AP32 Section:	12.5.1
Background Chapter	3
Reference:	14
Title:	Source Sampling for CO Emissions, EAF Baghouse. Nucor Steel, Crawfordsville, IN. September 22, 1995.

State Form 4336

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

Date: April 22, 1996

To: Phil Perry

Thru: Ed Surla

From: Stephen L. Friend SLF

Subject: Nucor Steel
Rural Route #2 ,Box 311
Crawfordsville, IN.
Source ID No. 107 00038

The subject company has submitted a report concerning particulate sampling of the Pickle Line and Acid Regeneration Line. Sampling of the Electric Arc Furnace Baghouse for particulate and CO was also conducted. The tests were conducted on Sepember 9, 19, 21 and 22, 1995 by Ramcon Environmental Corporation. The purpose of the testing was to determine the compliance status of the facility with regards to an operating permit and to fulfill the obligation of Cause No. A-1635. I have reviewed this report and found the sampling procedures used and results to be acceptable to this office. A copy of this report is filed in the Compliance Data Section. The following is a summary of the test results:

Pickle Line-Particulate

Maximum Permitted Rate:	150 tons/hr
Average Rate During Test:	144 tons/hr
Average Measured Emissions:	.138 lb/hr
Allowable Emissions:	0.8 lb/hr
Highest 6-Minute Opacity:	0%
Average Opacity:	0%

Status: IN COMPLIANCE

Acid Regeneration-Particulate

Maximum Permitted Rate:	8.5 gpm
Average Rate During Test:	6.93 gpm
Average Measured Emissions:	8.90 lb/hr
Allowable Emissions:	2 lb/hr
Highest 6-Minute Opacity:	0%
Average Opacity:	0%

Status: OUT OF COMPLIANCE

Electric Arc Furnace Baghouse

Maximum Permitted Rate:	260 tons/hr
CO	
Average Rate During Test:	235 tons/hr
Average Measured Emissions CO:	227 lbs/hr
Allowable Emissions CO:	520 lbs/hr

Status: IN COMPLIANCE

Particulate with AOD in operation

Maximum Permitted Rate:	282 tons/hr
Average Rate During Test:	192 tons/hr
Average Measured Emissions PM:	.0031 gr/dscf
Allowable Emissions PM:	.0018 gr/dscf
Highest 6-Minute Opacity:	0%
Average Opacity:	0%

Status: OUT OF COMPLIANCE

note: The acid regeneration and electric arc furnace were retested 11/95 for particulate matter. The 11/95 tests were in compliance and no enforcement action was recommended for the 9/95 tests.

cc:S. Friend
W. Stanfield
D. Valinetz
General Files-Montgomery County

I. INTRODUCTION

On September 19-22, 1995, personnel from RAMCON Environmental Corporation conducted air emissions testing at Nucor Steel located in Crawfordsville, Indiana. The testing was performed for particulate and hydrogen chloride (HCl) emissions from the Pickle Line exhaust and the Acid Regeneration Unit. Carbon monoxide (CO) emissions were also determined from the EAF Baghouse process.

EPA Reference Method 26A was employed for the analysis of particulate and HCl. Additionally, stack gas moisture, velocity, and volumetric flow rates were determined to provide data enabling conversion of flue gas concentrations to emission data. These determinations were performed in combination with each of the isokinetic test runs.

Carbon monoxide was collected and analyzed by a test method that utilizes "real-time" continuous emission monitor (CEM) instrumentation. This technology provides data with a high degree of reliability on-site. The EPA Method employed was Reference Method 10 for the analysis of CO.

This testing procedure sets forth a sampling strategy to continuously extract sample gas from the source. This sample stream is routed to individual CEMs for analysis of the various targeted pollutants and diluent gases. The test results are based on the average value of one-minute averages generated by the CEM instrument data acquisition during the test periods. Three (3) sampling periods were performed in which the gaseous concentrations were continuously monitored for the listed target compounds.

The purpose of the testing project was to determine if the targeted pollutant emissons are equal to or below the allowable limitation set forth by Indiana Department of Environmental Management. Mr. Steve Friend representing the State of Indiana was present during the testing procedure(s) conducted by RAMCON Environmental Corporation.

Nucor Steel		Run #1	Run #2	Runs #3
Crawfordsville, Indiana	Date	09/22/95	09/22/95	09/22/95
EAF Baghouse	Start time	18:00	19:09	20:16
	End time	19:00	20:09	21:16
SAMPLING TRAIN				
Sample gas volume corrected, ft^3	Vm(std)	0	0	0
Average meter temperature, R	Tm	0	0	0
Average orifice pressure drop, in. H_2O	ΔH	0	0	0
VELOCITY TRAVERSE				
Stack area, ft^2	A	267	267	267
Absolute stack gas pressure, inches Hg.	Ps	29.92	29.92	29.92
Barometric pressure, inches Hg.	Pbar	29.92	29.92	29.92
Average absolute stack temperature R	Ts	580	720	690
Average differential pressure, (cp = .84)	$\sqrt{\Delta P}$	1.08	1.08	1.09
Average gas velocity, ft/second	Vs	64.578	71.56	70.611
STACK MOISTURE				
Total water collected, ml	Vic	0	0	0
Moisture in stack gas, percent (%)	Bws	7.5	6	6.2
STACK MOLECULAR WEIGHT				
Percent CO_2 by volume	CO_2	0	0	0
Percent O_2 by volume	O_2	20.9	20.9	20.9
Percent CO by volume	CO	0	0	0
Percent N_2 by volume	N_2	79.1	79.1	79.1
Dry molecular weight, lb/lb mole	Md	28.84	28.84	28.84
Stack molecular weight, lb/lb-mole	Ms	28.03	28.19	28.17
EMISSIONS DATA				
Stack gas flow rate, dscf/hr	Qsd	52,268,816	47,414,585	48,716,268
Stack gas flow rate, cfm	acfm	1,034,532	1,146,387	1,131,189

CO TEST SUMMARY

Run	Start Time	End Time	ppm	lb/hr	lb/Ton *
1	18:00	19:00	52.4	198.69	0.845
2	19:09	20:09	78.17	268.88	1.144
3	20:16	21:16	59.94	211.84	0.901
Average			63.5	226.47	0.964

* CO lb/Ton value based on 235 Tons/hour production rate