

Note: This is a reference cited in AP 42, *Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

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.

AP-42 Section	11.23
Reference	19
Report Sect.	4
Reference	19

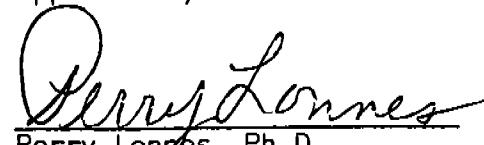
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RESULTS OF JUNE 12, 1975
OXIDES OF NITROGEN DETERMINATIONS
AT THE FAIRLANE PLANT
PELLET FURNACE WET SCRUBBER
INLET AND OUTLET

Submitted to:

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Report Number 5-146
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SYMBOLS AND ABBREVIATIONS

ACFM	actual cubic feet per minute
DEF-F	degrees Fahrenheit
FT/SEC	feet per second
GR/ACF	grains per actual cubic foot
GR/SCF	grains per dry standard cubic foot
g	gram
HRS	hours
IN.	inches
IN. HG.	inches of mercury
IN. WC.	inches of water
LB	pound
LB/HR	pounds per hour
LB/SCF	pounds per dry standard cubic foot of gas
MIN	minutes
SCFM	standard cubic feet of dry gas per minute
SQ. FT.	square feet
V/V	percent by volume

Standard conditions are defined as 70°F and 29.92 inches of mercury pressure.

1 INTRODUCTION

On June 12, 1975, Interpoll Inc. conducted a series of oxides of nitrogen (NO_x) determinations on the gas stream entering and exiting the pellet furnace wet scrubber. The NO_x determinations were carried out in accordance with EPA Method 7. Three 2-liter grab samples were collected at the inlet and outlet and the average inlet and outlet-concentrations determined. The actual volumetric flow, temperature and absolute gas pressure were also measured. The mass flow of oxides of nitrogen entering and exiting the scrubber were then calculated together with the scrubber "oxides of nitrogen" removal efficiency. At the time of the determinations, the kiln temperature was 2380°F., the air pressure -1 in. WC. and the feed rate 385 long tons per hour (wet).

The results of all field and laboratory measurements and determinations are reported in Section 2. Field data sheets are presented in the Appendix.

2 RESULTS

The results of the inlet and outlet oxides of nitrogen concentration determinations are presented in Table 1. The average inlet and outlet concentrations were 402 and 317 PPM (dry basis), respectively. The average mass flow of NO_x at the inlet and outlet were 638.4 and 504.0 LB/HR (reported as NO_2) which corresponds to a scrubber removal efficiency of 21.05%. The mass flows were calculated from the average dry standard concentrations and the dry standard flow measured at the outlet. This calculation assumes no leakage

into the duct system between the inlet and outlet sampling locations. The influence of water vapor introduced by the scrubber is eliminated when dry concentrations and flow rates are utilized.

The results of the volumetric flow determination at the scrubber outlet are summarized in Table 2. A Type S pitot was used to measure the velocity pressures. The moisture content was determined psychrometrically.

Table 1. Results of NO_x Concentration Determinations Conducted on June 12, 1975^x on the Inlet and Outlet of the Pellet Furnace Wet Scrubber at the Fairlane Plant.

SAMPLE	Concentration	
	LB/SCF	PPM
Inlet	3.97×10^{-5}	336 = 541 lb/hr
Inlet	5.45×10^{-5}	461 = 742
Inlet	4.83×10^{-5}	408 = 656
Outlet	3.75×10^{-5}	317 = 510 lb/hr
Outlet	3.59×10^{-5}	303 = 487
Outlet	3.92×10^{-5}	331 = 532

331
1000000000

Table 2. Results of Flow Determination at Scrubber Outlet

TIME AND DATE	1450, 6/12/75
BAROMETRIC PRESSURE (UNCOMPENSATED IN.HG.)	28.24
PITOT TUBE COEFFICIENT	0.84
NUMBER OF SAMPLING PORTS	2
TOTAL NUMBER OF POINTS TRAVESED	24
STACK DIAMETER (IN.)	120
CROSS SECTIONAL AREA (SQ.FT)	78.54
DIRECTION OF FLOW	VERTICAL, UP
STATIC PRESSURE (IN.WC)	-1.1
AVERAGE GAS TEMPERATURE (DEG-F)	132
ABSOLUTE GAS PRESSURE (IN.HG.)	28.24
AVERAGE MOISTURE CONTENT (V/V)	16.45
AVERAGE LINEAR VELOCITY	67.4
VOLUMETRIC FLOW	
ACTUAL (ACFM)	317,800
STANDARD DRY (SCFM)	224,400

Source category: Taconite Ore Processing
 Plant name : Eveleth Taconite Company
 Process : Induration

Filename: TAC4-19.WQ1
 Location: Eveleth, MN
 Test date: 6/12/75

Date: 10/24/96
 Ref. No.: 4-19
 Process rate basis: Feed/estimated production

Source	Type of control	Pollutant	Run No.	Test Method	Isokinetic, %	Gas volume, DSCFM	Volum. DSCFM	Mass, g	Concen., PPM	Emission rate, lb/hr	Emission factor		
											kg/Mg	lb/ton	Rate
Gas-fired grate/kiln (nat. gas-fired)	None	NOx	1	EPA 7		224,400		336	541	324	0.84	1.7	
		NOx	2			224,400		461	742	324	1.1	2.3	
		NOx	3			224,400		408	657	324	1.0	2.0	
	Wet scrubber	NOx	1			224,400		317	510	324	0.79	1.6	
		NOx	2			224,400		303	488	324	0.75	1.5	
		NOx	3			224,400		331	533	324	0.82	1.6	
									%	Average	0.79	1.6	C
									Average	1.0	2.0	C	

Basis for rating:

Problems noted:

Other notes:

Incomplete documentation; production rates estimated from feed rates.

Feed rates only reported; production rates estimated using feed-to-production ratio of 1.19 as indicated in Ref. 29 for this source.
 May be for one of two stacks, but cannot determine from the reference.

