the testing was to determine the particulate matter concentration and mass emissions rate from the exhaust of the quench car and compare the measured values with the allowable concentration or mass emissions rate promulgated by Pennsylvania Air Pollution Control Regulations. Testing was performed by Chester Environmental under the direction of Mr. Bill Wetzel of Erie Coke Corporation.

## 2.0 METHODOLOGIES

Particulate matter sampling was performed in accordance with EPA Stationary Source Sampling Methods 1 through 5 and Sections 139.11 and 139.12 of Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual (Revision Number 1, January 1983) with the exception that the PA DER requirement of sampling 50 cubic feet of exhaust gas was replaced with the requirement of sampling the emissions from 12 pushes per test. The emissions from each push were sampled for 2 minutes, resulting in a total sample test duration of 24 minutes per test. Testing was performed only during periods of normal plant operation.

The quench car exhausts through a horizontally aligned rectangular duct with dimensions of 48 inches (depth) by 23 inches (height). Sampling was conducted through three equally spaced sampling ports located in the same vertical plane. Each traverse for the duct included 4 traverse points as calculated from EPA Method 1. Sampling was conducted along a total of 3 traverses, or 12 traverse points, with each push sampled for 2 minutes at each traverse point. A schematic diagram of the duct and traverse points is presented in Figure 1.

Two test runs were executed over a two day period (one test per day). During each test, gas concentrations of $CO_2$, $O_2$, and $N_2$ (by difference) were determined with the use of Fyrite apparatus as specified by EPA Method 3.

Clean up of the sampling train included separate water and acetone rinses of both the front-half and back-half sample train components. The water soluble and water insoluble portions of the front-half of the sampling train were determined as a total, while the water soluble and water insoluble portions of the back-half components were determined separately. The back-half water and the water soluble rinses of the back-half components of the sampling train were treated in accordance with Section 139.12 of the PA DER Source Testing Manual.

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FIGURE 1

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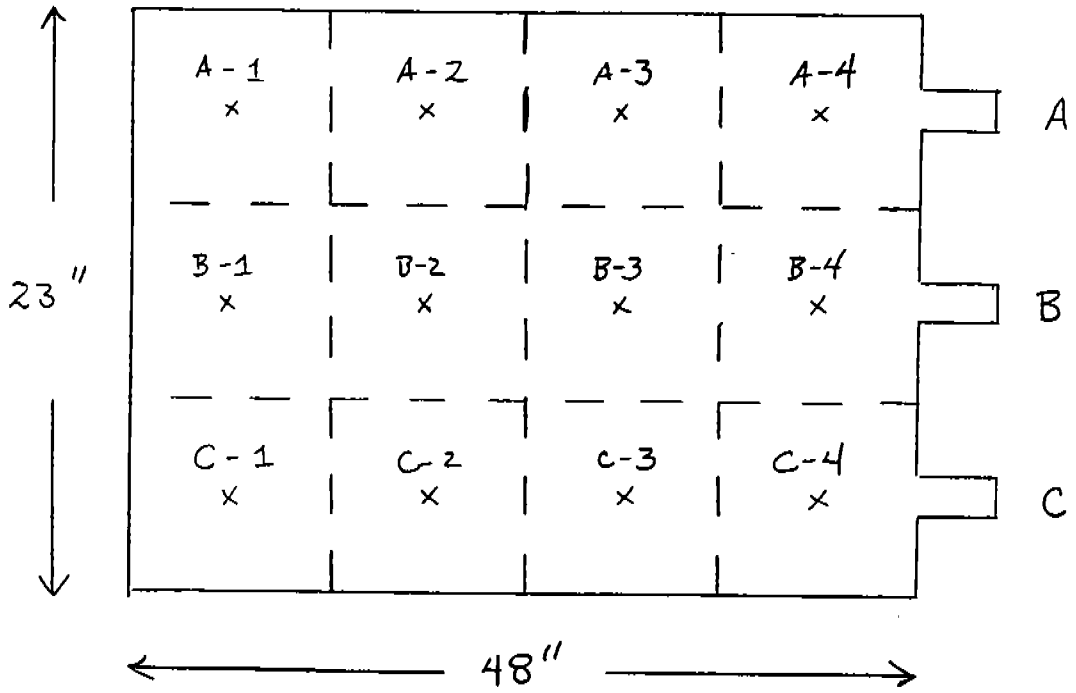
QUENCH CAR COMPLIANCE DEMONSTRATION

SCHEMATIC OF DUCT AND TRAVERSE POINTS




| POINT | DISTANCE |
|---|---|
| A, B, C - 1 | 42.0" |
| A, B, C - 2 | 30.0" |
| A, B, C - 3 | 18.0" |
| A, B, C - 4 | 6.0" |

## 3.0 RESULTS

The test results have been summarized in Table 1. The results of the testing showed an average particulate matter concentration and mass emission rate of 0.0181 grains per dry standard cubic feet (gr/dscf) and 4.39 pounds per hour of pushing (lb/hr pushing), respectively. Since emissions do not occur continuously, the mass emission rate has to be adjusted for the number of pushes which occurred during the testing period. Since there were 15 pushes during the 8-hour daylight turn on each of the emissions testing days (or 1.875 pushes of coke per hour), and each push was sampled for 2 minutes, the actual emission rate (based on a continuous operation) is equal to the following:

$$\frac{4.39\ \text{lb}}{\text{hr pushing}} \times \frac{1\ \text{hr pushing}}{60\ \text{min pushing}} \times \frac{2\ \text{min pushing}}{1\ \text{push}} \times \frac{1.875\ \text{pushes}}{\text{hr}} = \frac{0.27\ \text{lb}}{\text{hr}}$$

As promulgated in Pennsylvania Air Pollution Control Regulations, Section 123.13, the emissions can not exceed 0.02 gr/dscf or the mass emissions rate calculated from the following formula, whichever is greater:

$$A = 0.76\ E^{0.42}$$

where A = Allowable Emissions (lb/hr)
E = Emissions Index = F x W
F = Process Factor (pounds per unit)
W = Production or Charging Rate (units per hour)

For this compliance demonstration, the parameter F is equal to 1 lb/ton coke pushed, and the parameter W is equal 12.55 ton coke/push. Substituting the appropriate values into the formula listed above yields an allowable particulate matter emission rate of 2.20 lb/hr.

The particulate matter concentrations determined in this test program (0.0186 gr/dscf and 0.0175 gr/dscf) were less than the PA DER allowable concentration (0.02 gr/dscf). The average particulate matter emissions rate determined in this test program (0.27 lb/hr) was less than PA DER allowable emission rate (2.20 lb/hr).

Table 1 also lists other duct stack and sampling parameters which include exhaust gas flow rate in units of actual cubic feet per minute (acfm), standard cubic feet per minute (scfm), and dry standard cubic feet per minute (dscfm), moisture content of the exhaust gas (percent by volume), exhaust gas temperature ($^{O}F$), gas volume sampled for each test in units of dry standard cubic feet (dscf), and the isokinetics value for each test. The isokinetics value is equal to the ratio of the average linear gas velocity sampled through the probe nozzle to the average stack gas velocity. An isokinetics value between 90 percent and 110 percent is considered acceptable. The isokinetics values were in the acceptable range of values.

Copies of the field data sheets, pre-test and post-test equipment calibration results, gravimetric results, and emissions calculations can be found in Appendix A.

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ERIE, PENNSYLVANIA

TABLE 1

QUENCH CAR COMPLIANCE DEMONSTRATION
PARTICULATE MATTER EMISSIONS DATA

| | | Run 1 | Run 2 | Average |
|---|---|---|---|---|
| Test Number | | EC-QC-1 | EC-QC-1 | |
| Test Date | | 03-17-94 | 03-18-94 | |
| Concentrations and Mass Emissions Rates | | | | |
| Particulate Matter | (gr/dscf) | 0.0186 | 0.0175 | 0.0181 |
| | (lb/hr pushing) | 4.47 | 4.30 | 4.39 |
| Stack Conditions | | | | |
| Flow Rate | (acfm) | 28400 | 29900 | 29200 |
| | (scfm) | 28400 | 29300 | 28900 |
| | (dscfm) | 28000 | 28700 | 28400 |
| Temperature | (°F) | 59 | 61 | 60 |
| Moisture Content | (%) | 1.5 | 1.9 | 1.7 |
| Sampling Conditions | | | | |
| Sampling Time | (minutes) | 24 | 24 | |
| Sample Volume | (dscf) | 15.979 | 15.909 | |
| Isokinetics | (%) | 100.0 | 96.8 | |