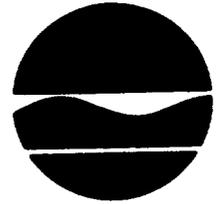


The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

New York State Department of Environmental Conservation

Region 9
600 Delaware Avenue
Buffalo, NY 14202-1073
(716) 847-4565



Robert F. Flacke
Commissioner

18
August 4, 1982

GRAY
IRON FOUNDRIES 12.10
AP-42 Section 7.10
Reference Number
18

Mr. Douglas E. Seely
GCA Corporation
Technology Division
213 Burlington Road
Bedford, MA 01730

Dear Mr. Seely:

Grey Iron Foundry Stack Test Data

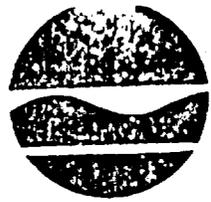
Attached per the request in your letter dated March 25, 1982 are copies of stack test reports for two grey iron cupolas. These tests were performed by our regional stack test team. ~~One test was performed on a cupola with wet scrubber at Dresser Clark in Olean, Cattaraugus County on July 14 and 18, 1977 and the other was performed on a cupola with wet scrubber at Dunkirk Radiator in Dunkirk, Chautauqua County on November 6-12, 1975.~~

If you need further information, please contact me.

Very truly yours,

James L. McGarry, P.E.
Associate Air Pollution
Control Engineer

JMcG:ec
ATT.



S770042

Stack

Testing

Section

Copy

Do Not Remove!

STACK TEST REPORT

Dresser Clark
Olean, New York

Cupola Wet Scrubber
July 14 and 18, 1977

Frank E. Shattuck, Senior Sanitary Engineer
William Pugh, Junior Engineer
Roger McCabe, Principal Engineering Technician
Gary Foersch, Senior Engineering Technician
Dominic Buccilli, Senior Engineering Technician

Certified by James L. McFarley P.E. License No. 647232

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ABSTRACT

A stack test was performed at Dresser Clark in Olean on their wet cupola scrubber.

The testing was performed by the Region 9 Stack Test Team at the request of the Region 9 Office of the New York State Department of Environmental Conservation to determine compliance with 6 NYCRR 213 (Contaminant Emissions from Ferrous Jobbing Foundries).

The personnel performing the testing included Roger McCabe, Principal Engineering Technician, Gary Foersch and Dominic Buccilli, Senior Engineering Technicians. Frank Shattuck, Senior Sanitary Engineer and William Pugh, Junior Engineer were also present to supervise the testing, document opacity and gather pertinent information regarding the cupola operation.

The results of the testing show compliance with 6 NYCRR Part 212 for both particulate and opacity emissions. For particulates the allowable emission rate is 33.6 lb/hr while the average actual emission is 16.4 lb/hr. For opacity emissions, no opacities greater than the allowable 19% were documented during the testing.

SOURCE DESCRIPTION

The Dresser Clark plant is located on North Fifth Street in the City of Olean, New York.

The cupola is prepared with a 5168 pound bed of coke, limestone, carbide and flux over a sand base. Combustion air is forced into the cupola to burn the coke thus melting the charged iron which then flows out a tap hole and into pouring ladles. Each charge into the cupola is composed of approximately 2000 lbs various metal, 285 to 385 lbs of coke, 70 lbs of limestone or 40 lbs limestone and 30 lbs carbide, and 3 lbs of flux.

The gases and particulates given off by the cupola pass through an afterburner and are precleaned by a quenching station where water sprays remove large particles and cool the exhaust gas stream. The gas stream is then drawn into a high energy wet scrubber and through a demister where free water is removed. The gas then passes through an induced draft fan and exits through the stack. Figure 1 in the Test Procedures section shows the air flow through the cupola exhaust system.

This cupola is governed under the production foundry process regulation of 6 NYCRR 212 since the average process weight exceeds 50,000 pounds/hour.

TEST PROCEDURES

The procedures used for testing this cupola were those set forth in the Federal Register, Volume 36, No. 247, December 23, 1971, and New York State Department of Environmental Conservation publications, AIR 100.81 (11/74), AIR 200 (3/73), AIR 200.1 (3/73), AIR 200.3 (3/73), 76-15-7 (9/75) and 76-11-5 (1/76).

The EPA approved sampling train was of the configuration shown in Figure 2 of this section. The testing was performed using a heated 5' glass lined probe. An approved filter, Type 1106 BH, manufactured by MSA, was used for all of the sampling.

A company-supplied blueprint in conjunction with field measurements provided the dimensions as shown in Figure 1 of this section. The ports were located 45' downstream from any flow disturbance (a transition in stack size) and 24' upstream from the exit of the stack. Since this is a 4½' diameter stack, the number of "diameters" downstream of the disturbance is 10, and upstream of the stack exit is 5. This number of straight stack "diameters" downstream and upstream of the sampling ports allowed the sampling to be performed at the minimum of 12 points. Figures 3 and 3a in this section show the location of these 12 sampling points in relation to the ports and stack wall.

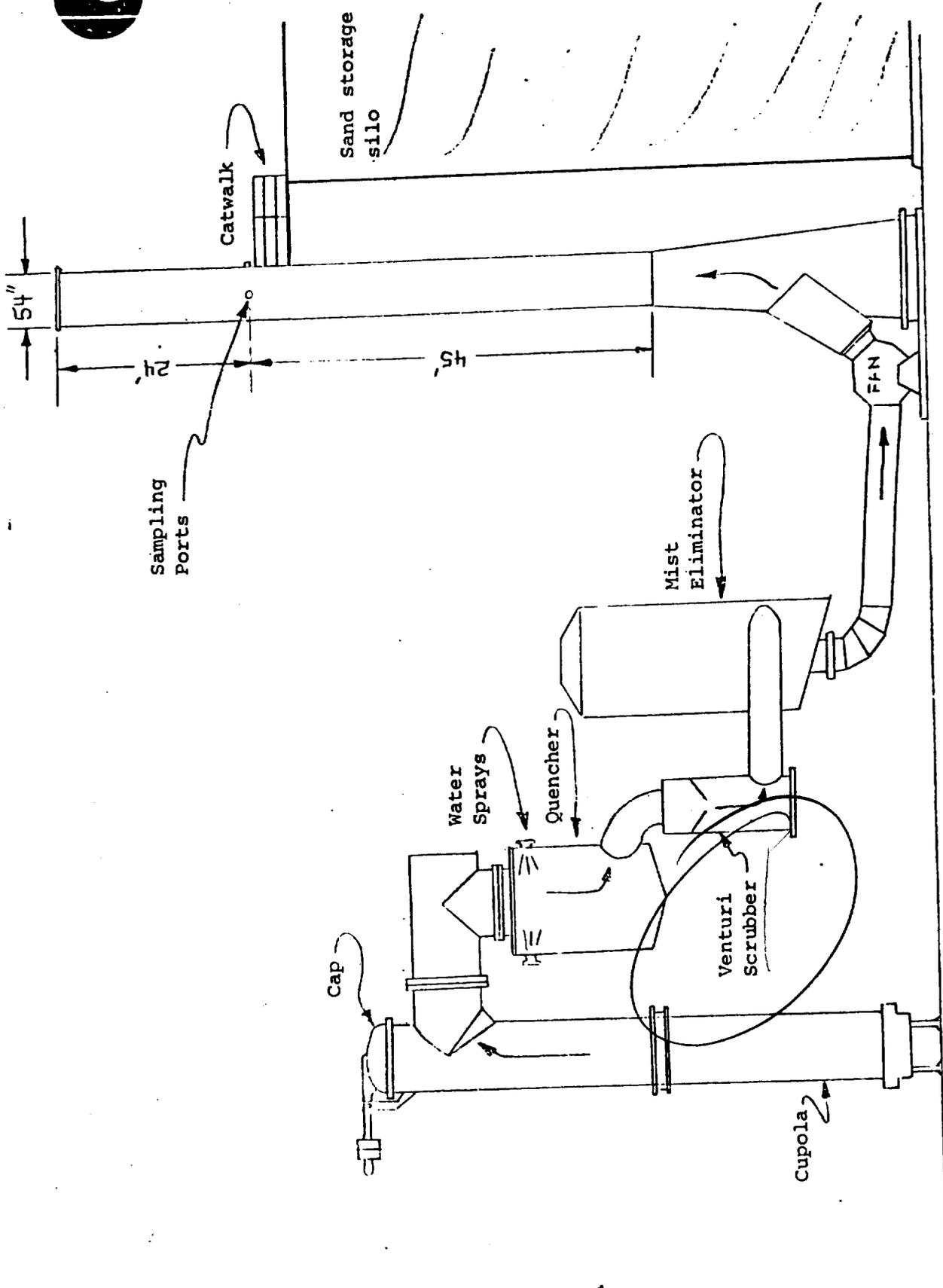
The analytical procedures used on each of the samples were according to the methods specified in the 76-11-5 (1/76) form, Section 5, Sample Analysis. The "wet catch" (particulate from the condensate plus impinger wash) is given for information only and is not included in the emission rate calculations. The wet catch data may be found on the 9AIR 224.1 (10/74) included in the Appendix of this report with the test data for each of the individual runs. The lab work was performed by the Department of Health, Central New York Laboratory, Division of Laboratories and Research located in Syracuse, NY.

The molecular weight of the stack gas was determined by using a Burrel Orsat Analyzer. The composite gas samples were taken in an evacuated mylar sample bag during the particulate testing at the stack site. The gas samples were then analyzed at the stack testing shop. More efficient and accurate Orsat analyses can be

performed at the shop than in the field. The Orsat analysis data may be found on the 76-00-93 (7/76) form in the Appendix of this report.

The allowable emission rate for foundries is based on the amount of materials introduced into the cupola prior to and during the melt cycle. The process weight per hour equals the process weight divided by the time of the melt cycle. The weights used in determining the process weight are taken from the Cupola Charge Reports as supplied by Dresser Clark. Copies of these charging reports are included in the Appendix section of this report. The computation of process weight is determined as shown in Table 2 in the Discussion of Results section.

New York State Department of Environmental Conservation



Dresser Clark-Olean
Flow Diagram and Port Location
Figure 1

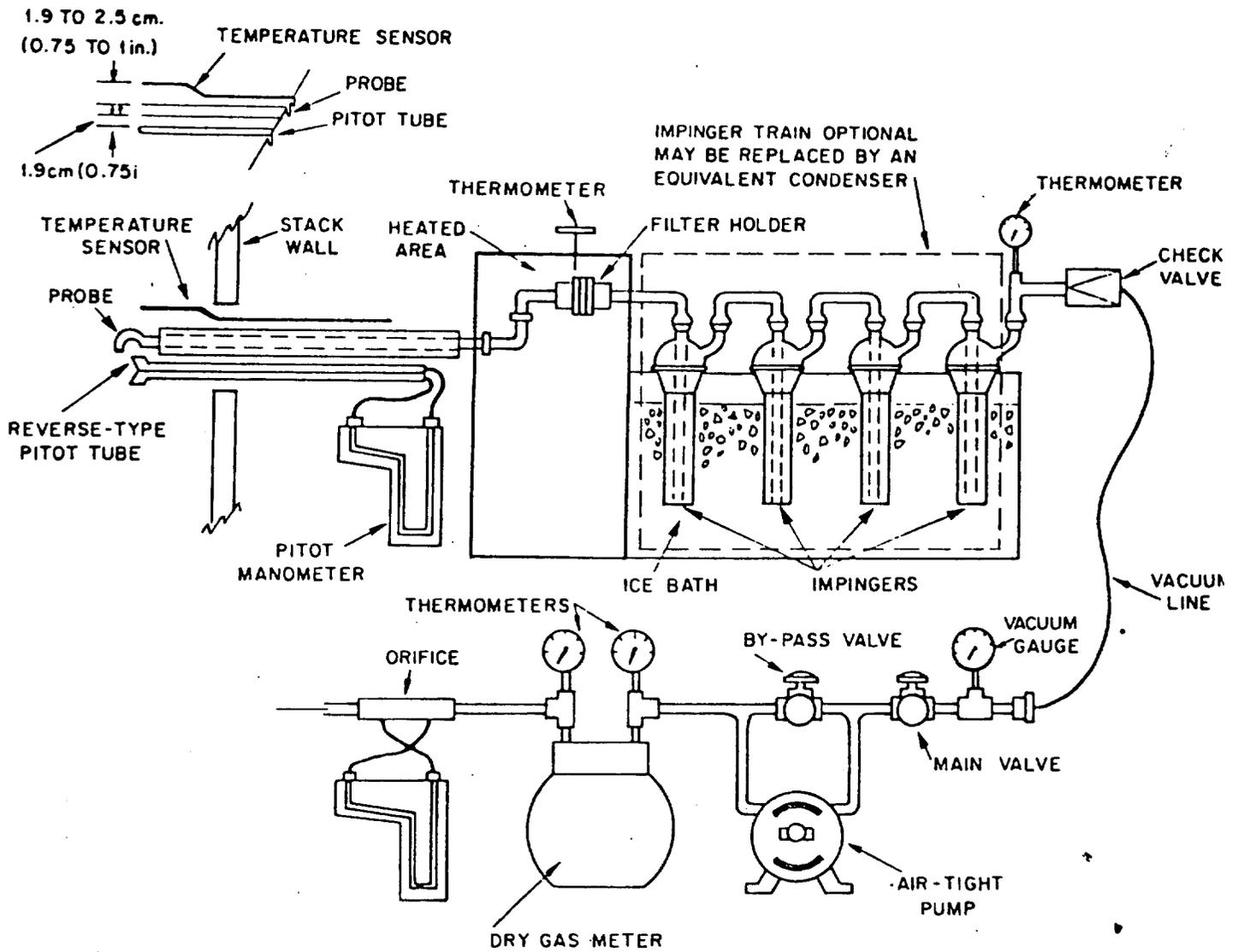
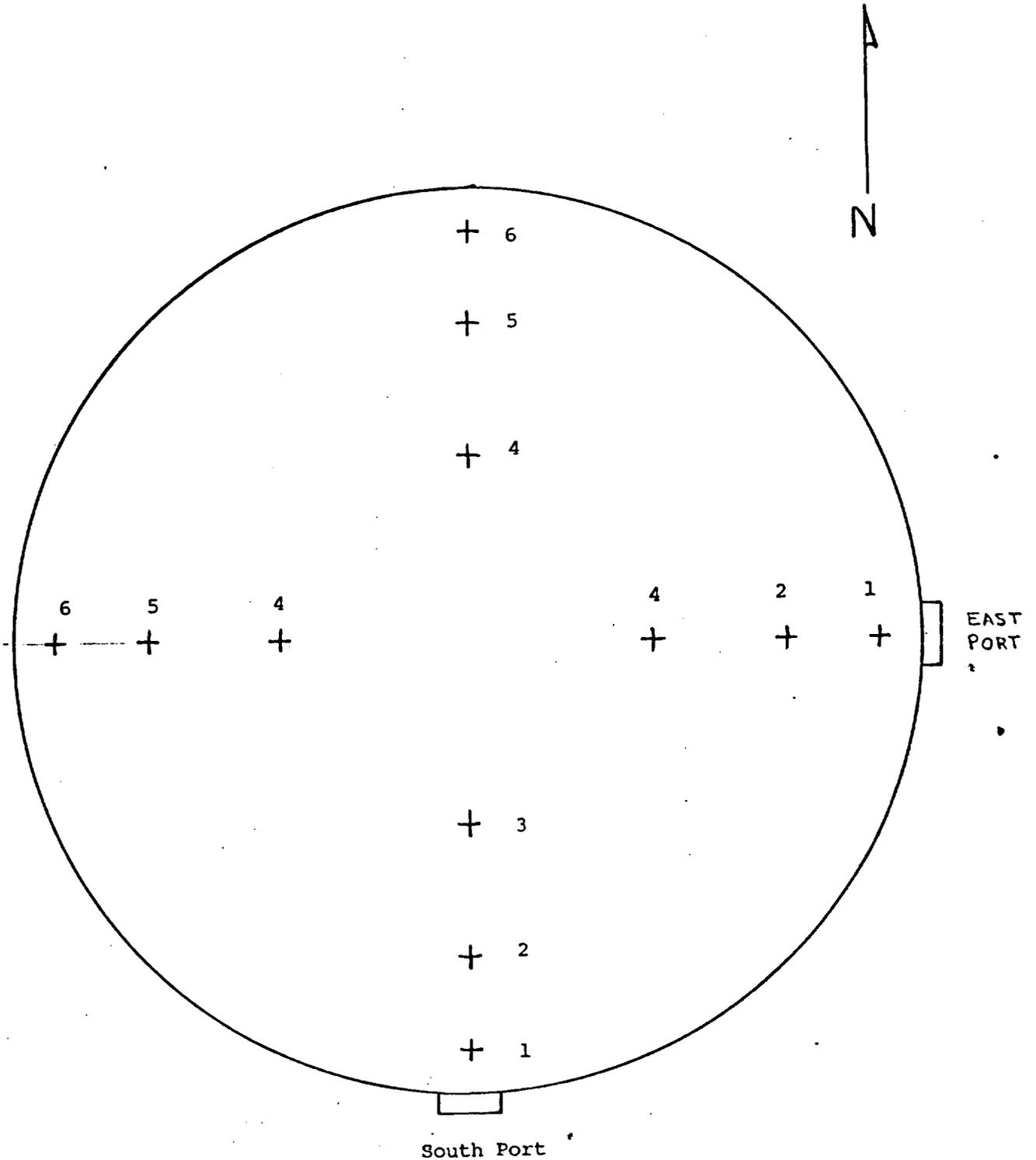


FIGURE 2 PARTICULATE SAMPLING TRAIN



New York State Department of Environmental Conservation

Dresser Clark - Olean
54" Inside Diameter



Sampling Point Locations - Figure 3

Dresser Clark - Olean
Cupola Wet Scrubber

<u>Point No.</u>	<u>% of Stack Diameter</u>	x	<u>Stack Diameter</u>	=	<u>Distance from Inside Wall</u>
1	4.4	x	54"	=	2 3/8"
2	14.7	x	54"	=	7 15/16"
3	29.5	x	54"	=	15 15/16"
4	70.5	x	54"	=	38 1/16"
5	85.3	x	54"	=	46 1/16"
6	95.6	x	54"	=	51 5/8"

Sampling Point Locations
Figure 3a

PLUME OBSERVATIONS

During the testing, plume observations were made by Frank Shattuck, a Senior Sanitary Engineer with the Region 9 Office. Mr. Shattuck is certified by the Department of Environmental Conservation as an opacity observer. Mr. Shattuck made his opacity observations on July 14 while the testing was in progress.

General Prohibitions, 6 NYCRR 212.7 (Opacity of Emissions Limited) states "No person shall cause or allow emissions having an opacity of 20% or greater from any process or exhaust and/or ventilation system to be emitted to the atmosphere except only the emission of uncombined water."

During the observation made by Mr. Shattuck, there were no smoke violations of 6 NYCRR 212.7. Copies of the opacity documentation on NYSDEC form 76-14-5 (3/76) Smoke Observation form are included in the Appendix.

DISCUSSION OF RESULTS

The rule that governs the Dresser Clark cupola is 6 NYCRR 212, Process, Exhaust and Ventilation Systems. Section 212.3, Emissions from Existing Emission Points, states: "Emissions of contaminants to the outdoor atmosphere from any process or exhaust and/or ventilation system through any emission point shall be restricted as follows: Subpart (a); No person shall cause or allow emissions that contravene Table 2 or Table 3 of this Part, for the Environmental Rating issued by the Commissioner."

The process weight, as described in the Cupola Testing Procedure (9AIR 100.81, 11/75) is all that material introduced into the cupola prior to and during the melt cycle. The summary of data used to determine the process weight (lb/hr) for each melt is shown in Table 2 (Process Weight Tabulation). The average process weight for the three test runs is 53,756 lb/hr. The cupola charging data for the days the stack tests were performed is included in the Appendix of this report.

The allowable emission rate from 6 NYCRR Part 212, Table 3 is 33.6 lb/hr. The allowable emission is determined as in Table 3 of this section. The average actual emission rate is 16.4 lb/hr. The Summary of Test Results is shown as Table 1 in this section.

Dresser Clark - Olean

<u>Date</u>	<u>Run No.</u>	<u>Process Weight (lb/hr)</u>	<u>Allowable Emission (Lb/hr)</u>	<u>% Isokinetic</u>	<u>Stack Flow Rate (SCF/hr)</u>	<u>Particulate Concentration (gr/SCF)</u>	<u>Particulate Emission Rate (lb/hr)</u>
7/14/77	2	54,505*		100.6	2,182,200	.0633	13.1
8/18/77	3	53,381*		98.0	2,312,640	.0576	12.8
7/18/77	4	<u>53,381*</u>		101.4	<u>2,364,540</u>	<u>.1046</u>	<u>23.4</u>
		53,756	33.6**		2,286,460	.0752	16.4

* - Process Weight as determined in Table 2 in this Section

** - Allowable Emission as determined in Table 3 in this Section

Dresser Clark - Olean

	<u>7/14/77</u>	<u>7/18/77</u>
Bed		
Coke	4800	4800
Limestone	300	300
Carbide	60	60
Flux	<u>8</u>	<u>8</u>
Subtotal.	5168 lbs	5168 lbs
Charges	(62)	(57)
Metal	124,000	114,000
Coke	18,920	16,530
Limestone	3,740	3,990
Carbide	600	--
Flux	<u>186</u>	<u>171</u>
Subtotal	147,446 lbs	134,691 lbs
Total	152,614 lbs	139,859 lbs
Melt Time	2.80 hrs	2.62 hrs
Process Wt.	54,505 lb/hr	53,381 lb/hr

Dresser Clark - Olean

As taken from 6 NYCRR, Part 212, Table 3 for process weight per hour up to 100,000 lb/hr

$$E = .024 (P)^{0.665}$$

Where E = Allowable Emission Rate

P = Process Weight

$$E = .024 (53,756 \text{ lb/hr})^{0.665}$$

$$E = 33.6 \text{ lb/hr}$$

Allowable Emission Rate Calculation
Table 3