BASELINE AND SOLVENT FUELS STACK EMISSIONS TESTS

PREPARED FOR

ENERGY & RESOURCE RECOVERY CORP.
111 WASHINGTON AVENUE
ALBANY, NY 12210

WALTER J. HINCKLEY, PRESIDENT

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9, Clemenson, NY

wet process

ABSTRACT

Emissions tests were performed on the electrostatic precipitator exhaust stack at the Alpha Portland Cement Company plant in Cementon, NY. Testing was conducted for particulate, hydrogen chloride, sulfur dioxide and heavy metals emissions during normal kiln operations (coal only - baseline) and during the burning of waste solvents in the kiln (solvent).

SOURCE DESCRIPTION

The source consists of a rotary kiln used in the manufacture of cement which has its emissions exhausted through an electrostatic precipitator and subsequently vented through an exhaust stack to the atmosphere.

SOURCE OPERATION

The source was operated as close to maximum conditions as possible. Operating data collected during the testing includes coal feed rate, waste solvent firing rate, slurry feed rate, slurry moisture content, clinker production, kiln O_2 content and kiln exit temperature. See the appendix for specific details.

HYDROGEN CHLORIDE (HCl)

To sample for both liquid and gaseous HCl emissions, a modified Reference Method 5 sampling train was used. The first two impingers were filled with 100 ml of 0.10N NaOH, the third left empty and the fourth impinger was filled with 200-300 grams of pre-weighed silica gel. A glass-lined stainless steel probe was used. All sampling components exposed to the contaminated gas stream were brushed and rinsed with distilled de-ionized water. The contaminated glass-fiber filter was washed with distilled de-ionized water to remove the water soluble chloride ions. Analysis of the quantitatively recovered chloride emissions was performed in accordance with the mecuric nitrate method.

SULFUR DIOXIDE (SO_2)

Sulfur dioxide samples were collected in accordance with the specifications of Method 6 of the Federal EPA "Standards of Performance for New Stationary Sources", as published in the Federal Register of August 18, 1977. Sampling was performed at a rate of 1 liter/min. for 30 minutes utilizing a critical orifice/vacuum pump train. A minimum of 0.71 DSCF was pulled per sample. Also, one run consisted of two (2) samples. The fourth impinger, normally empty, contained H_2O_2. This solution was analyzed separately to determine sample train efficiency.

CYCLONIC FLOW

Prior to each test, differential pressure readings were taken with "S" type pitot tubes, to check for cyclonic flow. Results were negative throughout the testing period.

1/26/82

COAL ONLY

STACK PARAMETERS AND EMISSIONS

PARAMETER	RUN NO. 1	RUN NO. 2	RUN NO. 3	AVERAGE
STACK FLOW - SCFM	166351	165012	167006	166123
STACK TEMP. - ^{o}F	267	265	267	266
STACK PRESS. - In. Hg	29.76	29.76	29.86	29.79
STACK VEL. - FPM	2134	2111	2136	2127
SAMPLE TIME - MIN.	72	72	72	72
% ISOKINETIC	106.9	101.1	99.5	102.5
% MOISTURE	24.3	24.6	24.4	24.4
M.W. OF STACK GAS	26.99	27.01	26.96	26.99
% CO_2 (DRY)	8.7	9.3	8.6	8.9
% CO (DRY)	0.0	0.0	0.0	0.0
% O_2 (DRY)	12.1	11.5	12.1	11.9
% N_2 (DRY)	79.2	79.2	79.3	79.2
EMISSIONS				
PART. CONC. - GR/DSCF	.0509	.0492	.0489	.0497
PART. EMISSIONS - LB/HR	54.93	52.46	52.91	53.43
HCl CONC. - GR/DSCF	.00329	.00187	.00143	.00220
HCl EMISSIONS - LB/HR	3.57	2.00	1.55	2.37
SO_2 CONC. GR/DSCF x 10^{-6}	20.9	16.7	17.5	18.4
SO_2 EMISSIONS - LB/HR	157.49	125.77	132.02	138.43

AUXILIARY FUEL ANALYSES

PARAMETER		
Be	<0.63	ug/g
Ba	924	ug/g
Cd	90.5	ug/g
Cr	327	ug/g
Cu	104	ug/g
Pb	2020	ug/g
Ni	12.7	ug/g
SULFUR	0.21%	
ASH	0.16%	
BTU/LB	11,640	
TOTAL PCB	≤1PPM	
PESTICIDES	<5PPB	

ORGANIC HALOGENS (PPM)

FREON	132
CHLOROFORM	6
1,1,1, TRI CHLORO-ETHANE	222
TRI CHLORO-ETHYLENE	62
TETRA CHLORO-ETHYLENE	168

HERBICIDES

ENDRIN	<10 PPM
METHOXYCHLOR	<1 PPM
TOXAPHANE	<250 PPM
2,4,D	≤80 PPB
2,4,5TP	≤50 PPB

COMPOSITE COAL SAMPLE

	1/25/82	1/26/82
SULFUR %	2.45	2.72
ASH %	11.2	11.0
BTU/LB	13470	13250

PROCESS OPERATING DATA

		1/25/82			1/26/82	
PARAMETER	RUN I	RUN II	RUN III	RUN I	RUN II	RUN III
Coal Rate (Ton/ Hr)	12.16	12.49	10.81	16.35	14.49	15.48
Waste Solvent Rate (GPM)	15	15	15	0	0	0
Slurry Feed Rate (GPM)	392	396	395	396	390	390
Slurry Moisture (% by Wt.)	39.2	39.2	39.2	45.4	45.4	45.4
Clinker Prod. (Ton/Hr Avg.)	54.3	54.3	54.3	50.2	50.2	50.2
Kiln O_2 (%)	2.7	2.6	3.8	4.5	4.6	3.7
Kiln Temp. (^{o}F)	2630	2670	2843	2600	2710	2660