Background Report Reference

AP-42 Section Number: 12.11

Background Chapter: 2

Reference Number: 28

Title: Source Evaluation Results at Master Metals, Inc.

Emnvisage Environmental

March 1991

MASTER METALS, INC., 2850 W. THIRD ST., CLEVELAND, OHIO 44113 • (216) 621-2361 FAX 621-7475

Lead Smelter and Refiner

June 8, 1992

Shelby Landy

Mr. Dennis Shipman
Emission Inventory Branch
U.S. EPA
Research Triangle Park, N.C. 27711

Dear Sir:

Enclosed you will find a copy of facility and air emissions information which was recently submitted to Mr. Bruce C. Jordan of your USEPA office of Air Quality Planning and Standards.

Sincerely,

Rudy A. Zupan

Rudy A. Zupan
Master Metals, Inc.

NO Prod. data - The S.T is for a single furnace, The Section 114 data is for 2 furnace, i. can't assume 1/2 of the data from Section 114 to be the furnace prod. data at the test date -

$CO_2 = 0$ #20 rotary furnace Pretreatment process (Baghouse)

Frat 1/2 Filterable only

(Rotary furnace smelting Baghouse) a

AP-42 Section: ~~Batt~~ 2nd Smelting 7.11 Ref #: 1

Date: 6/18/92 Rating: A

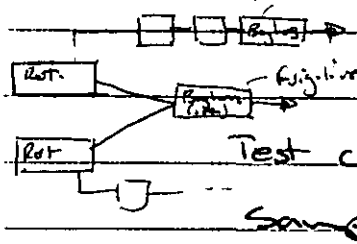
Firm/company: Master Metals, inc, cleveland OH

Tested by: Envisage Environmental Inc.

Test date: March 12/91

Special Process: Rotary Furnace smelting.

exhaust stacks of the 2 baghouses serving the lead smelter.



Test conditions: Usual ☐, unusual ☐

Sampling Method:

Sampling location and Velocity Method:

Calibration Info: Yes ☐, No ☐

PARAMETER:		Run #1	Run #2	Run #3	Avg.
Lead	lb/hr	0.009	0.004	0.002	0.005
Particulate	lb/hr	0.25	0.41	0.24	0.3
Sulfur Dioxide		0.06	Below detectable	Below detect.	—
% Isok.		96.1	94.6	95.6	

Production Data: 12,000/~~8760~~ lb/hr - (enclosure) P3

= 1.3699 T/hr

12,000 T/yr. (enclosure P14)

= 2,747.3 lb/hr = 1.374 T/hr

Emission Factors: Lead = $\frac{0.005 \text{ lb/hr}}{1.374 \text{ T/hr}}$ = 0.0036 lb/Ton ✓

Particulate = ~~1.3699 T/hr~~ $\frac{0.31 \text{ lb/hr}}{1.374 \text{ T/hr}}$ = 0.218 ✓ lb/Ton

6 NO pad

(Fugitive Baghouse for Rotary Furnace)

AP-42 Section: 7-11, 2nd Smelting Ref #: 1

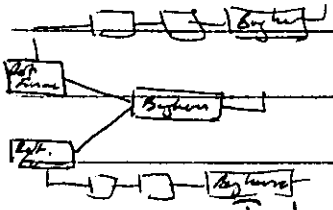
Date: 6/18/92 Rating: A

Firm/company: Master Metals

Tested by: ~~March 12/91~~ Envisage Environmental Inc.

Test date: March 12/91

Special Process: Fugitive Baghouse (Rotary Smelting)



Test conditions: Usual ☒, unusual ☐

Sampling method: 12

Sampling location and Velocity Method: 1-5

Calibration Info: Yes ☒, No ☐

PARAMETER:	Run #1	Run #2	Run #3	Avg.
Lead (lb/hr)	0.015	0.013	0.014	0.014
Particulate (lb/hr)	0.82	0.78	0.50	0.7
Sulfur Dioxide (lbs/hr)	0.09	Below	Below	—
	91.7	90.1	98.3	

Production Data: 12000 ~~lb~~/yr (P3 enclosure)

$$= 12000\ \frac{\text{T}}{\text{yr}} \times \frac{1\text{yr}}{365\text{ days}} \times \frac{1\text{ day}}{24\text{ hr}}$$

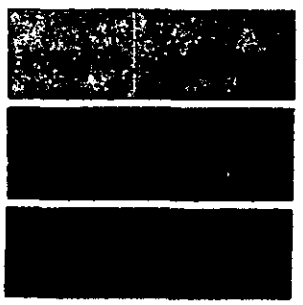
$$= 1.3699\ \text{T/hr}$$

Emission Factors: Lead = $\frac{0.014\text{ lb/hr}}{1.3699\text{ T/hr}}$ = 0.0102 lb/Ton

Particulate = $\frac{0.7\text{ lb/hr}}{1.3699\text{ T/hr}}$ = 0.511 lb/Ton SO_2 N/A

SOURCE EVALUATION RESULTS

PREPARED BY



Envisage Environmental Incorporated

P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

Envisage Environmental Incorporated P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

[redacted]

March 27, 1991

Mr. Douglas K. Mickey
President
Master Metals Incorporated
2850 West Third Street
Cleveland, Ohio 44113

Dear Mr. Mickey:

The following report is the result of the particulate, sulfur dioxide, and lead emission evaluation conducted on March 12, 1991 at the above location. Three (3) test runs were conducted on this date at the exhaust stacks of the two (2) baghouses serving the lead smelter. The systems are designated Furnace Baghouse and Fugitive Baghouse.

The results are true and accurate to the degree specified in the pertinent sections of the Code of Federal Regulations, in force at the time of testing.

I am looking forward to answering any questions you may have and assisting you in the future.

Respectfully submitted,

Tom E. Holder

Tom E. Holder
Environmental Engineer
ENVISAGE ENVIRONMENTAL INC.

TABLE OF CONTENTS

Envisage Environmental Incorporated

P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

INTRODUCTION

Envisage
Environmental
Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

INTRODUCTION

On March 12, 1991, Envisage Environmental Inc. conducted an emission evaluation at Master Metals Incorporated, 2850 West Third Street, Cleveland, Ohio. Testing was conducted at the exhaust stacks of the two (2) baghouses used for air pollution control of the lead smelting operation. Test parameters included particulate, sulfur dioxide, and lead conducted at each location.

The purpose of these tests was to determine compliance with applicable State and Federal Regulations concerning air pollution emissions. The furnace and the baghouses were monitored by Master Metals Inc. and EPA personnel. Test parameters were in accordance with USEPA Reference Methods 1-6 and 12.

The Envisage testing team consisted of Messrs. Bob Hovan, Joe Dossa, Mark Gierke, and Steve Norris. The Ohio EPA was represented by Mr. Douglas Seaman, Division of Air Pollution Control, Cleveland, Ohio. Mr. Rudy Zupan, Master Metals Inc., coordinated the testing.

Results are presented in this report for particulate, sulfur dioxide, and lead emissions with the various velocity, volumetric and temperature measurements associated with these tests for each baghouse.

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

DESCRIPTION OF PROGRAM

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

DESCRIPTION OF PROGRAM

The evaluation consisted of three (3) test runs, each one (1) hour in length. At each location, six (6) sample points were used in each of the two (2) ports. Sample time per point was five (5) minutes for a total sample time per run of sixty (60) minutes. Diagrams of the sample point locations are included in this report.

The samples were withdrawn from the gas streams isokinetically through three (3) foot Pyrex lined probes. The entire lengths of the probes were heated and attached to a Method 5 sample train modified for the collection of sulfur dioxide and lead. The hot boxes were set to maintain a temperature of 248 degree F. and the heated areas were monitored to ensure condensation did not form prior to the impingers. Exit gas temperature of the impingers was maintained below 68 degrees F. with an ice bath. The nozzle, probe and connecting glassware were cleaned before testing and at the conclusion of each test run with acetone. Leak checks of the pitot tube lines and the sample trains were all acceptable by EPA regulations. Cyclonic flow was less than ten (10) degrees at each location.

The method 5 impinger train was modified by replacing the distilled water with the following: # 1 - 100 ml 80% Isopropanol, # 2 - 200 ml 3% Hydrogen Peroxide, # 3 - 100 ml 0.1 Nitric Acid, # 4 - empty, # 5 - 200 grams silica gel. Analysis for sulfur dioxide was by the barium-thorin titration method. The filters and impinger solutions were analyzed for lead by atomic absorption spectrometry.

Flue gas analysis was conducted by drawing an integrated air bag sample throughout each test run and analyzed with a Hays Republic Model 621A "Orsat" Portable Gas Analyzer. The average of at least three readings for each run were used in calculating the emission rates.

Description of Program - continued

Calibration of the equipment used, including the dry gas meters, orifice meters, and the "S" type pitot tubes were conducted within 60 days of the test date. Copies of the data are included in this report.

All analytical procedures were performed in accordance with the methods specified in the Code of Federal Regulations, Title 40 Part 60, Volume 43. Blanks were collected and analyzed on the distilled water and acetone used in the evaluation. The residue from the distilled water was less than could be measured on a 0.1 milligram analytical balance and was considered zero. The acetone blank was recorded and incorporated into the results.

The example equations included in this report represents the data collected during Run # 1 conducted at the Fugitive Baghouse exhaust.

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS

SUMMARY

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS SUMMARY

Master Metals Inc

2850 West 3rd Street

Cleveland, Ohio

Furnace Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

Conducted - March 12, 1991

PARAMETER	RUN # 1	RUN # 2	RUN # 3
Particulate Emissions			
Pounds/hour	0.25	0.41	0.24
Grains/dscf	0.0021	0.0033	0.0019
Lead Emissions - Pounds/hour	0.009	0.004	0.002
Sulfur Dioxide Emissions			
Pounds/hour	0.06	* BDL	* BDL
Pounds/dscf	6.88E-08	* BDL	* BDL
ppmV	0.4	* BDL	* BDL
System Flow Rates			
Feet/second	80.61	80.71	79.27
ACFM	15,835	15,854	15,572
DSCFM	14,082	14,474	14,649
Moisture Content			
Volume percent	2.73	1.66	1.24
Sample Location Temperature			
Degrees Fahrenheit	112	104	89

* Below Detectable Limit

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS SUMMARY

Master Metals Inc

2850 West 3rd Street

Cleveland, Ohio

Fugitive Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

Conducted - March 12, 1991

PARAMETER	RUN # 1	RUN # 2	RUN # 3
Particulate Emissions			
Pounds/hour	0.82	0.78	0.50
Grains/dscf	0.0024	0.0023	0.0015
Lead Emissions - Pounds/hour	0.015	0.013	0.014
Sulfur Dioxide Emissions			
Pounds/hour	0.09	• BDL	* BDL
Pounds/dscf	3.71E-08	* BDL	• BDL
ppmV	0.2	* BDL	* BDL
System Flow Rates			
Feet/second	91.81	91.85	92.04
ACFM	38,937	38,953	39,034
DSCFM	39,989	39,887	40,053
Moisture Content			
Volume percent	1.31	1.07	1.04
Sample Location Temperature			
Degrees Fahrenheit	54	57	56

• Below Detectable Limit

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS

DETAILED

Envisage
Environmental
Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS

Master Metals Inc

Furnace Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

	DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
	Time of Day			0934 1046	1121 1226	1253 1357
1	Gas Volume-dry,std.	Vmstd	cu. ft.	47.65	48.11	49.21
2	Condensate Vapor Vol.	Vwstd	cu. ft.	1.34	0.81	0.62
3	Gas Stream Moisture	Bws	vol.dec	0.0273	0.0166	0.0124
4	Mol.Wt-flue gas (dry)	Msd	lb/lb mo.	28.84	28.84	28.84
5	Mol.Wt-flue gas (wet)	Ms	lb/lb mo.	28.54	28.66	28.70
6	Flue Gas Velocity	Vs	ft/sec	80.61	80.71	79.27
7	Flue Gas Volume-Actual	ACFM	cu. ft.	15,835	15,854	15,572
8	Flue Gas Volume-Std.	DSCFM	cu. ft.	14,082	14,474	14,649
9	Particulate Conc.	Cs				
	- Probe		gr/dscf	0.0019	0.0031	0.0018
	- Filter		gr/dscf	0.0002	0.0002	0.0001
	- Lead		gr/dscf	7.4E-05	3.4E-05	1.7E-05
	- Total		gr/dscf	0.0021	0.0033	0.0019
10	Emission Rate	E				
	- Probe		lb/hr	0.23	0.39	0.22
	- Filter		lb/hr	0.02	0.02	0.02
	- Lead		lb/hr	0.009	0.004	0.002
11	- Total		lb/hr	0.25	0.41	0.24
	Isokinetic Rate	I	%	96.3	94.6	95.6

* Totals DO NOT Include Lead

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

TEST RESULTS

Master Metals Inc

Fugitive Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
Time of Day			0940 1045	1120 1224	1252 1356
1 Gas Volume-dry,std.	Vmstd	cu. ft.	59.71	58.51	59.51
2 Condensate Vapor Vol.	Vwstd	cu. ft.	0.79	0.64	0.63
3 Gas Stream Moisture	Bws	vol.dec	0.0131	0.0107	0.0104
4 Mol.Wt-flue gas (dry)	Msd	lb/lb mo.	28.84	28.84	28.84
5 Mol.Wt-flue gas (wet)	Ms	lb/lb mo.	28.69	28.72	28.72
6 Flue Gas Velocity	Vs	ft/sec	91.81	91.85	92.04
7 Flue Gas Volume-Actual	ACFM	cu. ft.	38,937	38,953	39,034
8 Flue Gas Volume-Std.	DSCFM	cu. ft.	39,989	39,887	40,053
9 Particulate Conc.	Cs				
- Probe		gr/dscf	0.0021	0.0022	0.0013
- Filter		gr/dscf	0.0003	0.0001	0.0001
- Lead		gr/dscf	4.4E-05	3.9E-05	4.1E-05
- Total		gr/dscf	0.0024	0.0023	0.0015
10 Emission Rate	E				
- Probe		lb/hr	0.74	0.74	0.45
- Filter		lb/hr	0.09	0.04	0.04
- Lead		lb/hr	0.015	0.013	0.014
11 - Total		lb/hr	0.82	0.78	0.50
Isokinetic Rate	I	%	91.7	90.1	91.3

• Totals DO NOT Include Lead

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

SO2 LABORATORY SUMMARY

Master Metals Inc

Furnace Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
20 Normality of Ba(ClO4)2	N	meq/ml	0.0097	0.0097	0.0097
21 Volume of solution	Vsln	ml	240.0	240.0	230.0
22 Volume aliquot titrant	Va	ml	20.00	20.00	20.00
23 Volume Ba(ClO4)2 Blank	Vtb	ml	0.0	0.0	0.0
24 Volume Ba(ClO4)2 Sampl	Vt	ml	0.40	0.00	0.00

SO2 TEST RESULTS

Master Metals Inc

Furnace Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991		Units	RUN # 1	RUN # 2	RUN # 3
12 Concentration SO2	Cso2	lb/dscf	6.88E-08	* BDL	* BDL
13 Concentration SO2	PPM	ppmV	0.4	* BDL	* BDL
14 Emission Rate SO2	Eso2	lb/hr	0.06	* BDL	* BDL

* Below Detectable Limit

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

SO2 LABORATORY SUMMARY

Master Metals Inc

Fugitive Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
20 Normality of Ba(ClO4)2	N	meq/ml	0.0097	0.0097	0.0097
21 Volume of solution	Vsln	ml	240.0	230.0	225.0
22 Volume aliquot titrant	Va	ml	20.00	20.00	20.00
23 Volume Ba(ClO4)2 Blank	Vtb	ml	0.0	0.0	0.0
24 Volume Ba(ClO4)2 Sampl	Vt	ml	0.27	0.00	0.00

SO2 TEST RESULTS

Master Metals Inc

Fugitive Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991		Units	RUN # 1	RUN # 2	RUN # 3
12 Concentration SO2	Cso2	lb/dscf	3.71E-08	* BDL	* BDL
13 Concentration SO2	PPM	ppmV	0.2	* BDL	* BDL
14 Emission Rate SO2	Eso2	lb/hr	0.09	* BDL	* BDL

* Below Detectable Limit

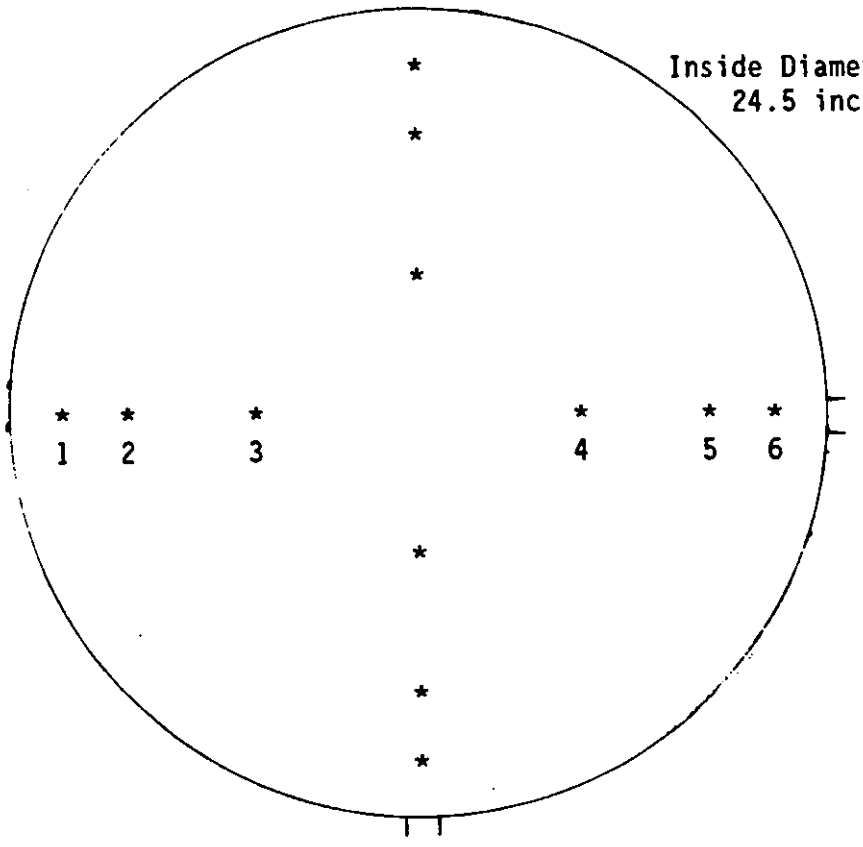
Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

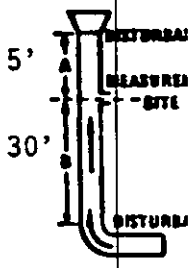
SAMPLE POINT LOCATION DIAGRAM

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

SAMPLE POINT LOCATIONS

Master Metals
Furnace Baghouse Exhaust



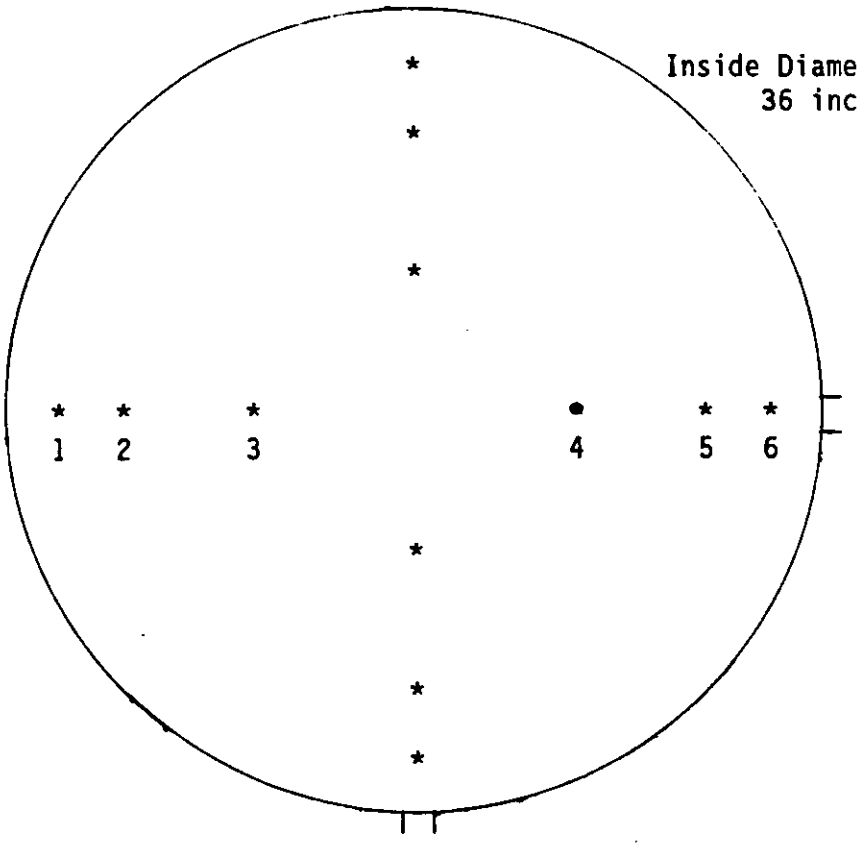


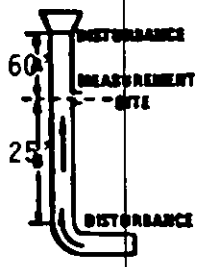
Point Number	Distance from Inside Wall
1	23.4 inches
2	20.9 inches
3	17.2 inches
4	7.3 inches
5	3.6 inches
6	1.1 inches

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

SAMPLE POINT LOCATIONS

Master Metals
Fugative Baghouse Exhaust



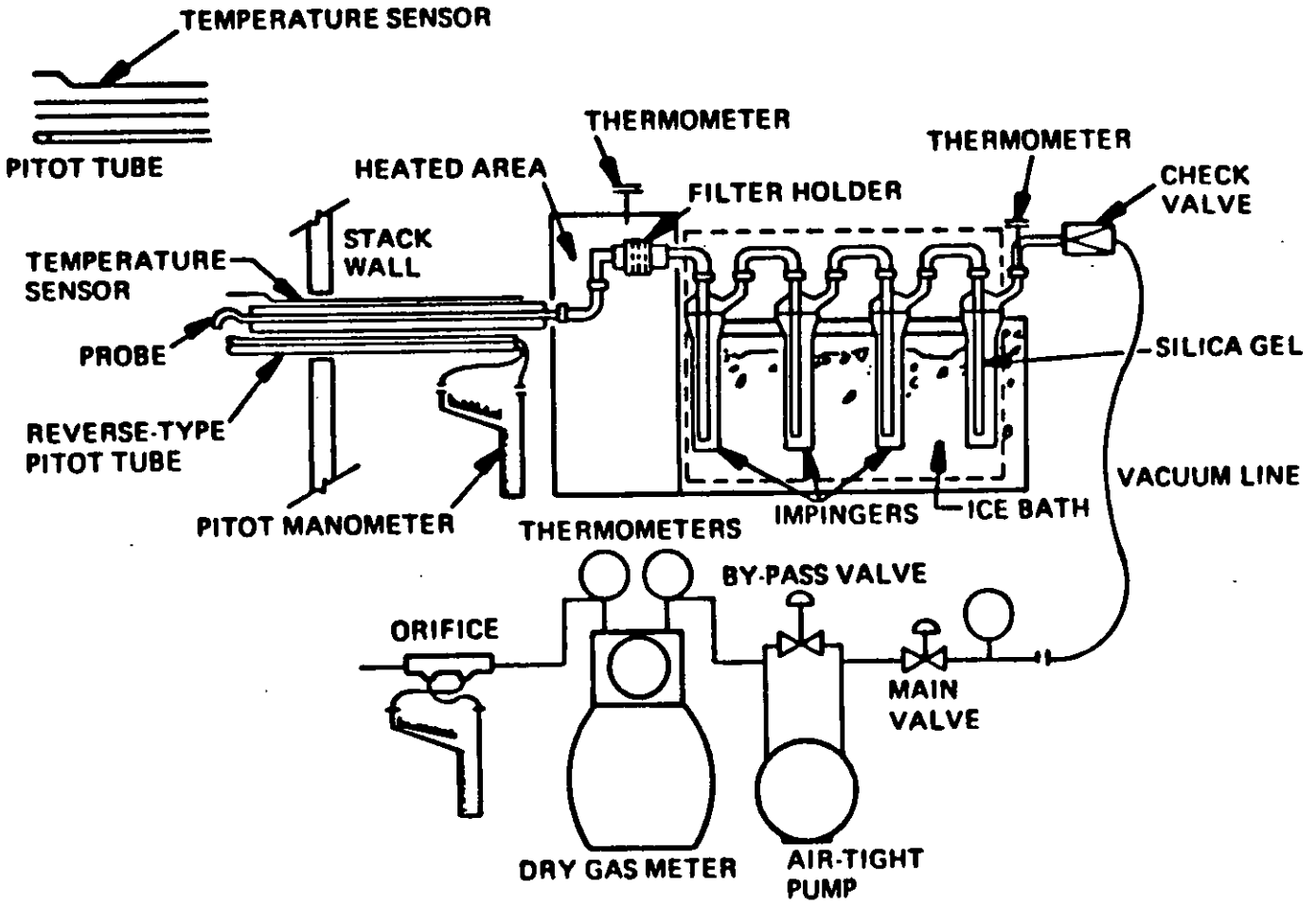


Point Number	Distance from Inside Wall
1	34.4 inches
2	30.7 inches
3	25.3 inches
4	10.7 inches
5	5.3 inches
6	1.6 inches

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

SAMPLING TRAIN DIAGRAM

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990



EPA METHOD 5 PARTICULATE SAMPLE APPARATUS

LABORATORY SECTION

Envisage
Environmental
Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

LABORATORY SUMMARY SHEET

Master Metals Inc

Furnace Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
1 Sampling Time	t	minutes	60.0	60.0	60.0
2 Barometric Pressure	Pb	in. Hg	30.18	30.18	30.18
3 Static Pressure	Pg	in. H2O	-7.20	-7.20	-7.20
Stack Pressure	Ps	in. Hg	29.65	29.65	29.65
4 Gas Meter Volume	Vm	cu. ft.	50.30	52.53	53.44
5 Stack Area	A	sq. ft.	3.27	3.27	3.27
6 Nozzle Diameter	Dn	dec. in.	0.1875	0.1875	0.1875
7 Meter Temperature		degrees F	105.0	124.5	121.4
	Tm	degrees R	565.0	584.5	581.4
8 Stack Temperature		degrees F	112.3	103.6	89.3
	Ts	degrees R	572.3	563.6	549.3
9 Velocity Head	^P	in. H2O	1.365	1.380	1.374
10 Orifice Pressure	^H	in. H2O	2.11	2.08	2.15
11 Carbon dioxide	CO2	%	0.0	0.0	0.0
12 Oxygen	O2	%	20.9	20.9	20.9
13 Carbon monoxide	CO	%	0.0	0.0	0.0
14 Nitrogen	N2	%	79.1	79.1	79.1
15 Pitot Coefficient	Cp		0.84	0.84	0.84
16 Water Collected	Vlc	ml	28.4	17.3	13.1
Sample Weight:	Mn				
17 - Probe		g	0.0059	0.0098	0.0057
18 - Filter		g	0.0006	0.0005	0.0004
19 - Lead		mg	0.22974	0.10752	0.05289

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

LABORATORY SUMMARY SHEET

Master Metals Inc

Fugitive Baghouse - Particulate,

Lead, & Sulfur Dioxide Emission Evaluation

DATE: March 12, 1991	Symbol	Units	RUN # 1	RUN # 2	RUN # 3
1 Sampling Time	t	minutes	60.0	60.0	60.0
2 Barometric Pressure	Pb	in. Hg	30.18	30.18	30.18
3 Static Pressure	Pg	in. H2O	1.90	1.90	1.90
Stack Pressure	Ps	in. Hg	30.32	30.32	30.32
4 Gas Meter Volume	Vm	cu. ft.	59.95	59.45	59.95
5 Stack Area	A	sq. ft.	7.07	7.07	7.07
6 Nozzle Diameter	Dn	dec. in.	0.1875	0.1875	0.1875
7 Meter Temperature		degrees F	78.8	85.3	80.7
	Tm	degrees R	538.8	545.3	540.7
8 Stack Temperature		degrees F	54.2	56.9	56.0
	Ts	degrees R	514.2	516.9	516.0
9 Velocity Head	^P	in. H2O	1.663	1.660	1.665
10 Orifice Pressure	^H	in. H2O	3.10	3.13	3.14
11 Carbon dioxide	CO2	%	0.0	0.0	0.0
12 Oxygen	O2	%	20.9	20.9	20.9
13 Carbon monoxide	CO	%	0.0	0.0	0.0
14 Nitrogen	N2	%	79.1	79.1	79.1
15 Pitot Coefficient	Cp		0.84	0.84	0.84
16 Water Collected	Vlc	ml	16.8	13.5	13.3
Sample Weight:	Mn				
17 - Probe		g	0.0083	0.0082	0.0051
18 - Filter		g	0.0010	0.0004	0.0005
19 - Lead		mg	0.17072	0.14720	0.15735

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT Master Metals, Furnace Baghouse

DATE March 12, 1991

RUN NO. 1

CASE NO. 3

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
352	0.6168	0.6162	0.0006	FILTER
N/A	- -	- -	- -	IMPINGERS
202	105.3060	105.3001	0.0059	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	418	241.6	
INITIAL	400	231.2	
NET LIQUID COLLECTED	18	10.4	
TOTAL NET VOLUME	28.4	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT Master Metals, Furnace Baghouse

DATE March 12, 1991

RUN NO. 2

CASE NO. 7

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
246	0.5765	0.5760	0.0005	FILTER
N/A	- -	- -	- -	IMPINGERS
302	106.1179	106.1081	0.0098	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	404	244.5	
INITIAL	400	231.2	
NET LIQUID COLLECTED	4	13.3	
TOTAL NET VOLUME	17.3	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT Master Metals, Furnace Baghouse

DATE March 12, 1991

RUN NO. 3

CASE NO. 77

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
268	0.5900	0.5896	0.0004	FILTER
N/A	- -	- -	- -	IMPINGERS
1	162.9029	162.8972	0.0057	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	405	239.3	
INITIAL	400	231.2	
NET LIQUID COLLECTED	5	8.1	
TOTAL NET VOLUME	13.1	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT	Master Metals, Fugitive Baghouse
DATE	March 12, 1991
RUN NO.	1
CASE NO.	8

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
270	0.5905	0.5895	0.0010	FILTER
N/A	- -	- -	- -	IMPINGERS
301	108.9172	108.9089	0.0083	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	402.6	246.3	
INITIAL	400	232.1	
NET LIQUID COLLECTED	2.6	14.2	
TOTAL NET VOLUME	16.8	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT Master Metals, Fugitive Baghouse

DATE March 12, 1991

RUN NO. 2

CASE NO. 14

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
245	0.5794	0.5790	0.0004	FILTER
N/A	- -	- -	- -	IMPINGERS
168	108.0401	108.0319	0.0082	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	400	245.6	
INITIAL	400	232.1	
NET LIQUID COLLECTED	0	13.5	
TOTAL NET VOLUME	13.5	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PLANT Master Metals, Fugitive Baghouse

DATE March 12, 1991

RUN NO. 3

CASE NO. 20

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED			
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN	
247	0.5805	0.5800	0.0005	FILTER
N/A	- -	- -	- -	IMPINGERS
603	106.6528	106.6477	0.0051	PROBE *

* Corrected for Acetone Blank

VOLUME OF LIQUID WATER COLLECTED			
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)	
FINAL	400	245.4	
INITIAL	400	232.1	
NET LIQUID COLLECTED	0	13.3	
TOTAL NET VOLUME	13.3	g *	ml

* Convert weight of water to volume by dividing weight increase by density of water:

$$\frac{\text{Increase g}}{(1\ \text{g/ml})} = \text{Volume Water, ml}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

ORSAT ANALYSIS DATA

Company Master Metals Incorporated

Location Furnace Baghouse Exhaust

Date March 12, 1991

	RUN # 1	RUN # 2	RUN # 3
ORSAT DATA			
Sample 1			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
Sample 2			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
Sample 3			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
AVERAGES			
% CO2	0.0	0.0	0.0
% O2	20.9	20.9	20.9
% CO	0	0	0
% N2	79.1	79.1	79.1

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

ORSAT ANALYSIS DATA

Company Master Metals Incorporated

Location Fugitive Baghouse Exhaust

Date March 12, 1991

	RUN # 1	RUN # 2	RUN # 3
ORSAT DATA			
Sample 1			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
Sample 2			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
Sample 3			
CO2 Reading	0.0	0.0	0.0
O2 Reading	20.9	20.9	20.9
CO Reading	20.9	20.9	20.9
AVERAGES			
% CO2	0.0	0.0	0.0
% O2	20.9	20.9	20.9
% CO	0	0	0
% N2	79.1	79.1	79.1

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 18, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0762-0764

Sample I.D.: #1 - EEI - Filter 246
#2 - EEI - Filter 268
#3 - EEI - Filter 270

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
Metals:	Total mg/Filter	Total mg/Filter	Total mg/Filter		Acidity ($CaCO_3$)				
					Alkalinity ($CaCO_3$)				
Cadmium					**Bacteria:**				
Chromium: Total					F. Coliform/100ml				
Hexavalent					T. Coliform/100ml				
Trivalent					Total Plate Count/1ml				
Copper					Chloride				
Lead	0.06	0.03	0.14		Chlorine: T. Res.				
Nickel					Conductivity - uMHOS/cm				
Silver					**Cyanide:** Total				
Zinc					Amenable				
					Free				
Aluminum					Reactive				
Antimony					Flash Point °F				
Arsenic					Fluoride				
Barium					Hardness ($CaCO_3$)				
Beryllium					MBAS				
Calcium					**Nitrogen:** Nitrate (N)				
Iron					Nitrite (N)				
Magnesium					Ammonia (N)				
Manganese					T Kjeldahl (N)				
Mercury					Oil & Grease				
Potassium					**Oxygen Demand:** BOD_5				
Selenium					COD				
Silicon					**pH**				
Sodium					Phenols				
Thallium					Phosphorus: Total (P)				
Tin					**Residue:** Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client xx KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

32

"LYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

ient
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATIN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0750-0752

Sample I.D.: #1 - EEI - OR1-1, 3/12/91
#2 - EEI - OR1-2, 3/12/91
#3 - EEI - OR1-3, 3/12/91

NALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
	Total mg/L	Total mg/L	Total mg/L	—	Acidity ($CaCO_3$)				
Metals:					Alkalinity ($CaCO_3$)				
Cadmium					**Bacteria:**				
Chromium: Total					F. Coliform/100ml				
Hexavalent					T. Coliform/100ml				
Trivalent					Total Plate Count/1ml				
Copper					Chloride				
Lead	0.58	<0.05	0.16		Chlorine: T. Res.				
Nickel					Conductivity - uMHOS/cm				
Silver					**Cyanide:** Total				
Zinc					Amenable				
					Free				
Aluminum					Reactive				
Antimony					Flash Point °F				
Arsenic					Fluoride				
Barium					Hardness ($CaCO_3$)				
Beryllium					MBAS				
Calcium					**Nitrogen:** Nitrate (N)				
Iron					Nitrite (N)				
Magnesium					Ammonia (N)				
Manganese					T Kjeldahl (N)				
Mercury					Oil & Grease				
Potassium					**Oxygen Demand:** BOD_5				
Selenium					COD				
Silicon					**pH**				
Sodium					Phenols				
Thallium					Phosphorus: Total (P)				
Tin					**Residue:** Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = *milligrams/kilogram* • > = *greater than* • < = less than (below detection)

Sampled By: Client xx KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

ANALYSIS CERTIFIED BY: John Ondo JO Laboratory Manager

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0753-0755

Sample I.D.: #1 - EEI - OR2-1, 3/12/91
#2 - EEI - OR2-2, 3/12/91
#3 - EEI - OR2-3, 3/12/91

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
Metals:	Total mg/L	Total mg/L	Total mg/L		Acidity ($CaCO_3$)				
Cadmium					Alkalinity ($CaCO_3$)				
Chromium: Total					**Bacteria:**				
Hexavalent					F. Coliform/100ml				
Trivalent					T. Coliform/100ml				
Copper					Total Plate Count/1ml				
Lead	1.24	<0.05	<0.05		Chloride				
Nickel					Chlorine: T. Res.				
Silver					Conductivity - uMHOS/cm				
Zinc					**Cyanide:** Total				
					Amenable				
Aluminum					Free				
Antimony					Reactive				
Arsenic					Flash Point °F				
Barium					Fluoride				
Beryllium					Hardness ($CaCO_3$)				
Calcium					MBAS				
Iron					**Nitrogen:** Nitrate **(N)**				
Magnesium					Nitrite **(N)**				
Manganese					Ammonia **(N)**				
Mercury					T Kjeldahl **(N)**				
Potassium					Oil & Grease				
Selenium					**Oxygen Demand:** BOD_5				
Silicon					COD				
Sodium					**pH**				
Thallium					Phenols				
Tin					Phosphorus: Total **(P)**				
					Residue: Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client XX KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

3

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATIN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0756-0758

Sample I.D.: #1 - EEI - OR3-1, 3/12/91
#2 - EEI - OR3-2, 3/12/91
#3 - EEI - OR3-3, 3/12/91

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
	Total mg/L	Total mg/L	Total mg/L		Acidity ($CaCO_3$)				
Metals:					Alkalinity ($CaCO_3$)				
Cadmium					**Bacteria:**				
Chromium: Total					F. Coliform/100ml				
Hexavalent					T. Coliform/100ml				
Trivalent					Total Plate Count/1ml				
Copper					Chloride				
Lead	0.58	0.05	<0.05		Chlorine: T. Res.				
Nickel					Conductivity - uMHOS/cm				
Silver					**Cyanide:** Total				
Zinc					Amenable				
					Free				
Aluminum					Reactive				
Antimony					Flash Point °F				
Arsenic					Fluoride				
Barium					Hardness ($CaCO_3$)				
Beryllium					MBAS				
Calcium					**Nitrogen:** Nitrate (N)				
Iron					Nitrite (N)				
Magnesium					Ammonia (N)				
Manganese					T Kjeldahl (N)				
Mercury					Oil & Grease				
Potassium					**Oxygen Demand:** BOD_5				
Selenium					COD				
Silicon					**pH**				
Sodium					Phenols				
Thallium					Phosphorus: Total (P)				
Tin					**Residue:** Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client XX KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

35

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 18, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0765-0767

Sample I.D.: #1 - EEI - Filter 245
#2 - EEI - Filter 247
#3 - EEI - Filter 252

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
	Total	Total	Total	—	Acidity ($CaCO_3$)				
Metals:					Alkalinity ($CaCO_3$)				
Cadmium					**Bacteria:**				
Chromium: Total					F. Coliform/100ml				
Hexavalent					T. Coliform/100ml				
Trivalent					Total Plate Count/1ml				
Copper					Chloride				
Lead mg/Filter	0.11	0.12	0.19		Chlorine: T. Res.				
Nickel					Conductivity - uMHOS/cm				
Silver					**Cyanide:** Total				
Zinc					Amenable				
					Free				
Aluminum					Reactive				
Antimony					*Flash Point* °F				
Arsenic					Fluoride				
Barium					Hardness ($CaCO_3$)				
Beryllium					MBAS				
Calcium					**Nitrogen:** Nitrate (N)				
Iron					Nitrite (N)				
Magnesium					Ammonia (N)				
Manganese					T Kjeldahl (N)				
Mercury					Oil & Grease				
Potassium					**Oxygen Demand:** BOD_5				
Selenium					COD				
Silicon					**pH**				
Sodium					Phenols				
Thallium					Phosphorus: Total (P)				
Tin					**Residue:** Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = *greater than* • < = *less than (below detection)*

Sampled By: Client XX KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

3C

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0747-0749

Sample I.D.: #1 - EEI - NR3-1, 3/12/91
#2 - EEI - NR3-2, 3/12/91
#3 - EEI - NR3-3, 3/12/91

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
Metals:	Total mg/L	Total mg/L	Total mg/L		Acidity ($CaCO_3$)				
Cadmium					Alkalinity ($CaCO_3$)				
Chromium: Total					**Bacteria:**				
Hexavalent					F. Coliform/100ml				
Trivalent					T. Coliform/100ml				
Copper					Total Plate Count/1ml				
Lead	0.24	<0.05	0.09		Chloride				
Nickel					Chlorine: T. Res.				
Silver					Conductivity - uMHOS/cm				
Zinc					**Cyanide:** Total				
					Amenable				
Aluminum					Free				
Antimony					Reactive				
Arsenic					Flash Point °F				
Barium					Fluoride				
Beryllium					Hardness ($CaCO_3$)				
Calcium					MBAS				
Iron					**Nitrogen:** Nitrate (N)				
Magnesium					Nitrite (N)				
Manganese					Ammonia (N)				
Mercury					T Kjeldahl (N)				
Potassium					Oil & Grease				
Selenium					**Oxygen Demand:** BOD_5				
Silicon					COD				
Sodium					**pH**				
Thallium					Phenols				
Tin					Phosphorus: Total (P)				
					Residue: Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client xx KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

3

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client
ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0741-0743

MAR 25

Sample I.D.: #1 - E.E.I - NR1-1 3-12-91
#2 - E.E.I - NR1-2 3-12-91
#3 - E.E.I - NR1-3 3/12/91

ANALYSIS	#1	#2	#3	#4	ANALYSIS	#1	#2	#3	#4
Metals:	Total mg/L	Total mg/L	Total mg/L		Acidity ($CaCO_3$)				
Cadmium					Alkalinity ($CaCO_3$)				
Chromium: Total					**Bacteria:**				
Hexavalent					F. Coliform/100ml				
Trivalent					T. Coliform/100ml				
Copper					Total Plate Count/1ml				
Lead	0.13	0.06	0.15		Chloride				
Nickel					Chlorine: T. Res.				
Silver					Conductivity - uMHOS/cm				
Zinc					**Cyanide:** Total				
					Amenable				
Aluminum					Free				
Antimony					Reactive				
Arsenic					Flash Point °F				
Barium					Fluoride				
Beryllium					Hardness ($CaCO_3$)				
Calcium					MBAS				
Iron					**Nitrogen:** Nitrate **(N)**				
Magnesium					Nitrite **(N)**				
Manganese					Ammonia **(N)**				
Mercury					T Kjeldahl **(N)**				
Potassium					Oil & Grease				
Selenium					**Oxygen Demand:** BOD_5				
Silicon					COD				
Sodium					**pH**				
Thallium					Phenols				
Tin					Phosphorus: Total **(P)**				
					Residue: Total				
					Total Volatile				
					Suspended				
					Volatile Suspended				
					Sulfate				
					Sulfide: Total				
					Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client xx KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client: ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AUDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0744-0746

Sample I.D.: #1 - EEI - NR2-1, 3/12/91
#2 - EEI - NR2-2, 3/12/91
#3 - EEI - NR2-3, 3/12/91

ANALYSIS	#1	#2	#3	#4
	Total mg/L	Total mg/L	Total mg/L	—
Metals:				
Cadmium				
Chromium: Total				
Hexavalent				
Trivalent				
Copper				
Lead	0.13	0.10	0.15	
Nickel				
Silver				
Zinc				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Calcium				
Iron				
Magnesium				
Manganese				
Mercury				
Potassium				
Selenium				
Silicon				
Sodium				
Thallium				
Tin				

ANALYSIS	#1	#2	#3	#4
Acidity ($CaCO_3$)				
Alkalinity ($CaCO_3$)				
Bacteria:				
F. Coliform/100ml				
T. Coliform/100ml				
Total Plate Count/1ml				
Chloride				
Chlorine: T. Res.				
Conductivity - uMHOS/cm				
Cyanide: Total				
Amenable				
Free				
Reactive				
Flash Point °F				
Fluoride				
Hardness ($CaCO_3$)				
MBAS				
Nitrogen: Nitrate (N)				
Nitrite (N)				
Ammonia (N)				
T Kjeldahl (N)				
Oil & Grease				
Oxygen Demand: BOD_5				
COD				
pH				
Phenols				
Phosphorus: Total (P)				
Residue: Total				
Total Volatile				
Suspended				
Volatile Suspended				
Sulfate				
Sulfide: Total				
Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • *mg/kg = milligrams/kilogram* • > = greater than • < = less than (below detection)

Sampled By: Client ~~xx~~ KWLI _____ Auto Sampler _____ Other _____

KUDUKIS WASTEWATER LABS, INC.

2779 BROADWAY AVENUE, CLEVELAND, OHIO 44115
(216) 696 - 0280 FAX: (216) 696 - 6831

39

ANALYSIS CERTIFIED BY: John Ondo **Laboratory Manager**

Client ENVISAGE ENVIRONMENTAL
P.O. BOX 152
RICHFIELD, OHIO 44286

ATTN: AYDREY

Report Date: March 20, 1991
P.O. #:
Client:
Sample Received: 3/14/91
Lab Sample #: 1-0759-0761

Sample I.D.: #1 - EEI - 80% IPA Blank, 3/12/91
#2 - EEI - 0.1 $NHNO_3$ Blank, 3/12/91
#3 - EEI - 3% H_2O_2 Blank, 3/12/91

ANALYSIS	#1	#2	#3	#4
	Total	Total	Total	
Metals:	mg/L	mg/L	mg/L	
Cadmium				
Chromium: Total				
Hexavalent				
Trivalent				
Copper				
Lead	<0.05	<0.05	<0.05	
Nickel				
Silver				
Zinc				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Calcium				
Iron				
Magnesium				
Manganese				
Mercury				
Potassium				
Selenium				
Silicon				
Sodium				
Thallium				
Tin				

ANALYSIS	#1	#2	#3	#4
Acidity ($CaCO_3$)				
Alkalinity ($CaCO_3$)				
Bacteria:				
F. Coliform/100ml				
T. Coliform/100ml				
Total Plate Count/1ml				
Chloride				
Chlorine: T. Res.				
Conductivity - uMHOS/cm				
Cyanide: Total				
Amenable				
Free				
Reactive				
Flash Point °F				
Fluoride				
Hardness ($CaCO_3$)				
MBAS				
Nitrogen: Nitrate (N)				
Nitrite (N)				
Ammonia (N)				
T Kjeldahl (N)				
Oil & Grease				
Oxygen Demand: BOD_5				
COD				
pH				
Phenols				
Phosphorus: Total (P)				
Residue: Total				
Total Volatile				
Suspended				
Volatile Suspended				
Sulfate				
Sulfide: Total				
Reactive				

ug/L = micrograms/Liter(ppb) • mg/L = milligrams/Liter(ppm) • mg/kg = milligrams/kilogram • > = greater than • < = less than (below detection)

Sampled By: Client XX KWLI _____ Auto Sampler _____ Other _____

EMISSION SAMPLING

EQUIPMENT SPECIFICATIONS

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

Equipment and Specifications
U.S.E.P.A. Reference methods 1-5

Control Unit (Meter Box)	Equipment Designation
___ Envisage Environmental Inc.	Control Unit #'s MB- 08 & 09
___ Anderson Samplers	Control Unit #'s MB- 01 - 02
✓ Remanufactured R.A.C.	Control Unit #'s MB- 03 - 07

Sample Box	
✓ E.E.I.	SB- 01, 02 & 05 - 07
___ Remanufactured R.A.C.	SB- 03 & 04
___ E.E.I. Special Design	SB- 08 - 11

Impingers - per sample train (each set changed for each test run)

✓ E.E.I.	3 Modified Smith Greenburg type
✓ E.E.I.	1 Smith Greenburg type

Probes	length	Lining types
___ E.E.I.	2 foot	SS, PYREX, QUARTZ
✓ E.E.I.	3 foot	SS, PYREX, QUARTZ, TEFLON
___ E.E.I.	5 foot	SS, PYREX, QUARTZ, TEFLON
___ E.E.I.	3 foot	SS, PYREX, TEFLON
___ E.E.I.	7 foot	SS, PYREX, TEFLON
___ E.E.I.	10 foot	SS, PYREX, TEFLON
___ E.E.I.	12 foot	SS, PYREX, TEFLON
___ E.E.I.	15 foot	SS, PYREX, TEFLON
___ E.E.I.	24 foot	SS, TEFLON

Temperature Sensors	Equipment Designation
___ Omega Engineering	PY- 01 & 02
___ Thermo Electric	PY- 03 - 08
✓ Fluke 51	PY- 01 - 02 - 03 - 04 - 05
___ Fisher Scientific	Mercury Thermometer
___ Fisher Scientific	Bimetallic Thermometer

Pressure Gauges	Type
✓ Dwyer Incline Manometer	Oil, 0 - 10 inch water
___ Dwyer Magnehelic	Magnetic/Mechanical 0 - 1 inch water
___ Dwyer Magnehelic	Magnetic/Mechanical 0 - 10 inch water
___ Dwyer "U" Tube Manometer	Mercury, 36 inches
___ Dwyer "U" Tube Manometer	Water, 72 inches
___ Dwyer Microtector (Micro - Manometer)	Water, 0 - 1 inches of water

Chemicals and Reagents	
✓ Water	Deionized/ Distilled
✓ Acetone	Reagent Grade (<0.001% residual)
✓ Silica Gel	6 - 16 Mesh
✓ Stopcock Grease	Acetone- Insoluble & Heat Resistant

CALIBRATION SECTION

Envisage
Environmental
Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

"S" TYPE PITOT TUBE CALIBRATION

"S" Type Pitot Tube (Probe) # # 303 - 3 ft. Probe

Calibration Date: March 4, 1991

$$C_p = C_{std} \sqrt{\frac{\Delta P_{std}}{\Delta P_p}} \qquad \text{(EPA Equation 2-2)}$$

where:

C_p = Coefficient of Type S pitot tube, dimensionless

C_{std} = Coefficient of Standard Pitot Tube (0.99), dimensionless

ΔP_{std} = Velocity head measured by standard pitot tube, inches H_2O

ΔP_p = Velocity head measured by Type S pitot tube, inches H_2O

	ΔP_{std}	ΔP_p	C_p
Side A	0.16	0.22	0.844
Side B	0.16	0.22	0.844
Side A	0.30	0.42	0.837
Side B	0.30	0.42	0.837
Side A	0.52	0.72	0.841
Side B	0.52	0.72	0.841

Average - 0.84

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

METER BOX CALIBRATION

Meter Box Number: RAC # 4

Calibration Date: March 5, 1991

$$Y = \frac{V_t \; P_b \; (T_m + 460)}{V_m \left[P_b + \frac{\Delta H}{13.6} \right] (T + 460)}$$

$$\Delta H_@ = \frac{0.0317 \; \Delta H}{P_b \; (Tm + 460)} \left[\frac{(T_t + 460) \; t}{V_t} \right]$$

Delta H (^H)	in. H2O	0.5	1.0	3.0	5.0	7.0
Pres.Barometer (P_b)	in. Hg	29.62	29.62	29.62	29.62	29.62
Vol.Meter Box (V_m)	cu. ft.	4.219	6.010	10.400	13.409	15.826
Vol.Test Meter(V_t)	cu. ft.	4.152	5.825	10.045	12.900	15.209
Temp. Meter Box (T_m)	^oF	88.0	95.7	100.7	106.9	110.2
	^oR	548.0	555.7	560.7	566.9	570.2
Temp. Test Meter (T_t)	^oF	78.0	78.0	78.0	78.0	78.0
	^oR	538.0	538.0	538.0	538.0	538.0
Time (t)	minutes	10.0	10.0	10.0	10.0	10.0
METER FACTOR (Y)		1.001	0.999	0.999	1.001	1.001
- Average				1.00		
METER COEFFICIENT ($^H_@$)		1.640	1.643	1.643	1.642	1.644
- Average				1.64		

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

METER BOX CALIBRATION

Meter Box Number: RAC # 6

Calibration Date: January 29, 1991

$$Y = \frac{V_t \, P_b \, (T_m + 460)}{V_m \left[P_b + \frac{\Delta H}{13.6} \right] (T + 460)}$$

$$\Delta H_@ = \frac{0.0317 \, \Delta H}{P_b \, (Tm + 460)} \left[\frac{(T_t + 460) \cdot t}{V_t} \right]$$

Delta H (ΔH)	in. H2O	0.5	1.0	3.0	5.0	7.0
Pres.Barometer (P_b)	in. Hg	29.45	29.45	29.45	29.45	29.45
Vol.Meter Box (V_m)	cu. ft.	4.018	5.689	9.878	12.697	14.969
Vol.Test Meter(V_t)	cu. ft.	3.963	5.589	9.613	12.391	14.646
Temp. Meter Box (T_m)	°F	87.0	90.0	97.8	99.4	100.6
	°R	547.0	550.0	557.8	559.4	560.6
Temp. Test Meter (T_t)	°F	79.0	79.0	79.0	79.0	79.0
	°R	539.0	539.0	539.0	539.0	539.0
Time (t)	minutes	10.0	10.0	10.0	10.0	10.0
METER FACTOR (Y)		1.000	1.000	1.000	1.000	1.000
- Average				1.00		
METER COEFFICIENT ($\Delta H_@$)		1.820	1.820	1.820	1.820	1.820
- Average				1.82		

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

"S" TYPE PITOT TUBE CALIBRATION

"S" Type Pitot Tube (Probe) # 301 - 3 ft Probe

Calibration Date: January 14, 1991

$$C_p = C_{std} \sqrt{\frac{\Delta p_{std}}{\Delta p}} \qquad \text{(EPA Equation 2-2)}$$

where:

C_p = Coefficient of Type S pitot tube, dimensionless

C_{std} = Coefficient of Standard Pitot Tube (0.99), dimensionless

Δp_{std} = Velocity head measured by standard pitot tube, inches H_2O

Δp = Velocity head measured by Type S pitot tube, inches H_2O

	Δp_{std}	Δp	C_p
Side A	0.15	0.21	0.837
Side B	0.15	0.21	0.837
Side A	0.25	0.35	0.837
Side B	0.25	0.35	0.837
Side A	0.40	0.55	0.844
Side B	0.40	0.55	0.844

Average - 0.84

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

NOZZLE DIAMETER CALIBRATION

I.D. of nozzles are checked periodically by inside micrometer on at least 12 different diameters. If deviation exceeds +0.001" on an average or 0.002" maximum, nozzle is reworked. Sharpening occurs after each test.

CALIBRATION FREQUENCY

The frequency of calibration is dictated by the Federal Register, Volume 42, Number 160, August 18, 1977. The regulations state that you must "use methods and equipment which have been approved by the Administrator to calibrate the orifice meter, pitot tube, dry gas meter, and probe heater. Recalibrate after each test".

The methods of calibration are determined from "Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment," published by the U.S. EPA Office of Air Program Publications APTD-0576. Per the above listed regulations, the equipment was checked after the stack test and the values of Y, Cp (Test) and nozzle diameter had not appreciably changed from the acceptable tolerances.

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

FIELD DATA SHEETS

Envisage
Environmental
Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

FIELD DATA

PLANT Master Metals
DATE 3/12/91
SAMPLING LOCATION New Outlet Furnace
SAMPLE TYPE M.-6
OPERATOR JD MG
AMBIENT TEMPERATURE 40's
BAROMETRIC PRESSURE
STATIC PRESSURE -7.2
HEATER BOX SETTING 248, ±25°F

PROBE LENGTH & TYPE 3' Pyrex
NOZZLE I.D. 3/16"
ASSUMED MOISTURE % 8
METER BOX NUMBER 4
METER ΔH @ 1.64
C FACTOR .90
PITOT CORRECTION FACTOR .84
PRE-TEST LEAK CHECK 0 CFM @ 17 "Hg
POST-TEST LEAK CHECK 0 CFM @ 9 "Hg

#2 0 @ 4.1"
#4 0 @ 4.8"

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

Run #1 Case #3

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE		PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
							INLET	OUTLET			
	0/0934	314.000	1.80	1.342	1.80	115	94	74	5.0	260	35
	5	317.72	1.80	1.342	1.95	116	106	76	6.0	265	36
	10	321.84	1.90	1.378	2.05	115	118	78	6.0	259	36
3	15	324.10	1.85	1.360	2.00	114	125	80	6.0	261	36
4	20	330.20	1.80	1.342	1.95	112	128	83	6.0	247	37
5	25	334.36	1.95	1.396	2.00	110	127	85	6.0	245	36
6	30	338.67	2.30	1.517	2.95	110	111	90	7.0	261	36
1	35	343.27	2.10	1.449	2.25	111	130	91	7.0	270	37
2	40	347.80	1.90	1.378	2.05	112	135	94	6.0	268	38
3	45	352.09	1.80	1.342	1.95	112	130	94	6.0	258	38
4	50	356.42	1.70	1.304	1.85	112	136	96	6.0	266	38
5	55	360.35	1.60	1.265	1.70	109	134	97	5.5	252	38
6	60/1046	364.295									
								Leak check	OK		
		50.295		1.365	2.11	112.33	105.04	N. Noonan	DAPC		
									3/12/91		

#2 0 @ 3.7"

Run #3 Case # 77

pre 0 @ 15"

#2 0 @ 5.0"
#4 0 @ 5.0"

PLANT Master Metals - Furnace Outlet DATE 3/12/91 LEAK CHECK 0 CFM@ 7 "Hg (post) PAGE 3 OF

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE		PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
							INLET	OUTLET			
1	0/1253	417.900	1.50	1.225	1.65	101	119	106	4.0	271	37
2	5	421.84	2.20	1.483	2.45	100	131	105	5.0	270	40
3	10	426.77	2.05	1.432	2.25	95	141	106	4.0	251	40
4	15	431.23	1.95	1.396	2.25	90	144	106	4.0	205	40
5	20	435.86	1.70	1.304	1.95	80	141	105	3.5	254	40
6	25	440.00	1.80	1.342	2.05	87	139	105	4.0	260	41
1	30	444.31	1.80	1.302	2.05	84	132	107	4.0	235	41
2	35	448.70	2.20	1.483	2.55	86	136	106	4.0	247	41
3	40	453.52	2.00	1.414	2.30	80	139	107	4.0	241	40
4	45	458.21	1.90	1.378	2.20	85	138	108	4.0	264	40
5	50	462.69	1.80	1.342	2.05	80	138	108	4.0	250	41
6	55	467.00	1.80	1.342	2.05	84	138	108	4.0	255	41
	60/1357	471.34									
		53.44		1.374	2.15	89.33		121.375			
								Leak test OK			
								D. Harmon	DEPC		
								3/12/91			

post pitots #2 0 @ 4.5"
#4 0 @ 5.2"

5U

RUN # 2 CASE = 7 pre 0 @ 18" " 0 @ 5.0"

PLANT Master Metals FURNACE Outlet DATE 3/12/91 LEAK CHECK post 0 CFM@ 11 "Hg PAGE 2 OF _____

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE INLET	GAS METER TEMPERATURE OUTLET	PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
1	0/1121	364.660	1.60	1.265	1.85	108	108	103	5.0	266	35
2	5	368.62	2.10	1.449	2.30	109	132	102	4.0	271	35
3	10	373.22	1.90	1.378	2.05	108	142	105	5.0	268	36
4	15	377.50	1.75	1.323	1.90	111	146	106	5.5	246	36
5	20	381.70	1.75	1.323	1.90	104	148	108	5.5	235	36
6	25	385.92	1.70	1.304	1.85	102	147	109	5.0	237	38
1	30	390.04	1.70	1.304	1.85	101	136	109	5.0	258	37
2	35	394.20	2.10	1.449	2.25	110	142	109	4.0	263	37
3	40	398.74	2.05	1432	2.20	100	147	108	5.5	259	37
4	45	403.26	2.00	1414	2.20	99	147	109	5.5	249	37
5	50	407.77	1.95	1.396	2.15	96	150	111	5.5	250	38
10	55	412.25	2.30	1.517	2.50	95	151	112	6.0	252	38
	60/1220	417.13									
		52.53		1.38	2.075	103.58	1244.6				

Earth Tech OK

J. Sherman PARC 3/12/91

post #2 0 @ 4.8"
pitots #4 0 @ 40"

FIELD DATA

PLANT MASTER METALS
DATE 3-12-91
SAMPLING LOCATION Fugitive Baghouse
SAMPLE TYPE 1-6
OPERATOR BH SN
AMBIENT TEMPERATURE 55
BAROMETRIC PRESSURE
STATIC PRESSURE [illegible] + 1.9
HEATER BOX SETTING 245 250

36" diameter

PROBE LENGTH & TYPE 3ft pyrex
NOZZLE I.D. [illegible] 0.187"
ASSUMED MOISTURE % 5
METER BOX NUMBER 6
METER ΔH @ 1.92
C FACTOR 1.0
PITOT CORRECTION FACTOR .84
PRE-TEST LEAK CHECK 0 CFM@ 13 "Hg
POST-TEST LEAK CHECK 0 CFM@ 9 "Hg
Pitot Tubes #2 to 4.3
#4 to 3.5

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

PAGE ____ OF ____

Run 1 CASE #8

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE INLET	GAS METER TEMPERATURE OUTLET	PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
1	0	772.40	2.9	1.70	3.3	54	98	98	5.0	244	56
2	5	776.69	2.8	1.67	3.1	54	80	62	5.0	266	56
3	10	781.76	2.9	1.70	3.3	54	66	68	5.5	270	56
4	15	786.87	2.7	1.64	3.0	54	70	69	5.0	244	56
5	20	791.45	2.5	1.54	2.9	54	72	70	5.0	272	56
6	25	796.16	2.7	1.64	3.0	54	92	71	6.0	266	56
1	30	801.34	2.6	1.61	2.95	54	84	72	5.0	273	58
2	35	805.82	2.7	1.64	3.0	54	68	73	6.0	262	55
3	40	810.60	2.7	1.64	3.0	54	92	74	6.0	238	55
4	45	815.44	2.9	1.70	3.3	54	94	76	7.0	273	55
5	50	820.44	2.9	1.70	3.3	55	94	76	7.0	265	56
6	55	825.47	2.8	1.67	3.1	55	95	76	6.0	270	58
	60/1145	832.345									
		59.945		1.663	3.10	54.17	here incref OR				
							D. Kaman		DAPC		
							3/12/91				
							78.79				

Post 1.67 #2 @ 4.0
#4 @ 3.4

PLANT Mirant Martin Outlet DATE 5-12-91 Pre LEAK CHECK 0 CFM @ 15 "Hg PAGE 2 OF _____

Run 2 CHS 14 FUGITIVE Pit Lk Ck 0 @ 9

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE		PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
							INLET	OUTLET			
1	0 // 11:20	830.70	2.9	1.70	3.3	56	72	72	6.0	235	39
2	5	835.75	2.9	1.70	3.3	57	86	76	4.0	242	39
3	10	840.82	2.8	1.67	3.1	57	92	77	5.5	247	38
4	15	845.75	3.0	1.73	3.5	57	96	78	6.5	250	38
5	20	850.93	2.8	1.67	3.1	57	98	78	5.5	264	38
6	25	855.90	2.7	1.64	3.0	57	99	80	5.5	260	40
1	30	860.76	2.9	1.67	3.1	57	96	78	5.5	269	40
2	35	865.62	2.8	1.67	3.1	57	93	80	5.5	270	42
3	40	870.55	2.9	1.70	3.3	57	95	80	6.0	265	42
4	45	875.66	2.7	1.64	3.0	57	96	80	5.0	272	42
5	50	880.86	2.5	1.58	2.9	57	96	79	5.0	272	42
6	55	885.42	2.5	1.58	2.9	57	95	80	5.0	259	42
	60 // 12:24	~~890.75~~ 890.15									
						Leak Tech OK					
						D. Newman					
						3/12/91					
		59.45		1.66	3.13	56.92	85.85				

Fit Pit #2 @ 3.4 Post 12 @ 3.2

5.0

PLANT Master Metals Fugitive DATE 3/12/91 LEAK CHECK 0 CFM 17 "Hg PAGE 5 OF
Run 3 Cell 2D 0 0 9

TRAVERSE POINT NUMBER	ELAPSED SAMPLING TIME min.	GAS METER READING	VELOCITY HEAD		ORIFICE PRESSURE DIFFERENTIAL	STACK TEMPERATURE	GAS METER TEMPERATURE INLET	GAS METER TEMPERATURE OUTLET	PUMP VACUUM	FILTER HOLDER TEMP.	IMPINGER TEMP.
1	0/1252	940.60	2.9	1.70	3.3	50	76	70	5.0	241	44
2	5	945.55	2.8	1.67	3.1	57	82	72	5.0	245	44
3	10	950.43	3.0	1.73	3.5	56	86	72	6.0	250	44
4	15	955.72	2.8	1.67	3.1	57	90	73	5.5	248	44
5	20	960.68	2.6	1.61	2.95	57	92	74	4.0	255	44
6	25	965.56	2.5	1.58	2.9	57	94	74	4.0	257	44
1	30	970.41	2.7	1.64	3.0	56	94	72	5.0	246	46
2	35	975.44	2.7	1.64	3.0	56	90	71	5.0	236	46
3	40	980.21	2.8	1.67	3.1	56	92	75	5.0	265	46
4	45	985.28	2.9	1.70	3.3	57	92	74	6.5	268	46
5	50	990.36	2.9	1.70	3.3	57	92	71	6.5	202	45
6	55	995.63	2.8	1.67	3.1	56	93	75	6.0	259	48
	60/1356	1000.55									
		59.95		1.685	3.14	56	80.67				
							Leak check OK				
							D. Seaman DAT C				
								3/12/91			

Filter #2 0 at 3.8 Port #2 0 at 3.1
#4 0 at 4.2 #4 0 at 3.2

EMISSIONS SAMPLING

NOMENCLATURE

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

PARTICULATE SAMPLING NOMENCLATURE

A = Cross sectional area of stack or duct, ft^2.

A_n = Cross sectional area of nozzle, ft^2.

B_{ws} = Water vapor in gas stream, proportion by volume.

C = Nomograph correction factor, dimensionless.

C_p = Pitot tube coefficient, dimensionless.

C_s = Concentration of particulate matter in gas stream, dry basis-corrected to standard conditions, gr/dscf.

D_n = Nominal diameter of probe nozzle tip, inches.

E = Particulate Emission Rate, lb/hr.

ΔH = Average pressure differential across orifice, in. H_2O.

$\Delta H_@$ = Orifice meter calibration factor, in. H_2O.

I = Percent of Isokinetic sampling, %.

K_p = Pitot tube constant, $85.49 \frac{ft}{sec} \left| \frac{(lb/lb\text{-}mole)(in.Hg)}{(^oR)(in.H_2O)} \right|$

M_d = Molecular weight of gas, dry basis, lb/lb-mole.

M_n = Total amount of particulate matter collected, g.

M_s = Molecular weight of gas, wet basis, lb/lb-mole.

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

Particulate Sampling Nomenclature - continued

M_w = Molecular weight of water, 18 lb/lb-mole.

P_{bar} = Barometric Pressure, in. Hg.

P_g = Pressure differential from gas stream to atmosphere, (static pressure) in.H_2O.

P_s = Absolute gas stream pressure, (P_{bar} + P_g/13.6) in.Hg.

P_{std} = Absolute pressure at standard conditions, 29.92 in. Hg.

P_w = Density of water, 0.0022 lb/ml.

$\hat{P}_{avg}$ = Average of the square roots of the velocity head readings, ($\sqrt{\hat{p}}$) (in.H O_2).

Q = Volumetric flow rate at gas stream conditions, A.C.F.M.

Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, S.C.F.M.

R = Ideal gas constant, 21.85 in. Hg-ft^3/ ^oR-lb-mole.

t = Total sampling time, minutes.

T_m = Average dry gas meter temperature, ^oR.

T_s = Average absolute gas stream temperature, ^oR.

T_{std} = Standard absolute temperature, 528^o Rankine.

V_{lc} = Volume of water collected in impingers & silica gel, ml.

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

Particulate Sampling Nomenclature - continued

V_m = Volume of gas sample measured at meter box (meter conditions), ft^3

$V_{m(std)}$ = Volume of gas sample measured at meter box (corrected to standard conditions), ft^3.

V_s = Average gas stream velocity, ft/sec.

$V_{w(std)}$ = Volume of water vapor in gas sample (standard conditions) ft^3.

13.6 = Specific gravity of mercury (Hg).

% CO_2 = Percent by volume of CO_2 in gas stream (dry basis).

% O_2 = Percent by volume of O_2 in gas stream (dry basis).

% CO = Percent by volume of CO in gas stream (dry basis).

% N_2 = Percent by volume of N_2 in gas stream (dry basis).

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

5:)

EMISSION SAMPLING

CALCULATIONS

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

1) Volume of dry gas sampled through meter box at standard conditions,

$$V_{m(std)} = V_m \left[\frac{T_{std}}{T_m} \right] \left[\frac{P_b + \frac{\Delta H}{13.6}}{P_{std}} \right]$$

(EPA Equation 5-1)

Where:

$V_{m(std)}$ = Volume of gas sample measured at meter box (corrected to standard conditions), ft^3.

V_m = Volume of gas sample measured at meter box (meter conditions), ft^3.

T_{std} = Standard absolute temperature, 528^o Rankine.

T_m = Average dry gas meter temperature, ^oR.

P_{bar} = Barometric Pressure, in. Hg.

ΔH = Average pressure differential across orifice, in. H_2O.

13.6 = Specific gravity of mercury (Hg).

P_{std} = Absolute pressure at standard conditions, 29.92 in. Hg.

Example: Run 1

V_m = 59.95 ft^3

T_m = 538.8 ^oR

ΔH = 3.10 in. H_2O

P_{bar} = 30.18 in. Hg

$$V_{m(std)} = 59.95 \left[\frac{528.0}{538.8} \right] \left[\frac{30.18 + \frac{3.10}{13.6}}{29.92} \right]$$

$$= 59.95 \quad (0.9799) \quad (1.0163)$$

$$= 59.71 \ ft^3$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

2) Volume of water vapor collected at standard conditions,

$$V_{w(std)} = V_{lc} \left[\frac{P_w}{M_w} \right] \left[\frac{(R)(T_{std})}{P_{std}} \right]$$

(EPA Equation 5-2)

Where:

$V_{w(std)}$ = Volume of water vapor in gas sample (standard conditions) ft^3.
V_{lc} = Volume of water collected in impingers & silica gel, ml.
P_w = Density of water, 0.0022 lb/ml.
M_w = Molecular weight of water, 18 lb/lb-mole.
R = Ideal gas constant, 21.85 in. Hg-ft^3/ ^oR-lb-mole.
T_{std} = Standard absolute temperature, 528 ^{o} Rankine.
P_{std} = Absolute pressure at standard conditions, 29.92 in. Hg.

Example: Run 1

V_{lc} = 16.8 ml

$$V_{w(std)} = 16.8 \left[\frac{0.0022}{18.0} \right] \left[\frac{(21.85)(528.0)}{29.92} \right]$$

= 0.79 ft^3

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

5) Molecular Weight of gas in gas stream,

$$M_s = M_d (1 - B_{ws}) + M_w (B_{ws})$$

(EPA Equation 2-5)

Where:

M_s = Molecular weight of gas, wet basis, lb/lb-mole.

M_d = Molecular weight of gas, dry basis, lb/lb-mole.

B_{ws} = Water vapor in gas stream, proportion by volume.

M_w = Molecular weight of water, 18 lb/lb-mole.

Example: Run 1

M_d = 28.84 lb/lb-mole

B_{ws} = 0.0131

M_s = 28.84 (1 - 0.0131) + 18 (0.0131)

= 28.459 + 0.235

= 28.69 lb/lb-mole

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

6) Average Gas Stream Velocity,

$$V_s = K_p \; C_p \; \Delta P_{avg} \sqrt{\frac{T_s}{P_s \, M_s}}$$

(EPA Equation 2-9)

Where:

V_s = Average gas stream velocity, ft/sec.

K_p = Pitot tube constant, $85.49 \; \frac{ft}{sec} \left[\frac{(lb/lb\text{-}mole)(in.Hg)}{(^oR)(in.H_2O)} \right]^{1/2}$

C_p = Pitot tube coefficient, dimensionless.

ΔP_{avg} = Average of the square roots of the velocity head readings, ($\sqrt{\Delta p}$) ($in.H_2O$).

T_s = Average absolute gas stream temperature, ^oR.

P_s = Absolute gas stream pressure, ($P_{bar} + P_g/13.6$) in.Hg.

P_{bar} = Barometric Pressure, in. Hg.

P_g = Pressure differential from gas stream to atmosphere, (static pressure) $in.H_2O$.

M_s = Molecular weight of gas, wet basis, lb/lb-mole.

Example: Run 1

C_p = 0.84

ΔP_{avg} = 1.663 $in.H_2O^{1/2}$

T_s = 514.2 ^oR

P_s = $P_{bar} + P_g/13.6$ = 30.18 + 1.90 /13.6 = 30.32 in.Hg

M_s = 28.69 lb/lb-mole

$$V_s = (85.49)(0.84) (1.663) \sqrt{\frac{514.2}{(30.32) (28.69)}}$$

$$= 91.81 \text{ ft/sec}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 528-0990

7) Volumetric Flow Rate at Gas Stream Conditions,

$$Q = A \times V_s \times 60$$

Where:

Q = Volumetric flow rate at gas stream conditions, A.C.F.M.

A = Cross sectional area of stack or duct, ft^2.

V_s = Average gas stream velocity, ft/sec.

60 = Conversion factor from seconds to minutes.

Example: Run 1

A = 7.07 ft^2

V_s = 91.81 ft/sec

Q = (7.07) (91.81) 60

= 38,937 ACFM

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

8) Volumetric Flow Rate at Standard Conditions,

$$Q_{sd} = 60 \quad (1 - B_{ws}) \quad V_s \quad A \left[\frac{T_{std}}{T_s} \right] \left[\frac{P_s}{P_{std}} \right]$$

(EPA Equation 2-10)

Where:

Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, S.C.F.M.

60 = Conversion factor from seconds to minutes.

B_{ws} = Water vapor in gas stream, proportion by volume.

V_s = Average gas stream velocity, ft/sec.

A = Cross sectional area of stack or duct, ft^2.

T_{std} = Standard absolute temperature, 528 ^{o} Rankine.

T_s = Average absolute gas stream temperature, ^oR.

P_s = Absolute gas stream pressure, $(P_{bar} + P_g/13.6)$ in.Hg.

P_{bar} = Barometric Pressure, in. Hg.

P_g = Pressure differential from gas stream to atmosphere, (static pressure) in.H_2O.

P_{std} = Absolute pressure at standard conditions, 29.92 in. Hg.

Example: Run 1

B_{ws} = 0.0131

V_s = 91.81 ft/sec

A = 7.07 ft^2

T_s = 514.2 ^oR

$P_s = P_{bar} + P_g /13.6 = 30.18 + 1.90 /13.6 = 30.32$ in.Hg

$$Q_{sd} = 60 \quad (1 - 0.0131) \quad (\quad 91.81 \quad) \quad (\quad 7.07 \quad) \left(\frac{528.0}{514.2} \right) \left(\frac{30.32}{29.92} \right)$$

= 39,989 SCFM

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

9) Gas Stream Particulate Concentration,

$$C_s = 15.43 \text{ gr./g} \left| \frac{M_n}{V_{m(std)}} \right|$$

(EPA Equation 5-6)

Where:

C_s = Concentration of particulate matter in gas stream, dry basis-corrected to standard conditions, gr/dscf.

M_n = Total amount of particulate matter collected in probe wash and on filter, g.

$V_{m(std)}$ = Volume of gas sample measured at meter box (corrected to standard conditions), ft^3.

Example: Run 1

$$M_n = \underset{\text{(probe)}}{0.0083} + \underset{\text{(filter)}}{0.0010} = 0.0093 \text{ g}$$

$$V_{m(std)} = 59.71 \text{ ft}^3$$

$$C_s = 15.43 \left| \frac{0.0093}{59.71} \right|$$

$$= 0.0024 \text{ gr/dscf}$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

10) Particulate Emission Rate,

$$E = Q_{sd} \; C_s \left[\frac{1 \text{ pound}}{7000 \text{ grains}}\right] \left[\frac{60 \text{ minutes}}{1 \text{ hour}}\right]$$

Where:

E = Particulate Emission Rate, lb/hr.

Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, S.C.F.M.

C_s = Concentration of particulate matter in gas stream, dry basis-corrected to standard conditions, gr/dscf.

Example: Run 1

Q_{sd} = 39,989 ft^3

C_s = 0.0024 gr/dscf

$$E = (\ 39{,}989\ )\ (\ 0.0024\ ) \left[\frac{60}{7000}\right]$$

= 0.82 lb/hr

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

11) Percent of Isokinetic Sampling,

$$I = \frac{100\ T_s \left[K_3\ V_{lc} + \left[\frac{V_m}{T_m} \right] \left[P_{bar} + \frac{\Delta H}{13.6} \right] \right]}{60\ A_n\ V_s\ P_s\ t}$$

(EPA Equation 5-7

Where:

I = Percent of Isokinetic sampling, %.

T_s = Average absolute gas stream temperature, ^oR.

K_3 = Constant, 0.002669 in.Hg-ft^3/ml-^oR.

V_{lc} = Volume of water collected in impingers & silica gel, ml.

V_m = Gas sample volume measured at meter box (meter conditions), ft^3.

T_m = Average dry gas meter temperature, ^oR.

P_{bar} = Barometric Pressure, in. Hg.

ΔH = Average pressure differential across orifice, in. H_2O.

t = Total sampling time, minutes.

V_s = Average gas stream velocity, ft/sec.

P_s = Absolute gas stream pressure, in.Hg.

D_n = Nominal diameter of probe nozzle tip, inches.

A_n = Cross sectional area of nozzle, ft^2.

Example: Run 1

T_s	=	514.2	^oR	ΔH	=	3.10 in.H_2O
V_{lc}	=	16.8	ml	t	=	60.0 min.
V_m	=	59.95	ft^3	V_s	=	91.81 ft/sec
T_m	=	538.8	^oR	P_s	=	30.32 in.Hg
A_n	=	0.0001917	ft^2	P_{bar}	=	30.18 in.Hg

$$I = \frac{514.2\ (\ 100\ ) \left[0.002669\ (\ 16.8\ ) + \left[\frac{59.95}{538.8} \right] \left[30.18 + \frac{3.10}{13.6} \right] \right]}{60\ (0.0001917\ )\ (\ 91.81\ )\ (\ 30.32\ )\ (\ 60.0\ )}$$

$$= 91.7\ \%$$

Envisage Environmental Incorporated
P.O. Box 152 Richfield, Ohio 44286
Phone (216) 526-0990

Not subject to the requirements
of Section 3507, Paperwork
Reduction Act of 1980

ENCLOSURE 1

SECONDARY LEAD SMELTER INFORMATION REQUEST

Please answer this information request as completely as possible. If you are unable to respond to an item as it is stated, please provide any information you believe may be related. Use additional sheets or the backs of the request pages for your responses, if necessary.

If you have any questions concerning this information request, please contact:

Mr. George Streit
(919) 541-2364
FAX (919) 541-3470

Please return this information request and any additional information you wish to have considered to:

United States Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

Attention: Mr. Bruce C. Jordan, ESD (MD-13)

I. ADMINISTRATION

Name of Facility Master Metals, Inc.

Address:

Street 2850 West 3rd Steet County Cuyahoha

City Cleveland State Ohio Zip 44113

Owner Master Metals, Inc.

Person Responsible for Questionnaire Rudy A. Zupan

Telephone Number (216) 621-2361

Mailing Address (If different from above)

Street _____

City _____ State _____ Zip _____

II. PLANT OPERATIONS AND EQUIPMENT

1. Plant operating schedule:

Hours per day 24

Days per week 7

Weeks per year 52

Do all the major process areas of the plant operate under this schedule?

X YES _____ NO

If NO, describe the processes and schedules that are different from the above _____

2. Smelter capacity: 12,000 tons of lead produced per year.

Which process or piece of equipment is the principal bottleneck to increasing production? percent

Lead content of feedstock material

3. Lead-bearing raw materials smelted; indicate the weight percentage of each:

____	Whole Batteries	10	Other Scrap Lead
25	Battery Plates	25	Purchased Drosses
2.5	Battery Oxide Paste	12,5	Other Flue Dust
		25	Leaded Glass Press Cake

4. Lead-bearing products; indicate the weight percentage of each:

90	Hard Lead Ingots (antimonial lead)		
5	Fabricated Lead Products (sheet, extrusions, etc.)		
5	Soft Lead Ingots	_____	Solder
____	Lead Oxide	_____	Other_____

5. Indicate the type of equipment that is used to break batteries:

____	Saw	_____	Hammer mill/rotary shredder
____	Shears	_____	Other, please describe_____

1. Oxy-acetylene torch
2. Drop on steel plate

6. Are there any air pollution control devices on the battery-breaking operations?

_____YES X NO

If YES, please describe_____

7. Are battery cases separated for recycling?

Steel-cased Industrial Batteries

X YES _____ NO

8. What is the size (in square feet) of the area in which lead-bearing raw materials (such as lead-bearing slag, battery grids and paste, flue dust, and drosses) are stored?

75,000 square feet

9. List any lead-bearing raw materials that are stored outdoors, and the size of the outdoor storage area (in square feet) for those materials:

Material	Storage area (square feet)
All Materials are stored outdoors in covered bins or 55 gallon drums	75,000

10. Are the lead-bearing raw materials wetted with water to control dust while they are in storage?

_____ YES X NO

If YES, how is the need for wetting determined (e.g., material appears dry, regular timed interval, continuous)? _____

What is the wetting frequency? _____

How is water applied? _____

11. Are <u>all</u> of the lead-bearing raw materials stored in a totally enclosed building?

_____ YES X NO

12. Please complete Table II-1 for the material storage and processing areas indicated.

13. Complete Table II-2 for all of the smelting furnaces, remelting furnaces, and refining kettles at your plant. An example response is provided in the first row of Table II-2.

14. For each of the sources identified in Table II-2 and for each building ventilation system, please provide a simple emissions flow diagram. Include the identification numbers for the afterburners, baghouses and scrubbers used in Questions 15, 16, and 17. Figure II-1 provides example diagrams for a hypothetical plant with a blast and reverberatory furnace and an enclosed raw material storage area.

15. If one or more afterburners are used at your plant, indicate the following for each:

	Afterburner #1	Afterburner #2	Afterburner #3
Furnaces or other equipment controlled			
Operating temperature (^{O}F)			
Flue gas retention time (seconds)			
Throat velocity			
Manufacturer			
Model Number			

16. Indicate the methods that are used to cool the furnace flue gas streams (check those that apply):

X Dilution air (dampers)

actual cubic feet per minute (acfm) dilution air/acfm flue gas Manually controlled based on flue temperature at control panel -unknown

____ Evaporative cooling (water spray)

gallons water/1,000 acfm flue gas _____

X Radiation cooling (cooling loops)

TABLE II-1. MATERIAL STORAGE AND PROCESSING AREAS
(QUESTION 12)

Area	Degree of Enclosure[a] (Total/ Partial/ None)	Is Area Ventilated? (Y/N)	Baghouse ID Number (State "none" if not applicable)	Number of Air Changes Per Hour
Battery Breaking	None	Outdoors (ambient)		-
Raw Material Storage	All storage outdoors in tarped, steel bins or 55 gallon drums, bags or boxes	Outdoors (ambient)		-
Furnace Area	Hoods control process and fugitive emissions	Outdoors (ambient)	Process emissions- #1 & #2 baghouse Secondary emsissions #3 baghouse	-
Refinery Area	Total enclousure with hoods on refining pots	Building ventilated by natural draft hoods connected to baghouse	Refining pots baghouse	UK
Other Extrusion Area	Total enclosure with hoods on melting furnace and press	Building ventilated by natural draft hoods connected to ambient air	None	UK
Other Small Lots Refining Area	Total Enclosure	Building Ventilated by natural draft	None	UK

[a]Total enclosure - enclosed on four sides with a roof.
Partial enclosure - enclosed on three sides, with or without a roof.
None - neither total or partial enclosure.

TABLE II-2. SMELTING AND REFINING FURNACE INFORMATION (QUESTION 13)

Fill in the appropriate information for each type of equipment located at your facility. An example is provided in the first row.

	Quantity	Age	Charge Material	Lead Production Capacity	Operating Temperature	Emission Controls	Hooded Areas
Blast Furnace (Example)	1	10 years	Reverb slag	5 tons/hour	2,200°F	Afterburner, baghouse, scrubber	Charging, lead and slag tapping.
Blast Furnace	0						
Stationary Reverb Furnace	0						
Rotary Furnace	2	3 years 5 years	battery plates lead bearing feedstock flux agents	2T/Hour 1.25T/Hour	1800° F	Baghouse	smelting, tapping, charging
Agglomerating/ Dust Furnace	0						
Refining Kettles	3	5-10 years	lead ingots flux agents alloying metals		1300° F	Baghouse	alloying, melting, fluxing
Other Remelting Pots	5	10 years	lead ingots		800° F	None	melting
Other							
Other							

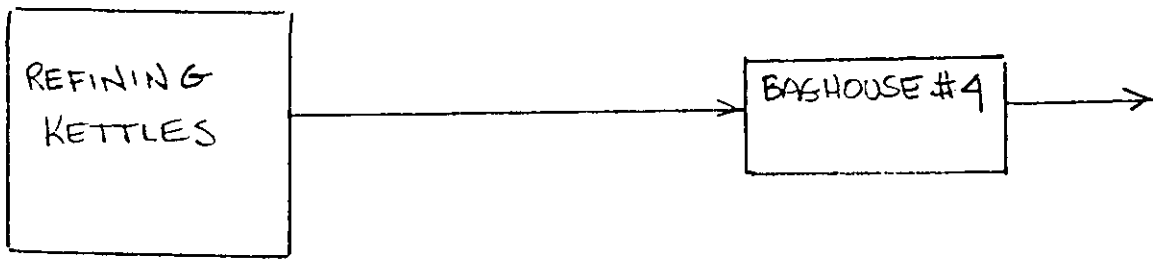


FIGURE II-1B: EMISSION FLOW DIAGRAM REFINING KETTLES

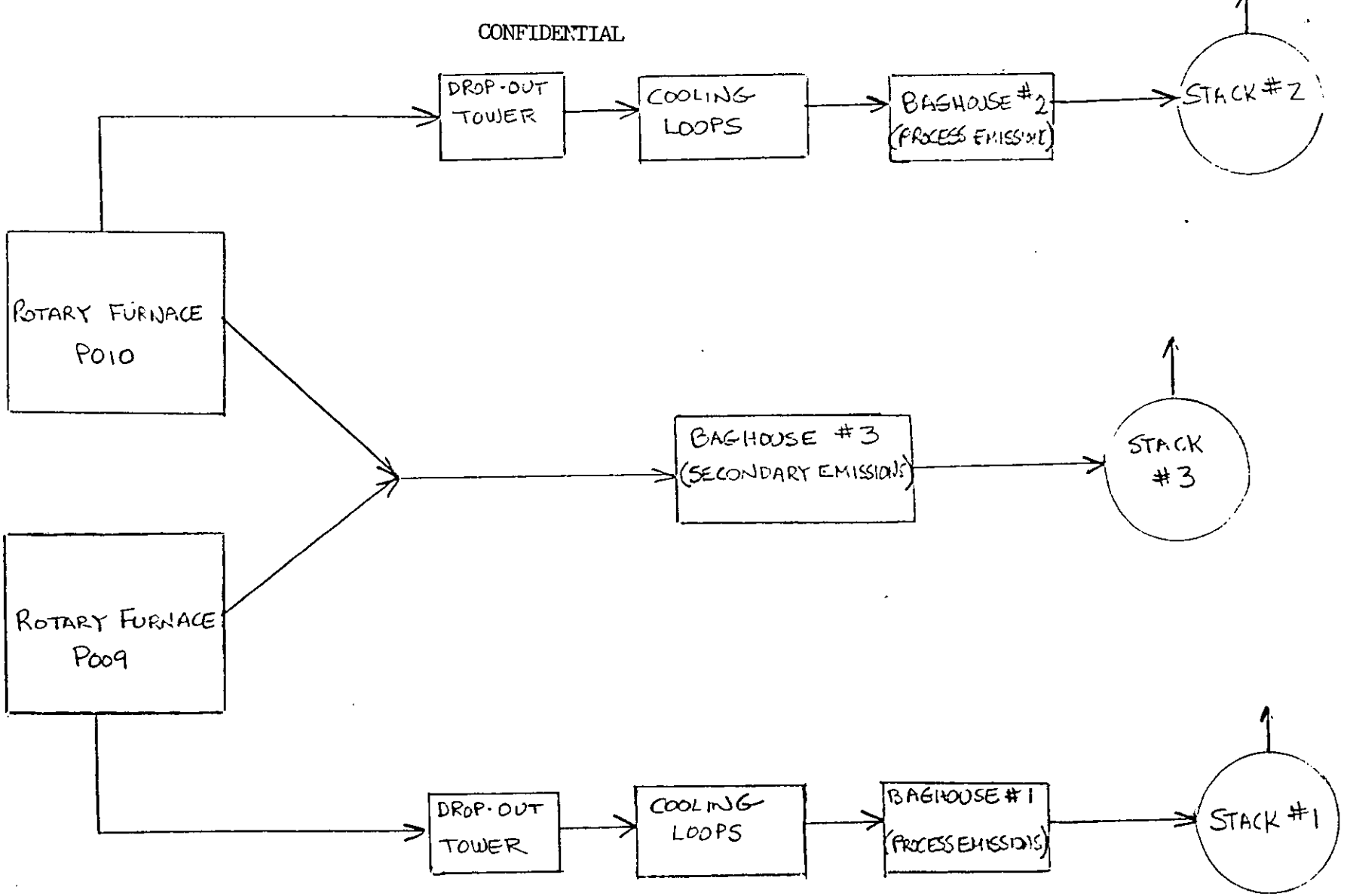


FIGURE II-1A: EMISSION FLOW DIAGRAM
ROTARY FURNACES

17. BAGHOUSE INFORMATION: Please photocopy this page and provide the following information for each baghouse at your plant. Assign each baghouse a unique identification number.

(a) Identification number Process Baghouse #2

(b) Process/equipment served Rotary Furnace P010

(c) Air flow rate (acfm) 12,500 acfm

(d) Operating temperature 275° F

(e) Number of compartments 3

(f) Number of bags per compartment 204

(g) Cloth type acrylic

(h) Bag dimensions 5½" dimater X 171" long

(i) Total filtering area 11,748 sq. ft.

(j) Net air to cloth ratio 1.6:1

(k) Operating pressure drop (inches of water [in. of H_2O]) 4-6 inches w.g./compartment

(l) Cleaning mechanism (shaker, pulse jet, etc.) shaker

(m) Is each compartment taken off line during cleaning?

X YES _____ NO

(n) How is cleaning activated (pressure drop, timer, etc.)? timer

(o) Manufacturer wheelabrator

(p) Model number Unit 1217-F Model 171, Series 5S

17. BAGHOUSE INFORMATION: Please photocopy this page and provide the following information for each baghouse at your plant. Assign each baghouse a unique identification number.

(a) Identification number Sanitary Baghouse #3

(b) Process/equipment served Rotary Furnaces P009 & P010

(c) Air flow rate (acfm) 40,000 acfm

(d) Operating temperature 210° F

(e) Number of compartments 9

(f) Number of bags per compartment 24

(g) Cloth type polyester

(h) Bag dimensions 11" dimater X 23'6" long

(i) Total filtering area 25,920 sq. ft.

(j) Net air to cloth ratio 1.5:1

(k) Operating pressure drop (inches of water [in. of H_2O]) unknown

(l) Cleaning mechanism (shaker, pulse jet, etc.) manual shaking

(m) Is each compartment taken off line during cleaning?

X YES _____ NO

(n) How is cleaning activated (pressure drop, timer, etc.)?

regular schedule

(o) Manufacturer Designed & installed by NL Industries (previous owner)

(p) Model number -

17. BAGHOUSE INFORMATION: Please photocopy this page and provide the following information for each baghouse at your plant. Assign each baghouse a unique identification number.

(a) Identification number Baghouse #1

(b) Process/equipment served refining pots

(c) Air flow rate (acfm) 10,000 acfm

(d) Operating temperature 210 F

(e) Number of compartments 5

(f) Number of bags per compartment 79

(g) Cloth type polyester

(h) Bag dimensions 6" diameter X 109" length

(i) Total filtering area 5800 sq. ft.

(j) Net air to cloth ratio 1.7:1

(k) Operating pressure drop (inches of water [in. of H_2O]) unknown

(l) Cleaning mechanism (shaker, pulse jet, etc.) shaker

(m) Is each compartment taken off line during cleaning?

X YES _____ NO

(n) How is cleaning activated (pressure drop, timer, etc.)? Schedule cleaning

(o) Manufacturer Norblo

(p) Model number unknown

18. SCRUBBER INFORMATION: Please photocopy this page and provide the following information for each scrubber at your plant used to control either sulfur dioxide (SO_2) or particulate matter. Assign each scrubber a unique identification number.

(a) Identification number N/A

(b) Process/equipment served _____

(c) Scrubber type or design (check one)

_____Spray

Countercurrent _____

Crosscurrent _____

Inlet water pressure _____

_____Tray

Number of trays _____

Type of tray _____

_____Packed-bed

Bed thickness _____

Bed media _____

_____Venturi

Is throat fixed or variable? _____

(d) Pressure drop (in. H_2O) _____

(e) Air flow rate (acfm) _____

(f) Scrubbing media:

Gallons per minute _____

Sorbent type _____

Stoichiometric ratio _____

Liquid to gas ratio _____

Sorbent concentration (pounds/gallon) _____

(g) Is scrubbing media recirculated?

_____YES _____NO

(h) Blowdown rate in gallons per minute (gpm) _____

(i) Manufacturer _____

(j) Model number _____

17. BAGHOUSE INFORMATION: Please photocopy this page and provide the following information for each baghouse at your plant. Assign each baghouse a unique identification number.

(a) Identification number Process Baghouse #1

(b) Process/equipment served Rotary Furnace P009

(c) Air flow rate (acfm) 12,500 acfm

(d) Operating temperature 275° F

(e) Number of compartments 3

(f) Number of bags per compartment 204

(g) Cloth type acrylic

(h) Bag dimensions 5½" diameter X 171" long

(i) Total filtering area 11,748 sq. ft.

(j) Net air to cloth ratio 1.6:1

(k) Operating pressure drop (inches of water [in. of H_2O]) 4-6 inches w.g./compartment

(l) Cleaning mechanism (shaker, pulse jet, etc.) shaker

(m) Is each compartment taken off line during cleaning?

X YES _____ NO

(n) How is cleaning activated (pressure drop, timer, etc.)?

timer

(o) Manufacturer Wheelabrator

(p) Model number Unit 1217-F, Model 171, Series 5S

19. Is the flue dust collected by the fabric filter baghouses recycled to the furnaces?

X YES _____ NO

(a) If the flue dust is recycled, is it recycled to the furnaces directly (i.e., is there no intermediate storage)?

_____ YES X NO

(b) If the flue dust is not recycled, please describe its disposal: _____

20. List all outdoor areas where fugitive dust control is used and indicate the methods used (low pressure washing, high pressure power washing, sweeping, vacuuming, wet suppression, other [please indicate]).

Outdoor Area	Method Used
Battery breaking area	low pressure washing
All other outside areas	power sweeping

21. Are all plant roadways, yards, and storage areas paved?

x YES _____ NO

If no, please describe the areas that are not paved ____

_____

_____

_____

22. Is runoff water from stormwater and/or fugitive dust control collected and treated?

_____ YES X NO

23. Are vehicles washed before they leave plant buildings?

X YES _____ NO

24. Are vehicles washed before they leave the plant property?

X YES _____ NO

III. HAZARDOUS AIR POLLUTANT EMISSIONS

This section requests information on sources of emissions of hazardous air pollutants (HAP's) located at your plant. The HAP's are listed in Table III-2.

1. Complete Table III-1 for all secondary lead smelting, remelting, and refining processes at your plant that use or are suspected or known sources of the HAP's listed in Table III-2. (A suspected source of a HAP is one that may be a source of the HAP, based on the type of materials being used and the processes involved. A known source of a HAP is a source for which actual testing data are available that demonstrate that the HAP in question is being emitted from the source.)

2. For each piece of lead smelting, remelting, and refining equipment at your facility, provide a diagram that indicates all sources of air emissions (such as stack emissions, process fugitive emissions, and area fugitive emissions). Indicate all uncontrolled and controlled emission streams and label each stream with a unique code. These codes will be used in completing Tables III-2 and III-3, below. Figures III-1 through III-6 provide examples of emission diagrams for the furnace types listed in Table II-2 and for emissions from a simplified building ventilation system. These example figures may be copied and modified to represent the emission sources at your plant, if convenient.

3. Complete Table III-2 for each emission point identified in the emission diagram(s) developed for No. 2, above. For each HAP listed on the table, indicate the likelihood, using the codes defined at the bottom of each page of Table III-2, that the HAP is emitted from a given emission point within the source category. Identify the appropriate emission points using the same terminology/codes you used in completing the emission diagram(s) in No. 2.

4. Copy Table III-3 and complete for those processes that emit HAP's identified with codes "A" or "C" in Table III-2, above, only. The first row of Table III-3 provides an example of how the table should be prepared.

5. <u>Provide worksheets and copies of test reports to document reported emissions and control devices/methods and capture system efficiencies</u>. If you are submitting test results, include: (1) a description of the test protocol and method followed and any problems encountered during testing, and (2) a record of raw test data. For calculations based on emission factors, material balance, or engineering principles, submit: (1) a step-by-step description of the calculations, including assumptions used, and (2) a brief rationale for the validity of the calculation method used.

TABLE III-1. SUMMARY OF PROCESSES FOR SECONDARY LEAD SMELTING, REMELTING, AND REFINING

Processes Using and/or Emitting HAP's	No. of Units	Average Annual Production[a]	Operating Cycle		Maximum Annual Production Capacity[a]
			Hours/day	Days/year	
Rotary Furnaces	2	12,000 T/yr.	24	7	18,000 T/yr
Refining and Alloying Kettles	3	12,000 T/yr.	24	7	18,000 T/yr
Remelting Pots (small lots)	3	200 T/yr.	8	5	800 T/yr
Remelting Pots (extrusion)	2	600 T/yr.	8	5	2,400 T/yr

52 U/hr
P2

[a]Indicate production in appropriate units, e.g., tons/yr of lead.

TABLE III-3. INFORMATION ON HAZARDOUS AIR POLLUTANTS

Emission Point (from Table III-2)	Name of Hazardous Air Pollutant	Collection Device	Flow Rate of Captured Stream (dscfm)	Control Device I.D. No.	Controlled Stream Concentration[a]	Controlled Stream Emissions (lb/yr)	Control Device Efficiency, (%)	Controlled Stream Efficiency Basis
BF-6	Lead compounds	Fabric filter	15,000	Fabric Filter No. 1	.00010 gr/dscf	113	99.5	Manufacturer's specification
RK-4	Lead Compounds	Fabric Filter	20,000	Fabric Filter #4	Not Tested	Not Tested	> 99.0	Manufacturer Spec.
PK-5	Lead Compounds	Fabric Filter	20,000	Fabric Filter #4	Not Tested	Not Tested	> 99.0	Manufacturer Spec.

[a]Provide concentration units for each HAP.

TABLE III-3. INFORMATION ON HAZARDOUS AIR POLLUTANTS

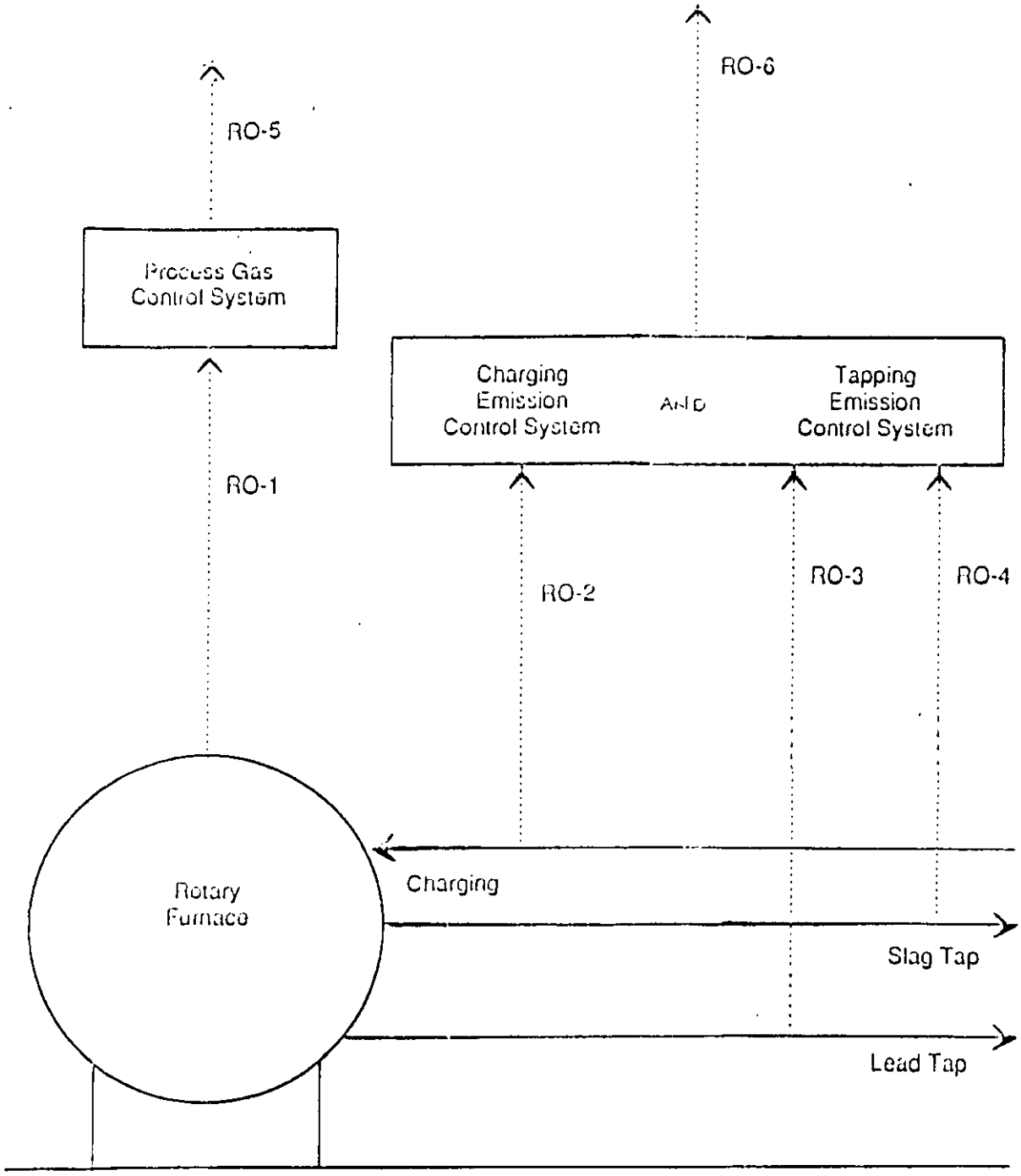
Emission Point (from Table III-2)	Name of Hazardous Air Pollutant	Collection Device	Flow Rate of Captured Stream (dscfm)	Control Device I.D. No.	Controlled Stream Concentration[a]	Controlled Stream Emissions (lb/yr)	Control Device Efficiency, (%)	Controlled Stream Efficiency Basis
BF-6	Lead compounds	Fabric filter	15,000	Fabric Filter No. 1	.00010 gr/dscf	113	99.5	Manufacturer's specification
RP-1	lead	none	-	-	negligible	-	-	-
RP-2	lead	none	-	-	negligible	-	-	-
RP-3	lead	none	-	-	negligible	-	-	-

[a]Provide concentration units for each HAP.

TABLE III-3. INFORMATION ON HAZARDOUS AIR POLLUTANTS

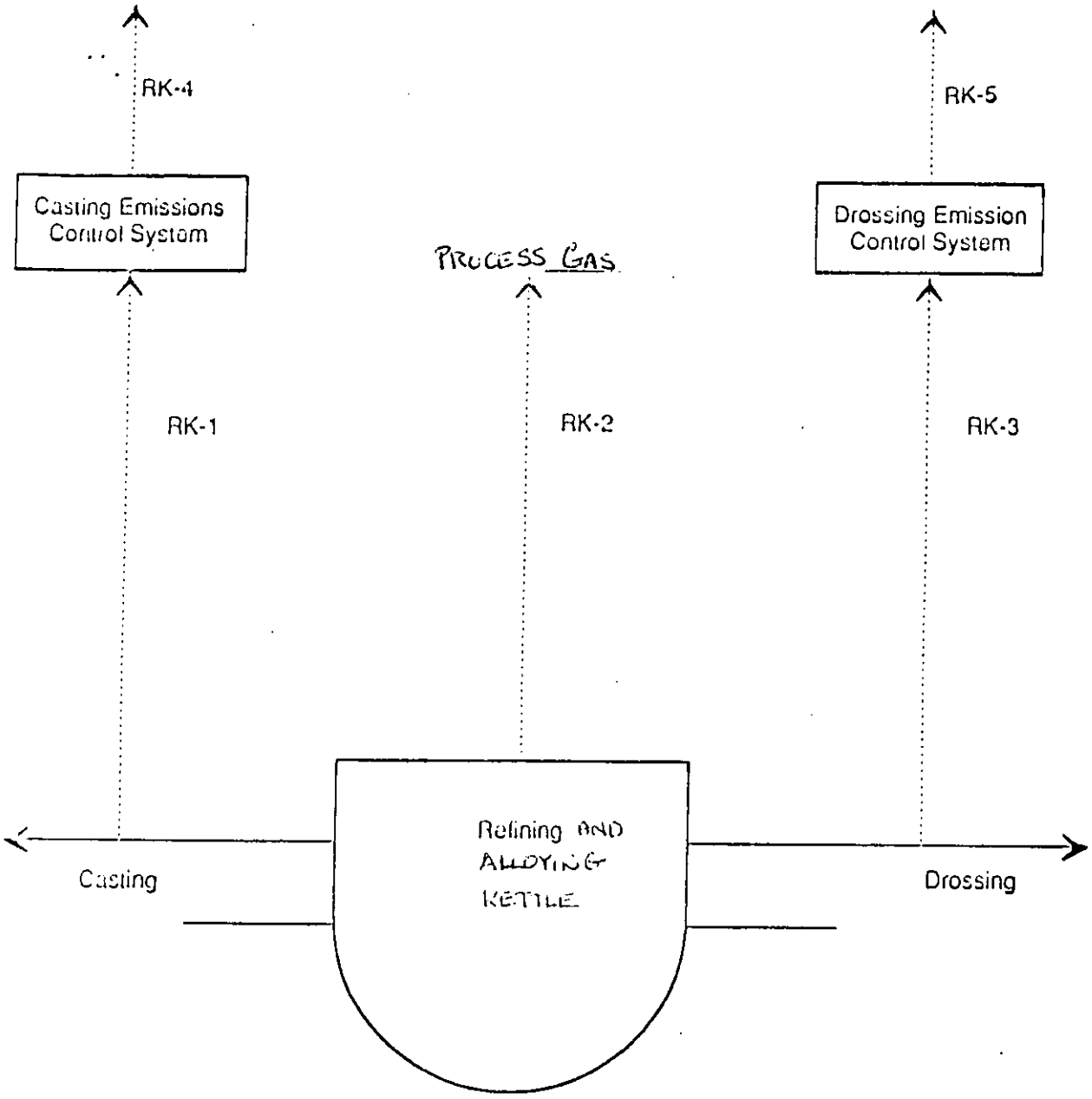
Emission Point (from Table III-2)	Name of Hazardous Air Pollutant	Collection Device	Flow Rate of Captured Stream (dscfm)	Control Device I.D. No.	Controlled Stream Concentration[a]	Controlled Stream Emissions (lb/yr)	Control Device Efficiency, (%)	Controlled Stream Efficiency Basis
BF-6	Lead compounds	Fabric filter	15,000	Fabric Filter No. 1	.00010 gr/dscf	113	99.5	Manufacturer's specification
RO-5	Lead Compounds	Fabric Filter	14,4000 each	Baghouse #1 Baghouse #2	.00004 gr/dscf	87#/yr.	99.0	Test
RO-6	Lead Compounds	Fabric Filter	40,000	Baghouse #3	.00008 gr/dscf	122#/yr.	98.0	Test

[a]Provide concentration units for each HAP.



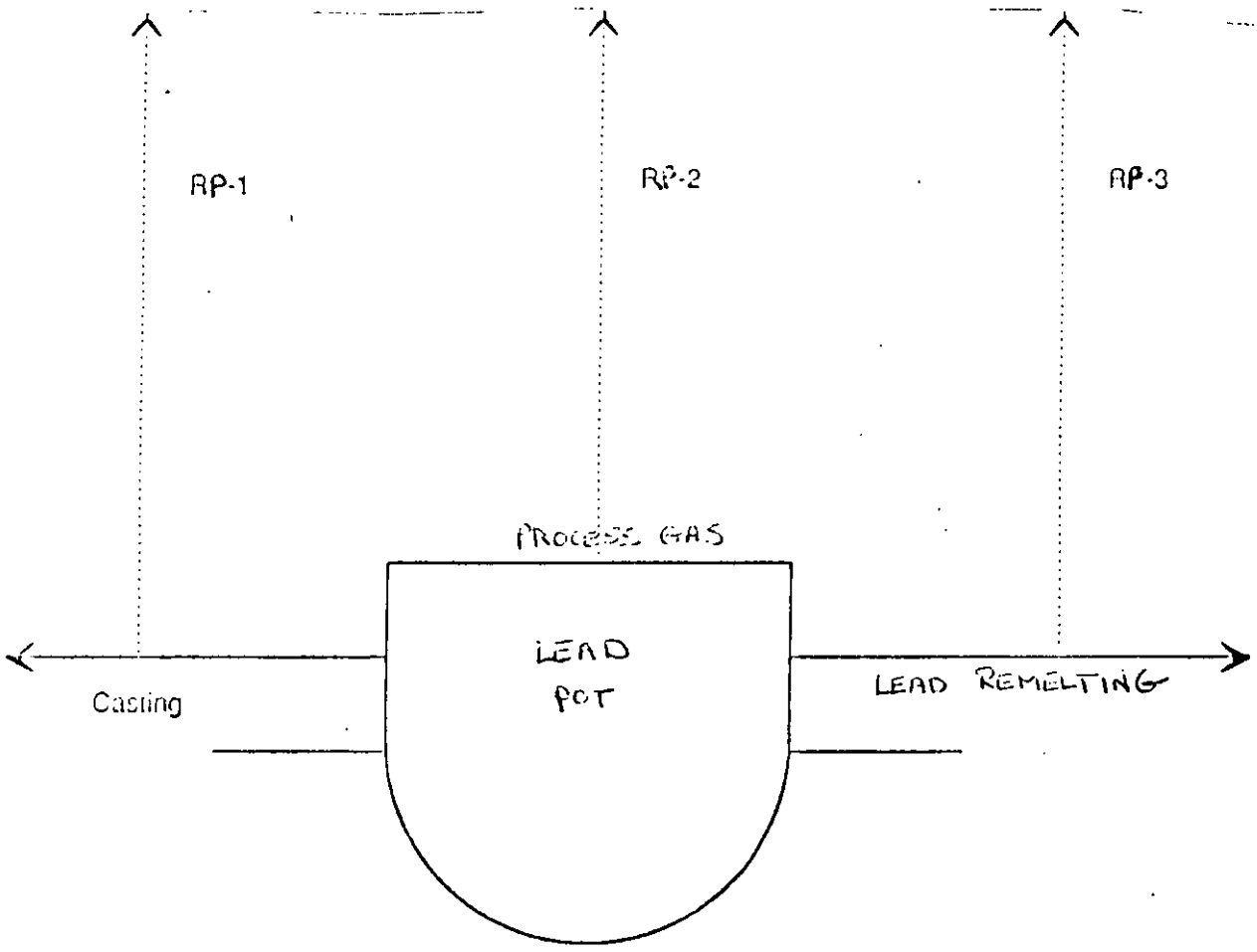
I. rotary furnace emissions diagram.

RO-1 through RO-4 are uncontrolled emission streams and RO-5 through RO-6 are controlled emission stream.



II. refining kettle emissions diagram.

RK-1 through RK-3 are uncontrolled emission streams and RK-4 through RK-5 are controlled emission streams.



III. LEAD REMELT POTS. RK-1 THRU RK-3 ARE UNCONTROLLED EMISSION STREAMS.

IV. EMISSIONS AND MONITORING DATA

1. Emissions Data

Please attach the most recent emission test reports for all furnaces and control devices for which testing was conducted for the Federal criteria pollutants (i.e., particulate matter, lead, carbon monoxide, sulfur oxides, nitrogen oxides, ozone, and hydrocarbons) and/or hazardous air pollutants (HAP's). For each test report, provide the following:

(a) Hourly lead production rate at time of test.

2500 #/hr.

(b) Whether or not paste desulfurization was being performed at the time of the test. No

(c) A brief description of any differences between the furnace/control configuration at the time of the test and the present configuration.

None

2. Continuous Monitoring Data

Complete Table IV-1 for the pollutants for which you have continuous emission monitoring (CEM) data. For the range and average values, provide values for a typical 24-hour period during which the plant is operating at or near full capacity.

Please attach copies of any reports, tables, or graphs that provide a concise summary of the continuous emission monitoring data.

3. Does your plant have a Standard Operating Procedures Manual for work practices, housekeeping, or other fugitive control measures?

_____Yes __X__No

If YES, please attach a copy of the manual.

TABLE IV-1. CONTINUOUS EMISSION MONITORING (CEM) DATA N/A

CEM Location (Stack ID)	Pollutant (CO, SO_2, Opacity)	Range (min/max)	Average	Units