

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

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP42 Section:	11.7
Background Chapter:	4
Reference:	32
Title:	<i>Ceramic Kiln Afterburner Testing, Murata Erie North America, State College, PA, Hemeon Associates, Inc., Pittsburgh, PA, October 23, 1991.</i>

*Insufficient process
data and process
description. NIOSH
TEST METHOD. DO
NOT USE.*

Commonwealth of Pennsylvania
Environmental Resources
January 13, 1992

AP-42 Section	11.7
Reference	—
Report Sect.	4
Reference	32

Subject: Source Test Review

To: Data File
Murata Erie North America
Perguson Township, Centre County

From: Richard St. Louis, Chief
Source Testing Unit
Division of Technical Services and Monitoring
Bureau of Air Quality Control

Through: Chief, Source Testing and Monitoring Section *W*

Murata Erie North America operates six NRE Kilns at its Perguson Township, Centre County facility. Ceramic capacitors are arranged on small 4 inch by 6 inch plates with each kiln supporting 540 plates which can be stacked onto a ceramic pad located under the kiln. The ceramic pad is actually the bottom of the kiln. After the plates are stacked, the bottom of the kiln is raised via screw jacks from the floor level up to the kiln bottom. Thirty six electrically operated glow bars provide the heat necessary to remove organic binders from the capacitors and to vitrify the components. The organic binders are released at temperatures between 300-400°C and the temperature of the kiln is gradually increased to 1,300°C to vitrify the ceramic components. The entire cycle takes approximately 32 hours to complete.

Hemcon Associates conducted destruction efficiency tests for acetone and benzene utilizing charcoal absorption tubes on the associated NRE afterburner servicing NRE Kiln No. 2. Page 4 erroneously reports that the sampling was conducted on an NRE Kiln rather than NRE Kiln No. 2. None of the field data sheets provide any information as to the source tested while the last page of the report (unnumbered) labeled "Strip Chart of Thermocouple Readings" indicate that Curves 1-6 are readings for Kilns 7 and 8. The report lacks any process description as required by Chapter 139 but which was acquired from Mr. Steve Ford of Murata Erie through a telephone conversation on January 7, 1992.

The test results indicate destruction efficiencies of 99.9% and 99.9% for acetone from Test Run 1 and 3 while efficiencies of 98.1%, 97.7% and 97.4% reported for benzene from Runs 1, 2, and 3, respectively. The report does not provide any information as to the reason why the inlet concentration for acetone during Run No. 2 was below the detectable limit.

The tests were conducted in accordance with a submitted protocol during the kiln operating temperature range of 355-380°C, the period during which organic emissions would be expected. The results of Run No. 3 for acetone is unacceptable, however, the remaining results are acceptable.

Data File

- 2 -

January 13, 1992

cc: David Binh, Northcentral Region
14-389-010
AdC
EPA/REM
Reading File -- Source Testing

BBBledg



COMMONWEALTH OF PENNSYLVANIA

November 13, 1991

SUBJECT: Source Test Report
Murata Erie North America
Ferguson Township, Centre County
File 14-399-010

TO: L. Blaine DeHaven, Chief *LDH*
Source Testing & Monitoring Section
Div. of Technical Services & Monitoring

THROUGH: *P* Richard L. Maxwell, Jr.
Chief, Engineering Services
Air Quality Control
Northcentral Region

FROM: David Alan Bish *DAB*
Air Pollution Control Engineer
Air Quality Control
Northcentral Region

Attached you will find a source test report to determine the benzene and acetone concentrations from a ceramic kiln and the emissions from the electric afterburner associated with it. I have also attached Brian Hammer's test observation memo dated October 15, 1991.

The pretest protocol was evaluated by Rick St. Louis.

It appears that the kiln operating temperature was above 200°C during the tests as we had requested.

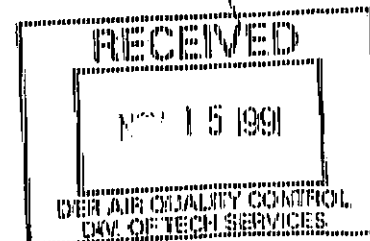
Please have a member of your staff review the subject test and advise me regarding the validity of the results.

If you have any questions, please feel free to call me at 8-465-3642.

DAB/rjh

Attachment

11
Steve Ford
Murata Erie



1/7/92
012X #2

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Resources
October 15, 1991

SUBJECT: Murata Erie

TO: Operating Permit File #14-199-010

FROM: Brian J. Hammer
Air Quality Specialist
Hawk Run District

THROUGH: John B. [Signature]
District Supervisor
Williamsport Region

6

David Bish
APC Engineer III
Williamsport Region

On October 11, 1991, from approximately 8:15 AM to 9:00 AM, I attended the stack test on NRE Kiln #2. Bill Seay, an environmental scientist for Nittany GeoScience Inc., was overseeing the test for Murata Erie. John Barry, Amy Barry, and Jim Cambel were the personnel from Hemeon Associates who were doing the stack testing. There were no company officials from Murata Erie at the stack test.

Below are my findings:

- To cool the kiln effluent, Hemeon Associates rigged into the sampling line an empty impinger surrounded by an ice bath. I hand-felt the metal fittings near the charcoal tubes and found that the fittings were close to room temperature.
- Hemeon Associates was using two charcoal tubes in the sampling line. The tubes were separated from each other by metal fittings. Note that each charcoal tube had a backup section.
- The kiln temperature gauge had a reading of 207.6 C. Mr. Seay said that the kiln temperature was 200.6 C when the test was initiated.
- Test data was being recorded every five minutes.
- There was a note attached to Kiln #2 which stated "start this kiln at exactly 6:00 AM, Friday, 10/11/91" (signed Chris). Note that no one from Nittany GeoScience or Hemeon Associates was present when the kiln was loaded or started. Evidently, the third-shift kiln operator loaded/started the kiln before going off the clock.
- After examining the ledger for kiln #2, Bernadette Wood, the first-shift kiln operator, said that the reported load in the kiln was representative of typical operations.

cc: files



MURATA ERIE NORTH AMERICA
1900 W. COLLEGE AVE.
STATE COLLEGE, PA 16801
TELEPHONE: 814-237-1431
TELEX: 26-1708
FAX: 1-814-238-0400

November 7, 1991

RECEIVED

NOV 8 1991

CERTIFIED MAIL

David Bish
Air Pollution Control Engineer
Pa. DEP
200 Pine Street
Williamsport, PA 17701-6510

DEPT. OF QUALITY CONTROL
WILLIAMSPORT REGION

RE: Plan Approval 14-399-010
Air Quality Tests

Dear Mr. Bish:

In accordance with Condition Number 4 of Plan Approval Number 14-399-010 for 6 (six) NRC ceramic kilns with afterburners, emission testing was conducted by Hamon Associates, Inc. of Pittsburgh, PA on October 11, 1991. Three separate tests were performed at one hour intervals with inlet and outlet concentrations of acetone and benzene monitored. As you will see in Tables 1 and 2 of the report (page 4), destruction efficiencies associated with the DBK afterburner are excellent.

If you have any questions about test results, please contact me.

Sincerely,

Steven W. Foord
Environmental/Safety Manager

SWF/rem

cc: M. Higgins (w/o attachments)
G. Myers - Nittany Geoscience (w/o attachments)

HANSEN ASSOCIATES INC.

Air Pollution Consulting Engineers
125 Thirty-ninth Street
Pittsburgh, PA 15201

(412) 483-4100

FAX (412) 610-0100

CERAMIC KILN AFTERBURNER TESTING
MURATA ERIE NORTH AMERICA
STATE COLLEGE, PA

Report To:
Mr. J. Greg Myers
Nittany Geoscience
120 Radnor Road
State College, PA 16801

Report By:
Mr. Christopher Michael
Project Manager
Hansen Associates, Inc.
125 Thirty-ninth Street
Pittsburgh, PA 15201

October 23, 1991

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- 2.0 Summary of Results
- 3.0 Test Program and Sampling Description

APPENDICES

- A. Laboratory Data
- B. Field Data Sheets
- C. Process Data

1.0 INTRODUCTION

On October 11, 1991, an emission testing program for Benzene and Acetone concentrations was conducted at one sample location at Murata Erie North America's, State College, PA plant. The test program was authorized by Mr. Greg Myers of Nittany Geoscience. Testing was performed by Mr. John C. Parry, Mrs. Amy Parry, and Mr. James Campbell of Hemcon Associates, Inc. Process coordination was provided by Mr. Greg Myers and Mr. Bill Seay of Nittany Geoscience and Mr. Chris Geist of Murata Erie. Testing was observed by Mr. Brian Hammer of the PA Department of Environmental Resources.

PURPOSE

The purpose of this program was to measure acetone and benzene concentrations at the EXR afterburner inlet and outlet and to determine its efficiency.

2.0 SUMMARY OF RESULTS

TABLE NO. 1

Acetone Emissions
EMME Afterburner
10/11/91

Test No.	Inlet PPM	Outlet PPM	Efficiency %	Testing Times
1	40.00	<0.04	>99.9%	7:47 AM - 8:02 AM
2	<0.04	<0.05		8:47 AM - 9:02 AM
3	34.16	<0.05	>99.8%	9:47 AM - 10:02 AM

PPM - Parts Per Million
* - Lowest Detectable Limit

TABLE NO. 2

Benzene Emissions
EMME Afterburner
10/11/91

Test No.	Inlet PPM	Outlet PPM	Efficiency %	Testing Times
1	0.21	<0.004	>98.1%	7:47 AM - 8:02 AM
2	0.13	<0.004	>97.7%	8:47 AM - 9:02 AM
3	0.19	<0.005	>97.4%	9:47 AM - 10:02 AM

PPM - Parts Per Million
* - Lowest Detectable Limit

TABLE NO. 3
SUMMARY OF FLUE GAS PARAMETERS

TEST NO.	01	Outlet 02	03
TEST DATA			
Static Press. in. WC	-.018	-.018	-.018
Pitot Readings. mm	.0431	.0433	.0195
Gas Temp., deg. F	477	471	473
MITTEL01			
Barom. Pres. in. Hg	28.52	28.52	28.52
GAS COMPOSITION			
CO ₂ , mole fraction	.005	0	0
O ₂ , mole fraction	.2	.205	.205
N ₂ , mole fraction	.795	.795	.795
AREAS			
Stack Area, sq. ft.	.11	.11	.11
CALCULATED RESULTS			
Gas, Dry mol. wt.	28.88	28.82	28.82
Gas Density, lb/cu. ft.	.0747	.0745	.0745
Water, volume %	.9	.8	1.2
Gas Mol. Wt., Actual	28.83	28.73	28.69
Gas Density in Stack	.0402	.0403	.0402
Stack Gas, scfm	105	135	71
Stack Gas, lb/hr	253	254	171
Stack Gas, lb/hr dry	253	254	171
Stack Gas, dscfm dry	56	57	38
Stack Gas, dscft dry	3360	3420	2280

3.0 TEST PROGRAM AND SAMPLING DESCRIPTION

Sampling was conducted on the inlet and outlet of CBK afterburner which controls emissions from a SSK ceramic chip drying kiln. Figures No's. 1 and 2 show the afterburner's inlet and outlet ducts.

According to the NIOSH Methods, samples were taken in a glass tube containing two sections of activated charcoal. An EPA Method 6 sampling system was used to control and measure sample flow and volume. The sampling rate was 200 ml per minute for 15 minutes. A midget impinger in an ice bath was located ahead of the charcoal tube to serve as a moisture trap. No condensate was found in the trap.

Analysis was performed using a gas chromatograph with f.i.d. according to procedures specified in the NIOSH methods.

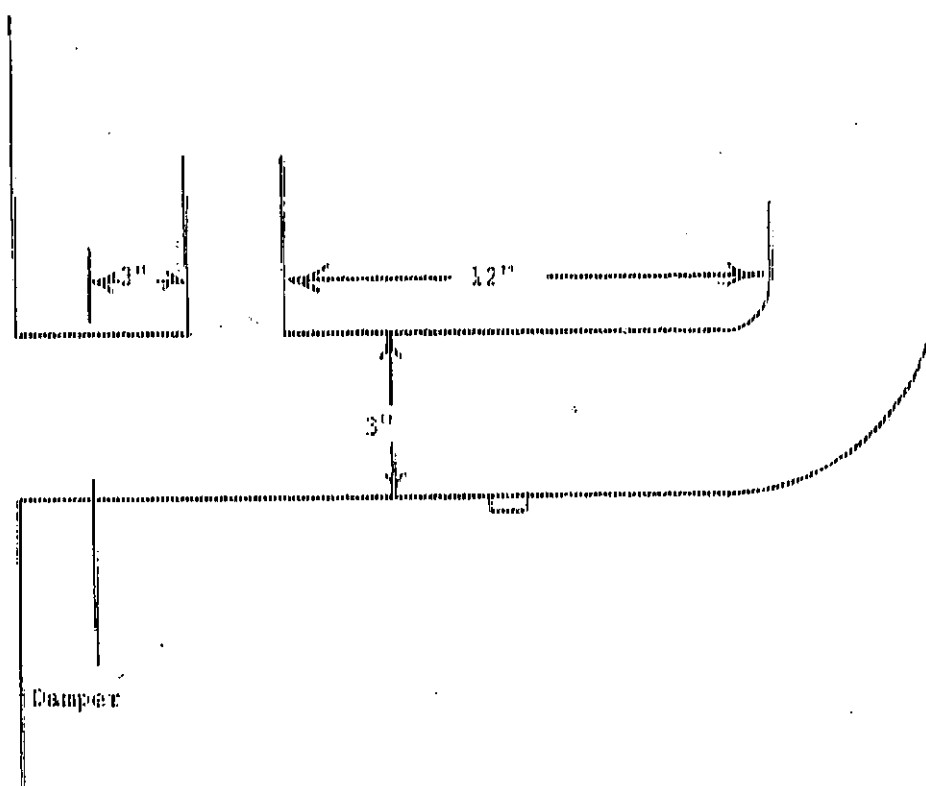


FIGURE NO. 1
Incinerator Inlet
Sample Port Locations
Murata Erie North American
State College, PA

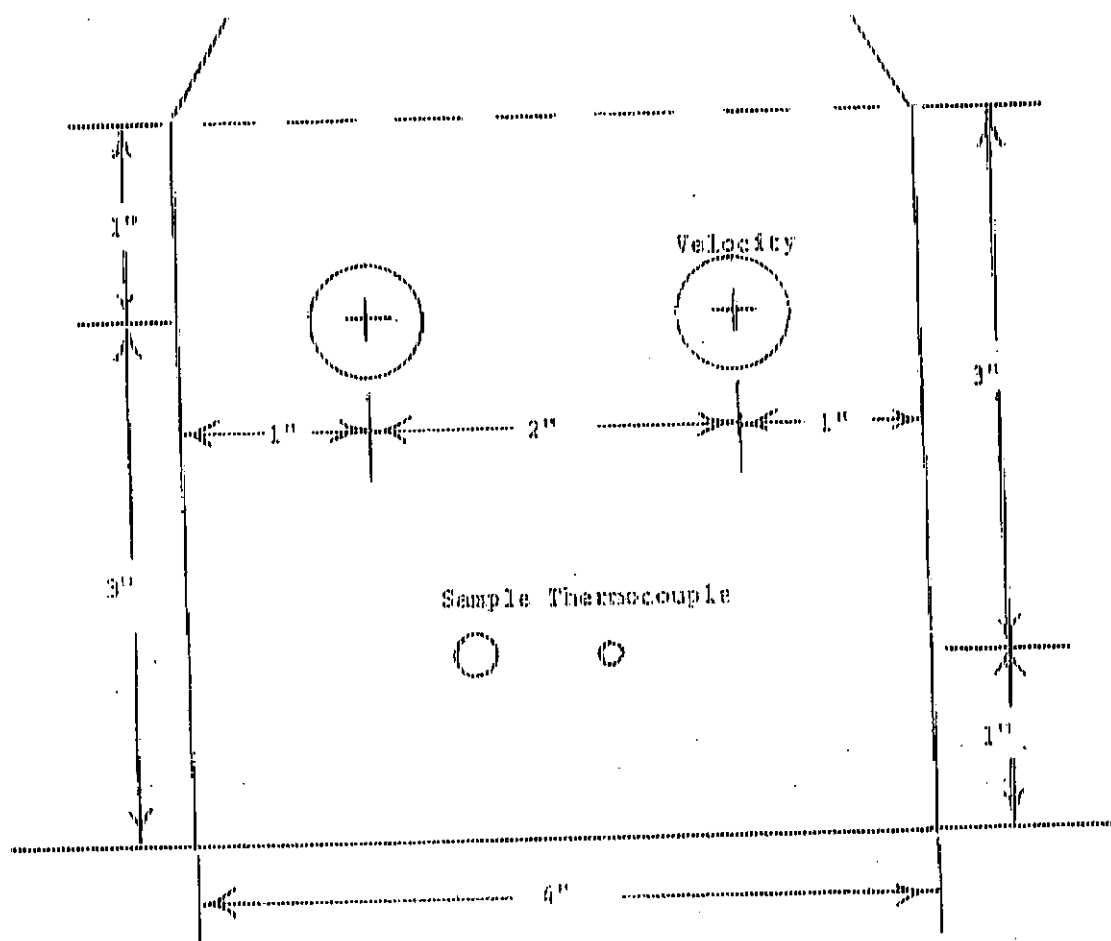


FIGURE NO. 2
Incinerator Outlet
Sample Port Locations
Marata Erie North America
State College, PA

Homonon Associates, Inc., report 10/23/91
to Nittany Geoscience, State College, PA

A. LABORATORY DATA

TABLE X
ANALYSIS OF SAMPLES FOR ACETONE AND BENZENE
HEMBON ASSOCIATES, INC.
125 THIRTY-NINTH STREET
PITTSBURGH, PA 15201
PURCHASE ORDER 07591 MICHAEL GEOSCIENCES
SAMPLES RECEIVED: OCTOBER 14, 1991

HEMBON SAMPLE NUMBER	ACS LABORATORY NUMBER	SAMPLE TIME MINUTES	VOLUME SAMPLED LITERS	CONCENTRATION ACETONE PPM	BENZENE PPM	
0336	59042	15	3.61	46.00	0.21	und
0337	59043	15	3.61	<0.04	<0.003	9
0338	59044	15	2.00	<0.05	<0.004	1
0339	59045	15	2.00	<0.05	<0.004	2
0340	59046	15	3.33	<0.04	0.10	und 17
0341	59047	15	3.33	<0.04	<0.004	12
0342	59048	15	2.00	<0.05	<0.004	9
0343	59049	15	2.00	<0.05	<0.004	10
0344	59050	15	3.10	34.16	0.19	und 19
0345	59051	15	3.10	<0.05	<0.004	20
0346	59052	15	2.70	<0.05	<0.005	17
0347	59053	15	2.70	<0.05	<0.003	18

0348 (BLANK) 59054

NDA

NDA

THE SAMPLES WERE DESORBED AND ANALYZED BY GAS CHROMATOGRAPHY USING A
FLAME IONIZATION DETECTOR.

Michael Geosciences
MICHAEL GEOSCIENCES, INC.

JOB 3113

Hammock Associates, Inc., report 10/23/91
to Nitrary Geoscience, State College, PA

B. FIELD DATA SHEETS

4571 EON ASSOCIATES, INC.

Plant: Missouri Botanical Garden, City State College Operator: J.C.

Location 2500 1st Ave. S. S.W. 25th St. Tract No. 75 Date 10/1/91

Stock Division *63-28* Domicile No. *41111111111111111111* Filer No. *11111111111111111111*

Pilot Certificate: Pilot No. Motorbox No. 25202

Fluorobenzene (C₆H₅F) *ggs* Nozzle Diameter *mm* Nozzle I.D. *mm*

Trav. Point No.	Velocity Head (ΔP) H ₂ O	Gas Temp. °F	Orifice Uncorr. Inches (H ₂ O)	ΔH Corr. for. Moist. Inches (H ₂ O)	Clock Time	Sample Time Min.	Vacuum "HG	Motor Read Cu. Ft	Motor Temperature Degrees F		Temperature Probes		Diagram
									In	Out	250	Filter Box 275	Last Empirical 68 degree or less
Init.	XXXXXX	XXXXXX	Factor	$\frac{90}{min.}$	7.47	0	XXXX	548	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	---	90.8	$\frac{7.46}{7.46}$	200	752	5	4.0	548	79	77	---	---	---
#1	---	89.0	$\frac{3.44}{7.46}$	200	757	10	4.0	548	79	79	---	---	---
	---	89.6	"	200	$\frac{7.46}{7.46}$	15	4.0	548	79	77	---	---	---
	---	---	---	$\frac{90}{min.}$	7.47	0	---	548	---	---	---	---	---
#2	---	87.8	$\frac{7.46}{7.46}$	200	850	5	4.0	548	79	77	---	---	---
	---	87.8	$\frac{1.12}{7.46}$	11	857	10	4.0	548	79	77	---	---	---
	---	87.6	"	11	$\frac{7.46}{7.46}$	15	4.0	548	79	77	---	---	---
	---	---	---	$\frac{90}{min.}$	9.97	0	---	548	---	---	---	---	---
#3	---	87.8	$\frac{7.46}{7.46}$	200	952	5	4.0	548	79	77	---	---	---
	---	87.6	$\frac{1.94}{7.46}$	11	957	10	4.0	548	79	77	---	---	---
Sum- mary	BMS	87.6	"	11	$\frac{7.46}{7.46}$	15	4.0	548	79	77	---	---	---

don't hurt me. *angry* P

DATE: 12/18/2014

SUBJECTS **STIMULI** **EQUIPMENT**

IMPENDING DATE

For information of the Bureau, the following information is being furnished:

Index

Concl. _____ and _____

Bill C-46

Final 4/17/11

Init. _____ GUN # _____

6.03.01 11/11/11

ONSET ANALYSIS:

7. Time ...

002 - [REDACTED]

02 " 00

Final Leak Rate 0.0000 cc/min 0.0000 inches Hg

Not on:

MEMEON ASSOCIATES, INC.

Plant Munroe, Ohio City State College Operator Ang Perry
 Location 4th Street - 4th St Test No. 05-2-00013 Date 10-11-91
 Stack Dimension 4 x 4 Desiccant No. Filter No.
 Pitot Coefficient Pitot No. Meterbox No. Nutack
 Meterbox (Cal. V) 1.005 Nozzle Diameter Nozzle I.D.

Trav. Point No.	Velocity Head (ΔP) H2O	Gas Temp. ° F	Orifice Uncorr. Inches (H2O)	ΔH Corr. for Moist. Inches (H2O)	Clock Time	Sample Time Min.	Vacuum "HG	Meter Read Cu. Ft.	Meter Temperature Degrees F		Temperatures Degrees F		
									In	Out	Probe 2330-279	Filter Box	Last Impinger 68 degree or less
Init.	XXXXXX	XXXXXX	Factor	cc/min.	7:47	0	XXXX	630	XXXX	XXXX	XXXX	XXXXXX	XXXXXX
#1	478	Tube	100	7:52	5	42.0	630	76	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	477	1st	200	7:57	10	42.0	630	76	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	475		200	8:02	15	42.0	630	78	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
							1.005	0.1015					
#2				cc/min.	8:47	0		630					
	470	Tube	200	8:52	5	42.0	630	79	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	472	9+10	200	8:57	10	42.0	630	79	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	472		200	9:02	15	42.0	630	79	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
							1.005	0.100	0.1005				
#3				cc/min.	9:47	0		630					
	478	Tube	200	9:52	5	42.0	630	80	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	474	17+18	200	9:57	10	42.0	630	80	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
	Sum-UNITS	RMS	478	200	9:57	15	42.0	630	80	XXXXXX	XXXXXX	XXXXXX	XXXXXX

Ambient Temp. 88° F
 Bar. Pres. 28.52 "Hg
 Stat. Pres. -.018 "WC

IMPINGER WATER
 Final ml
 Init. ml
 Cond. ml

DESSICANT
 Final gms
 Init. gms
 Gain gms

ORSAT ANALYSES
 Time
 CO₂
 O₂ CO

Final Leak Rate 0.0022 cfm 8.0 inches hg

Notes: 270.54 Method 1000 - 1000
1000 - 1000

MEYERSON ASSOCIATES, INC.

Plant Rockwell City San Diego, Cal. Operator W. J. G.
Location Rockwell Plant Test No. 22-1000000 Date 10-10-50
Stack Dimension 52" dia Desiccant No. _____ Filter No. _____
Pitot Coefficient _____ Pitot No. _____ Manometer No. _____
Manometer (Cal. Y) _____ Nozzle Diameter _____ Nozzle I.D. _____

Trav. Point No.	Velocity Head (ΔP) H2O	Gas Temp. ° F	Orifice Uncorr. Inches (H2O)	ΔH Corr. for. Moist. Inches (H2O)	Clock Time	Sample Time	Vacuum "HG	Motor Read Cu. Ft	Meter Temperature Degrees F		Temperatures Degrees F		
									In	Out	Probe 230 275	Filter Box	Last Impinger 48 degree or lower
Init.	XXXXXX	XXXXXX	Factor				XXXX		XXXXX	XXXXX	XXXXXX	XXXXXX	XXXXXXXXXX
			0.5	0.5					R = 5	12	10		
			0.5	0.5					R = 5.0	12	10.0		
									(10)(12.0)(100) 10000		1.3%		
									N = 5	12	10		
			0.5	0.5					R = 3	12	6		
									(6)(12.0)(100) 10000		0.8%		
									N = 5	12	10		
			0.5	0.5					R = 2.5	12	5.0		
									(12)(12.0)(100) 10000		0.7%		

IMPINGER WATER		DESICCANT		ORSAT ANALYSES	
Ambient Temp. <u>22.5° F</u>	Final <u> </u> ml	Final <u> </u> gram	Temp <u> </u>		
Bar. Press. <u>29.95 in Hg</u>	Init. <u> </u> ml	Init. <u> </u> gram	CO ₂ <u> </u>		
Stack. Press. <u> </u> "Hg	Concl. <u> </u> ml	Gain <u> </u> gram	CO <u> </u>	CO <u> </u>	

—Furnish complete report _____ by _____ at _____

Method

Hammock Associates, Inc., report 10/29/61
to Nitany Geoscience, State College, PA

C. PROCESS DATA

NAK PRODUCTIVITY RECORD

(1 sheet per Burn Cycle)

(1 sheet per Burn Cycle)

Burn Cycle No. 65

AFK No. 2

START DATE: 10.11.91

STOP DATE: 4/26/2012 12:00:00 PM

START TIME: 6:00 (EST) pm

STOP TIME: **DATE:**

[illegible]

TOTALS	103	100
--------	-----	-----

10-21-1991 13:53

0142542174

NITTANY GEO SCIENCE

P.02/02

1/10/92

10-21-1991 13:53

2.85°C

83

2.85°C

83

15.00

15.10

15.20

15.30

15.40

15.50

16.00

16.10

16.20

16.30

16.40

16.50

17.00

17.10

17.20

17.30

Hemson Associates, Inc., report 10/23/91
to Nitany Geoscience, State College, PA

Strip Chart of Thermocouple Readings

Time is T - axis

Temperature is K - axis

Curves 1-6 are 0-1500°C full scale (Kilns 7 & 8)

Curves 7-11 are 0-1000°C full scale (7 & 8 are ambient afterburner temp., 9 is not in use, 10 is kiln exhaust, and 11 is afterburner exhaust).

33

160