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RESULTS OF THE JUNE 22, 1993 PARTICULATE AND OPACITY COMPLIANCE TESTS CONDUCTED ON THE NO. 2A WASTE GAS STACK AT THE NATIONAL STEEL PELLET PLANT IN KEEWATIN, MINNESOTA

Submitted to:

NATIONAL STEEL PELLET COMPANY
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Attention:

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Approved by:

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SP/slp

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	dry standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^6BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/Nm^3	milligrams per dry standard cubic meter
ug/Nm^3	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	≤ (when following a number)

Standard contitions are defined as 68°F (20°C) and 29.92 IN. of mercury pressure.

g:\stack\wp\misc\abbrev.frm

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Testing was conducted from 4 test ports oriented at 90 degrees on the stack. The test ports are located 7 diameters downstream and 2 diameters upstream of the nearest flow disturbances. A 16-point traverse was used to collect representative particulate samples. Each traverse point was sampled 4 minutes to give a total sampling time of 64 minutes per run. Visible emissions determinations were performed by Rick Eidem, an EPA-certified observer.

The important results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

Table 1. Summary of the Results of the June 22, 1993 Particulate Emission Compliance Test on the No. 2A Waste Gas Stack at the National Steel Pellet Company Plant in Keewatin, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		06-21-93	06-21-93	06-21-93
Time runs were done	(HRS)	805/ 910	945/1055	1125/1145
Process rate	(LTPH)	606.0	606.0	606.0
Volumetric flow				
actual	(ACFM)	407418	410476	408062
standard	(DSCFM)	259156	256518	253972
Gas temperature	(DEG-F)	233	239	242
Moisture content	(%V/V)	11.93	12.67	12.72
Gas composition	(%V/V,dry)			
carbon dioxide		1.10	1.10	1.00
oxygen		18.10	18.00	18.10
nitrogen		80.80	80.90	80.90
Isokinetic variation	(%)	100.6	101.0	100.0
Particulate concentration				
actual	(GR/ACF)	.0515	.0420	.0413
standard	(GR/DSCF)	.0810	.0673	.0664
Part. emission rate	(LB/HR)	179.8	147.9	144.5

Note: Dry + Organic Wet Catch

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3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) are presented first followed by the computer printout of the particulate and opacity results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written in Extended BASIC specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs. The particulate emission rate has been calculated using the product of the concentration times flow method.

Source category: Taconite Ore Processing
Plant name : National Steel Pellet Co.
Process : Indurating furnace

Filename: TAC4-54.WQ1
Location: Keewatin, MN
Test date: 6/22/93

Date: 10/11/96
Ref. No.: 4-54
Process rate basis: Production

Source	Type of control	Pollutant	Run No.	Test Method	Isokinetic, %	Gas volume, DSCF	Volum. flow rate, DSCFM	Mass, g	Concen., gr/DSCF	Emission rate, lb/hr	Process rate, ton/hr	Emission factor kg/Mg	Emission factor lb/ton	Rat.
Natural gas-fired grate/kiln, (acid pellets)	Multiclone	filterable PM	1	EPA 5	100.6	NS	259,156	NS	0.080	355	721	0.25	0.49	
		filterable PM	2		101.0	NS	256,518	NS	0.066	292	721	0.20	0.40	
		filterable PM	3		100.0	NS	253,972	NS	0.066	286	721	0.20	0.40	
											Average	0.22	0.43	C
		CO2	1	Orsat	NA	NA	259,156	NA	1.1	39,135	721	27	54	
		CO2	2		NA	NA	256,518	NA	1.1	38,736	721	27	54	
		CO2	3		NA	NA	253,972	NA	1.1	38,352	721	27	53	
											Average	27	54	C

Basis for rating: Incomplete documentation; only one of two stacks measured.
Problems noted:
Other notes: Emissions doubled because only one of two stacks tested.
Additional information provided in Attachment 2 of Reference 53.