AP42 Section:	11.3
Title:	Comments, correspondence and test summaries from contractor for August 1997 supplement BELDEN BRICK SOURCE TESTS

THE Belden Brick COMPANY
P.O. BOX 20910
CANTON, OHIO 44701-0910

THE STANDARD
OF COMPARISON
SINCE 1885

PHONE (216) 456-0031 FAX (216) 456-2694
Main Office: 700 W. Tuscarawas St., Canton, Ohio
New York Office: 386 Park Ave., South, New York, NY 10016
Detroit Area Office: 17092 Masonic Blvd., Fraser, MI 48026

RECEIVED 1/25/94

January 21, 1994

Midwest Research Institute
401 Harrison Oaks Blvd.
Cary, N.C. 27513-2412

ATTENTION: Mr. Rick Marinshaw

RE: REIMBURSABLE COST OF AP-42 TESTS AT BELDEN BRICK

Dear Mr. Marinshaw:

Please excuse the delay in preparing the enclosed breakdown of the costs incurred by the Belden Brick Company for the emission testing done at our plant # 6. I knew that if it did not get done by thanksgiving, it would be early in January before I could complete the cost analysis.

Please note on page 7 that the total expenditure amounted to $22,753.83 of which purchased materials amounted to $7695.72 and labor was $15058.11. All invoices attached have been paid by The Belden Brick Company and are only enclosed as reference. All moneys expended by us were to be reimbursed by agreement, so please accept the attached as an invoice to Midwest Research Institute.

Should you have any questions or comments concerning this, please do not hesitate to contact me at 216-852-2424.

Sincerely Yours,

THE BELDEN BRICK COMPANY

John C. Jensen
ENVIRONMENTAL ENGINEER

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
TOTAL REIMBURSABLE COST
LABOR COST BREAKDOWN

Labor $/hr....$19.35

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Wed	9/22/93	Locate test ports with Ron Myers	RD	2			
Thur	10/7/93	Grinding plant test ports	RD	2			
			RJ	2			
Mon	10/11/93	Grinding plant test ports	RD	1			
			RJ	1			
Thur	10/21/93	Grinding plant test ports	RD	9			
			JP	4			
Sat	10/23/93	Grinding plant test ports	RD	4			
			JP	4			
Subtotal hours....................					29	$561.29	
Mon	10/25/93	Construct kiln and dryer working platform	RD	9			
			JP	9			
			GS	9			
			TI	9			
Tues	10/26/93	Construct kiln and dryer working platform	RD	9			
			JP	9			
			GS	9			
			TI	9			
Wed	10/27/93	Construct kiln and dryer working platform	RD	9			
			JP	9			
			GS	9			
			TI	9			
Thur	10/28/93	Construct kiln and dryer working platform	RD	9			
			JP	9			
			GS	9			
			TI	9			
Fri	10/29/93	Construct kiln and dryer working platform	RD	9			
			JP	9			
			GS	9			
			TI	9			
			DS	7			
Sat	10/30/93	Construct kiln and dryer working platform	RD	4			
			JP	4			
			GS	4			
			TI	4			
			TB	2			
Subtotal hours....................					205	$3967.75	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/1/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	TB	5			
			KL	3			
			GS	9			
Tues	11/2/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	TB	5			
			KL	3			
			GS	9			
			TI	9			
Wed	11/3/93	Construct kiln	RD	8			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			KL	3			
			DA	9			
Thur	11/4/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			FM	1			
			DA	9			
Fri	11/5/93	Construct kiln	TB	6			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			DA	2			
Sat	11/6/93	Construct kiln	RD	4			
		and dryer	JP	4			
		working platform	GS	4			
			DA	4			
			TB	4			
Subtotal hours....................					227	$4393.56	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/8/93	Test Setup	JP	9			
		and preliminary	GS	12			
		testing	RD	9			
			TI	12			
Tues	11/9/93	Testing kiln	JP	12			
		and grinding plant	GS	9			
		Thru-put test of	RD	9			
		grinding plant	TI	12			
			TG	9			
Wed	11/10/93	Testing kiln	JP	9			
		and dryer	GS	12			
			RD	9			
			TI	12			
Thur	11/12/93	Testing kiln, dryer	JP	12			
		and grinding plant	GS	9			
		Thru-put test of	RD	5			
		grinding plant	TI	12			
			TG	9			
			TB	1			
			DA	3			
			JR	9			
Fri	11/13/93	Teardown of	GS	5			
		equipment	TI	6			
Sat	11/14/93	Teardown kiln	TB	4			
		and dryer	JP	4			
		working platform	GS	4			
			DA	4			
			TI	4			
				=====			
Subtotal hours....................					226	$4374.21	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/16/93	Teardown kiln	TB	1			
		and dryer	DA	3			
		working platform	KL	3			
			JP	9			
			GS	9			
			TI	9			
			RD	3			
Tues	11/17/93	Teardown kiln	KL	3			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			RD	3			
Wed	11/18/93	Teardown kiln	KL	3			
		and dryer	JP	2			
		working platform	GS	5			
			TI	6			
Subtotal hours....................					86	$1664.52	
Mon	11/20/93	Teardown kiln	JP	1			
		and dryer	TI	4			
		working platform					
Subtotal hours....................					5	$96.77	

Total Labor Cost..$15058.11

LABOR COST PER HOUR

Ave hourly rate.....		$10.36	
FICA	6.200%	$0.64	
Medicare	1.450%	$0.15	
Unempl-US	0.800%	$0.08	
Unempl-OH	1.725%	$0.18	
Wkmn Comp	3.000%	$0.31	
Blue Cross		$2.10	
			$13.82
Supv, Equip Use..............	20%		$2.76
Vehicles.....................	20%		$2.76
Labor Cost Per Hour.........................			$19.35

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
MATERIAL COST BREAKDOWN

Day	Date	Invoice From	Invoice For	Cost	Total Cost
	10/21/93	Decker Steel	Mating rings grinding plant	$19.77	
	10/25/93	Sugarcreek Lumber	Lumber for stack platforms	$349.98	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$344.86	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$78.80	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$16.58	
	10/30/93	Sugarcreek Lumber	Lumber for stack platforms	$596.47	
	11/1/93	Sugarcreek Lumber	Lumber for stack platforms	$101.41	
	11/5/93	Sugarcreek Lumber	Lumber for stack platforms	$124.90	
	11/8/93	Sugarcreek Lumber	Lumber for stack platforms	$1.73	
	11/8/93	Hitemp	Drill holes in brick stack	$4093.40	
	11/15/93	Hitemp - credit	Drill holes in brick stack	($211.00)	
	11/5/93	Fenton Bros	Electrical supplies	$5.44	
	11/5/93	Fenton Bros	Electrical supplies	$5.44	
	10/27/93	Dover Tank	Steel for stack platforms	$61.50	
	11/10/93	Dover Tank	Steel for stack platforms	$183.92	
	11/15/93	Chas Rewinding	Transformer rental	$138.52	
	11/15/93	Ohio Whey	Truck weighings	$55.00	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
MATERIAL COST BREAKDOWN - contd

Day	Date	Invoice From	Invoice For	Cost	Total Cost
	10/27/93	Am High Reach	Crane & lift rental	$562.00	
	10/28/93	Am High Reach	Crane & lift rental	$267.00	
	10/30/93	Am High Reach	Crane & lift rental	$225.00	
	11/8/93	Am High Reach	Crane & lift rental	$475.00	
	11/12/93	Am High Reach	Crane & lift rental	$200.00	

TOTAL MATERIAL COST.......................... $7695.72

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
TOTAL REIMBURSABLE COST

Total Labor Cost	$15058.11
Total Material Cost	$7695.72
Total Invoice	$22753.83

Please Make Check Payable To:

The Belden Brick company
P.O. Box 20910
Canton, Ohio 44701-0910

ORIGINAL INVOICE

PHONE:

216/281-7900
1-800/321-6100
FAX 216/281-1441

CUST. NO.

300432

DECKER

STEEL & SUPPLY, INC. **ORIGINAL**

4500 TRAIN AVE
CLEVELAND OH 44102

PLEASE REMIT TO: P.O. BOX 931011-N, CLEVELAND, OHIO 44193-1215

* * PAGE 1 * *

DATE 10/21/93

INVOICE NO. 75591

OUR ORDER NO. 74582

SOLD TO:
BELDEN BRICK CO
700 W TUSCARAWAS ST
PO BOX 20910
CANTON OH 44701-0910

99916

SHIP TO:
MIDWEST RESEARCH INSTITUTE
425 VOLKER BLVD.
KANSAS CITY MO
64110-2299

SHIPPING DATE	YOUR PURCHASE ORDER NO.	REQUISITION NO./JOB #	F.O.B.	SHIPPED VIA
10/21/93	VERBAL JOHN JENSEN			U.P.S.

DESCRIPTION	QUANTITY	PRICE	AMOUNT	TOTAL
6" KB PUNCHED FLANGES	6.0000	2.6000E	15.60	
				15.60

10-29-93

Job #6320

OCT 25 1993

PRICES OK—RFB

140-06-40 (6320) 4.17
140-06-41 (6320) 15.60

TERMS	CASH DISCOUNT	SUB TOTAL	TAX RATE	SALES TAX	FREIGHT	PAY THIS AMOUNT
INVOICES DATED 1ST - 15TH PAYABLE ON 25TH, 16TH - EOM PAYABLE ON 10TH NET 30 DAYS	0.00	15.60	7.00	0.00	4.17	19.77

1½% PER MONTH OR 18% PER ANNUM CHARGED ON PAST DUE ACCOUNTS

"We hereby certify that these goods were produced in compliance with all applicable requirements of Section 6, 7 and 12 of the Fair Labor Standards Act, as amended, and of regulations and orders of the United States Department of Labor issued Under Section 14 thereof."

PAY FROM THIS INVOICE

Thank You!

Sugarcreek Lumber, Inc.

P.O. BOX 280
216 E. MAIN STREET
SUGARCREEK, OHIO 44681

Complete Building Supplies
Phone (216) 852-4611
Ohio, W. Va., 800-852-4611
FAX (216) 852-4920

SHIP TO:990015
CENTRAL MAIN

ORIGINAL

BELDEN BRICK CO.
P.O. BOX 20910

CANTON OH 44701

DOCUMENT NO. 039284
DATE: 10/25/93 07:05
KEN TROYER
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY	
1	020816	18	2X8-16 SPF #2 OR BETTER	10.75	5%DISCOUNT	183.82	SUBTOTAL	367.38
2	020810	2	2X8-10 SPF #2 OR BETTER	6.72	5%DISCOUNT	12.77	DISCOUNT	17.40
3	020808	3	2X8-8 SPF #2 OR BETTER	5.38	5%DISCOUNT	15.33	CHARGE DUE	349.98
4	T040620	4	4X6-20 #2 .40 CCA	31.20	5%DISCOUNT	118.56		
5	CC16D	50	LB 16D SINKERS	.59 .39		19.50		

140-06-41 (6320)

PRICES OK—RFB

Date Required

Date Shipped

Prepared By

Driver

SERVISTAR
WHERE SERVICE STARS

OK DALE SMITH
DATE 11-3-93

NOV 02 1993

JOB #6320

Gary Smith
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LET INTERGRITY AND UPRIGHTNESS
PRESERVE ME. PS.25:21A

FINANCE CHARGE of 2% per month (24% per year) added to all PAST DUE ACCOUNTS

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ORIGINAL

DOCUMENT NO.039332
DATE: 10/26/93 07:01
A.R.MULLET
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY	
1	020812	4	2X8-12 SPF #2 OR BETTER	8.06	5%DISCOUNT	30.63	SUBTOTAL	351.72
2	020810	4	2X8-10 SPF #2 OR BETTER	6.72	5%DISCOUNT	25.54	DISCOUNT	7.66
3	020814	10	2X8-14 SPF #2 OR BETTER	9.41	5%DISCOUNT	89.39	CHARGE DUE	344.06
4	9213012	10	1/2-4X8 A C PLYWOOD	21.35 19.85		198.50		

140-06-41 (6320)

PRICES OK—RFB

SERVISTAR
WHERE SERVICE STARS

Date Required

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Prepared By

Driver

OK DALE SMITH
DATE 11-3-93
JOB
#6320

NOV 02 1993

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P.O. BOX 20910

CANTON OH 44701

JOB 6320

DOCUMENT NO. 039337
DATE: 10/26/93 08:01
JR MILLER
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION
1	021210	2	2X12-10 SPF #2 OR BETTER	12.96	5%DISCOUNT	24.62
2	021218	2	2X12-18 SPF #2 OR BETTER	23.33	5%DISCOUNT	44.33
3	021208	1	2X12-8 SPF #2 OR BETTER	10.37	5%DISCOUNT	9.85

TRANSACTION SUMMARY

SUBTOTAL	82.95
DISCOUNT	4.15
CHARGE DUE	78.80

140-06-41 (6320)

PRICES OK—RFB

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WHERE SERVICE STARS

NOV 0 2 1993

OK DALE SMITH
DATE 11-3-93

Date Required

Date Shipped

Prepared By

Driver

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FAX (216) 852-4920

BELDEN BRICK CO.
P.O. BOX 20910
CANTON OH 44701

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CENTRAL MAINT.
6320

ORIGINAL

DOCUMENT NO.022786
DATE: 10/26/93 10:10
A.R.MULLET
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY
1	D20414	2	2X4-14 SPF #2 OR BETTER	4.70	5%DISCOUNT	8.93	SUBTOTAL 17.90
2	CC7D	10	LB 7D SINKERS	.85	10%DISCOUNT	7.65	DISCOUNT 1.32
							CHARGE DUE 16.58

140-06-41 (6320)

PRICES OK—RFB

SERVISTAR
WHERE SERVICE STARS

NOV 02 1993

OK DALE SMITH
DATE 11-3-93
6320

Date Required

Date Shipped

Prepared By

Driver

Jim [signature]
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ALL THE PATHS OF THE LORD
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FINANCE CHARGE of 2% per month (24% per year) added to all PAST DUE ACCOUNTS

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JOB 6320

ORIGINAL

DOCUMENT NO. 022986
DATE: 10/30/93 06:58
A.R. MULLET
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY
1	020812	2	2X8-12 SPF #2 OR BETTER	8.54	5%DISCOUNT	16.23	SUBTOTAL 628.71
2	020814	2	2X8-14 SPF #2 OR BETTER	9.97	5%DISCOUNT	18.94	DISCOUNT 32.24
3	020810	5	2X8-10 SPF #2 OR BETTER	7.12	5%DISCOUNT	33.82	CHARGE DUE 596.47
4	020412	15	2X4-12 SPF #2 OR BETTER	4.18	5%DISCOUNT	59.56	
5	DH16D	10	LB 16D DOUBLEHEAD NAILS	.79	10%DISCOUNT	7.11	
6	020812	10	2X8-12 SPF #2 OR BETTER	8.54	5%DISCOUNT	81.13	
7	020412	15	2X4-12 SPF #2 OR BETTER	4.18	5%DISCOUNT	59.56	140-06-41(6320)
8	8213012	1	1/2-4X8 A C PLYWOOD	21.35	5%DISCOUNT	20.28	
9	020812	10	2X8-12 SPF #2 OR BETTER	8.54	5%DISCOUNT	81.13	
10	020412	24	2X4-12 SPF #2 OR BETTER	4.18	5%DISCOUNT	95.30	
11	DH16D	10	LB 16D DOUBLEHEAD NAILS	.79	10%DISCOUNT	7.11	
12	020814	2	2X8-14 SPF #2 OR BETTER	9.97	5%DISCOUNT	18.94	
13	020812	12	2X8-12 SPF #2 OR BETTER	8.54	5%DISCOUNT	97.36	

Date Required

Date Shipped

Prepared By

Driver

SERVI...
WHERE SERVICE STARS

PRICES OK—RFB

NOV 02 1993

OK DALE SMITH
DATE 11-3-93

JOB #6320

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FINANCE CHARGE of 2% per month (24% per year) added to all PAST DUE ACCOUNTS

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CANTON OH 44701

SHIP TO:990015
JOB# 6320

CM

ORIGINAL

NOV 22 1993

DOCUMENT NO.023050
DATE: 11/01/93 14:20
R. ROPP
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION
1	9213012	5	1/2-4X8 A C PLYWOOD	21.35	5%DISCOUNT	101.41

TRANSACTION SUMMARY

SUBTOTAL	106.75
DISCOUNT	5.34
CHARGE DUE	101.41

140-06-41 (6320)

PRICES OK—RFB

OK Scott 11-26-93 6320

SERVISTAR
WHERE SERVICE STARS

Date Required

Date Shipped

Prepared By

Driver

Jim [signature]
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FINANCE CHARGE ...% per month (...% per year) added to all PAST DUE ACCOUNTS

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SUGARCREEK, OHIO 44681

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FAX (216) 852-4920

990015 BELDEN BRICK CO. ORIGINAL
P.O. BOX 20910
CANTON OH 44701

DOCUMENT NO.023195
DATE: 11/05/93 12:44
JR MILLER
2% 10TH NET 11

Central Maint.

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY	
1	T040412	2	4X4-12 #2 .40 CCA	9.87	5%DISCOUNT	18.75	SUBTOTAL	131.48
2	020814	2	2X8-14 SPF #2 OR BETTER	9.97	5%DISCOUNT	18.94	DISCOUNT	6.58
3	0211034	5	3/4-4X8 CDX	18.36	5%DISCOUNT	87.21	CHARGE DUE	124.90

140-06-41 (6320)

OK
Scott
6320
11-26-93

SERVISTAR
WHERE SERVICE STARS

PRICES OK - REB
NOV 22 1993

JOB # 6320

Date Required

Date Shipped

Prepared By

Driver

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ALL THE PATHS OF THE LORD ARE MERCY AND TRUTH. PS.25:10

FINANCE CHARGE of 2% per month (24% per year) added to all PAST DUE ACCOUNTS

CUSTOMER COPY

Sugarcreek Lumber, Inc.
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SUGARCREEK, OHIO 44681

Complete Building Supplies
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Ohio, W. Va., 800-852-4611
FAX (216) 852-4920

ORIGINAL

BELDEN BRICK CO.
P.O. BOX 20910

CANTON OH 44701

SHIP TO: 990015
CENTRAL MAINT

DOCUMENT NO. 023301
DATE: 11/08/93 09:59
KEN TROYER
2% 10TH NET 11

LINE	ITEM NO.	QTY.	DESCRIPTION	EACH PRICE	MESSAGE	EXTENSION	TRANSACTION SUMMARY
1	122861	4	SP2150 5/16X4 LS EYE ZINC	.48	10%DISCOUNT	1.73	SUBTOTAL 1.92 DISCOUNT 0.19 CHARGE DUE 1.73

140-06-41 (6320)

OK
Scott 11-26-93
6320

SERVISTAR
WHERE SERVICE STARS

PRICES OK—RFB

NOV 22 1993

6320

Date Required

Date Shipped

Prepared By

Driver

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ALL THE PATHS OF THE LORD
ARE MERCY AND TRUTH. PS.25:10A

CUSTOMER COPY

FINANCE CHARGE of 2% per month (24% per year) added to all PAST DUE ACCOUNTS

****
* INVOICE *
****

HiTEMP, INC.
2550 Medina Rd.
MEDINA, OH 44256
(216) 725-6656
Toll Free (800) 929-4422

ORIGINAL

Invoice Number: 049744

Invoice Date: 11/08/93

Page: 1

100482

Sold To: BELDEN BRICK CO.
P.O. BOX 430
SUGAR CREEK, OH
44681

Ship To: BELDEN BRICK CO.
P.O. BOX 430
SUGAR CREEK, OH
44681

4

Ship Via.:
Ship Date: 11/04/93
Due Date.: 11/08/93
Terms....: ON RECEIPT

Cust I.D.....: B10160
P.O. Number..: JOHN JENSEN
P.O. Date....: 11/02/93
Job/Order No.: 930458
Salesperson..: SNYDER

Item I.D./Desc.	Ordered	Shipped	Unit	Price	Net	TX
PROVIDE LABOR AND MATERIAL TO DRILL 4 HOLES IN MASONARY STACK						
MATERIAL	1.00	1.00		1050.0000	1050.00	T
LABOR 47 MAN HOURS $50.00	47.00	47.00		50.0000	2350.00	T
12 HOURS TRAVEL TIME @ $40.00	12.00	12.00		40.0000	480.00	T

10-11-93

PRICES OK—RFB NOV 10 1993

Job # 6320
EPA STACK TEST

Note
$200.00 Credit Memo Coming
Against Labor Charges

Subtotal: 3880.00
Tax.....: 213.40
Total...: 4093.40

140-06-40 (6320)

HiTEMP, INC.
2550 Medina Rd.
MEDINA, OH 44256
(216) 725-6656
Toll Free (800) 929-4422

****
* CREDIT MEMO *
****

Invoice Number: 049748

Invoice Date: 11/15/93 ORIGINAL

Page: 1

Sold To: BELDEN BRICK CO.
P.O. BOX 430
SUGAR CREEK, OH
44681

Ship To: BELDEN BRICK CO.
P.O. BOX 430
SUGAR CREEK, OH
44681

NOV 22 1993

Ship Via.:
Ship Date: 11/04/93
Due Date.: 11/15/93
Terms....: ON RECEIPT

Cust I.D.....: B10160
P.O. Number..: JOHN JENSEN
P.O. Date....: 11/02/93
Job/Order No.: 930458
Salesperson..: SNYDER

4

Item I.D./Desc.	Ordered	Shipped	Unit	Price	Net	TX
CREDIT OF $200.00 ON INVOICE #049458						
$200.00 CREDIT					200.00-	T

PRICES OK—

CREDIT

11-23-93

Job # 6320

Subtotal: 200.00-
Tax.....: 11.00-
Total...: 211.00

140-06-40 (6320)

INVOICE OFFICE COPY

ORIGINAL

"THE COMPLETE MOTOR REPAIR SHOP"
MOTORS - CONTROLS - POWER TOOLS - WIRING

FENTON BROS ELECTRIC CO

235 RAY AVE. N.E. P.O. BOX 280
NEW PHILADELPHIA, OHIO 44663
TELEPHONE (216) 343-8858

DATE	NUMBER
11/05/93	62234
CUSTOMER P.O. NO.	CUSTOMER NO.
	1180

REFERENCE	SHIP VIA	SHIP DATE	TERMS	STORE	CODES.	B/O	PAGE
CENTRAL MAINT.		11/05/93	NET 30 DAYS		C 7	Y	01

SOLD TO: BELDEN BRICK *
P.O. BOX 20910
CANTON OH 44701

SHIP TO:

ITEM NO.	QUANTITY ORDERED	QUANTITY SHIP	B/O	PROD. LINE	PART NUMBER	DESCRIPTION	PRICE	UNIT PRICE	EXTENSION
1.	4	4		NEE	C2000	2 RMX CN.	2.13	1.36	5.44
						NON-TAX MERCH.		5.44	
						MERCH. TOTAL			5.44
TOTAL UNITS SHIPPED:					4				
							INVOICE TOTAL		5.44

OK DALE SMITH
DATE 11-16-93
6320

PRICES OK—RFB

NOV 15 1993

PLEASE PAY FROM THIS INVOICE. ADDITIONAL COPIES WILL BE SENT ON REQUEST ONLY.
AN INTEREST CHARGE OF 1-1/2% PER MONTH (18% PER YEAR) WILL BE ADDED AFTER 30 DAYS.

140-06-41 (6320)

INVOICE

2819

Dover Tank And Plate Company
P.O. Box 70
Dover, Oh. 44622

CUSTOMER NO. BB

Telephone 216/343-4443

ORIGINAL

BILL TO:

Belden Brick Co.
P.O. Box 20910
Canton, OH 44701

SHIP TO:

Belden Brick Co.
Cent. Maint.

DATE	SHIP VIA	F.O.B.	TERMS
10/27/93	Truck	Dover	net 30 days

PURCHASE ORDER NUMBER	ORDER DATE	SALESPERSON	OUR ORDER NUMBER
Verbal-Scott S.	10/13/93	EL	930531

REQUIRED	SHIPPED / BACK ORD	ITEM NUMBER / DESCRIPTION	U/M	REQUIRED DATE	UNIT PRICE / DISC %	AMOUNT
246.000 6320	246.000	C030410 Channel 3 x 4.1 HR x 20'-0 3 EA	LB		0.25 N	61.50
216.000 462	216.000	C040540 Channel 4 x 5.4 HR x 20'-0 2 EA	LB		0.25 N	54.00
408.000 PAT 8. 445	408.000	FB050006000 2 - Bar - 1/2 x 6 x 20'-0	LB		0.25 N	102.00
324.000	324.000	TQ015000120 Tube Square 1.500 x 0.120wa CS 6 @ 24'-0	LB		0.40 N	129.60
153.000	153.000	FB012503000 6 - Bar - 1/8 x 3 x 20'-0	LB	OCT 28 1993	0.36 N	55.08
135.000	135.000	RB011250 Round Bar 1.1250 HR x 20'-0 2 EA	LB		0.30 N	40.50
167.000	167.000	RB012500 Round Bar 1.250 HR x 20'-0 2 EA	LB		0.30 N	50.10
240.000	240.000	RB015000 Round Bar 1.500 HR x 20'-0 2 EA	LB		0.30 N	72.00
202.000	202.000	RB013750 Round Bar 1.375 HR x 20'-0 2 EA	LB		0.30 N	60.60

405

PRICES OK—RFB

(Continued)

Thank You!

INVOICE

2968

The Dover Tank And Plate Company
P.O. Box 70
Dover, Oh. 44622

Telephone 216/343-4443

CUSTOMER NO. BB

ORIGINAL

BILL TO:

Belden Brick Co.
P.O. Box 20910
Canton, OH 44701

SHIP TO:

Belden Brick Co.
Cent. Maint.
Sugarcreek, OH

DATE	SHIP VIA	F.O.B.	TERMS
11/10/93	Truck	Dover	net 30 days

PURCHASE ORDER NUMBER	ORDER DATE	SALESPERSON	OUR ORDER NUMBER
Verbal-Ken L.	10/29/93	GC	930730

	REQUIRED	SHIPPED / BACK ORD.	ITEM NUMBER / DESCRIPTION	U/M	REQUIRED DATE	UNIT PRICE / DISC %		AMOUNT
	432.000	432.000	C040 4 Channel 4 x 5.4# x 20'0	LB		0.22 N	$183.92	95.04
6320	268.000	268.000	C050 2 Channel- 5 x 6.7# x 20'0	LB		0.22 N		58.96
	136.000	136.000	MISC 2 Bars- 1/2 x 2 x 20'0	LB		0.22 N		29.92
PLT #4	648.000	648.000	A150150188 18. Angle 1 1/2 x 1 1/2 x 3/16 x 20'0	LB		0.22 N		142.56
440	281.000	281.000	A150150250 6 Angle- 1 1/2 x 1 1/2 x 1/4 x 20'0	LB		0.22 N		61.82
405	294.000	294.000	A300300250 3 Angle 3 x 3 x 1/4 x 20'0	LB		0.22 N		64.68
PLT 3	199.000	199.000	MISC 1 AR plate- 1/4 x 34 x 81" Bend 1" @ 45 degrees both ends 34" enters brake	LB		0.50 N		99.50
430	268.000	268.000	MISC 1 channel 9 x 13.4# x 20'0	LB		0.35 N		93.80

OK DALE SMITH
DATE 11-15-93

NOV 12 1993

(Continued)

Thank You!

CHARLES REWINDING DIVISION

HANNON ELECTRIC COMPANY
P.O. BOX 398 • 801 COMMERCIAL PARKWAY • DOVER, OHIO 44622
PHONE (216) 343-7758 • FAX (216) 343-5650

ORIGINAL INVOICE

NUMBER	DATE
25880	11/15/93

SOLD TO
BELDEN BRICK
P.O. BOX 20910
CANTON, OH 44701

C50487
CENTRAL MAINTENANCE

ORIGINAL

SHIPPED FROM:

OUR ORDER NO.	ORDER DATE	CUST. NO.	SLM.	CUSTOMER ORDER NO.	TERMS NET 30 DAYS
26077	11/03/93	121	1A	CEN MAIN 11/04/93 DIRECT SHIP	NET 30 DAYS

QUANTITY ORDERED	SHIPPED	BACK ORD.	DESCRIPTION	SELLING PRICE	TRADE DISCOUNT	NET AMOUNT	CASH DISCOUNT
1	1		*MATERIAL-A 25KVA TRANSFORMER RENTAL	100.00		100.00	

OK DALE SMITH
DATE 11-18-93
6320

NOV 17 1993

PRICES OK—RFB

140-06-40 (6320) 38.52
140-06-41 (6320) 100.00

SALE 100.00	IN FRT 38.52	OUT FRT .00	TAX .00

CASH DISCOUNT TOTAL	INVOICE TOTAL
.00	138.52

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied, in its entirety, with the Fair Labor Standards Act of 1938, as amended.

A FINANCE CHARGE OF 1½% PER MONTH (18% PER ANNUM) WILL BE ADDED TO ALL AMOUNTS PAST DUE.

Ohio Whey Products, Ltd.
A Limited Partnership
Post Office Box 365
Sugarcreek, Ohio 44681
Phone: (216) 852-2491

100656

Nov. 2, 1993

INVOICE

14 Truck Weighings for the month of NOv. at $5.00 ea.

Total due - $70.00

462-08-40 15/100
140-06-40 (6320) 55/100

Tom Hershberger
Plant Manager

OK
Scott
12-3-93
11- 6320
3- 462

REMIT TO:

American High Reach, Inc.

ORIGINAL INVOICE

Cleveland Office
3351 Brecksville Rd.
Richfield, OH 44286
Phone (216) 659-7272

Pittsburgh Office
4573 Campbells Run Road
Parkway West
Pittsburgh, PA 15205
Phone (412) 788-0300

Columbus Office
7791 Taylor Road S.W.
Reynoldsburg, OH 43068
Phone (614) 863-3303

Cincinnati Office
11060 Deerfield Road
Cincinnati, OH 45242
Phone (513) 793-9900

Knoxville Office
914 Maryville Pike
Knoxville, Tennessee 37920
Phone (615) 577-4900

PAGE 01   INVOICE NUMBER 04E1840140

DATE 10/27/93

ORIGINAL

CM

SOLD TO: 10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

SHIP TO: 10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

F.O.B. [ ] [X] SHIPPING POINT   TERMS NET UPON RECEIPT

CUSTOMER ORDER NO.	SALESMAN	DATE SHIPPED	VIA	PPD.	COLL.
VERB S SMITH	30	10/25/93	OUR TRUCK	X	

QUAN ORD	QUAN. SHIPPED	BACK ORDERED	PRODUCT CODE	DESCRIPTION	PRICE EACH	TOTAL
				CONTRACT # 04CR035387 1		
1	1		9010	*JL1943 RENTAL WEEK(S)	475.00	475.00
				FROM: 10/26/93 THRU: 11/01/93		
				DESC: 40' SCISSOR		
				MAKE: JLG -4/90		
				MODEL: CM40RT		
				SER#: 0209005304		
				INSURED VALUE: 45,000.00		
1	1		9710	*JL1943 PICKUP & DELIVERY	50.00	50.00
				NEW DELIVERY		
1	1		9200	*JL1943 FUEL CHARGE	20.00	20.00
				LP FUEL		
10	10		9200	*JL1943 FUEL CHARGE	1.70	17.00
				SUB-TOTAL		562.00
				INVOICE TOTAL		562.00

PRICES OK—RFB

OK DALE SMITH
DATE 11-5-93
6320

NOV 03 1993

140-06-40 (6320) 87.00
140-06-41 (6320) 475.00

CUSTOMER TO SUPPLY INSURANCE WITH LOSS PAYABLE TO: American High Reach, Inc. IN THE VALUE STATED ABOVE.

A HANDLING CHARGE OF 15% WILL BE MADE ON ALL MATERIAL RETURNED FOR CREDIT.

A FINANCE CHARGE WILL APPLY ON ALL OVERDUE ACCOUNTS.

WE MUST HAVE EXEMPTION CERTIFICATE ON FILE IN ORDER TO CREDIT OUT SALES TAX IF YOU ARE TAX EXEMPT.

IN THE VALUE STATED ABOVE. ACCOUNTS. TAX IF YOU ARE TAX EXEMPT.

TO:

American High Reach, Inc.

ORIGINAL INVOICE

Cleveland Office
3351 Brecksville Rd.
Richfield, OH 44286
Phone (216) 659-7272

Pittsburgh Office
4573 Campbells Run Road
Parkway West
Pittsburgh, PA 15205
Phone (412) 788-0300

Columbus Office
7791 Taylor Road S.W.
Reynoldsburg, OH 43068
Phone (614) 863-3303

Cincinnati Office
11060 Deerfield Road
Cincinnati, OH 45242
Phone (513) 793-9900

Knoxville Office
914 Maryville Pike
Knoxville, Tennessee 37920
Phone (615) 577-4900

PAGE: 01　　INVOICE NUMBER 04E1863530

DATE 10/28/93

CM

ORIGINAL

SOLD TO
10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

SHIP TO
10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

F.O.B. [ ]　X [ ] SHIPPING POINT　TERMS NET UPON RECEIPT

CUSTOMER ORDER NO.	SALESMAN	DATE SHIPPED	VIA	PPD.	COLL.
VERB S SMITH	30	10/25/93	OUR TRUCK	X	

QUAN. ORD.	QUAN. SHIPPED	BACK ORDERED	PRODUCT CODE	DESCRIPTION	PRICE EACH	TOTAL
				CONTRACT # 04CR035392 1		
1	1		9030	*JL1368 RENTAL DAY(S)	250.00	250.00
				FROM: 10/26/93 THRU: 10/26/93		
				DESC: 7.5 TON INDS.		
				MAKE: JLG		
				MODEL: 8875		
				SER #: 0408200427		
				INSURED VALUE: 46,000.00		
1	1		9710	*JL1368 PICKUP & DELIVERY	.00	.00
10	10		9200	*JL1368 FUEL CHARGE	1.70	17.00
				SUB-TOTAL		267.00
				INVOICE TOTAL		267.00

NOV 03 1993

OK DALE SMITH DATE 11-5-93

6320

140-06-40 (6320) 17.00
140-06-41 (6320) 250.00

PRICES OK—RFB

CUSTOMER TO SUPPLY INSURANCE WITH LOSS PAYABLE TO: American High Reach, Inc. IN THE VALUE STATED ABOVE.

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WE MUST HAVE EXEMPTION CERTIFICATE ON FILE IN ORDER TO CREDIT OUT SALES TAX IF YOU ARE TAX EXEMPT.

REMIT TO:

American High Reach,Inc.

ORIGINAL INVOICE

Cleveland Office
3351 Brecksville Rd.
Richfield, OH 44286
Phone (216) 659-7272

Pittsburgh Office
4573 Campbells Run Road
Parkway West
Pittsburgh, PA 15205
Phone (412) 788-0300

Columbus Office
7791 Taylor Road S.W.
Reynoldsburg, OH 43068
Phone (614) 863-3303

Cincinnati Office
11060 Deerfield Road
Cincinnati, OH 45242
Phone (513) 793-9900

Knoxville Office
914 Maryville Pike
Knoxville, Tennessee 37920
Phone (615) 577-4900

 INVOICE NUMBER 04E1866440

CM

DATE 10/30/93

SOLD TO
10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

ORIGINAL

SHIP TO
10803
BELDEN BRICK 99951
P.O. BOX 20910
CANTON, OHIO 44701

F.O.B. SHIPPING POINT

TERMS NET UPON RECEIPT

CUSTOMER ORDER NO.	SALESMAN	DATE SHIPPED	VIA	PPD.	COLL.
VERA S SMITH	70	10/25/93	OUR TRUCK	Y	

QUAN ORD	QUAN. SHIPPED	BACK ORDERED	PRODUCT CODE	DESCRIPTION	PRICE EACH	TOTAL
				CONTRACT # C40R035392 2		
1	1		9030	JL1362 PARTIAL RENTAL	450.00	450.00
				BILL RENTAL ADJUSTMENT FOR $450.00 TO MEET THE WEEKLY RATE OF $700.00. YOUR ORIGINAL INVOICE 04E1853530 WAS BILLED FOR 1 DAY RENTAL AT $250.00. THIS BILLING OF $450.00 AND THE 1 DAY RENTAL OF $250.00 WILL THE WEEKLY RATE OF $700.00 FOR THE PERIOD 10/26/93 THRU 10/29/93.		
				SUB-TOTAL		450.00
				INVOICE TOTAL		450.00

OK DALE SMITH
DATE 11-9-93

1/2 - 6320
1/2 - PLT #4-2
430
Grinding Room

PRICES OK—RFB

NOV 08 1993

140-06-41 (6320) 225.00
431-04-41 225.00

CUSTOMER TO SUPPLY INSURANCE WITH LOSS PAYABLE TO: American High Reach,Inc. IN THE VALUE STATED ABOVE.

A HANDLING CHARGE OF 15% WILL BE MADE ON ALL MATERIAL RETURNED FOR CREDIT.

A FINANCE CHARGE WILL APPLY ON ALL OVERDUE ACCOUNTS.

WE MUST HAVE EXEMPTION CERTIFICATE ON FILE IN ORDER TO CREDIT OUT SALES TAX IF YOU ARE TAX EXEMPT.

REMIT TO:

American High Reach,Inc. ORIGINAL ORIGINAL INVOICE

Cleveland Office
3351 Brecksville Rd.
Richfield, OH 44286
Phone (216) 659-7272

Pittsburgh Office
4573 Campbells Run Road
Parkway West
Pittsburgh, PA 15205
Phone (412) 788-0300

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7791 Taylor Road S.W.
Reynoldsburg, OH 43068
Phone (614) 863-3303

Cincinnati Office
11060 Deerfield Road
Cincinnati, OH 45242
Phone (513) 793-9900

Knoxville Office
914 Maryville Pike
Knoxville, Tennessee 37920
Phone (615) 577-4900

PAGE 01 INVOICE NUMBER 04E1874240

NOV 15 1993

DATE 11/08/93

SOLD TO:
10803
BELDEN ERICK
P.O. BOX 20910
CANTON, OHIO 44701

OM

SHIP TO:
10803
BELDEN ERICK
P.O. BOX 20910
CANTON, OHIO 44701

F.O.B. ☐ ☒ SHIPPING POINT

TERMS: NET UPON RECEIPT

CUSTOMER ORDER NO.	SALESMAN	DATE SHIPPED	VIA	PPD.	COLL.
VERB S SMITH	30	10/25/93	OUR TRUCK	X	

QUAN ORD	QUAN. SHIPPED	BACK ORDERED	PRODUCT CODE	DESCRIPTION	PRICE EACH	TOTAL
				CONTRACT # C4CR035387 2		
1	1		9010	*JL1943 RENTAL WEEK(S)	475.00	475.00
				FROM: 11/02/93 THRU: 11/08/93		
				DESC: 40' SCISSOR		
				MAKE: JLG 4/90		
				MODEL: CM40RT		
				SER #: 0209005304		
				INSURED VALUE: 45,000.00		
				SUB-TOTAL		475.00
				INVOICE TOTAL		475.00

140-06-41 (6320)

6320

OK DALE SMITH
DATE 11-17-93

PRICES OK—RFB

CUSTOMER TO SUPPLY INSURANCE WITH LOSS PAYABLE TO: American High Reach,Inc. IN THE VALUE STATED ABOVE.

A HANDLING CHARGE OF 15% WILL BE MADE ON ALL MATERIAL RETURNED FOR CREDIT.

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REMIT TO:

American High Reach, Inc.

ORIGINAL INVOICE

Cleveland Office
3351 Brecksville Rd.
Richfield, OH 44286
Phone (216) 659-7272

Pittsburgh Office
4573 Campbells Run Road
Parkway West
Pittsburgh, PA 15205
Phone (412) 788-0300

Columbus Office
7791 Taylor Road S.W.
Reynoldsburg, OH 43068
Phone (614) 863-3303

Cincinnati Office
11060 Deerfield Road
Cincinnati, OH 45242
Phone (513) 793-9900

Knoxville Office
914 Maryville Pike
Knoxville, Tennessee 37920
Phone (615) 577-4900

PAGE: 01

INVOICE NUMBER 04E1878730

100332

DATE 11/12/93

SOLD TO

10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

CM

SHIP TO

10803
BELDEN BRICK
P.O. BOX 20910
CANTON, OHIO 44701

ORIGINAL

F.O.B. ☐ ☒ SHIPPING POINT

TERMS: NET UPON RECEIPT

CUSTOMER ORDER NO.	SALESMAN	DATE SHIPPED	VIA	PPD.	COLL.
VERP S SMITH	30	10/25/93	OUR TRUCK	X	

QUAN ORD	QUAN SHIPPED	BACK ORDERED	PRODUCT CODE	DESCRIPTION	PRICE EACH	TOTAL
				CONTRACT # 04CR035387 3		
1	1		9016	4JL1943 RENTAL WEEK(S)	200.00	200.00
				FROM: 11/09/93 THRU: 11/15/93		
				DESC: 40' SCISSOR		
				MAKE: JLG 4/90		
				MODEL: CK40RT		
				SER #: 0209005304		
				THIS WEEK'S RENTAL ADJUSTED TO $200.00		
				TO MEET THE MONTHLY RATE OF $1,150.00		
				INSURED VALUE: 45,000.00		
				SUB-TOTAL		200.00
				INVOICE TOTAL		200.00

140-06-41 (6320)

NOV 17 1993

OK DALE SMITH
DATE 11-18-93

6320

PRICES OK—RFB

CUSTOMER TO SUPPLY INSURANCE WITH LOSS PAYABLE TO: American High Reach, Inc. THE VALUE STATED ABOVE.

A HANDLING CHARGE OF 15% WILL BE MADE ON ALL MATERIAL RETURNED FOR CREDIT.

A FINANCE CHARGE WILL APPLY ON ALL OVERDUE ACCOUNTS.

WE MUST HAVE EXEMPTION CERTIFICATE ON FILE IN ORDER TO CREDIT OUT SALES TAX IF YOU ARE TAX EXEMPT.

PROCESS DATA

THE BELDEN BRICK COMPANY

PLANT # 6

SUGARCREEK, OHIO 44681

FOR MONDAY 11/8/93

THROUGH FRIDAY 11/12/93

PREPARED BY:

JOHN C. JENSEN
ENVIRONMENTAL ENGINEER
THE BELDEN BRICK COMPANY

Filename:	THE BELDEN BRICK COMPANY	DATE:
PLT6_EPA	SUGARCREEK OHIO	Tuesday
	PLANT INFORMATION	11/9/93

PLANT NUMBER........ 6

KILN NUMBER......... 3 DRYER TUNNELS #'S...6. 7. & 8 to 1 stack

RAW MATERIAL........ 50% # 4 Shale From Shanesville Pit # 2
50% # 4 Shale From Shanesville Pit # 3

PROCESS WEIGHT	BOTTOM	TOP 4 courses	TOTAL
TYPE OF BRICK	503-505	Acid Brick	
KILN SCHEDULE (cars/day)	10	10	
BRICK PER CAR	2496	976	3472
SIZE BRICK	Standard	Standard	
BRICK WEIGHT (lbs)	4.7462	6.0525	
PROCESS WEIGHT (lbs/hr)	4936	2461	
TOTAL PROCESS WEIGHT (Kiln)			7397

DRYER		Tues	Wed	Thur
Full Times	Dryer # 8	5:50 AM		7:10 AM
	Dryer # 6	8:10 AM	5:30 AM	9:30 AM
	Dryer # 7	10:30 AM	7:50 AM	11:50 AM
	Dryer # 8	12:50 PM	10:10 AM	2:10 PM
	Dryer # 6	3:00 PM	12:30 PM	4:30 PM
	Dryer # 7	5:20 PM	2:50 PM	6:50 PM
	Dryer # 8	7:40 PM	5:10 PM	11:30 PM
	Dryer # 6		7:30 PM	
	Dryer # 7		9:50 PM	
	Dryer # 8			
Exit Temp		269	265	274
Inlet Temp (stack)		95	100	100

KILN # 3	Tues	Wed	Thur
Gas Consumption (24hrs-cu.ft.)	230560	228,000	218,880
Inlet Temp	106	124	140
Peak Temp	2040	2040	2031
Push Times	5:50 AM	5:30 AM	7:10 AM
	8:10 AM	7:50 AM	9:30 AM
	10:30 AM	10:10 AM	11:50 AM
	12:50 AM	12:30 PM	2:10 PM
	3:00 PM	2:50 PM	4:30 PM
	5:20 PM	5:10 PM	6:50 PM
	7:40 PM	7:30 PM	11:30 PM
		9:50 PM	

503-505
Standard
Cored

THE BELDEN BRICK COMPANY
PLANT # 6 SUGARCREEK OHIO
BRICK WEIGHTS (LBS)

DATE:
Monday
11/8/93

	Green Brick B/4 Dryer	Dried Brick B/4 Kiln	Fired Brick
1	5.5492	4.7542	4.4690
2	5.5688	4.7422	4.4632
3	5.6050	4.7488	4.4656
4	5.5778	4.7362	4.4734
5	5.5836	4.7386	4.4718
6	5.5442	4.7264	4.4714
7	5.5628	4.7610	4.4592
8	5.5722	4.7404	4.4508
9	5.5720	4.7410	4.4726
10	5.5906	4.7736	4.4552
Average...	5.5726	4.7462	4.4652
Loss of wgt in dryer..........		0.8264	
% Wgt lost....................		14.83%	
loss of wgt in kiln..............................			0.2810
% Wgt lost.......................................			5.92%

Acid
Singles
Solids

THE BELDEN BRICK COMPANY
PLANT # 6 SUGARCREEK OHIO
BRICK WEIGHTS (LBS)

DATE:
Monday
11/8/93

	Green Brick B/4 Dryer	Dried Brick B/4 Kiln	Fired Brick
1	7.0544	6.0860	5.6532
2	7.0124	6.0678	5.6586
3	7.0590	6.1132	5.6700
4	6.9950	6.0104	5.6910
5	6.9944	6.0244	5.6818
6	7.1330	6.0384	5.6560
7	7.0484	6.0186	5.7018
8	6.9942	6.0104	5.6506
9	7.0306	6.0858	5.6566
10	7.0132	6.0702	5.6720
Average...	7.0335	6.0525	5.6692

Loss of wgt in dryer.......... 0.9809

% Wgt lost.................... 13.95%

loss of wgt in kiln.................................. 0.3834

% Wgt lost... 6.33%

Filename:
TRK_LOADS.EPA

Ave Load = 25 Ton

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
RECORD OF TRUCKLOADS RECEIVED

DATE:
Tuesday
11/9/93

TIME	SHALE S'ville Pit # 2	SHALE S'ville Pit # 3	CLAY S'ville Pit # 2	CLAY Moomaw Pit # 1	CLAY Wallick Pit # 6
7:20 AM	X				
7:70 AM					X
8:00 AM	X				
8:15 AM			X		
8:32 AM		X			
9:15 AM					X
9:25 AM	X				
9:40 AM				X	
10:00 AM		X			
10:30 AM	X				X
11:00 AM		X			
11:10 AM			X		
12:15 PM	X				
1:00 PM					X
1:10 PM			X		
1:45 PM			X		
2:00 PM					X
2:20 PM				X	
2:30 PM					X
TOTALS					
LOADS	5	3	4	2	6
TONS	125	75	100	50	150

TOTAL TONS FIRECLAY RECEIVED.................................... 300

CONDITION
Empty
1/4 Full
1/2 Full
3/4 Full
Full

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
RECORD OF BIN CONDITION

DATE:
Tuesday
11/9/93

COARSE BINS

	SHALE		CLAY		
	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
Beginning of Shift			Full	Full	Full
End of Shift			1/2 Full	Full	1/2 Full

FINES BINS

Beginning of Shift					Empty
End of Shift					3/4 Full

NOTES:

Began grinding at 7:00 AM

Electrical power failure from 7:59 AM till 8:14 AM

Grinding plant worked straight through lunch

Shut down grinding plant at 3:00 PM

Grinding plant operated for 8 hours

THE BELDEN BRICK COMPANY
FLANT # 6 - GRINDING FLANT
FIRECLAY SCREENS FRODUCTION

DATE:
Tuesday
11/9/93

Pully RPM.............	37.726
Pully Diameter inches..	16
Belt Width inches......	20
Belt Speed FPM.........	157
Empty Tub Wgt pounds...	20.25

*Sample should be taken every 15 minutes.
*Sample should be taken for 10 seconds.
*Part of sample should be bagged every 1-1/2 hours.
*Sampling should continue for 4 hours.

TIME	NET WEIGHT	SAMPLED BAGGED (Y/N)	SAMPLE NUMBER
7:52 AM	247.75		
8:29 AM	251.75	* Time extended due to power failure	
8:44 AM	232.25		
8:59 AM	234.75		
9:14 AM	233.75		
9:29 AM	241.75	Yes, time marked on bag	
9:44 AM	236.75		
9:59 AM	244.75		
10:14 AM	237.75		
10:29 AM	251.75		
10:44 AM	241.75		
10:59 AM	237.75	Yes, time marked on bag	
11:14 AM	231.75		
11:29 AM	236.25		
11:44 AM	245.75		
11:59 AM	227.75		
12:14 PM	234.75	Yes, time marked on bag	

Ave Wgt...... 239.34

Ton/Hr....... 43.08

Total tons of fireclay ground (in 8 hours)...................... 344.65

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY DUST COLLECTOR

DATE:
TUESDAY
11/9/93

This represents the weight of dust collected during the above date

Hopper under dust collector should be emptied and cleaned before test begins.

Hopper under dust collector should be emptied and cleaned after test ends. That dust must also be weighed and logged on report.

Empty Weight Hopper # 1 12400

Empty Weight Hopper # 2 12400

HOPPER NUMBER	TIME HOPPER FILLED	GROSS HOPPER WEIGHT	FULL HOPPER WEIGHT
1	10:00 AM	14000	1600
2	1:00 PM	14080	1680
1	3:00 PM	14140	1740
2	3:15 PM	12920	520

Total dust removed from dust collector (lbs)......... 5540

Filename:
TRK_LOADS.EPA

Ave Load = 25 Ton

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
RECORD OF TRUCKLOADS RECEIVED

DATE:
Thursday
11/11/93

	SHALE		CLAY		
TIME	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
7:00 AM		X			
7:20 AM			X		
7:23 AM	X				
8:00 AM			X		
8:05 AM		X			
8:45 AM	X				X
9:33 AM				X	
10:00 AM					X
10:17 AM			X		
10:40 AM					X
10:55 AM			X		
11:25 AM		X			
12:01 PM					X
12:25 PM			X		
1:30 PM			X		
1:45 PM			X		
2:15 PM	X				
2:40 PM					X
TOTALS					
LOADS	3	3	7	1	5
TONS	75	75	175	25	125

TOTAL TONS FIRECLAY RECEIVED................................ 325

CONDITION	THE BELDEN BRICK COMPANY	DATE:
Empty	PLANT # 6 - GRINDING PLANT	Thursday
1/4 Full	RECORD OF BIN CONDITION	11/11/93
1/2 Full		
3/4 Full		
Full		

COARSE BINS

	SHALE		CLAY		
	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
Beginning of Shift			1/2 Full	Full	3/4 Full
End of Shift			1/2 Full	1/2 Full	3/4 Full

FINES BINS

Beginning of Shift					3/4 Full
End of Shift					3/4 Full

NOTES:

Began grinding at 7:00 AM

Grinding plant worked straight through lunch

Shut down grinding plant at 2:40 PM

Grinding plant operated for 7-3/4 hours

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY SCREENS PRODUCTION

DATE:
Thursday
11/11/93

Pully RPM	37.726
Pully Diameter inches	16
Belt Width inches	20
Belt Speed FPM	157
Empty Tub Wgt pounds	20.25

*Sample should be taken every 15 minutes.
*Sample should be taken for 10 seconds.
*Part of sample should be bagged every 1-1/2 hours.
*Sampling should continue for 4 hours.

TIME	NET WEIGHT	SAMPLED BAGGED (Y/N)	SAMPLE NUMBER
7:30 AM	251.25		
7:45 AM	250.75		
8:00 AM	242.75		
8:15 AM	235.25		
8:30 AM	227.75		
8:45 AM	228.75	Yes, time marked on bag	
9:00 AM	236.25		
9:15 AM	226.75		
9:30 AM	226.25		
9:45 AM	242.25		
10:00 AM	241.75		
10:15 AM	238.75	Yes, time marked on bag	
10:30 AM	241.75		
10:45 AM	224.25		
11:00 AM	231.75		
11:15 AM	224.50		
11:30 AM	220.75	Yes, time marked on bag	

Ave Wgt...... 234.79

Ton/Hr....... 42.26

Total tons of fireclay ground (in 8 hours).................... 338.10

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY DUST COLLECTOR

DATE:
Thursday
11/11/93

This represents the weight of dust collected during the above date

Hopper under dust collector should be emptied and cleaned before test begins.

Hopper under dust collector should be emptied and cleaned after test ends. That dust must also be weighed and logged on report.

Empty Weight Hopper # 1 12400

Empty Weight Hopper # 2 12400

HOPPER NUMBER	TIME HOPPER FILLED	GROSS HOPPER WEIGHT	FULL HOPPER WEIGHT
1	10:00 AM	13820	1420
2	12:30 PM	14040	1640
1	1:45 PM	13740	1340
2	2:50 PM	13780	1380
1	3:10 PM	12780	380

Total dust removed from dust collector (lbs)......... 6160

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

June 20, 1994

To: Miro Szydlo

From: Rick Marinshaw

Subject: Belden Brick Emission Test

Attached are the following: (1) sketches of the sampling locations for the grinding/screening baghouse, the kiln, and the dryer; and (2) table showing the raw data still needed for the test report. I would appreciate it if you could pull together the information listed and send it to me as soon as possible. Regarding the sampling location figures, I have made comments on the pages to indicate the information we still need. The attached table lists all the information we need for the test report. You have already provided many of these, so I have indicated with an "X" those items we still are waiting for.

In addition to these, we need the following : (1) start and stop times for the ambient testing inside the grinding/screening building; (2) were there 2 or 3 ambient runs inside? (The final weights are provided for 3 runs, but the flow/data sheets only show 2 runs.); (3) a brief description of field test changes and problems (i.e., any problems you encountered during the test or any changes in the procedures that you said you would follow in the test plan); and (4) sample equations/calculations for the appendix of the test report.

Please give me a call if you have any questions about any of this.

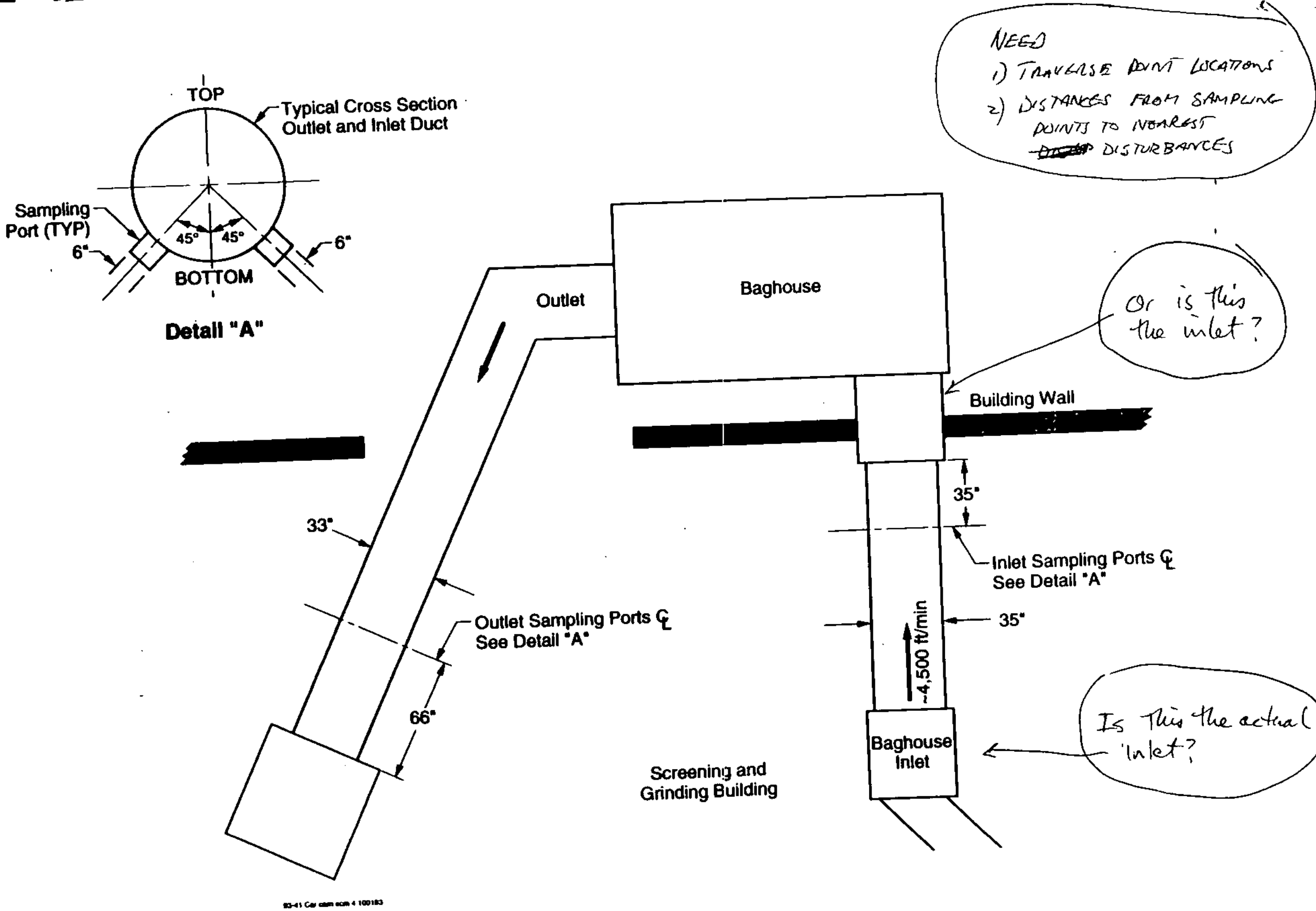

Figure 4-4. Baghouse inlet and outlet sampling port locations.

MRI-M\Z4601 fig

#	x
1	15.2
2	21.5
3	28.6
4	35.3
5	42.0

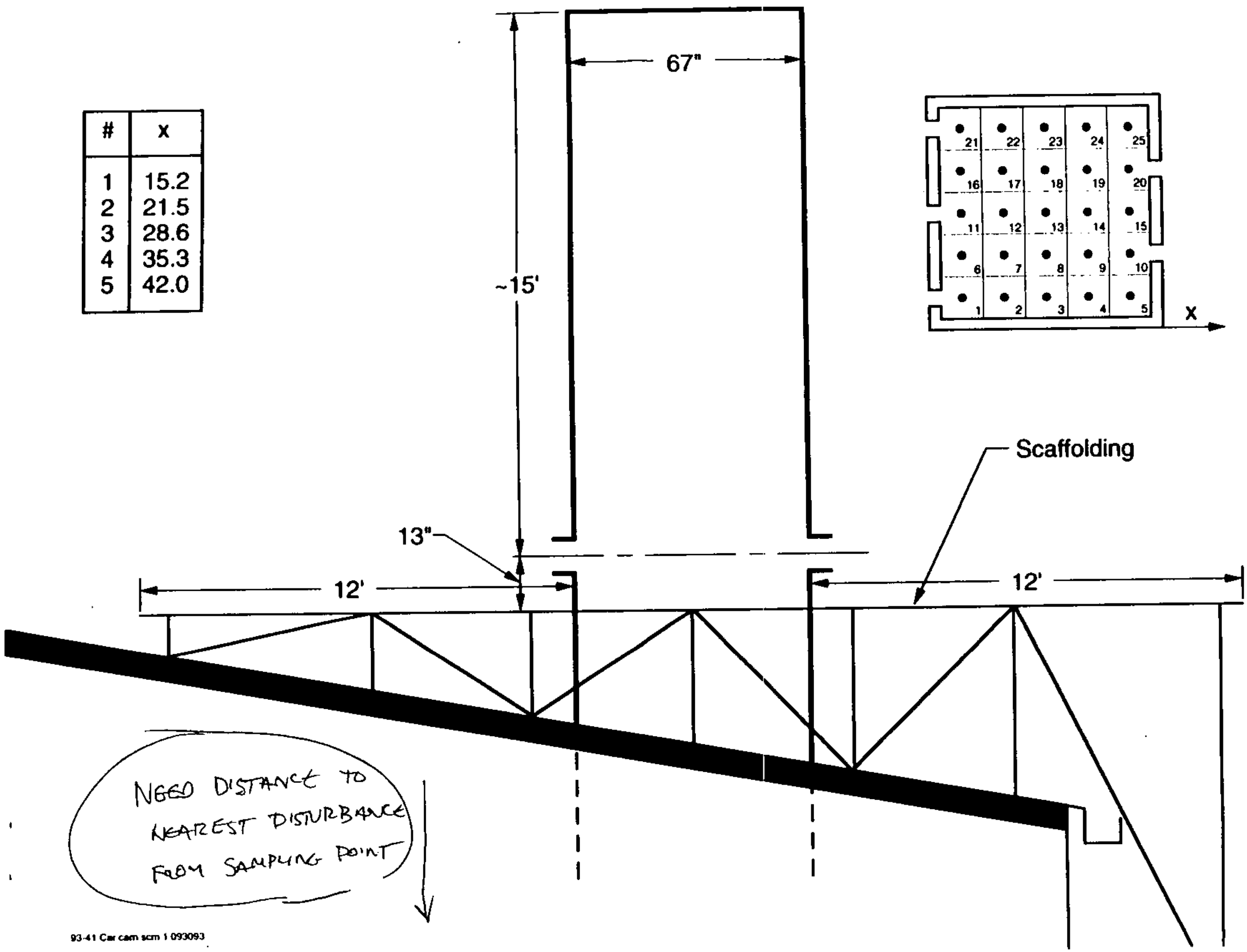

Figure 4-7. Kiln stack sampling points.

MRI M\Z4601.fig

NEGO

~~TRAVERSE POINT LOCATIONS~~

1) DISTANCE FROM SAMPLING POINT TO NEAREST DISTURBANCE

2) VELOCITY TRAVERSE POINT LOCATIONS

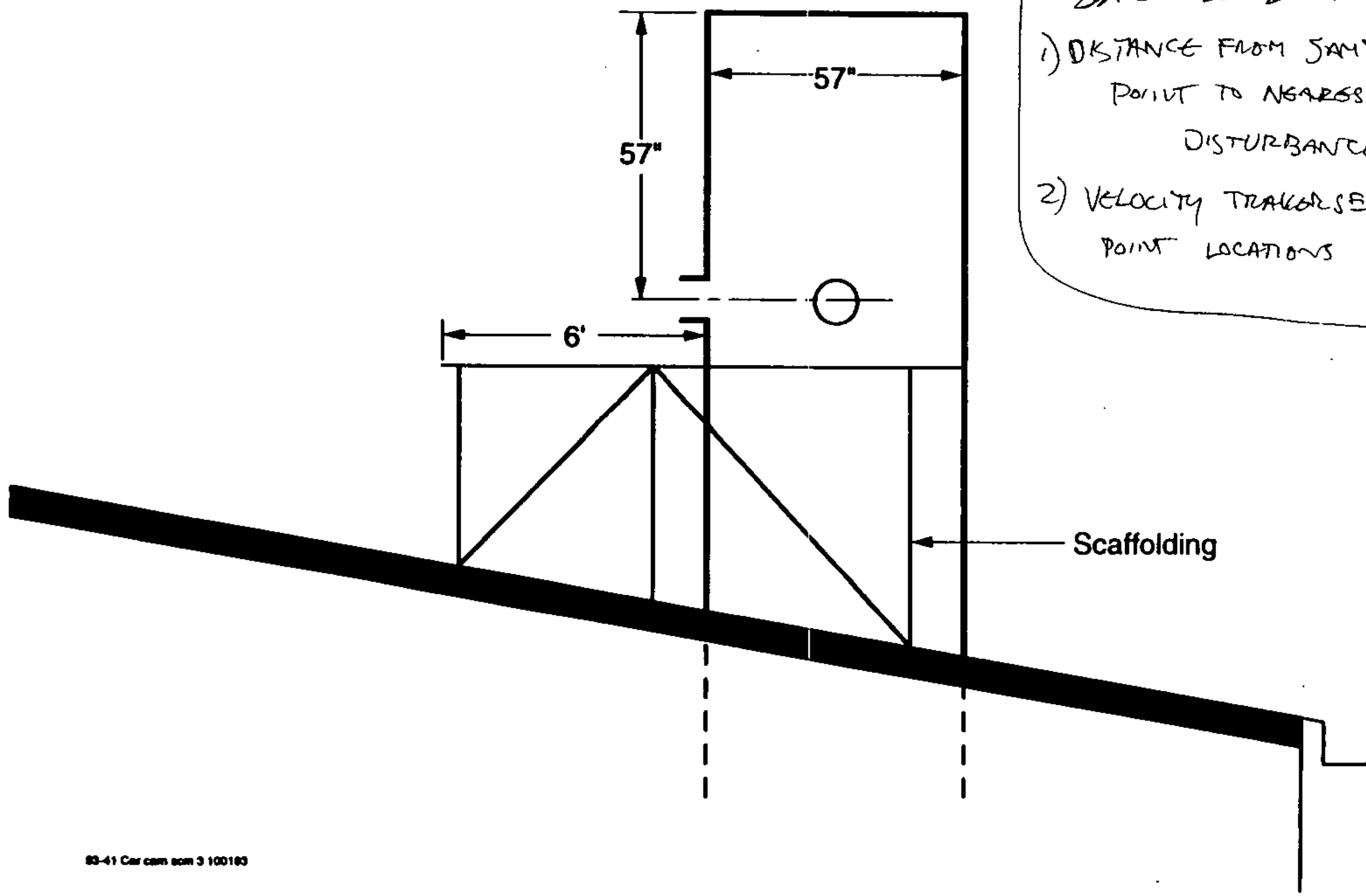

Figure 4-9. Dryer stack sampling port location.

BELDEN BRICK EMISSION TEST 06/20/94

Location	Sampling train	Information	Needed
FIELD DATA			
Grinding/screening	PM-10	Orsat field data sheet	X
		Velocity (preliminary)	X
		Field data form	X
		Orsat analysis	X
		field recovery	X
		field laboratory setup	X
	Ambient	Filter tare/final weight	
		Field data form	
Kiln	PM, PM-10	Orsat field data sheet	X
		Velocity (preliminary)	X
		Field data form	X
		Orsat analysis	X
		Field recovery	X
		Field laboratory setup	X
	Metals	Orsat field data sheet	
		Velocity (preliminary)	X
		Field data form	
		Orsat analysis	
		Field recovery	
		Field laboratory setup	
	Semi-volatiles	Field lab setup	
		Field lab recovery	
		Field data form	
	VOST	Field data	
	HF/HCl/Cl2	Orsat field data sheet	
		Velocity (preliminary)	X
		Test data	
		Orsat analysis	
		field recovery	
		field laboratory setup	
	SO2/NOx/CO/THC	Field computation	
	methane/ethane	Calibration data	
Dryer	THC/methane/	Velocity (preliminary)	X
	ethane	Field computation	
		Calibration data	
		Orsat field data sheet	X
		Orsat analysis	X
		Moisture	X

Location	Sampling train	Information	Needed
ANALYSIS			
Grinding/screening	PM-10	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	X
		Filter PM analysis	X
		Front half rinse analysis	X
	Ambient	Filter tare weight	
		Balance check data	
		Final weights	
Kiln	PM/PM-10 (201A)	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	X
		Filter PM analysis	X
		Front half rinse analysis	X
	Condensible PM	Back half organic analysis	
		Back half inorganic analysis	
	Metals	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	
		Filter PM analysis	
		Front half rinse analysis	
		Back half analysis	
	Semivolatiles	Lab results	
	VOST	Lab results	
	HF/HCl/Cl2	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	
		Filter PM analysis	
		Front half rinse analysis	
	SO2/NOx/CO/THC		
	methane/ethane		

PM 2.5

~~How many ambient readings inside bldg~~
~~- final weights show 3~~
~~- Flow/data sheets show 2~~
~~Need start/stop times for inside bldg (ambient)~~

MIRO

pg 2-5	- FF OUTLET DUCT	33" IN FIGURE,	32" ON COMPUTER PRINTOUT		
pg 2-7	- FF INLET DUCT	35 "	36 "	"	"
pg 2-7	- KILN STACK	67x67 "	68x68 "	"	"

pg 3-4 FIELD TEST CHANGES & PROBLEMS
pg 3-38 PM-10 filter temp on kiln (3.3.4.6)
pg 4-1 Was cyclonic flow check done 4.1
pg 4-5 Exceptions to SW846-30 4.1.3
Confirm for 201A There were 2 filters (Instack and out) (figure 4-7)
Dryer point No 4 distance not on figure

Marilyn Whitacre
CCC's =
SPCC's =

TABLE 3-15. GRINDING/SCREENING EMISSION TESTS RESULTS--PM-10 (METRIC UNITS

Ambient air--inside building

Run No.	1	2
Date	11/09/93	11/09/93
Start time		
Finish time		
Sample time, min	120	120
Flow rate, ACM/min	1.186	1.188
Flow rate, DSCM/min	1.198	1.196
Mass collected, mg	0.3	0.3
Concentration, g/DSCM	0.030	0.030

Ambient air--outside (East)

Run No.	1	2	3
Date	11/09/93	11/11/93	11/11/93
Start time	1200	800	1045
Finish time	1400	1000	1245
Sample time, min	120	120	120
Flow rate, ACM/min	1.169	1.186	1.188
Flow rate, DSCM/min	1.173	1.198	1.196
Mass collected, mg	0.15	0.3	0.25
Concentration, g/DSCM	0.015	0.030	0.025

Ambient air--outside (West)

Run No.	1	2
Date	11/11/93	11/11/93
Start time	945	1230
Finish time	1145	1430
Sample time, min	120	120
Flow rate, ACM/min	1.186	1.188
Flow rate, DSCM/min	1.198	1.196
Mass collected, mg	0.05	0.05
Concentration, g/DSCM	0.0050	0.0050

TABLE 3-15. (ENGLISH UNITS)

Ambient air--inside building

Run No.	1	2
Date	11/09/93	11/09/93
Start time		
Finish time		
Sample time, min	120	120
Flow rate, ACFM	41.87	41.94
Flow rate, DSCFM	42.32	42.23
Mass collected, gr	0.0046	0.0046
Concentration, gr/DSCF	0.013	0.013

Ambient air--outside (East)

Run No.	1	2	3
Date	11/09/93	11/11/93	11/11/93
Start time	1200	800	1045
Finish time	1400	1000	1245
Sample time, min	120	120	120
Flow rate, ACFM	41.30	41.87	41.94
Flow rate, DSCFM	41.42	42.32	42.23
Mass collected, gr	0.0023	0.0046	0.0039
Concentration, gr/DSCF	0.0067	0.013	0.011

Ambient air--outside (West)

Run No.	1	2
Date	11/11/93	11/11/93
Start time	945	1230
Finish time	1145	1430
Sample time, min	120	120
Flow rate, ACFM	41.87	41.94
Flow rate, DSCFM	42.32	42.23
Mass collected, gr	0.00077	0.00077
Concentration, gr/DSCF	0.0022	0.0022

TABLE 3-16. GRINDING/SCREENING EMISSION TESTS RESULTS--FABRIC FILTER INLET FILTERABLE PM, PM-10 (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/09/93	11/11/93
Start time			
Finish time			
Sample time, min			
% isokinetic	94.5	97	97.8
Sample volume, ACM	1.497	0.785	0.774
Sample volume, DSCM	1.498	0.765	0.778
GAS PARAMETERS			
Gas temperature, C	15.0	17.8	12.8
Oxygen, %	21	21	21
Carbon dioxide, %	0	0	0
Moisture, %	1.5	1.5	1.5
Velocity, M/min	905	909	902
Flowrate, ACM/min	593.9	596.5	591.8
Flowrate, DSCM/min	578.8	576.3	580.9
Filterable PM-10			
Mass collected, mg	0.4604	0.234	0.2242
Concentration, g/DSCM	0.307	0.306	0.288
Filterable PM			
Mass collected, mg	4.5862	4.1066	4.5845
Concentration, g/DSCM	3.061	5.366	5.895

TABLE 3-16. (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/09/93	11/11/93
Start time	0	0	0
Finish time	0	0	0
Sample time, min	0	0	0
% isokinetic	94.5	97.0	97.8
Sample volume, ACF	52.878	27.738	27.347
Sample volume, DSCF	52.915	27.028	27.464
GAS PARAMETERS			
Gas temperature, F	59	64	55
Oxygen, %	21	21	21
Carbon dioxide, %	0	0	0
Moisture, %	1.5	1.5	1.5
Velocity, ft/min	2,967	2,980	2,957
Flowrate, ACFM	20,974	21,065	20,899
Flowrate, DSCFM	20,439	20,351	20,513
Filterable PM-10			
Mass collected, gr	7.10	3.61	3.46
Concentration, gr/DSCF	0.134	0.134	0.126
Filterable PM			
Mass collected, gr	70.8	63.4	70.7
Concentration, gr/DSCF	1.34	2.34	2.58

TABLE 3-17. GRINDING/SCREENING EMISSION TESTS RESULTS--FABRIC FILTER OUTLE
FILTERABLE PM, PM-10 (METRIC UNITS)

Run No.	1	2
Date	11/09/93	11/11/93
Start time		
Finish time		
Sample time, min		
% isokinetic	92.1	91.1
Sample volume, ACM	5.153	6.057
Sample volume, DSCM	4.968	5.849
GAS PARAMETERS		
Gas temperature, C	14.4	13.3
Oxygen, %	21	21
Carbon dioxide, %	0	0
Moisture, %	1.5	1.5
Velocity, m/min	1,455	1,438
Flowrate, ACM/min	754.8	745.8
Flowrate, DSCM/min	740.2	734.1
Filterable PM-10		
Mass collected, mg	0.0027	0.0027
Concentration, g/DSCM	0.00054	0.00046
Filterable PM		
Mass collected, mg	0.0133	0.0109
Concentration, g/DSCM	0.00268	0.00186

TABLE 3-17. (ENGLISH UNITS)

Run No.	1	2
Date	11/09/93	11/11/93
Start time	0	0
Finish time	0	0
Sample time, min	0	0
% isokinetic	92.1	91.1
Sample volume, ACF	181.97	213.913
Sample volume, DSCF	175.437	206.567
GAS PARAMETERS		
Gas temperature, F	58	56
Oxygen, %	21	21
Carbon dioxide, %	0	0
Moisture, %	1.5	1.5
Velocity, ft/min	4,773	4,716
Flowrate, ACFM	26,656	26,337
Flowrate, DSCFM	26,140	25,925
Filterable PM-10		
Mass collected, gr	0.0417	0.0417
Concentration, gr/DSCF	0.00024	0.00020
Filterable PM		
Mass collected, gr	0.2052	0.1682
Concentration, gr/DSCF	0.0012	0.00081

TABLE 3-18. KILN EMISSION TESTS RESULTS--METALS (METRIC UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	0	0	0	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACM	2.891	3.724	2.990	
Sample volume, DSCM	2.809	3.594	2.867	
GAS PARAMETERS				
Gas temperature, C	221	221	224	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, M/min	354	422	339	
Flowrate, ACMM	1,055	1,259	1,012	
Flowrate, DSCMM	587	701	557	
Mass collected, ug				
Arsenic	<1.97	<1.96	<1.97	
Beryllium	<0.034	0.034	<0.034	
Cadmium	4.06	7.87	1.396	
Chromium	435.811	2083.911	544.341	
Cobalt	6.6	27.2	11.33	
Mercury	21.446	9.659	30.523	
Manganese	53.592	175.222	65.762	
Nickel	214.92	1135.62	370.73	
Lead	12.3	8.77	10.09	
Antimony	3.43	1.92	3.421	
Selenium	39.2	37.2	69.63	
Concentration, ug/DSCM				Average
Arsenic	ND	ND	ND	
Beryllium	ND	ND	ND	
Cadmium	1.445	2.139	0.487	1.357
Chromium	155.128	566.504	189.834	303.822
Cobalt	2.349	7.394	3.951	4.565
Mercury	7.634	2.626	10.645	6.968
Manganese	19.076	47.633	22.934	29.881
Nickel	76.501	308.714	129.288	171.501
Lead	4.378	2.384	3.519	3.427
Antimony	1.221	0.522	1.193	0.979
Selenium	13.953	10.113	24.283	16.116

ND = not detected.

TABLE 3-18. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min				
% isokinetic	92.7	99.3	99.5	
Sample, volume, ACF	102.102	131.495	105.603	
Sample volume, DSCF	99.211	126.906	101.263	
GAS PARAMETERS				
Gas temperature, F	429	429	435	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, ft/min	1,160	1,385	1,113	
Flowrate, ACFM	37,260	44,462	35,729	
Flowrate, DSCFM	20,713	24,738	19,683	
Mass collected, gr				
Arsenic	<7.2E-05	<7.2E-05	<7.2E-05	
Beryllium	<1.4E-06	<1.4E-06	<1.4E-06	
Cadmium	6.265E-05	0.0001214	2.154E-05	
Chromium	0.0067254	0.0321589	0.0084003	
Cobalt	0.0001019	0.0004198	0.0001748	
Mercury	0.000331	0.0001491	0.000471	
Manganese	0.000827	0.002704	0.0010148	
Nickel	0.0033166	0.0175249	0.0057211	
Lead	0.0001898	0.0001353	0.0001557	
Antimony	5.293E-05	2.963E-05	5.279E-05	
Selenium	0.0006049	0.0005741	0.0010745	
Concentration, gr/DSCF				Average
Arsenic	ND	ND	ND	
Beryllium	ND	ND	ND	
Cadmium	6.315E-07	9.349E-07	2.127E-07	5.931E-07
Chromium	6.779E-05	0.0002476	8.295E-05	0.0001328
Cobalt	1.027E-06	3.231E-06	1.727E-06	1.995E-06
Mercury	3.336E-06	1.147E-06	4.652E-06	3.045E-06
Manganese	8.336E-06	2.082E-05	1.002E-05	1.306E-05
Nickel	3.343E-05	0.0001349	5.65E-05	7.494E-05
Lead	1.913E-06	1.042E-06	1.538E-06	1.498E-06
Antimony	5.335E-07	2.281E-07	5.213E-07	4.277E-07
Selenium	6.097E-06	4.419E-06	1.061E-05	7.043E-06

ND = not detected.

TABLE 3-19. KILN EMISSION TESTS RESULTS–VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACM	0	0	0
Sample volume, DSCM	0.019964	0.0201194	0.0201688
GAS PARAMETERS			
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, m/min			
Flowrate, ACM/min	572.3	574.3	576.4
Flowrate, DSCM/min	541.0	546.5	552.0
Mass, ng (blank corrected)			
Chloromethane (a)	1475.956	88.518	192.644
Dichlorofluoromethane			
Bromomethane (a)	324.879		58.478
Acetonitrile	75.424		
Acrylonitrile			
Vinl chloride			
Chloroethane	1132.853		368.637
Iodomethane (a)	159.293	13.875	74.476
Trichlorofluoromethane			
Methylene chloride	5.532	9.259	1.362
Acetone	993.771	1261.417	2543.338
Carbon disulfide	42.116	51.006	25.523
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	94.625	216.682	338.132
1,1,1-Trichloroethane	7.106		4.913
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	2522.718	4337.655	1184.394
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		33.904	4.64
2-Hexanone	2.64	147.467	98.485
Tetrachloroethene		3.65	3.944
1,1,2,2-Tetrachloroethane			
Toluene	103.442	159.558	176.358
Chlorobenzene			
Ethylbenzene	30.577	41.073	52.656
Styrene	9.654	46.172	2.492
m-/p-Xylene	46.992	64.574	77.281
o-Xylene	40.168	58.095	66.438
Hexachloroethane			
1,2-Dbromo-3-chloropropane		116.513	20.215

TABLE 3-19. (Continued)

Concentration, ug/DSCM				Average
Chloromethane (a)	73.930895	4.3996363	9.5515938	29.29404
Dichlorofluoromethane				
Bromomethane (a)	16.273246		2.8994316	6.390893
Acetonitrile	3.7780014			
Acrylonitrile				
Vinl chloride				
Chloroethane	56.744806		18.277605	
Iodomethane (a)	7.9790143	0.6896332	3.6926377	4.120428
Trichlorofluoromethane				
Methylene chloride	0.2770989	0.4602028	0.0675301	0.268277
Acetone	49.778164	62.696581	126.10272	79.52582
Carbon disulfide	2.1095978	2.5351663	1.2654707	1.970078
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	4.7397829	10.769809	16.765119	10.75824
1,1,1-Trichloroethane	0.3559408		0.2435943	0.299768
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	126.36339	215.59575	58.724125	133.5611
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		1.6851405	0.2300585	0.9576
2-Hexanone	0.1322381	7.3295958	4.8830419	4.114959
Tetrachloroethene		0.181417	0.1955498	0.188483
1,1,2,2-Tetrachloroethane				
Toluene	5.1814279	7.9305583	8.7441082	7.285365
Chlorobenzene				
Ethylbenzene	1.5316073	2.0414634	2.6107677	2.061279
Styrene	0.4835706	2.2949005	0.1235573	0.967343
m-/p-Xylene	2.3538375	3.2095406	3.8317141	3.131697
o-Xylene	2.0120222	2.8875129	3.294101	2.731212
Hexachloroethane				
1,2-Dbromo-3-chloropropane		5.79108	1.0022916	3.396686

(a) Results invalid due to contaminated blank sample.
(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.
(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related
(d) Interference coeluted with analyte; mass spectrum did not meet criteria.
(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACF			
Sample volume, DSCF	0.7050085	0.7104962	0.7122403
GAS PARAMETERS			
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, ft/min			
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493
Mass, ng (blank corrected)			
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06
Dichlorofluoromethane			
Bromomethane (a)	5.01E-06		9.02E-07
Acetonitrile	1.16E-06		
Acrylonitrile			
Vinl chloride			
Chloroethane	1.75E-05		5.69E-06
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06
Trichlorofluoromethane			
Methylene chloride	8.54E-08	1.43E-07	2.10E-08
Acetone	1.53E-05	1.95E-05	3.92E-05
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	1.46E-06	3.34E-06	5.22E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	3.89E-05	6.69E-05	1.83E-05
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		5.23E-07	7.16E-08
2-Hexanone	4.07E-08	2.28E-06	1.52E-06
Tetrachloroethene		5.63E-08	6.09E-08
1,1,2,2-Tetrachloroethane			
Toluene	1.60E-06	2.46E-06	2.72E-06
Chlorobenzene			
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07
Styrene	1.49E-07	7.13E-07	3.85E-08
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06
o-Xylene	6.20E-07	8.97E-07	1.03E-06
Hexachloroethane			
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07

TABLE 3-19. (Continued)

Concentration, gr/DSCF				Average
Chloromethane (a)	3.2E-05	1.923E-06	4.174E-06	1.28E-05
Dichlorofluoromethane				
Bromomethane (a)	7.1E-06		1.267E-06	2.79E-06
Acetonitrile	1.7E-06			
Acrylonitrile				
Vinl chloride				
Chloroethane	2.5E-05		7.987E-06	
Iodomethane (a)	3.5E-06	3.014E-07	1.614E-06	1.8E-06
Trichlorofluoromethane				
Methylene chloride	1.2E-07	2.011E-07	2.951E-08	1.17E-07
Acetone	2.2E-05	2.74E-05	5.511E-05	3.48E-05
Carbon disulfide	9.2E-07	1.108E-06	5.53E-07	8.61E-07
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	2.1E-06	4.706E-06	7.326E-06	4.7E-06
1,1,1-Trichloroethane	1.6E-07		1.064E-07	1.31E-07
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	5.5E-05	9.421E-05	2.566E-05	5.84E-05
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		7.364E-07	1.0E-07	4.18E-07
2-Hexanone	5.8E-08	3.203E-06	2.134E-06	1.8E-06
Tetrachloroethene		7.928E-08	8.545E-08	8.24E-08
1,1,2,2-Tetrachloroethane				
Toluene	2.3E-06	3.466E-06	3.821E-06	3.18E-06
Chlorobenzene				
Ethylbenzene	6.7E-07	8.921E-07	1.141E-06	9.0E-07
Styrene	2.1E-07	1.003E-06	5.399E-08	4.2E-07
m-/p-Xylene	1.0E-06	1.403E-06	1.674E-06	1.4E-06
o-Xylene	8.8E-07	1.262E-06	1.44E-06	1.2E-06
Hexachloroethane				
1,2-Dbromo-3-chloropropane		2.531E-06	4.38E-07	1.5E-06

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min	0	0	0
% isokinetic	94.8	100.5	100.5
Sample volume, ACM	3.004	2.966	3.294
Sample volume, DSCM	2.891	2.844	3.136
GAS PARAMETERS			
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Velocity, m/min			
Flowrate, ACMM	610.5	572.1	628.2
Flowrate, DSCMM	584.3	547.2	598.0
Mass collected, ug			
Phenol	13	13	8.7
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	4.8	4.9	9.7
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	2.1	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	623
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	6	12	8.5
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

TABLE 3-20. (METRIC UNITS continued)

Mass collected, ug			
2-Methylnaphthalene	4.8	11	7.4
Hexachlorocyclopentadiene	<2	<2	<2
2,4,6-Trichlorophenol	<2	<2	<2
2,4,5-Trichlorophenol	<2	<2	<2
2-Chloronaphthalene	<2	<2	<2
2-Nitroaniline	<2	<2	<2
Dimethylphthalate	<2	<2	<2
Acenaphthylene	<2	<2	<2
2,6-Dinitrotoluene	<2	<2	<2
2,3,4,6-Tetrachlorophenone	<2	<2	<2
3-Nitroaniline	<2	<2	<2
Acenaphthene	<2	<2	<2
2,4-Dinitrophenol	<2	<2	<2
4-Nitrophenol	<2	<2	<2
Dibenzofuran	<2	<2	<2
2,4-Dinitrotoluene	<2	<2	<2
Diethyl phthalate	53	23	18
4-Chlorophenylphenyl ether	<2	<2	<2
Fluorene	<2	<2	<2
4-Nitroaniline	<2	<2	<2
4,6-Dinitro-2-methylphenol	<2	<2	<2
N-Nitrosodiphenylamine	<2	<2	<2
4-Bromophenyl-phenylether	<2	<2	<2
Hexachlorobenzene	<2	<2	<2
Pentachlorophenol	<2	<2	<2
Phenanthrene	<2	<2	<2
Anthracene	<2	<2	<2
Carbazole	<2	<2	<2
Di-n-butyl phthalate	13	14	31
Fluoranthene	<2	<2	<2
Benzidine	<2	<2	<2
Pyrene	<2	<2	<2
Butylbenzyl phthalate	2	2.2	3
3,3'-Dichlorobenzidine	<2	<2	<2
Benzo(a)anthracene	<2	<2	<2
Chrysene	<2	<2	<2
Bis(2-ethylhexyl) phthalate	77	240	510
Di-n-octyl phthalate	<2	<2	10
Benzo(b)fluoranthene	<2	<2	<2
Benzo(k)fluoroanthene	<2	<2	<2
Benzo(a)pyrene	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2	<2	<2
Dibenz(a,h)anthracene	<2	<2	<2
Benzo(g,h,i)perylene	<2	<2	<2

TABLE 3-20. (METRIC UNITS continued)

Concentration, ug/DSCM				Ave.
Phenol	4.50	4.57	2.77	3.95
Aniline				
Bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene	1.66	1.72	3.09	2.16
Benzyl alcohol				
1,2-Dichlorobenzene				
2-Methylphenol	0.726			
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitrosodipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
Benzoic acid			199	
Bis(2-chloroethoxy)methane				
2-Chloroacetophenone				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene	2.08	4.22	2.71	3.00
4-Chloroaniline				
2,6-Dichlorophenol				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Hydroxyacetophenone				
2-Methylnaphthalene	1.66	3.87	2.36	2.63
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
2,3,4,6-Tetrachlorophenenone				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				

TABLE 3-20. (METRIC UNITS continued)

Concentration, ug/DSCM				Ave.
2,4-Dinitrotoluene				
Diethyl phthalate	18.3	8.09	5.74	10.7
4-Chlorophenylphenyl ether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di-n-butyl phthalate	4.50	4.92	9.88	6.43
Fluoranthene				
Benzidine				
Pyrene				
Butylbenzyl phthalate	0.692	0.774	0.957	0.807
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
Bis(2-ethylhexyl) phthalate	26.6	84.4	162.6	91.2
Di-n-octyl phthalate			3.2	
Benzo(b)fluoranthene				
Benzo(k)fluoroanthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min			
% isokinetic	94.8	100.5	100.5
Sample volume, ACF	106.077	104.759	116.333
Sample volume, DSCF	102.084	100.421	110.755
GAS PARAMETERS			
Gas temperature, F	433	428	428
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACFM	21,559	20,202	22,184
Flowrate, DSCFM	20,635	19,325	21,118
Mass collected, gr			
Phenol	2.0E-04	2.0E-04	1.3E-04
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	7.4E-05	7.6E-05	1.5E-04
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	3.24E-05	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	0.0096
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	9.3E-05	0.00019	0.00013
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

TABLE 3-20. (ENGLISH UNITS continued)

Mass collected, gr			
2-Methylnaphthalene	7.4E-05	1.7E-04	1.1E-04
Hexachlorocyclopentadiene	<2	<2	<2
2,4,6-Trichlorophenol	<2	<2	<2
2,4,5-Trichlorophenol	<2	<2	<2
2-Chloronaphthalene	<2	<2	<2
2-Nitroaniline	<2	<2	<2
Dimethylphthalate	<2	<2	<2
Acenaphthylene	<2	<2	<2
2,6-Dinitrotoluene	<2	<2	<2
2,3,4,6-Tetrachlorophenone	<2	<2	<2
3-Nitroaniline	<2	<2	<2
Acenaphthene	<2	<2	<2
2,4-Dinitrophenol	<2	<2	<2
4-Nitrophenol	<2	<2	<2
Dibenzofuran	<2	<2	<2
2,4-Dinitrotoluene	<2	<2	<2
Diethyl phthalate	0.00082	0.00035	0.00028
4-Chlorophenylphenyl ether	<2	<2	<2
Fluorene	<2	<2	<2
4-Nitroaniline	<2	<2	<2
4,6-Dinitro-2-methylphenol	<2	<2	<2
N-Nitrosodiphenylamine	<2	<2	<2
4-Bromophenyl-phenylether	<2	<2	<2
Hexachlorobenzene	<2	<2	<2
Pentachlorophenol	<2	<2	<2
Phenanthrene	0.0E+00	<2	<2
Anthracene	<2	<2	<2
Carbazole	<2	<2	<2
Di-n-butyl phthalate	0.00020	0.00022	0.00048
Fluoranthene	<2	<2	<2
Benzidine	<2	<2	<2
Pyrene	<2	<2	<2
Butylbenzyl phthalate	3.1E-05	3.4E-05	4.6E-05
3,3'-Dichlorobenzidine	<2	<2	<2
Benzo(a)anthracene	<2	<2	<2
Chrysene	<2	<2	<2
Bis(2-ethylhexyl) phthalate	0.0012	0.0037	0.0079
Di-n-octyl phthalate	<2	<2	0.00015
Benzo(b)fluoranthene	<2	<2	<2
Benzo(k)fluoroanthene	<2	<2	<2
Benzo(a)pyrene	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2	<2	<2
Dibenz(a,h)anthracene	<2	<2	<2
Benzo(g,h,i)perylene	<2	<2	<2

TABLE 3-20. (ENGLISH UNITS continued)

Concentration, gr/DSCF				Ave.
Phenol	1.97E-06	2.00E-06	1.21E-06	1.73E-06
Aniline				
Bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene	7.26E-07	7.53E-07	1.35E-06	9.43E-07
Benzyl alcohol				
1,2-Dichlorobenzene				
2-Methylphenol	3.17E-07			
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitrosodipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
Benzoic acid			8.68E-05	
Bis(2-chloroethoxy)methane				
2-Chloroacetophenone				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene	9.07E-07	1.84E-06	1.18E-06	1.31E-06
4-Chloroaniline				
2,6-Dichlorophenol				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Hydroxyacetophenone				
2-Methylnaphthalene	7.26E-07	1.69E-06	1.03E-06	1.15E-06
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
2,3,4,6-Tetrachlorophenenone				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				

TABLE 3-20. (ENGLISH UNITS continued)

Concentration, gr/DSCF				Ave.
2,4-Dinitrotoluene				
Diethyl phthalate	8.01E-06	3.53E-06	2.51E-06	4.68E-06
4-Chlorophenylphenyl ether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene	0.00E+00			
Anthracene				
Carbazole				
Di-n-butyl phthalate	1.97E-06	2.15E-06	4.32E-06	2.81E-06
Fluoranthene				
Benzidine				
Pyrene				
Butylbenzyl phthalate	3.02E-07	3.38E-07	4.18E-07	3.53E-07
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
Bis(2-ethylhexyl) phthalate	1.16E-05	3.69E-05	7.11E-05	3.99E-05
Di-n-octyl phthalate			1.4E-06	
Benzo(b)fluoranthene				
Benzo(k)fluoroanthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

TABLE 3-21. KILN EMISSION TESTS RESULTS--INORGANIC GASES AND THC (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, C	193.33	204.44	209.44	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min				
Flowrate, ACMM	641.0	572.3	576.4	
Flowrate, DSCMM	614.8	541.0	552.0	
Concentration, ppm (a)				Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.95	2.02	1.88	1.95

(a) Based on average of 120 1-minute readings.

(b) Concentration in percent.

TABLE 3-21. KILN EMISSION TESTS RESULTS--INORGANIC GASES AND THC (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min				
Flowrate, ACFM	22,636	20,209	20,356	
Flowrate, DSCFM	21,711	19,104	19,493	
Concentration, ppm (a)				Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.9	2.0	1.9	1.95

(a) Based on average of 120 1-minute readings.

(b) Concentration in percent.

TABLE 3-22. KILN EMISSION TESTS RESULTS--THC, METHANE/ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, C	193.33	204.44	209.44	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min				
Flowrate, ACM/min	641.0	572.3	576.4	
Flowrate, DSCM/min	614.8	541.0	552.0	
Concentration, ppm (a)				Average
THC	1.99	1.21	2.41	1.87
Methane (c)	6.55	5.05	4.92	5.51
Ethane (c)	<3	<3	<3	

(a) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

TABLE 3-22. KILN EMISSION TESTS RESULTS--THC, METHANE/ETHANE (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min				
Flowrate, ACFM	22,636	20,209	20,356	
Flowrate, DSCFM	21,711	19,104	19,493	
Concentration, ppm (a)				Average
THC	2.0	1.2	2.4	1.87
Methane (c)	6.6	5.1	4.9	5.51
Ethane (c)	<3	<3	<3	

(a) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (METRIC UNITS)

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	0	0	0	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSCM	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18	
Carbon dioxide, %	1.1	1.8	2	
Moisture, %	4.4	4.6	4.7	
Velocity, m/min				
Flowrate, ACM/min	601.5	594.5	572.6	
Flowrate, DSCM/min	575.0	567.4	545.6	
Mass collected, g				
Filterable PM	0.0496	0.0473	0.0600	
Concentration, g/DSCM				Average
Filterable PM	0.0212	0.0160	0.0212	0.019464

Method 29 train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	0	0	0	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACM	2.891	3.724	2.990	
Sample volume, DSCM	2.809	3.594	2.867	
GAS PARAMETERS				
Gas temperature, C	221	221	224	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, m/min				
Flowrate, ACM/min	613.3	731.7	1,011.7	
Flowrate, DSCM/min	586.5	700.5	584.6	
Mass collected, g				
Filterable PM	0.0537	0.0430	0.0886	
Concentration, g/DSCM				Average
Filterable PM	0.0191	0.0120	0.0309	0.02066

TABLE 3-23. (METRIC UNITS continued)

Method 201A/202 train				
Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:55	14:59	17:07	
Finish time	12:27	16:42	18:39	
Sample time, min	90	90	90	
% isokinetic	106.8	99	97.4	
Sample volume, ACM	1.212	1.234	1.247	
Sample volume, DSCM	1.174	1.183	1.187	
GAS PARAMETERS				
Gas temperature, C	193	204	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min				
Flowrate, ACM/min	641.0	572.3	576.4	
Flowrate, DSCM/min	614.8	541.0	552.0	
Mass collected, g				
Filterable PM	0.0177	0.0188	0.0127	
Filterable PM-10	0.0033	0.0147	0.0047	
Cond. inorganic PM	0.167	0.183	0.162	
Cond. organic PM	0.0548	0.0153	0.0104	
Total cond. PM	0.222	0.199	0.172	
Concentration, g/DSCM				Average
Filterable PM	0.0151	0.0159	0.0107	0.0139
Filterable PM-10	0.0028	0.0124	0.0040	0.0064
Cond. inorganic PM	0.1420	0.1551	0.1363	0.1444
Cond. organic PM	0.0467	0.0129	0.0088	0.0228
Total cond. PM	0.1886	0.1680	0.1450	0.1672

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (ENGLISH UNITS)

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min				
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.148	109.203	105.783	
Sample volume, DSCF	82.567	104.337	100.101	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min				
Flowrate, ACFM	21,243	20,994	20,222	
Flowrate, DSCFM	20,307	20,036	19,269	
Mass collected, gr				
Filterable PM	0.765	0.730	0.926	
Concentration, gr/DSCF				Average
Filterable PM	0.00889	0.00668	0.00875	0.00811

TABLE 3-23. (ENGLISH UNITS continued)

Method 29 train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min				
% isokinetic	92.7	99.3	99.5	
Sample volume, ACF	102.102	131.495	105.603	
Sample volume, DSCF	99.211	126.906	101.263	
GAS PARAMETERS				
Gas temperature, F	429	429	435	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, ft/min				
Flowrate, ACFM	21,657	25,840	35,729	
Flowrate, DSCFM	20,713	24,738	20,645	
Mass collected, gr				
Filterable PM	0.829	0.664	1.367	
Concentration, gr/DSCF				Average
Filterable PM	0.00812	0.00505	0.01295	0.00870

Method 201A/202 train	Run			
Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:55	14:59	17:07	
Finish time	12:27	16:42	18:39	
Sample time, min	90	90	90	
% isokinetic	106.8	99.0	97.4	
Sample volume, ACF	42.789	43.568	44.040	
Sample volume, DSCF	41.464	41.763	41.926	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min				
Flowrate, ACFM	22,636	20,209	20,356	
Flowrate, DSCFM	21,711	19,104	19,493	
Mass collected, gr				
Filterable PM	0.273	0.290	0.196	
Filterable PM-10	0.051	0.227	0.073	
Cond. inorganic PM	2.573	2.830	2.497	
Cond. organic PM	0.846	0.236	0.160	
Total cond. PM	3.418	3.066	2.657	
Concentration, gr/DSCF				Average
Filterable PM	0.00638	0.00666	0.00445	0.00583
Filterable PM-10	0.00119	0.00521	0.00165	0.00268
Cond. inorganic PM	0.06012	0.06496	0.05670	0.06059
Cond. organic PM	0.01976	0.00542	0.00364	0.00961
Total cond. PM	0.0799	0.0704	0.0603	0.07020

TABLE 3-24. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (METRIC UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Elapsed time, min				
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSC	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity M/min				
Flowrate, ACM/min	601.5	594.5	572.6	
Flowrate, DSCM/min	575.0	567.4	545.6	
Mass collected, ug				
HF	31,969	43,518	37,333	
HCl	2,117	2,449	2,302	
Cl2	128	216	169	
Concentration, ug/DSCM				Average
HF	13,673	14,729	13,171	13,858
HCl	905	829	812	849
Cl2	54.7	73.1	59.6	62.5

TABLE 3-24. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min				
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.148	109.203	105.783	
Sample volume, DSCF	82.567	104.337	100.101	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min				
Flowrate, ACFM	21,243	20,994	20,222	
Flowrate, DSCFM	20,307	20,036	19,269	
Mass collected, gr				
HF	0.493	0.672	0.576	
HCl	0.0327	0.0378	0.0355	
Cl2	0.00198	0.00333	0.00261	
Concentration, gr/DSCF				Average
HF	0.0060	0.0064	0.0058	0.0061
HCl	0.00040	0.00036	0.00035	0.00037
Cl2	2.4E-05	3.2E-05	2.6E-05	2.73E-05

TABLE 3-25. DRYER EMISSION TESTS RESULTS--THC, METHANE/ETHANE (METRIC UNITS)

Run No.	1 (a)	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Elapsed time	121	120	120	
GAS PARAMETERS				
Gas temperature, C	37.8	37.8	37.8	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, m/min				
Flowrate, ACM/min	1971.0331	1,947	1,995	
Flowrate, DSCM/min	1733.7083	1,712	1,755	
Concentration, ppm				Average
THC	80.2	85.6	91.9	85.9
methane	102	91.0	106	99.7
ethane	9.2	6.7	7.6	7.8

(a) Run 1 data estimated as average of Runs 2 and 3 data.

TABLE 3-25. (ENGLISH UNITS)

Run No.	1 (a)	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Elapsed time	121	120	120	
GAS PARAMETERS				
Gas temperature, F	100	100	100	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, ft/min				
Flowrate, ACFM	69,606	68,760	70,452	
Flowrate, DSCFM	61,225	60,472	61,978	
Concentration, ppm				Average
THC	80.2	85.6	91.9	85.9
methane	102	91.0	106	99.7
ethane	9.2	6.7	7.6	7.8

(a) Run 1 data estimated as average of Runs 2 and 3 data.

Need to clarify effect EPA guidance 2 Units: m3 dscm m3/min dscm/min ?

TABLE 3-15. GRINDING/SCREENING ~~EMISSION~~ Fabric filter TESTS RESULTS--PM-10 (METRIC UNITS)

Fabric filter inlet				Fabric filter outlet			Ambient		
Run No.	1	2	3	Run No.	1	2			Flowrate,
Date	11/09/93	11/09/93	11/11/93	Date	11/09/93	11/11/93	Location	Ru	DSCMM
Start time	0	0	0	Start time			Inside	1	1.198
Finish time	0	0	0	Finish time				2	1.196
~~Elapsed~~ time	0	0	0	Elapsed time			East	1	1.173
% isokinetic	94.5	97	97.8	% isokinetic	92.1	91.1		2	1.198
GAS PARAMETERS				GAS PARAMETERS				3	1.196
Volume, ACM	1.497	0.785	0.774	Volume, ACM	5.153	6.057	West	1	1.198
Volume, DSCM	1.498	0.765	0.778	Volume, DSCM	4.968	5.849		2	1.196
Gas temperature, °C	15.0	17.8	12.8	Gas temperature, C	14.4	13.3			
Oxygen, %	21	21	21	Oxygen, %	21	21			
Carbon dioxide, %	0	0	0	Carbon dioxide, %	0	0			
Moisture, %	1.5	1.5	1.5	Moisture, %	1.5	1.5			
Flowrate, ACMM ?	593.9	596.5	591.8	Flowrate, ACMM	754.8	745.8			
Flowrate, DSCMM ?/min	578.8	576.3	580.9	Flowrate, DSCMM	740.2	734.1			

Sample

sample sample

Add velocity here & on all others

elapsed time 120 min

put on separate pg

Source/analyte	Mass, mg 1	2	3	Average ?	Concentration, g/DSCM 1	2	3	Average
Fabric filter inlet								
Filterable PM-10	0.4604	0.234	0.2242	0.3062	0.307	0.306	0.288	0.300
Filterable PM	4.5862	4.1066	4.5845	4.4257667	3.061	5.366	5.895	4.77
Fabric filter outlet								
Filterable PM-10	0.0027	0.0027		0.0027	0.00054	0.00046	??	0.00050
Filterable PM	0.0133	0.0109		0.0121	0.00268	0.00186		0.00227
Fabric filter hopper catch								
Total PM	2,513	2,794		2,654	0.00686	0.00776		0.00731
Ambient air--inside building								
Filterable PM-10	0.3	0.3	0.2	0.27	2.09E-03	2.09E-03	?	2.09E-03
Ambient air--east of building								
Filterable PM-10	0.15	0.3	0.25	0.23	1.07E-03	2.09E-03	1.74E-03	1.63E-03
Ambient air--west of building								
Filterable PM-10	0.05	0.05		0.05	3.48E-04	3.48E-04		3.48E-04

To be consistent & probably would recognize this table like one above

$$\frac{.3}{1.198} \times 10^{-3} \frac{g}{mg} \times ?\ \text{minutes} =$$

SCFM

FFI FFO

mass:

conc:

TABLE 3-15. GRINDING/SCREENING EMISSION TESTS RESULTS--PM-10 (ENGLISH UNITS)

Fabric filter inlet				Fabric filter outlet			Ambient		
Run No.	1	2	3	Run No.	1	2			Flowrate,
Date	11/09/93	11/09/93	11/11/93	Date	11/09/93	11/11/93	Location	Ru	DSCFM
Start time				Start time			Inside	1	42.32
Finish time				Finish time				2	42.23
Elapsed time				Elapsed time			East	1	41.42
% isokinetic	94.5	97.0	97.8	% isokinetic	92.1	91.1		2	42.32
GAS PARAMETERS				GAS PARAMETERS				3	42.23
Volume, ACF	52.878	27.738	27.347	Volume, ACF	181.97	213.913	West	1	42.32
Volume, DSCF	52.915	27.028	27.464	Volume, DSCF	175.437	206.567		2	42.23
Gas temperature, F	59	64	55	Gas temperature, F	58	56			
Oxygen, %	21	21	21	Oxygen, %	21	21			
Carbon dioxide, %	0	0	0	Carbon dioxide, %	0	0			
Moisture, %	1.5	1.5	1.5	Moisture, %	1.5	1.5			
Flowrate, ACFM	20,974	21,065	20,899	Flowrate, ACFM	26,656	26,337			
Flowrate, DSCFM	20,439	20,351	20,513	Flowrate, DSCFM	26,140	25,925			

	Mass, gr				Concentration, gr/DSCF			
Source/analyte	1	2	3	Average	1	2	3	Average
Fabric filter inlet								
Filterable PM-10	7.10	3.61	3.46	4.73	0.134	0.134	0.126	0.131
Filterable PM	70.8	63.4	70.7	68.3	1.34	2.34	2.58	2.09
Fabric filter outlet								
Filterable PM-10	0.0417	0.0417		0.0417	0.00024	0.00020		0.00022
Filterable PM	0.2052	0.1682		0.1867272	0.0012	0.00081		0.00099
Fabric filter hopper catch								
Total PM	3.88E+07	4.31E+07		4.10E+07	3.83	4.32		4.08
Ambient air--inside building								
Filterable PM-10	0.0046	0.0046	0.0031	0.0041	9.12E-07	9.14E-07		9.13E-07
Ambient air--east of building								
Filterable PM-10	0.0023	0.0046	0.0039	0.0036	4.66E-07	9.12E-07	7.61E-07	7.13E-07
Ambient air--west of building								
Filterable PM-10	0.00077	0.00077		0.00077	1.52E-07	1.52E-07		1.52E-07

TABLE 3-16. KILN EMISSION TESTS RESULTS--METALS (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
~~Elapsed~~ time	0	0	0
% isokinetic	92.7	99.3	99.5
GAS PARAMETERS			
Volume, ACM	2.891	3.724	2.990
Volume, DSCM	2.809	3.594	2.867
Gas temperature, C	221	221	224
Oxygen, %	17.6	18.4	17.8
Carbon dioxide, %	2.2	1	1.7
Moisture, %	4.4	4.3	4.7
Flowrate, ACMM	613.3	731.7	1,012
Flowrate, DSCMM	586.5	700.5	584.6

sample

sample

sample

mass collected

	Catch, ug									
	~~Run~~									
	1		2		3		Average		Blank	
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	Front	Back
Arsenic	<4.67	<1.97	<4.67	<1.96	<4.67	<1.97	0.00	0.00	<4.67	<1.89
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	0.0068	0.0068	<0.09	<0.033
Cadmium	7.52	2.63	7.65	6.31	6.36	1.126	6.09	4.82	5.93	0.16
Chromium	35.8	405	21.9	2067	22.2	527.13	510.38	608.65	4.4	0.589
Cobalt	6.01	6.21	5.56	27.2	5.56	11.33	10.11	11.17	5.62	<0.382
Mercury	1.73	22.083	1.37	10.296	11	22.31	9.30	13.41	2.15	0.637
Manganese	7.7	48.3	5.63	172	5.48	62.69	47.82	58.82	2.18	0.228
Nickel	32.5	207	27.2	1133	27.2	368.11	285.38	352.50	22.5	2.08
Lead	152	12.3	156	7.77	157	8.09	97.01	68.23	155	<3.14
Antimony	21	2.03	18.6	1.92	17.9	3.421	12.29	8.77	19.6	<1.59
Selenium	23.4	28.7	17.2	32.9	18.1	64.43	24.06	32.27	12.9	<3.31

Also quantitate?

Include blank corrected totals here
Put front, back, blank in Appendix

TABLE 3-16. (Continued) ~Separate Table? collected

Analyte	Mass, ug (blank corrected)								Mass, ug (front + back, blank corrected)			
	Run								Run			
	1		2		3		Average		1	2	3	Average
	Front	Back	Front	Back	Front	Back	Front	Back				
Arsenic	<4.67	<1.97	<4.67	<1.96	<4.67	<1.97	BDL	BDL	<1.97	<1.96	<1.97	<1.97
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	BDL	BDL	<0.034	0.034	<0.034	<0.034
Cadmium	1.59	2.47	1.72	6.15	0.43	0.966	2.47	2.35	4.06	7.87	1.396	4.44
Chromium	31.4	404.411	17.5	2066.411	17.8	526.541	507.50	606.53	435.811	2,083.91	544.341	1,021.35
Cobalt	0.39	6.21	0	27.2	0	11.33	6.76	8.95	6.6	27.20	11.33	15.04
Mercury	0	21.446	0	9.659	8.85	21.673	7.99	12.33	21.446	9.66	30.523	20.54
Manganese	5.52	48.072	3.45	171.772	3.3	62.462	46.42	57.81	53.592	175.22	65.762	98.19
Nickel	10	204.92	4.7	1130.92	4.7	366.03	271.05	342.25	214.92	1,135.62	370.73	573.76
Lead	0	12.3	1	7.77	2	8.09	4.61	6.23	12.3	8.77	10.09	10.39
Antimony	1.4	2.03	0	1.92	0	3.421	1.07	1.47	3.43	1.92	3.421	2.92
Selenium	10.5	28.7	4.3	32.9	5.2	64.43	16.32	27.11	39.2	37.2	69.63	48.68

Not sure what Avg values give you with respect to MASS. — I would probably delete

TABLE 3-16. (Continued) — New Table

Analyte	Concentration, ug/DSCM			
	Run			
	1	2	3	Average
Arsenic	a	a	a	
Beryllium	a	a	a	
Cadmium	1.45	2.14	0.487	1.36
Chromium	155.1	566.5	189.8	303.8
Cobalt	2.35	7.39	3.95	4.56
Mercury	7.63	2.63	10.64	6.97
Manganese	19.1	47.6	22.9	29.9
Nickel	76.5	309	129	172
Lead	4.38	2.38	3.52	3.43
Antimony	1.22	0.52	1.19	0.979
Selenium	14.0	10.1	24.3	16.1

[a] Conc. not calculated ~~because all runs [illegible] less than~~ for ~~runs with~~ analyte below detection limit

TABLE 3-16. KILN EMISSION TESTS RESULTS--METALS (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Elapsed time			
% isokinetic	92.7	99.3	99.5
GAS PARAMETERS			
Volume, ACF	102.102	131.495	105.603
Volume, DSCF	99.211	126.906	101.263
Gas temperature, F	429	429	435
Oxygen, %	17.6	18.4	17.8
Carbon dioxide, %	2.2	1	1.7
Moisture, %	4.4	4.3	4.7
Flowrate, ACFM	21,657	25,840	35,729
Flowrate, DSCFM	20,713	24,738	20,645

	Catch, ug									
	Run									
	1		2		3		Average		Blank	
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	Front	Back
Arsenic	<4.67	<1.97	<4.67	<1.96	<4.67	<1.97	0.00	0.00	<4.67	<1.89
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	0.0068	0.0068	<0.09	<0.033
Cadmium	7.52	2.63	7.65	6.31	6.36	1.126	6.09	4.82	5.93	0.16
Chromium	35.8	405	21.9	2067	22.2	527.13	510.38	608.65	4.4	0.589
Cobalt	6.01	6.21	5.56	27.2	5.56	11.33	10.11	11.17	5.62	<0.382
Mercury	1.73	22.083	1.37	10.296	11	22.31	9.30	13.41	2.15	0.637
Manganese	7.7	48.3	5.63	172	5.48	62.69	47.82	58.82	2.18	0.228
Nickel	32.5	207	27.2	1133	27.2	368.11	285.38	352.50	22.5	2.08
Lead	152	12.3	156	7.77	157	8.09	97.01	68.23	155	<3.14
Antimony	21	2.03	18.6	1.92	17.9	3.421	12.29	8.77	19.6	<1.59
Selenium	23.4	28.7	17.2	32.9	18.1	64.43	24.06	32.27	12.9	<3.31

TABLE 3-16. (Continued)

	Mass, ug (blank corrected)								Mass, gr (front + back, blank corrected)			
	Run								Run			
	1		2		3		Average					
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	1	2	3	Average
Arsenic	<4.67	<1.97	<4.67	<1.96	<4.67	<1.97	BDL	BDL	<7.2E-05	<7.2E-05	<7.2E-05	
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	BDL	BDL	<1.4E-06	<1.4E-06	<1.4E-06	
Cadmium	1.59	2.47	1.72	6.15	0.43	0.966	2.47	2.35	6.27E-05	0.00012	2.15E-05	6.855E-05
Chromium	31.4	404.411	17.5	2066.411	17.8	526.541	507.50	606.53	0.00673	0.0322	0.00840	0.0157615
Cobalt	0.39	6.21	0	27.2	0	11.33	6.76	8.95	0.00010	0.00042	0.00017	0.0002321
Mercury	0	21.446	0	9.659	8.85	21.673	7.99	12.33	0.00033	0.00015	0.00047	0.000317
Manganese	5.52	48.072	3.45	171.772	3.3	62.462	46.42	57.81	0.00083	0.00270	0.00101	0.00152
Nickel	10	204.92	4.7	1130.92	4.7	366.03	271.05	342.25	0.00332	0.0175	0.00572	0.00885
Lead	0	12.3	1	7.77	2	8.09	4.61	6.23	0.00019	0.00014	0.00016	0.0001603
Antimony	1.4	2.03	0	1.92	0	3.421	1.07	1.47	5.29E-05	2.96E-05	5.28E-05	4.512E-05
Selenium	10.5	28.7	4.3	32.9	5.2	64.43	16.32	27.11	0.00060	0.00057	0.00107	0.0007512

TABLE 3-16. (Continued)

	Concentration, gr/DSCF			
	Run			
Analyte	1	2	3	Average
Arsenic				
Beryllium				
Cadmium	6.32E-07	9.35E-07	2.13E-07	5.93E-07
Chromium	6.78E-05	0.00025	8.30E-05	0.00013
Cobalt	1.03E-06	3.23E-06	1.73E-06	1.99E-06
Mercury	3.34E-06	1.15E-06	4.65E-06	3.04E-06
Manganese	8.34E-06	2.08E-05	1.00E-05	1.31E-05
Nickel	3.34E-05	0.00013	5.65E-05	7.49E-05
Lead	1.91E-06	1.04E-06	1.54E-06	1.50E-06
Antimony	5.34E-07	2.28E-07	5.21E-07	4.28E-07
Selenium	6.10E-06	4.42E-06	1.06E-05	7.04E-06

VOST.

TABLE 3-17. KILN EMISSION TESTS RESULTS--~~VOC'S~~ (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample ~~Elapsed time~~	0	0	0
~~% isokinetic~~	~~0~~	~~0~~	~~0~~
GAS PARAMETERS			
Sample Volume, ACM	0	0	0
Volume, DSCM	0.019964	0.0201194	0.0201688
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Flowrate, ACMM	572.3	574.3	576.4
Flowrate, DSCMM	541.0	546.5	552.0

why only B Corrected given for VOST for Butanol?

TABLE 3-17. (Continued)

Source/analyte	Mass, ng (blank corrected)				Concentration, ug/DSCM			
	Run				Run			
	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (a)	1475.956	88.518	192.644	585.706	73.9309	4.399636	9.551594	29.29404
Dichlorofluoromethane								
Bromomethane (a)	324.879		58.478	127.7857	16.27325		2.899432	6.390893
Acetonitrile	75.424				3.778001			
Acrylonitrile								
Vinl chloride								
Chloroethane	1132.853		368.637		56.74481		18.2776	
Iodomethane (a)	159.293	13.875	74.476	82.548	7.979014	0.689633	3.692638	4.120428
Trichlorofluoromethane								
Methylene chloride	5.532	9.259	1.362	5.384333	0.277099	0.460203	0.06753	0.268277
Acetone	993.771	1261.417	2543.338		49.77816	62.69658	126.1027	79.52582
Carbon disulfide	42.116	51.006	25.523	39.54833	2.109598	2.535166	1.265471	1.970078
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	94.625	216.682	338.132	216.4797	4.739783	10.76981	16.76512	10.75824
1,1,1-Trichloroethane	7.106		4.913		0.355941		0.243594	0.299768
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	2522.718	4337.655	1184.394	2681.589	126.3634	215.5957	58.72413	133.5611
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		33.904	4.64			1.685141	0.230059	0.9576
2-Hexanone	2.64	147.467	98.485	82.864	0.132238	7.329596	4.883042	4.114959
Tetrachloroethene		3.65	3.944			0.181417	0.19555	0.188483
1,1,2,2-Tetrachloroethane								
Toluene	103.442	159.558	176.358	146.4527	5.181428	7.930558	8.744108	7.285365
Chlorobenzene								
Ethylbenzene	30.577	41.073	52.656	41.43533	1.531607	2.041463	2.610768	2.061279
Styrene	9.654	46.172	2.492	19.43933	0.483571	2.294901	0.123557	0.967343
m-/p-Xylene	46.992	64.574	77.281	62.949	2.353838	3.209541	3.831714	3.131697
o-Xylene	40.168	58.095	66.438	54.90033	2.012022	2.887513	3.294101	2.731212
Hexachloroethane								
1,2-Dbromo-3-chloropropan		116.513	20.215			5.79108	1.002292	3.396686

(a) Results invalid due to contaminated blank sample.
(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.
(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.
(d) Interference coeluted with analyte; mass spectrum did not meet criteria.
(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-17. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Elapsed time			
% isokinetic			
GAS PARAMETERS			
Volume, ACF			
Volume, DSCF	0.7050085	0.7104962	0.7122403
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493

TABLE 3-17. (Continued)

Source/analyte	Mass, gr (blank corrected)				Concentration, gr/DSCF			
	Run				Run			
	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06	9.04E-06	3.2E-05	1.92E-06	4.17E-06	1.28E-05
Dichlorofluoromethane								
Bromomethane (a)	5.01E-06		9.02E-07	1.97E-06	7.1E-06		1.27E-06	2.79E-06
Acetonitrile	1.16E-06				1.7E-06			
Acrylonitrile								
Vinl chloride								
Chloroethane	1.75E-05		5.69E-06		2.5E-05		7.99E-06	
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06	1.27E-06	3.5E-06	3.01E-07	1.61E-06	1.8E-06
Trichlorofluoromethane								
Methylene chloride	8.54E-08	1.43E-07	2.10E-08	8.31E-08	1.2E-07	2.01E-07	2.95E-08	1.17E-07
Acetone	1.53E-05	1.95E-05	3.92E-05		2.2E-05	2.74E-05	5.51E-05	3.48E-05
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07	6.1E-07	9.2E-07	1.11E-06	5.53E-07	8.61E-07
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	1.46E-06	3.34E-06	5.22E-06	3.34E-06	2.1E-06	4.71E-06	7.33E-06	4.7E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08		1.6E-07		1.06E-07	1.31E-07
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	3.89E-05	6.69E-05	1.83E-05	4.14E-05	5.5E-05	9.42E-05	2.57E-05	5.84E-05
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		5.23E-07	7.16E-08			7.36E-07	1.0E-07	4.18E-07
2-Hexanone	4.07E-08	2.28E-06	1.52E-06	1.28E-06	5.8E-08	3.2E-06	2.13E-06	1.8E-06
Tetrachloroethene		5.63E-08	6.09E-08			7.93E-08	8.55E-08	8.24E-08
1,1,2,2-Tetrachloroethane								
Toluene	1.60E-06	2.46E-06	2.72E-06	2.26E-06	2.3E-06	3.47E-06	3.82E-06	3.18E-06
Chlorobenzene								
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07	6.39E-07	6.7E-07	8.92E-07	1.14E-06	9.0E-07
Styrene	1.49E-07	7.13E-07	3.85E-08	3E-07	2.1E-07	1E-06	5.4E-08	4.2E-07
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06	9.71E-07	1.0E-06	1.4E-06	1.67E-06	1.4E-06
o-Xylene	6.20E-07	8.97E-07	1.03E-06	8.47E-07	8.8E-07	1.26E-06	1.44E-06	1.2E-06
Hexachloroethane								
1,2-Dbromo-3-chloropropan		1.80E-06	3.12E-07			2.53E-06	4.38E-07	1.5E-06

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-18. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
~~Elapsed time~~	0	0	0
% isokinetic	94.8	100.5	100.5
GAS PARAMETERS			
Volume, ACM	3.004	2.966	3.294
Volume, DSCM	2.891	2.844	3.136
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACMM	610.5	572.1	628.2
Flowrate, DSCMM	584.3	547.2	598.0

	Catch, ug				Concentration, ug/DSCM			
	Run				Run			
Source/analyte	1	2	3	Ave	1	2	3	Ave.
Phenol	13	13	8.7	11.6	4.50	4.57	2.77	3.95
Aniline	<2	<2	<2					
Bis(2-chloroethyl)ether	<2	<2	<2					
2-Chlorophenol	<2	<2	<2					
1,3-Dichlorobenzene	<2	<2	<2					
1,4-Dichlorobenzene	4.8	4.9	9.7	6.5	1.66	1.72	3.09	2.16
Benzyl alcohol	<2	<2	<2					
1,2-Dichlorobenzene	<2	<2	<2					
2-Methylphenol	2.1	<2	<2		0.726			
2,2'-oxybis(1-Chloropropane)	<2	<2	<2					
4-Methylphenol	<2	<2	<2					
N-Nitrosodipropylamine	<2	<2	<2					
Hexachloroethane	<2	<2	<2					
Nitrobenzene	<2	<2	<2					
Isophorone	<2	<2	<2					
2-Nitrophenol	<2	<2	<2					
2,4-Dimethylphenol	<2	<2	<2					
Benzoic acid	<2	<2	623				199	
Bis(2-chloroethoxy)methane	<2	<2	<2					
2-Chloroacetophenone	<2	<2	<2					
2,4-Dichlorophenol	<2	<2	<2					
1,2,4-Trichlorobenzene	<2	<2	<2					
Naphthalene	6	12	8.5	8.8	2.08	4.22	2.71	3.00
4-Chloroaniline	<2	<2	<2					
2,6-Dichlorophenol	<2	<2	<2					
Hexachlorobutadiene	<2	<2	<2					
4-Chloro-3-methylphenol	<2	<2	<2					
2-Hydroxyacetophenone	<2	<2	<2					
2-Methylnaphthalene	4.8	11	7.4	7.7	1.66	3.87	2.36	2.63

TABLE 3-18. (METRIC UNITS continued)

Source/analyte	Catch, ug				Concentration, ug/DSCM			
	Run				Run			
	1	2	3	Average	1	2	3	Average
Hexachlorocyclopentadiene	<2	<2	<2					
2,4,6-Trichlorophenol	<2	<2	<2					
2,4,5-Trichlorophenol	<2	<2	<2					
2-Chloronaphthalene	<2	<2	<2					
2-Nitroaniline	<2	<2	<2					
Dimethylphthalate	<2	<2	<2					
Acenaphthylene	<2	<2	<2					
2,6-Dinitrotoluene	<2	<2	<2					
2,3,4,6-Tetrachlorophenone	<2	<2	<2					
3-Nitroaniline	<2	<2	<2					
Acenaphthene	<2	<2	<2					
2,4-Dinitrophenol	<2	<2	<2					
4-Nitrophenol	<2	<2	<2					
Dibenzofuran	<2	<2	<2					
2,4-Dinitrotoluene	<2	<2	<2					
Diethyl phthalate	53	23	18	31	18.3	8.09	5.74	10.7
4-Chlorophenylphenyl ether	<2	<2	<2					
Fluorene	<2	<2	<2					
4-Nitroaniline	<2	<2	<2					
4,6-Dinitro-2-methylphenol	<2	<2	<2					
N-Nitrosodiphenylamine	<2	<2	<2					
4-Bromophenyl-phenylether	<2	<2	<2					
Hexachlorobenzene	<2	<2	<2					
Pentachlorophenol	<2	<2	<2					
Phenanthrene	<2	<2	<2					
Anthracene	<2	<2	<2					
Carbazole	<2	<2	<2					
Di-n-butyl phthalate	13	14	31	19	4.50	4.92	9.88	6.43
Fluoranthene	<2	<2	<2					
Benzidine	<2	<2	<2					
Pyrene	<2	<2	<2					
Butylbenzyl phthalate	2	2.2	3	2.4	0.692	0.774	0.957	0.807
3,3'-Dichlorobenzidine	<2	<2	<2					
Benzo(a)anthracene	<2	<2	<2					
Chrysene	<2	<2	<2					
Bis(2-ethylhexyl) phthalate	77	240	510	276	26.6	84.4	162.6	91.2
Di-n-octyl phthalate	<2	<2	10				3.2	
Benzo(b)fluoranthene	<2	<2	<2					
Benzo(k)fluoroanthene	<2	<2	<2					
Benzo(a)pyrene	<2	<2	<2					
Indeno(1,2,3-cd)pyrene	<2	<2	<2					
Dibenz(a,h)anthracene	<2	<2	<2					
Benzo(g,h,i)perylene	<2	<2	<2					

TABLE 3-19. KILN EMISSION TESTS RESULTS--INORGANIC GASES AND THC (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time min	~~2:01~~ 121	~~2:00~~ 120	~~2:00~~ 120
~~% isokinetic~~	~~106.8~~	~~99~~	~~97.4~~
GAS PARAMETERS			
Volume, ACM	1.212	1.234	1.247
Volume, DSCM	1.174	1.183	1.187
Gas temperature, C	193.33	204.44	209.44
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.1	5.5	4.2
Flowrate, ACMM	641.0	572.3	576.4
Flowrate, DSCMM	614.8	541.0	552.0

NOT Applicable ??

NOT Applicable

Analyte	Concentration, ppm (a)			
	Run			
	1	2	3	Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.95	2.02	1.88	1.95
THC	1.99	1.21	2.41	1.87
Methane (c)	6.55	5.05	4.92	5.51
Ethane (c)	<3	<3	<3	

(a) Based on average of 120 readings. 1-min

(b) Concentration in percent.

(c) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

nothing said about These in text. Need to ~~explain~~ mention method (

TABLE 3-19. KILN EMISSION TESTS RESULTS--INORGANIC GASES AND THC (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time	2:01	2:00	2:00
% isokinetic	106.8	99.0	97.4
GAS PARAMETERS			
Volume, ACF	42.789	43.568	44.040
Volume, DSCF	41.464	41.763	41.926
Gas temperature, F	380	400	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.1	5.5	4.2
Flowrate, ACFM	22,636	20,209	20,356
Flowrate, DSCFM	21,711	19,104	19,493

Same Comments AS Above

Analyte	Concentration, ppm			
	Run			
	1	2	3	Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (a)	1.95	2.02	1.88	1.95
THC	1.99	1.21	2.41	1.87
Methane (c)	6.55	5.05	4.92	5.51
Ethane (c)	<3	<3	<3	

(a) Based on average of 120 readings.

(b) Concentration in percent.

(c) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

Need to explain Anomaly of meth/ethane > THC.

TABLE 3-20. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (METRIC UNITS)

Method 26A train				Method 29 train				Method 201A/202 train			
Run No.	1	2	3	Run No.	1	2	3	Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93	Date	11/09/93	11/10/93	11/10/93	Date	11/11/93	11/11/93	11/11/93
Start time	14:07	09:42	15:53	Start time	14:30	09:42	15:53	Start time	10:55	14:59	17:07
Finish time	19:17	13:57	19:47	Finish time	19:15	13:57	19:47	Finish time	12:27	16:42	18:39
Elapsed time	0	0	0	Elapsed time	0	0	0	Elapsed time	90	90	90
% isokinetic	78.3	100.8	100.5	% isokinetic	92.7	99.3	99.5	% isokinetic	106.8	99	97.4
GAS PARAMETERS				GAS PARAMETERS				GAS PARAMETERS			
Volume, ACM	2.439	3.092	2.995	Volume, ACM	2.891	3.724	2.990	Volume, ACM	1.212	1.234	1.247
Volume, DSCM	2.338	2.955	2.835	Volume, DSCM	2.809	3.594	2.867	Volume, DSCM	1.174	1.183	1.187
Gas temperature, C	224	222	227	Gas temperature, C	221	221	224	Gas temperature, C	193	204	209
Oxygen, %	17.8	18.8	18	Oxygen, %	17.6	18.4	17.8	Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	1.1	1.8	2	Carbon dioxide, %	2.2	1	1.7	Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.4	4.6	4.7	Moisture, %	4.4	1259 4.3	4.7	Moisture, %	4.1	5.5	4.2
Flowrate, ACMM	601.5	594.5	572.6	Flowrate, ACMM 1055	613.3	~~731.7~~	1,011.7	Flowrate, ACMM	641.0	572.3	576.4
Flowrate, DSCMM	575.0	567.4	545.6	Flowrate, DSCMM	586.5	700.5	~~584.6~~ 557	Flowrate, DSCMM	614.8	541.0	552.0

Analyte	Mass, g Run 1	2	3	Average	Concentration, g/DSCM Run 1	2	3	Average
Filterable PM (a)	0.0496	0.0473	0.0600	0.0523	0.0212	0.0160	0.0212	0.0195
Filterable PM (b)	0.0537	0.0430	0.0886	0.0618	0.0191	0.0120	0.0309	0.0207
Filterable PM (c)	0.0177	0.0188	0.0127	0.0164	0.0151	0.0159	0.0107	0.0139
Filterable PM-10	0.0033	0.0147	0.0047	0.0076	0.0028	0.0124*	0.0040	0.0064
Cond. inorganic PM	0.167	0.183	0.162	0.171	0.1420	0.1551	0.1363	0.1444
Cond. organic PM	0.0548	0.0153	0.0104	0.0268	0.0467	0.0129	0.0088	0.0228
Total cond. PM	0.222	0.199	0.172	0.197	0.1886	0.1680	0.1450	0.1672

(a) Measured simultaneously with Method 26A (HF, HCl) train.
(b) Measured simultaneously with Method 29 (metals) train.
(c) Based on Method 201A train.

Looks wrong

Ratio of ACMM/DSCMM should stay about the same
≈ 1.05

1000/584 = 1.7

check flag in text

make This Table consistent with ABOVE

	Meth 26	29	201A/202
	1 2 3	1 - 2 - 3	1 - 2 - 3

MASS | Filt. PM (gram)
Filt PM-10
Cond in PM
Con or PM
~~Total Con PM~~
Total PM

Conc (g/dscm) ~~Conc~~

TABLE 3-20. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (ENGLISH UNITS)

Method 26A train				Method 29 train				Method 201A/202 train			
Run No.	1	2	3	Run No.	1	2	3	Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93	Date	11/09/93	11/10/93	11/10/93	Date	11/11/93	11/11/93	11/11/93
Start time	14:07	09:42	15:53	Start time	14:30	09:42	15:53	Start time	10:55	14:59	17:07
Finish time	19:17	13:57	19:47	Finish time	19:15	13:57	19:47	Finish time	12:27	16:42	18:39
Elapsed time, min				Elapsed time				Elapsed time, min	90	90	90
% isokinetic	78.3	100.8	100.5	% isokinetic	92.7	99.3	99.5	% isokinetic	106.8	99.0	97.4
GAS PARAMETERS				GAS PARAMETERS				GAS PARAMETERS			
Volume, ACF	86.148	109.203	105.783	Volume, ACF	102.102	131.495	105.603	Volume, ACF	42.789	43.568	44.040
Volume, DSCF	82.567	104.337	100.101	Volume, DSCF	99.211	126.906	101.263	Volume, DSCF	41.464	41.763	41.926
Gas temperature, F	436	431	440	Gas temperature, F	429	429	435	Gas temperature, F	380	400	409
Oxygen, %	17.8	18.8	18.0	Oxygen, %	17.6	18.4	17.8	Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	1.1	1.8	2.0	Carbon dioxide, %	2.2	1	1.7	Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.4	4.6	4.7	Moisture, % 37260	4.4	4.3	4.7	Moisture, %	4.1	5.5	4.2
Flowrate, ACFM	21,243	20,994	20,222	Flowrate, ACFM	~~21,657~~	25,840	35,729	Flowrate, ACFM	22,636	20,209	20,356
Flowrate, DSCFM	20,307	20,036	19,269	Flowrate, DSCFM	20,713	24,738	20,645	Flowrate, DSCFM	21,711	19,104	19,493

	Mass, gr				Concentration, gr/DSCF			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (a)	0.765	0.730	0.926	0.807	0.00889	0.00668	0.00875	0.00811
Filterable PM (b)	0.829	0.664	1.367	0.953	0.00812	0.00505	0.01295	0.00870
Filterable PM (c)	0.273	0.290	0.196	0.253	0.00638	0.00666	0.00445	0.00583
Filterable PM-10	0.051	0.227	0.073	0.117	0.00119	0.00521	0.00165	0.00268
Cond. inorganic PM	2.573	2.830	2.497	2.633	0.06012	0.06496	0.05670	0.06059
Cond. organic PM	0.846	0.236	0.160	0.414	0.01976	0.00542	0.00364	0.00961
Total cond. PM	3.418	3.066	2.657	3.047	0.0799	0.0704	0.0603	0.07020

(a) Measured simultaneously with Method 26A (HF, HCl) train.

(b) Measured simultaneously with Method 29 (metals) train.

(c) Based on Method 201A train.

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (METRIC UNITS)

Reviewed RMN

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	0	0	0	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSCM	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18	
Carbon dioxide, %	1.1	1.8	2	
Moisture, %	4.4	4.6	4.7	
Velocity, m/min				
Flowrate, ACM/min	601.5	594.5	572.6	
Flowrate, DSCM/min	575.0	567.4	545.6	
MASS COLLECTED, g		OK		
Filterable PM	0.0496	0.0473	0.0600	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0212	0.0160	0.0212	0.0194637

STET

18 entered incorrectly on FP computer

corrected

Method 29 train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	0	0	0	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACM	2.891	3.724	2.990	
Sample volume, DSCM	2.809	3.594	2.867	
GAS PARAMETERS				
Gas temperature, C	221	221	224	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, m/min				
Flowrate, ACM/min	~~613.3~~	~~731.7~~	~~1,011.7~~	
Flowrate, DSCM/min	586.5	700.5	584.6	
MASS COLLECTED, g		Correct		
Filterable PM	0.0537	0.0430	0.0886	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0191	0.0120	0.0309	0.0206596

added

Added

Corrected

TABLE 3-23. (METRIC UNITS continued)

Method 201A/202 train				
Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:55	14:59	17:07	
Finish time	12:27	16:42	18:39	
Sample time, min	90	90	90	
% isokinetic	106.8	99	97.4	
Sample volume, ACM	1.212	1.234	1.247	
Sample volume, DSCM	1.174	1.183	1.187	
GAS PARAMETERS				
Gas temperature, C	193	204	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min				Corrected
Flowrate, ACM/min	641.0	572.3	576.4	
Flowrate, DSCM/min	614.8	541.0	552.0	
MASS COLLECTED, g				
Filterable PM	0.0177	0.0188	0.0127	
Filterable PM-10	0.0033	0.0147	0.0047	
Cond. inorganic PM	0.167	0.183	0.162	
Cond. organic PM	0.0548	0.0153	0.0104	
Total cond. PM	0.222	0.199	0.172	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0151	0.0159	0.0107	0.0139
Filterable PM-10	0.0028	0.0124	0.0040	0.0064
Cond. inorganic PM	0.1420	0.1551	0.1363	0.1444
Cond. organic PM	0.0467	0.0129	0.0088	0.0228
Total cond. PM	0.1886	0.1680	0.1450	0.1672

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (ENGLISH UNITS)

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min		175		added
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.148	109.203	105.783	
Sample volume, DSCF	82.567	104.337	100.101	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min				Added
Flowrate, ACFM	~~21,243~~	~~20,994~~	~~20,222~~	corrected
Flowrate, DSCFM	20,307	20,036	19,269	
MASS COLLECTED, gr				deleted
Filterable PM	0.765	0.730	0.926	
CONCENTRATION, gr/DSCF				Average
Filterable PM	0.00889	0.00668	0.00875	0.00811

corrected

TABLE 3-23. (ENGLISH UNITS continued)

Method 29 train					
Run No.	1	2	3		
Date	11/09/93	11/10/93	11/10/93		
Start time	14:30	09:42	15:53		
Finish time	19:15	13:57	19:47		
Sample time, min					
% isokinetic	92.7	99.3	99.5		
Sample volume, ACF	102.102	131.495	105.603		
Sample volume, DSCF	99.211	126.906	101.263		
GAS PARAMETERS					
Gas temperature, F	429	429	435		
Oxygen, %	17.6	18.4	17.8		
Carbon dioxide, %	2.2	1	1.7		
Moisture, %	4.4	4.3	4.7		
Velocity, ft/min					Added
Flowrate, ACFM	~~21,657~~	~~25,840~~	~~35,729~~		corrected
Flowrate, DSCFM	20,713	24,738	20,645		
MASS COLLECTED, gr		Corrected			
Filterable PM	0.829	0.664	1.367		
CONCENTRATION, gr/DSCF				Average	
Filterable PM	0.00812	0.00505	0.01295	0.00870	Corrected

Method 201A/202 train	Run				
Run No.	1	2	3		
Date	11/11/93	11/11/93	11/11/93		
Start time	10:55	14:59	17:07		
Finish time	12:27	16:42	18:39		
Sample time, min	90	90	90		
% isokinetic	106.8	99.0	97.4		
Sample volume, ACF	42.789	43.568	44.040		
Sample volume, DSCF	41.464	41.763	41.926		
GAS PARAMETERS					
Gas temperature, F	380	400	409		
Oxygen, %	17.6	17.6	17.6		
Carbon dioxide, %	2.2	2.2	2.2		
Moisture, %	4.1	5.5	4.2		
Velocity, ft/min	1152	1054	1072		Added
Flowrate, ACFM	22,636	20,209	20,356		
Flowrate, DSCFM	21,711	19,104	19,493		
MASS COLLECTED, gr					
Filterable PM	0.273	0.290	0.196		
Filterable PM-10	0.051	0.227	0.073		
Cond. inorganic PM	2.573	2.830	2.497		
Cond. organic PM	0.846	0.236	0.160		
Total cond. PM	3.418	3.066	2.657		
CONCENTRATION, gr/DSCF				Average	
Filterable PM	0.00638	0.00666	0.00445	0.00583	
Filterable PM-10	0.00119	0.00521	0.00165	0.00268	Corrected
Cond. inorganic PM	0.06012	0.06496	0.05670	0.06059	
Cond. organic PM	0.01976	0.00542	0.00364	0.00961	
Total cond. PM	0.0799	0.0704	0.0603	0.07020	

TABLE 3-21. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:07	09:42	15:53
Finish time	19:17	13:57	19:47
Elapsed time, min			
% isokinetic	78.3	100.8	100.5
GAS PARAMETERS			
Volume, ACM	2.439	3.092	2.995
Volume, DSCM	2.338	2.955	2.835
Gas temperature, C	224	222	227
Oxygen, %	17.8	18.8	18.0
Carbon dioxide, %	1.1	1.8	2.0
Moisture, %	4.4	4.6	4.7
Flowrate, ACMM	601.5	594.5	572.6
Flowrate, DSCMM	575.0	567.4	545.6

	Mass, ug				Concentration, ug/DSCM			
Analyte	1	2	3	Average	1	2	3	Average
HF	31,969	43,518	37,333	37,607	13,673	14,729	13,171	13,858
HCl	2,117	2,449	2,302	2,289	905	829	812	849
Cl2	128	216	169	171	54.7	73.1	59.6	62.5

TABLE 3-21. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:07	09:42	15:53
Finish time	19:17	13:57	19:47
Elapsed time, min			
% isokinetic	78.3	100.8	100.5
GAS PARAMETERS			
Volume, ACF	86.148	109.203	105.783
Volume, DSCF	82.567	104.337	100.101
Gas temperature, F	436	431	440
Oxygen, %	17.8	18.8	18.0
Carbon dioxide, %	1.1	1.8	2.0
Moisture, %	4.4	4.6	4.7
Flowrate, ACFM	21,243	20,994	20,222
Flowrate, DSCFM	20,307	20,036	19,269

	Mass, gr				Concentration, gr/DSCF			
Analyte	1	2	3	Average	1	2	3	Average
HF	0.493	0.672	0.576	0.580	0.0060	0.0064	0.0058	0.0061
HCl	0.0327	0.0378	0.0355	0.0353	0.00040	0.00036	0.00035	0.00037
Cl2	0.00198	0.00333	0.00261	0.00264	2.4E-05	3.2E-05	2.6E-05	2.73E-05

TABLE 3-22. DRYER EMISSION TESTS RESULTS--THC, METHANE/ETHANE (METRIC UNITS)

Run No.	1 (a)	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time			
~~% isokinetic~~			
GAS PARAMETERS			
~~Volume, ACM~~			
~~Volume, DSCM~~			
Gas temperature, C	37.8	37.8	37.8
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.2	4.2	4.2
Flowrate, ACMM	1971.0331	1,947	1,995
Flowrate, DSCMM	1733.7083	1,712	1,755

(a) Run 1 data estimated as average of Runs 2 and 3 data.

	Concentration, ppm			
	Run			
Analyte	1	2	3	Average
THC	80.2	85.6	91.9	85.9
methane	102	91	106	99.66667
ethane	9.2	6.7	7.6	7.833333

TABLE 3-22. DRYER EMISSION TESTS RESULTS--THC, METHANE/ETHANE (ENGLISH UNITS)

Run No.	1 (a)	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time			
% isokinetic			
GAS PARAMETERS			
Volume, ACF			
Volume, DSCF			
Gas temperature, F	100	100	100
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.2	4.2	4.2
Flowrate, ACFM	69,606	68,760	70,452
Flowrate, DSCFM	61,225	60,472	61,978

(a) Run 1 data estimated as average of Runs 2 and 3 data.

	Concentration, ppm			
	Run			
Analyte	1	2	3	Average
THC	80.2	85.6	91.9	85.9
methane	102	91	106	99.7
ethane	9.2	6.7	7.6	7.83

BELDEN BRICK EMISSION TEST 06/17/94

Location	Sampling train	Information	Needed
FIELD DATA			
Grinding/screening	PM-10	Orsat field data sheet	X
		Velocity (preliminary)	X
		Field data form	X
		Orsat analysis	X
		field recovery	X
		field laboratory setup	X
	Ambient	Filter tare/final weight	
		Field data form	
Kiln	PM, PM-10	Orsat field data sheet	X
		Velocity (preliminary)	X
		Field data form	X
		Orsat analysis	X
		Field recovery	X
		Field laboratory setup	X
	Metals	Orsat field data sheet	
		Velocity (preliminary)	X
		Field data form	
		Orsat analysis	
		Field recovery	
		Field laboratory setup	
	Semi-volatiles	Field lab setup	
		Field lab recovery	
		Field data form	
	VOST	Field data	
	HF/HCl/Cl2	Orsat field data sheet	
		Velocity (preliminary)	X
		Test data	
		Orsat analysis	
		field recovery	
		field laboratory setup	
	SO2/NOx/CO/THC methane/ethane	Field computation	
		Calibration data	
Dryer	THC/methane/ethane	Velocity (preliminary)	X
		Field computation	
		Calibration data	

← What is the difference here we have field data forms that appear to have the analysis

ORSAT Field data form
ORSAT Analysis
Moisture?

Location	Sampling train	Information	Needed
ANALYSIS			
Grinding/screening	PM-10	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	X
		Filter PM analysis	X
		Front half rinse analysis	X
	Ambient	Filter tare weight	
		Balance check data	
		Final weights	
Kiln	PM/PM-10 (201A)	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	X
		Filter PM analysis	X
		Front half rinse analysis	X
	Metals	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	
		Filter PM analysis	
		Front half rinse analysis	
	Semivolatiles	Lab Results	
	VOST	Lab Results	
	HF/HCl/Cl2	Filter tare weight data	X
		Beaker tare weight data	X
		Controls	X
		Blanks	
		Filter PM analysis	
		Front half rinse analysis	
	SO2/NOx/CO/THC	N/A	
	methane/ethane	N/A	

} Anything needed here

PM - 202 Condensables

BH ~~Cond.~~ organic Analy

BH Inorganic Anal

Back half analysis

Brick 7/14/94

Action items

1. Revise Figs (WP)
   Revise Tabling (Roy/Rick)
2. call M. Whitmore re Acronyms <? >

3. call Mario re Questions / Fax List <? >

4. check Data input for Bttom HEC (Same mass for Runs 1+2)? <Roy>

5. Check CEMS distributor re date <? >

6. Assemble Appendix <Roy/Rick>

Next Revision ↓

1. Need to address QA/Validity of VOST Samples

2. Send Package to D. Hooten

3. Add GC/FID to Figure 4-8

4. Section 3.2 -- within text add units for E.F.s (e.g. "Bricks Produced")

5. Section 4.1.5 -- Add clarification on Traverse Points used

6. Add Traverse Point locations to Figs

7. Prel. Vel. Traverses; cyclonic flow?

consider 8. Delete ACM from Tables

consider 9. Convert English mass units from gr to g or mg.

Miro

1. Dimensions @ BH 32" vs 33"
35" vs 36"

** 2. Need write-up Field test Changes/Problems

3. Configuration of PM-10 Train -(Fig 4-7)
 • one or two filters?
 • Filter temp
 • Same @ Dryer + Kiln?

4. Dates for Kiln / Dryer CEMS
Both 11/11 ??

5. Sect. 4.1.3 -- Type of VOST Sample Probe.

6. Sample sheets / Times for inside ambient Sampler.

7. Confirm Start/Stop + Sample Time for BH inlet Run 1. --- A full 120 minutes?

RON — cover letter / note to Ron

- DRAFT
- MRI QA Unit Review NOT Completed
- Preference re Scientific NOTATION ?

Rick

TABLES

BB_HF,wa1

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	0.47	0.50	0.43	0.47	0.15	0.16	0.14	0.15
HCl	0.031	0.028	0.027	0.029	0.010	0.0089	0.0084	0.0091
Cl2	0.0019	0.0025	0.0020	0.00211	0.00060	0.00079	0.00062	0.00067

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	1.0	1.1	1.0	1.0	0.30	0.32	0.27	0.30
HCl	0.069	0.062	0.059	0.063	0.020	0.018	0.017	0.018
Cl2	0.0042	0.0055	0.0043	0.0047	0.0012	0.0016	0.0012	0.0013

(a) Emission factors based on process rate of 3.48 tons of brick produced per hour.

← wider column →

TABLE 3-24. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (METRIC UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample ~~Elapsed~~ time, min				
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSCM	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity M/min				
Flowrate, ACM/min	601.5	594.5	572.6	
Flowrate, DSCM/min	575.0	567.4	545.6	
MASS COLLECTED, ug				
HF	31,969	43,518	37,333	
HCl	2,117	2,449	2,302	
Cl2	128	216	169	
CONCENTRATION, ug/DSCM				Average
HF	13,673	14,729	13,171	13,858
HCl	905	829	812	849
Cl2	54.7	73.1	59.6	62.5

TABLE 3-24. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min				
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.148	109.203	105.783	
Sample volume, DSCF	82.567	104.337	100.101	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min				
Flowrate, ACFM	21,243	20,994	20,222	
Flowrate, DSCFM	20,307	20,036	19,269	
MASS COLLECTED, gr				
HF	0.493	0.672	0.576	
HCl	0.0327	0.0378	0.0355	
Cl2	0.00198	0.00333	0.00261	
CONCENTRATION, gr/DSCF				Average
HF	0.0060	0.0064	0.0058	0.0061
HCl	0.00040	0.00036	0.00035	0.00037
Cl2	2.4E-05	3.2E-05	2.6E-05	2.73E-05

BB_svwa1

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SEMI-VOLATILES (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	0.000158	0.000150	0.000100	0.000136	5.0E-05	4.8E-05	3.1E-05	4.3E-05
1,4-Dichlorobenzene	5.822E-05	5.658E-05	0.000111	7.525E-05	1.8E-05	1.8E-05	3.5E-05	2.4E-05
Naphthalene	7.277E-05	0.0001386	9.724E-05	0.000103	2.3E-05	4.4E-05	3.1E-05	3.3E-05
2-Methylnaphthalene	5.822E-05	0.000127	8.466E-05	9.00E-05	1.8E-05	4.0E-05	2.7E-05	2.8E-05
Diethyl phthalate	0.0006428	0.0002656	0.0002059	0.0003714	0.00020	8.4E-05	6.5E-05	0.00012
Di-n-butyl phthalate	0.0001577	0.0001616	0.0003547	0.0002247	5.0E-05	5.1E-05	1.1E-04	7.1E-05
Butylbenzyl phthalate	2.426E-05	2.54E-05	3.432E-05	2.80E-05	7.7E-06	8.0E-06	1.1E-05	8.9E-06
Bis(2-ethylhexyl) phthalate	0.0009339	0.0027711	0.00583	0.0031799	0.00030	0.00088	0.0018	0.0010

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SEMI-VOLATILES (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	0.000348	0.000331	0.000219	0.000299	0.00010	9.5E-05	6.3E-05	8.6E-05
1,4-Dichlorobenzene	0.000128	0.000125	0.000245	0.000166	3.7E-05	3.6E-05	7.0E-05	4.8E-05
Naphthalene	0.000160	0.000305	0.000214	0.000227	4.6E-05	8.8E-05	6.2E-05	6.5E-05
2-Methylnaphthalene	0.000128	0.000280	0.000187	0.000198	3.7E-05	8.0E-05	5.4E-05	5.7E-05
Diethyl phthalate	0.00142	0.000585	0.000454	0.000819	0.00041	0.00017	0.00013	0.00024
Di-n-butyl phthalate	0.000348	0.000356	0.000782	0.000495	0.00010	0.00010	0.00022	0.00014
Butylbenzyl phthalate	5.35E-05	5.60E-05	7.57E-05	6.17E-05	1.5E-05	1.6E-05	2.2E-05	1.8E-05
Bis(2-ethylhexyl) phthalate	0.00206	0.00611	0.01286	0.00701	0.00059	0.0018	0.0037	0.0020

Sig. figs

BB - ~~[illegible]~~ KPM

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	0.73	0.54	0.69	0.66	0.23	0.17	0.22	0.21
Filterable PM (c)	0.67	0.42	1.1	0.73	0.21	0.13	0.34	0.23
Filterable PM (d)	0.56	0.52	0.35	0.48	0.18	0.16	0.11	0.15
Filterable PM-10	0.10	0.40	0.13	0.21	0.033	0.13	0.041	0.067
Cond. inorganic PM	5.2	5.0	4.5	4.9	1.7	1.6	1.4	1.6
Cond. organic PM	1.7	0.42	0.29	0.81	0.54	0.13	0.092	0.26
Total cond. PM	7.0	5.5	4.8	5.7	2.2	1.7	1.5	1.8

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	1.5	1.1	1.4	1.4	0.44	0.33	0.42	0.40
Filterable PM (c)	1.4	1.1	2.3	1.6	0.41	0.31	0.66	0.46
Filterable PM (d)	1.2	1.1	0.8	1.0	0.34	0.31	0.23	0.29
Filterable PM-10	0.22	0.85	0.28	0.45	0.064	0.25	0.079	0.13
Cond. inorganic PM	11	11	9.5	10	3.2	3.1	2.7	3.0
Cond. organic PM	3.7	0.89	0.61	1.7	1.1	0.26	0.17	0.50
Total cond. PM	15	12	10	12	4.3	3.3	2.9	3.5

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

3.48 ton

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACM	0	0	0
Sample volume, DSCM	0.019964	0.0201194	0.0201688
GAS PARAMETERS			
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, m/min			
Flowrate, ACM/min	572.3	574.3	576.4
Flowrate, DSCM/min	541.0	546.5	552.0
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	1475.956	88.518	192.644
Dichlorofluoromethane			
Bromomethane (a)	324.879		58.478
Acetonitrile	75.424		
Acrylonitrile			
Vinl chloride			
Chloroethane	1132.853		368.637
Iodomethane (a)	159.293	13.875	74.476
Trichlorofluoromethane			
Methylene chloride	5.532	9.259	1.362
Acetone	993.771	1261.417	2543.338
Carbon disulfide	42.116	51.006	25.523
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	94.625	216.682	338.132
1,1,1-Trichloroethane	7.106		4.913
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	2522.718	4337.655	1184.394
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		33.904	4.64
2-Hexanone	2.64	147.467	98.485
Tetrachloroethene		3.65	3.944
1,1,2,2-Tetrachloroethane			
Toluene	103.442	159.558	176.358
Chlorobenzene			
Ethylbenzene	30.577	41.073	52.656
Styrene	9.654	46.172	2.492
m-/p-Xylene	46.992	64.574	77.281
o-Xylene	40.168	58.095	66.438
Hexachloroethane			
1,2-Dbromo-3-chloropropane		116.513	20.215

Increase ~~[illegible]~~ left margin.
[illegible]

TABLE 3-19. (Continued)

CONCENTRATION, ug/DSCM				Average
Chloromethane (a)	73.930895	4.3996363	9.5515938	29.29404
Dichlorofluoromethane				
Bromomethane (a)	16.273246		2.8994316	6.390893
Acetonitrile	3.7780014			
Acrylonitrile				
Vinl chloride				
Chloroethane	56.744806		18.277605	
Iodomethane (a)	7.9790143	0.6896332	3.6926377	4.120428
Trichlorofluoromethane				
Methylene chloride	0.2770989	0.4602028	0.0675301	0.268277
Acetone	49.778164	62.696581	126.10272	79.52582
Carbon disulfide	2.1095978	2.5351663	1.2654707	1.970078
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	4.7397829	10.769809	16.765119	10.75824
1,1,1-Trichloroethane	0.3559408		0.2435943	0.299768
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	126.36339	215.59575	58.724125	133.5611
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		1.6851405	0.2300585	0.9576
2-Hexanone	0.1322381	7.3295958	4.8830419	4.114959
Tetrachloroethene		0.181417	0.1955498	0.188483
1,1,2,2-Tetrachloroethane				
Toluene	5.1814279	7.9305583	8.7441082	7.285365
Chlorobenzene				
Ethylbenzene	1.5316073	2.0414634	2.6107677	2.061279
Styrene	0.4835706	2.2949005	0.1235573	0.967343
m-/p-Xylene	2.3538375	3.2095406	3.8317141	3.131697
o-Xylene	2.0120222	2.8875129	3.294101	2.731212
Hexachloroethane				
1,2-Dbromo-3-chloropropane		5.79108	1.0022916	3.396686

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACF			
Sample volume, DSCF	0.7050085	0.7104962	0.7122403
GAS PARAMETERS			
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, ft/min			
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06
Dichlorofluoromethane			
Bromomethane (a)	5.01E-06		9.02E-07
Acetonitrile	1.16E-06		
Acrylonitrile			
Vinl chloride			
Chloroethane	1.75E-05		5.69E-06
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06
Trichlorofluoromethane			
Methylene chloride	8.54E-08	1.43E-07	2.10E-08
Acetone	1.53E-05	1.95E-05	3.92E-05
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	1.46E-06	3.34E-06	5.22E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	3.89E-05	6.69E-05	1.83E-05
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		5.23E-07	7.16E-08
2-Hexanone	4.07E-08	2.28E-06	1.52E-06
Tetrachloroethene		5.63E-08	6.09E-08
1,1,2,2-Tetrachloroethane			
Toluene	1.60E-06	2.46E-06	2.72E-06
Chlorobenzene			
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07
Styrene	1.49E-07	7.13E-07	3.85E-08
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06
o-Xylene	6.20E-07	8.97E-07	1.03E-06
Hexachloroethane			
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07

TABLE 3-19. (Continued)

CONCENTRATION, gr/DSCF				Average
Chloromethane (a)	3.2E-05	1.923E-06	4.174E-06	1.28E-05
Dichlorofluoromethane				
Bromomethane (a)	7.1E-06		1.267E-06	2.79E-06
Acetonitrile	1.7E-06			
Acrylonitrile				
Vinl chloride				
Chloroethane	2.5E-05		7.987E-06	
Iodomethane (a)	3.5E-06	3.014E-07	1.614E-06	1.8E-06
Trichlorofluoromethane				
Methylene chloride	1.2E-07	2.011E-07	2.951E-08	1.17E-07
Acetone	2.2E-05	2.74E-05	5.511E-05	3.48E-05
Carbon disulfide	9.2E-07	1.108E-06	5.53E-07	8.61E-07
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	2.1E-06	4.706E-06	7.326E-06	4.7E-06
1,1,1-Trichloroethane	1.6E-07		1.064E-07	1.31E-07
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	5.5E-05	9.421E-05	2.566E-05	5.84E-05
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		7.364E-07	1.0E-07	4.18E-07
2-Hexanone	5.8E-08	3.203E-06	2.134E-06	1.8E-06
Tetrachloroethene		7.928E-08	8.545E-08	8.24E-08
1,1,2,2-Tetrachloroethane				
Toluene	2.3E-06	3.466E-06	3.821E-06	3.18E-06
Chlorobenzene				
Ethylbenzene	6.7E-07	8.921E-07	1.141E-06	9.0E-07
Styrene	2.1E-07	1.003E-06	5.399E-08	4.2E-07
m-/p-Xylene	1.0E-06	1.403E-06	1.674E-06	1.4E-06
o-Xylene	8.8E-07	1.262E-06	1.44E-06	1.2E-06
Hexachloroethane				
1,2-Dbromo-3-chloropropane		2.531E-06	4.38E-07	1.5E-06

(a) Results invalid due to contaminated blank sample.
(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.
(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high
(d) Interference coeluted with analyte; mass spectrum did not meet criteria.
(e) Results biased low due to mass peak saturating the mass spectrometric detector.

FIGURES

A -- Scan Fig from T. Report

B. B. Vost

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Acetonitrile	1.23E-04			4.09E-05	3.9E-05			3.9E-05
Chloroethane	1.84E-03		6.05E-04	8.16E-04	5.8E-04		1.9E-04	3.9E-04
Methylene chloride	8.99E-06	1.51E-05	2.24E-06	8.77E-06	2.8E-06	4.8E-06	7.1E-07	2.8E-06
Acetone	1.62E-03	2.06E-03	4.18E-03	2.62E-03	5.1E-04	6.5E-04	1.3E-03	8.3E-04
Carbon disulfide	6.85E-05	8.31E-05	4.19E-05	6.45E-05	2.2E-05	2.6E-05	1.3E-05	2.0E-05
2-Butanone	1.54E-04	3.53E-04	5.55E-04	3.54E-04	4.9E-05	1.1E-04	1.8E-04	1.1E-04
1,1,1-Trichloroethane	1.16E-05		8.07E-06	6.54E-06	3.7E-06		2.6E-06	3.1E-06
Benzene	4.10E-03	7.07E-03	1.94E-03	4.37E-03	1.3E-03	2.2E-03	6.2E-04	1.4E-03
4-Methyl-2-Pentanone		5.53E-05	7.62E-06	2.10E-05		1.7E-05	2.4E-06	9.9E-06
2-Hexanone	4.29E-06	2.40E-04	1.62E-04	1.35E-04	1.4E-06	7.6E-05	5.1E-05	4.3E-05
Tetrachloroethene		5.95E-06	6.48E-06	4.14E-06		1.9E-06	2.0E-06	2.0E-06
Toluene	1.68E-04	2.60E-04	2.90E-04	2.39E-04	5.3E-05	8.2E-05	9.2E-05	7.6E-05
Ethylbenzene	4.97E-05	6.69E-05	8.65E-05	6.77E-05	1.6E-05	2.1E-05	2.7E-05	2.1E-05
Styrene	1.57E-05	7.52E-05	4.09E-06	3.17E-05	5.0E-06	2.4E-05	1.3E-06	1.0E-05
m-/p-Xylene	7.64E-05	1.05E-04	1.27E-04	1.03E-04	2.4E-05	3.3E-05	4.0E-05	3.3E-05
o-Xylene	6.53E-05	9.47E-05	1.09E-04	8.97E-05	2.1E-05	3.0E-05	3.5E-05	2.8E-05
1,2-Dbromo-3-chloropropane		1.90E-04	3.32E-05	7.44E-05		6.0E-05	1.1E-05	3.5E-05

Note
- English
Metric
not the same!!!

Can these be all written $\times 10^{-6}$?

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton			
	Run			Run	Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Bromomethane	1.16E-03		2.12E-04	4.59E-04	3.3E-04		6.1E-05	2.0E-04
Acetonitrile	2.70E-04			9.01E-05	7.8E-05			7.8E-05
Chloroethane	4.06E-03		1.33E-03	1.80E-03	1.2E-03		3.8E-04	7.8E-04
Iodomethane	5.71E-04	4.99E-05	2.70E-04	2.97E-04	1.6E-04	1.4E-05	7.7E-05	8.5E-05
Methylene chloride	1.98E-05	3.33E-05	4.93E-06	1.93E-05	5.7E-06	9.6E-06	1.4E-06	5.6E-06
Acetone	3.56E-03	4.53E-03	9.21E-03	5.77E-03	1.0E-03	1.3E-03	2.6E-03	1.7E-03
Carbon disulfide	1.51E-04	1.83E-04	9.24E-05	1.42E-04	4.3E-05	5.3E-05	2.7E-05	4.1E-05
2-Butanone	3.39E-04	7.79E-04	1.22E-03	7.81E-04	9.7E-05	2.2E-04	3.5E-04	2.2E-04
1,1,1-Trichloroethane	2.55E-05		1.78E-05	1.44E-05	7.3E-06		5.1E-06	6.2E-06
Benzene	9.04E-03	1.56E-02	4.29E-03	9.64E-03	2.6E-03	4.5E-03	1.2E-03	2.8E-03
4-Methyl-2-Pentanone		1.22E-04	1.68E-05	4.62E-05		3.5E-05	4.8E-06	2.0E-05
2-Hexanone	9.46E-06	5.30E-04	3.57E-04	2.99E-04	2.7E-06	1.5E-04	1.0E-04	8.6E-05
Tetrachloroethene		1.31E-05	1.43E-05	9.13E-06		3.8E-06	4.1E-06	3.9E-06
Toluene	3.71E-04	5.73E-04	6.38E-04	5.27E-04	1.1E-04	1.6E-04	1.8E-04	1.5E-04
Ethylbenzene	1.10E-04	1.48E-04	1.91E-04		3.1E-05	4.2E-05	5.5E-05	4.3E-05
Styrene	3.46E-05	1.66E-04	9.02E-06		9.9E-06	4.8E-05	2.6E-06	2.0E-05
m-/p-Xylene	1.68E-04	2.32E-04	2.80E-04	2.27E-04	4.8E-05	6.7E-05	8.0E-05	6.5E-05
o-Xylene	1.44E-04	2.09E-04	2.41E-04	1.98E-04	4.1E-05	6.0E-05	6.9E-05	5.7E-05
1,2-Dbromo-3-chloropropane		4.19E-04	7.32E-05	1.64E-04		1.2E-04	2.1E-05	7.1E-05

MRI FAX

MIDWEST RESEARCH INSTITUTE
425 Volker Boulevard, Kansas City, Missouri 64110-2299

Telephone (816) 753-7600
FAX (816) 753-8420

Date 11-19-93

To Rick Marinshaw

From Miro Szydlo

4601-01-05-01
Overhead #, or Project, Task + Sub-Task

This transmission consists of 3 pages (including cover)

Receiving Facsimile Telephone Number (919)-677-0065

Verification Telephone Number (919)-677-0249 ext. 5354

MRI Facsimile Machine: RAPICOM 610 (816) 753-8420 GROUP III

MRI Verification: (816) 753-7600 Ext. 361

MESSAGE:

Rick:

Please find attached a copy of the planned work schedule for the Belden Brick Project and the actual schedule. J. Hosenfeld and I were talking about it and we feel that Ron Myers should be made aware that the job was done on schedule, even with the additional Hi-Vol runs. I think that a short after-project memo would be useful.

Miro.

Actual Schedule For Belden Brick Project

Day	Baghouse			Kiln											Dryer		
	Inlet PM10	Outlet PM10	Hi-Vol*	PM10	VOST	SVOST	Metal	PHCL	THC	NOx	CO	SO2	Meth.	Eth.	THC	Meth.	Eth.
November 7 Travel and setup																	
November 8 Setup																	
November 9 Runs:	1,2	1	SG 1,2 E 1			1	1	1									
November 10 Runs:						2,3	2,3	2,3									
November 11 Runs:	3	2	SG 3 E 2,3 W 1,2	1,2,3	1,2,3				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3
November 12 Breakdown and departure																	

* The Hi-Vol runs for East and West of the screening nad grinding room were not originally scheduled in the work plan

Planned Schedule For Belden Brick Project

Day	Baghouse			Kiln											Dryer		
	Inlet PM10	Outlet PM10	Hi-Vol	PM10	VOST	SVOST	Metal	PHCL	THC	NOx	CO	SO2	Meth.	Eth.	THC	Meth.	Eth.
November 7 Travel and setup																	
November 8 Setup																	
November 9 Runs:	1,2,3	1	1,2,3						1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3
November 10 Runs:				1		1	1	1									
November 11 Runs:				2,3	1,2,3	2,3	2,3	2,3									
November 12 Breakdown and departure																	

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

February 2, 1994

To: April Carender

From: Rick Marinshaw

Subject: Test Report for Belden Brick
EIB Work Assignment I-01
MRI Project No. 4601-01

As you are aware, expenditures on this project already have exceeded the amounts in the approved work plan despite the fact that the test report remains to be written. In view of this situation, we would like to prepare the test report in the North Carolina office to allow us to monitor and control costs as much as possible. Also, our word processing costs are charged to overhead rather than being direct-billed to the client. We would appreciate your help in pulling together the data and other information from those staff that were involved in the sampling and analysis for this project. This information includes descriptions of deviations in the sampling and analytical procedures from the procedures specified in the site-specific test plan, and the data for the appendices. We have tried to summarize below the specific types of information needed; please use your judgement in determining what should and should not be included in the report.

The following is a summary of the information needed:

Miro Szydlo: Actual test schedule with dates, start, and completion times of each test run; names and responsibilities of members of the test crew; descriptions of deviations in the sampling protocols and test port locations; description of changes in operating or testing procedures that could impact the results of the test; field data sheets; calibration data; initial calculations (insokinetic rates, flow rates, etc.); data from the analysis of PM, PM-10, Hi-Vol ambient, and process samples; CEM results; and other relevant observations related to the sampling and analysis.

Avie Mainey: Results of the metals analysis; description of deviations in analytical methods; and other relevant observations related to the metals samples.

Marilynn Whitacre: Results of the semiVOST analysis; description of deviations in analytical methods; and other relevant observations related to the semiVOST samples.

John Onstot (or other person involved in the VOST analysis):

Results of the VOST analysis; description of deviations in analytical methods; and other relevant observations related to the VOST samples.

The simplest approach to conveying information on deviations in the sampling and analytical procedures would be to have these staff mark up the procedures specified in the site-specific test plan to reflect what actually happened. Therefore, we are providing a copy of the relevant sections of the test plan to each of the staff listed. In addition, we would appreciate a disk-copy of all spreadsheets or data bases that were used to input or reduce the raw data.

Because we must provide the WAM with an accurate estimate of the hours needed to complete the remaining work on this assignment, we would appreciate an estimate of the labor hours needed to pull this information together before you proceed.

Please contact me or Roy Neulicht if you have any questions regarding this matter.

cc: Miro Szydlo, MRI/KC (with test plan excerpt)
Avie Mainey, MRI/KC (with test plan excerpt)
Marilynn Whitacre, MRI/KC (with test plan excerpt)
John Onstot, MRI/KC (with test plan excerpt)
Roy Neulicht, MRI/NC

MIDWEST RESEARCH INSTITUTE

425 VOLKER BOULEVARD
KANSAS CITY, MO 64110
816-753-7600 FAX NO. 816-753-8420

PURCHASE ORDER

THIS NUMBER MUST APPEAR ON ALL INVOICES, PACKING SLIPS, SHIPPING CONTAINERS AND ALL CORRESPONDENCE PERTAINING TO THIS PO.

P.O. #: D02101
4601-012-45 88
WORK BRKDN: 4601.01.05.01

SUBCONTRACT

DIRECT ALL TRUCKS TO OUR OAK ST ENTRANCE

VENDOR: BELDEN BRICK CO
PO BOX 20910
CANTON OH 44701 0910

SHIP TO: MIDWEST RESEARCH INSTITUT
425 VOLKER BOULEVARD
(OAK STREET ENTR
KANSAS CITY, MO 64110

CONTACT: JOHN C JENSEN
PHONE: 216-456-0031

DELIVER TO: RICK MARINSHAW
CONTRACT #: 68-D2-0159
F.O.B: DESTINATION

P.O. NO.	P.O. DATE	BUYER	VENDOR NO.	TERMS	SHIP VIA
D02101	04/04/94	TUCKER	068150	NET 30	BEST WAY

ITEM NUMBER	DESCRIPTION	REQ. DATE	QTY	UNIT COST	EXT. COST

****
*** C O N F I R M A T I O N ***
****

PAYMENT FOR BELDEN BRICK TO ALTER THEIR WORK SITE TO ALLOW MRI TO PERFORM EMISSION TESTING AT A STRUCTURAL BRICK MANUFACTURING PLANT FOR WORK ASSIGNMENT 4601.01. BELDEN BRICK IS TO CONSTRUCT THEN TEAR DOWN KILN AND DRYER WORKING PLATFORMS

ITEM NUMBER	DESCRIPTION	REQ. DATE	QTY	UNIT COST	EXT. COST
001.	PAYMENT FOR PLANT ALTERATIONS REQUISITION: 12920	04/04/94	1.00 /EA	21824.80	21824.80

OVERSHPMTS NOT ACCEPTED

TOTAL: 21,824.80

Do not add Missouri Sales Tax to invoice. Midwest Research Institute ruled exempt under No. 13017993.

REQUISITIONER'S COPY

(AUTHORIZED SIGNATURE)

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

March 2, 1994

To: Joann Richardson

From: Rick Marinshaw, NCO

Subject: Invoice for Belden Brick Site Modifications
Perform Emission Testing at a Structural Brick Manufacturing Plant and Data Entry Into FIRE Data Entry Forms
EPA Contract 68-D2-0159, Work Assignment I-01
MRI Project 4601-01

Enclosed is the invoice for site modifications made prior to the emission test conducted at the Belden Brick plant under Work Assignment I-01. The EPA WAM for this project concurs with the costs itemized in the invoice and has funded the work assignment to cover the costs. Please note that no purchase order was prepared prior to these expenditures.

I would appreciate it if you could let Nancy Ruf know about this matter and forward the invoice to accounting so that Belden can be reimbursed for these costs.

Please give me a call if you have any questions about this.

cc: Roy Neulicht

[redacted]

THE STANDARD OF COMPARISON SINCE 1885

PHONE (216) 456-0031 FAX (216) 456-2694
Main Office: 700 W. Tuscarawas St., Canton, Ohio
New York Office: 386 Park Ave., South, New York, NY 10016
Detroit Area Office: 17092 Masonic Blvd., Fraser, MI 48026

February 23, 1994

Midwest Research Institute
401 Harrison Oaks Blvd.
Cary, N.C. 27513-2412

ATTENTION: Mr. Rick Marinshaw

RE: REIMBURSABLE COST OF AP-42 TESTS AT BELDEN BRICK - REVISED

Dear Mr. Marinshaw:

Upon discussion with Mr. Ronald Myers of USEPA, we mutually reduced the costs incurred by the Belden Brick Company for the emission testing done at our plant # 6. Ron asked, and I concurred, that Belden Brick did not have to have two men working with your stack testers...that one to run the lift would have been sufficient. We therefore reduced the hours worked each day of the testing by 12.

Please note on page 7 that the total expenditure now amount to $21,824.80 of which purchased materials amounted to $7695.72 and labor was $14129.08. All invoices attached have been paid by The Belden Brick Company and are only enclosed as reference. All moneys expended by us were to be reimbursed by agreement, so please accept the attached as an invoice to Midwest Research Institute.

Should you have any questions or comments concerning this, please do not hesitate to contact me at 216-852-2424.

Sincerely Yours,

THE BELDEN BRICK COMPANY

John C. Jensen
ENVIRONMENTAL ENGINEER

THE BELDEN BRICK COMPANY

PLANT 6 EPA EMISSION TESTS

TOTAL REIMBURSABLE COST

LABOR COST BREAKDOWN - REVISED...... 2/23/94

Labor $/hr....$19.35

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Wed	9/22/93	Locate test ports with Ron Myers	RD	2			
Thur	10/7/93	Grinding plant	RD	2			
		test ports	RJ	2			
Mon	10/11/93	Grinding plant	RD	1			
		test ports	RJ	1			
Thur	10/21/93	Grinding plant	RD	9			
		test ports	JP	4			
Sat	10/23/93	Grinding plant	RD	4			
		test ports	JP	4			
Subtotal hours....................					29	$561.29	
Mon	10/25/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
Tues	10/26/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
Wed	10/27/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
Thur	10/28/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
Fri	10/29/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			DS	7			
Sat	10/30/93	Construct kiln	RD	4			
		and dryer	JP	4			
		working platform	GS	4			
			TI	4			
			TB	2			
Subtotal hours....................					205	$3967.75	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/1/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	TB	5			
			KL	3			
			GS	9			
Tues	11/2/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	TB	5			
			KL	3			
			GS	9			
			TI	9			
Wed	11/3/93	Construct kiln	RD	8			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			KL	3			
			DA	9			
Thur	11/4/93	Construct kiln	RD	9			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			FM	1			
			DA	9			
Fri	11/5/93	Construct kiln	TB	6			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			DA	2			
Sat	11/6/93	Construct kiln	RD	4			
		and dryer	JP	4			
		working platform	GS	4			
			DA	4			
			TB	4			
Subtotal hours....................				=====	227	$4393.56	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/8/93	Test Setup	JP	9			
		and preliminary	TI	12			
		testing	RD	9			
Tues	11/9/93	Testing kiln	TI	12			
		and grinding plant	TG	9			
		Thru-put test of	RD	9			
		grinding plant	GS	9			
Wed	11/10/93	Testing kiln	JP	9			
		and dryer	TI	12			
			RD	9			
Thur	11/12/93	Testing kiln, dryer	JR	9			
		and grinding plant	GS	9			
		Thru-put test of	RD	5			
		grinding plant	TI	12			
			TG	9			
			TB	1			
			DA	3			
Fri	11/13/93	Teardown of	GS	5			
		equipment	TI	6			
Sat	11/14/93	Teardown kiln	TB	4			
		and dryer	JP	4			
		working platform	GS	4			
			DA	4			
			TI	4			
				=====			
Subtotal hours....................					178	$3445.17	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
LABOR COST BREAKDOWN - contd

Day	Date	Job	Men	Hours	Total Hours	Labor Cost	Total Cost
Mon	11/16/93	Teardown kiln	TB	1			
		and dryer	DA	3			
		working platform	KL	3			
			JP	9			
			GS	9			
			TI	9			
			RD	3			
Tues	11/17/93	Teardown kiln	KL	3			
		and dryer	JP	9			
		working platform	GS	9			
			TI	9			
			RD	3			
Wed	11/18/93	Teardown kiln	KL	3			
		and dryer	JP	2			
		working platform	GS	5			
			TI	6			
Subtotal hours....................					86	$1664.52	
Mon	11/20/93	Teardown kiln	JP	1			
		and dryer	TI	4			
		working platform					
Subtotal hours....................					5	$96.77	
Total Labor Cost..							$14129.08

LABOR COST PER HOUR

Ave hourly rate.....		$10.36	
FICA	6.200%	$0.64	
Medicare	1.450%	$0.15	
Unempl-US	0.800%	$0.08	
Unempl-OH	1.725%	$0.18	
Wkmn Comp	3.000%	$0.31	
Blue Cross		$2.10	
			$13.82
Supv, Equip Use..............	20%		$2.76
Vehicles.....................	20%		$2.76
Labor Cost Per Hour............................			$19.35

PLANT 6 EPA EMISSION TESTS
MATERIAL COST BREAKDOWN

Day	Date	Invoice From	Invoice For	Cost	Total Cost
	10/21/93	Decker Steel	Mating rings grinding plant	$19.77	
	10/25/93	Sugarcreek Lumber	Lumber for stack platforms	$349.98	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$344.86	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$78.80	
	10/26/93	Sugarcreek Lumber	Lumber for stack platforms	$16.58	
	10/30/93	Sugarcreek Lumber	Lumber for stack platforms	$596.47	
	11/1/93	Sugarcreek Lumber	Lumber for stack platforms	$101.41	
	11/5/93	Sugarcreek Lumber	Lumber for stack platforms	$124.90	
	11/8/93	Sugarcreek Lumber	Lumber for stack platforms	$1.73	
	11/8/93	Hitemp	Drill holes in brick stack	$4093.40	
	11/15/93	Hitemp - credit	Drill holes in brick stack	($211.00)	
	11/5/93	Fenton Bros	Electrical supplies	$5.44	
	11/5/93	Fenton Bros	Electrical supplies	$5.44	
	10/27/93	Dover Tank	Steel for stack platforms	$61.50	
	11/10/93	Dover Tank	Steel for stack platforms	$183.92	
	11/15/93	Chas Rewinding	Transformer rental	$138.52	
	11/15/93	Ohio Whey	Truck weighings	$55.00	

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
MATERIAL COST BREAKDOWN - contd

Day	Date	Invoice From	Invoice For	Cost	Total Cost
	10/27/93	Am High Reach	Crane & lift rental	$562.00	
	10/28/93	Am High Reach	Crane & lift rental	$267.00	
	10/30/93	Am High Reach	Crane & lift rental	$225.00	
	11/8/93	Am High Reach	Crane & lift rental	$475.00	
	11/12/93	Am High Reach	Crane & lift rental	$200.00	
		TOTAL MATERIAL COST			$7695.72

THE BELDEN BRICK COMPANY
PLANT 6 EPA EMISSION TESTS
TOTAL REIMBURSABLE COST
===========================

Total Labor Cost....................$14129.08

Total Material Cost................. $7695.72

=========

Total Invoice...............................$21824.80

=========

Please Make Check Payable To:

The Belden Brick company
P.O. Box 20910
Canton, Ohio 44701-0910

MRI

Faxed to
Carol Morrison
@ Galbraith 12/3/93
Phone No. (615) 546-1335
Fax No. 615 546 7209

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

December 1, 1993

Ms. Gail Hutchens
Galbraith Laboratories
2323 Sycamore Drive
Knoxville, Tennessee 37921-1750

Subject: Request for Analysis of Samples,
MRI Project No. 4601.01.05.01
MRI Purchase Order No. 011063

Dear Ms. Hutchens:

Midwest Research Institute (MRI) conducted an emission test at a brick manufacturing facility during the period of November 8 to November 12, 1993. We are sending two sets of samples from this test to you for analysis.

We are sending one set of six liquid samples which are to be analyzed for hydrogen chloride (HCl), chlorine (Cl_2), and hydrogen fluoride (HF) by EPA Method 26A. These samples are listed in Table 1.

In addition, we are sending a set of samples to be analyzed for condensible particulate matter, as listed in Table 2. For this second set of samples, the entire contents of each of the first six samples are to be analyzed in accordance with EPA Method 202, and the volume of the water and methylene chloride blanks must be determined.

We would appreciate receiving the results of the analyses of both sets of samples by December 15. Also, within 25 days, we need you to provide us with a copy of all raw data and calculations.

TABLE 1. HCl, Cl, AND HF SAMPLES FOR ANALYSIS BY METHOD 26A

Description	Sample No.		
	Run 1	Run 2	Run 3
H_2SO_4 Aliquot	1025	2025	3025
NaOH Aliquot	1027	2027	3027
H_2SO_4 Blank	1053		
NaOH Blank	1054		

TABLE 2. CONDENSIBLE PM SAMPLES FOR ANALYSIS BY METHOD 202

Sample No.	Description	Volume (mls)
1019	Impinger contents, Run 1	226.8
1020	Methylene chloride rinse, Run 1	168.3
2019	Impinger contents, Run 2	490.3
2020	Methylene chloride rinse, Run 2	262.8
3019	Impinger contents, Run 3	490.7
3020	Methylene chloride rinse, Run 3	262.8
1066A	Water blank	Not determined
1066B	Methylene chloride blank	Not determined

TABLE 1. HCl, Cl, AND HF SAMPLES FOR ANALYSIS BY METHOD 26A

Description	Sample No.		
	Run 1	Run 2	Run 3
H_2SO_4 Aliquot	1025	2025	3025
NaOH Aliquot	1027	2027	3027
H_2SO_4 Blank	1053		
NaOH Blank	1054		

TABLE 2. CONDENSIBLE PM SAMPLES FOR ANALYSIS BY METHOD 202

Sample No.	Description	Volume (mls)
1019	Impinger contents, Run 1	226.8
1020	Methylene chloride rinse, Run 1	168.3
2019	Impinger contents, Run 2	490.3
2020	Methylene chloride rinse, Run 2	262.8
3019	Impinger contents, Run 3	490.7
3020	Methylene chloride rinse, Run 3	262.8
1066A	Water blank	Not determined
1066B	Methylene chloride blank	Not determined

Thank you for your assistance. Please call me to verify that the shipment has been received intact. If you have any questions or need additional information, please call me at (919) 677-0249, extension 5359, or Miro Szydlo at (816) 753-7600, extension 1424.

Sincerely,

Richard Marinshaw
Environmental Engineer

cc: Pam Murowchick, KCO
Miro Szydlo, KCO
April Carender, KCO

DOCUMENT CONTROL SHEET

Project No.: 4607-01 (Subtask No.) 05

Document Name: Letter to Galbraith Labs

Originator: Harrington

WP ID No.: 2522

WP COMMENTS:

---

1 DATE TO WP: 11/30

DESIRED DUE DATE: 11/30
Flexible ( )
Firm (✓)

OPERATOR'S INITIALS: NMW

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

COMMENTS:

T/2

ROUTE:	ACTION:	DATE:	COMMENTS:

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2 DATE TO WP: 11/30

DESIRED DUE DATE: 11/30
Flexible ( )
Firm (✓)

OPERATOR'S INITIALS: Sue

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

COMMENTS:

T/5

ROUTE:	ACTION:	DATE:	COMMENTS:

---

3 DATE TO WP: 12/1

DESIRED DUE DATE: 12/1
Flexible ( )
Firm (✓)

OPERATOR'S INITIALS: Db

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow

COMMENTS: Please Finalize

W2

ROUTE:	ACTION:	DATE:	COMMENTS:

DOCUMENT CONTROL SHEET

Project No.: ______________________ Document name: ______________________

4 DATE TO WP: 12/1
DESIRED DUE DATE: 12/1
Flexible ( )
Firm ( )
OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special
SPACING: ( ) Single ( ) 1 1/2 ( ) Double
OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow
PREPARE: ( ) Envelope ( ) Label
WP PROOF: ( ) Yes ( ) No

COMMENTS: PLEASE ALSO PREPARE ENVELOPE TO GALBRAITH (ONE CHANGE ON CC LIST)

ROUTE: ACTION: DATE: COMMENTS:

5 DATE TO WP:
DESIRED DUE DATE:
Flexible ( )
Firm ( )
OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special
SPACING: ( ) Single ( ) 1 1/2 ( ) Double
OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow
PREPARE: ( ) Envelope ( ) Label
WP PROOF: ( ) Yes ( ) No

COMMENTS:

ROUTE: ACTION: DATE: COMMENTS:

6 DATE TO WP:
DESIRED DUE DATE:
Flexible ( )
Firm ( )
OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special
SPACING: ( ) Single ( ) 1 1/2 ( ) Double
OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow
PREPARE: ( ) Envelope ( ) Label
WP PROOF: ( ) Yes ( ) No

COMMENTS:

ROUTE: ACTION: DATE: COMMENTS:

7 DATE TO WP:
DESIRED DUE DATE:
Flexible ( )
Firm ( )
OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special
SPACING: ( ) Single ( ) 1 1/2 ( ) Double
OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow
PREPARE: ( ) Envelope ( ) Label
WP PROOF: ( ) Yes ( ) No

COMMENTS:

ROUTE: ACTION: DATE: COMMENTS:

(1) CONFIRM Sampling locations / dimensions ARE Correct 2 - Schematics in Test Report
(- show Ducts with baghouse inlet) - NCO

(2) Delete 2-10 (4-6)
(3) Possibly Combine 2-09 (4-5) + 2-11 (4-7)
(4) Delete 2-12 (4-8)
(5) Add PLAN View to fig 2-13
(6) Fig 2-1 ; Locate Sampling ports, Redirect inlet to BH

Section 3
TABLE 3-1 ~ Confirm correct

Need data for
(1) · PM-10 START/FINISH, data sheet
(2) · Kiln stack - CEM - + Flow
· Dryer stack - CEM - THC (Hamm / methane / ethane) + Flows
(3) · PM-10 - Kiln stack
(4) Need HF results (Galbraith)/MRI) Doesn't have
(4) Sec. 3-2 = Need field test Changes + Problems

(5) Follow up Metals - call AVIE (Re Metal Blanks) - Roy
(6) Metric, TEST Train Field DATA Sample Runs (sheet); Diskette
(7) Preliminary Velocity Traverse data / cyclonic flow
(8) call Denny Hooten - QA → D. Hooten (Roy)

TABLE LIST FOR BELDEN TEST REPORT--CHAPTER 3

TABLE 3-2. BELDEN BRICK--TEST SCHEDULE

Analyte	Location	Run	Date	Start	Finish	Comments
PM-10	Grinding/screening: fabric filter inlet	1	11/09/93			
		2	11/09/93			
		3	11/11/93			
	Grinding/screening: fabric filter outlet	1	11/09/93			
		2	11/11/93			
	Grinding/screening: ambient--east	1	11/09/93			
		2	11/11/93			
		3	11/11/93			
	Grinding/screening: ambient--west	1	11/11/93			
		2	11/11/93			
Total PM	Grinding/screening: fabric filter hopper	1	11/09/93	700	1515	
		2	11/11/93	700	1510	
Process samples	Grinding/screening: finished material conveyor	1	11/09/93	929	929	
		2	11/09/93	1059	1059	
		3	11/09/93	1214	1214	
		1	11/11/93	845	845	
		2	11/11/93	1015	1015	
		3	11/11/93	1130	1130	
Metals/PM	Kiln stack	1	11/09/93	1430	1915	
		2	11/10/93	942	1357	
		3	11/10/93	1553	1947	Shutdown between 1609 and 1613
VOST	Kiln stack	1	11/11/93	1520	1540	Sample No. 1067/1068
		1	11/11/93	1550	1610	Sample No. 1069/1070
		1	11/11/93	1620	1640	Sample No. 1071/1072
		1	11/11/93	1650	1710	Sample No. 1073/1074
		2	11/11/93	1715	1735	Sample No. 2067/2068
		2	11/11/93	1745	1805	Sample No. 2069/2070
		2	11/11/93	1815	1835	Sample No. 2071/2072
Semi-VOST	Kiln stack	1	11/09/93	1430	1915	
		2	11/10/93	942	1357	
		3	11/10/93	1553	1947	Shutdown between 1609 and 1613
THC/NOx/CO/SO2	Kiln stack	1	11/11/93	1035	1236	
		2	11/11/93	1311	1511	
		3	11/11/93	1527	1727	
PM/HCl/Cl2/HF	Kiln stack	1	11/09/93	1407	1917	Shutdown between 1410 and 1431
		2	11/10/93	942	1357	
		3	11/10/93	1553	1947	Shutdown between 1609 and 1613
PM-10/ condensible PM	Kiln stack	1	11/11/93	1055	1227	
		2	11/11/93	1459	1642	
		3	11/11/93	1707	1839	
THC/methane/ ethane	Dryer stack	1	11/11/93	1035	1236	
		2	11/11/93	1311	1511	
		3	11/11/93	1527	1727	

FILENAME: BB_T3-2

TABLE 3-3. SUMMARY OF GRINDING/SCREENING EMISSION RATES AND EMISSION FACTORS--PM-10 (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Source/analyte	1	2	3	Average	1	2	3	Average
Fabric filter inlet								
Filterable PM-10	11	11	10	10	0.27	0.27	0.26	0.27
Filterable PM	107	186	206	166	2.7	4.7	5.3	4.2
Fabric filter outlet								
Filterable PM-10	0.024	0.020		0.022	0.00062	0.00053		0.00057
Filterable PM	0.12	0.082		0.10	0.0030	0.0021		0.0026
Fabric filter hopper catch								
Total PM	305	343		324	7.8	8.9		8.3

TABLE 3-3. SUMMARY OF GRINDING/SCREENING EMISSION RATES AND EMISSION FACTORS--PM-10 (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Source/analyte	1	2	3	Average	1	2	3	Average
Fabric filter inlet								
Filterable PM-10	24	23	22	23	0.55	0.54	0.51	0.53
Filterable PM	234	409	453	365	5.4	9.5	10.5	8.5
Fabric filter outlet								
Filterable PM-10	0.053	0.045		0.049	0.0012	0.0011		0.0011
Filterable PM	0.26	0.18		0.22	0.0061	0.0043		0.0052
Fabric filter hopper catch								
Total PM	672	754		713	16	18		17

TABLE 3-4. SUMMARY OF PROCESS SAMPLE MOISTURE AND SIEVE ANALYSIS

Date	11/9/93						11/11/93							
Sample No.	1		2		3		1		2		3		Average	
Moisture, percent	4.44		4.35		4.24		3.59		3.48		3.48		3.93	
Sieve size	Wt., g	%	Wt., g	%	Wt., g	%	Wt., g	%	Wt., g	%	Wt., g	%	Wt., g	%
10 mesh	2.2	0.47	2.2	0.40	1.6	0.39	2.4	0.42	2.1	0.42	1.6	0.36	2.0	0.41
20 mesh	137.3	29.5	189.6	34.2	120.6	29.8	179.8	31.6	184.6	36.9	139.7	31.0	158.6	32.2
40 mesh	108.8	23.4	128.4	23.2	93.3	23.0	120.5	21.2	108.7	21.7	97.0	21.6	109.5	22.4
100 mesh	105.6	22.7	110.8	20.0	89.9	22.2	109.6	19.3	88.9	17.8	87.1	19.4	98.7	20.2
140 mesh	21.8	4.69	25.7	4.64	17.1	4.22	28.4	5.00	17.0	3.40	21.7	4.82	22.0	4.5
200 mesh	14.9	3.20	20.0	3.61	13.7	3.38	22.9	4.03	15.3	3.06	17.0	3.78	17.3	3.5
Pan	74.4	16.0	76.9	13.9	68.9	17.0	104.7	18.4	83.9	16.8	85.9	19.1	82.5	16.9
Total	465.0	100	553.6	100	405.1	100	568.3	100	500.5	100	450.0	100	490.4	100

FILENAME: BB_T3-7.WQ1

TABLE 3-5. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--METALS (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Arsenic								
Beryllium								
Cadmium	5.09E-05	8.99E-05	1.63E-05	5.24E-05	1.6E-05	2.8E-05	5.2E-06	1.7E-05
Chromium	0.00546	0.0238	0.00635	0.0119	0.0017	0.0075	0.0020	0.0038
Cobalt	8.27E-05	0.00031	0.00013	0.00018	2.6E-05	9.8E-05	4.2E-05	5.5E-05
Mercury	0.00027	0.00011	0.00036	0.00024	8.5E-05	3.5E-05	0.00011	7.8E-05
Manganese	0.00067	0.00200	0.00077	0.00115	0.00021	0.00063	0.00024	0.00036
Nickel	0.00269	0.0130	0.00432	0.00666	0.00085	0.0041	0.0014	0.0021
Lead	0.00015	0.00010	0.00012	0.00012	4.9E-05	3.2E-05	3.7E-05	3.9E-05
Antimony	4.30E-05	2.19E-05	3.99E-05	3.49E-05	1.4E-05	6.9E-06	1.3E-05	1.1E-05
Selenium	0.00049	0.00043	0.00081	0.00058	0.00016	0.00013	0.00026	0.00018

Emission factors based on process rate of 3.16 Mg of brick produced per hour.

TABLE 3-5. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--METALS (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Arsenic								
Beryllium								
Cadmium	0.00011	0.00020	3.59E-05	0.00012	3.2E-05	5.7E-05	1.0E-05	3.3E-05
Chromium	0.01204	0.05249	0.01400	0.0262	0.0035	0.0151	0.0040	0.0075
Cobalt	0.00018	0.00069	0.00029	0.00039	5.2E-05	0.00020	8.4E-05	0.00011
Mercury	0.00059	0.00024	0.00078	0.00054	0.00017	7.0E-05	0.00023	0.00016
Manganese	0.00148	0.00441	0.00169	0.0025	0.00043	0.0013	0.00049	0.00073
Nickel	0.00594	0.02861	0.00953	0.0147	0.0017	0.0082	0.0027	0.0042
Lead	0.00034	0.00022	0.00026	0.00027	9.8E-05	6.3E-05	7.5E-05	7.9E-05
Antimony	9.47E-05	4.84E-05	8.80E-05	7.70E-05	2.7E-05	1.4E-05	2.5E-05	2.2E-05
Selenium	0.00108	0.00094	0.00179	0.0013	0.00031	0.00027	0.00051	0.00036

Emission factors based on process rate of 3.48 tons of brick produced per hour.

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Chloromethane	2.4E-03	1.4E-04	3.2E-04	9.5E-04	7.6E-04	4.6E-05	1.0E-04	3.0E-04
Dichlorofluoromethane								
Bromomethane	5.3E-04		9.6E-05	2.1E-04	1.7E-04		3.0E-05	9.9E-05
Acetonitrile	1.2E-04			4.1E-05	3.9E-05			3.9E-05
Acrylonitrile								
Vinl chloride								
Chloroethane	1.8E-03		6.1E-04	8.2E-04	5.8E-04		1.9E-04	3.9E-04
Iodomethane	2.6E-04	2.3E-05	1.2E-04	1.3E-04	8.2E-05	7.2E-06	3.9E-05	4.3E-05
Trichlorofluoromethane								
Methylene chloride	9.0E-06	1.5E-05	2.2E-06	8.8E-06	2.8E-06	4.8E-06	7.1E-07	2.8E-06
Acetone	1.6E-03	2.1E-03	4.2E-03	2.6E-03	5.1E-04	6.5E-04	1.3E-03	8.3E-04
Carbon disulfide	6.8E-05	8.3E-05	4.2E-05	6.5E-05	2.2E-05	2.6E-05	1.3E-05	2.0E-05
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	1.5E-04	3.5E-04	5.6E-04	3.5E-04	4.9E-05	1.1E-04	1.8E-04	1.1E-04
1,1,1-Trichloroethane	1.2E-05		8.1E-06	6.5E-06	3.7E-06		2.6E-06	3.1E-06
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	4.1E-03	7.1E-03	1.9E-03	4.4E-03	1.3E-03	2.2E-03	6.2E-04	1.4E-03
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		5.5E-05	7.6E-06	2.1E-05		1.7E-05	2.4E-06	9.9E-06
2-Hexanone	4.3E-06	2.4E-04	1.6E-04	1.4E-04	1.4E-06	7.6E-05	5.1E-05	4.3E-05
Tetrachloroethene		5.9E-06	6.5E-06	4.1E-06		1.9E-06	2.0E-06	2.0E-06
1,1,2,2-Tetrachloroethane								
Toluene	1.7E-04	2.6E-04	2.9E-04	2.4E-04	5.3E-05	8.2E-05	9.2E-05	7.6E-05
Chlorobenzene								
Ethylbenzene	5.0E-05	6.7E-05	8.6E-05	6.8E-05	1.6E-05	2.1E-05	2.7E-05	2.1E-05
Styrene	1.6E-05	7.5E-05	4.1E-06	3.2E-05	5.0E-06	2.4E-05	1.3E-06	1.0E-05
m-/p-Xylene	7.6E-05	1.1E-04	1.3E-04	1.0E-04	2.4E-05	3.3E-05	4.0E-05	3.3E-05
o-Xylene	6.5E-05	9.5E-05	1.1E-04	9.0E-05	2.1E-05	3.0E-05	3.5E-05	2.8E-05
Hexachloroethane								
1,2-Dbromo-3-chloropropan		1.9E-04	3.3E-05	7.4E-05		6.0E-05	1.1E-05	3.5E-05

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton			
	Run			Run	Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Chloromethane	5.3E-03	3.2E-04	7.0E-04	2.1E-03	1.5E-03	9.1E-05	2.0E-04	6.0E-04
Dichlorofluoromethane								
Bromomethane	1.2E-03		2.1E-04	4.6E-04	3.3E-04		6.1E-05	2.0E-04
Acetonitrile	2.7E-04			9.0E-05	7.8E-05			7.8E-05
Acrylonitrile								
Vinl chloride								
Chloroethane	4.1E-03		1.3E-03	1.8E-03	1.2E-03		3.8E-04	7.8E-04
Iodomethane	5.7E-04	5.0E-05	2.7E-04	3.0E-04	1.6E-04	1.4E-05	7.7E-05	8.5E-05
Trichlorofluoromethane								
Methylene chloride	2.0E-05	3.3E-05	4.9E-06	1.9E-05	5.7E-06	9.6E-06	1.4E-06	5.6E-06
Acetone	3.6E-03	4.5E-03	9.2E-03	5.8E-03	1.0E-03	1.3E-03	2.6E-03	1.7E-03
Carbon disulfide	1.5E-04	1.8E-04	9.2E-05	1.4E-04	4.3E-05	5.3E-05	2.7E-05	4.1E-05
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	3.4E-04	7.8E-04	1.2E-03	7.8E-04	9.7E-05	2.2E-04	3.5E-04	2.2E-04
1,1,1-Trichloroethane	2.5E-05		1.8E-05	1.4E-05	7.3E-06		5.1E-06	6.2E-06
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	9.0E-03	1.6E-02	4.3E-03	9.6E-03	2.6E-03	4.5E-03	1.2E-03	2.8E-03
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		1.2E-04	1.7E-05	4.6E-05		3.5E-05	4.8E-06	2.0E-05
2-Hexanone	9.5E-06	5.3E-04	3.6E-04	3.0E-04	2.7E-06	1.5E-04	1.0E-04	8.6E-05
Tetrachloroethene		1.3E-05	1.4E-05	9.1E-06		3.8E-06	4.1E-06	3.9E-06
1,1,2,2-Tetrachloroethane								
Toluene	3.7E-04	5.7E-04	6.4E-04	5.3E-04	1.1E-04	1.6E-04	1.8E-04	1.5E-04
Chlorobenzene								
Ethylbenzene	1.1E-04	1.5E-04	1.9E-04		3.1E-05	4.2E-05	5.5E-05	4.3E-05
Styrene	3.5E-05	1.7E-04	9.0E-06		9.9E-06	4.8E-05	2.6E-06	2.0E-05
m-/p-Xylene	1.7E-04	2.3E-04	2.8E-04	2.3E-04	4.8E-05	6.7E-05	8.0E-05	6.5E-05
o-Xylene	1.4E-04	2.1E-04	2.4E-04	2.0E-04	4.1E-05	6.0E-05	6.9E-05	5.7E-05
Hexachloroethane								
1,2-Dbromo-3-chloropropan		4.2E-04	7.3E-05	1.6E-04		1.2E-04	2.1E-05	7.1E-05

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS–SEMI-VOLATILES (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	0.000158	0.000150	0.000100	0.000136	5.0E-05	4.8E-05	3.1E-05	4.3E-05
Aniline								
Bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene					0	0	0	
1,4-Dichlorobenzene	5.822E-05	5.658E-05	0.000111	7.525E-05	1.8E-05	1.8E-05	3.5E-05	2.4E-05
Benzyl alcohol								
1,2-Dichlorobenzene								
2-Methylphenol	2.547E-05							
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitrosodipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
Benzoic acid			0.00713					
Bis(2-chloroethoxy)methane								
2-Chloroacetophenone								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene	7.277E-05	0.0001386	9.724E-05	0.000103	2.3E-05	4.4E-05	3.1E-05	3.3E-05
4-Chloroaniline								
2,6-Dichlorophenol								
Hexachlorobutadiene								
4-Chloro-3-methylphenol								
2-Hydroxyacetophenone								
2-Methylnaphthalene	5.822E-05	0.000127	8.466E-05	9.00E-05	1.8E-05	4.0E-05	2.7E-05	2.8E-05
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
2,3,4,6-Tetrachlorophenone								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethyl phthalate	0.0006428	0.0002656	0.0002059	0.0003714	0.00020	8.4E-05	6.5E-05	0.00012
4-Chlorophenylphenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-Nitrosodiphenylamine								
4-Bromophenyl-phenylether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butyl phthalate	0.0001577	0.0001616	0.0003547	0.0002247	5.0E-05	5.1E-05	1.1E-04	7.1E-05
Fluoranthene								
Benzidine								
Pyrene								
Butylbenzyl phthalate	2.426E-05	2.54E-05	3.432E-05	2.80E-05	7.7E-06	8.0E-06	1.1E-05	8.9E-06
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
Bis(2-ethylhexyl) phthalate	0.0009339	0.0027711	0.00583	0.0031799	0.00030	0.00088	0.0018	0.0010
Di-n-octyl phthalate			0.000114					
Benzo(b)fluoranthene								
Benzo(k)fluoroanthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SEMI-VOLATILES (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	0.000348	0.000331	0.000219	0.000299	0.00010	9.5E-05	6.3E-05	8.6E-05
Aniline								
Bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene	0.000128	0.000125	0.000245	0.000166	3.7E-05	3.6E-05	7.0E-05	4.8E-05
Benzyl alcohol								
1,2-Dichlorobenzene								
2-Methylphenol	5.61E-05							
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitrosodipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
Benzoic acid			0.0157					
Bis(2-chloroethoxy)methane								
2-Chloroacetophenone								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene	0.000160	0.000305	0.000214	0.000227	4.6E-05	8.8E-05	6.2E-05	6.5E-05
4-Chloroaniline								
2,6-Dichlorophenol								
Hexachlorobutadiene								
4-Chloro-3-methylphenol								
2-Hydroxyacetophenone								
2-Methylnaphthalene	0.000128	0.000280	0.000187	0.000198	3.7E-05	8.0E-05	5.4E-05	5.7E-05
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
2,3,4,6-Tetrachlorophenone								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethyl phthalate	0.00142	0.000585	0.000454	0.000819	0.00041	0.00017	0.00013	0.00024
4-Chlorophenylphenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-Nitrosodiphenylamine								
4-Bromophenyl-phenylether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butyl phthalate	0.000348	0.000356	0.000782	0.000495	0.00010	0.00010	0.00022	0.00014
Fluoranthene								
Benzidine								
Pyrene								
Butylbenzyl phthalate	5.35E-05	5.60E-05	7.57E-05	6.17E-05	1.5E-05	1.6E-05	2.2E-05	1.8E-05
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
Bis(2-ethylhexyl) phthalate	0.00206	0.00611	0.01286	0.00701	0.00059	0.0018	0.0037	0.0020
Di-n-octyl phthalate			0.000252					
Benzo(b)fluoranthene								
Benzo(k)fluoroanthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

TABLE 3-8. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES AND THC (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
SO2	3.86	5.25	5.22	4.78	1.2	1.7	1.7	1.5
NOx	1.07	1.53	1.52	1.38	0.34	0.49	0.48	0.44
CO	1.92	1.86	1.62	1.80	0.61	0.59	0.51	0.57
CO2	1,378	1,261	1,198	1,279	436	399	379	405
THC	0.0490	0.0263	0.0533	0.0428	0.015	0.0083	0.017	0.014
Methane	0.161	0.109	0.109	0.127	0.051	0.035	0.034	0.040
Ethane								

Emission factors based on process rate of 3.16 Mg of brick produced per hour.

TABLE 3-8. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES AND THC (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
SO2	8.48	11.5	11.5	10.5	2.4	3.3	3.3	3.0
NOx	2.36	3.37	3.34	3.03	0.68	0.97	0.96	0.87
CO	4.22	4.09	3.57	3.96	1.2	1.2	1.0	1.1
CO2	3,032	2,774	2,635	2,814	871	797	757	809
THC	0.108	0.0578	0.117	0.0942	0.031	0.017	0.034	0.027
Methane	0.355	0.241	0.239	0.278	0.10	0.069	0.069	0.080
Ethane								

Emission factors based on process rate of 3.48 Mg of brick produced per hour.

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	0.732	0.545	0.693	0.657	0.23	0.17	0.22	0.21
Filterable PM (c)	0.673	0.421	1.087	0.727	0.21	0.13	0.34	0.23
Filterable PM (d)	0.556	0.516	0.354	0.475	0.18	0.16	0.11	0.15
Filterable PM-10	0.104	0.403	0.131	0.213	0.033	0.13	0.041	0.067
Cond. inorganic PM	5.24	5.03	4.51	4.93	1.7	1.6	1.4	1.6
Cond. organic PM	1.72	0.420	0.290	0.811	0.54	0.13	0.092	0.26
Total cond. PM	6.96	5.45	4.80	5.74	2.2	1.7	1.5	1.8

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	1.55	1.15	1.45	1.38	0.44	0.33	0.42	0.40
Filterable PM (c)	1.44	1.07	2.29	1.60	0.41	0.31	0.66	0.46
Filterable PM (d)	1.19	1.09	0.79	1.02	0.34	0.31	0.23	0.29
Filterable PM-10	0.221	0.853	0.275	0.45	0.064	0.25	0.079	0.13
Cond. inorganic PM	11.2	10.6	9.47	10.43	3.2	3.1	2.7	3.0
Cond. organic PM	3.68	0.887	0.61	1.72	1.1	0.26	0.17	0.50
Total cond. PM	14.9	11.5	10.1	12.16	4.3	3.3	2.9	3.5

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	0.47	0.50	0.43	0.47	0.15	0.16	0.14	0.15
HCl	0.031	0.028	0.027	0.029	0.010	0.0089	0.0084	0.0091
Cl2	0.0019	0.0025	0.0020	0.00211	0.00060	0.00079	0.00062	0.00067

Emission factors based on process rate of 3.16 Mg of brick produced per hour.

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	1.0	1.1	1.0	1.0	0.30	0.32	0.27	0.30
HCl	0.069	0.062	0.059	0.063	0.020	0.018	0.017	0.018
Cl2	0.0042	0.0055	0.0043	0.0047	0.0012	0.0016	0.0012	0.0013

Emission factors based on process rate of 3.48 tons of brick produced per hour.

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--THC AND METHANE/ETHANE (METRIC)

	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
Analyte	1 (b)	2	3	Average	1 (b)	2	3	Average
THC	5.57	5.87	6.46	5.97	1.8	1.9	2.0	1.9
methane	7.09	6.24	7.45	6.93	2.2	2.0	2.4	2.2
ethane	1.20	0.86	1.00	1.02	0.38	0.27	0.32	0.32

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour

(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--THC AND METHANE/ETHANE (ENGLISH)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1 (b)	2	3	Average	1 (b)	2	3	Average
THC	12.3	12.9	14.2	13.1	3.5	3.7	4.1	3.8
methane	15.6	13.7	16.4	15.2	4.5	3.9	4.7	4.4
ethane	2.6	1.9	2.2	2.2	0.76	0.54	0.63	0.65

(a) Emission factors based on process rate of 3.48 Mg of brick produced per hour

(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

TABLE 3-15. GRINDING/SCREENING EMISSION TESTS RESULTS--PM-10 (METRIC UNITS)

Fabric filter inlet				Fabric filter outlet			Ambient		
Run No.	1	2	3	Run No.	1	2			Flowrate,
Date	11/09/93	11/09/93	11/11/93	Date	11/09/93	11/11/93	Location	Ru	DSCMM
Start time	0	0	0	Start time			Inside	1	1.198
Finish time	0	0	0	Finish time				2	1.196
Elapsed time	0	0	0	Elapsed time			East	1	1.173
% isokinetic	94.5	97	97.8	% isokinetic	92.1	91.1		2	1.198
GAS PARAMETERS				GAS PARAMETERS				3	1.196
Volume, ACM	1.497	0.785	0.774	Volume, ACM	5.153	6.057	West	1	1.198
Volume, DSCM	1.498	0.765	0.778	Volume, DSCM	4.968	5.849		2	1.196
Gas temperature, C	15.0	17.8	12.8	Gas temperature, C	14.4	13.3			
Oxygen, %	21	21	21	Oxygen, %	21	21			
Carbon dioxide, %	0	0	0	Carbon dioxide, %	0	0			
Moisture, %	1.5	1.5	1.5	Moisture, %	1.5	1.5			
Flowrate, ACMM	593.9	596.5	591.8	Flowrate, ACMM	754.8	745.8			
Flowrate, DSCMM	578.8	576.3	580.9	Flowrate, DSCMM	740.2	734.1			

	Mass, mg				Concentration, g/DSCM			
Source/analyte	1	2	3	Average	1	2	3	Average
Fabric filter inlet								
Filterable PM-10	0.4604	0.234	0.2242	0.3062	0.307	0.306	0.288	0.300
Filterable PM	4.5862	4.1066	4.5845	4.4257667	3.061	5.366	5.895	4.77
Fabric filter outlet								
Filterable PM-10	0.0027	0.0027		0.0027	0.00054	0.00046		0.00050
Filterable PM	0.0133	0.0109		0.0121	0.00268	0.00186		0.00227
Fabric filter hopper catch								
Total PM	2,513	2,794		2,654	0.00686	0.00776		0.00731
Ambient air--inside building								
Filterable PM-10	0.3	0.3	0.2	0.27	2.09E-03	2.09E-03		2.09E-03
Ambient air--east of building								
Filterable PM-10	0.15	0.3	0.25	0.23	1.07E-03	2.09E-03	1.74E-03	1.63E-03
Ambient air--west of building								
Filterable PM-10	0.05	0.05		0.05	3.48E-04	3.48E-04		3.48E-04

TABLE 3-15. GRINDING/SCREENING EMISSION TESTS RESULTS--PM-10 (ENGLISH UNITS)

Fabric filter inlet			
Run No.	1	2	3
Date	11/09/93	11/09/93	11/11/93
Start time			
Finish time			
Elapsed time			
% isokinetic	94.5	97.0	97.8
GAS PARAMETERS			
Volume, ACF	52.878	27.738	27.347
Volume, DSCF	52.915	27.028	27.464
Gas temperature, F	59	64	55
Oxygen, %	21	21	21
Carbon dioxide, %	0	0	0
Moisture, %	1.5	1.5	1.5
Flowrate, ACFM	20,974	21,065	20,899
Flowrate, DSCFM	20,439	20,351	20,513

Fabric filter outlet		
Run No.	1	2
Date	11/09/93	11/11/93
Start time		
Finish time		
Elapsed time		
% isokinetic	92.1	91.1
GAS PARAMETERS		
Volume, ACF	181.97	213.913
Volume, DSCF	175.437	206.567
Gas temperature, F	58	56
Oxygen, %	21	21
Carbon dioxide, %	0	0
Moisture, %	1.5	1.5
Flowrate, ACFM	26,656	26,337
Flowrate, DSCFM	26,140	25,925

Ambient		
Location	Ru	Flowrate, DSCFM
Inside	1	42.32
	2	42.23
East	1	41.42
	2	42.32
	3	42.23
West	1	42.32
	2	42.23

	Mass, gr				Concentration, gr/DSCF			
Source/analyte	1	2	3	Average	1	2	3	Average
Fabric filter inlet								
Filterable PM-10	7.10	3.61	3.46	4.73	0.134	0.134	0.126	0.131
Filterable PM	70.8	63.4	70.7	68.3	1.34	2.34	2.58	2.09
Fabric filter outlet								
Filterable PM-10	0.0417	0.0417		0.0417	0.00024	0.00020		0.00022
Filterable PM	0.2052	0.1682		0.1867272	0.0012	0.00081		0.00099
Fabric filter hopper catch								
Total PM	3.88E+07	4.31E+07		4.10E+07	3.83	4.32		4.08
Ambient air--inside building								
Filterable PM-10	0.0046	0.0046	0.0031	0.0041	9.12E-07	9.14E-07		9.13E-07
Ambient air--east of building								
Filterable PM-10	0.0023	0.0046	0.0039	0.0036	4.66E-07	9.12E-07	7.61E-07	7.13E-07
Ambient air--west of building								
Filterable PM-10	0.00077	0.00077		0.00077	1.52E-07	1.52E-07		1.52E-07

TABLE 3-16. KILN EMISSION TESTS RESULTS—METALS (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:16	13:57	19:47
Elapsed time	0	0	0
% isokinetic	92.7	99.3	99.5
GAS PARAMETERS			
Volume, ACM	2.891	3.724	2.990
Volume, DSCM	2.809	3.594	2.867
Gas temperature, C	221	221	224
Oxygen, %	17.6	18.4	17.8
Carbon dioxide, %	2.2	1	1.7
Moisture, %	4.4	4.3	4.7
Flowrate, ACMM	613.3	731.7	1,012
Flowrate, DSCMM	586.5	700.5	584.6

	Catch, ug									
	Run									
	1		2		3		Average		Blank	
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	Front	Back
Arsenic	<4.67	<1.97	<4.67	<1.98	<4.67	<1.97	0.00	0.00	<4.67	<1.69
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	0.0068	0.0068	<0.09	<0.033
Cadmium	7.52	2.63	7.65	8.31	6.38	1.126	8.09	4.82	5.93	0.16
Chromium	35.8	405	21.9	2067	22.2	527.13	610.38	608.65	4.4	0.589
Cobalt	6.01	6.21	5.56	27.2	5.56	11.33	10.11	11.17	5.62	<0.382
Mercury	1.73	22.083	1.37	10.298	11	22.31	9.30	13.41	2.15	0.637
Manganese	7.7	48.3	5.63	172	5.48	62.69	47.82	58.82	2.18	0.228
Nickel	32.5	207	27.2	1133	27.2	368.11	285.38	352.50	22.5	2.08
Lead	152	12.3	158	7.77	157	8.09	97.01	68.23	165	<3.14
Antimony	21	2.03	18.8	1.92	17.9	3.421	12.29	8.77	19.8	<1.59
Selenium	23.4	28.7	17.2	32.9	18.1	64.43	24.06	32.27	12.9	<3.31

	Mass, ug (blank corrected)								Mass, ug (front + back, blank corrected)				Concentration, ug/DSCM			
	Run								Run				Run			
	1		2		3		Average									
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	1	2	3	Average	1	2	3	Average
Arsenic	<4.67	<1.97	<4.67	<1.98	<4.67	<1.97	BDL	BDL	<1.97	<1.98	<1.97	<1.97				
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	BDL	BDL	<0.034	0.034	<0.034	<0.034				
Cadmium	1.59	2.47	1.72	6.15	0.43	0.986	2.47	2.35	4.06	7.87	1.396	4.44	1.45	2.14	0.487	1.35
Chromium	31.4	404.411	17.5	2066.411	17.8	526.541	507.50	606.53	435.811	2,083.91	544.341	1,021.35	155.1	586.5	189.8	303.8
Cobalt	0.39	6.21	0	27.2	0	11.33	6.76	8.95	6.6	27.20	11.33	15.04	2.35	7.39	3.95	4.56
Mercury	0	21.446	0	9.659	8.65	21.673	7.99	12.33	21.446	9.66	30.523	20.54	7.63	2.69	10.64	6.97
Manganese	6.52	48.072	3.45	171.772	3.3	62.462	46.42	57.61	53.592	175.22	65.762	98.19	19.1	47.6	22.9	29.9
Nickel	10	204.92	4.7	1130.92	4.7	366.03	271.05	342.25	214.92	1,135.62	370.73	573.76	76.5	309	129	172
Lead	0	12.3	1	7.77	2	8.09	4.61	6.23	12.3	8.77	10.09	10.39	4.38	2.38	3.52	3.43
Antimony	1.4	2.03	0	1.92	0	3.421	1.07	1.47	3.43	1.92	3.421	2.92	1.22	0.52	1.19	0.979
Selenium	10.5	28.7	4.3	32.9	5.2	64.43	16.32	27.11	39.2	37.2	69.63	48.68	14.0	10.1	24.3	16.1

TABLE 3-16. KILN EMISSION TESTS RESULTS—METALS (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Elapsed time			
% isokinetic	92.7	99.3	99.5
GAS PARAMETERS			
Volume, ACF	102.102	131.495	105.603
Volume, DSCF	99.211	126.906	101.263
Gas temperature, F	429	429	435
Oxygen, %	17.6	18.4	17.8
Carbon dioxide, %	2.2	1	1.7
Moisture, %	4.4	4.3	4.7
Flowrate, ACFM	21,657	25,840	35,729
Flowrate, DSCFM	20,713	24,738	20,646

	Catch, ug									
	Run									
	1		2		3		Average		Blank	
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	Front	Back
Arsenic	<4.67	<1.97	<4.67	<1.98	<4.67	<1.97	0.00	0.00	<4.67	<1.69
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	0.0068	0.0068	<0.09	<0.033
Cadmium	7.52	2.63	7.65	8.31	6.38	1.126	8.09	4.82	5.93	0.16
Chromium	35.8	405	21.9	2067	22.2	527.13	610.38	608.65	4.4	0.589
Cobalt	6.01	6.21	5.56	27.2	5.56	11.33	10.11	11.17	5.62	<0.382
Mercury	1.73	22.083	1.37	10.298	11	22.31	9.30	13.41	2.15	0.637
Manganese	7.7	48.3	5.63	172	5.48	62.69	47.82	58.82	2.18	0.228
Nickel	32.5	207	27.2	1133	27.2	368.11	285.38	352.50	22.5	2.08
Lead	152	12.3	158	7.77	157	8.09	97.01	68.23	155	<3.14
Antimony	21	2.03	18.8	1.92	17.9	3.421	12.29	8.77	19.8	<1.59
Selenium	23.4	28.7	17.2	32.9	18.1	64.43	24.06	32.27	12.9	<3.31

	Mass, ug (blank corrected)								Mass, gr (front + back, blank corrected)				Concentration, gr/DSCF			
	Run								Run				Run			
	1		2		3		Average									
Analyte	Front	Back	Front	Back	Front	Back	Front	Back	1	2	3	Average	1	2	3	Average
Arsenic	<4.67	<1.97	<4.67	<1.98	<4.67	<1.97	BDL	BDL	<7.2E-05	<7.2E-05	<7.2E-05					
Beryllium	<0.09	<0.034	<0.09	0.034	<0.09	<0.034	BDL	BDL	<1.4E-06	<1.4E-06	<1.4E-06					
Cadmium	1.59	2.47	1.72	6.15	0.43	0.986	2.47	2.35	6.27E-05	0.00012	2.15E-05	6.85482E-05	6.32E-07	6.35E-07	2.13E-07	5.60E-07
Chromium	31.4	404.411	17.5	2066.411	17.8	526.541	507.50	606.53	0.00673	0.0322	0.00840	0.01576154	6.78E-05	0.00025	6.30E-05	0.00013
Cobalt	0.39	6.21	0	27.2	0	11.33	6.76	8.95	0.00010	0.00042	0.00017	0.000232149	1.03E-06	3.23E-06	1.73E-06	1.99E-06
Mercury	0	21.446	0	9.659	8.65	21.673	7.99	12.33	0.00033	0.00015	0.00047	0.000317014	3.34E-06	1.15E-06	4.65E-06	3.04E-06
Manganese	6.52	48.072	3.45	171.772	3.3	62.462	46.42	57.61	0.00083	0.00270	0.00101	0.00152	8.34E-06	2.08E-05	1.00E-05	1.31E-05
Nickel	10	204.92	4.7	1130.92	4.7	366.03	271.05	342.25	0.00332	0.0175	0.00572	0.00885	3.34E-05	0.00013	5.65E-05	7.48E-05
Lead	0	12.3	1	7.77	2	8.09	4.61	6.23	0.00019	0.00014	0.00016	0.000160287	1.91E-06	1.04E-06	1.54E-06	1.50E-06
Antimony	1.4	2.03	0	1.92	0	3.421	1.07	1.47	5.29E-05	2.96E-05	5.28E-05	4.5118E-05	5.34E-07	2.26E-07	5.21E-07	4.26E-07
Selenium	10.5	28.7	4.3	32.9	5.2	64.43	16.32	27.11	0.00060	0.00057	0.00107	0.000751178	6.10E-06	4.42E-06	1.05E-05	7.04E-06

TABLE 3-17. KILN EMISSION TESTS RESULTS--VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Elapsed time	0	0	0
% isokinetic	0	0	0
GAS PARAMETERS			
Volume, ACM	0	0	0
Volume, DSCM	0.019964	0.0201194	0.0201688
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Flowrate, ACMM	572.3	574.3	576.4
Flowrate, DSCMM	541.0	546.5	552.0

Source/analyte	Mass, ng (blank corrected)				Concentration, ug/DSCM			
	Run				Run			
	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (a)	1475.956	88.518	192.644	585.706	73.9309	4.399636	9.551594	29.29404
Dichlorofluoromethane								
Bromomethane (a)	324.879		58.478	127.7857	16.27325		2.899432	6.390893
Acetonitrile	75.424				3.778001			
Acrylonitrile								
Vinl chloride								
Chloroethane	1132.853		368.637		56.74481		18.2776	
Iodomethane (a)	159.293	13.875	74.476	82.548	7.979014	0.689633	3.692638	4.120428
Trichlorofluoromethane								
Methylene chloride	5.532	9.259	1.362	5.384333	0.277099	0.460203	0.06753	ERR
Acetone	993.771	1261.417	2543.338		49.77816	62.69658	126.1027	ERR
Carbon disulfide	42.116	51.006	25.523	39.54833	2.109598	2.535166	1.265471	ERR
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	94.625	216.682	338.132	216.4797	4.739783	10.76981	16.76512	ERR
1,1,1-Trichloroethane	7.106		4.913		0.355941		0.243594	ERR
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	2522.718	4337.655	1184.394	2681.589	126.3634	215.5957	58.72413	ERR
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		33.904	4.64			1.685141	0.230059	ERR
2-Hexanone	2.64	147.467	98.485	82.864	0.132238	7.329596	4.883042	ERR
Tetrachloroethene		3.65	3.944			0.181417	0.19555	ERR
1,1,2,2-Tetrachloroethane								
Toluene	103.442	159.558	176.358	146.4527	5.181428	7.930558	8.744108	ERR
Chlorobenzene								
Ethylbenzene	30.577	41.073	52.656	41.43533	1.531607	2.041463	2.610768	ERR
Styrene	9.654	46.172	2.492	19.43933	0.483571	2.294901	0.123557	ERR
m-/p-Xylene	46.992	64.574	77.281	62.949	2.353838	3.209541	3.831714	ERR
o-Xylene	40.168	58.095	66.438	54.90033	2.012022	2.887513	3.294101	ERR
Hexachloroethane								
1,2-Dbromo-3-chloropropane		116.513	20.215			5.79108	1.002292	ERR

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-17. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Elapsed time			
% isokinetic			
GAS PARAMETERS			
Volume, ACF			
Volume, DSCF	0.7050085	0.7104962	0.7122403
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493

Source/analyte	Mass, gr (blank corrected)				Concentration, gr/DSCF			
	Run				Run			
	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06	9.04E-06	3.2E-05	1.92E-06	4.17E-06	1.28E-05
Dichlorofluoromethane								
Bromomethane (a)	5.01E-06		9.02E-07	1.97E-06	7.1E-06		1.27E-06	2.79E-06
Acetonitrile	1.16E-06				1.7E-06			
Acrylonitrile								
Vinl chloride								
Chloroethane	1.75E-05		5.69E-06		2.5E-05		7.99E-06	
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06	1.27E-06	3.5E-06	3.01E-07	1.61E-06	1.8E-06
Trichlorofluoromethane								
Methylene chloride	8.54E-08	1.43E-07	2.10E-08	8.31E-08	1.2E-07	2.01E-07	2.95E-08	ERR
Acetone	1.53E-05	1.95E-05	3.92E-05		2.2E-05	2.74E-05	5.51E-05	ERR
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07	6.1E-07	9.2E-07	1.11E-06	5.53E-07	ERR
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
t-1,2-Dichloroethene								
Chloroform								
1,2-Dichloroethane								
2-Butanone	1.46E-06	3.34E-06	5.22E-06	3.34E-06	2.1E-06	4.71E-06	7.33E-06	ERR
1,1,1-Trichloroethane	1.10E-07		7.58E-08		1.6E-07		1.06E-07	ERR
Carbon tetrachloride								
Vinyl acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
2-Chloroethyl vinyl ether								
Dibromochloromethane								
Dibromomethane								
Dibromoethane								
1,1,2-Trichloroethane								
1,4-Dichloro-2-butene								
Benzene	3.89E-05	6.69E-05	1.83E-05	4.14E-05	5.5E-05	9.42E-05	2.57E-05	ERR
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone		5.23E-07	7.16E-08			7.36E-07	1.01E-07	ERR
2-Hexanone	4.07E-08	2.28E-06	1.52E-06	1.28E-06	5.8E-08	3.2E-06	2.13E-06	ERR
Tetrachloroethene		5.63E-08	6.09E-08			7.93E-08	8.55E-08	ERR
1,1,2,2-Tetrachloroethane								
Toluene	1.60E-06	2.46E-06	2.72E-06	2.26E-06	2.3E-06	3.47E-06	3.82E-06	ERR
Chlorobenzene								
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07	6.39E-07	6.7E-07	8.92E-07	1.14E-06	ERR
Styrene	1.49E-07	7.13E-07	3.85E-08	3E-07	2.1E-07	1E-06	5.4E-08	ERR
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06	9.71E-07	1.0E-06	1.4E-06	1.67E-06	ERR
o-Xylene	6.20E-07	8.97E-07	1.03E-06	8.47E-07	8.8E-07	1.26E-06	1.44E-06	ERR
Hexachloroethane								
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07			2.53E-06	4.38E-07	ERR

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-18. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Elapsed time	0	0	0
% isokinetic	94.8	100.5	100.5
GAS PARAMETERS			
Volume, ACM	3.004	2.966	3.294
Volume, DSCM	2.891	2.844	3.136
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACMM	610.5	572.1	628.2
Flowrate, DSCMM	584.3	547.2	598.0

	Catch, ug				Concentration, ug/DSCM			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	13	13	8.7	11.6	4.50	4.57	2.77	3.95
Aniline	<2	<2	<2					
Bis(2-chloroethyl)ether	<2	<2	<2					
2-Chlorophenol	<2	<2	<2					
1,3-Dichlorobenzene	<2	<2	<2					
1,4-Dichlorobenzene	4.8	4.9	9.7	6.5	1.66	1.72	3.09	2.16
Benzyl alcohol	<2	<2	<2					
1,2-Dichlorobenzene	<2	<2	<2					
2-Methylphenol	2.1	<2	<2		0.726			
2,2'-oxybis(1-Chloropropane)	<2	<2	<2					
4-Methylphenol	<2	<2	<2					
N-Nitrosodipropylamine	<2	<2	<2					
Hexachloroethane	<2	<2	<2					
Nitrobenzene	<2	<2	<2					
Isophorone	<2	<2	<2					
2-Nitrophenol	<2	<2	<2					
2,4-Dimethylphenol	<2	<2	<2					
Benzoic acid	<2	<2	623				199	
Bis(2-chloroethoxy)methane	<2	<2	<2					
2-Chloroacetophenone	<2	<2	<2					
2,4-Dichlorophenol	<2	<2	<2					
1,2,4-Trichlorobenzene	<2	<2	<2					
Naphthalene	6	12	8.5	8.8	2.08	4.22	2.71	3.00
4-Chloroaniline	<2	<2	<2					
2,6-Dichlorophenol	<2	<2	<2					
Hexachlorobutadiene	<2	<2	<2					
4-Chloro-3-methylphenol	<2	<2	<2					
2-Hydroxyacetophenone	<2	<2	<2					
2-Methylnaphthalene	4.8	11	7.4	7.7	1.66	3.87	2.36	2.63

TABLE 3-18. (METRIC UNITS continued)

	Catch, ug				Concentration, ug/DSCM			
	Run				Run			
Source/analyte	1	2	3	Average	1	2	3	Average
Hexachlorocyclopentadiene	<2	<2	<2					
2,4,6-Trichlorophenol	<2	<2	<2					
2,4,5-Trichlorophenol	<2	<2	<2					
2-Chloronaphthalene	<2	<2	<2					
2-Nitroaniline	<2	<2	<2					
Dimethylphthalate	<2	<2	<2					
Acenaphthylene	<2	<2	<2					
2,6-Dinitrotoluene	<2	<2	<2					
2,3,4,6-Tetrachlorophenone	<2	<2	<2					
3-Nitroaniline	<2	<2	<2					
Acenaphthene	<2	<2	<2					
2,4-Dinitrophenol	<2	<2	<2					
4-Nitrophenol	<2	<2	<2					
Dibenzofuran	<2	<2	<2					
2,4-Dinitrotoluene	<2	<2	<2					
Diethyl phthalate	53	23	18	31	18.3	8.09	5.74	10.7
4-Chlorophenylphenyl ether	<2	<2	<2					
Fluorene	<2	<2	<2					
4-Nitroaniline	<2	<2	<2					
4,6-Dinitro-2-methylphenol	<2	<2	<2					
N-Nitrosodiphenylamine	<2	<2	<2					
4-Bromophenyl-phenylether	<2	<2	<2					
Hexachlorobenzene	<2	<2	<2					
Pentachlorophenol	<2	<2	<2					
Phenanthrene	<2	<2	<2					
Anthracene	<2	<2	<2					
Carbazole	<2	<2	<2					
Di-n-butyl phthalate	13	14	31	19	4.50	4.92	9.88	6.43
Fluoranthene	<2	<2	<2					
Benzidine	<2	<2	<2					
Pyrene	<2	<2	<2					
Butylbenzyl phthalate	2	2.2	3	2.4	0.692	0.774	0.957	0.807
3,3'-Dichlorobenzidine	<2	<2	<2					
Benzo(a)anthracene	<2	<2	<2					
Chrysene	<2	<2	<2					
Bis(2-ethylhexyl) phthalate	77	240	510	276	26.6	84.4	162.6	91.2
Di-n-octyl phthalate	<2	<2	10				3.2	
Benzo(b)fluoranthene	<2	<2	<2					
Benzo(k)fluoroanthene	<2	<2	<2					
Benzo(a)pyrene	<2	<2	<2					
Indeno(1,2,3-cd)pyrene	<2	<2	<2					
Dibenz(a,h)anthracene	<2	<2	<2					
Benzo(g,h,i)perylene	<2	<2	<2					

TABLE 3-18. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Elapsed time			
% isokinetic	94.8	100.5	100.5
GAS PARAMETERS			
Volume, ACF	106.077	104.759	116.333
Volume, DSCF	102.084	100.421	110.755
Gas temperature, F	433	428	428
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACFM	21,559	20,202	22,184
Flowrate, DSCFM	20,635	19,325	21,118

	Catch, gr				Concentration, gr/DSCF			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	2.0E-04	2.0E-04	1.3E-04	1.8E-04	1.97E-06	2.00E-06	1.21E-06	1.73E-06
Aniline	<2	<2	<2					
Bis(2-chloroethyl)ether	<2	<2	<2					
2-Chlorophenol	<2	<2	<2					
1,3-Dichlorobenzene	<2	<2	<2					
1,4-Dichlorobenzene	7.4E-05	7.6E-05	1.5E-04	1.0E-04	7.26E-07	7.53E-07	1.35E-06	9.43E-07
Benzyl alcohol	<2	<2	<2					
1,2-Dichlorobenzene	<2	<2	<2					
2-Methylphenol	3.24E-05	<2	<2		3.17E-07			
2,2'-oxybis(1-Chloropropane)	<2	<2	<2					
4-Methylphenol	<2	<2	<2					
N-Nitrosodipropylamine	<2	<2	<2					
Hexachloroethane	<2	<2	<2					
Nitrobenzene	<2	<2	<2					
Isophorone	<2	<2	<2					
2-Nitrophenol	<2	<2	<2					
2,4-Dimethylphenol	<2	<2	<2					
Benzoic acid	<2	<2	0.0096				8.68E-05	
Bis(2-chloroethoxy)methane	<2	<2	<2					
2-Chloroacetophenone	<2	<2	<2					
2,4-Dichlorophenol	<2	<2	<2					
1,2,4-Trichlorobenzene	<2	<2	<2					
Naphthalene	9.3E-05	0.00019	0.00013	0.00014	9.07E-07	1.84E-06	1.18E-06	1.31E-06
4-Chloroaniline	<2	<2	<2					
2,6-Dichlorophenol	<2	<2	<2					
Hexachlorobutadiene	<2	<2	<2					
4-Chloro-3-methylphenol	<2	<2	<2					
2-Hydroxyacetophenone	<2	<2	<2					
2-Methylnaphthalene	7.4E-05	1.7E-04	1.1E-04	1.2E-04	7.26E-07	1.69E-06	1.03E-06	1.15E-06

TABLE 3-18. (ENGLISH UNITS continued)

	Catch, gr				Concentration, gr/DSCF			
	Run				Run			
Source/analyte	1	2	3	Average	1	2	3	Average
Hexachlorocyclopentadiene	<2	<2	<2					
2,4,6-Trichlorophenol	<2	<2	<2					
2,4,5-Trichlorophenol	<2	<2	<2					
2-Chloronaphthalene	<2	<2	<2					
2-Nitroaniline	<2	<2	<2					
Dimethylphthalate	<2	<2	<2					
Acenaphthylene	<2	<2	<2					
2,6-Dinitrotoluene	<2	<2	<2					
2,3,4,6-Tetrachlorophenone	<2	<2	<2					
3-Nitroaniline	<2	<2	<2					
Acenaphthene	<2	<2	<2					
2,4-Dinitrophenol	<2	<2	<2					
4-Nitrophenol	<2	<2	<2					
Dibenzofuran	<2	<2	<2					
2,4-Dinitrotoluene	<2	<2	<2					
Diethyl phthalate	0.00082	0.00035	0.00028	0.00048	8.01E-06	3.53E-06	2.51E-06	4.68E-06
4-Chlorophenylphenyl ether	<2	<2	<2					
Fluorene	<2	<2	<2					
4-Nitroaniline	<2	<2	<2					
4,6-Dinitro-2-methylphenol	<2	<2	<2					
N-Nitrosodiphenylamine	<2	<2	<2					
4-Bromophenyl-phenylether	<2	<2	<2					
Hexachlorobenzene	<2	<2	<2					
Pentachlorophenol	<2	<2	<2					
Phenanthrene	0.0E+00	<2	<2		0.00E+00			
Anthracene	<2	<2	<2					
Carbazole	<2	<2	<2					
Di-n-butyl phthalate	0.00020	0.00022	0.00048	0.00030	1.97E-06	2.15E-06	4.32E-06	2.81E-06
Fluoranthene	<2	<2	<2					
Benzidine	<2	<2	<2					
Pyrene	<2	<2	<2					
Butylbenzyl phthalate	3.1E-05	3.4E-05	4.6E-05	3.7E-05	3.02E-07	3.38E-07	4.18E-07	3.53E-07
3,3'-Dichlorobenzidine	<2	<2	<2					
Benzo(a)anthracene	<2	<2	<2					
Chrysene	<2	<2	<2					
Bis(2-ethylhexyl) phthalate	0.0012	0.0037	0.0079	0.0043	1.16E-05	3.69E-05	7.11E-05	3.99E-05
Di-n-octyl phthalate	<2	<2	0.00015				1.4E-06	
Benzo(b)fluoranthene	<2	<2	<2					
Benzo(k)fluoroanthene	<2	<2	<2					
Benzo(a)pyrene	<2	<2	<2					
Indeno(1,2,3-cd)pyrene	<2	<2	<2					
Dibenz(a,h)anthracene	<2	<2	<2					
Benzo(g,h,i)perylene	<2	<2	<2					

TABLE 3-19. KILN EMISSION TESTS RESULTS–INORGANIC GASES AND THC (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time	2:01	2:00	2:00
% isokinetic	106.8	99	97.4
GAS PARAMETERS			
Volume, ACM	1.212	1.234	1.247
Volume, DSCM	1.174	1.183	1.187
Gas temperature, C	193.33	204.44	209.44
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.1	5.5	4.2
Flowrate, ACMM	641.0	572.3	576.4
Flowrate, DSCMM	614.8	541.0	552.0

	Concentration, ppm (a)			
	Run			
Analyte	1	2	3	Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.95	2.02	1.88	1.95
THC	1.99	1.21	2.41	1.87
Methane (c)	6.55	5.05	4.92	5.51
Ethane (c)	<3	<3	<3	

(a) Based on average of 120 readings.

(b) Concentration in percent.

(c) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

TABLE 3-19. KILN EMISSION TESTS RESULTS–INORGANIC GASES AND THC (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time	2:01	2:00	2:00
% isokinetic	106.8	99.0	97.4
GAS PARAMETERS			
Volume, ACF	42.789	43.568	44.040
Volume, DSCF	41.464	41.763	41.926
Gas temperature, F	380	400	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.1	5.5	4.2
Flowrate, ACFM	22,636	20,209	20,356
Flowrate, DSCFM	21,711	19,104	19,493

	Concentration, ppm			
	Run			
Analyte	1	2	3	Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (a)	1.95	2.02	1.88	1.95
THC	1.99	1.21	2.41	1.87
Methane (c)	6.55	5.05	4.92	5.51
Ethane (c)	<3	<3	<3	

(a) Based on average of 120 readings.

(b) Concentration in percent.

(c) Runs 1 and 2 based on average of 2 readings; Run 3 based on average of 5 readings.

TABLE 3-20. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (METRIC UNITS)

Method 26A train				Method 29 train				Method 201A/202 train			
Run No.	1	2	3	Run No.	1	2	3	Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93	Date	11/09/93	11/10/93	11/10/93	Date	11/11/93	11/11/93	11/11/93
Start time	14:07	09:42	15:53	Start time	14:30	09:42	15:53	Start time	10:55	14:59	17:07
Finish time	19:17	13:57	19:47	Finish time	19:15	13:57	19:47	Finish time	12:27	16:42	18:39
Elapsed time	0	0	0	Elapsed time	0	0	0	Elapsed time	90	90	90
% isokinetic	78.3	100.8	100.5	% isokinetic	92.7	99.3	99.5	% isokinetic	106.8	99	97.4
GAS PARAMETERS				GAS PARAMETERS				GAS PARAMETERS			
Volume, ACM	2.439	3.092	2.995	Volume, ACM	2.891	3.724	2.990	Volume, ACM	1.212	1.234	1.247
Volume, DSCM	2.338	2.955	2.835	Volume, DSCM	2.809	3.594	2.867	Volume, DSCM	1.174	1.183	1.187
Gas temperature, C	224	222	227	Gas temperature, C	221	221	224	Gas temperature, C	193	204	209
Oxygen, %	17.8	18.8	18	Oxygen, %	17.6	18.4	17.8	Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	1.1	1.8	2	Carbon dioxide, %	2.2	1	1.7	Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.4	4.6	4.7	Moisture, %	4.4	4.3	4.7	Moisture, %	4.1	5.5	4.2
Flowrate, ACMM	601.5	594.5	572.6	Flowrate, ACMM	613.3	731.7	1,011.7	Flowrate, ACMM	641.0	572.3	576.4
Flowrate, DSCMM	575.0	567.4	545.6	Flowrate, DSCMM	586.5	700.5	584.6	Flowrate, DSCMM	614.8	541.0	552.0

	Mass, g				Concentration, g/DSCM			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (a)	0.0496	0.0473	0.0600	0.0523	0.0212	0.0160	0.0212	0.0195
Filterable PM (b)	0.0537	0.0430	0.0886	0.0618	0.0191	0.0120	0.0309	0.0207
Filterable PM (c)	0.0177	0.0188	0.0127	0.0164	0.0151	0.0159	0.0107	0.0139
Filterable PM-10	0.0033	0.0147	0.0047	0.0076	0.0028	0.0124	0.0040	0.0064
Cond. inorganic PM	0.167	0.183	0.162	0.171	0.1420	0.1551	0.1363	0.1444
Cond. organic PM	0.0548	0.0153	0.0104	0.0268	0.0467	0.0129	0.0088	0.0228
Total cond. PM	0.222	0.199	0.172	0.197	0.1886	0.1680	0.1450	0.1672

(a) Measured simultaneously with Method 26A (HF, HCl) train.

(b) Measured simultaneously with Method 29 (metals) train.

(c) Based on Method 201A train.

TABLE 3-20. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (ENGLISH UNITS)

Method 26A train				Method 29 train				Method 201A/202 train			
Run No.	1	2	3	Run No.	1	2	3	Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93	Date	11/09/93	11/10/93	11/10/93	Date	11/11/93	11/11/93	11/11/93
Start time	14:07	09:42	15:53	Start time	14:30	09:42	15:53	Start time	10:55	14:59	17:07
Finish time	19:17	13:57	19:47	Finish time	19:15	13:57	19:47	Finish time	12:27	16:42	18:39
Elapsed time, min				Elapsed time				Elapsed time, min	90	90	90
% isokinetic	78.3	100.8	100.5	% isokinetic	92.7	99.3	99.5	% isokinetic	106.8	99.0	97.4
GAS PARAMETERS				GAS PARAMETERS				GAS PARAMETERS			
Volume, ACF	86.148	109.203	105.783	Volume, ACF	102.102	131.495	105.603	Volume, ACF	42.789	43.568	44.040
Volume, DSCF	82.567	104.337	100.101	Volume, DSCF	99.211	126.906	101.263	Volume, DSCF	41.464	41.763	41.926
Gas temperature, F	436	431	440	Gas temperature, F	429	429	435	Gas temperature, F	380	400	409
Oxygen, %	17.8	18.8	18.0	Oxygen, %	17.6	18.4	17.8	Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	1.1	1.8	2.0	Carbon dioxide, %	2.2	1	1.7	Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.4	4.6	4.7	Moisture, %	4.4	4.3	4.7	Moisture, %	4.1	5.5	4.2
Flowrate, ACFM	21,243	20,994	20,222	Flowrate, ACFM	21,657	25,840	35,729	Flowrate, ACFM	22,636	20,209	20,356
Flowrate, DSCFM	20,307	20,036	19,269	Flowrate, DSCFM	20,713	24,738	20,645	Flowrate, DSCFM	21,711	19,104	19,493

	Mass, gr				Concentration, gr/DSCF			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (a)	0.765	0.730	0.926	0.807	0.00889	0.00668	0.00875	0.00811
Filterable PM (b)	0.829	0.664	1.367	0.953	0.00812	0.00505	0.01295	0.00870
Filterable PM (c)	0.273	0.290	0.196	0.253	0.00638	0.00666	0.00445	0.00583
Filterable PM-10	0.051	0.227	0.073	0.117	0.00119	0.00521	0.00165	0.00268
Cond. inorganic PM	2.573	2.830	2.497	2.633	0.06012	0.06496	0.05670	0.06059
Cond. organic PM	0.846	0.236	0.160	0.414	0.01976	0.00542	0.00364	0.00961
Total cond. PM	3.418	3.066	2.657	3.047	0.0799	0.0704	0.0603	0.07020

(a) Measured simultaneously with Method 26A (HF, HCl) train.
(b) Measured simultaneously with Method 29 (metals) train.
(c) Based on Method 201A train.

TABLE 3-21. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:07	09:42	15:53
Finish time	19:17	13:57	19:47
Elapsed time, min			
% isokinetic	78.3	100.8	100.5
GAS PARAMETERS			
Volume, ACM	2.439	3.092	2.995
Volume, DSCM	2.338	2.955	2.835
Gas temperature, C	224	222	227
Oxygen, %	17.8	18.8	18.0
Carbon dioxide, %	1.1	1.8	2.0
Moisture, %	4.4	4.6	4.7
Flowrate, ACMM	601.5	594.5	572.6
Flowrate, DSCMM	575.0	567.4	545.6

	Mass, ug				Concentration, ug/DSCM			
Analyte	1	2	3	Average	1	2	3	Average
HF	31,969	43,518	37,333	37,607	13,673	14,729	13,171	13,858
HCl	2,117	2,449	2,302	2,289	905	829	812	849
Cl2	128	216	169	171	54.7	73.1	59.6	62.5

TABLE 3-21. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:07	09:42	15:53
Finish time	19:17	13:57	19:47
Elapsed time, min			
% isokinetic	78.3	100.8	100.5
GAS PARAMETERS			
Volume, ACF	86.148	109.203	105.783
Volume, DSCF	82.567	104.337	100.101
Gas temperature, F	436	431	440
Oxygen, %	17.8	18.8	18.0
Carbon dioxide, %	1.1	1.8	2.0
Moisture, %	4.4	4.6	4.7
Flowrate, ACFM	21,243	20,994	20,222
Flowrate, DSCFM	20,307	20,036	19,269

	Mass, gr				Concentration, gr/DSCF			
Analyte	1	2	3	Average	1	2	3	Average
HF	0.493	0.672	0.576	0.580	0.0060	0.0064	0.0058	0.0061
HCl	0.0327	0.0378	0.0355	0.0353	0.00040	0.00036	0.00035	0.00037
Cl2	0.00198	0.00333	0.00261	0.00264	2.4E-05	3.2E-05	2.6E-05	2.73E-05

TABLE 3-22. DRYER EMISSION TESTS RESULTS--THC, METHANE/ETHANE (METRIC UNITS)

Run No.	1 (a)	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time			
% isokinetic			
GAS PARAMETERS			
Volume, ACM			
Volume, DSCM			
Gas temperature, C	37.8	37.8	37.8
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.2	4.2	4.2
Flowrate, ACMM	1971.0331	1,947	1,995
Flowrate, DSCMM	1733.7083	1,712	1,755

(a) Run 1 data estimated as average of Runs 2 and 3 data.

	Concentration, ppm			
	Run			
Analyte	1	2	3	Average
THC	80.2	85.6	91.9	85.9
methane	102	91	106	99.66667
ethane	9.2	6.7	7.6	7.833333

TABLE 3-22. DRYER EMISSION TESTS RESULTS--THC, METHANE/ETHANE (ENGLISH UNITS)

Run No.	1 (a)	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	10:35	13:11	15:27
Finish time	12:36	15:11	17:27
Elapsed time			
% isokinetic			
GAS PARAMETERS			
Volume, ACF			
Volume, DSCF			
Gas temperature, F	100	100	100
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	4.2	4.2	4.2
Flowrate, ACFM	69,606	68,760	70,452
Flowrate, DSCFM	61,225	60,472	61,978

(a) Run 1 data estimated as average of Runs 2 and 3 data.

	Concentration, ppm			
	Run			
Analyte	1	2	3	Average
THC	80.2	85.6	91.9	85.9
methane	102	91	106	99.7
ethane	9.2	6.7	7.6	7.83

FIELD NOTEBOOK

MIDWEST RESEARCH INSTITUTE
ENVIRONMENTAL ENGINEERING DEPARTMENT
SUITE 350
401 HARRISON OAKS BLVD.
CARY, NC 27513
Telephone: (919) 677-0249
Facsimile: (919) 677-0065

ISSUED TO: RICHARD MARINSHAW

SUBJECT: BELDEN BRICK PRETEST SITE SURVEY

MRI PROJECT NO.: 4600-01

MRI CBI Pending No.: ______

EPA CBI Pending No.: ______

Declassified/Released: ______
(CDCO initial/date)

Facility Name: Belden Brick Co.

Address: P.O. Box 430
Sugarcreek, OH 44681

Facility Contact: John Jensen

Telephone: (216) 852-2424

Date and Time: 9/22 7:00 AM

Attendees: Ron Myers, EPA:EIB
Sharon Szydlo, MRI/RC
R. Marinshaw, MRI/NC

Directions to Facility: From Akron-Canton Airport take I-77 South to Exit 83 Dover/Sugarcreek; right onto State Road 39 toward Sugarcreek (8 miles); left @ light in town; left @ blinking light to Bed & Breakfast Barn

Restaurant: From I-77 take Exit 87 (Strasburg) turn left & go 1/2 mile to [illegible] Restaurant on right

MIDWEST RESEARCH INSTITUTE

Project No. ____________ Date/Time ____________

Subject ____________

→ NEED TO GET MOISTURE OF RAW MATERIAL

P1 - SHALE FF INLET DUCT
P2 " " " "
P3 CLAY " " "
P4 " " OUTLET DUCT

→ FINALIZE ~~LENGTH~~ DURATION OF SAMPLE RUNS
MAXIMUM PLANT CAN HANDLE

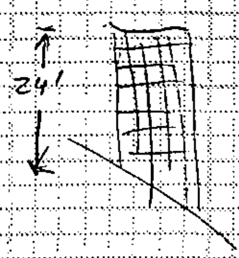
→ LOOK INTO CLEANING OUT FF PRIOR TO TEST
& COLLECTING FF CLEANINGS DURING TEST & COMPARE TO
INLET ~~[illegible]~~ EMISSION RATE MEASUREMENT (RUN [illegible] AFTER
~~[illegible]~~ CLEANING)

P5 - CLAY FF → PULSE JET EACH BAG PULSED EVERY 1.5 MINUTES

P6 - KILN STACKS 68'

~~BELOW WILL~~
PROCESS RATE - MEASUREMENT OPTIONS
→ TIME SAMPLE CATCH & CONVEYOR DROP TO BINS AS IS
→ INSTALL DIVERTER @ CONVEYOR END
P7 - FINE MATERIAL CONVEYOR TO STORAGE BINS
P8 " " " "
→ STOP CONVEYOR & WEIGH 5-8' OF BELT MATERIAL
→ JENSEN WILL WORK TO THIS NEED IT

P9 - KILN STACK
P10 - " "
P11 - DRYER STACK
P12 - KILN STACK



KILN STACK 89" OUTSIDE →84← □
~~89~~" INSIDE
STEEL BRACES @ 5'
DRYER STACK 57"∅ OD
7/16" THICK

P13 - BRICK CUTTER (NOTE ODOR @ FRONT)

ZERO POINT IN KILN IS BAFFLED

KILN PROCESS RATES
- NEED TO COLLECT KILN CAR RECORDS (# & TYPE OF BRICKS)
- HAVE USAGE METER FOR GAS CONSUMPTION (RECORDS PRESSURE)
- NEED TO COLLECT KILN RECORD INCLUDES TEMPS & PUSH TIMES

CARS MOVE CONTINUOUSLY THROUGH KILN ~~[illegible]~~.
@ VERY SLOW RATE (1"/HR?)
PUSH TIMES CORRESPOND TO WHEN NEW CAR ENTERS KILN
WHEN RAM RETRACTS & PICKS UP NEW CAR

LAST WEEK OF OCTOBER IS OUT BECAUSE OF PLANT OPERATORS FORUM
JENSEN & OTHER STAFF WILL BE OUT THAT WEEK

FIRST WEEK OF NOVEMBER - SHOOT FOR THAT
NEED TO ALLOW A WEEK TO HAVE PORTS INSTALLED IN STACKS

MIDWEST RESEARCH INSTITUTE

Project No. ____________ Date/Time ____________ Page 3 of 10

Subject ____________

MIDWEST RESEARCH INSTITUTE

Project No. ____________ Date/Time ____________

Subject ____________

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______ Page 7 of 10

Subject ______

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______ Page 9 of 10

Subject ______

FIELD NOTEBOOK

MIDWEST RESEARCH INSTITUTE
ENVIRONMENTAL ENGINEERING DEPARTMENT
SUITE 350
401 HARRISON OAKS BLVD.
CARY, NC 27513
Telephone: (919) 677-0249
Facsimile: (919) 677-0065

ISSUED TO: Brian Shrager

SUBJECT: Belden Brick Site Visit

MRI PROJECT NO.: 3612

MRI CBI Pending No.:

EPA CBI Pending No.:

Declassified/Released:
(CDCO initial/date)

Facility Name: Belden Brick

Address: Dover Road

Sugarcreek, Ohio 44681

Facility Contact: John Jensen

Telephone: (216) 456-0031 (216) 852-2424

Date and Time: 6/9/93 7:00 am

Attendees: John Jensen, Environmental Eng.

Brian Shrager

Rick Marinshaw

Directions to Facility:

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

Plant owns 6 mining licenses, 32 open pits.

· First visited pit. Overview of mining of clays, shales.

Plant 5 currently firing more fire clay than shale.

Fire clay gives off a bluish plume.

Plant 4 has 31 periodic kilns (natural gas fired).

Two types of testing on raw materials.

Fire samples of raw materials to check colors.

3A Shale is lowest used.

36-40 million brick/yr

PLANT 6 GRINDING ROOM

2 fabric filters - 1 pulse jet, one shaker
25,000 cfm 18000 cfm

Exhaust back into building

1 side shale, 1 side fire clay

2400 cfm/screen

600 cfm/pickup point

all carrying velocities = 4500 fpm

Shale

Truck → Prim. Crusher (Double roller) → Crushed Clay Storage bins → Grinder → Screens (3) → fine clay storage

oversize

Hoods @ all transfer pts, all screens

Baghouse outlet stacks back into bldg. Both appear to have sufficient length.

12'4" Length | 29" ϕ duct (Shaker) | 33" ϕ ~ 12'-13' (pulse jet)

Additives: added to body (raw material) (not surface except Barium)

Barium Carbonate: Keeps sulfates from rising to the brick surface

Iron Chromite - Color

Manganese dioxide - Color

Fine clay storage

additive feeder

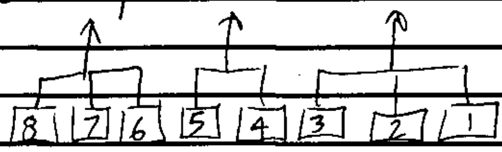
*No. 2 oil used for lubricating columns

2 clay lines # 2, 3
2 shale lines # 1, 4
} can mix materials to any line

4 extruding lines

Bricks hand stacked onto RR cars

8 brick dryers → 3 stacks → all very long

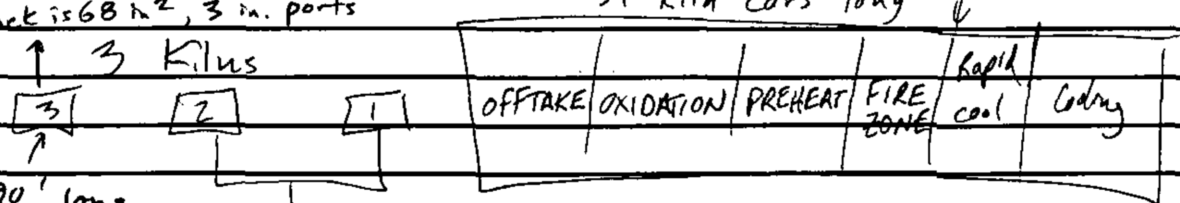


Stack is 68 in², 3 in. ports

3 Kilns

Kilns 1+2 340'
34 Kiln cars long

zero pt

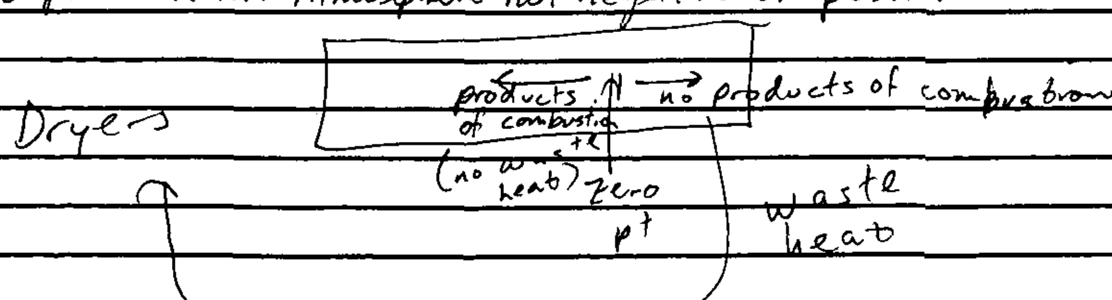


390' long (extra cooling length)

Share a stack — 60"x64" split to 60"x32", 3 in. ports on Kiln 2 side.

Excess air @ beginning of Kiln. Need to burn off impurities before high heat exposure.

Zero pt. in Kiln. Atmosphere not negative or positive



MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

PLANT 8

2 primary crushers in separate building (1 clay, 1 shale)

clay ↓ → Storage hoppers (3) ↓ → 2 pan (rim discharge) grinders ↓ → 7 screens ↓ → fine clay storage bins

oversize → 2 pan grinders

shale ↓ → storage hoppers (5) ↓ → pan (rim discharge) grinder ↓ → 4 screens ↓ → fine clay storage bins

oversize → pan grinder

4 collectors (baghouses) 2 double

Grinding room is not typical. Very large, multiple baghouses.

Soft mud line

Soft Mud Line

Double pug mill ~28% moist.

Material drops into a mold, sand finish on outside. To dryer. (mechanical handling)

Dry bricks → mechanically set onto Kiln cars.

Sand dryer used. Natural gas fired. Sand to bins

2 extrusion lines $\xrightarrow{\text{hand stacked}}$ Holding Room

Soft mud to predry before dryer

8 dryers / 3 Kilns

Hot zone → Rapid cool → Flashing zone → Rapid cool → cooling

All Kilns

raw fuel to [illegible] atmosphere @~1700°F
can flash w/ gas, coal, [illegible] zinc (green) not used often
SMOKE gets (black) sucked back to hot zone & burns.

1 has own stack - 56 in²
2 & 3 share a stack - 56 in² w/ 3" sampling ports.

Plant 8 70 million bricks/yr

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

FIELD NOTEBOOK

MIDWEST RESEARCH INSTITUTE
ENVIRONMENTAL ENGINEERING DEPARTMENT
SUITE 350
401 HARRISON OAKS BLVD.
CARY, NC 27513
Telephone: (919) 677-0249
Facsimile: (919) 677-0065

ISSUED TO: R. MARINSHAW

SUBJECT: BELDEN BRICK TRIP

MRI PROJECT NO.: 3612

MRI CBI Pending No.:

EPA CBI Pending No.:

Declassified/Released:
(CDCO initial/date)

Facility Name: BELDEN BRICK, INC

Address: P.O. BOX 430
SUGARCREEK, OH
44681

Facility Contact: JOHN JENSEN

Telephone: (216) 456-0031

Date and Time: 6/9/93 7:00AM - 1:30PM

Attendees: BRIAN SHRAGER, MRI
RICHARD MARINSHAW, MRI
JOHN JENSEN, BELDEN BRICK

Directions to Facility: FROM AKRON-CANTON AIRPORT TAKE I-77 SOUTH FOLLOW TO EXIT 83 (DOVER/SUGARCREEK) TURN RIGHT OFF EXIT ONTO STATE ROAD 39 FOLLOW 8 MILES TO SUGARCREEK. BELDEN HAS 6 BRICK PLANTS SURROUNDING & IN TOWN

MIDWEST RESEARCH INSTITUTE

Project No. ________ Date/Time ________ Page 1 of 10

Subject ________

PH 1 SHALE

LIME

~~LIME~~

COAL

FIRE CLAY

PH 2 — PERIODIC KILNS & STOCK YARD

PH 3 — " " STACKS 110' HIGH

PH 4 — 3A SHALE PIT (ENTIRE SEAM EXPOSED)

PH 5 — OUTLET DUCT FROM FF TO FAN PLANT 6 CRUSH/GRIND ROOM
33"Ø SHALE SIDE

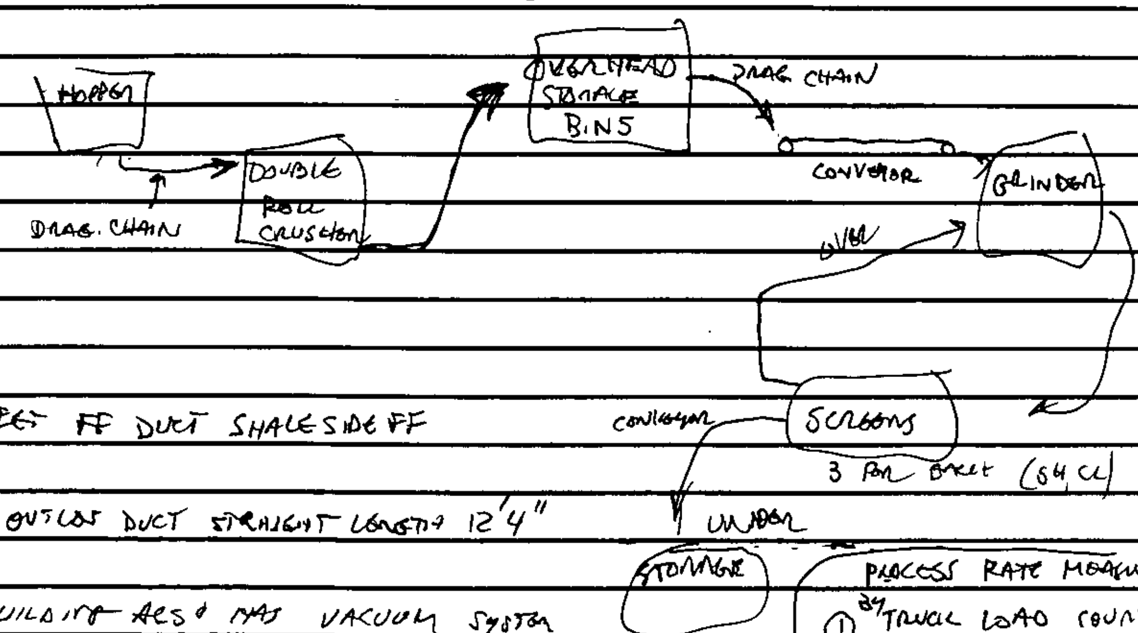
PH 6 — HOODED SCREEN WITH EXHAUST PIPING

PH 7 — OUTLET DUCTS (~~29"Ø~~) FROM CLAY SIDE FF
(BACKGROUND TOP, INLET DUCT TO FF IS VISIBLE)

PLANT 6

CRUSHING 2 FFs 1 SHAKER, 1 PULSEJET

RIM DISCHARGE GRINDERS



PH 8 - INLET FF DUCT SHALE SIDE FF

CLAY SIDE OUTLET DUCT STRAIGHT LENGTH 12'4"

BUILDING ALSO HAS VACUUM SYSTEM
160" Hg

PROCESS RATE MEASUREMENT
1) BY TRUCK LOAD COUNT
25 TONS/TRUCK
2) RUN TIME THROUGH CONVEYOR DISCHARGE & WEIGHT

FINE MATERIAL STORAGE IN ADJACENT BLDG.
SEE SHEET FOR # OF STORAGE BINS
ALSO, ADDITIVE STOCKS IN SAME BLDG
IRON CHROMITE, MANGANESE DIOXIDE, $BaCO_3$
ADDITIVE FEED IS COMPUTER CONTROLLED

NO 2 OIL USED AS DIE LUBRICANT & TO FACILITATE CUTTING OF EXTRUDED COLUMN

MIDWEST RESEARCH INSTITUTE

Project No. ____________ Date/Time ____________

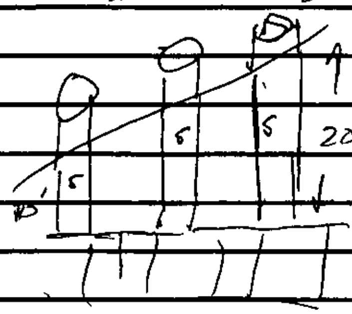
Subject ____________

→ PUG MILL

STEAM OR OIL LUBRICATED DIES

3 DRYER STACKS - 8 TUNNELS

STRAIGHT LENGHT - ~20 - ~10'



3 TUNNEL KILNS

KILN 3 HAS SEPARATE STACK

KILNS 1, 2 SHARE A PARTITIONED STACK

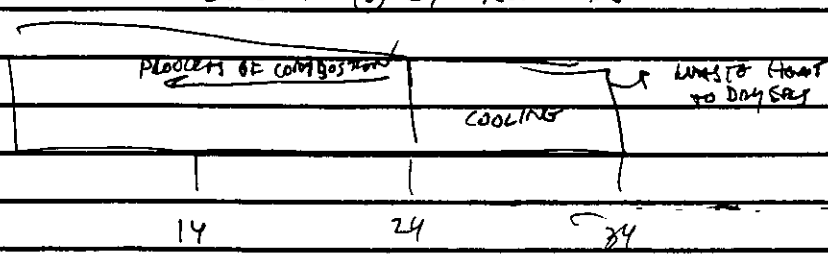
FIRST 1/3 OF KILN → BURNERS HAVE 200% EXCESS AIR

TO KEEP TEMP DOWN   MIXED @ BURNER

HOT ZONE - GAS/AIR PREMIXED PRIOR TO BURNER

34 KILN CARS LONG

ZERO PT @ 24 KILN CARS



ADD AIR @ ZERO PT.

PH 9 - KILN DUCT UNIDENTIFIED (STACKS ARE BACK)

PH 10 - KILN STACKS

PH 11 - DRYER STACKS

PH 12 - GRINDING PLANT

MIDWEST RESEARCH INSTITUTE

Project No. ______________ Date/Time ______________

Subject ______________

PLANT 8

PH 13 - PLANT 8 STACKS

VIBRATING SCREENS

SEPARATE TO CRUSHER BLDG

CRUSH → STR → GRND → SCR.

PH 14 - HOODED SCREENS

PH 15 - INTAKES FROM SCREEN HOODS

FROM STORAGE CAN ADJUST FEED RATE OF 2 MATERIALS (FOR BLENDING) TO GRINDERS

GRINDERS HAVE MOTOR LOAD CONTROLS

i.e. IF AMPS ↓ GRINDER FEED ↑

IF AMPS ↑ GRINDER FEED ↓

PH 16 - ONE OF SIX FF's IN GRIND/SCREEN BLDG. (INTAKE DUCT ON LEFT)

PH 17 - ~~ANOTHER~~ MORE FF's - OUTLET DUCTS VISIBLE BELOW (2 ADJACENT)

PH 18 - BASE OF GRINDER

WET MUD PROCESS - WOODEN MOLDS - SAND BLOWN INTO WET MOLDS PRIOR TO CLAY

SAND DRYER (BUCKET DRYER) - ROTATING BUCKETS PICK UP SAND & POUR OUT ACROSS BURNER FLAME

GAS FIRED

SAND DRYER EXHAUST → FF → OUTSIDE

→ ONLY FF VENTED TO OUTSIDE

ALL OTHERS VENTED INSIDE BLDGS.

FLASHING - WITH COAL, 2ND, OR GAS

PH 19 - DOUBLE KILN STACK (BRICK STACK) ~ 4' x 4'

2 + 3 ?

PH 20 - KILN 1 STACK (BRICK STACK) ~ 4' x 4'

PLANT 3

PH 21, 22 TUNNEL KILNS

PH 23 MOLDING MACHINERY PLANT 3

PH 24 FF PLANT 3 GRINDING BLDG

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______ Page 7 of 10

Subject ______

MIDWEST RESEARCH INSTITUTE

Project No. ______ Date/Time ______

Subject ______

~~CB1~~ ← RELEASED

DOCUMENT CONTROL SHEET

Project No.: 3612 (Subtask No.) ______

Document Name: S/V: Belden Brick

ON DISK - PLANT6.DOC

Originator: B. Shrager

WP ID No.: a1205-4/CB1 2180

WP COMMENTS: ______

1 DATE TO WP: 7/14 FORMAT: (✓) EPA ( ) MRI ( ) Special SPACING: ( ) Single (✓) 1 1/2 ( ) Double OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 7/15

Flexible ( )

Firm (✓)

OPERATOR'S INITIALS: db PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

T16

COMMENTS: ______

ROUTE: ACTION: DATE: COMMENTS:

2 DATE TO WP: 7/15 FORMAT: (✓) EPA ( ) MRI ( ) Special SPACING: ( ) Single (✓) 1 1/2 ( ) Double OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 7/16

Flexible ( )

Firm (✓)

OPERATOR'S INITIALS: RMW PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

TH9

COMMENTS: Corrections as noted. Need caption pages for figures 7 and 16. See previous draft for these captions! Return to Rick M.

ROUTE: ACTION: DATE: COMMENTS:

3 DATE TO WP: 7/19 FORMAT: (✓) EPA ( ) MRI ( ) Special SPACING: ( ) Single (✓) 1 1/2 ( ) Double OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 7/19

Flexible ( )

Firm (✓)

OPERATOR'S INITIALS: db PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

MC3

COMMENTS: Few minor corrections. Also, last 2 pictures should be standard size.

ROUTE: ACTION: DATE: COMMENTS:

DOCUMENT CONTROL SHEET

Project No.: 3612-03 Document name: a 1205-4/CBI

4 DATE TO WP: 7/19 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 7/20
Flexible ( )
Firm (✓)

PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

OPERATOR'S INITIALS:

COMMENTS: 1 correction. Last 2 photo's still strange sizes?

ROUTE:	ACTION:	DATE:	COMMENTS:

5 DATE TO WP: 7/20 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 7/21
Flexible ( )
Firm (✓)

PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

T10

OPERATOR'S INITIALS: MMW

COMMENTS: A FEW CHANGES

ROUTE:	ACTION:	DATE:	COMMENTS:

6 DATE TO WP: 7/21 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow

DESIRED DUE DATE: 7/27
Flexible ( )
Firm (✓)

PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

OPERATOR'S INITIALS: db

T10

COMMENTS: A FEW CHANGES. PLEASE FINALIZE FOR MAILOUT

ROUTE:	ACTION:	DATE:	COMMENTS:

7 DATE TO WP: 7/27 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft (✓) Final Draft (✓) Final ( ) Rainbow

DESIRED DUE DATE: 7/27
Flexible ( )
Firm (✓)

PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

OPERATOR'S INITIALS: MMD

W2

COMMENTS:

ROUTE:	ACTION:	DATE:	COMMENTS:

DOCUMENT CONTROL SHEET

Project No.: 3612 (Subtask No.) 03-00

Document Name: Belden Brick Trip Report

WP COMMENTS:

Originator: Marinslaw / Shroger

WP ID No.: 2180

1 DATE TO WP: 9/2 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow

DESIRED DUE DATE: 9/3 AM

Flexible ( ) Firm (✓)

OPERATOR'S INITIALS: SW PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS: THIS HAS BEEN RELEASED. PLEASE CORRECT & REMOVE FROM CBI DIRECTORY

THI4

ROUTE: ACTION: DATE: COMMENTS:

2 DATE TO WP: 9/3 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow

DESIRED DUE DATE: 9/3 AM

Flexible ( ) Firm (✓)

OPERATOR'S INITIALS: SW PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS: PLEASE FINALIZE

B

ROUTE: ACTION: DATE: COMMENTS:

3 DATE TO WP: 9/3 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft (✓) Final ( ) Rainbow

DESIRED DUE DATE: 9/3

Flexible ( ) Firm (✓)

OPERATOR'S INITIALS: SW PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS: PLEASE PUT PAGE # ON FIGURE 16 & PRINT OUT SCANNED FIGURES AGAIN (SOME ARE SMUDGED)

M

ROUTE: ACTION: DATE: COMMENTS:

Project No.: ____________ Document name: ____________

4

DATE TO WP: ____________

DESIRED DUE DATE: ____________
Flexible (___)
Firm (___)

OPERATOR'S INITIALS: ____________

FORMAT: (___) EPA (___) MRI (___) Special

SPACING: (___) Single (___) 1 1/2 (___) Double

OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow

PREPARE: (___) Envelope (___) Label

WP PROOF: (___) Yes (___) No

COMMENTS: ____________

ROUTE:	ACTION:	DATE:	COMMENTS:

5

DATE TO WP: ____________

DESIRED DUE DATE: ____________
Flexible (___)
Firm (___)

OPERATOR'S INITIALS: ____________

FORMAT: (___) EPA (___) MRI (___) Special

SPACING: (___) Single (___) 1 1/2 (___) Double

OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow

PREPARE: (___) Envelope (___) Label

WP PROOF: (___) Yes (___) No

COMMENTS: ____________

ROUTE:	ACTION:	DATE:	COMMENTS:

6

DATE TO WP: ____________

DESIRED DUE DATE: ____________
Flexible (___)
Firm (___)

OPERATOR'S INITIALS: ____________

FORMAT: (___) EPA (___) MRI (___) Special

SPACING: (___) Single (___) 1 1/2 (___) Double

OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow

PREPARE: (___) Envelope (___) Label

WP PROOF: (___) Yes (___) No

COMMENTS: ____________

ROUTE:	ACTION:	DATE:	COMMENTS:

7

DATE TO WP: ____________

DESIRED DUE DATE: ____________
Flexible (___)
Firm (___)

OPERATOR'S INITIALS: ____________

FORMAT: (___) EPA (___) MRI (___) Special

SPACING: (___) Single (___) 1 1/2 (___) Double

OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow

PREPARE: (___) Envelope (___) Label

WP PROOF: (___) Yes (___) No

COMMENTS: ____________

ROUTE:	ACTION:	DATE:	COMMENTS:

Project No.: ____________________ Document name: ____________________

4 DATE TO WP: __________
FORMAT: (__) EPA (__) MRI (__) Special
SPACING: (__) Single (__) 1 1/2 (__) Double
OUTPUT: (__) Draft (__) Final Draft (__) Final (__) Rainbow

DESIRED DUE DATE: __________
Flexible (__)
Firm (__)

PREPARE: (__) Envelope (__) Label
WP PROOF: (__) Yes (__) No

OPERATOR'S INITIALS: __________

COMMENTS: ____________________

ROUTE:	ACTION:	DATE:	COMMENTS:

5 DATE TO WP: __________
FORMAT: (__) EPA (__) MRI (__) Special
SPACING: (__) Single (__) 1 1/2 (__) Double
OUTPUT: (__) Draft (__) Final Draft (__) Final (__) Rainbow

DESIRED DUE DATE: __________
Flexible (__)
Firm (__)

PREPARE: (__) Envelope (__) Label
WP PROOF: (__) Yes (__) No

OPERATOR'S INITIALS: __________

COMMENTS: ____________________

ROUTE:	ACTION:	DATE:	COMMENTS:

6 DATE TO WP: __________
FORMAT: (__) EPA (__) MRI (__) Special
SPACING: (__) Single (__) 1 1/2 (__) Double
OUTPUT: (__) Draft (__) Final Draft (__) Final (__) Rainbow

DESIRED DUE DATE: __________
Flexible (__)
Firm (__)

PREPARE: (__) Envelope (__) Label
WP PROOF: (__) Yes (__) No

OPERATOR'S INITIALS: __________

COMMENTS: ____________________

ROUTE:	ACTION:	DATE:	COMMENTS:

7 DATE TO WP: __________
FORMAT: (__) EPA (__) MRI (__) Special
SPACING: (__) Single (__) 1 1/2 (__) Double
OUTPUT: (__) Draft (__) Final Draft (__) Final (__) Rainbow

DESIRED DUE DATE: __________
Flexible (__)
Firm (__)

PREPARE: (__) Envelope (__) Label
WP PROOF: (__) Yes (__) No

OPERATOR'S INITIALS: __________

COMMENTS: ____________________

ROUTE:	ACTION:	DATE:	COMMENTS:

DOCUMENT CONTROL SHEET

Project No.: 3612 (Subtask No.) 03-06

Document Name: Belden Final Trip Report Transmittal

WP COMMENTS:

Originator: Marinelin

WP ID No.: 2185-LTR 2186-Variable

1 DATE TO WP: 9/3 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE: 9/3 AM
Flexible ( )
Firm (✓)

OPERATOR'S INITIALS: Sue PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS:

FD

ROUTE:	ACTION:	DATE:	COMMENTS:

2 DATE TO WP: 9/3 FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft ( ) Final (✓) Rainbow

DESIRED DUE DATE: 9/3 AM
Flexible ( )
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OPERATOR'S INITIALS: PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS: PLEASE RAINBOW

ROUTE:	ACTION:	DATE:	COMMENTS:

3 DATE TO WP: FORMAT: ( ) EPA ( ) MRI ( ) Special SPACING: ( ) Single ( ) 1 1/2 ( ) Double OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow

DESIRED DUE DATE:
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OPERATOR'S INITIALS: PREPARE: ( ) Envelope ( ) Label WP PROOF: ( ) Yes ( ) No

COMMENTS:

ROUTE:	ACTION:	DATE:	COMMENTS:

THE BELDEN BRICK COMPANY

P. O. BOX # 430

SUGARCREEK, OHIO 44701-0430

August 25, 1993

Midwest Research Institute
401 Harison Oaks Blvd.
Cary NC, 27513

ATTENTION: Mr. Richard MArinshaw

RE: BELDEN BRICK TRIP REPORT

Dear Rick:

Please find enclosed the June 9, 1993 trip report with corrections indicated. Our review found nothing of any consequence that needs to be changed. We also find nothing of any confidential nature that needs to be withheld.

Should you have any questions concerning the changes that need to be made, do not hesitate to contact me.

Please make every attempt to give us at least six (6) weeks notice of the dates you intent to test, as we wish to have the Center for Engineering Ceramic Manufacturing come up from Clemson to observe the tests. Also, we may ask our contract stack tester to run parallel tests for comparative purposes. Also, The only motel in town is a local Bed and Breakfast Barn and may not be able to supply us with enough rooms if we wait to schedule much longer.

Rick, if this letter needs to be sent to another party, please do so for me as I could not tell from the instructions where to send it.

Thank you for you consideration in this matter, and should you have any questions please advise.

Sincerely Yours,

THE BELDEN BRICK COMPANY

John C. Jensen
ENVIRONMENTAL ENGINEER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

AUG 3 1993

Mr. John Jensen
Environmental Engineer
Belden Brick Company
Dover Road
Sugarcreek, Ohio 44681

Dear Mr. Jensen:

Enclosed is a draft of the trip report covering a visit by Brian Shrager and Richard Marinshaw of Midwest Research Institute (MRI) to the Belden Brick Company (Belden) facility in Sugarcreek, Ohio on June 9, 1993. We would appreciate your reviewing the report for any errors or omissions. You may return the enclosed copy of the report with your written comments, if you wish. A copy of the final version of the report incorporating your comments will be sent to you for your records. Since this report will eventually become a part of the public record, we want to portray your operation as accurately as possible. The custody receipt for the trip report is also enclosed. Please sign and date the form to acknowledge receipt of the report and return a copy of the form to the Document Control Officer, Emission Standards Division (MD-13), Research Triangle Park, North Carolina 27711.

If you believe that disclosure of any specific information contained in the trip report would reveal trade secrets or other confidential information, you should clearly identify the specific information. If EPA determines that there is a need to disclose such information, we will need, at that time, the following to support your claim:

1. Measures taken by Belden to guard against undesired disclosure of the specific information to others;

2. The extent to which the specific information has been disclosed to others and the precautions taken in connection therewith;

3. Pertinent confidentiality determinations, if any, by other Federal agencies (furnish a copy of any such determination, or reference to it, if available); and

4. Whether Belden asserts that disclosure of the specific information would be likely to result in substantial harmful effects on Belden's competitive position, and, if so, what those harmful effects would be, why they should be viewed as substantial, and an explanation of the causal relationship between disclosure and such harmful effects.

Any specific information subsequently determined to constitute a trade secret will be protected under 18 U.S.C 1905. However, all emission data will be available to the public.

We respectfully request that you submit your review comments on the trip report by September 3, 1993. If you concur with the information contained in the report, we would appreciate a letter to that effect. In addition, please indicate in your letter or use the attached form to indicate whether the report is considered nonconfidential, partially confidential, or fully confidential. If we do not receive a response by September 3, 1993, the report will be considered nonconfidential and accurate.

Again, we appreciate the cordial reception and information provided by Belden. The information you supplied will be most helpful to us. If you have any questions, please call Mr. Ron Myers at (919) 541-5407 or Richard Marinshaw of MRI at (919) 677-0249.

Sincerely,

James W. Southerland for

David Mobley, Chief
Emission Inventory Branch
Technical Support Division

Enclosure

TO WHOM IT MAY CONCERN:

I have reviewed the attached draft trip report (dated July 13, 1993) for the visit to the Belden Brick Company facility in Sugarcreek, Ohio on June 9, 1993, by Brian Shrager and Richard Marinshaw of Midwest Research Institute. Belden Brick Company considers the report to be:

X nonconfidential in its entirety.

________ confidential in its entirety.

________ partially confidential (the specific portions that are considered to be confidential have been noted on a copy of the report or in the cover letter).

Name: [signature]

Title: ENV ENG

Date: 8-26-93

DRAFT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JUL 29 1993

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. John Jensen
Environmental Engineer
Belden Brick Company
Dover Road
Sugarcreek, Ohio 44681

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Sincerely,

David Mobley, Chief
Emission Inventory Branch
Technical Support Division

Enclosure

OAQPS/TSD/EIB:RMyers, rm 455B, 4201 Bldg., 541-5407, MD-14
(MRI/RMarinshaw/LKaufman/677-0249/07/29/93)

MRI

MIDWEST RESEARCH INSTITUT
Suite 3:
401 Harrison Oaks Bouleva
Cary, North Carolina 27513-24
Telephone (919) 677-02-
FAX (919) 677-0C

Date: July 13, 1993
(Finalized September 3, 1993)

Subject: Site Visit--Belden Brick Company
Review and Update Remaining Sections of Chapter 8
(Mineral Products Industry) of AP-42,
EPA Contract 68-D2-0159, Work Assignment 12
MRI Project 3612

From: Brian Shrager BS

To: Ron Myers
EPA/EIB/EFMS (MD-14)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

I. Purpose

The purpose of the visit was to evaluate the feasibility of emission testing at this site for the purpose of developing emission factors for AP-42.

II. Place and Date

Belden Brick Company
Dover Road
Sugarcreek, Ohio 44681

Date: June 9, 1993

III. Attendees

Belden Brick Company (Belden)

John Jensen, Environmental Engineer

Midwest Research Institute (MRI)

Richard Marinshaw
Brian Shrager

IV. Discussion

The group began a tour of Belden's Sugarcreek, Ohio operations by viewing the mining operations that provide the raw materials for all of Belden's Sugarcreek plants. Belden has 32 open pits, one of which is shown in Figure 1, from which the materials are mined. The pits include deposits of three types of shale (Nos. 5A, 4, and 3A), No. 4 fire clay, and No. 5 fire clay, in addition to limestone, sandstone, and coal. Figure 2 shows the profile of a typical "Belden hill" from which these raw materials are mined. The raw materials are mined by power shovels and transported to the plants by truck. Figure 3 shows an exposed seam of 3A shale at a "Belden hill" or open pit mine. Mr. Jensen pointed out the regional geologic formations and emphasized Belden's use of different raw material blends for production of different types of brick. The group proceeded to a facility where the raw materials are test fired on a weekly basis. Belden maintains detailed records of the material characteristics and locations within the pits. Mr. Jensen explained that it is vital to the production operations to know exactly how a particular material will look when it is fired in a kiln. The group then visited Plant 6, which consists of a central crushing, grinding, and screening operation, a central brick forming operation, eight brick dryers, and three kilns. Plant 6 produces 36 to 40 million bricks per year. The grinding room operates 8 hours per day, 5 days per week, and the kilns operate continuously. The typical raw material moisture content was not known at the time of the visit.

From Plant 6, the group proceeded to Plant 8, which consists of two primary crushers in a separate building; a central grinding, screening, and raw material storage area; a central brick forming operation that includes two extruding lines; a soft mud line; a dryer for the soft mud line; six drying tunnels for the extruding lines; a preheater for the soft mud line; and three kilns. Plant 8 produces 70 million bricks per year. The grinding room operates 8 hours per day, 5 days per week, and the kilns operate continuously.

The group also visited Plants 3 and 4, but these plants are not typical of the brick manufacturing industry and are not good candidates for testing. Plant 3 is a new facility that has a very large grinding room and tunnel kiln, and Plant 4 uses periodic kilns to fire bricks. Figures 4 and 5 show the Plant 4 brickyard and periodic kilns. Figure 6 shows a periodic kiln. The following paragraphs describe the process operations in Plants 6 and 8 in more detail.

Plant 6

Figure 7 presents a process flow diagram for Plant 6. Production begins at the grinding room, which is a large metal building that contains separate fire clay and shale processing lines. Each identical line consists of a hopper, double-roll primary crusher, crushed material storage bins, a grinder, and three screens. The raw material is transported from the mine by truck in loads of approximately 23 Megagrams (Mg) (25 tons). The trucks dump the material into the fire clay or shale hoppers from which the material transported by drag chains to double roll primary crushers. From each crusher, the material is conveyed to storage bins, then to the grinder and screens. All material is ground prior to screening. Oversize material from the screens is conveyed back to the grinder for further size reduction. Undersized material from the screens is conveyed to the fine clay/shale storage bins located in an adjacent building. Emissions from each line (crusher, grinder, screens and conveyor transfer points) are ducted to separate fabric filtration systems that are located just outside of the grinding room. Figure 8 shows a vibrating screen with the hood and ductwork that leads to the fabric filter. Figure 9 shows the fabric filter inlet duct for the clay processing line. The duct is of sufficient length for testing, but two smaller ducts from the processing line tie into the main duct downstream of the potential test area. Figures 10 and 11 show the fabric filter outlet ducts for the clay and shale processing lines, respectively. The shale line outlet duct is 0.84 meters (m) (29 inches [in.]) in diameter and is 3.7 to 4.0 m (12 to 13 feet [ft]) in length. The clay line outlet duct is 0.74 m (33 in.) in diameter and is 3.8 m (12.3 ft) in length. The air flow rate for each screen hood is about 2,400 cubic feet per minute (ft^3/min) and the air flow rate through each crusher and grinder pickup point and conveyor transfer point hood is 600 ft^3/min. The system carrying velocity is 4,500 feet per minute (ft/min). Because nearly all of the emission points in the grinding room are hooded, fugitive particulate matter (PM) emissions are negligible.

The grinding room product is conveyed to the fine clay/shale storage bins located in a building adjacent to the grinding room. The grinding room and conveyors are shown in Figure 12. Material from the fine clay/shale storage bins is conveyed to the mill room.

In the mill room, the material is conveyed to one of four extrusion lines. Lines 1 and 4 process shale, and lines 2 and 3 process fire clay. However, clay and shale can be mixed on any of the four lines. Approximately one-third of the bricks produced in Plant 6 are made from a blend of shales, one-third are made from fire clay blends, and the remaining third are made from a mixture of fire clays and shales.

Each extrusion line includes a pug mill, vacuum chamber, and die. The pug mills mix the material with water to raise the material moisture content and discharge the material directly into the vacuum chambers. The vacuum chambers de-air and compact the material. Next, the material is continuously augered through the dies. This is referred to as the "stiff extrusion process." The material is extruded in four continuous columns, the outsides of which are lubricated with No. 2 oil, which facilitates cutting. The columns then pass through rotating wire cutters and are cut into the desired brick dimensions.

Several additives are mixed with the raw material (as needed) before extrusion. Iron chromite and manganese dioxide are used for coloring purposes, and barium carbonate is added to keep sulfates from rising to the surface of the brick. Additive feed is controlled by computer.

After cutting, the bricks are stacked by hand onto the kiln cars. On average, each car carries 3,472 bricks. From the stacking area, the bricks are transported to eight dryers (shown in Figure 13), which are heated by waste heat from the cooling section of the kilns and by Dutch oven type heaters, which are additional gas-fired burners located on the top of the dryers. These dryers maintain temperatures ranging from 49°C (120°F) at the entrances to 177°C (350°F) at the exits. Three stacks (shown in Figure 14) vent emissions from the eight dryers to the atmosphere. Dryers 1, 2, and 3 share a stack, dryers 4 and 5 share a stack, and dryers 6, 7, and 8 share a stack. The dryer stacks are circular in cross section and are made of steel. From the dryers, the cars are transported to the kilns for firing.

Plant 6 has three natural gas-fired tunnel kilns that are used to fire the bricks. Kilns 1 and 2 are 104 m (340 ft) long, and kiln 3 is 119 m (390 ft) long. Each kiln consists of six sections, including the offtake, oxidation, preheat, firing, rapid cool, and cooling sections. Kilns firing fire clay products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1149°C (2100°F) at the hottest point of the firing section. Kilns firing shale products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1071°C (1960°F) at the hottest point of the firing section. Between the firing and rapid cool sections is the zero point of each kiln. The zero point is the theoretical point beyond which combustion gases do not pass. Beyond the zero point, only the waste heat (no combustion gases) from the fired bricks in the cooling section is ducted to the brick dryers.

Emissions from the kilns are ducted to two stacks (shown in Figure 15), one serving kilns 1 and 2, and one serving kiln 3. The stack serving kilns 1 and 2 is brick and has dimensions of 1.5 x 1.6 m (60 x 64 in). This stack is split in the center, effectively creating two 1.5 x 0.81 m (60 x 32 in.) stacks. The side of the stack that vents emissions from kiln 2 is equipped with 5 in. sampling ports. The stack serving kiln 3 is also brick and is 1.7 m (68 in.) square in cross section. This stack is equipped with 5 in. sampling ports. There are no emission control devices on either of the two stacks. Emissions from the kiln are likely to be PM, sulfur dioxide, nitrogen oxides, carbon monoxide, fluorides, and other inorganic and organic compounds from combustion or vaporization of the raw materials.

Plant 8

Figure 16 presents a process flow diagram for Plant 8. Production begins at the primary crusher building. The raw material is dumped by truck into the fire clay or shale hoppers that feed the primary crushers. From each crusher, the material is conveyed to storage bins that are located in the grinding room. The grinding room is a large metal building that contains separate fire clay and shale processing lines and includes four baghouses, two of which contain dual fabric filters. Figure 17 shows a rim discharge grinder, Figures 18 and 19 show some of the vibrating screens and hoods, Figure 20 shows several screens and a fabric filter, and Figure 21 shows a fabric filter. Because of the number of fabric filter ducts that would require testing, this grinding room is not considered a good candidate for an emission test.

The grinding room product is conveyed to the fine clay storage bins. Material from the fine clay storage bins is conveyed to the mill room.

In the mill room, the material is conveyed to one of two extrusion lines or to the soft mud line. Most of the bricks produced in Plant 8 are made from a blend of clays and shales. The extrusion lines are similar to the Plant 6 extrusion lines. The soft mud line uses a completely different method to form bricks. A double pug mill increases the material moisture content to about 28 percent. This "soft" material is forced into sand-lined molds, which are inverted, depositing the molded material onto wooden pallets that support the material so that it will retain the proper brick dimensions. The pallets transport the "soft" bricks to a dryer, which hardens the bricks so that they can be mechanically set onto kiln cars. The drying process takes 20 hours, and the finishing temperature in the dryer is about 66°C (150°F).

After forming and drying, the soft mud bricks are mechanically set onto kiln cars. After forming and cutting, the extruded bricks are hand set onto kiln cars. On average, each car carries 5,616 bricks. From the stacking area, the soft mud bricks are transported to a holding area and then to a preheater, and the extruded bricks are transported to six holding rooms/dryers, which are heated by waste heat from the cooling section of the kilns. These dryers maintain temperatures ranging from 49°C (120°F) at the entrances to 177°C (350°F) at the exits. Three stacks vent emissions from the preheaters and dryers to the atmosphere. The preheater has one stack; dryers 1, 2, and 3 share a stack; and dryers 4, 5, and 6 share a stack. From the dryers, the cars are transported to the kilns for firing.

Plant 8 has three natural gas-fired tunnel kilns that are used to fire the bricks. The kilns have a considerably larger capacity than the Plant 6 kilns, and they include a flashing zone, where coal, natural gas, or zinc can be introduced into the kiln atmosphere, creating smoke that adds color to the surface of the bricks. The smoke is drawn into the firing section of the kiln. Kilns firing fire clay products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1149°C (2100°F) at the hottest point of the firing section. Kilns firing shale products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1071°C (1960°F) at the hottest point of the firing section. Between the firing and rapid cool sections is the zero point of each kiln. At the zero point in each kiln, the combustion gases are drawn away from the cooling zone, and the waste heat (no combustion gases) from the fired bricks in the cooling section is drawn to the ducts that lead to the brick dryers and preheaters.

Emissions from the kiln are ducted to two stacks, one serving kiln 1 (shown in Figure 22), and one serving kilns 2 and 3 (shown in Figure 23). Both stacks are constructed with brick and are 1.4 m (56 in.) square in cross section. The stack serving kilns 2 and 3 is equipped with a 5-in. sampling port. There are no emission control devices on either of the two stacks. Figure 23 shows both kiln stacks above the roof of Plant 8. Emissions from the kiln are likely to be PM, sulfur dioxide, nitrogen oxides, carbon monoxide, fluorides, and other inorganic and organic compounds from combustion or vaporization of the raw materials.

V. Conclusions

The sources being considered for testing are the grinding room and the kilns. It appears feasible to test controlled PM and PM-10 emissions from the Plant 6 grinding room. The grinding room appears typical of the industry, except for the separate processing lines for shale and fire clay. The Plant 8 grinding room is not typical of the industry and is not a good candidate for testing.

Testing of emissions from the dryers and kilns at either plant should be relatively straightforward. However, the flashing process used in the Plant 8 kilns is not standard industry practice, and may effect kiln emissions. Sampling ports would have to be installed in the dryer stacks at either plant.

Trucks carrying raw material to the primary crushers produce some fugitive dust emissions at both plants, but fugitive dust emissions from plant traffic appear to be minimal. Also, there are no open storage piles at either plant.

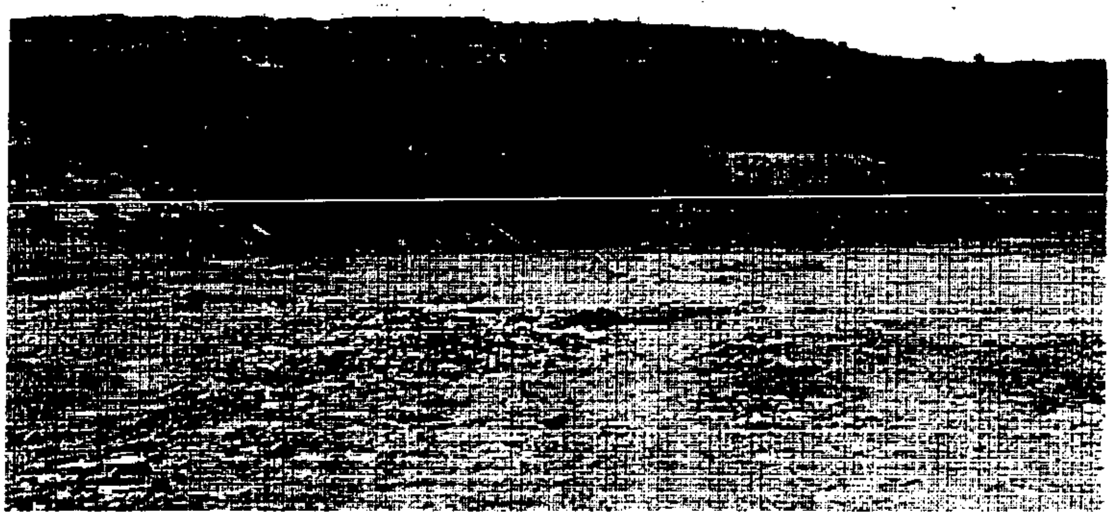

Figure 1. Belden Brick Company open pit mine.

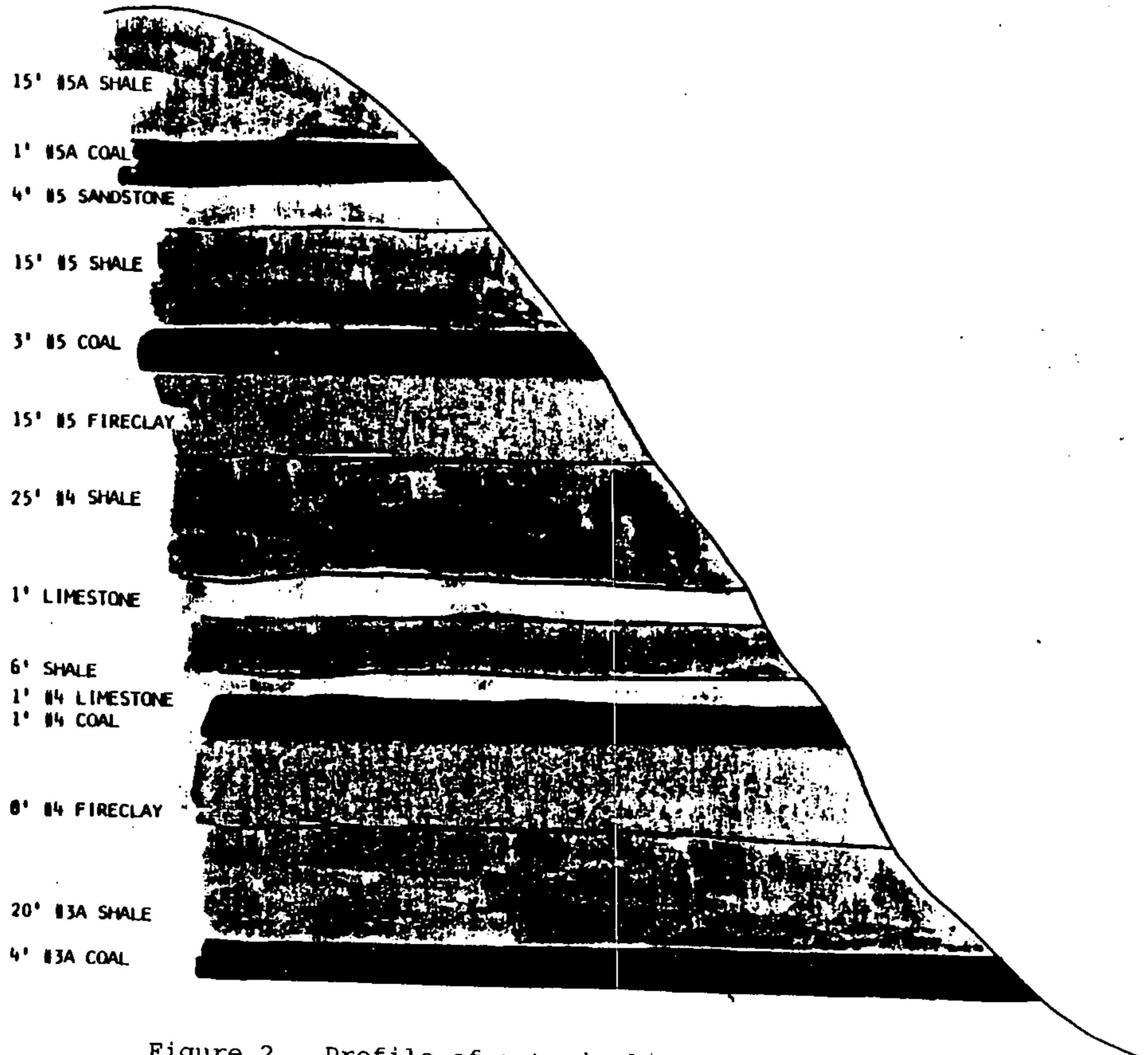

Figure 2. Profile of a typical "Belden hill".

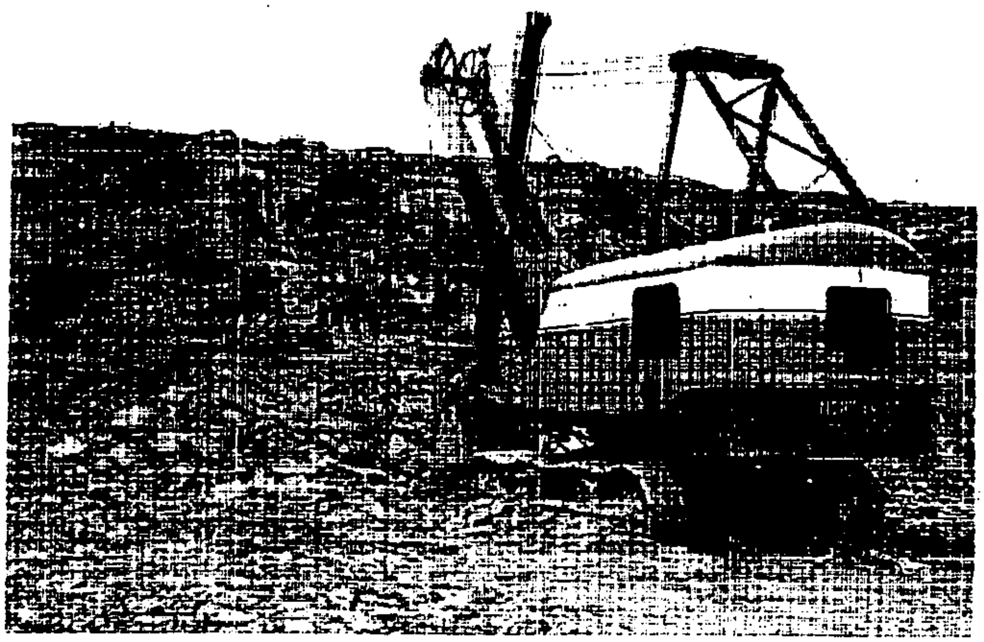

Figure 3. Exposed seam of 3A shale at a Belden open pit mine.

Figure 4. Plant 4 brickyard and periodic kilns.

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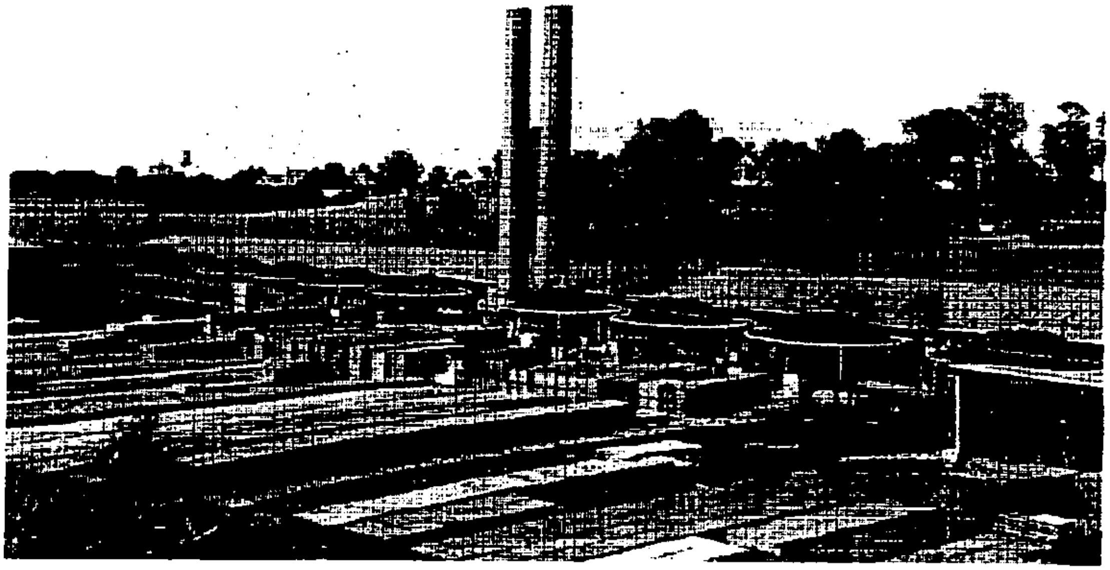

Figure 5. Plant 4 brickyard and periodic kilns.

Figure 6. Plant 4 periodic kiln.

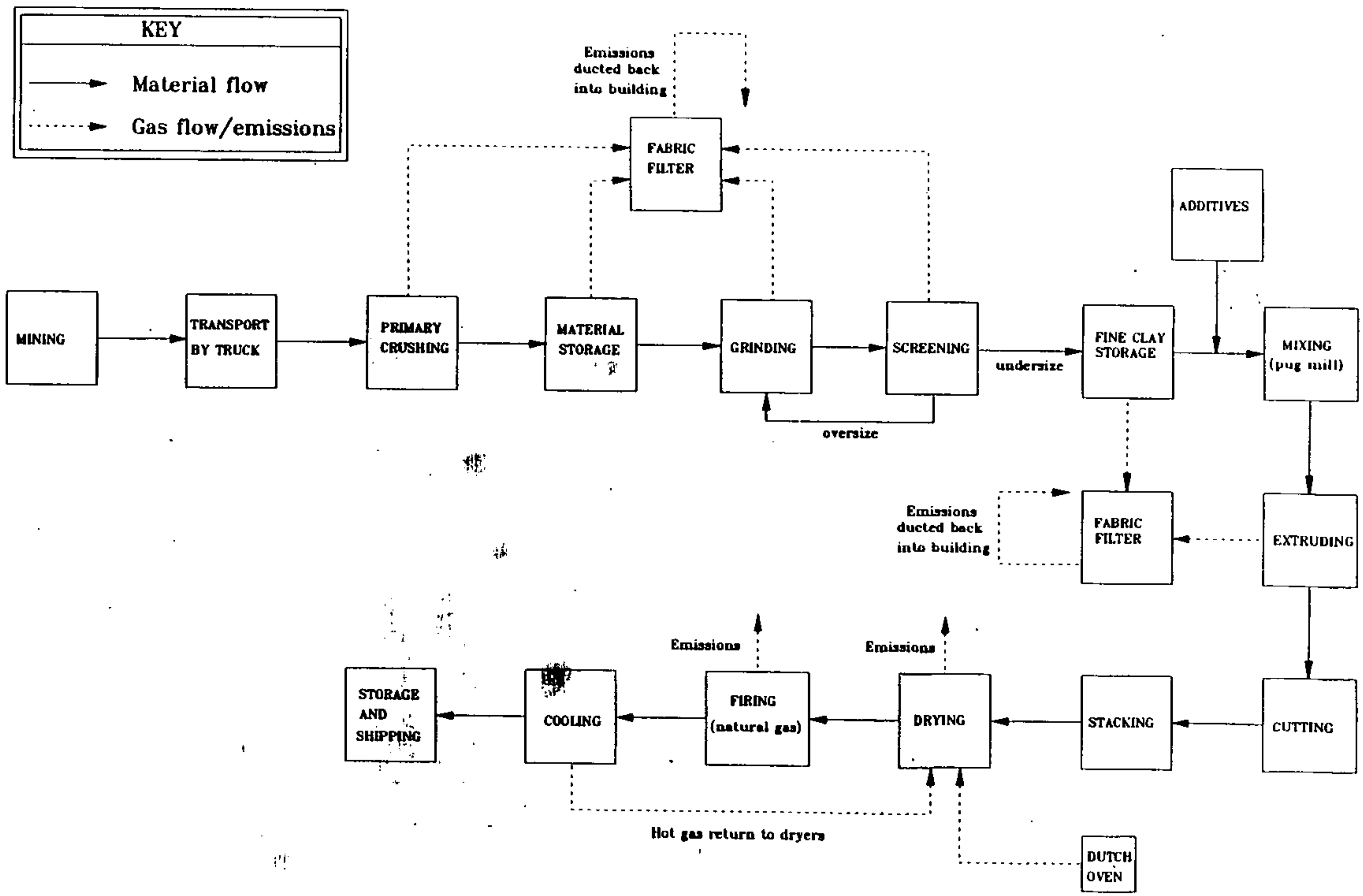

FIGURE 7. PROCESS FLOW DIAGRAM FOR BELDEN BRICK, PLANT 6, SUGARCREEK, OHIO.

Figure 8. Plant 6 vibrating screen with hood and ductwork.

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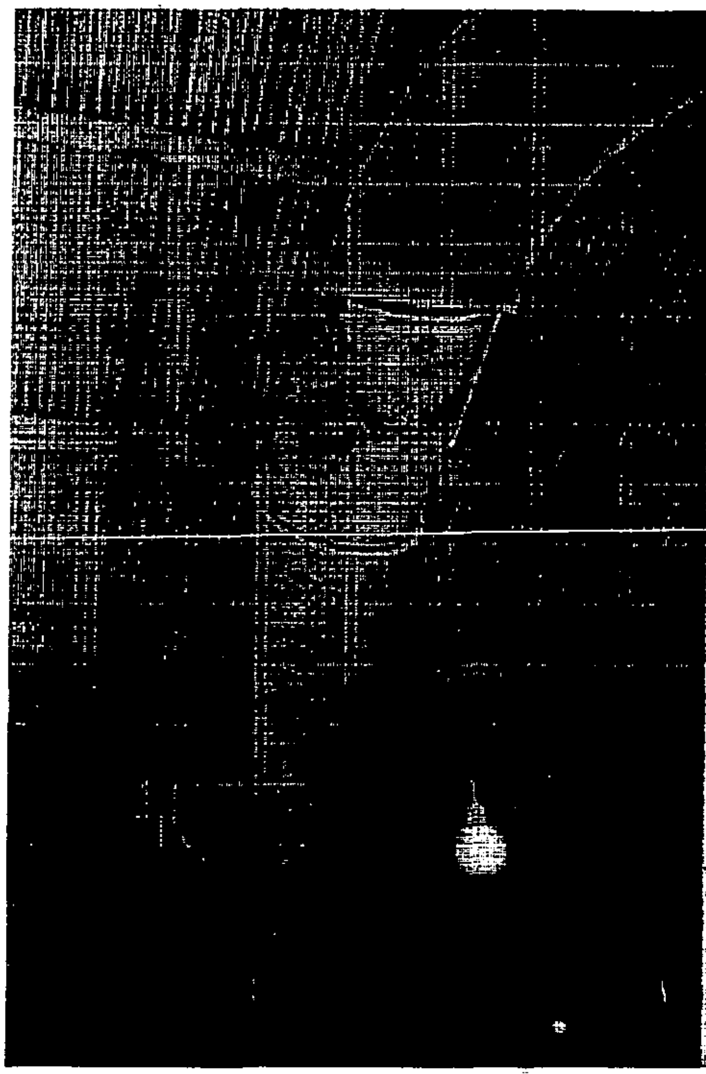

Figure 9. Plant 6 fabric filter inlet duct for the clay processing line.

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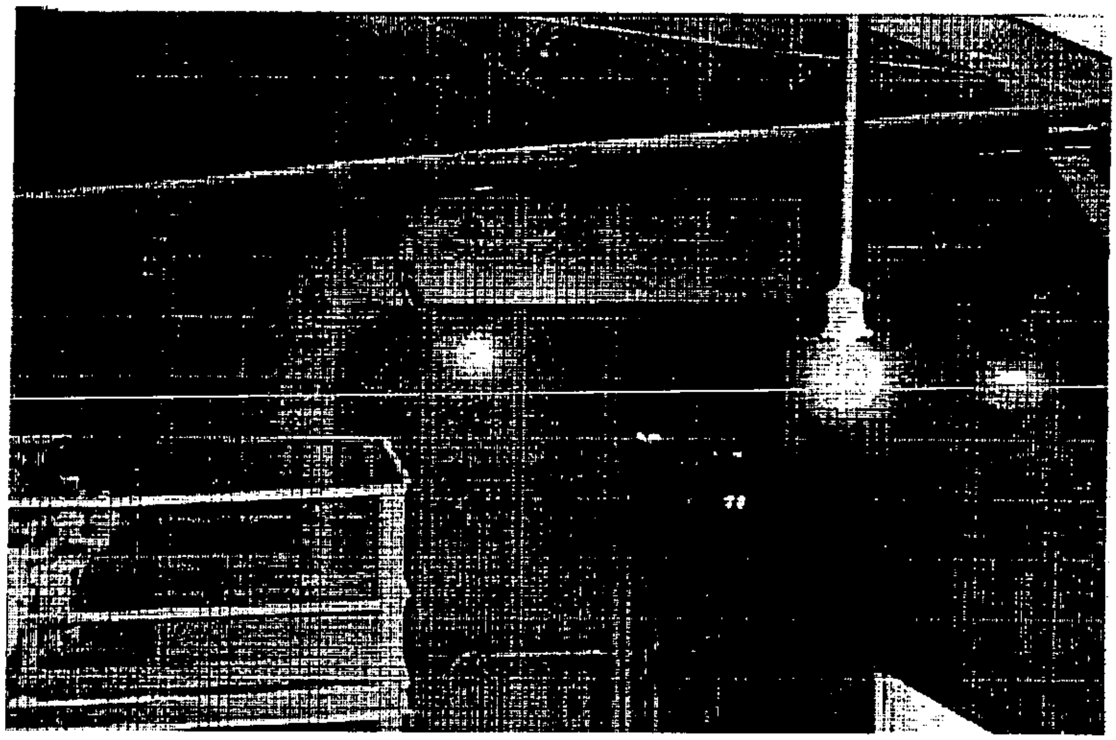

Figure 10. Plant 6 clay processing line fabric filter outlet duct.

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Figure 11. Plant 6 shale processing line fabric filter outlet duct.

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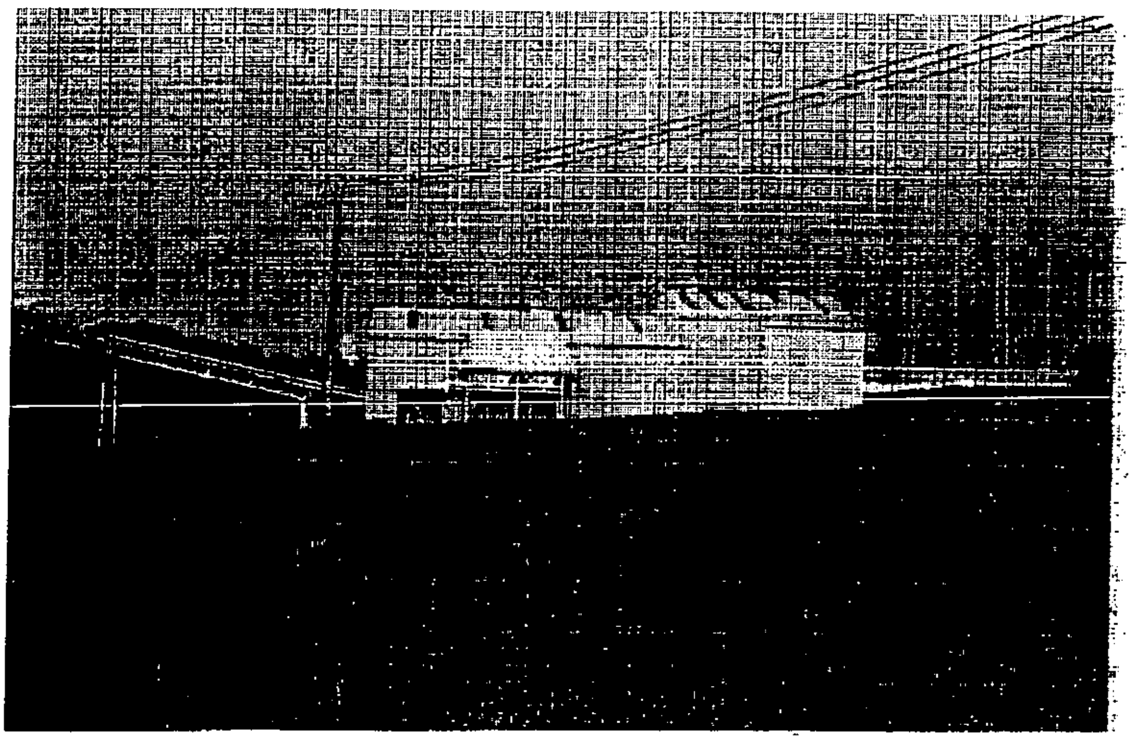

Figure 12. Plant 6 grinding room and conveyors to fine clay storage.

Figure 13. Plant 6 brick dryers.

Figure 14. Plant 6 dryer stacks.

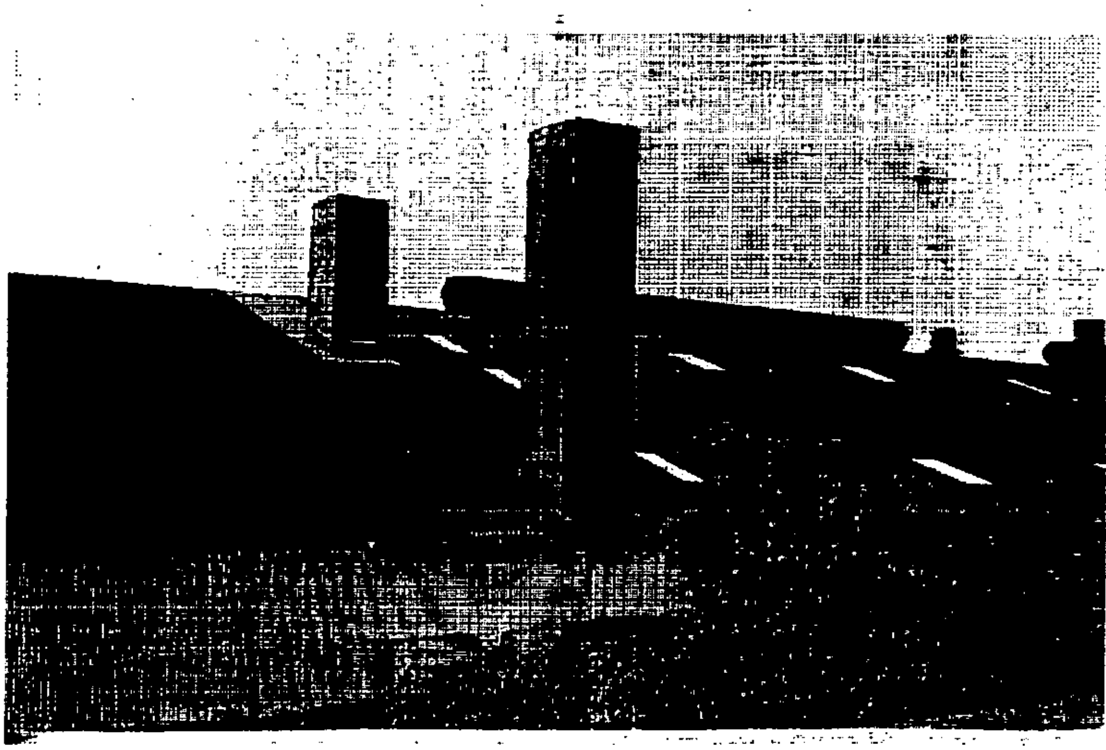

Figure 15. Plant 6 kiln stacks.

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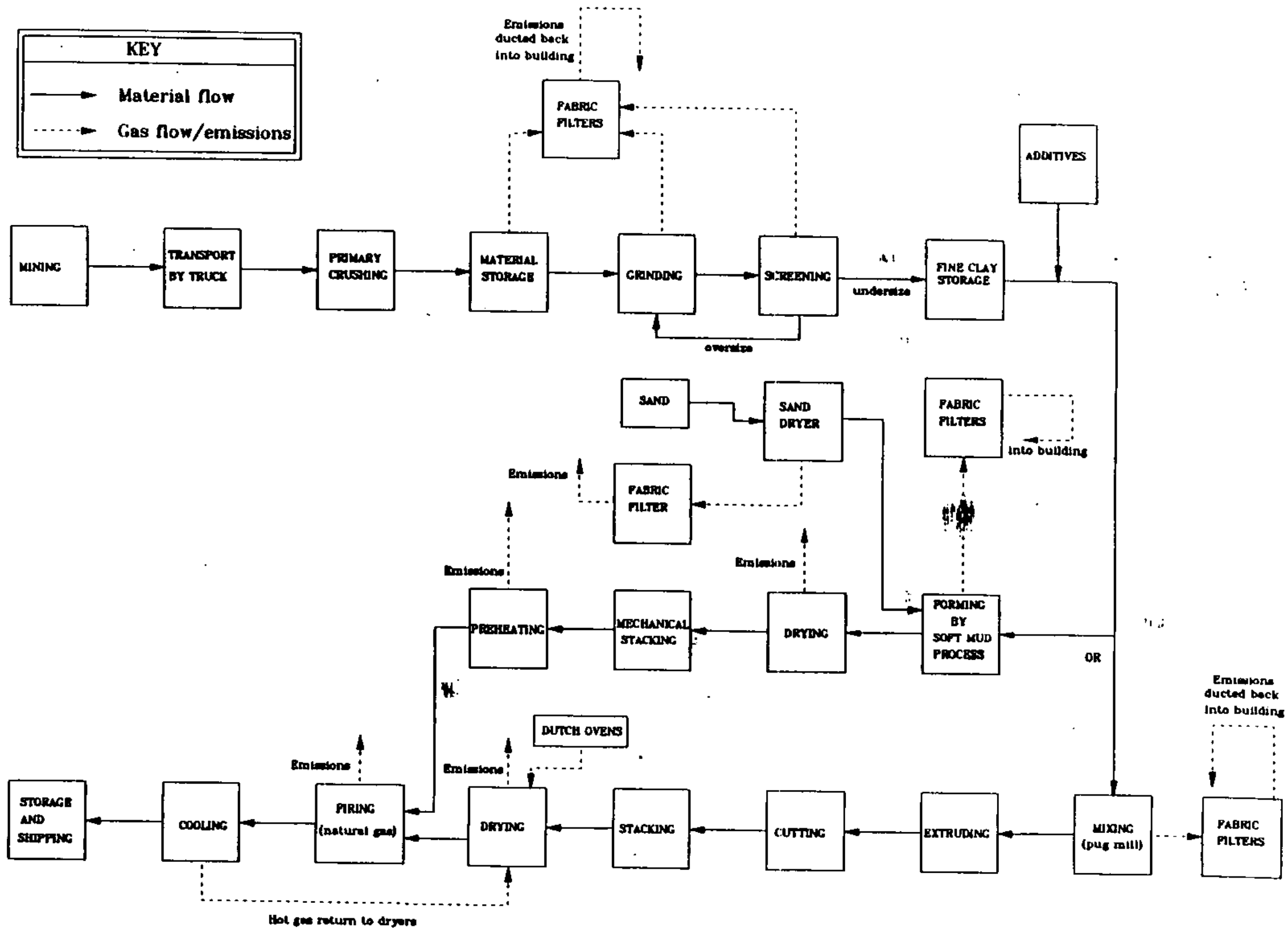

FIGURE 16. PROCESS FLOW DIAGRAM FOR BELDEN BRICK, PLANT 8, SUGARCREEK, OHIO.

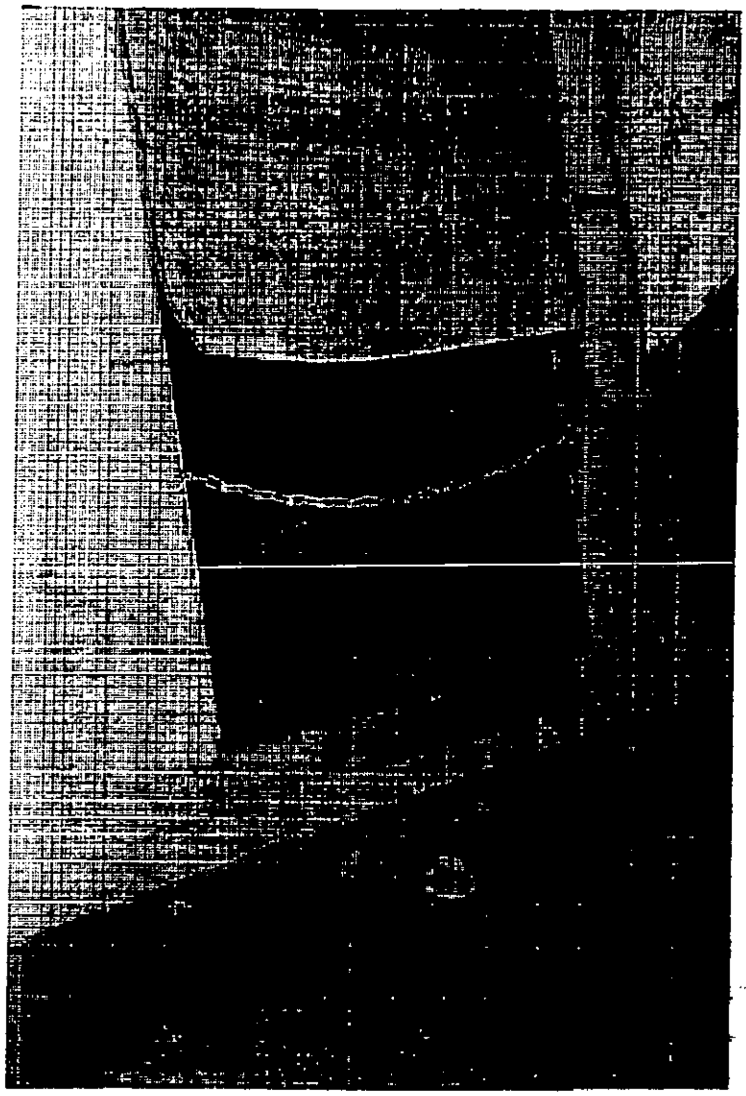

Figure 17. Plant 8 rim discharge grinder.

Figure 18. Plant 8 screens and hoods.

Figure 19. Plant 8 screens and hoods.

ISB-03-36

MRI

Copy 1 of 3
3612-03-04

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

~~SUBJECT TO CONFIDENTIALITY CLAIM~~
Released 8/26/93

Date: July 13, 1993

Subject: Site Visit--Belden Brick Company
Review and Update Remaining Sections of Chapter 8 (Mineral Products Industry) of AP-42,
EPA Contract 68-D2-0159, Work Assignment 12
MRI Project 3612

(216)456-0031
John Jensen

From: Brian Shrager

To: Ron Myers
EPA/EIB/EFMS (MD-14)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

I. Purpose

The purpose of the visit was to evaluate the feasibility of emission testing at this site for the purpose of developing emission factors for AP-42.

II. Place and Date

Belden Brick Company
Dover Road
Sugarcreek, Ohio 44681

Date: June 9, 1993

III. Attendees

Belden Brick Company (Belden)

John Jensen, Environmental Engineer

Midwest Research Institute (MRI)

Richard Marinshaw
Brian Shrager

5A SHALE
4 SHALE
3A SHALE

IV. Discussion

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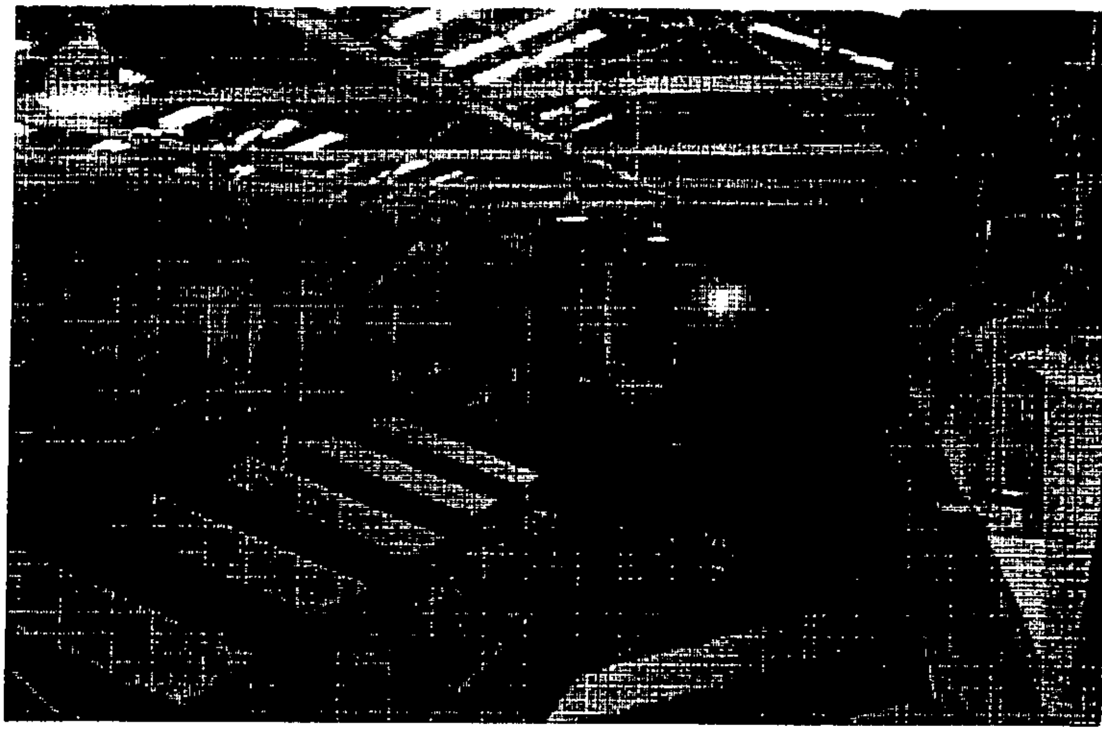

Figure 20. Plant 8 vibrating screens, hoods, and fabric filter.

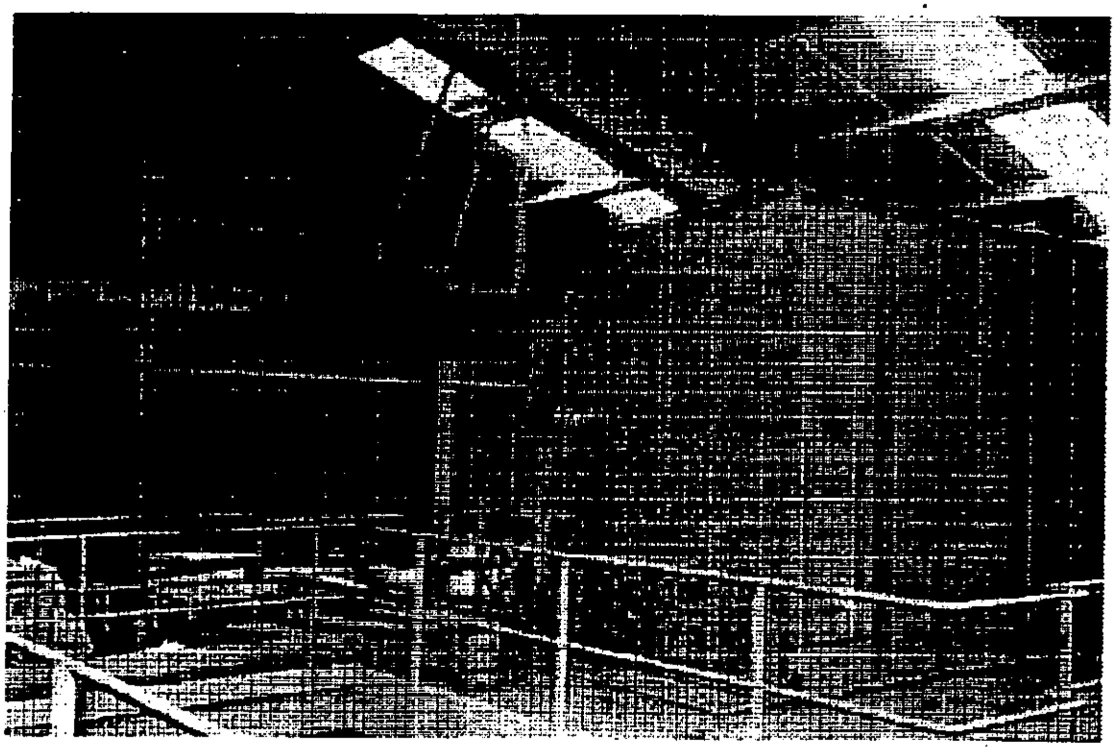

Figure 21. Plant 8 fabric filter.

addition to limestone, sandstone, and coal. Figure 2 shows the profile of a typical "Belden hill" from which these raw materials are mined. The raw materials are mined by power shovels and transported to the plants by truck. Figure 3 shows an exposed seam of 3A shale at a "Belden hill" or open pit mine. Mr. Jensen pointed out the regional geologic formations and emphasized Belden's use of different raw material blends for production of different types of brick. The group proceeded to a facility where the raw materials are test fired on a weekly basis. Belden maintains detailed records of the material characteristics and locations within the pits. Mr. Jensen explained that it is vital to the production operations to know exactly how a particular material will look when it is fired in a kiln. The group then visited Plant 6, which consists of a central crushing, grinding, and screening operation, a central brick forming operation, eight brick dryers, and three kilns. Plant 6 produces 36 to 40 million bricks per year. The grinding room operates 8 hours per day, 5 days per week, and the kilns operate continuously. The typical raw material moisture content was not known at the time of the visit.

SEE ATTACHED

From Plant 6, the group IN A SEPARATE BUILDING proceeded to Plant 8, which consists of two primary crushers, a central ~~crushing~~, grinding, and screening operation, a central brick forming operation that includes two extruding lines and one soft mud line, two preheaters, six brick dryers, and three kilns. Plant 8 produces 70 million bricks per year. The grinding room operates ~~7~~ 8 hours per day, 5 days per week, and the kilns operate continuously.

The group also visited Plants 3 and ~~16~~ 4, but these plants are not typical of the brick manufacturing industry and are not good candidates for testing. Plant 3 is a new facility that has a very large grinding room and tunnel kiln, and Plant ~~16~~ 4 uses periodic kilns to fire bricks. Figures 4 and 5 show the Plant ~~16~~ 4 brickyard and periodic kilns. Figure 6 shows a periodic kiln. The following paragraphs describe the process operations in Plants 6 and 8 in more detail.

Plant 6

Figure 7 presents a process flow diagram for Plant 6. Production begins at the grinding room, which is a large metal building that contains separate fire clay and shale processing lines. Each identical line consists of a hopper, double-roll primary crusher, crushed material storage bins, a grinder, and three screens. The raw material is transported from the mine by truck in loads of approximately 23 Megagrams (Mg) (25 tons). The trucks dump the material into the fire clay or shale hoppers from which the material transported by drag chains to double roll primary crushers. From each crusher, the material is conveyed to storage bins,. then to the grinder and screens. All material is ground prior to screening. Oversize material from the screens is conveyed back to the grinder for further size reduction.

From Plant 6, the group proceeded to Plant 8, which consists of two primary crushers in a separate building, a central grinding, screening, and raw material storage area, a central brick forming operation that includes two extruding lines, a soft mud line, a dryer for the soft mud line, six drying tunnels for the extruding lines, a preheater for the soft mud line, and three kilns.

Undersized material from the screens is conveyed to the fine clay/shale storage bins located in an adjacent building. Emissions from each line (crusher, grinder, screens and conveyor transfer points) are ducted to separate fabric filtration systems that are located just outside of the grinding room. Figure 8 shows a vibrating screen with the hood and ductwork that leads to CLAY the fabric filter. Figure 9 shows the fabric filter inlet duct for the ~~shale~~ processing line. The duct is of sufficient length SHALE for testing, but two smaller ducts from the processing line tie into the main duct downstream of the potential test area. Figures 10 and 11 show the fabric filter outlet ducts for the CLAY – ~~shale~~ and ~~clay~~ processing lines, respectively. The shale line outlet duct is 0.84 meters (m) (29 inches [in.]) in diameter and is 3.7 to 4.0 m (12 to 13 feet [ft]) in length. The clay line outlet duct is 0.74 m (33 in.) in diameter and is 3.8 m (12.3 ft) in length. The air flow rate for each screen hood is about 2,400 cubic feet per minute (ft^3/min) and the air flow rate through each crusher and conveyor transfer point hood is 600 ft^3/min. The system carrying velocity is 4,500 feet per minute (ft/min). Because nearly all of the emission points in the grinding room are hooded, fugitive particulate matter (PM) emissions are negligible. & GRINDER PICK UP POINT

The grinding room product is conveyed to the fine clay/SHALE storage bins located in a building adjacent to the grinding room. The grinding room and conveyors are shown in Figure 12. Material from the ~~fire clay~~ FINE CLAY/SHALE storage bins is conveyed to the mill room. X

In the mill room, the material is conveyed to one of four extrusion lines. Lines 1 and 4 process shale, and lines 2 and 3 process fire clay. However, clay and shale can be mixed on any of the four lines. Approximately one-third of the bricks produced in Plant 6 are made from a blend of shales, one-third are made from fire clay blends, and the remaining third are made from a mixture of fire clays and shales.

Each extrusion line includes a pug mill, vacuum chamber, and die. The pug mills mix the material with water to raise the material moisture content and discharge the material directly into the vacuum chambers. The vacuum chambers de-air and compact the material. Next, the material is continuously augered through the dies. This is referred to as the "stiff extrusion process." The material is extruded in four continuous columns, the outsides of which are lubricated with No. 2 oil, which facilitates cutting X ~~and lubricates the dies~~. The columns then pass through rotating wire cutters and are cut into the desired brick dimensions.

Several additives are mixed with the raw material (as needed) before extrusion. Iron chromite and manganese dioxide are used for coloring purposes, and barium carbonate is added to keep sulfates from rising to the surface of the brick. Additive feed is controlled by computer.

& Dutch oven type heaters located on top of the dryers

After cutting, the bricks are stacked by hand onto the kiln cars. On average, each car carries 3,472 bricks. From the stacking area, the bricks are transported to eight dryers (shown in Figure 13), which are heated by waste heat from the cooling section of the kilns. These dryers maintain temperatures ranging from 49°C (120°F) at the entrances to 177°C (350°F) at the exits. Three stacks (shown in Figure 14) vent emissions from the eight dryers to the atmosphere. Dryers 1, 2, and 3 share a stack, dryers 4 and 5 share a stack, and dryers 6, 7, and 8 share a stack. The dryer stacks are circular in cross section and are made of steel. From the dryers, the cars are transported to the kilns for firing.

Plant 6 has three natural gas-fired tunnel kilns that are used to fire the bricks. Kilns 1 and 2 are 104 m (340 ft) long, and kiln 3 is 119 m (390 ft) long. Each kiln consists of six sections, including the offtake, oxidation, preheat, firing, rapid cool, and cooling sections. Kilns firing fire clay products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1149°C (2100°F) at the hottest point of the firing section. Kilns firing shale products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1071°C (1960°F) at the hottest point of the firing section. Between the firing and rapid cool sections is the zero point of each kiln. The zero point is the theoretical point beyond which combustion gases do not pass. Beyond the zero point, only the waste heat (no combustion gases) from the fired bricks in the cooling section is ducted to the brick dryers.

Emissions from the kilns are ducted to two stacks (shown in Figure 15), one serving kilns 1 and 2, and one serving kiln 3. The stack serving kilns 1 and 2 is brick and has dimensions of 1.5 x 1.6 m (60 x 64 in). This stack is split in the center, effectively creating two 1.5 x 0.81 m (60 x 32 in.) stacks. The side of the stack that vents emissions from kiln 2 is equipped with 3 in. sampling ports. The stack serving kiln 3 is also brick and is 1.7 m (68 in.) square in cross section. This stack is equipped with 3 in. sampling ports. There are no emission control devices on either of the two stacks. Emissions from the kiln are likely to be PM, sulfur dioxide, nitrogen oxides, carbon monoxide, fluorides, and other inorganic and organic compounds from combustion or vaporization of the raw materials.

5

Plant 8

Figure 16 presents a process flow diagram for Plant 8. Production begins at the primary crusher building. The raw material is dumped by truck into the fire clay or shale hoppers that feed the primary crushers. From each crusher, the material is conveyed to storage bins that are located in the grinding room. The grinding room is a large metal building that contains separate fire clay and shale processing lines and includes four baghouses, two of which contain dual fabric filters. Figure 17 shows a rim discharge grinder, Figures 18 and 19 show some of the vibrating screens and hoods, Figure 20 shows several screens and a fabric filter, and Figure 21 shows a fabric filter. Because of the number of fabric filter ducts that would require testing, this grinding room is not considered a good candidate for an emission test.

The grinding room product is conveyed to the fine clay storage bins. Material from the fine clay storage bins is conveyed to the mill room.

In the mill room, the material is conveyed to one of two extrusion lines or to the soft mud line. Most of the bricks produced in Plant 8 are made from a blend of clays and shales. The extrusion lines are similar to the Plant 6 extrusion lines. The soft mud line uses a completely different method to form bricks. A double pug mill increases the material moisture content to about 28 percent. This "soft" material is forced into sand-lined molds, which are inverted, depositing the molded material onto wooden pallets that support the material so that it will retain the proper brick dimensions. The pallets transport the "soft" bricks to a dryer, which hardens the bricks so that they can be mechanically set onto kiln cars. The drying process takes 20 hours, and the finishing temperature in the dryer is about 66°C (150°F).

After forming and drying, the soft mud bricks are mechanically set onto kiln cars. After forming and cutting, the extruded bricks are hand set onto kiln cars. On average, each car carries 5,616 bricks. From the stacking area, the soft mud bricks are transported to a holding area and then to ~~two~~ a preheater~~s~~, and the extruded bricks are transported to six holding rooms/dryers, which are heated by waste heat from the cooling section of the kilns. These dryers maintain temperatures ranging from 49°C (120°F) at the entrances to 177°C (350°F) at the exits. Three stacks vent emissions from the preheaters and dryers to the atmosphere. The preheater~~s~~ ~~share~~ HAS ~~a~~ ONE stack, dryers 1, 2, and 3 share a stack, and dryers 4, 5, and 6 share a stack. From the dryers, the cars are transported to the kilns for firing.

Plant 8 has three natural gas-fired tunnel kilns that are used to fire the bricks. The kilns have a considerably larger capacity than the Plant 6 kilns, and they include a flashing zone, where coal, natural gas, or zinc can be introduced into the kiln atmosphere, creating smoke that adds color to the surface of the bricks. The smoke is drawn into the firing section of the kiln. Kilns firing fire clay products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1149°C (2100°F) at the hottest point of the firing section. Kilns firing shale products maintain temperatures ranging from 204°C (400°F) at the offtake section to about 1071°C (1960°F) at the hottest point of the firing section. Between the firing and rapid cool sections is the zero point of each kiln. At the zero point in each kiln, the combustion gases are drawn away from the cooling zone, and the waste heat (no combustion gases) from the fired bricks in the cooling section is drawn to the ducts that lead to the brick dryers and preheaters.

Emissions from the kiln are ducted to two stacks, one serving kiln 1 (shown in Figure 22), and one serving kilns 2 and 3 (shown in Figure 23). Both stacks are constructed with brick and are 1.4 m (56 in.) square in cross section. The stack serving kilns 2 and 3 is equipped with 5 in. sampling ports. There are no emission control devices on either of the two stacks. Figure 23 shows both kiln stacks above the roof of Plant 8. Emissions from the kiln are likely to be PM, sulfur dioxide, nitrogen oxides, carbon monoxide, fluorides, and other inorganic and organic compounds from combustion or vaporization of the raw materials.

V. Conclusions

The sources being considered for testing are the grinding room and the kilns. It appears feasible to test controlled PM and PM-10 emissions from the Plant 6 grinding room. The grinding room appears typical of the industry, except for the separate processing lines for shale and fire clay. The Plant 8 grinding room is not typical of the industry and is not a good candidate for testing.

Testing of emissions from the dryers and kilns at either plant should be relatively straightforward. However, the flashing process used in the Plant 8 kilns is not standard industry practice, and may effect kiln emissions. Sampling ports would have to be installed in the dryer stacks at either plant.

Trucks carrying raw material to the primary crushers produce some fugitive dust emissions at both plants, but fugitive dust emissions from plant traffic appear to be minimal. Also, there are no open storage piles at either plant.

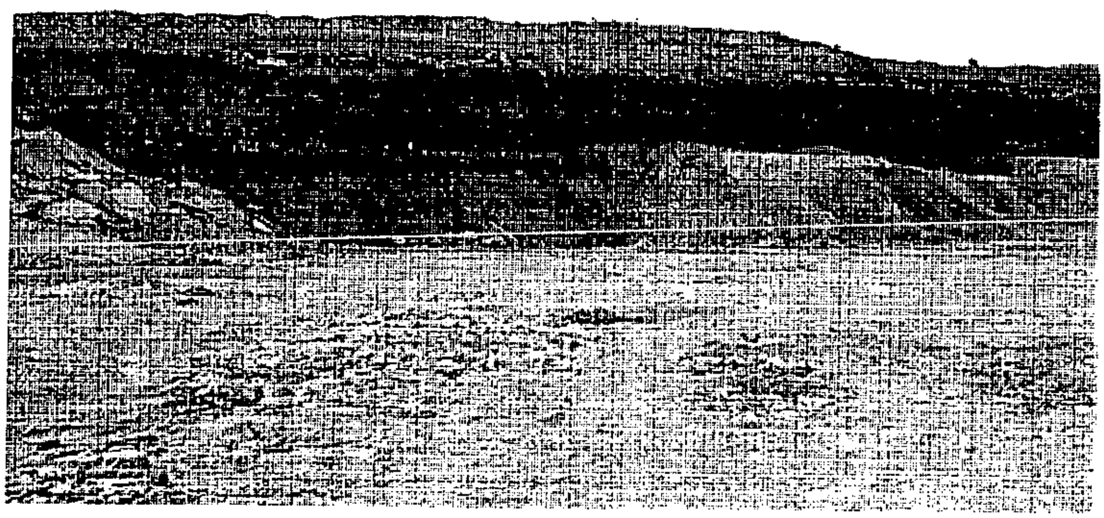

Figure 1. Belden Brick Company open pit mine.

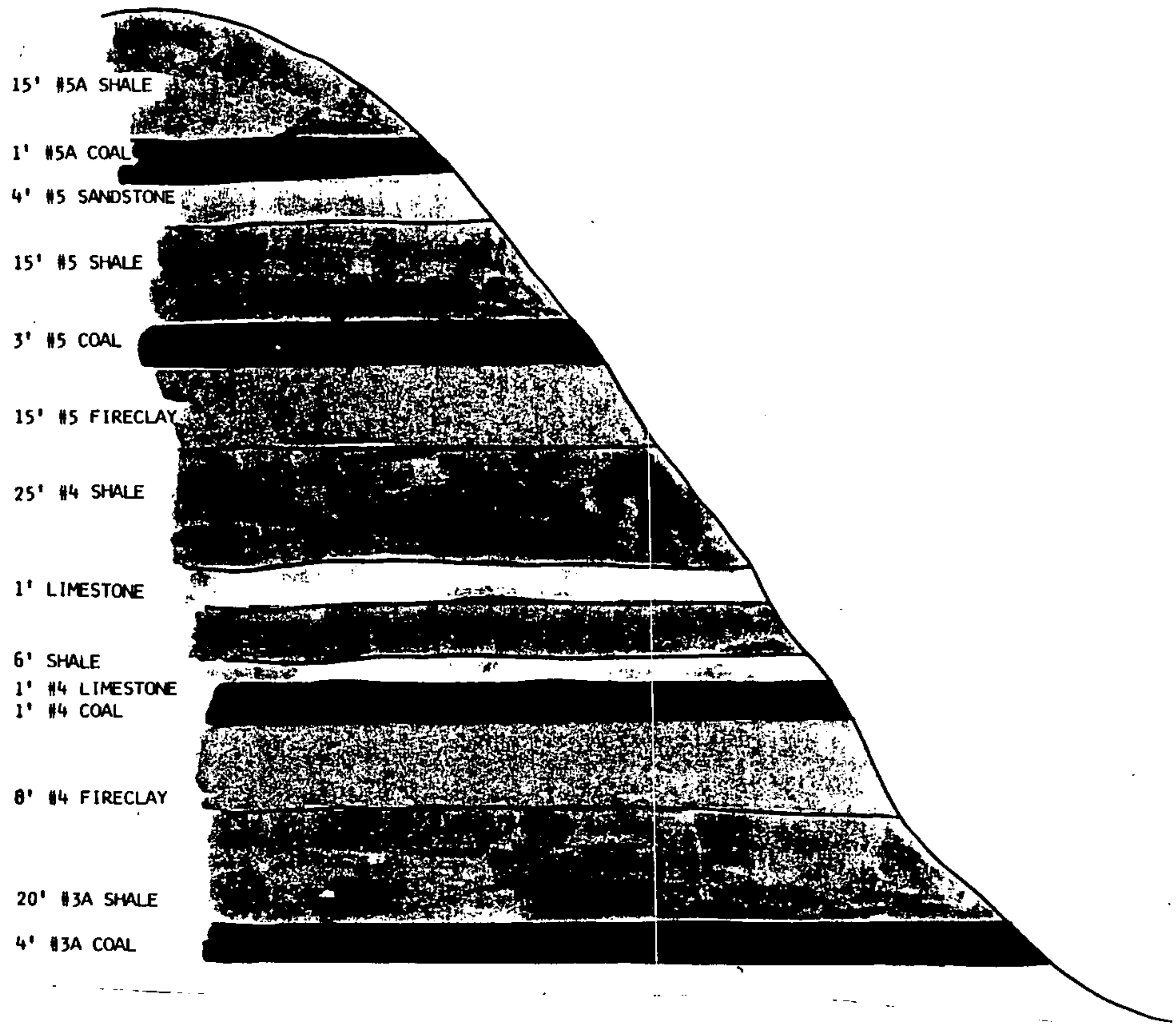

Figure 2. Profile of a typical "Belden hill".

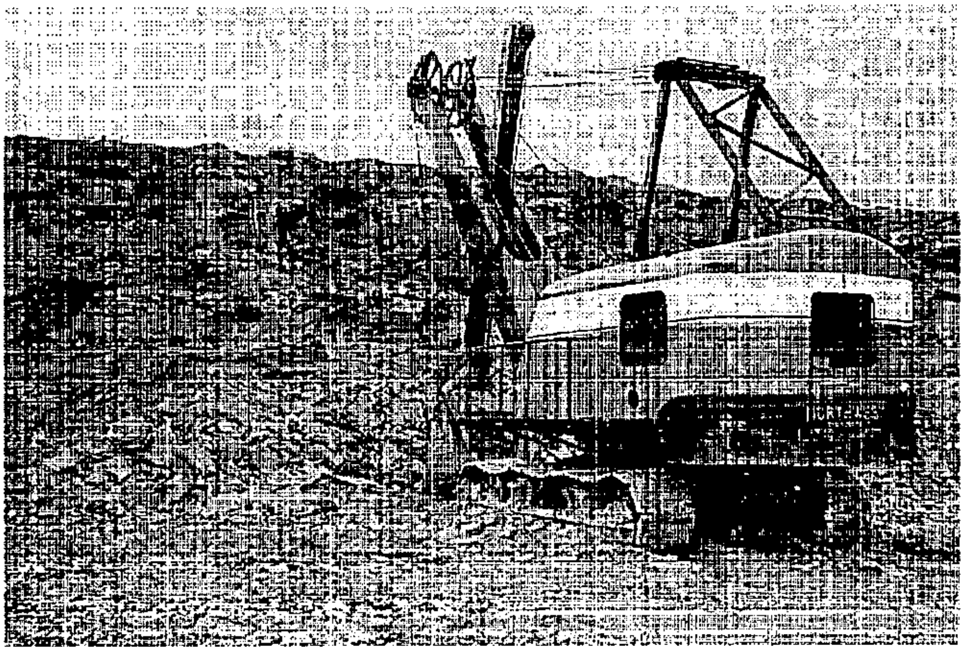

Figure 3. Exposed seam of 3A shale at a Belden open pit mine.

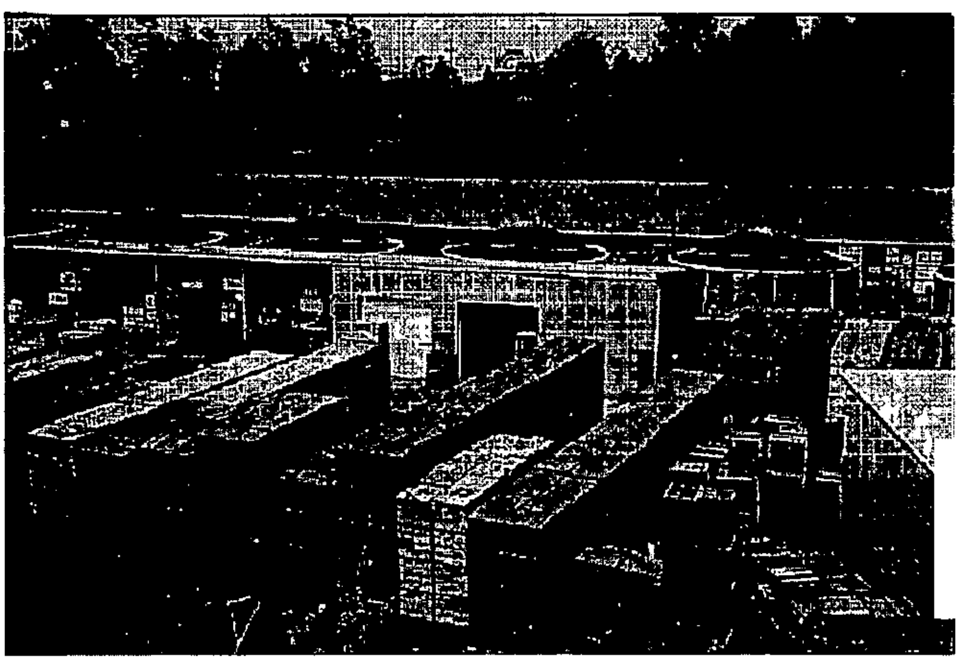

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Figure 4. Plant ~~18~~ brickyard and periodic kilns.

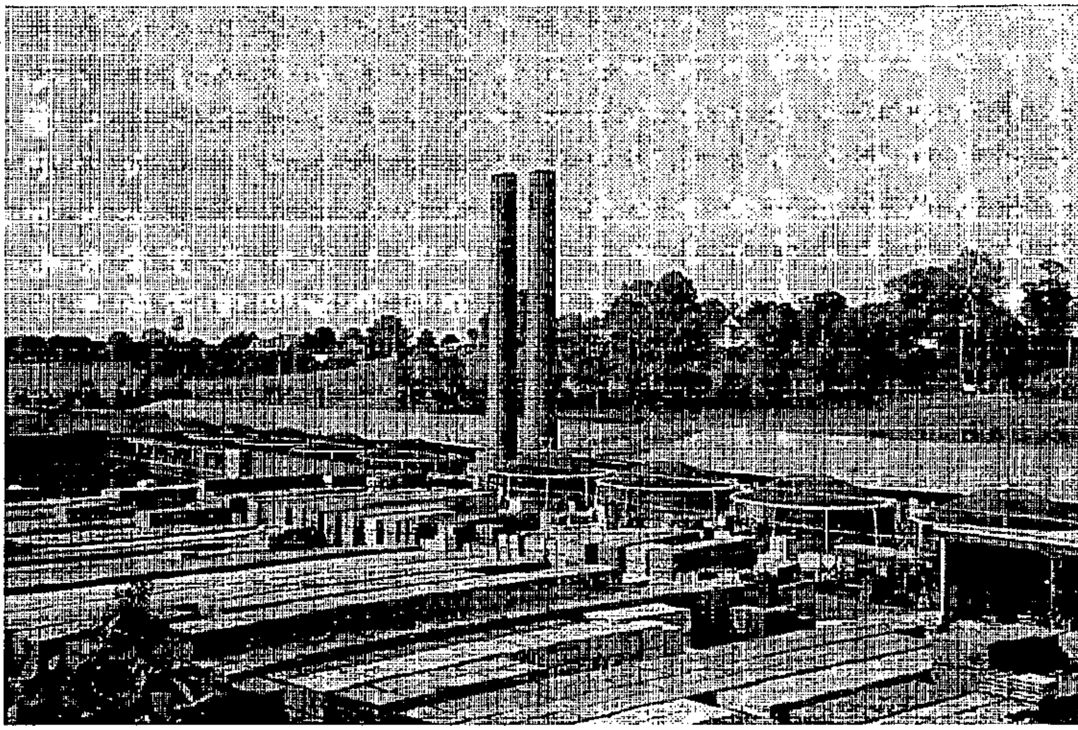

Figure 5. Plant ~~18~~ 4 brickyard and periodic kilns.

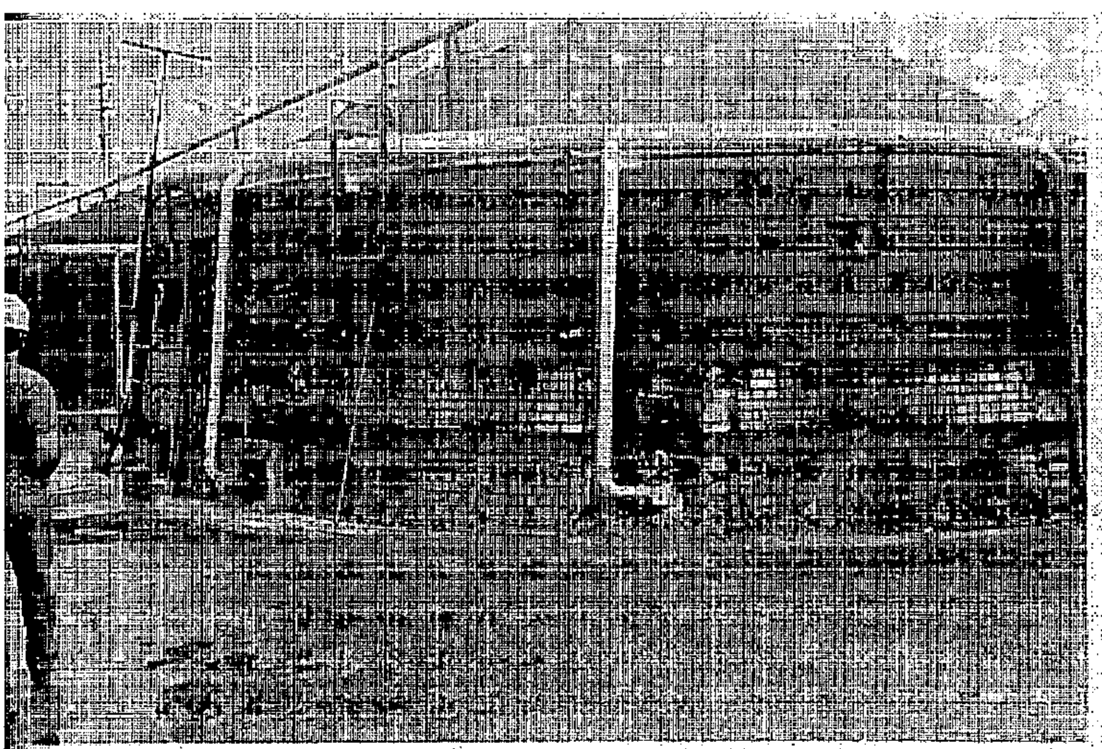

Figure 6. Plant ~~18~~ 4 periodic kiln.

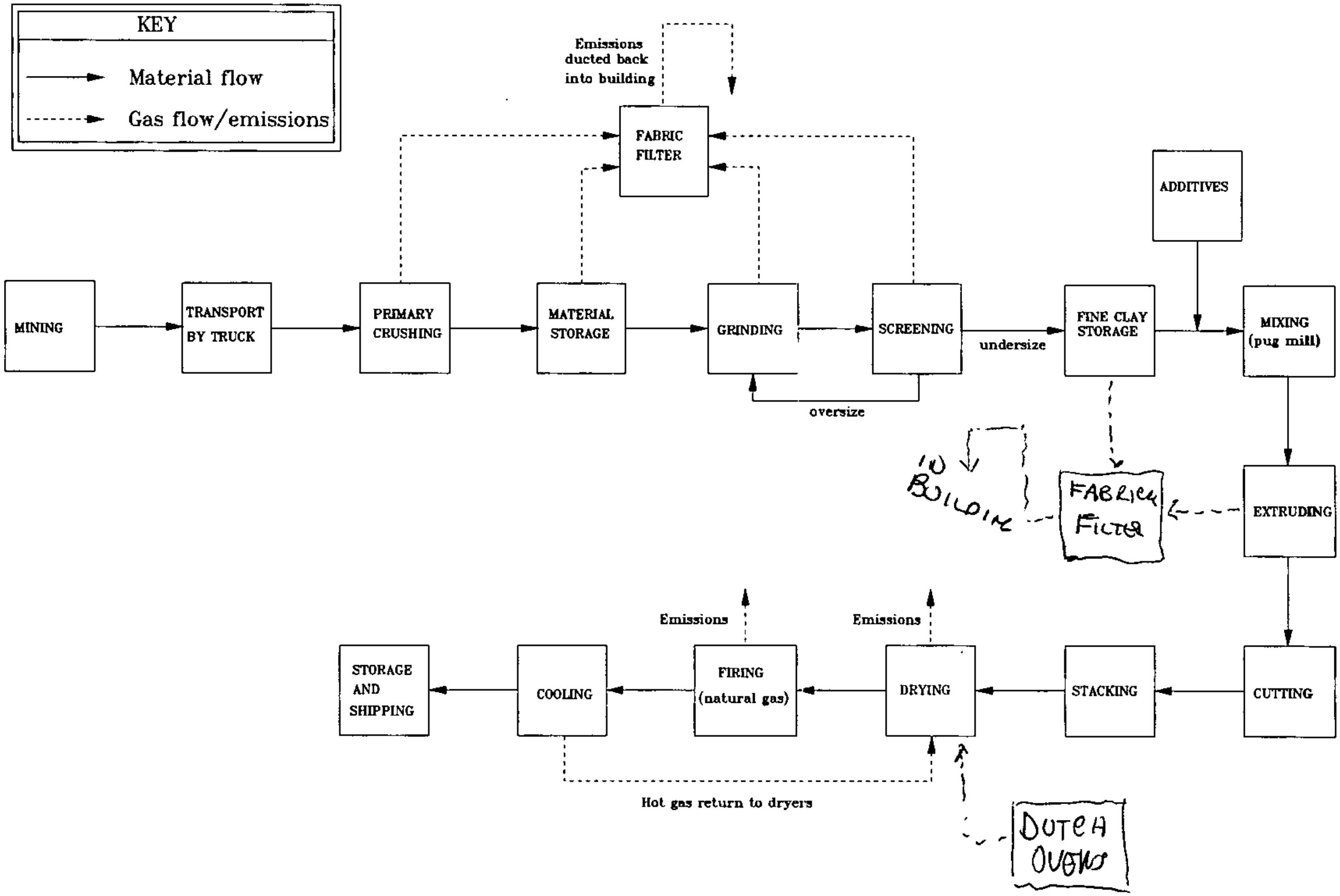

FIGURE 7. PROCESS FLOW DIAGRAM FOR BELDEN BRICK, PLANT 6, SUGARCREEK, OHIO.

Figure 8. Plant 6 vibrating screen with hood and ductwork.

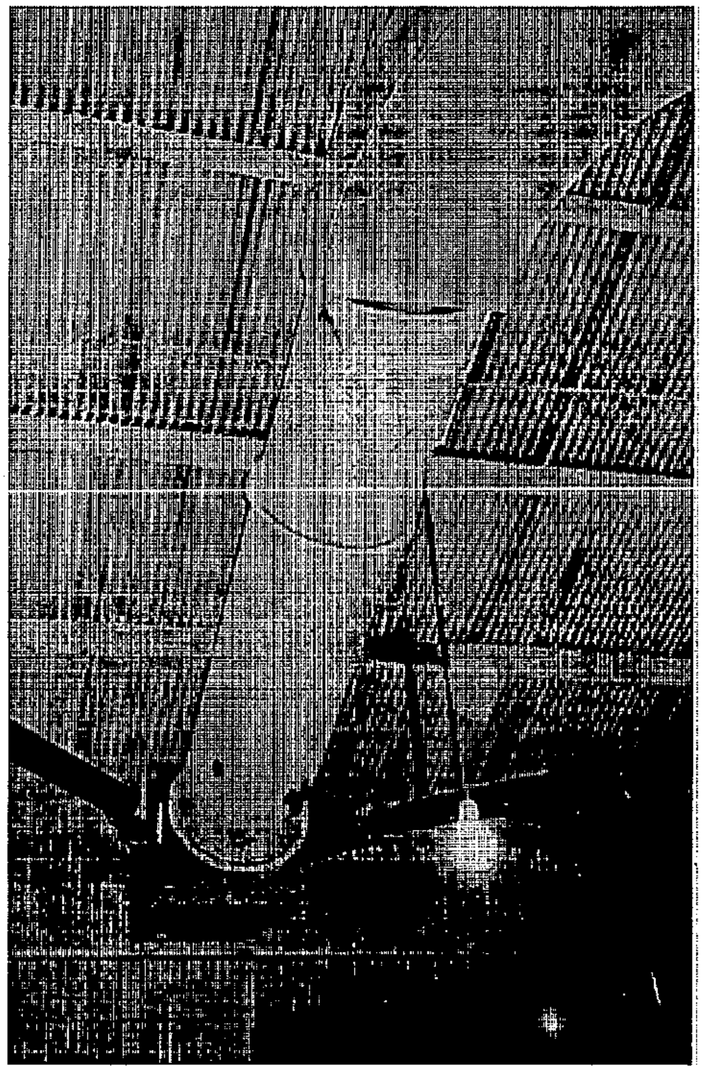

Figure 9. Plant 6 fabric filter inlet duct for the ~~shale~~ processing line.

Clay

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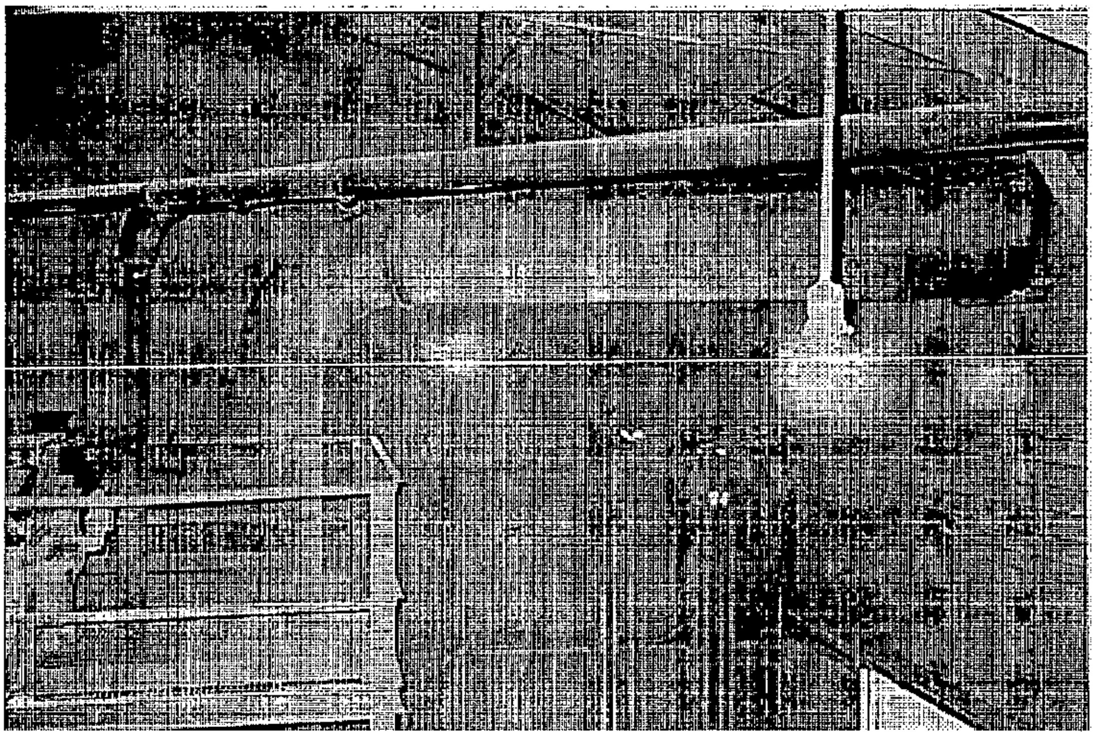
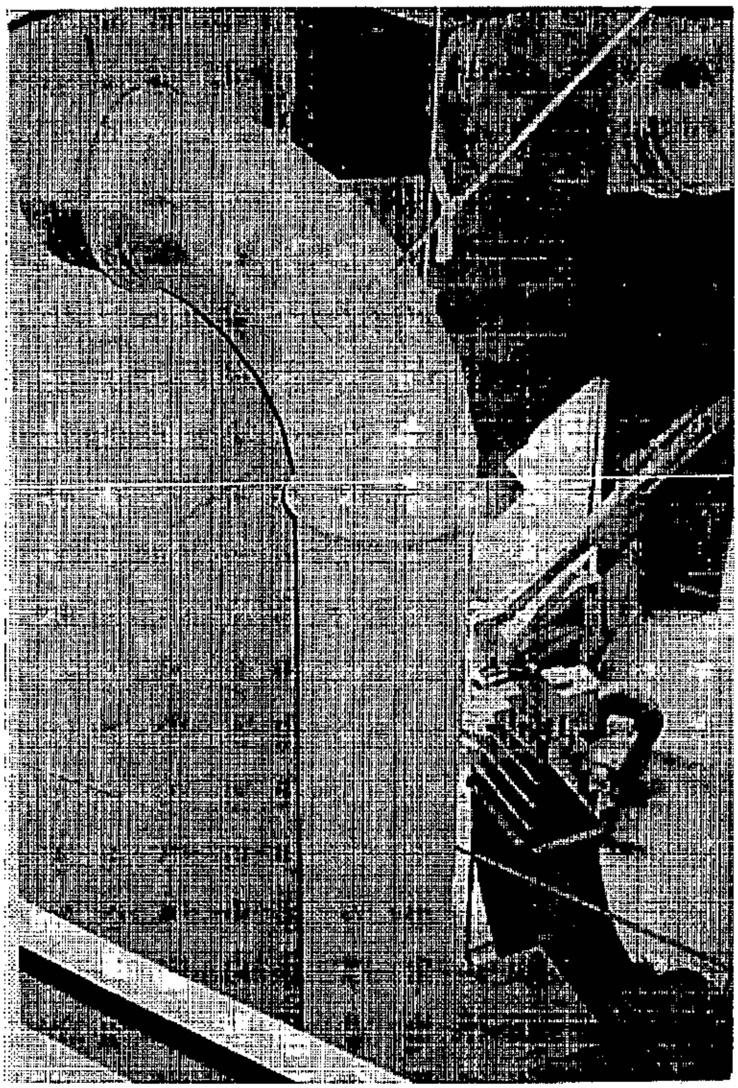


Figure 10. Plant 6 ~~shale~~ CLAY processing line fabric filter outlet duct.



SHALE

Figure I1. Plant 6 ~~clay~~ processing line fabric filter outlet duct.

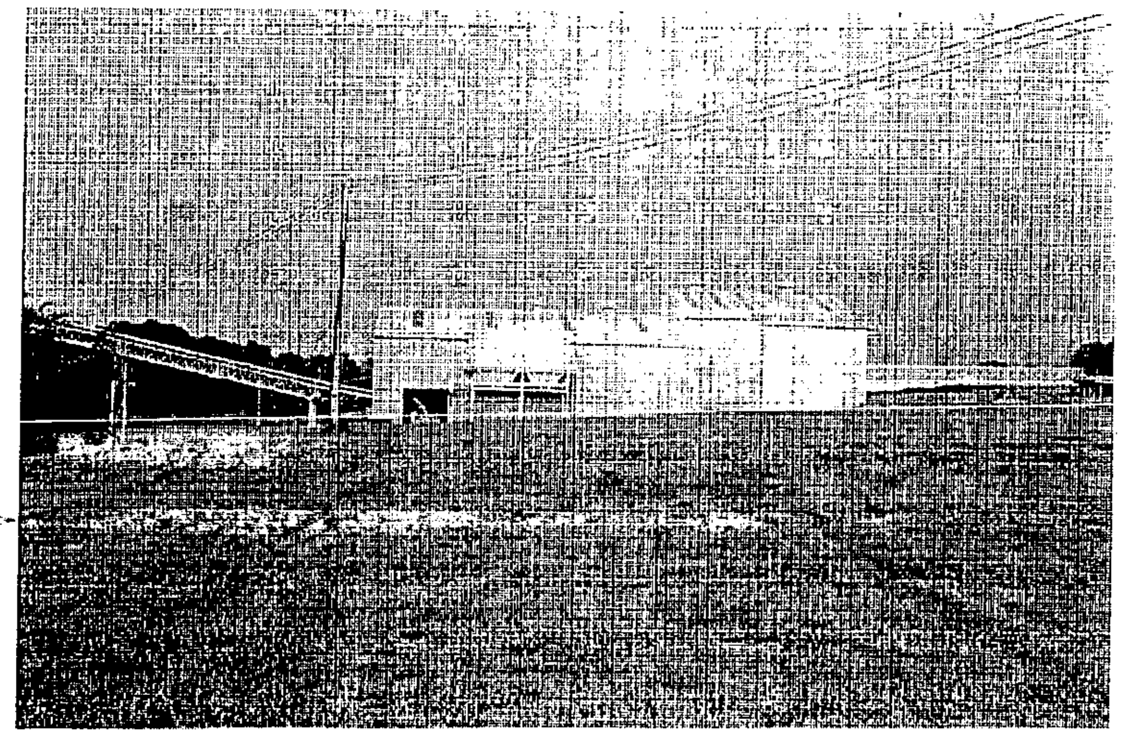


Figure 12. Plant 6 grinding room and conveyors to fine clay storage.

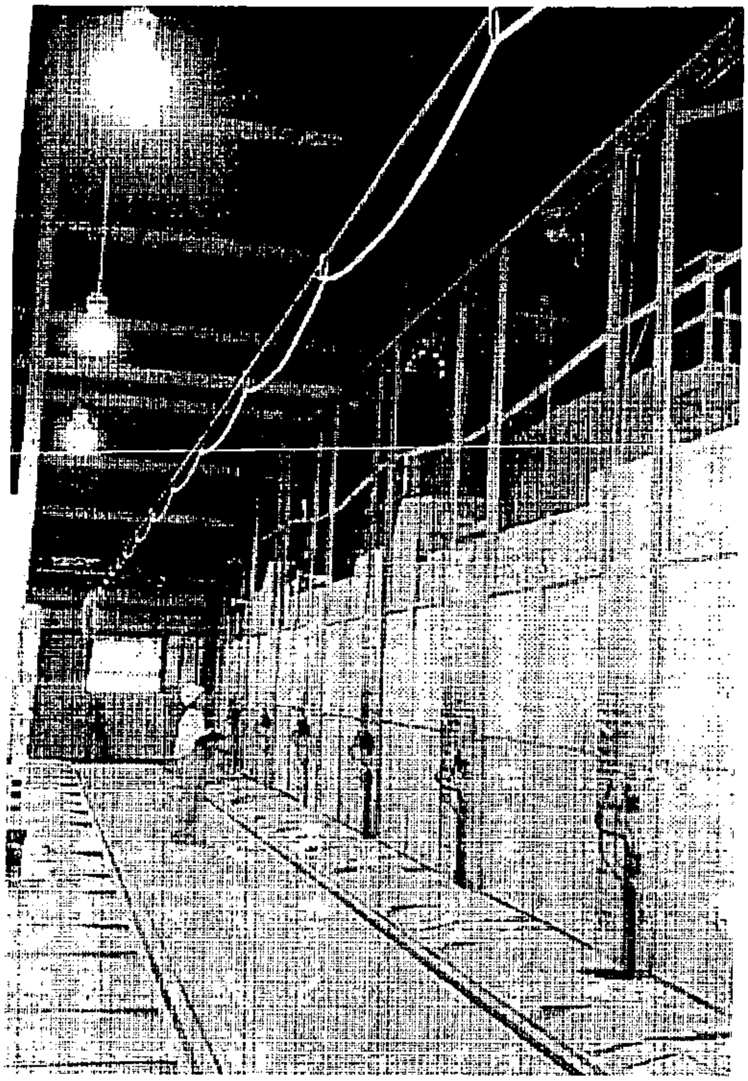


Figure 13. Plant 6 brick dryers.

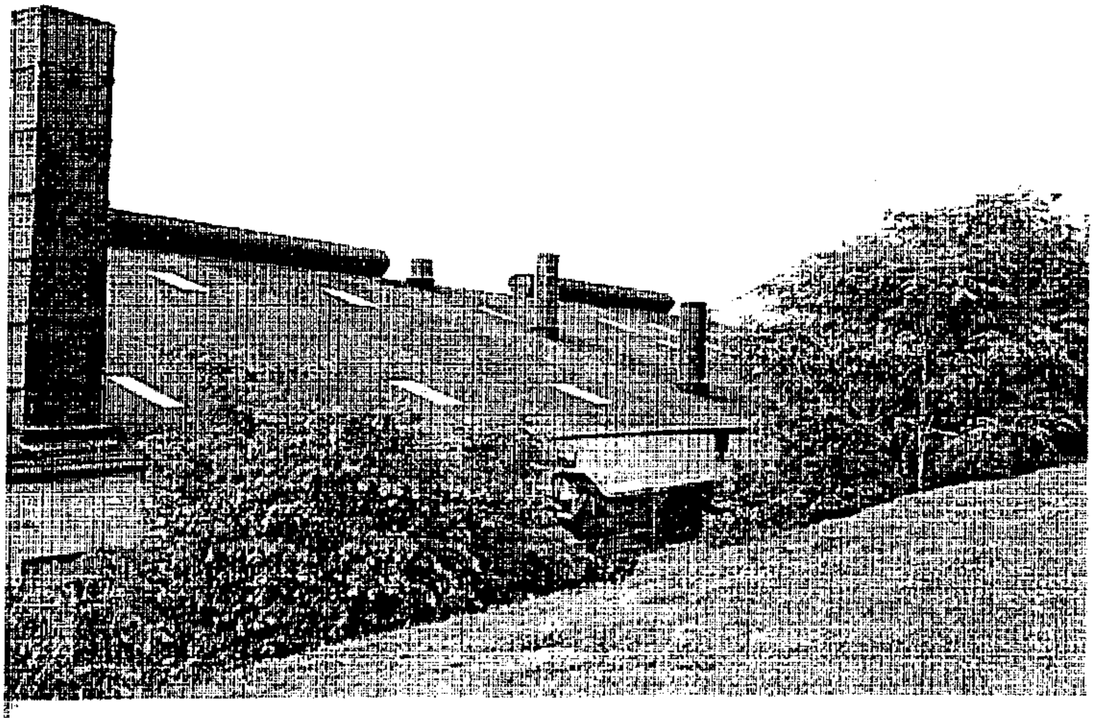


Figure 14. Plant 6 dryer stacks.

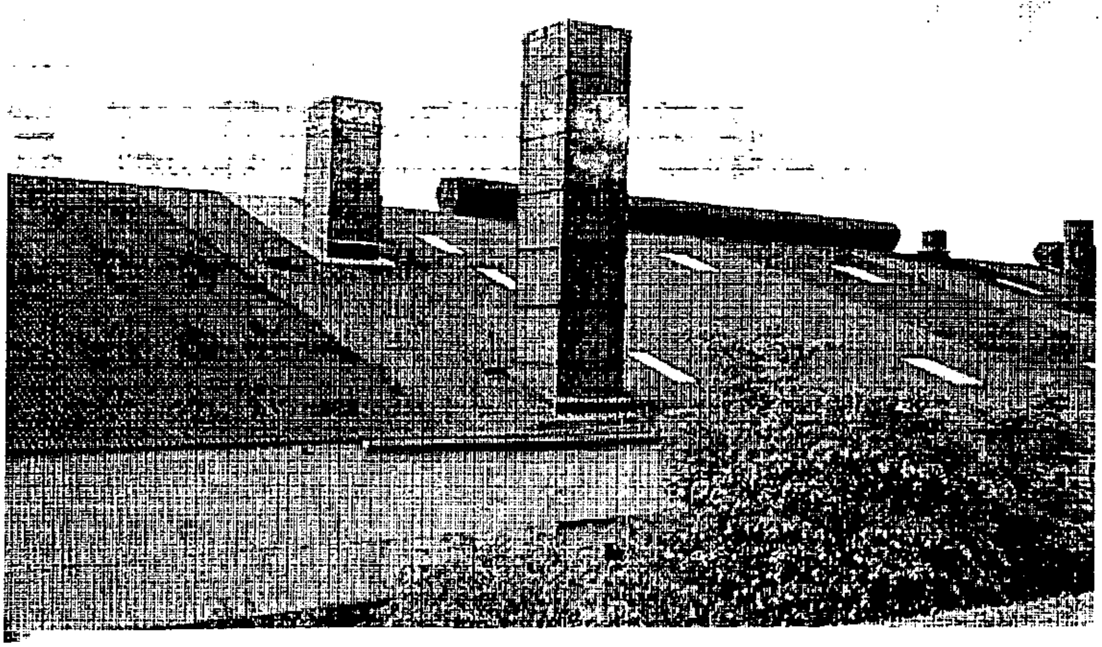


Figure 15. Plant 6 kiln stacks.

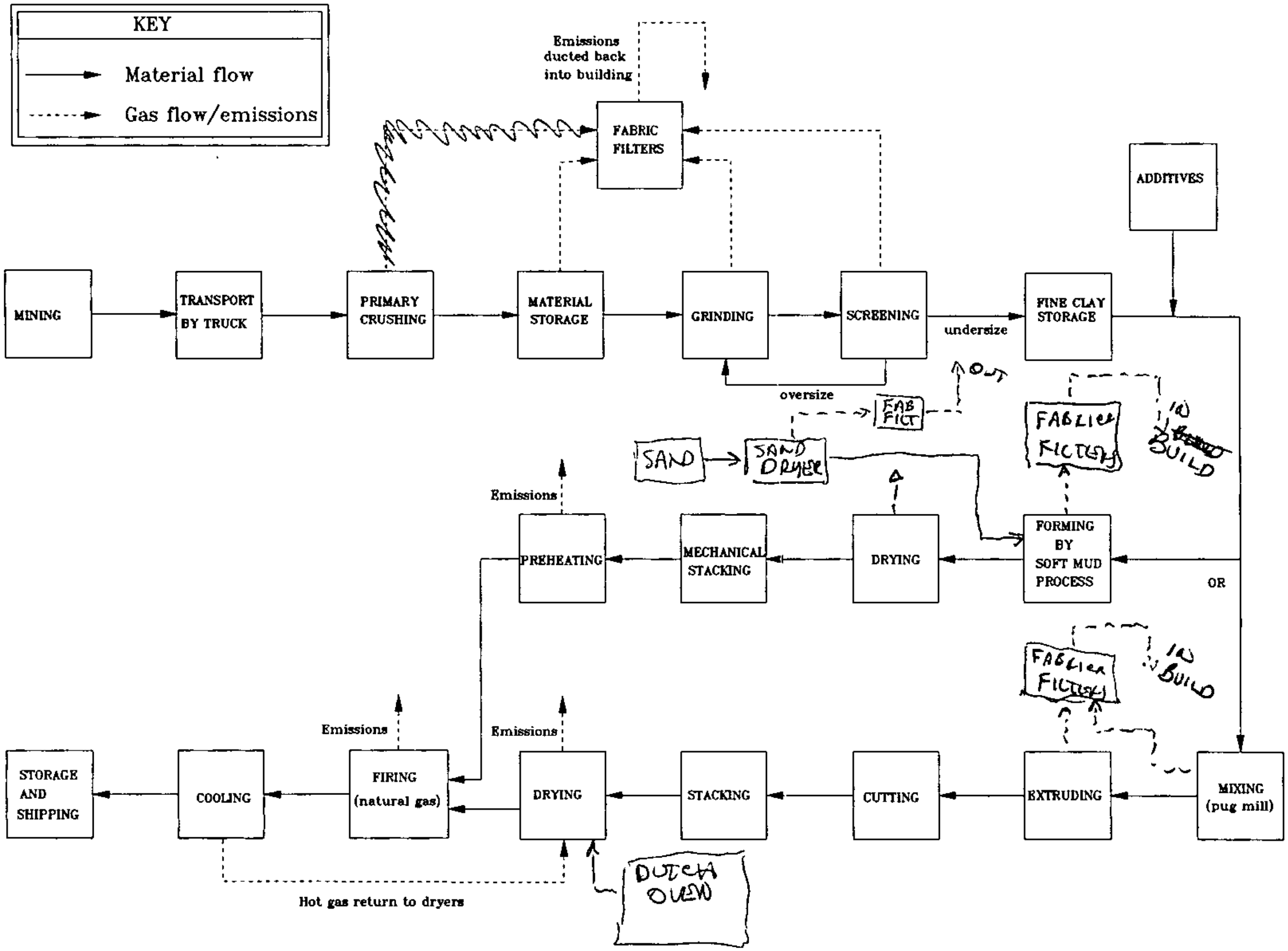


FIGURE 16. PROCESS FLOW DIAGRAM FOR BELDEN BRICK, PLANT 8, SUGARCREEK, OHIO.

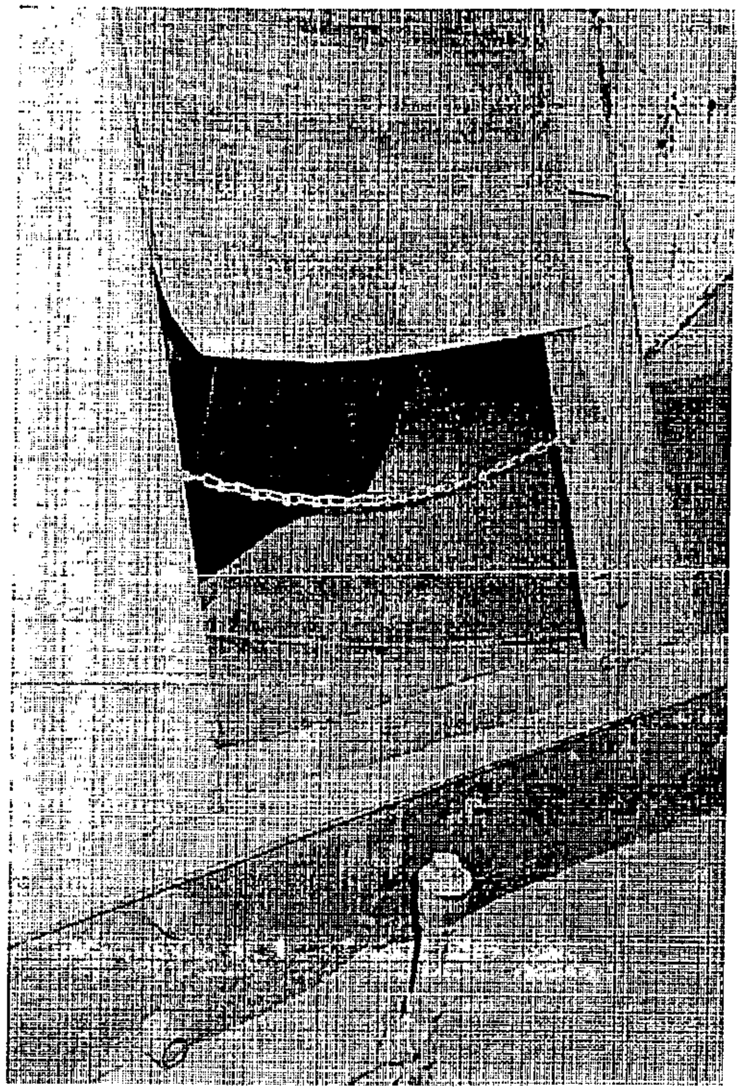


Figure 17. Plant 8 rim discharge grinder.

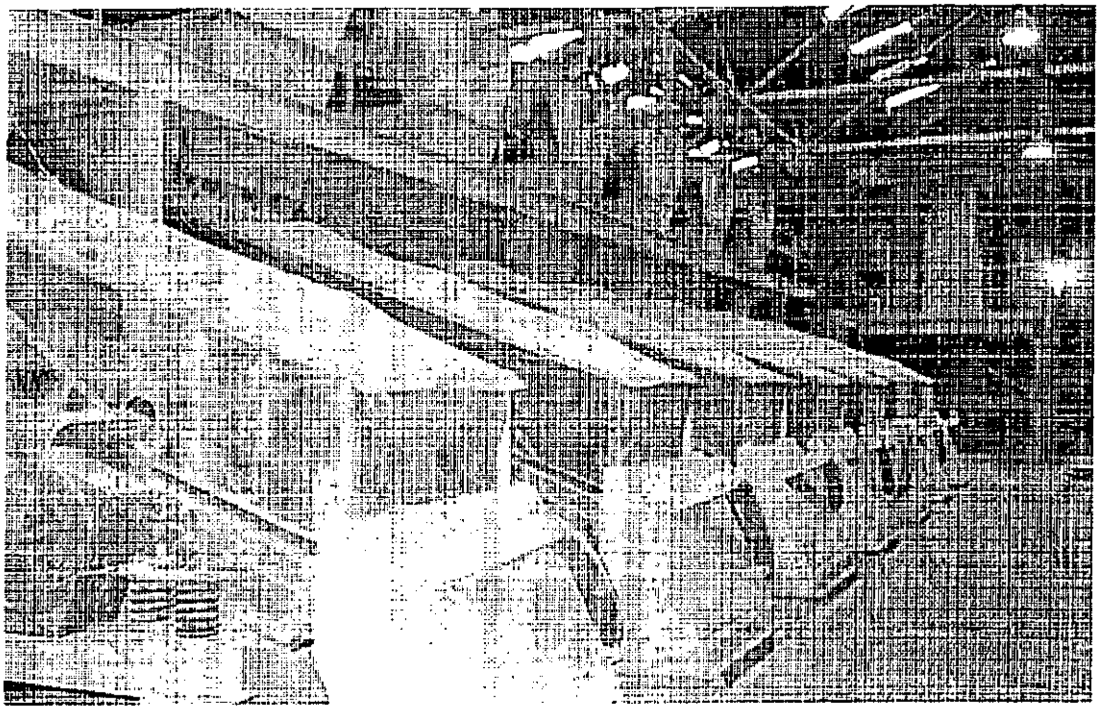


Figure 18. Plant 8 screens and hoods.

Figure 19. Plant 8 screens and hoods.

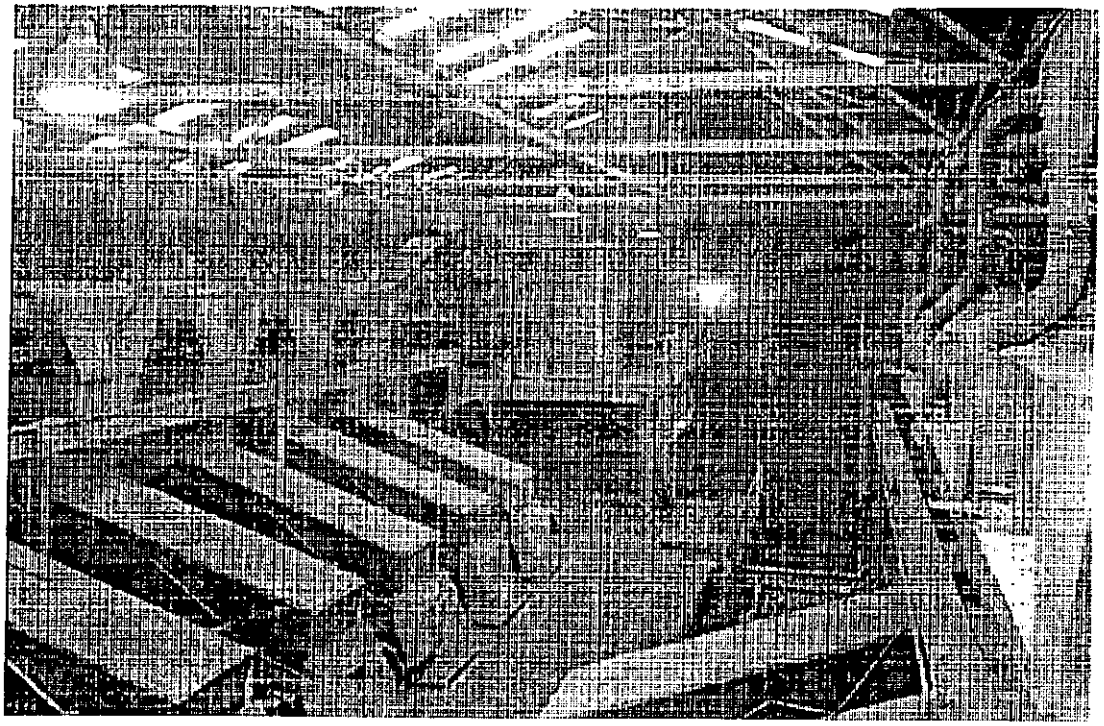


Figure 20. Plant 8 vibrating screens, hoods, and fabric filter.

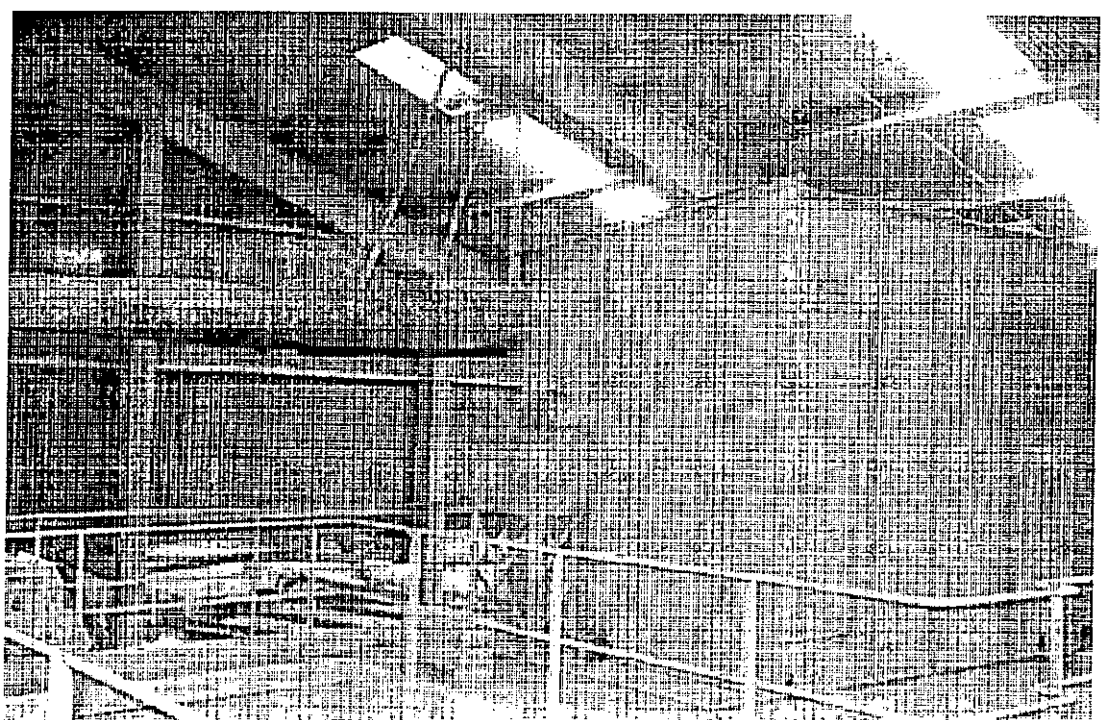


Figure 21. Plant 8 fabric filter.

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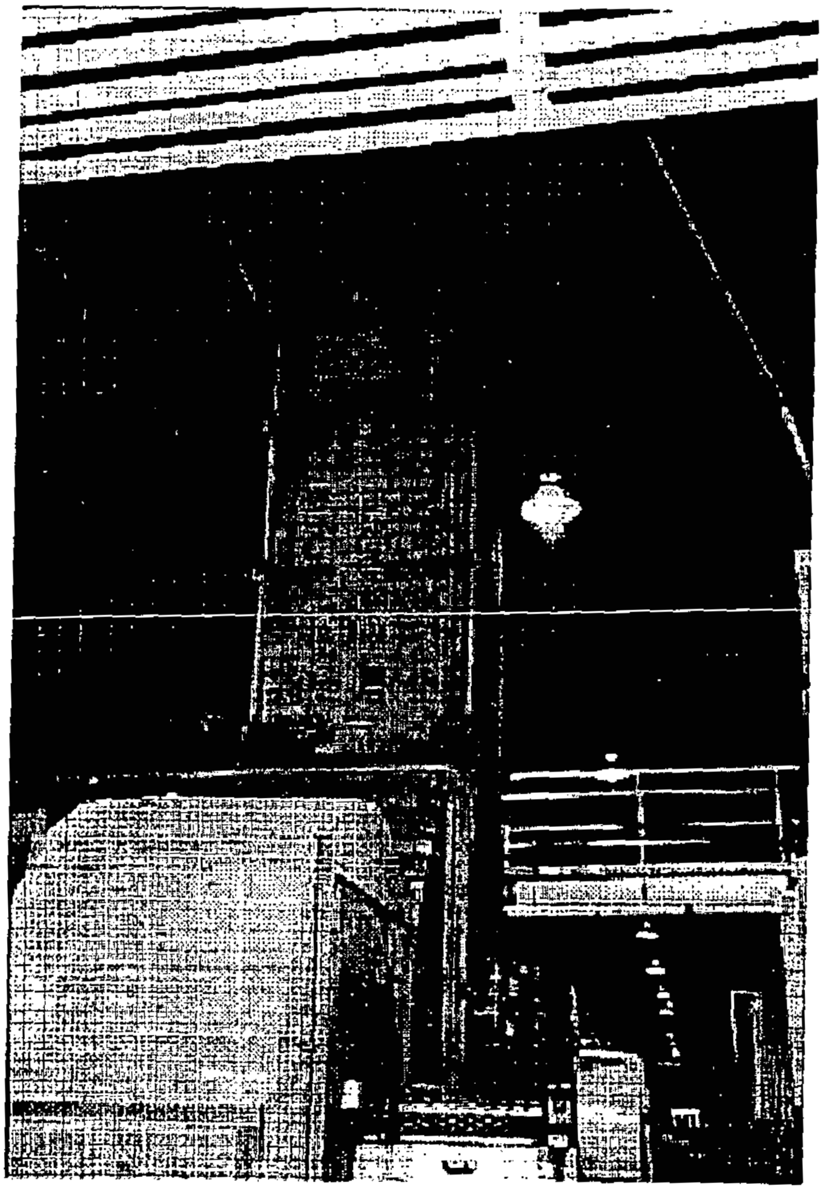

Figure 22. Plant 8 stack serving kiln 1.

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Figure 23. Plant 8 stack serving kilns 2 and 3.

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Figure 24. Plant 8 kiln stacks.

MRI

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Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

November 29, 1994

Mr. Ron Myers
Emission Factor and Inventory Group (MD-14)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

Re: Review and Update of Mineral Products Industry and Metallurgical Industries Sections of Chapters 11 and 12 of AP-42
EPA Contract No. 68-D2-0159; Work Assignment No. II-01
MRI Project No. 4602-01

Dear Mr. Myers:

In response to comments received from John Jensen of Belden Brick in his September 14, 1994 letter to you, I have reviewed MRI's records and have rechecked the calculations for total organic compounds (TOC) emissions from the dryer. Based upon the field records, I believe the emission concentrations presented in the report to be correct. However, the reported emission rates and emission factors are in slight error for two reasons. First, velocity traverse data for Run 1 were not available when the report was prepared; the average of the velocities and flow rates for Runs 2 and 3 were used. Second, the flow rate for Run 3 was entered into the calculation spreadsheet incorrectly. The corrected average emission rates and emission factors are 2 to 3 percent higher than the values presented in the draft test report. The correct emission rates and factors will be reported in the final report.

The steps taken during my data review and my comments on the results are summarized as follows:

(a) The concentrations of calibration standards were verified. The span and midpoint calibration gas values were confirmed by reviewing the calibration gas certifications;

(b) The data logger field records of 1-minute concentration measurements were reviewed. The field records indicate the measured values are consistent with the reported data. The field records have not been drift corrected, and hence are slightly different (1-2 ppm) than the 1-minute readings presented in the appendix to the report; the data presented in the report have been drift corrected using the pre- and post-test zero and span calibrations;

(c) The results of the quality control (QC) checks for the monitor (i.e., calibration error, drift and bias checks) were reviewed. The results are within specification;

(d) The stack gas flow rate calculations were checked. Calculations from the velocity traverse data were verified to be accurate. However, review of the data identified one anomaly. A separate orsat measurement (oxygen and carbon dioxide) and moisture measurement for the dryer gas was not reported; the orsat/moisture measurements for the kiln stack gas (O_2 = 17.6%, CO_2 = 2.2%, and H_2O = 4.2%) were used in the dryer emissions calculations. These data are used only to calculate the molecular weight of the stack gas for determination of the stack gas velocity. The molecular weight has only a small impact on the calculation. To evaluate the possible impact on the stack gas flowrate (and consequently the emission rate), a sensitivity analysis was conducted by substituting the molecular weight for the two extremes between which the true molecular weight would lie -- ambient air and undiluted combustion gas. The deviations of the flowrate from the reported value using these two extremes in molecular weight are +4% and -2%, respectively. The actual molecular weight should be between these two extremes, and, consequently, use of the kiln gas molecular weight is reasonable; and

(e) The following spreadsheet calculations were checked: (1) conversion from propane basis to methane basis, (2) mass emission rate (i.e., lb/hr), and (3) emission factor (i.e., lb/ton bricks produced).

The following records are attached:

Attachment 1 -- Calibration gas certification records

Attachment 2 -- Data logger field records (Annotated)

Attachment 3 -- Velocity traverse field records and calculations

Attachment 4 -- Example calculation

It is our understanding that this facility is unusual (with respect to other facilities for which we have data) in that the dryer uses auxiliary burners in addition to the heated air from the kiln. Perhaps this explains the higher than expected TOC results.

Please let me know if you need any additional information.

Sincerely,

Roy Neulicht
Program Manager

Attachments

ATTACHMENT 1

CALIBRATION GAS CERTIFICATES

213-585-2154
FAX# 213-585-0582

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. P.O NUMBER 092193-1

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	1667b	CLM-005042	47.3 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT PROPANE ANALYZER MAKE-MODEL-S/N HP 5890 SERIES II S/N 3310A48533

ANALYTICAL PRINCIPLE GC/ FLAME IONIZATION LAST CALIBRATION DATE 07/08/93

FIRST ANALYSIS DATE	09/28/93					SECOND ANALYSIS DATE			
Z 0	R 58386	C 63294	CONC.	51.3 ppm	Z	R	C	CONC.	
R 59250	Z 0	C 64278	CONC.	51.3 ppm	R	Z	C	CONC.	
Z 0	C 64093	R 59056	CONC.	51.3 ppm	Z	C	R	CONC.	
U/M uV		MEAN TEST ASSAY		51.3 ppm	U/M uV			MEAN TEST ASSAY	

THIS CYLINDER NO. SA 8784
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 09/28/93
EXPIRATION DATE 03/28/95 TERM 18 MONTHS

CERTIFIED CONCENTRATION	
PROPANE	51.3 ppm
ZERO AIR	BALANCE

ANALYZED BY Kelly Gallagher
KELLY GALLAGHER

CERTIFIED BY Doug Grant
DOUG GRANT

LIQUID CARBONIC
SPECIALTY GAS CORPORATION
5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058
213 585-2154
FAX # 213 585-0582

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. **P.O NUMBER** 021293-3

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	vs. 1668b	SA 5909	95.3 ppm

ANALYZER READINGS

R=REFERENCE STANDARD Z=ZERO GAS C=GAS CANDIDATE

1. COMPONENT PROPANE ANALYZER MAKE-MODEL-S/N HP 5890 Series II S/N 3108A34409

ANALYTICAL PRINCIPLE GC/ Thermal Conductivity LAST CALIBRATION DATE 10/26/92

FIRST ANALYSIS DATE 03/04/93 SECOND ANALYSIS DATE

Z 0	R 738	C 703	CONC.	90.8 ppm	Z	R	C	CONC.	
R 742	Z 0	C 701	CONC.	90.0 ppm	R	Z	C	CONC.	
Z 0	C 693	R 735	CONC.	89.9 ppm	Z	C	R	CONC.	
U/M uV		MEAN TEST ASSAY		90.2 ppm	U/M uV			MEAN TEST ASSAY	

THIS CYLINDER NO. SA 5736
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 03/02/93
EXPIRATION DATE 09/02/94

CERTIFIED CONCENTRATION	
PROPANE	90.2 ppm
ZERO AIR	BALANCE

ANALYZED BY K.A. Gallagher
K.A. GALLAGHER

CERTIFIED BY K.T. Young
K.T. YOUNG

213-585-2154
FAX# 213-585-0582

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

5700 SOUTH ALEMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. P.O NUMBER

REFERENCE STANDARD

COMPONENT		NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	GMIS	vs 1667b	579140	29.8 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C-GAS CANDIDATE*

1. COMPONENT PROPANE GMIS ANALYZER MAKE-MODEL-S/N HP 5890 Series II S/N 3108A34409

ANALYTICAL PRINCIPLE GC/ Thermal Conductivity LAST CALIBRATION DATE 04/15/93

FIRST ANALYSIS DATE 05/24/93 SECOND ANALYSIS DATE

Z 0	R 208	C 206	CONC. 29.5 ppm	Z	R	C	CONC.
R 208	Z 0	C 205	CONC. 29.4 ppm	R	Z	C	CONC.
Z 0	C 205	R 206	CONC. 29.7 ppm	Z	C	R	CONC.
U/M uV		MEAN TEST ASSAY	29.5 ppm	U/M uV			MEAN TEST ASSAY

THIS CYLINDER NO. SA 6981
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 05/24/93
EXPIRATION DATE 11/24/94

CERTIFIED CONCENTRATION

PROPANE	29.5 ppm
ZERO AIR	BALANCE

ANALYZED BY Kelly Gallagher
KELLY GALLAGHER

CERTIFIED BY
KWAN TAK YOUNG

ATTACHMENT 2

DATA LOGGER RECORDS

All handwritten notations are
R. Neulicht
11/28/94

Filename:RUN1
Name:RUN1
Date:11-11-1993
Location:BELDON BRICK
Project #:4601-01-05-01
Operator:BG

Dryer

	0
	THC
07:51:2	24.90
07:51:3	24.91
07:51:4	24.90
07:51:5	24.90
07:52:0	24.90
07:52:1	24.89

07:52:1 INIT. ZERO
0 THC 24.39 — Zero reading RMN 11/28/94

08:14:4	57.01
08:14:5	57.05
08:15:0	57.16
08:15:1	57.05

08:15:1 INIT. SPAN
0 THC 57.05 90.20 — Span reading RMN 11/28/94

Cylinder No. SA~~5909~~ 5736 RMN (90.2ppm)

08:16	46.96
08:16	61.9
08:17	43.00
08:17	50.8

LINEARITY CHECK PROPANE 50.3 PPM--BG [11-11-1993 -- 08:17:28]

Cylinder No. SA8784 (51.3ppm)
(51.3 value correctly used during calculation of calibration error)

08:18	43.00
08:18	50.8
08:19	43.00
08:19	50.8

THC PASSED AT 50.8 PPM--BG [11-11-1993 -- 08:19:09]
LINEARITY CHECK 29.5 PPM PROPANE--BG [11-11-1993 -- 08:19:44]

Cylinder No. SA 6981 (29.5ppm)

08:20	38.95
08:20	39.4
08:21	35.28
08:21	29.1
08:22	35.27
08:22	29.1
08:23	35.27
08:23	29.1

THC PASSED AT 29.1 PPM--BG [11-11-1993 -- 08:23:39]

08:24	34.78
08:24	27.7
08:25	25.00
08:25	0.3
08:26	24.86
08:26	-0.1
08:27	24.84
08:27	-0.1

08:28	-0.1
08:29	24.83
08:29	-0.2
08:30	24.81
08:30	-0.2
08:31	24.82
08:31	-0.2
08:32	24.80
08:32	-0.3
08:33	24.82
08:33	-0.2
08:34	24.81
08:34	-0.2
10:26	66.95
10:26	118.0
10:27	55.40
10:27	85.6
10:28	49.11
10:28	67.9
10:29	47.72
10:29	64.0
10:30	46.85
10:30	61.6
10:31	46.32
10:31	60.1
10:32	46.59
10:32	60.9
10:33	47.15
10:33	62.4
10:34	47.67
10:34	63.9
10:35	48.32
10:35	65.7

BEGIN RUN 1--BG [11-11-1993 -- 10:35:56] Dryer Run 1

10:36	48.82	Data Logger Reading
10:36	67.1	ppm
10:37	49.20	
10:37	68.2	
10:38	49.57	
10:38	69.2	
10:39	49.43	
10:39	68.8	
10:40	49.39	
10:40	68.7	
10:41	49.58	
10:41	69.2	
10:42	49.77	
10:42	69.8	
10:43	49.76	
10:43	69.8	

10:44	[illegible]
10:45	50.05
10:45	70.6
10:46	50.45
[illegible]	[illegible]
10:49	50.77
10:49	72.6
10:50	51.21
10:50	73.8
10:51	51.58
10:51	74.9
10:52	52.07
10:52	76.2
10:53	51.78
10:53	75.4
10:54	51.48
10:54	74.6
10:55	50.98
10:55	73.2
10:56	50.65
10:56	72.2
10:57	50.35
10:57	71.4
10:58	49.86
10:58	70.0
10:59	49.20
10:59	68.2
11:00	49.35
11:00	68.6
11:01	49.08
11:01	67.8
11:02	48.68
11:02	66.7
11:03	48.33
11:03	65.8
11:04	48.35
11:04	65.8
11:05	48.12
11:05	65.1
11:06	47.89
11:06	64.5
11:07	47.77
11:07	64.2
11:08	47.64
11:08	63.8
11:09	47.34
11:09	63.0
11:10	47.64
11:10	63.8
11:11	47.20

11:1[illegible]	
11:12	[illegible]
11:13	46.63
11:13	61.1
11:14	46.60
11:14	60.9
11:15	46.45
11:15	60.5
11:16	46.52
11:16	60.7
11:17	46.37
11:17	60.2
11:18	46.47
11:18	60.5
11:19	46.53
11:19	60.7
11:20	46.47
11:20	60.5
11:21	46.38
11:21	60.3
11:22	46.39
11:22	60.3
11:23	46.22
11:23	59.8
11:24	46.23
11:24	59.9
11:25	46.14
11:25	59.6
11:26	45.95
11:26	59.1
11:27	45.14
11:27	56.8
11:28	44.72
11:28	55.6
11:29	45.14
11:29	56.8
11:30	42.24
11:30	48.7
11:31	42.92
11:31	50.6
11:32	52.25
11:32	76.7
11:33	56.19
11:33	87.8
11:34	55.26
11:34	85.2
11:35	55.56
11:35	86.0

11:37	58.79
11:37	95.1
11:38	59.11
[illegible]	[illegible]
11:44	59.08
11:44	95.9
11:45	59.17
11:45	96.2
11:46	58.73
11:46	94.9
11:47	58.70
11:47	94.8
11:48	58.81
11:48	95.1
11:49	58.63
11:49	94.6
11:50	58.41
11:50	94.0
11:51	58.46
11:51	94.1
11:52	58.27
11:52	93.6
11:53	58.72
11:53	94.9
11:54	58.84
11:54	95.2
11:55	58.53
11:55	94.4
11:56	58.55
11:56	94.4
11:57	58.57
11:57	94.5
11:58	58.28
11:58	93.6
11:59	58.83
11:59	95.2
12:00	58.78
12:00	95.1
12:01	59.14
12:01	96.1
12:02	59.15
12:02	96.1
12:03	59.64
12:03	97.5
12:04	59.73
12:04	97.7
12:05	59.64
12:05	97.5
12:06	59.75

12:07	59.34
12:07	98.0
12:08	59.97
12:08	98.4
12:09	59.83
12:09	98.0
12:10	59.44
12:10	96.9
12:11	58.87
12:11	95.3
12:12	59.12
12:12	96.0
12:13	59.34
12:13	96.6
12:14	59.62
12:14	97.4
12:15	59.07
12:15	95.9
12:16	59.38
12:16	96.7
12:17	59.88
12:17	98.1
12:18	59.68
12:18	97.6
12:19	59.11
12:19	96.0
12:20	59.43
[illegible]	[illegible]
12:23	59.31
12:23	96.5
12:24	59.71
12:24	97.7
12:25	59.68
12:25	97.6
12:26	59.37
12:26	96.7
12:27	59.42
12:27	96.8
12:28	59.39
12:28	96.8
12:29	59.39
12:29	96.8
12:30	59.48
12:30	97.0
12:31	59.12
12:31	96.0
12:32	58.82
[illegible]	[illegible]

12:33 [illegible]
12:33 95.2

12:34 58.75
12:34 95.0

[illegible]UN 1[illegible][11-11-1993 -- 12:37:39]

End Run 1

12:40 43.05
12:40 50.9
12:41:0 25.44
12:41:1 25.47
12:41:2 25.42
12:41:3 24.87
12:41:4 24.71
12:41:5 24.66
12:42:0 24.64
12:42:1 24.61
12:42:2 24.76
12:42:3 25.60
12:42:4 25.86
12:42:5 25.95
12:42:5FINAL ZERO
0 THC 25.95
12:46:0 58.55
12:46:1 58.63
12:46:2 58.50
12:46:3 58.51

12:46:4 58.67
12:46:5 58.55
12:47:0 57.76
12:47:0FINAL SPAN
0 THC 57.76 90.20

Filename:RUN2

Name:RUN2

Date:11-11-1993 [illegible]K01

Run 2 dryer

13:11	55.59
13:11	84.0

BEGIN RUN 2--BG [11-11-1993 -- 13:11:13]

13:12	55.80
13:12	84.6
13:13	55.91
13:13	84.9
13:14	55.93
13:14	85.0
13:15	56.46
13:15	86.5
13:16	56.39
13:16	86.3
13:17	56.28
13:17	86.0
13:18	55.78
13:18	84.6
13:19	55.88
13:19	84.9
13:20	55.94
13:20	85.0
13:21	55.55
13:21	83.9
13:22	55.69
13:22	84.3
13:23	55.60
13:23	84.1
13:24	55.85
13:24	84.8
13:25	56.09
13:25	85.4
13:26	56.25
13:26	85.9
13:27	55.73
13:27	84.4

13:29	55.57
13:29	84.0
13:30	55.63
13:30	84.2
13:31	55.75
13:31	84.5
13:32	55.86
13:32	84.8
13:33	55.58
13:33	84.0
13:34	56.37
13:34	86.2
13:35	56.33
13:35	86.1
13:36	55.99
13:36	85.2
13:37	55.99
13:37	85.2
13:38	56.01
13:38	85.2
13:39	55.73
13:39	84.5
13:40	56.35
13:40	86.2
13:41	56.64
13:41	87.0
13:42	56.40
13:42	86.3
13:43	56.13
13:43	85.6
13:44	55.61
13:44	84.1
13:45	56.39
13:45	86.3
13:46	56.44
13:46	86.5
13:47	55.26
13:47	83.1
13:48	53.67
13:48	78.6
13:49	54.31
13:49	80.4
13:50	56.09
13:50	85.5
13:51	53.50
13:51	78.1
13:52	49.44
13:52	66.6
13:53	48.45
13:53	63.8
13:54	49.87
13:54	67.8

	[illegible]
13:56	52.55
13:56	75.4
13:57	54.98
13:57	82.3
13:58	56.23
13:58	85.9
13:59	55.96
13:59	85.1
14:00	56.29
14:00	86.0
14:01	57.23
14:01	88.7
14:02	57.31
14:02	88.9
14:03	57.24
14:03	88.7
14:04	57.03
14:04	88.1
14:05	56.64
14:05	87.0
14:06	56.85
14:06	87.6
14:07	57.03
14:07	88.1
14:08	57.35
14:08	89.0
14:09	57.20
14:09	88.6
14:10	57.51
14:10	89.5
14:11	57.22
14:11	88.7
14:12	56.86
14:12	87.7
14:13	56.35
14:13	86.2
14:14	56.01
14:14	85.2
14:15	56.22
14:15	85.8
14:16	56.50
14:16	86.6
14:17	56.14
14:17	85.6
14:18	56.05
14:18	85.4
14:19	56.09
14:19	85.5
14:20	55.89
14:20	84.9
14:21	56.04
14:21	85.3
14:22	56.22
14:22	[illegible]

[illegible]	[illegible]
14:23	86.0
14:24	55.91
14:24	85.0
14:25	55.72
14:25	84.4
14:26	55.91
14:26	85.0
14:27	56.30
14:27	86.1
14:28	55.94
14:28	85.0
14:29	55.72
14:29	84.4
14:30	55.59
14:30	84.0
14:31	55.75
14:31	84.5
14:32	55.89
14:32	84.9
14:33	56.31
14:33	86.1
14:34	56.13
14:34	85.6
14:35	55.73
14:35	84.4
14:36	55.75
14:36	84.5
14:37	56.40
14:37	86.3
14:38	56.32
14:38	86.1
14:39	56.85
14:39	87.6
14:40	57.30
14:40	88.9
14:41	57.19
14:41	88.6
14:42	56.49
14:42	86.6
14:43	56.60
14:43	86.9
14:44	57.16
14:44	88.5
14:45	57.07
14:45	88.2
14:46	57.26
14:46	88.8
14:47	57.56
14:47	89.6
14:48	57.10
14:48	88.3
14:49	57.19
14:49	88.6

14:50		
14:51	56.70	
14:51	87.2	
14:52	56.58	
14:52	86.8	
14:53	56.47	
14:53	86.5	
14:54	56.64	
14:54	87.0	
14:55	57.05	
14:55	88.2	
14:56	56.96	
14:56	87.9	
14:57	56.55	
14:57	86.8	
14:58	56.58	
14:58	86.9	
14:59	56.62	
14:59	87.0	
15:00	57.20	
15:00	88.6	
15:01	56.67	
15:01	87.1	
15:02	56.57	
15:02	86.8	
15:03	56.40	
15:03	86.3	
15:04	56.69	
15:04	87.2	
15:05	57.03	
15:05	88.1	
15:06	57.48	
15:06	89.4	
15:07	57.25	
15:07	88.7	
15:08	57.14	
15:08	88.4	
15:09	57.18	
15:09	88.6	
15:10	56.74	
15:10	87.3	
15:11	56.83	
15:11	87.6	END RUN #2 - dryer
15:12	57.12	
15:12	88.4	
15:13	56.65	
15:13	87.0	
15:14	57.00	
15:14	88.0	
15:15	57.37	
15:15	89.1	
15:16	57.57	
15:16	89.7	
15:17	57.10	

[illegible]	88.1	
15:19	56.74	
15:19	87.3	
15:20	57.20	
15:20	88.6	
15:21	57.59	
15:21	89.7	
15:22	57.89	
15:22	90.6	
15:23	57.77	
15:23	90.2	
15:24	57.32	
15:24	88.9	
15:25	56.77	
15:25	87.4	
15:26	56.91	
15:26	87.8	
15:27	57.28	Begin Run 3 – Dryer
15:27	88.8	
15:28	57.45	
15:28	89.3	
15:29	57.53	
15:29	89.5	
15:30	57.30	
15:30	88.9	
15:31	57.88	
15:31	90.5	
15:32	58.09	
15:32	91.1	
15:33	57.17	
15:33	88.5	
15:34	56.85	
15:34	87.6	
15:35	57.10	
15:35	88.3	
15:36	57.57	
15:36	89.7	
15:37	57.70	
15:37	90.0	
15:38	58.07	
15:38	91.1	
15:39	57.73	
15:39	90.1	
15:40	57.51	
15:40	89.5	
15:41	57.27	
15:41	88.8	
15:42	57.88	
15:42	90.5	
15:43	58.44	
15:43	92.1	
15:44	57.80	

15:45	57.27
15:45	88.8
15:46	56.79
15:46	87.4
15:47	57.18
15:47	88.6
15:48	57.02
15:48	88.1
15:49	57.15
15:49	88.5
15:50	57.22
15:50	88.7
15:51	57.03
15:51	88.1
15:52	56.93
15:52	87.8
15:53	57.36
15:53	89.1
15:54	57.31
15:54	88.9
15:55	57.21
15:55	88.6
15:56	57.21
15:56	88.6
15:57	57.19
15:57	88.6
15:58	57.49
15:58	89.4
15:59	57.89
15:59	90.6
16:00	58.03
16:00	90.9
16:01	58.13
16:01	91.3
16:02	58.14
16:02	91.3
16:03	58.09
16:03	91.1
16:04	57.86
16:04	90.5
16:05	57.88
16:05	90.5
16:06	58.03
16:06	91.0
16:07	57.95
16:07	90.7
16:08	57.46
16:08	89.4
16:09	57.86
16:09	90.5
16:10	58.10
16:10	91.2
16:11	49.51
16:11	66.8

16:12	61.4
16:13	51.46
16:13	72.3
16:14	56.23
16:14	85.9
16:15	55.83
16:15	84.7
16:16	57.74
16:16	90.1
16:17	58.16
16:17	91.3
16:18	58.49
16:18	92.3
16:19	58.48
16:19	92.2
16:20	58.49
16:20	92.3
16:21	58.81
16:21	93.2
16:22	58.82
16:22	93.2
16:23	58.84
16:23	93.3
16:24	58.94
16:24	93.5
16:25	58.93
16:25	93.5
16:26	59.06
16:26	93.9
16:27	59.15
16:27	94.1
16:28	59.26
16:28	94.4
16:29	59.01
16:29	93.7
16:30	58.99
16:30	93.7
16:31	58.98
16:31	93.6
16:32	58.64
16:32	92.7
16:33	58.70
16:33	92.8
16:34	58.88
16:34	93.4
16:35	58.81
16:35	93.2
16:36	58.77
16:36	93.1
16:37	58.81
16:37	93.2
16:38	58.75
16:38	93.0

16:40	58.77
16:40	93.1
16:41	58.89
16:41	93.4
16:42	58.73
16:42	92.9
16:43	58.37
16:43	91.9
16:44	58.68
16:44	92.8
16:45	58.89
16:45	93.4
16:46	58.70
16:46	92.8
16:47	58.98
16:47	93.7
16:48	58.96
16:48	93.6
16:49	59.15
16:49	94.1
16:50	58.92
16:50	93.5
16:51	58.70
16:51	92.9
16:52	58.69
16:52	92.8
16:53	58.73
16:53	92.9
16:54	59.20
16:54	94.3
16:55	59.44
16:55	95.0
16:56	59.29
16:56	94.5
16:57	59.53
16:57	95.2
16:58	59.21
16:58	94.3
16:59	59.29
16:59	94.5
17:00	59.30
17:00	94.6
17:01	59.34
17:01	94.7
17:02	59.49
17:02	95.1
17:03	59.29
17:03	94.5
17:04	59.30
17:04	94.6
17:05	59.51
17:05	95.2

[illegible] 94.7
17:07 59.51
17:07 95.1
17:08 59.71
17:08 95.7
17:09 59.53
17:09 95.2
17:10 59.33
17:10 94.7
17:11 59.28
17:11 94.5
17:12 59.04
17:12 93.8
17:13 59.08
17:13 93.9
17:14 59.27
17:14 94.5
17:15 59.71
17:15 95.7
17:16 59.90
17:16 96.3
17:17 59.65
17:17 95.5
17:18 59.44
17:18 95.0
17:19 59.48
17:19 95.1
17:20 59.90
17:20 96.3
17:21 59.83
17:21 96.0
17:22 59.63
17:22 95.5
17:23 59.68
17:23 95.6
17:24 59.38
17:24 94.8
17:25 59.08
17:25 93.9
17:26 59.70
17:26 95.7
17:27 59.87
17:27 96.2
END RUN 3--BG [11-11-1993 -- 17:27:19] — End Run 3, dryer
17:28 48.83
17:28 64.9
17:30:1 26.43
17:30:2 26.41
17:30:3 26.42
17:30:3FINAL ZERO
0 THC 26.42
17:32:2 57.74
17:32:3 57.71
17:32:4 57.54
17:32:5 57.57
17:32:5FINAL SPAN
0 THC [illegible]

THC Analyzer

- Linearity check
- Response time check

```
16:30       0.27
16:30       0.04
Filename:prelim
Name:prelim
Date:11-10-1993
Location:BELDON BRICK
Project #:4601-01-05-01
Operator:BG
              0
             THC
16:35:2      0.00
16:35:3      0.00
16:35:4      0.00
16:35:5      0.00
16:36:0      1.20
16:36:1      1.45
16:36:2      2.59
16:36:3      3.71
16:36:4      3.70
16:36:5      3.70
16:36:5 INIT. ZERO
 0   THC    3.70
17:01:4    26.91
17:01:5    26.94
17:02:0    26.93
17:02:1    26.91
17:02:2    26.90
17:02:3    26.90
17:02:4    26.89
17:02:5    26.87
17:03:0    26.88
17:03:0 INIT. ZERO
 0   THC   26.88
17:05:1    65.22
17:05:2    65.16
17:05:3    65.29
17:05:4    65.40
17:05:5    65.20
17:05:5 INIT. SPAN
 0   THC   65.20      90.20
17:07      54.47
17:07       64.9
17:08      48.52
17:08       50.9
17:09      48.52
17:09       50.9
LINEARITY CHECK PROPANE 51.3 PPM [11-10-1993 -- 17:09:35]
17:10      48.57
17:10       51.1
```

... 17:10:04]

17:11	45.63
	44.1
17:12	39.34
17:12	29.3

LINEARITY CHECK 29.5 PPM--BG [11-10-1993 -- 17:12:16]

17:13	39.36
17:13	29.4

THC PASSED AT 29.5 PPM--BG [11-10-1993 -- 17:13:04]

17:14	42.03
17:14	35.6
17:15	65.29
17:15	90.4
7:16	65.47
7:16	90.8
7:17	65.49
7:17	90.9
7:18	65.56
7:18	91.0
7:19	65.60
7:19	91.1
7:20	65.59
7:20	91.1
7:21	65.66
7:21	91.3
7:22	65.66
7:22	91.3
7:23	65.64
7:23	91.2
17:24	65.54
17:24	91.0
17:25	39.96
17:25	30.8
17:26	62.89
17:26	84.7
17:27	75.36
17:27	114.1
17:28	74.11
17:28	111.2

BEGIN RISE TIME [11-10-1993 -- 17:28:25]

17:29	64.92
17:29	89.5

END RISE TIME [11-10-1993 -- 17:30:00]

17:30	64.73
17:30	89.1

BEGIN FALL TIME [11-10-1993 -- 17:30:18]

17:31	63.71
17:31	86.7

BIAS CHECK WAS 89.5 PPM--PASS BG [11-10-1993 -- 17:31:01]

17:32	64.25
17:32	88.0
17:33	65.40
17:33	90.7

END FALL TIME [11-10-1993 -- 17:33:07]

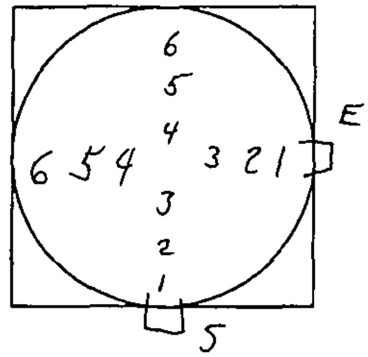
17:34	35.39

ATTACHMENT 3

VELOCITY TRAVERSE DATA AND CALCULATIONS

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #1 Date 11/11/93
Plant Belden Brick
Sampling Location Dryer Stack
Operator(s) Edwards and Neil
Barometric Pressure, in. Hg ______
Site to Barometer Elevation ______ ft.
Corrected Barometric Pressure ______
Pitot No. ______ Pitot Cp .84
T/C No. ______ Temp. Meter No. ______
Stack Area, sq.ft. ______
Static Pressure, in. H_2O ______
Assumed Moisture, % ______
Assumed $\%CO_2$ ______ Assumed $\%O_2$ ______
Initial Pitot Leak Check Pass
Final Pitot Leak Check Pass
Comments:



Traverse Point Layout

Start Time 1012 End Time 1020

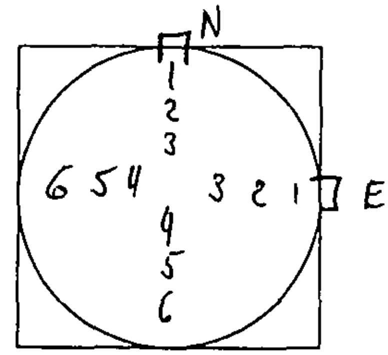
TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E1	0.75			
E2	0.71			
E3	0.74			
E4	0.77			
E5	0.75			
E6	0.52			
S1	~~0.37~~ .60			
S2	~~0.68~~ .66			
S3	~~0.68~~ .69			
S4	~~0.68~~ .68			
S5	0.62			
S6	0.37			

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	

93-3 SEV surfrm 020393

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #2 Date 11/11/93
Plant Belden Brick
Sampling Location Dryer Stack
Operator(s) Edwards + Neil
Barometric Pressure, in. Hg
Site to Barometer Elevation ft.
Corrected Barometric Pressure
Pitot No. M5 Pitot Cp .84
T/C No. 48-10 Temp. Meter No.
Stack Area, sq.ft.
Static Pressure, in. H_2O
Assumed Moisture, %
Assumed $\%CO_2$ Assumed $\%O_2$
Initial Pitot Leak Check PASS
Final Pitot Leak Check PASS
Comments:



Traverse Point Layout

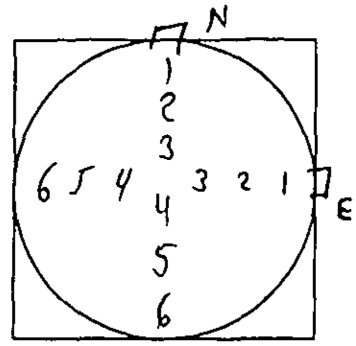
Start Time End Time

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E 1	0.78	98		
2	0.76	100		
3	0.78	101		
4	0.84	101		
5	0.72	101		
6	0.42	96		

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
N 1	0.71	99		
2	0.74	100		
3	0.69	100		
4	0.49	101		
5	0.32	100		
6	0.17	99		

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #3 Date 11/11/93
Plant Belden Brick
Sampling Location Dryer Stack
Operator(s) Edwards + Neil
Barometric Pressure, in. Hg 29.126
Site to Barometer Elevation — ft.
Corrected Barometric Pressure —
Pitot No. M 5 Pitot Cp .84
T/C No. 48-10 Temp. Meter No. ______
Stack Area, sq.ft. ______
Static Pressure, in. H_2O ______
Assumed Moisture, % ______
Assumed $\%CO_2$ ______ Assumed $\%O_2$ ______
Initial Pitot Leak Check PASS
Final Pitot Leak Check PASS
Comments:



Traverse Point Layout

Start Time ______ End Time ______

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E 1	0.82	99		
2	0.74	100		
3	0.74	100		
4	0.81	100		
5	0.75	99		
6	0.44	98		

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
N 1	0.72	100		
2	0.76	100		
3	0.72	100		
4	0.58	100		
5	0.38	99		
6	0.24	99		

FILE NAME - dryve12
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:03

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	0.00
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H20)=	0.618
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H20)=	0.7719
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	~~68.0~~ 57.0
Stack Axis #2 (Inches)=	~~68.0~~ 57.0
Circular Stack	
Stack Area (Square Feet)=	25.22 17.72
Stack Velocity (Actual, Feet/min)=	2,726
Flow Rate (Actual, Cubic ft/min)=	~~68,760~~ 48,305
Flow rate (Standard, Wet, Cubic ft/min)=	~~63,148~~ 44,369
Flow Rate (Standard, Dry, Cubic ft/min)=	~~60,472~~ 42,490

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H20)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H20)=	15.7
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H20)=	3.8902
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	~~1.727~~ 1.448
Stack Axis #2 (Meters)=	~~1.727~~ 1.448
Circular Stack	
Stack Area (Square Meters)=	~~2.343~~ 1.646
Stack Velocity (Actual, m/min)=	831
Flow rate (Actual, Cubic m/min)=	~~1,947~~ 1368
Flow rate (Standard, Wet, Cubic m/min)=	~~1,788~~ 1256
Flow rate (Standard, Dry, Cubic m/min)=	~~1,712~~ 1,203

FILE NAME - dryvel2
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:04

Point #	Delta P (in. H20)	Stack T (F)
1	0.780	98
2	0.760	100
3	0.780	101
4	0.840	101
5	0.720	101
6	0.420	96
7	0.710	99
8	0.740	100
9	0.690	100
10	0.490	101
11	0.320	100
12	0.170	99

APR 11 '94 9:45 MIDWEST RESEARCH KC

FILE NAME - dryvel3 PROG.=VER 06/09/8P. 3/ 6

RUN # - dryerv3 04-11-1994 08:09:28

LOCATION - dryer

DATE - 11-11-93

PROJECT # - 4601.01.05.01

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	0.00
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H20)=	0.642
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H20)=	0.7910
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	~~68.0~~ 57.0
Stack Axis #2 (Inches)=	~~68.0~~ 57.0
Circular Stack	
Stack Area (Square Feet)=	~~25.22~~ 17.72
Stack Velocity (Actual, Feet/min)=	2,794
Flow Rate (Actual, Cubic ft/min)=	~~70,452~~ 49502
Flow rate (Standard, Wet, Cubic ft/min)=	~~64,721~~ 45,475
Flow Rate (Standard, Dry, Cubic ft/min)=	~~61,978~~ 43,548

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H20)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H20)=	16.3
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H20)=	3.9866
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	~~1.727~~ 1.448
Stack Axis #2 (Meters)=	~~1.727~~ 1.448
Circular Stack	
Stack Area (Square Meters)=	~~2.343~~ 1.646
Stack Velocity (Actual, m/min)=	851
Flow rate (Actual, Cubic m/min)=	~~1,995~~ 1,402
Flow rate (Standard, Wet, Cubic m/min)=	~~1,833~~ 1,288
Flow rate (Standard, Dry, Cubic m/min)=	1~~,755~~ 1,233

FILE NAME - dryvel3
RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:09:30

Point #	Delta P (in. H20)	Stack T (F)
1	0.820	99
2	0.740	100
3	0.740	100
4	0.810	100
5	0.750	99
6	0.440	98
7	0.720	100
8	0.760	100
9	0.720	100
10	0.580	100
11	0.380	99
12	0.240	99

SUMMARY:	Run 1	Run 2	Run 3	Deviation (%)
Velocity,fpm				
Reported	2847	2727	2794	
Combustion Source	2805	2727	2794	
Air	2835	2727	2794	
Flowrate:				
Reported	44365	42487	43545	
Combustion Source	42668	41467	42500	-2.4
Air	46113	44350	45455	4.4

DRYER STACK --FLOWRATE CALCULATIONS

RUN:			1			2			3
DATE:			11/11/93			11/11/93			11/11/93
	DP	T	(DP)^.5	DP	T	(DP)^.5	DP	T	(DP)^.5
	0.75		0.866	0.78	98	0.883	0.82	99	0.906
	0.71		0.843	0.76	100	0.872	0.74	100	0.860
	0.74		0.860	0.78	101	0.883	0.74	100	0.860
	0.77		0.877	0.84	101	0.917	0.81	100	0.900
	0.75		0.866	0.72	101	0.849	0.75	99	0.866
	0.52		0.721	0.42	96	0.648	0.44	98	0.663
	0.6		0.775	0.71	99	0.843	0.72	100	0.849
	0.66		0.812	0.74	100	0.860	0.76	100	0.872
	0.69		0.831	0.69	100	0.831	0.72	100	0.849
	0.68		0.825	0.49	101	0.700	0.58	100	0.762
	0.62		0.787	0.32	100	0.566	0.38	99	0.616
	0.37		0.608	0.17	99	0.412	0.24	99	0.490
	0.655	99.6	0.805956	0.618333	99.7	0.772	0.641667	99.5	0.791
							0.801041		

Calculation of flowrate using Orsat and moisture from Kiln:

Orsat:			
Oxygen	17.6	17.6	17.6
CO2	2.2	2.2	2.2
nitrogen	80.2	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	29.056	29.056	29.056
Moisture:	4.2	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	28.59165	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2846.619	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	44364.96	42486.96	43545.44

DRYER STACK --FLOWRATE CALCULATIONS

RUN:	1	2	3
DATE:	11/11/93	11/11/93	11/11/93

Calculation of flowrate using typical combustion source:

Orsat:			
Oxygen	8	17.6	17.6
CO2	12	2.2	2.2
nitrogen	80	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	30.24	29.056	29.056
Moisture: (saturated)	6.5	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	29.4444	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2805.095	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	42668.21	41466.91	42499.99

Calculation of flowrate using air:

Orsat:			
Oxygen	20.9	17.6	17.6
CO2	0	2.2	2.2
nitrogen	79.1	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	28.836	29.056	29.056
Moisture:	0	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	28.836	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2834.532	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	46113.35	44349.64	45454.53

ATTACHMENT 4

EXAMPLE CALCULATIONS

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11/28/94

Project Title Belden Brick

Signature R Neulicht Verified by ________ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Page 1 of 1

Summary of ORSAT Results

Date	Run #	Location	CO_2	O_2
11/9	Metals 1	Kiln	2.2	17.6
11/10	MM-2	Kiln	1.0	18.4
11/10	MM-3	Kiln	1.7	17.8
11/9	PH-1	Kiln	1.1	17.8
11/10	PH-2	Kiln	1.8	18.8

Summary of Moisture Results

Date	Run #	Location	% H_2O	
11-09	BH-in 1	BH inlet	1.5	
11-09	2	"	1.5	
11-09	BH in 3	"	1.5	* Saturated
11-11	BH out 1	BH outlet	1.5	
	BH out 2	"	1.5	
11-11	PM-1	PM/PM-10 Kiln	4.1	
11-11	Kiln 2	PM/PM-10 Kiln	5.5	
11-11	Kiln 3	PM/PM-10 Kiln	4.2	
11-09	MM5-1	metals Kiln	4.4	
11-10	MM5-2	metals Kiln	4.3	
11-10	MM5-3	metals Kiln	4.7	
11-09	MM5-1	SV Kiln	4.3	
11-10	-2	SV Kiln	4.3	
11-10	3	SV Kiln	4.8	
11-09	HCl-1	HCl Kiln	4.4	
11-10	-2	HCl Kiln	4.6	
11-10	3	HCl Kiln	4.7	

MRI

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11-28-94

Project Title Belden Brick

Signature R. [signature] Verified by ______ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Example Calculation - Dryer stack THC (Run #2)

1. Concentration, ppm, as measured (wet basis)

From Data logger Summary, ppm corrected for drift
Run 2 = 85.6 ppm, as propane

2. Concentration, ppm, dry Basis

$$\text{ppm dry} = \frac{\text{ppm wet}}{1-\text{Bws}}$$

where Bws = moisture fraction
For Run 2, moisture = 4.2%
= .042

$$\text{ppm dry} = \frac{85.6}{(1-.042)} = \frac{85.6}{0.958}$$

= 89.4 ppm dry, as propane

3. Concentration, ppm, as methane

ppm as methane = (ppm as propane) x (3)
= 89.4 x 3
= 268

MRI

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11-28-94

Project Title Belden Brick

Signature R. Neulicht Verified by ______ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

4. Pound Methane per hour

$$\text{lb/hr} = \text{lb/dscf} \times \text{dscf/min} \times 60\ \text{min/hr}$$

$$= \left[\text{ppm (dry)} \times \text{mw} \left(\text{lb/lb-mole}\right) \times \frac{\text{lb-mole}}{385\ \text{ft}^3/\text{lb-mole}} \times 10^{-6}\right] \times \frac{\text{dscf}}{\text{min}} \times 60$$

(NOTE: $385\ \frac{\text{ft}^3}{\text{mole}}$ @ 68°F)

$$= \left[268 \times 16 \times \frac{1}{385} \times 10^{-6}\right] \frac{\text{lb}}{\text{dscf}} \times 42{,}490\ \frac{\text{dscf}}{\text{min}} \times 60\ \frac{\text{min}}{\text{hr}}$$

$$= 28.3\ \text{lb/hr as methane}$$

5. Emission Factor: lb methane / ton product

$$\frac{\text{lb methane}}{\text{ton product}} = \text{lb/hr methane} \div \frac{\text{ton product}}{\text{hr}}$$

$$= 28.3\ \frac{\text{lb}}{\text{hr}} \div 3.7\ \frac{\text{ton}}{\text{hr}}$$

$$= 7.7\ \text{lb/ton product}$$

MRI

SOURCE EMISSION TEST
AT
BELDEN BRICK, INC.
SUGARCREEK, OHIO
PLANT 6, KILN 3 DRIER
NOVEMBER 17, 1994

Brief of Tests

Tests were performed to determine the carbon monoxide (CO) and total volatile organic (VOC) emissions from the plant 6, kiln 3 drier stack to verify previous data obtained by others. The testing developed into an impromtu mini test program to find the cause of the emissions that were present.

The drier is used to evaporate the moisture from the brick before charging it into the kiln. It is heated by removing the hot air from the cooling section of the kiln and transporting it via. fan and duct to the product discharge end of the drier. Additional heat is added with a natural gas burner located on top of the drier at the product discharge end. The hot air and flue gas pass over the product and discharges through a vane/axial fan to the stack at the product charging end of the kiln. The samples were extracted from the stack below the roof line and the gas flow was measured from sample ports above the roof line.

Results

See table 1 and 2.

Discussion

The testing was originally intended to verify data obtained by others that showed the emissions from this drier to be much higher than those at other sites. Since the data verified these findings showing [redacted] ppmv of CO and [redacted] ppmv VOC as carbon, the drier gas burner was turned off to see if it was the cause. The results showed [redacted] ppmv of CO and [redacted] ppmv of VOC as carbon. This was a decrease of [redacted] percent CO and [redacted] percent VOC.

A fifteen minute integrated sample was taken in the duct from the kiln cooling section to the drier to determine if this was the cause of the remaining emissions. It showed [redacted] PPMV of CO.

Since a very small quantity of fuel oil (diesel fuel) is used as a mold release in forming the clay, the Tedlar bags from the

BELDEN BRICK, SUGARCREEK, PLANT 6, KILN 3 DRIER, NOVEMBER 17,1994

CONTENTS

CSA CO., PO BOX 3750, ALLIANCE, OH 44601 PH (216)525-5119

FAX (216)525-7908

Method 3 test were tested for benzine, ethylbenzene, toluene and xylene. These are the standard tests performed for fuel oil contaminations. The results were below the detection limits of the chromatograph.

The Tedlar bags were also tested for methane to check for unburned natual gas. The results showed the highest concentration with the drier burner in operation. There were smaller quantities in the kiln cooling section air/gas to the drier.

The pitot traverse at the sample ports located above the roofline are the same sample ports used in prior tests. The velocity profile showed a tangential component of 6-10 degrees at the outer perimeter of the stack with the flow dropping off sharply (within 10 inches from the stack wall) to no flow with a negative flow near the center. A judgement call was made in selecting the pitot traverse points that may not reflect an accurate gas velocity and flow that in turn would cause erroneous mass emission rates. There are no other ports higher up the stack. It may be difficult to obtain a good velocity profile at any location in the stack since the gas is moved by a vane/axial (propeller) type fan with an evase' and control damper located directly below the roof line. Also, the velocity profile will change with movement of the butterfly control damper. A location of two diameters down from the top of the stack would be the most ideal place for the sample ports but this would be difficult and costly to accomplish.

<u>Test Apparatus and Procedures.</u>

<u>(A) Methods 1-4</u>

During each of the two tests, a pitot traverse (Method 1 and 2) was performed simultaneously with CO and VOC tests. The sampling port locations are shown in figure 1A. The traverse point locations are shown in figure 1B.

An integrated sample was withdrawn as per Method 3 to determine the carbon dioxide and oxygen concentrations required for the gas density. The flue gas was sampled from a single point through a stainless steel probe connected to a condenser by neoprene hose as shown in figure 2. The condenser was connected to the sampling module with a teflon hose. The module is designed with a three way valve to purge the system prior to injecting it into a tedlar bag. This was done at the inlet and stack during each of the VOC tests collecting about two cubic feet of flue gas in each bag. The orsat analysis were performed with the gas contained in the bag shortly after the test was completed.

The Method 4 test was started at the same time as the CO and VOC sample and ran for one hour. The sample train is shown in figure 3. The first and second impinger contained 100 ml of distilled water and the third one was used as a dry trap. They were packed in ice to condense the water vapor from the flue gas with any remaining vapor collected in a Drierite column . The impingers and the Drierite column were weighed prior to and after the test with the weight difference showing the amount of condensate collected. This data along with the flue gas temperature, flue gas composition and meter temperature, pressure and volume were used to calculate the percent moisture by volume.

The flue gas temperature was measured with a type K thermocouple connected to a digital temperature indicator.

Data from the above Methods 1-4 were used to calculate the flue gas volumes at the inlet and stack of the incinerator. The raw data and calculations are shown in Appendix I.

(B) Carbon Monoxide Test Methods

EPA Method 10 was used to measure the CO emission using a Thermal Environmental Instruments Model 48 nondispersive infared analyzer (NDIR). The NDIR was opperated as per manufactures operating instructions.

It was set up to show instantaneous readings recorded on a strip chart recorder and from a one hour integrated sample collected in the Tedlar bag used in Method 3 test. The results obtained from the Tedlar bag were used to report data. The readings of the recorder were used to observe changes during the test.

The instantaneous sample was obtained by withdrawing a sample via stainless steel probe through Teflon tubing using a vacuum/pressure pump discharging to a stainless steel dump tube as shown in figure 4. The flow to the dump tube was held at a higher rate than the internal pump of the analyzer to maintain atmospheric pressure required to operate the instrument.

All calibrating gases were EPA Protocol.

The Tedlar sample bags were taken to an outside laboratory for analysis of methane, benzine, etylbenzene, toluene and xylene.

(C) VOC Test Methods

EPA Method 25A was used to determine the total volatile organic compounds using a Thermal Environmental Instruments model 51H high temperature flame ionization analyzer (FIA). The FIA was operated as per manufacturers operating instructons.

The sample was withdrawn through a stainlesss steel probe and heated sample line directly to the analyzer as shown in figure 5.

The analyzer output was connected to a serial dot matrix printer. It was programed to print the VOC concentratin high, low and average every five minutes. The five minute averages were used to obtain an average for the one hour run. The analyzer automaticaly calibrated after each run. The results are shown in appendix I.

EPA Protocol gases were used for operating the flame detector and calibrations. A mixture of fourty percent hydrogen and sixty percent helium along with air was used for the fuel and propane in nitrogen was used for the calibration gases.

Submitted by

Ernest L.Kolm

TEST	1	2
DATE	11/17/94	11/17/94
TIME	10:50/11:50	13:13/14:13
EMISSIONS		
CO - PPMV MEASURED	[redacted]	[redacted]
CO - POUNDS/HOUR		
VOC - PPMV(MEASURED PROPANE)		
VOC - PPMV AS CARBON		
VOC - POUNDS/HOUR AS CARBON		
STACK GAS CONDITIONS		
TEMPERATURE - ^{o}F	103	164
STATIC PESSURE - IN.H_2O	-.5	-.5
CO_2 - %	2.1	1.8
O_2 - %	18.1	18.3
H_2O - %	2.40	2.55
VELOCITY - FPS	39.07	39.73
STACK AREA - F^2	17.7	17.7
GAS FLOW - ACFM	41494	42191
GAS FLOW - (DSTP) CFH	2225078	2040602
SAMPLE TRAIN CONDITIONS		
PITOT Δ P - IN. H_2O	.440	.411
ORIFICE Δ P - IN. H_2O	2.0	2.0
AVG. METER TEMP - ^{o}F	85	90
METER GAS VOLUME - DSCF	44.09	43.28
BAROMETER - IN. Hg	29.14	29.14

NOTE: TEST 1, DRIER GAS BURNER TURNED ON.
TEST 2, DRIER GAS BURNER TURNED OFF.

BELDEN BRICK, INC.
SUGARCREEK, OHIO
PLANT 6, KILN 3 DRIER
COMPILED DATA

TABLE 1

AIR QUALITY SERVICES, INC.
4527 Clairton Boulevard
Pittsburgh, PA 15236
(412) 881-5630

TABLE I
RESULTS OF THE ANALYSIS OF TEDLAR AIR BAGS
FOR HYDROGEN AND CARBON MONOXIDE CONTENT
CSA COMPANY
POST OFFICE BOX 3750
ALLIANCE, OHIO 44601
SAMPLES COLLECTED BY CSA COMPANY
SAMPLES RECEIVED: NOVEMBER 18, 1994 9:50 AM

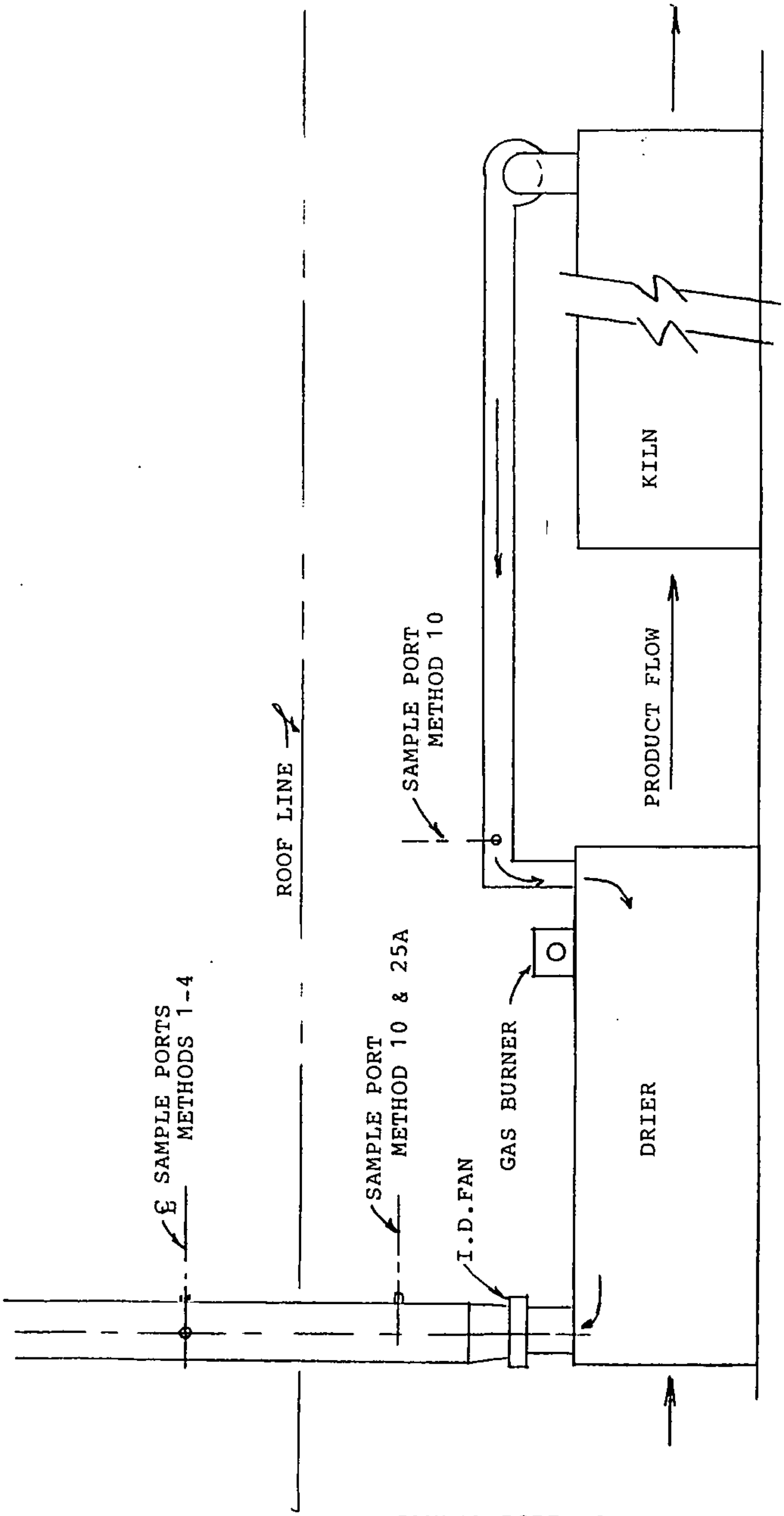
PARAMETER	TEDLAR BAG #206 KILN OUT	TEDLAR BAG #207 TEST 2	TEDLAR BAG #213 TEST 1
LABORATORY #	68022	68023	68024
CARBON MONOXIDE (PPM)	[redacted]	[redacted]	[redacted]
METHANE (PPM)	[redacted]	[redacted]	[redacted]
BENZENE (PPM)	<0.1	<0.1	<0.1
TOLUENE (PPM)	<0.2	<0.2	<0.2
XYLENE (PPM)	<0.3	<0.3	<0.3
ETHYL BENZENE (PPM)	<0.1	<0.1	<0.1
TOTAL HYDROCARBON EXPRESSED AS METHANE (PPM)	[redacted]	[redacted]	[redacted]

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

BELDEN BRICK

John O. Frohliger
AIR QUALITY SERVICES, INC.

JOB 4557
REPORTED: NOVEMBER 21, 1994
TABLE 2



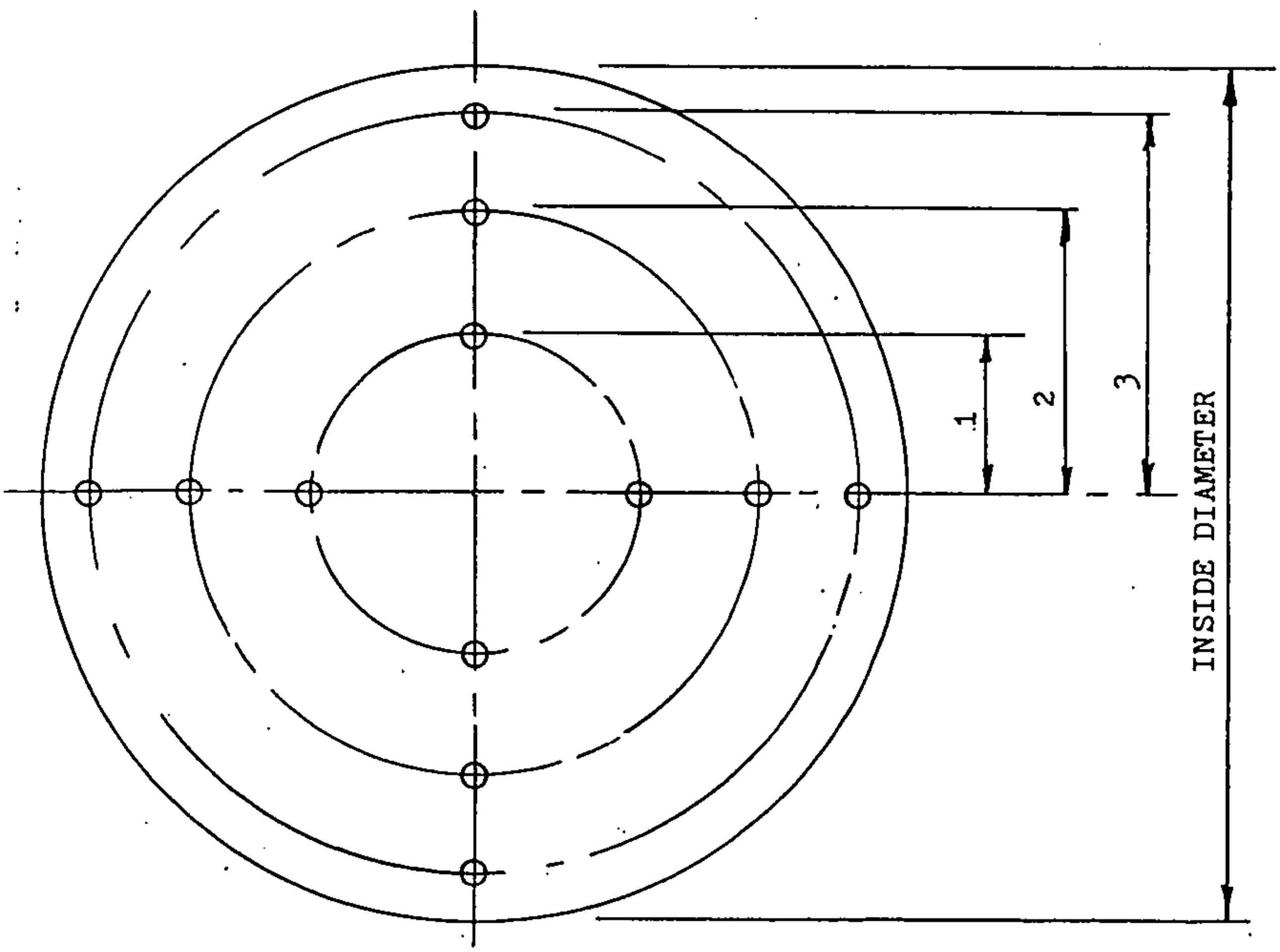
SAMPLE PORT LOCATION

FIGURE 1A

Sample Points For Round Ducts

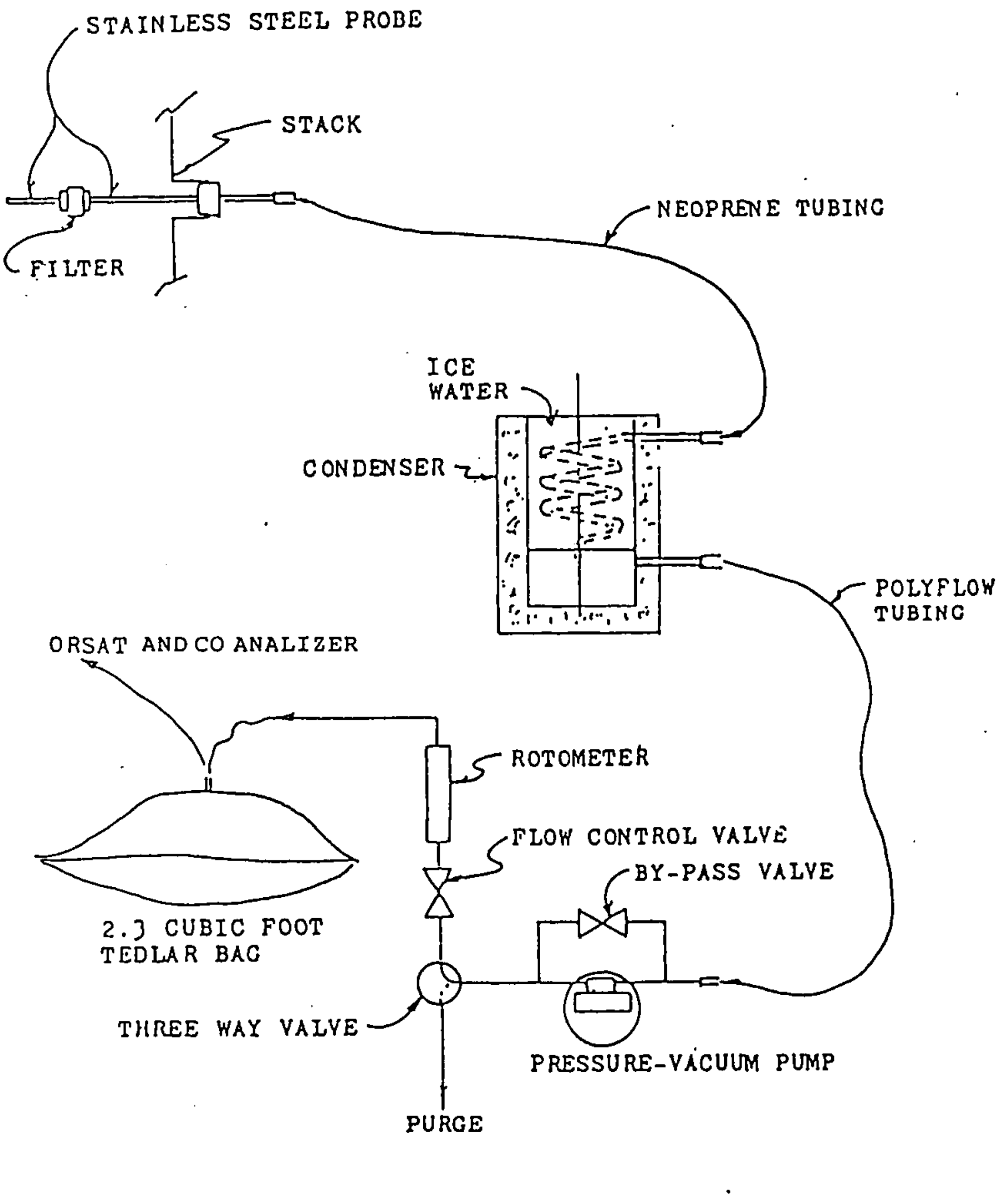
Diameter of duct in inches = 57
Area = 17.72055
Radius = 28.5
Total No. Of Points = 15

(1)- 10.40673
(2)- 18.02498
(3)- 23.27015



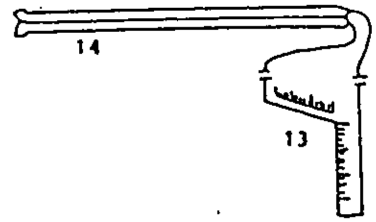
SAMPLE POINT LOCATION

FIGURE 1B

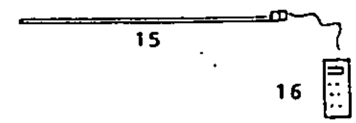


INTEGRATED SAMPLER

FIGURE 2

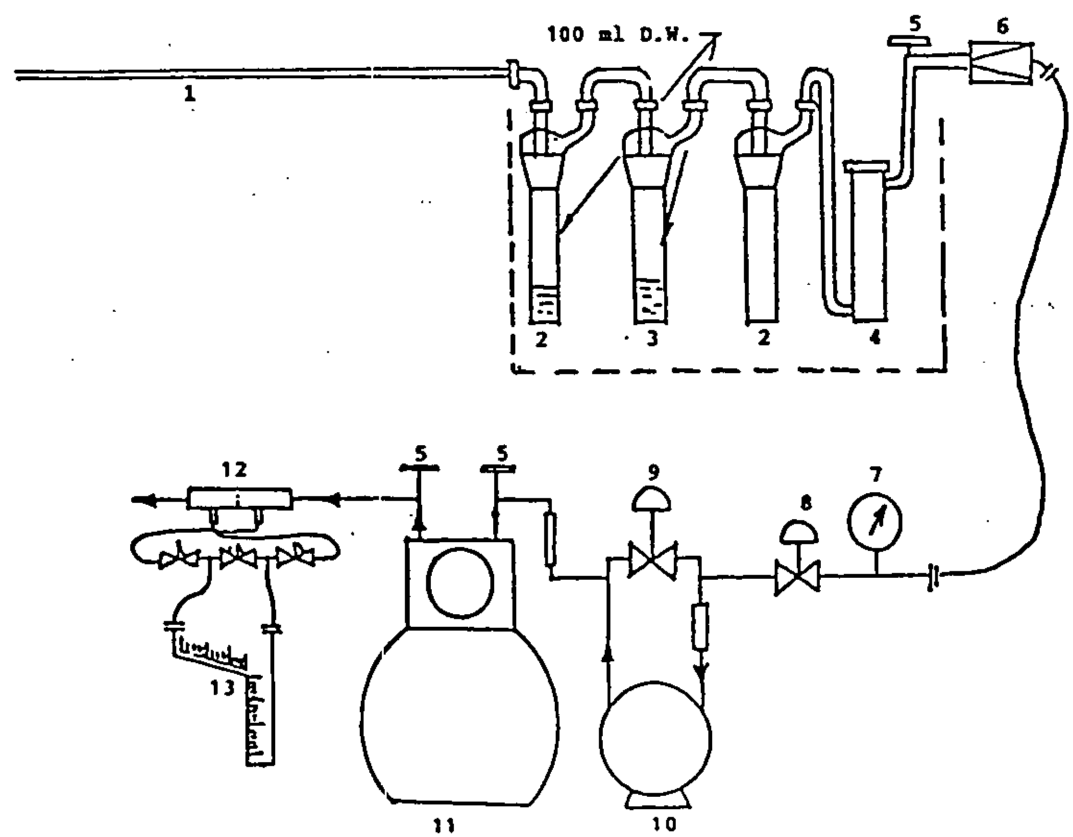


EPA METHOD 2



STACK TEMPERATURE

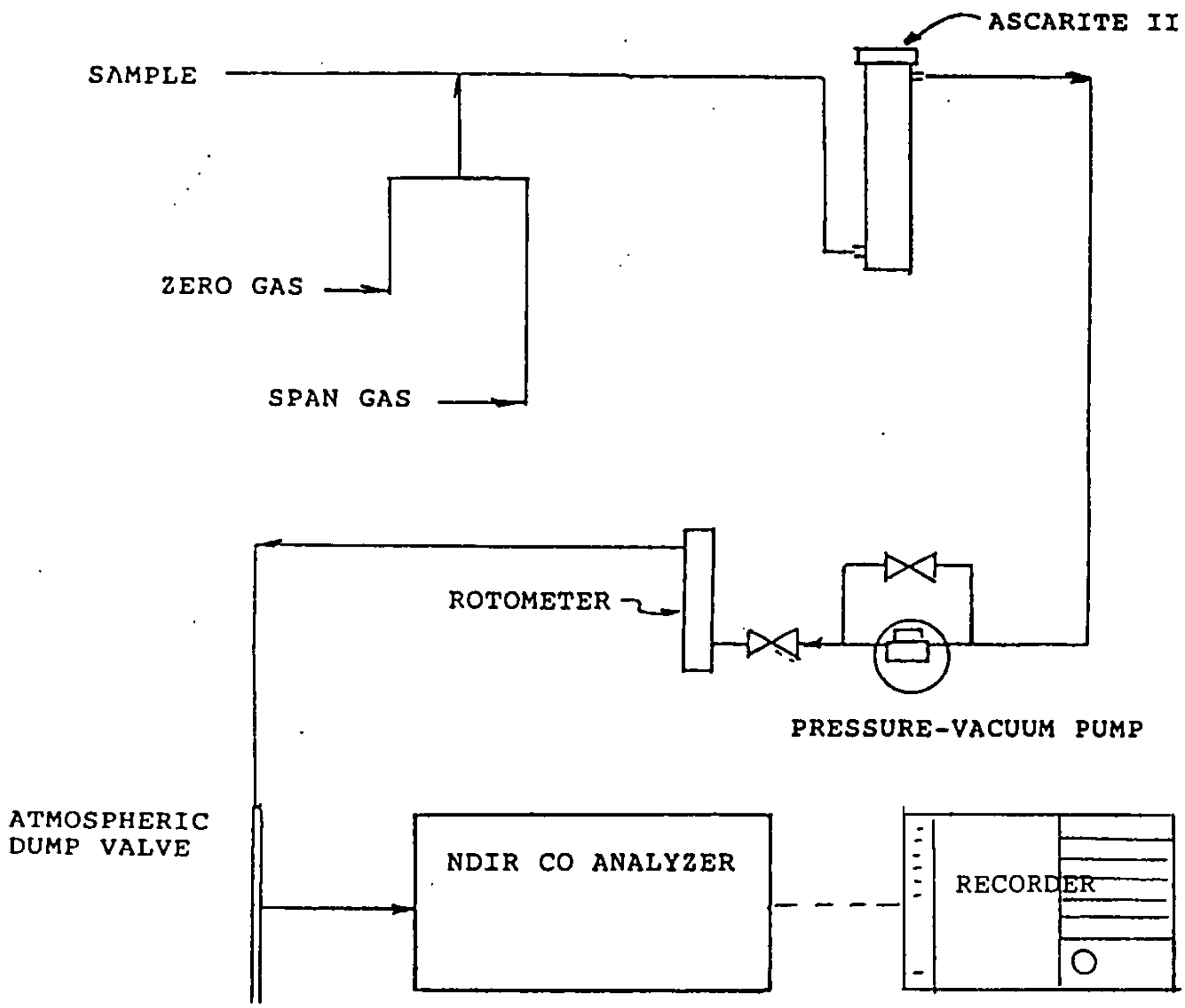
1) PROBE
2) IMPINGER (MODIFIED G-S)
3) IMPINGER (STD. G-S)
4) DESICANT COLUMN
5) THERMOMETER
6) CHECK VALVE
7) VACUMM GAGE
8) COARSE CONTROL VALVE
9) FINE CONTROL VALVE
10) VACUMM PUMP
11) DRY GAS METER
12) ORICICE TUBE
13) MANOMETER
14) PITOT TUBE
15) THERMOCOUPLE
16) DIGITAL TEMPERATURE INDICATOR



EPA METHOD 4 SAMPLE TRAIN

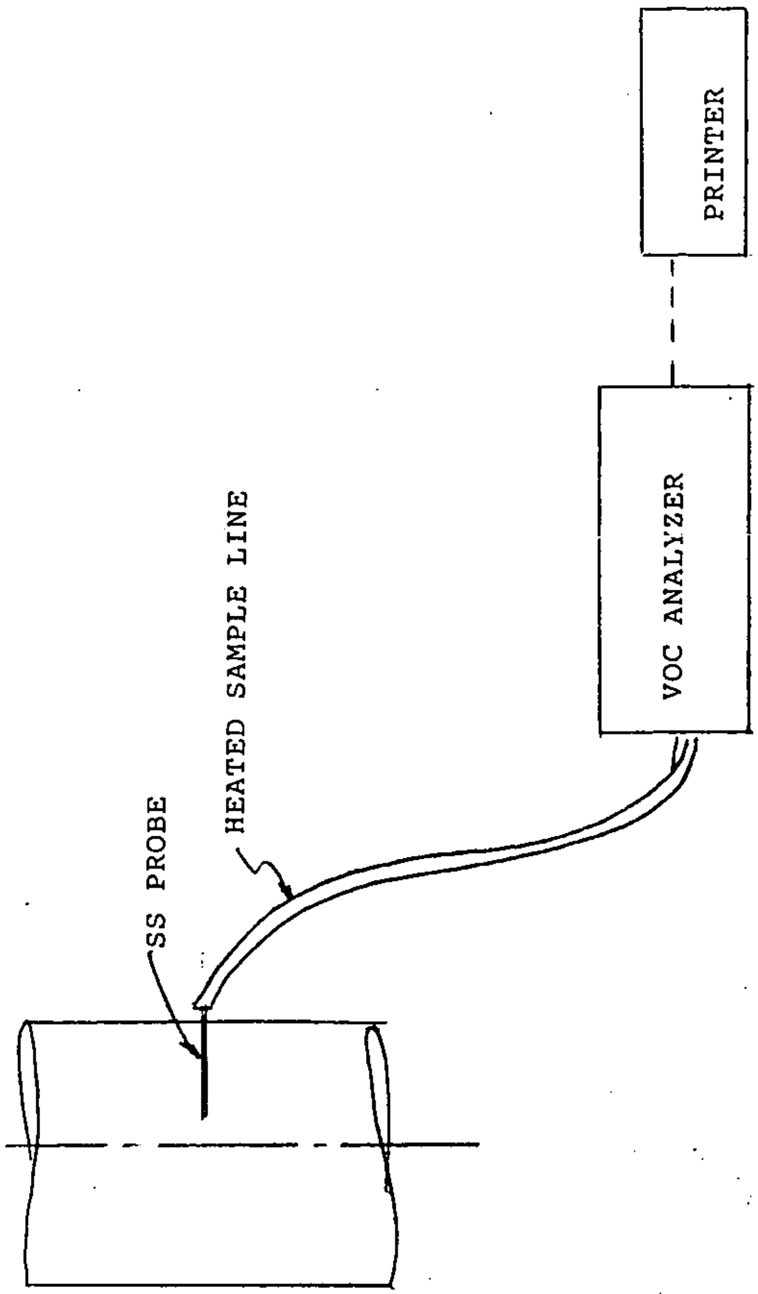
SAMPLING APPARATUS FOR GAS FLOW MEASUREMENT

FIGURE 3



METHOD 10 - CARBON MONOXIDE ANALYSIS

FIGURE 4



METHOD 25A VOC ANALYZER

FIGURE 5

METHOD 2, 3 and 4
COMPUTER NOMENCLATURE

SYMBOL	DESCRIPTION	UNITS
VM, FT_3	METER VOLUME	CUBIC FEET
Pb, IN Hg	BAROMETRIC PRESSURE	INCHES MERCURY
ΔH, IN H_2O	ORIFICE DIFFERENTIAL	INCHES WATER
PMA, IN Hg	ABSOLUTE METER PRESSURE	INCHES MERCURY
TM, ^oF	METER TEMPERATURE	DEGREES FARENHEIT
TS, ^oF	STACK TEMPERATURE	DEGREES FARENHEIT
PG, IN H2O	STACK STATIC PRESSURE	INCHES WATER
PSA, IN H2O	STACK ABSOLUTE PRESSURE	INCHES MERCURY
CP,	PITOT COEFFICIENT	DIMENSIONLESS
ΔP, IN H2O	AVERAGE SQUARE ROOT OF ΔP	INCHES WATER
%CO2	CARBON DIOXIDE	PERCENT
%O2	OXYGEN	PERCENT
%CO	CARBON MONOXIDE	PERCENT
%N2	NITROGEN	PERCENT
MD	MOLECULAR WEIGHT DRY	DIMENTIONLESS
VCL, ML	VOLUME OF CONDENSATE	MILLILITERS
AS, FT^2	STACK AREA	SQUARE FEET
Θ, MIN	TEST TIME	MINUTES
VMSTP, FT^3	METER VOLUME @ STANDARD TEMP. & PRESS.(DRY)	CUBIC FEET
VWSTP, FT^3	METER VOLUME @ STANDARD TEMP. & PRESS.(WET)	CUBIC FEET
BW%	MOISTURE	PERCENT
MS	MOLECULAR WEIGHT @ STACK CONDITIONS	DIMENSIONLESS
VS, FT/SEC	STACK GAS VELOCITY	FEET/SECOND
QA, FT^3/SEC	STACK GAS VOLUME ACTUAL	ACFM
QS, FT^3/HR	STACK GAS VOLUME @ STD. TEMP. & PRESS.(DRY)	CUBICFEET/HOUR

METHOD 2, 3 & 4 CACULATIONS

DRY MOLECULAR WEIGHT lb/lb mol
$Md = .44(\%CO_2) + .32(\%O_2) + .28(\%N_2 + \%O_2).$

DRY GAS VOLUME (Standard conditions) F^3
$VMSTP = (17.71\ ^oR/in.Hg)(VM)((Pb + (PM/13.6))/(TM + 460)$

VOLUME OF WATER VAPOR (Standard conditions) FT^3
$VWSTP = (0.0474\ FT^3/ML)(VLC)$

MOISTURE CONTENT (Proportion by volume) %
$BW\% = VMSTP/(VMSTP + VWSTP)$

MOLECULAR WEIGHT @ STACK CONDITIONS (Wet basis) lb/lb mol
$MS = MD\ (1-BW) + 18(BW)$

GAS VELOCITY ft/sec
$VS = (85.48)(CP)(\triangle P)\ ((TSA/(PSA)(MS))$

GAS FLOW (Actual cubic feet /minute) ACFM
$QA = (AS)(VS)$

GAS FLOW (Dry standard cubic feet/hour)
$QS = 3600\ (1 - BW)(VS)(AS)((530/(TSA))((PSA)/(29.92))$

Y = METER CALIBRATION FACTOR (Dimensionless)

$P_b = 29.14$

1-4

CSA CO. DATA SHEET (METHOD ~~20~~)

TEST NO. 1 PLANT BELDEN BRICK DATE 11/17/94

LOCATION PLANT 6 NC DRIER BY ~~JK~~ GT

BAROMETER(P_B) 29.14 AMBIENT TEMP ASSUMED MOISTURE "Y" .994

MOUDULE NO. 2031 PROBE NO. — FILTER NO. — HEATER NO. — NOZZLE DIA. —

TEST POINT	METER VOLUME (Vm)	METER TEMP (Tm) IN	METER TEMP (Tm) OUT	COND TEMP °F	FILTER HEATER TEMP°F	STACK TEMP °F(Ts)	STACK PRESS. (Ps)	VACUUM "Hg	ORIFICE "H_2O (ΔH)(Pm)	VEL HEAD (ΔP)	TIME
1	48.0	68	68	48	10,250	102	-.5	4	2.0	.55	10:50
↓		83	70	48	11.3	102	-.5	4	2.0	.50	55
		86	74	48	11.2	102	-.5	4	2.0	.45	11:00
		88	76	48	12.0	102	-.5	4	2.0	.40	05
		91	77	45	19.6	102	-.5	4	2.0	.44	10
		93	77	46	10.9	103	-.5	4	2.0	.43	15
		95	79	48	21.9	103	-.5	4	2.0	.44	20
		96	80	48	12.8	103	-.5	4	2.0	.43	25
		98	82	50	13.6	103	-.5	4	2.0	.43	30
		99	83	50	19.3	103	-.5	4	2.0	.42	35
		99	84	50	14.0	104	-.5	4	2.0	.42	40
		99	84	50	14.0	104	-.5	4	2.0	.41	45
	94.9	99	85	50	17.2	104	-.5	4	2.0	.47	50
(Vm)	46.9	91.8	78.4								
AVERAGE		85		****	******	103	-.5	MAX 4	2.0	.44	60 MINUTES

INTEGRATED GAS SAMPLE 2/3				AVG
CO_2				2.1
O_2				18.1
CO				

N_2= 79.8

CONDENSATE COLLECTED

	FINAL	INITIAL	TOTAL
DRIERITE	952.9	944.5	8.4
IMPINGER	214.6	200	14.6
GRAND TOTAL			23.0

FILTER WT		PROBE WASH WT
GROSS	N	X
TARE		
NET		

HEAVY METALS WT-mg			
As	N	Hg	
Be		Ni	
Cd			
Cr			
Pb			

LEAK RATE @ 6 "Hg= <.02

STACK AREA (As) 17.7 f^2

AVG SQ RT ΔP .6638

BAG 205 17 min

57" DIA

AVG VOC 316 ppm

CSA CO. DATA SHEET (METHOD 29)

TEST NO. 2 PLANT Belden Brick DATE 11/17/94

LOCATION Plant 6 Kiln 3 Drier BY [illegible]

BAROMETER (P_B) 29.14 AMBIENT TEMP ASSUMED MOISTURE "Y" .998

MOUDULE NO. 2031 PROBE NO. — FILTER NO. — HEATER NO. — NOZZLE DIA. —

TEST POINT	METER VOLUME (Vm)	METER TEMP (Tm) IN	METER TEMP (Tm) OUT	COND TEMP °F	FILTER HEATER TEMP°F	STACK TEMP °F(Ts)	STACK PRESS. (Ps)	VACUUM "Hg	ORIFICE "H_2O (ΔH)(Pm)	VEL HEAD (ΔP)	TIME	
1	94.9	85	85	50	4,400	106	-.5	4	2.0	.41	13:13	
		89	82	50	4.2	106		4	2.0	.41	:19	
		93	82	51	5.0	106		4	2.0	.41	23	
		95	83	52	6.0	106		4	2.0	.40	28	
		96	84	52	3.9	106		4	2.0	.43	33	
		99	84	52	13.7	106		4	2.0	.40	38	
		92	84	54	5.3	102	-.5	4	2.0	.42	43	lost power
		95	84	54	23.0	102		4	2.0	.41	48	
		97	85	54	6	102		4	2.0	.41	53	
		99	86	56	5.8	102		4	2.0	.41	58	
		99	86	56	7.9	102		4	2.0	.41	03	
		100	87	58	4.5	103		4	2.0	.40	08	
	141.3	100	88	60	4.9	103	-.5	4	2.0	.42	14:13	
		GAS OFF										
		Kiln Exhaust Bag 206										
		14:40 to 14:55										
(Vm)	46.4	95.3	84.6									
AVERAGE		90		****	******	164	-.5	MAX 4	2.0	.411	60 MINUTES	

INTEGRATED GAS SAMPLE 207				AVG	N_2= 79.4
CO_2				1.8	
O_2				18.3	
CO					

CONDENSATE COLLECTED	FINAL	INITIAL	TOTAL
DRIERITE	981.9	974.4	7.5
IMPINGER	216.6	200	16.6
GRAND TOTAL			24.1

LEAK RATE @ 6 "Hg= <.02

STACK AREA (As) 17.7 f^2

AVG SQ RT ΔP .6409

FILTER WT	PROBE WASH WT
GROSS	
TARE	NA
NET	

HEAVY METALS WT-mg			
As		Hg	
Be		Ni	
Cd			
Cr			
Pb			

Gas Conditions From Methods 1, 2, 3 & 4

DATA INPUT

Pb,In Hg	Barometer	29.14
VM,ft3	Meter Volume	46.9
ΔH,In H2O	Orifice Differential	2
PG,In H20	Stack Static Pressure	-.5
Tm,F	Meter Temperture	85
Ts,F	Stack Temperture	103
CP	Pitot Coefficient	.84
$\sqrt{\Delta P}$,In H20	Average Square Root Of Delta P	.6638
% CO2	Carbon Dioxide	2.1
% O2	Oxygen	18.1
% N	Nitrogen	79.8
VCL,Ml	Volume Of Condensate	23
AS,ft2	Stack Area	17.7

RESULTS

Pma,In Hg	Absolute Meter Pressure	29.29
PSA,In Hg	Absolute Stack Pressure	29.10
MD	Molecular Weight Dry Gas	29.06
MS	Molecular Weight @ Stack Conditions	28.79
VMSTP,ft3	VM Standard Temp.& Press. Dry	44.09
VWSTP,ft3	VM Standard Temp.& Press. Wet	1.08
BWO,%	Moisture	2.40
VS,ft/Sec	Stack Velocity	39.07
QA,ASCFM	Stack Gas Flow (Actual)	41494
QS,ft3/HR	Stack Gas Flow (Dry STP)	2225078

BELDEN BRICK
SUGARCREEK PLANT 6
KILN 3 DRIER STACK
11/17/94
TEST 1

Gas Conditions From Methods 1, 2, 3 & 4

DATA INPUT

Pb,In Hg	Barometer	29.14
VM,ft3	Meter Volume	46.4
ΔH,In H2O	Orifice Differential	2
PG,In H20	Stack Static Pressure	0
Tm,F	Meter Temperture	90
Ts,F	Stack Temperture	164
CP	Pitot Coefficient	.84
$\sqrt{\Delta P}$,In H20	Average Square Root Of Delta P	.6409
% CO2	Carbon Dioxide	1.8
% O2	Oxygen	18.3
% N	Nitrogen	79.9
VCL,Ml	Volume Of Condensate	24.1
AS,ft2	Stack Area	17.7

RESULTS

Pma,In Hg	Absolute Meter Pressure	29.29
PSA,In Hg	Absolute Stack Pressure	29.14
MD	Molecular Weight Dry Gas	29.02
MS	Molecular Weight @ Stack Conditions	28.74
VMSTP,ft3	VM Standard Temp.& Press. Dry	43.28
VWSTP,ft3	VM Standard Temp.& Press. Wet	1.13
BWO,%	Moisture	2.55
VS,ft/Sec	Stack Velocity	39.73
QA,ASCFM	Stack Gas Flow (Actual)	42191
QS,ft3/HR	Stack Gas Flow (Dry STP)	2040602

BELDEN BRICK
SUGARCREEK PLANT 6
KILN 3 DRIER STACK
11/17/94
TEST 2

CSA CO.

CARBON MONOXIDE DATA SHEET-CFR METHOD 10

PLANT Belden Brick DATE 11/17/94 BY [illegible]

LOCATION Plant 6 No 3 Kiln Drier BAG ______ STACK ______

NDIR UNIT T.E MOD.48 RECORDER ✓ RANGE 0-500 FLOW 1.1 lpm

SPAN GAS VALUES, CO IN N_2 1) 99.6 2) 150.0 3) 316 4) ______

	ZERO	SPAN 1	SPAN 2	SPAN 3
INITIAL CALIBRATION	0	99.3	149.7	316
FINAL CALIBRATION				

	TRIAL 1	TRIAL 2	TRIAL 3
TEST 1	[redacted]	Gas Burner On	
TEST 2	[redacted]	Gas Burner Off	
TEST 3			

CO_7 (CO CORRECTED TO 7% O_2) = CO (ACTUAL) X (20.9 - 7)/(20.9 - O_2)

TEST 1, ______ X 13.9 /20.9 - ______ = ______ PPM @ 7% O_2

TEST 2, ______ X 13.9 /20.9 - ______ = ______

TEST 3, ______ X 13.9 /20.9 - ______ = ______

TEST 4, ______ X 13.6 /20.9 - ______ = ______

CARBON MONOXIDE MASS CONCENTRATION CALCULATION

CO_L = Qs X %V X D_{CO}

CO_L = POUNDS PER HOUR CARBON MONOXIDE

Qs = GAS FLOW, F^3/HR (FROM M-5 TEST)

%V = DECIMAL PERCENTAGE OF CO (V/V)

D_{CO} = DENSITY OF CO, LB/F^3 = 0.0724

TEST 1 2225078 x [redacted] x 10^{-6} x 0.0724 = [redacted] LB/HR

TEST 2 2040602 x [redacted] x 10^{-6} x 0.0724 = [redacted] LB/HR

TEST 3 ______ x ______ x 10^{-6} x 0.0724 = ______ LB/HR

TEST 4 ______ x ______ x 10^{-6} x 0.0724 = ______ LB/HR

METHOD 25A CALCULATIONS FOR THC AS CARBON

FOR Belden Brick BY [illegible] DATE 11/17/94

C_C = ORGANIC CONCENTRATION AS CARBON, PPMV

C_{meas} = ORGANIC CONCENTRATION AS MEASURED, PPMV

K = CARBON EQUIVALENT CORRECTION FACTOR

K = 2 FOR ETHANE, K = 3 FOR PROPANE, K = 4 FOR BUTANE

$M_C = C_C\ Q_S\ D_C\ 10^{-6}$

M_C = MASS FLOW RATE AS CARBON, LB/HR

Q_S = GAS FLOW, DRY STD FT^3/HR FROM GAS FLOW MEASUREMENT

D_C = 0.0312 LB/FT^3 AT 68 °F

10^{-6} = DECIMAL PERCENT VOLUME CONVERSION FROM PPMV

FUEL GAS 40% N_2 / 60% He

CAL GAS 951 ppmv PROPANE/N_2

RANGE 0-500

AUTOMATIC CAL TIME 60 MINUTES (T.E.I. MODEL 51)

HEATED SAMPLE LINE TEMP 350 °F

TEST	TIME	C_{meas}	C_C	M_C
1	10:50/11:50	[redacted]	[redacted]	[redacted]
2	13:13/14:13	[redacted]	[redacted]	[redacted]

APPENDIX D.3

QA/QC AUDIT REPORT

QA/QC AUDIT REPORT

The subject report (in draft final form) was independently reviewed and representative data were audited by the project QA Coordinator. The review was based primarily on the QA Objectives for Measurement Data (Table 6-2) of the Draft Site-Specific Test Plan/Quality Assurance Plan for Testing at Plant 6 Belden Brick Company, dated October 22, 1993. Derived emission rates were verified by manual calculation on randomly-selected data points for the VOST, metals, semivolatiles, HCl, Cl_2, and HF tests. In addition, analytical performance samples were introduced during sample analyses.

Based on the reviews and audits described above, and with the few exceptions noted below, test results were found to be complete, traceable, and correctly reported. In general, data quality objectives were met for all analyses. Specific comments, review findings, and performance sample results are summarized below by type of analysis.

VOST ANALYSES

- Several additions were made to the VOST sections of the report to complete the QA/QC evaluation, specifically:

1. Surrogate recoveries (as percent of spiked amount added) have been added to the QA/QC section of the report (Table 5-8). Average recoveries for the four surrogates ranged from 79% to 145 %, and the precision of these determinations varied by less than 16% RSD in all cases. The 4-bromofluorobenzene surrogate recovery averaged 145%, slightly above the 130% objective.

2. Based on an instrument detection limit study, stack gas concentrations for undetected compounds would be less than 1-2 ug/dscm.

3. Blank corrections were applied to several of the listed compounds because of background levels found in laboratory method blanks. The blank corrections impact only a few of the listed compounds, as summarized in the table below. Results for these four compounds should therefore be considered as "estimated values" only.

SUMMARY OF COMPOUNDS AFFECTED BY BLANK CORRECTION OF VOST RESULTS

Compound	Blank Correction (ng)	Equivalent to Concentratration (ug/dscm)	Average Reported Concentration (ug/dscm)
Chloromethane	129	6	29
Bromomethane	114	6	6.4
Iodomethane	84	4	4.1
Methylene chloride	29	2	0.3

4. Footnotes (a) through (e) in Table 3-19 "Kiln Emission Test ResultsVOC's (metric units) are not applicable to this table. The footnotes are analyst's comments on specific data points within the VOST analyses, and do not necessarily apply to the summarized data report. However, benzene results should be flagged as estimated or minimum concentrations because sample concentrations exceeded the acceptable calibration range of the instrument. The analyst took action to try to bracket the sample concentrations with additional standards and special techniques to provide better estimates of the high benzene concentrations.

VOST ANALYSES (continued)

- Because chloromethane and bromomethane were found in the system blanks, data for these two analytes were determined by the analyst to be suspect. Chloromethane was found in at least one of the field samples at ~ 10 times the approximate average amount found in the blanks and could possibly be a true emission; however, the majority of field samples appear to have levels of chloromethane and bromomethane roughly equivalent to the background levels demonstrated by the field blanks.

- A performance audit sample (an independent check standard spiked onto a clean VOST trap) was analyzed with the field samples with the following results: methylene chloride, 118% accuracy at 400 ng on-column; 1,1,1-trichloroethane, 117% accuracy at 400 ng on-column; 14 other analytes (not found in the field samples) were correctly identified and reported to within accuracies of 103% to 151% at 400 ng on-column. These results are summarized in Table 5-9 of the report.

- The benzene emission rate for Run 1 was verified from the analytical data and the reported stack data (sample volume and gas flow rate).

SEMIVOLATILE ANALYSES

- Surrogate recoveries for the SV trains met the 50-150% objective for recovery. The additional solvent rinse of the filter support assembly produced discolored matrices and erratic surrogate recoveries, but indicated no significant concentrations of the target analytes upon analysis. Therefore, the data quality objectives were met for the primary sample results.

- An independent audit sample (check standard) was used to spike a laboratory control XAD and water sample prior to co-extraction with the actual field samples. The same check standard was analyzed directly to verify instrument calibration and chemical identification. Out of 43 spiked analytes from the target analyte list, 42 (98%) had accuracies ranging from 80% to 106% by direct analysis (2,4-dinitrophenol was the only exception at 60%), 39 of the 43 spiked analytes were within 50% to 150% for the spiked XAD sample, and 37 of the 43 spiked analytes were within 50% to 150% for the spiked water sample. Complete results for the performance audit samples are presented in Table 5-6.

- Phenol emission rates for Run 1 was verified from the analytical report through the derived emission factors by manual calculation.

METALS ANALYSES

- Front-half results for the metals train samples indicated significant background levels for cadmium, cobalt, chromium, manganese, nickel, lead, antimony, and selenium. The blank levels also appear to represent minimum levels found in all the field samples, indicating that the field samples also have a reproducible background contamination. Based on the blank filter levels, background corrections were applied to the cumulative concentrations (front/back half combination) of the samples prior to deriving emission rates. For chromium, manganese, and nickel, the background corrections are relatively insignificant to the total amount found for the combined front and back half train samples; however, the background corrections for cadmium cobalt, lead, antimony, and selenium represent a significant proportion of the total amounts found (> 50% in most cases). Therefore, derived stack gas concentrations for these 5 elements (Cd, Co, Pb, Sb, Se) should be considered as estimated concentrations.

- Analysis QC samples, including an independent check standard and an ICAP interference check sample, showed accuracies within the QA plan data quality objectives of 90-110% and 75-125%, respectively.

- Analysis of a spiked blank train (both front half and back half) demonstrated recoveries within the 70-130% QA objective.

- Analysis of a NIST Reference Standard filter indicated accuracies of 70-110%.

- Derived emission test results for chromium and nickel were verified from the analytical data and calculation of derived concentrations (ug/dscm) were checked for all 3 runs.

HF, HCl, Cl_2 ANALYSES

Check standards and matrix spikes were analyzed by Galbraith Laboratories as part of the analysis run. These results showed accuracies/recoveries within the 80-120% objective for the chloride analyses; no check standard or matrix spike was indicated for the fluoride analysis.

Duplicate analysis of one sample per matrix was not indicated for the chloride/fluoride analyses; however, the individual results from all 3 runs varied by less than the 30% RPD objective for sample precision.

HF, HCl, and Cl_2 emission rates for Run 1 were verified by manual calculation.

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Emission Testing at a Structural Brick Manufacturing Plant

Draft Emission Test Report For Testing at Belden Brick Company Plant 6

Sugarcreek, Ohio November 8 to 12, 1993

Prepared for
Emission Inventory Branch, MD-14
U.S. Environmental Protection Agency

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July 27, 1994

[redacted]

TABLE 3-19. KILN EMISSION TESTS RESULTS–VOC'S (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	15:50	16:50	17:45	
Finish time	16:10	17:10	18:05	
Sample time, min	20	20	20	
Sample volume, ACM	0	0	0	
Sample volume, DSCM	0.019964	0.0201194	0.0201688	
GAS PARAMETERS				
Gas temperature, C	204	207	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	5.5	4.9	4.2	
Velocity, m/min	351	321	327	
Flowrate, ACM/min	1,048	958.1	975.1	
Flowrate, DSCM/min	614.8	541.0	552.0	
MASS, ng ~~(BLANK CORRECTED)~~				
Chloromethane (a)	1475.956	88.518	192.644	BLANK CORRECTED (129 ng)
Dichlorofluoromethane	<17	<17	<17	
Bromomethane (a)	324.879	<12	58.478	BLANK CORRECTED (114 ng)
Acetonitrile	75.424	<20	<20	
Acrylonitrile	<20			
Vinl chloride	<20			
Chloroethane	1132.853	<20	368.637	
Iodomethane (a)	159.293	13.875	74.476	BLANK Corrected (84 ng)
Trichlorofluoromethane	<10			
Methylene chloride (a)	5.532	9.259	1.362	BLANK Corrected (29 ng)
Acetone	993.771	1261.417	2543.338	
Carbon disulfide	42.116	51.006	25.523	
1,1-Dichloroethene	<30			
1,1-Dichloroethane	<10			
1,2-Dichloroethene (total)	<20			
t-1,2-Dichloroethene	<10			
Chloroform	<10			
1,2-Dichloroethane	<10			
2-Butanone (a)	94.625	216.682	338.132	BLANK Corrected (7 ng)
1,1,1-Trichloroethane	7.106	<20	4.913	
Carbon tetrachloride	<10			
Vinyl acetate	<10			
Bromodichloromethane	<10			
1,2-Dichloropropane	<10			
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				

TABLE 3-19. (Metric units--continued)

MASS, ng ~~(BLANK CORRECTED)~~					
Dibromomethane	< 10				
Dibromoethane					
1,1,2-Trichloroethane					
1,4-Dichloro-2-butene					
Benzene (a)	2522.718	4337.655	1184.394	BLANK CORRECTED (22ng)	
trans-1,3-Dichloropropene	<10				
Bromoform	< 10				
4-Methyl-2-Pentanone	< 10	33.904	4.64		
2-Hexanone (a)	2.64	147.467	98.485	BLANK CORRECTED (9ng)	
Tetrachloroethene	< 10	3.65	3.944		
1,1,2,2-Tetrachloroethane	< 10	< 10	< 10		
Toluene	103.442	159.558	176.358		
Chlorobenzene	< 10	< 10	< 10		
Ethylbenzene	30.577	41.073	52.656		
Styrene	9.654	46.172	2.492		
m-/p-Xylene	46.992	64.574	77.281		
o-Xylene	40.168	58.095	66.438		
Hexachloroethane	< 10				
1,2-Dbromo-3-chloropropane	< 10	116.513	20.215		
CONCENTRATION, ug/DSCM				Average	
Chloromethane (a)	73.930895	4.3996363	9.6515938	29.29404	29
Dichlorofluoromethane					<2
Bromomethane (a)	16.273246		2.8994316	6.390893	6.4
Acetonitrile	3.7780014				<2
Acrylonitrile					
Vinl chloride					
Chloroethane	56.744806		18.277605		
Iodomethane (a)	7.9790143	0.6896332	3.6926377	4.120428	4.1
Trichlorofluoromethane					<2
Methylene chloride	0.2770989	0.4602028	0.0675301	0.268277	0.3
Acetone	49.778164	62.696581	126.10272	79.52582	80
Carbon disulfide	2.1095978	2.5351663	1.2654707	1.970078	2.0
1,1-Dichloroethene					<2
1,1-Dichloroethane					
1,2-Dichloroethene (total)					
t-1,2-Dichloroethene					
Chloroform					
1,2-Dichloroethane					
2-Butanone	4.7397829	10.769809	16.765119	10.75824	11
1,1,1-Trichloroethane	0.3559408		0.2435943	0.299768	0.3
Carbon tetrachloride					<2
Vinyl acetate					
Bromodichloromethane					

Sig figs.

TABLE 3-19. (Metric units--continued)

CONCENTRATION, ug/DSCM				Average	
1,2-Dichloropropane					<2
cis-1,3-Dichloropropene					
Trichloroethene					
2-Chloroethyl vinyl ether					
Dibromochloromethane					
Dibromomethane					
Dibromoethane					
1,1,2-Trichloroethane					
1,4-Dichloro-2-butene					
Benzene	126.36339	215.59575	58.724125	133.5611	134
trans-1,3-Dichloropropene					<2
Bromoform					"
4-Methyl-2-Pentanone		1.6851405	0.2300585	0.9576	1.0
2-Hexanone	0.1322381	7.3295958	4.8830419	4.114959	4.1
Tetrachloroethene		0.181417	0.1955498	0.188483	0.2
1,1,2,2-Tetrachloroethane					<2
Toluene	5.1814279	7.9305583	8.7441082	7.285365	7.3
Chlorobenzene					<2
Ethylbenzene	1.5316073	2.0414634	2.6107677	2.061279	2.1
Styrene	0.4835706	2.2949005	0.1235573	0.967343	1.0
m-/p-Xylene	2.3538375	3.2095406	3.8317141	3.131697	3.1
o-Xylene	2.0120222	2.8875129	3.294101	2.731212	2.7
Hexachloroethane					<2
1,2-Dbromo-3-chloropropane		5.79108	1.0022916	3.396686	3.4

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

a) Blank corrected; estimated values.

SECTION 5

INTERNAL QA/QC ACTIVITIES

5.1 METALS ANALYSIS

5.1.1 Instrumental Quality Control

Instrument calibration was verified using multielement standards obtained from an alternate supplier than those used for calibration. In addition, all correlation coefficient requirements were met per the analytical method. Instrumental drift was monitored throughout each analysis at less than 7% for all analytes (method criteria is ± 10% from target). All initial calibration verification analyses met SW-846 Methods 6010A and 7470 criteria and were within 5% from the target concentration (method criteria is ± 10% from target).

In addition, the interference check standard results (ICP only) were within the limits set by Method 6010A (method criteria is ± 20% from target). Serial dilution tests were not required per Method 6010A, due to the low levels in the resulting digest by ICP.

5.1.2 Method Quality Control

The method blanks were used for monitoring potential laboratory contribution during processing and analysis. Levels of analytes in the method blank were beneath the detection limit for most analytes. The few analytes detected were close to the detection limit (i.e., less than approximately 2 times the MDL).

Reagent blanks were also analyzed to monitor potential for contribution from reagent supplies and equipment used in sample collection. All back-half and Hg impinger reagents were detected near or less than the instrumental DL. Results for the filter and acetone rinse reagent blanks are reported in Table 5-1 (1056/MMBI R. Blanks). Table 5-2 presents the reagent and method blank values for the mercury analysis.

Method quality control results are reported in Tables 5-3 (for ICP analytes) and 5-4 (for Hg). Accuracy was monitored using spiked laboratory reagents (LCS), recoveries ranged from 93% to 111% (criteria is 70% to 130%). Further accuracy was monitored using a front-half representative NIST filter containing certified levels of Cd, Mn, and Pb. The resulting front-half recoveries ranged from 70% to 110%, with the exception of Pb, which was at a target level below ICP detection capability.

Precision, based on duplicate samples, were not a requirement for this work based on QA/QC objectives in the Draft test plan. However, precision was monitored for Hg analysis; results for duplicate analysis were less than 5% relative percent difference.

5.2 SEMIVOLATILE ANALYSIS

5.2.1 Calibration

For the initial calibration curve analyzed on October 25, 1993, all calibration check compounds (CCCs) and system performance check compounds (SPCCs) passed Method criteria. Two analytes were greater than 30% REF (Benzidine at 42% and 3,3′-dichlorobenzidine at 30.1%).

All CCCs and SPCCs for the CCAL (continuing calibration check) analyzed on November 30, 1993, passed Method criteria. Four analytes were greater than 30% difference from the initial calibration curve (benzoic acid at 47%, 2,4-dinitrophenol at 30.3%, 3,′dichlorobenzidine at 30.1%, and benzidine at 86%).

All CCCs and SPCCs for the CCAL (continuing calibration check) analyzed on December 1, 1993, passed Method criteria. One analyte was greater than 30% difference from the initial calibration curve benzidine at 62%).

5.2.2 Sample Surrogate Recoveries

Surrogate recoveries for the samples are reported in Table 5-5 with the exception of the additional filter, support rinse samples. All sample surrogate recoveries were within the objective of 50% to 150%.

5.2.3 Quality Control Sample Analyses

During the extraction of the XAD/filter samples, a XAD method blank, 28425, and one XAD QA spike, 00482, were also extracted. A water QA spike, 00483, was extracted with the condensate samples. The results and surrogate recoveries of the blank and QA samples are presented in Tables 5-6 and 5-7. The spikes met the objective of 50% to 150%.

The method blank contained four compounds, three of which were also found in the samples. The amounts in the blank are lower than the samples. The compounds and amounts in the blank are: benzoic acid 64 µg, naphthalene 3.1 µg, 2-hydroxyace-tophenone 3.2 µg, and bis(2-ethyl hexyl)phthalate 17 µg. Benzoic acid is found Run in 3 at 623 µg, naphthalene in Runs 1 through 3 at 6 to 12 µg, and bis(2-ethyl hexyl)phthalate in Runs 1 through 3 at 77 to 510 µg. Benzoic acid and bis(2-ethyl hexyl)phthalate were found in the XAD spike sample 00482.

5.2.4 Performance Audit Analyses

A Performance Audit Sample (PAS) 00481, provided by MRI's QA unit was analyzed by GC/MS. The PAS met the objective of 50% to 150%.

5.3 VOST ANALYSIS

5.3.1 GC/MS Calibration

MRI used historical data from March 1993 for Initial Precision Recovery; these data are presented in Appendix C. For each matrix, four replicate samples were analyzed at the mid-level standard of 100 ng on-column.

Samples were received on November 15, 1993, in good condition. Eleven trap pairs were received, including two field blank pairs, two trip blank pairs, and seven sample pairs. The Tenax calibration curve was extended with two standards on November 18, 1993, and two more standards on November 19, 1993. The purpose was to bracket the high levels of benzene in the samples. The addition of calibration points to the curve for high level samples is allowed by Method 5041. Sample 1073 contained very high levels of benzene, and the instrument detector was saturated. The benzene result should be considered a minimum value. Since the Tenax samples contained high levels of analytes, several system blanks were required to ensure that the analytical system was free of sample contamination.

5.3.2 Assessment of Data Quality

The method was followed, and the objectives were met except for the following:

1. Chloromethane, bromomethane, and iodomethane were observed in the system blank samples. The source of the contamination was identified as the methanol which was used to prepare the internal standard solution and the internal standard/surrogate solution. Chloromethane was observed in the field sample at 10 times the amount found in the system blanks. Bromomethane was observed in the samples at the same level or below

that found in the system blank. Iodomethane was not a target compound. These three compounds have been blank corrected and should be considered as "estimated" values only.

2. The calibration curve ranged from 20 to 3,000 ng for the Tenax trap analysis, with an extension for benzene up to 15,000 ng. Four compounds (chloromethane, bromomethane, 1,1,2-trichlorotrifluoethane, and methylene chloride) did not meet the calibration curve objective of 30% RSD.

   The calibration curve ranged from 30 to 1,000 ng for the Tenax/charcoal trap curve. Eight compounds (chloromethane, bromomethane, dichlorodifluoromethane, methylene chloride, carbon disulfide, benzene, 1,1,2-trichloroethane, and chloroethane) did not meet the 30% RSD objective. All values below 20 ng are considered estimates.

3. Two additional standards with benzene and internal standards were analyzed in order to quantitate the high level of benzene in one sample. Since the benzene peak was saturated in these two standards, the average response factor was not calculated for these two points. The calibration standards were used to estimate the level of benzene found in the sample using a single point calibration.

4. A high bias was observed in the performance audit samples (PAS) for a few analytes, but all results were between 103% and 151% accuracy.

   For the Tenax trap analysis, three compounds (carbon tetrachloride, *cis*-1,3-dichloropropene, and *trans*-1,3-dichloropropene) were higher than the 70% to 130% objective listed in the project plan. These three analytes were not observed in the samples.

5.3.3 Performance Audit Samples

For the Tenax/charcoal trap analysis, five compounds in one PAS and eight compounds in a second PAS did not meet the 7% to 130% objective listed in the project plan. The results for the two PASs were consistent with each other. The affected compounds were 1,1-dichloroethane, 1,2-dichloroethane, *trans*-1,2-dichloroethane, carbon tetrachloride, 1,2-dicholoropropane, *cis*-1, 3-dichloropropene, dibromochloromethane, and *trans*-1,3-dichloropropene. These compounds were not observed in the samples; therefore, there is minimal impact to the data quality. Results of the blind audit sample No. C-139-03 is presented in Table 5-8.

5.3.4 Surrogate Recoveries

Surrogate recoveries were 79% ± 6% RSD for toluene-d_8, 88% ± 6% RSD for benzene-d_6, and 103% ± 16% for 1,2-dichloroethane-d_4. The spiked surrogate 4-bromofluorobenzene averaged 145% ± 7% RSD which was slightly above the 130% objective. Surrogate recoveries are presented in Table 5-9.

TABLE 5-1. METALS, FILTER, AND ACETONE RINSE REAGENT BLANK RESULTS

Front-half Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se	Hg
Microwave Method Blank	02881	ug	< 4.67	< 0.09	< 0.24	< 1.17	< 1.33	< 0.28	< 1.26	< 8.51	< 2.33	< 3.23	1.18
Microwave Method Blank	02894	ug	< 4.67	< 0.09	< 0.24	< 1.17	< 1.33	< 0.28	< 1.26	< 8.51	< 2.33	< 3.23	2.43
1056/MMBl (Filter/Acet. R.Blk)*	02883	ug	< 4.67	< 0.09	5.93*	5.62*	4.40*	2.18*	22.5*	155*	19.6*	12.9*	2.15
1055 (0.1N HNO3 R. Blank)	02895	ug	< 4.67	< 0.09	< 0.24	< 1.17	< 1.33	< 0.28	3.51	< 8.51	< 2.33	< 3.23	< 1.00
1029/1030/1065	02884	ug	< 4.67	< 0.09	7.52	6.01	35.8	7.70	32.5	152	21.0	23.4	1.73
2029/2030/2065	02885	ug	< 4.67	< 0.09	7.65	5.56	21.9	5.63	27.2	156	18.6	17.2	1.37
3029/3030/3065	02886	ug	< 4.67	< 0.09	6.36	5.56	22.2	5.48	27.2	157	17.9	18.1	11
Hg Prep Method Blank	02921	ug											2.26

* Results are higher than expected for sample 1056/MMBl (filter and acetone reagent blanks), since levels for these reagent blanks are elevated compared to historical data.

Back-half Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se	CVAA Hg
Method Bl/Cooldown Bl	02888	ug	2.49	< 0.030	0.099	< 0.350	< 0.340	0.047	< 0.520	< 2.88	< 1.46	< 3.03	< 1.00
1057/1055	02890	ug	< 1.89	< 0.033	0.160	< 0.382	0.519	0.228	2.08	< 3.14	< 1.59	< 3.31	0.637
1031	02889	ug	< 1.97	< 0.034	2.63	6.21	435	48.3	207	12.3	2.03	28.7	15.9
2031	02891	ug	< 1.96	0.034	6.31	27.2	2067	172	1133	7.77	1.92	32.9	4.86
3031	02892	ug	< 1.97	< 0.034	0.593	0.430	7.13	5.99	9.11	6.15	2.44	57.1	17.3
3031A	02893	ug	< 2.33	< 0.040	0.533	10.9	510	56.7	359	< 3.870	< 1.962	7.33	0.098

Notes:

"<" indicates a sample result below the method DL.
All analyses reported are from ICP analysis results except for Hg which is taken from CVAA analyis results.
Bold values represent field samples, all others are laboratory generated QC samples.

TABLE 5-2. MERCURY REAGENT AND METHOD BLANK RESULTS

Impingers 4 - 6, Hg Results:

Sample ID	Barcode ID	CVAA Hg	Units
Method Blank	02921	2.26*	ug
1058 Reagent Blank	**02904**	**0.150**	**ug**
1059 Reagent Blank	**02905**	**< 0.20**	**ug**
1060 Reagent Blank	**02906**	**0.294**	**ug**
1032	**02907**	**0.353**	**ug**
2032	**02908**	**0.132**	**ug**
3032	**02909**	**0.394**	**ug**
1033	**02910**	**5.72**	**ug**
2033	**02911**	**5.04**	**ug**
3033	**02912**	**4.28**	**ug**
1034	**02913**	**< 0.22**	**ug**
2034	**02914**	**0.264**	**ug**
3034	**02915**	**0.238**	**ug**

"<" indicates a sample result is below the method DL.
Bold values represent field samples, all others are laboratory generated QC samples.

* The method blank level is near the DL.

TABLE 5-3. QC SUMMARY FOR METALS ICP ANALYSIS

Front-Half QC Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se
LCS	02882	ug	100.090	97.839	108.330	105.460	105.340	106.960	109.580	110.330	106.820	102.250
LCS Spike Level		ug	100	100	100	100	100	100	100	100	100	100
LCS % Recovery:			**100.1%**	**97.8%**	**108.3%**	**105.5%**	**105.3%**	**107.0%**	**109.6%**	**110.3%**	**106.8%**	**102.3%**
NIST 2676c lc**	02896	ug	< 4.67	< 0.09	0.672	< 1.17	< 1.23	2.315	< 1.26	< 8.51	< 2.33	< 3.23
NIST 2676c lc Spike Level		ug	NA	NA	0.954	NA	NA	2.11	NA	7.47	NA	NA
NIST % Recovery:			**NA**	**NA**	**70.4%**	**NA**	**NA**	**109.7%**	**NA**	**0.0%**	**NA**	**NA**

** The NIST filter digested was low level. The Pb concentration was below the quarterly IDL and therefore shows low recovery.

Back-Half QC Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se
LCS	02897	ug	101.690	96.588	107.730	104.530	103.990	104.340	107.180	107.560	103.640	101.040
LCS Spike Level		ug	100	100	100	100	100	100	100	100	100	100
LCS % Recovery:			**101.7%**	**96.6%**	**107.7%**	**104.5%**	**104.0%**	**104.3%**	**107.2%**	**107.6%**	**103.6%**	**101.0%**

"<" indicates a sample result below the method DL.

% RPD = | Found 1 - Found 2 | / ((Found 1 + Found 2) / 2) * 100

LCS % Recovery = LCS Found / LCS Spike Level * 100

TABLE 5-4. QC SUMMARY FOR MERCURY CVAA ANALYSIS

Sample ID	Reported Average Conc.	Units	% Recovery	% RPD*	
1055 (digest) MS	49.2	ug	98.3%	----	Front-half Results
7470 LCS	49.3	ug	98.6%	----	
FH LCS (digest)	1074	ug	107.4%	----	
3029/3030/3065 (digest)	**11.0**	ug	----	4.3%	
BH MB/Ckdn Blk (digest)	< 1.00	ug	----	----	Back-half Results
BH LCS (digest)	985	ug	98.5%	----	
1031	**15.9**	ug	----	1.5%	
2031	**4.86**	ug	----	1.3%	
3031	**17.3**	ug	----	0.8%	
1055/1057 BH Blank	**0.637**	ug	----	----	
1055/1057 MS	49.2	ug	94.2%	----	
1033	**5.72**	ug	----	4.6%	Impinger 4 - 6 Results
2033	**5.04**	ug	----	1.7%	
3033	**4.28**	ug	----	1.9%	
1058 MS	48.4	ug	93.3%	----	
1059 MS	50.3	ug	98.4%	----	
1060 MS	48.7	ug	94.8%	----	

Bold Sample IDs represent field samples, all others are lab QC samples.
"<" indicates a sample result below the method DL.
"digest" means that the Hg aliquot is taken from a previously digested sample.
*RPD Relative Percent Difference. This is calculated only if the instrument response is greater than 10 times the IDL.

TABLE 5-5. SURROGATE RECOVERY, %

Analyte	Sample ID						
	Run 1	Run 1 RI	Run 2	Run 3	1038A	2038A	3038A
D4-1,2-Dichlorobenzene	57	57	72	67	31[a]	29[a]	32[a]
D5-Nitrobenzene	63	61	73	67	64	49[a]	56
2-Fluorobiphenyl	76	76	83	82	128	340[a]	495[a]
D1 4-4-Terphenyl	94	91	91	102	280[a]	423[a]	485[a]
2-Fluorophenol	62	62	75	68	39[a]	42[a]	42[a]
D6-Phenol	60	61	75	68	13[a]	13[a]	10[a]
D4-2-Chlorophenol	60	61	71	67	6.4[a]	47[a]	48[a]
2,4,6-Tribromophenol	106	115	111	118	220[a]	528[a]	650[a]

[a]Do not meet method objective of 50 to 150 percent. Samples extracts were dark in color and internal standard response was less than required.
These difficulties are due to the sample matrix.

TABLE 5-6. SEMIVOLATILE ORGANIC COMPOUND QA RESULTS

Analyte	Method blank mass, ug	00481 Mass, ug	Percent recovery	00482 Mass, ug	Percent recovery	00483 Mass, ug	Percent recovery
Phenol	<2	308	92	39	58	10	30
Aniline	<2	<2		<2		<2	
Bis(2-chloroethyl)ether	<2	<2		<2		<2	
2-Chlorophenol	<2	316	95	39	58	22	67
1,3-Dichlorobenzene	<2	597	90	76	57	34	50
1,4-Dichlorobenzene	<2	615	92	79	59	36	55
Benzyl alcohol	<2	597	90	77	57	29	45
1,2-Dichlorobenzene	<2	589	88	74	55	35	54
2-Methylphenol	<2	<2		<2		<2	
2,2'-oxybis(1-Chloropropane)	<2	<2		<2		<2	
4-Methylphenol	<2	5.3		<2		<2	
N-Nitrosodipropylamine	<2	<2		<2		<2	
Hexachloroethane	<2	592	89	71	53	30	45
Nitrobenzene	<2	584	88	80	60	46	70
Isophorone	<2	584	88	86	64	50	76
2-Nitrophenol	<2	320	96	43	64	23	71
2,4-Dimethylphenol	<2	337	101	15	22	17	52
Benzoic acid	64	<2		85		<2	
Bis(2-chloroethoxy)methane	<2	<2		<2		<2	
2-Chloroacetophenone	<2	<2		<2		<2	
2,4-Dichlorophenol	<2	331	99	<2	65	24	74
1,2,4-Trichlorobenzene	<2	606	91	82	61	41	62
Naphthalene	3.1	326	98	46	69	24	71
4-Chloroaniline	<2	<2		<2		<2	
2,6-Dichlorophenol	<2	<2		<2		<2	
Hexachlorobutadiene	<2	617	93	82	61	37	56
4-Chloro-3-methylphenol	<2	323	97	49	73	25	77
2-Hydroxyacetophenone	3.2	<2		<2		<2	
2-Methylnaphthalene	<2	554	83	81	60	45	68
Hexachlorocyclopentadiene	<2	607	91	42	3	18	27
2,4,6-Trichlorophenol	<2	350	105	54	81	27	83
2,4,5-Trichlorophenol	<2	<2		<2		<2	
2-Chloronaphthalene	<2	604	91	93	70	51	76
2-Nitroaniline	<2	<2		<2		<2	
Dimethylphthalate	<2	<2		<2		<2	
Acenaphthylene	<2	360	108	59	88	31	94
2,6-Dinitrotoluene	<2	662	99	128	96	58	88
2,3,4,6-Tetrachlorophenone	<2	<2		<2		<2	
3-Nitroaniline	<2	<2		<2		<2	
Acenaphthene	<2	337	101	57	85	29	88
2,4-Dinitrophenol	<2	200	60	<2	0	167	5
4-Nitrophenol	<2	289	87	57	85	9	27
Dibenzofuran	<2	574	86	104	78	56	85
2,4-Dinitrotoluene	<2	632	95	128	96	58	88
Diethyl phthalate	<2	<2		<2		<2	
4-Chlorophenylphenyl ether	<2	<2		<2		<2	
Fluorene	<2	354	106	67	100	33	100
4-Nitroaniline	<2	<2		<2		<2	
4,6-Dinitro-2-methylphenol	<2	280	84	19	29	21	65
N-Nitrosodiphenylamine	<2	<2		<2		<2	

TABLE 5-6. (Continued)

Analyte	Method blank mass, ug	00481 Mass, ug	Percent recovery	00482 Mass, ug	Percent recovery	00483 Mass, ug	Percent recovery
4-Bromophenyl-phenylether	<2	<2		<2		<2	
Hexachlorobenzene	<2	620	93	119	89	63	95
Pentachlorophenol	<2	365	110	38	57	29	88
Phenanthrene	<2	345	104	66	99	32	97
Anthracene	<2	339	102	63	94	31	92
Carbazole	<2	<2		<2		<2	
Di-n-butyl phthalate	<2	<2		<2		<2	
Fluoranthene	<2	358	108	71	106	35	106
Benzidine	<2	<2		<2		<2	
Pyrene	<2	342	103	69	103	35	105
Butylbenzyl phthalate	<2	<2		<2		<2	
3,3'-Dichlorobenzidine	<2	<2		<2		<2	
Benzo(a)anthracene	<2	314	94	62	93	30	90
Chrysene	<2	292	88	58	87	28	86
Bis(2-ethylhexyl) phthalate	17	<2		14		<2	
Di-n-octyl phthalate	<2	<2		<2		<2	
Benzo(b)fluoranthene	<2	352	106	73	109	31	92
Benzo(k)fluoroanthene	<2	318	95	63	94	29	89
Benzo(a)pyrene	<2	336	101	59	88	27	82
Indeno(1,2,3-cd)pyrene	<2	332	100	62	93	28	85
Dibenz(a,h)anthracene	<2	352	106	65	97	29	88
Benzo(g,h,i)perylene	<2	265	80	49	73	22	70

TABLE 5-7. QA SURROGATE RECOVERY, %

Analyte	Sample ID		
	Method blank	00482	00483
D4-1,2-Dichlorobenzene	51	56	45[a]
D5-Nitrobenzene	55	62	67
2-Fluorobiphenyl	60	73	66
D14-4-Terphenyl	100	93	87
2-Fluorophenol	49[a]	49[a]	41[a]
D6-Phenol	51	54	27[a]
D4-2-Chlorophenol	50	52	60
2,4,6-Tribromophenol	87	98	92

[a]Do not meet method objective of 50 to 150%.

TABLE 5-8. VOST SURROGATE RECOVERIES

	VOST surrogate recoveries (%)[a]			
Sample	1,2-Dichloroethane-d_4	Benzene-d_6	4-Bromofluorobenzene	Toluene-d_8
TR BL TNX 1077	115	92	130	76
TR BL T/C 1078	94	84	155	76
FD BL TNX 1075	113	90	139	76
FD BL T/C 1076	109	88	127	78
Pair 2 TNX 1069	106	95	140	77
Pair 2 T/C 1070	88	84	149	85
Pair 4 TNX 1073	140	80	155	77
Pair 4 T/C 1074	84	94	151	89
Pair 2 TNX 2069	93	91	156	76
Pair 2 T/C 2070	92	86	152	78
Average:	103% R	88% R	145% R[b]	79% R
Precision (RSD):	± 16% RSD	± 6% RSD	± 7% RSD	± 6% RSD

[a] Based on spiked concentration of 250 ng per trap.
[b] Value is above the 70% to 130% recovery objective of the QA Plan.

TABLE 5-9. VOST AUDIT SAMPLE RESULTS
Sample: VOC Mix C-139-03

Analysis Date: 11/23/93

Compound	Accuracy (%)[a]
Methylene chloride	118
1,1-Dichloroethane	149
1,2-Dichloroethane (total	131
t-1,2-Dichloroethene	142
Chloroform	123
1,2-Dichloroethane	119
1,1,1-Trichlooethane	117
Carbon Tetrachloride	135
Bromodichloromethane	116
1,2-Dichloropropane	132
cis-1,3-Dichloropropene	136
Dibromochloromethane	131
1,1,2-Trichloroethane	127
trans-1,3-Dichloropropene	151
Bromoform	126
1,1,2,2-Tetrachloroethane	103

[a] Based on theoretical concentration of 400 ng per trap.

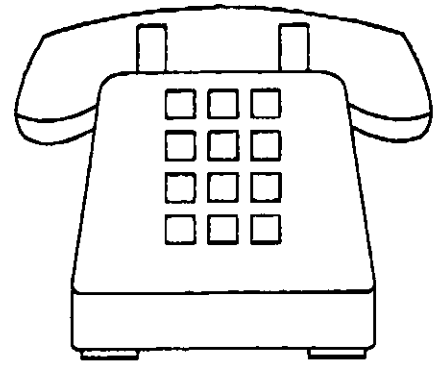
MRI FAX

MIDWEST RESEARCH INSTITUTE
425 Volker Boulevard
Kansas City, Missouri 64110-2299

FAX

(816) 753-5359, Chemical Sciences Dept.
(816) 753-8420, Institute

Telephone - (816) 753-7600



Date 8/11/94 Time 9:30 a CT
To: Rick Marinshaw
From: Dennis Hooton
Overhead #, or Project, Task + Sub-Task
This transmission consists of 6 pages (including cover)
Receiving Facsimile Telephone Number 919-677-0065
Verification Telephone Number

MRI Facsimile Machine Number: (816) 753-5359 or (816) 753-8420

MRI Verification: (816) 753-7600 Ext. 1229, 1417, 1353

MESSAGE:

See attachments.

DRAFT
2885/460101
7/14/94 1

Emission Testing at a Structural Brick Manufacturing Plant

Draft Emission Test Report For Testing at Belden Brick Company Plant 6

Sugarcreek, Ohio
November 8 to 12, 1993

Prepared for
Emission Inventory Branch, MD-14
U.S. Environmental Protection Agency

EPA Contract No. 68-D2-0159
MRI Project No. 4601-M(01)

July 1994

APPENDIX D.3

QA/QC AUDIT REPORT

DRAFT

Please call Dennis Hooton
@ 816-753-7600 x 1198
to discuss ★ items. —

May want to edit
report.

QA/QC AUDIT REPORT

The subject draft report has been independently reviewed and representative data were audited by the QA Coordinator. The review was based primarily on the QA Objectives for Measurement Data (Table 6-2) of the Draft Site-Specific Test Plan/Quality Assurance Plan for Testing at Plant 6 Belden Brick Company, dated October 22, 1993. Derived emission rates were verified by manual calculation on randomly-selected data points for the VOST, metals, semivolatiles, HCl, Cl_2, and HF tests. In addition, analytical performance samples were introduced during sample analyses.

Based on the reviews and audits described above, and with the exceptions noted, test results were found to be complete, traceable, and correctly reported. Specific comments, review findings, and performance sample results are summarized below by type of analysis.

VOST ANALYSES

- Data reduction for the VOST analysis results were determined to be incomplete due to the following omissions:

1. Surrogate recoveries (as percent of spiked amount added) are not calculated. There appears to be adequate responses for the spiked surrogate compounds (~200-400 ng per analysis), however, the theoretical amounts are not indicated in the report.

2. Minimum detection limits are not reported for the target analytes undetected in the samples. In other words, what would be the estimated maximum emission rates for undetected analytes based on the analysis limitations?

3. Blank corrections for sample data are indicated in Table 3-19 of the draft report; however, the specific compounds which were blank corrected and the amounts used for correction are not indicated.

4. Footnotes (b) through (e) in Table 3-19 "Kiln Emission Test ResultsVOC's (metric units) are not identified in the table. Benzene results should be flagged as estimated values because sample concentrations exceeded the acceptable calibration range of the instrument.

- Because chloromethane and bromomethane were found in the system blanks, data for these two analytes were determined by the analyst to be invalid. Chloromethane was found in at least one of the field samples at ~ 10 times the approximate average amount found in the blanks and could possibly be a true emission; however, the majority of field samples appear to have levels of chloromethane and bromomethane roughly equivalent to the background levels demonstrated by the field blanks. Emission rates for these two compounds are not reported due to the background concentrations.

- A performance audit sample (an independent check standard spiked onto a clean VOST trap) was analyzed with the field samples with the following results: methylene chloride, 118% accuracy at 400 ng on-column; 1,1,1-trichloroethane, 117% accuracy at 400 ng on-column; 14 other analytes (not found in the field samples) were correctly identified and reported to within accuracies of 103% to 151% at 400 ng on-column.

- The benzene emission rate for Run 1 was verified from the analytical data and the reported stack data (sample volume and gas flow rate).

SEMIVOLATILE ANALYSES

- Surrogate recoveries for the SV trains met the 50-150% objective for recovery. The additional solvent rinse of the filter support assembly produced discolored matrices and erratic surrogate recoveries, but indicated no significant concentrations of the target analytes upon analysis. Therefore, the data quality objectives were met for the primary sample results.

- An independent audit sample (check standard) was used to spike a laboratory control XAD and water sample prior to co-extraction with the actual field samples. The same check standard was analyzed directly to verify instrument calibration and chemical identification. Out of 43 spiked analytes from the target analyte list, 42 (98%) had accuracies ranging from 80% to 106% by direct analysis (2,4-dinitrophenol was the only exception at 60%), 39 of the 43 spiked analytes were within 50% to 150% for the spiked XAD sample, and 37 of the 43 spiked analytes were within 50% to 150% for the spiked water sample.

- It was noted that the appendices include a working draft of the semivolatile analytical report rather than a more appropriate final report.

- Phenol emission rates for Run 1 was verified from the analytical report through the derived emission factors by manual calculation.

METALS ANALYSES

- Front-half results for the metals train samples indicated significant background levels for cadmium, cobalt, chromium, manganese, nickel, lead, antimony, and selenium. The blank levels also appear to represent minimum levels found in all the field samples, indicating that the field samples also have a reproducible background contamination. Based on the blank filter levels, background corrections were applied to the cumulative concentrations (front/back half combination) of the samples prior to deriving emission rates. For chromium, manganese, and nickel, the background corrections are relatively insignificant to the total amount found for the combined front and back half train samples; however, the background corrections for cadmium cobalt, lead, antimony, and selenium represent a significant proportion of the total amounts found (> 50% in most cases). Therefore, derived emission factors for these 5 elements (Cd, Co, Pb, Sb, Se) should be qualified accordingly.

- Analysis QC samples, including an independent check standard and an ICAP interference check sample, showed accuracies within the QA plan data quality objectives of 90-110% and 75-125%, respectively.

- Analysis of a spiked blank train (both front half and back half) demonstrated recoveries within the 70-130% QA objective.

- Analysis of a NIST Reference Standard filter indicated accuracies of 70-110%.

- The reported chromium emission rate and emission factor for Run 1 was verified by manual calculation.

HF, HCl, Cl_2 ANALYSES

Check standards and matrix spikes were analyzed by Galbraith Laboratories as part of the analysis run. These results showed accuracies/recoveries within the 80-120% objective for the chloride analyses; no check standard or matrix spike was indicated for the fluoride analysis.

Duplicate analysis of one sample per matrix was not indicated for the chloride/fluoride analyses; however, the individual results from all 3 runs varied by less than the 30% RPD objective for sample precision.

HF, HCl, and Cl_2 emission rates for Run 1 were verified by manual calculation.

MRI

MIDWEST RESEARCH INSTITUT
Suite 3!
401 Harrison Oaks Bouleva
Cary, North Carolina 27513-24
Telephone (919) 677-02
FAX (919) 677-00

November 29, 1994

Mr. Ron Myers
Emission Factor and Inventory Group (MD-14)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

Re: Review and Update of Mineral Products Industry and Metallurgical Industries Sections of Chapters 11 and 12 of AP-42
EPA Contract No. 68-D2-0159; Work Assignment No. II-01
MRI Project No. 4602-01

Dear Mr. Myers:

In response to comments received from John Jensen of Belden Brick in his September 14, 1994 letter to you, I have reviewed MRI's records and have rechecked the calculations for total organic compounds (TOC) emissions from the dryer. Based upon the field records, I believe the emission concentrations presented in the report to be correct. However, the reported emission rates and emission factors are in slight error for two reasons. First, velocity traverse data for Run 1 were not available when the report was prepared; the average of the velocities and flow rates for Runs 2 and 3 were used. Second, the flow rate for Run 3 was entered into the calculation spreadsheet incorrectly. The corrected average emission rates and emission factors are 2 to 3 percent higher than the values presented in the draft test report. The correct emission rates and factors will be reported in the final report.

The steps taken during my data review and my comments on the results are summarized as follows:

(a) The concentrations of calibration standards were verified. The span and midpoint calibration gas values were confirmed by reviewing the calibration gas certifications;

(b) The data logger field records of 1-minute concentration measurements were reviewed. The field records indicate the measured values are consistent with the reported data. The field records have not been drift corrected, and hence are slightly different (1-2 ppm) than the 1-minute readings presented in the appendix to the report; the data presented in the report have been drift corrected using the pre- and post-test zero and span calibrations;

(c) The results of the quality control (QC) checks for the monitor (i.e., calibration error, drift and bias checks) were reviewed. The results are within specification;

(d) The stack gas flow rate calculations were checked. Calculations from the velocity traverse data were verified to be accurate. However, review of the data identified one anomaly. A separate orsat measurement (oxygen and carbon dioxide) and moisture measurement for the dryer gas was not reported; the orsat/moisture measurements for the kiln stack gas (O_2 = 17.6%, CO_2 = 2.2%, and H_2O = 4.2%) were used in the dryer emissions calculations. These data are used only to calculate the molecular weight of the stack gas for determination of the stack gas velocity. The molecular weight has only a small impact on the calculation. To evaluate the possible impact on the stack gas flowrate (and consequently the emission rate), a sensitivity analysis was conducted by substituting the molecular weight for the two extremes between which the true molecular weight would lie -- ambient air and undiluted combustion gas. The deviations of the flowrate from the reported value using these two extremes in molecular weight are +4% and -2%, respectively. The actual molecular weight should be between these two extremes, and, consequently, use of the kiln gas molecular weight is reasonable; and

(e) The following spreadsheet calculations were checked: (1) conversion from propane basis to methane basis, (2) mass emission rate (i.e., lb/hr), and (3) emission factor (i.e., lb/ton bricks produced).

The following records are attached:

Attachment 1 -- Calibration gas certification records

Attachment 2 -- Data logger field records (Annotated)

Attachment 3 -- Velocity traverse field records and calculations

Attachment 4 -- Example calculation

It is our understanding that this facility is unusual (with respect to other facilities for which we have data) in that the dryer uses auxiliary burners in addition to the heated air from the kiln. Perhaps this explains the higher than expected TOC results.

Please let me know if you need any additional information.

Sincerely,

Roy Neulicht
Program Manager

Attachments

ATTACHMENT 1

CALIBRATION GAS CERTIFICATES

213-585-2154
FAX# 213-585-0582

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. P.O NUMBER 092193-1

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	1667b	CLM-005042	47.3 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT PROPANE ANALYZER MAKE-MODEL-S/N HP 5890 SERIES II S/N 3310A48533

ANALYTICAL PRINCIPLE GC/ FLAME IONIZATION LAST CALIBRATION DATE 07/08/93

FIRST ANALYSIS DATE 09/28/93 SECOND ANALYSIS DATE

Z 0	R 58386	C 63294	CONC.	51.3 ppm	Z	R	C	CONC.
R 59250	Z 0	C 64278	CONC.	51.3 ppm	R	Z	C	CONC.
Z 0	C 64093	R 59056	CONC.	51.3 ppm	Z	C	R	CONC.
U/M uV			MEAN TEST ASSAY	51.3 ppm	U/M uV			MEAN TEST ASSAY

THIS CYLINDER NO. SA 8784
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 09/28/93
EXPIRATION DATE 03/28/95 TERM 18 MONTHS

CERTIFIED CONCENTRATION

PROPANE	51.3 ppm
ZERO AIR	BALANCE

ANALYZED BY KELLY GALLAGHER

CERTIFIED BY DOUG GRANT

LIQUID CARBONIC
SPECIALTY GAS CORPORATION
5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058
213 585-2154
FAX # 213 585-0582

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. **P.O NUMBER** 021293-3

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	vs. 1668b	SA 5909	95.3 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT PROPANE ANALYZER MAKE-MODEL-S/N HP 5890 Series II S/N 3108A34409

ANALYTICAL PRINCIPLE GC/ Thermal Conductivity LAST CALIBRATION DATE 10/26/92

FIRST ANALYSIS DATE 03/04/93 SECOND ANALYSIS DATE

Z 0	R 738	C 703	CONC.	90.8 ppm	Z	R	C	CONC.	
R 742	Z 0	C 701	CONC.	90.0 ppm	R	Z	C	CONC.	
Z 0	C 693	R 735	CONC.	89.9 ppm	Z	C	R	CONC.	
U/M uV			MEAN TEST ASSAY	90.2 ppm	U/M uV			MEAN TEST ASSAY	

THIS CYLINDER NO. SA 5736
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 03/02/93
EXPIRATION DATE 09/02/94

CERTIFIED CONCENTRATION

PROPANE	90.2 ppm
ZERO AIR	BALANCE

ANALYZED BY K.A. Gallagher
K.A. GALLAGHER

CERTIFIED BY [signature]
K.T. YOUNG

213-585-2154
FAX# 213-585-0582

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

5700 SOUTH ALEMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST. P.O NUMBER

REFERENCE STANDARD

COMPONENT		NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE	GMIS	vs 1667b	579140	29.8 ppm

ANALYZER READINGS

R=REFERENCE STANDARD Z=ZERO GAS C=GAS CANDIDATE

1. COMPONENT PROPANE GMIS ANALYZER MAKE-MODEL-S/N HP 5890 Series II S/N 3108A34409

ANALYTICAL PRINCIPLE GC/ Thermal Conductivity LAST CALIBRATION DATE 04/15/93

FIRST ANALYSIS DATE	05/24/93				SECOND ANALYSIS DATE			
Z 0	R 208	C 206	CONC.	29.5 ppm	Z	R	C	CONC.
R 208	Z 0	C 205	CONC.	29.4 ppm	R	Z	C	CONC.
Z 0	C 205	R 206	CONC.	29.7 ppm	Z	C	R	CONC.
U/M uV		MEAN TEST ASSAY		29.5 ppm	U/M uV			MEAN TEST ASSAY

THIS CYLINDER NO. SA 6981
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 05/24/93
EXPIRATION DATE 11/24/94

CERTIFIED CONCENTRATION
PROPANE 29.5 ppm
ZERO AIR BALANCE

ANALYZED BY CERTIFIED BY

ATTACHMENT 2

DATA LOGGER RECORDS

All handwritten
NOTATIONS are
R. Neulicht
11/28/94

Filename:RUN1
Name:RUN1
Date:11-11-1993
Location:BELDON BRICK
Project #:4601-01-05-01
Operator:BG

Dryer

	0
	THC
07:51:2	24.90
07:51:3	24.91
07:51:4	24.90
07:51:5	24.90
07:52:0	24.90
07:52:1	24.89
07:52:1	INIT. ZERO
0 THC	24.89

Zero reading RMN 11/28/94

08:14:4	57.01
08:14:5	57.05
08:15:0	57.16
08:15:1	57.05
08:15:1	INIT. SPAN
0 THC	57.05 90.20

Span reading RMN 11/28/94

Cylinder No. ~~SA5909~~ 5736 RMN (90.2ppm)

08:16	46.96
08:16	61.9
08:17	43.00
08:17	50.8

LINEARITY CHECK PROPANE 50.3 PPM--BG [11-11-1993 -- 08:17:28]

Cylinder No. SA8784 (51.3ppm)
(51.3 value correctly used during calculation of calibration error)

08:18	43.00
08:18	50.8
08:19	43.00
08:19	50.8

THC PASSED AT 50.8 PPM--BG [11-11-1993 -- 08:19:09]
LINEARITY CHECK 29.5 PPM PROPANE--BG [11-11-1993 -- 08:19:44]

Cylinder No. SA 6981 (29.5ppm)

08:20	38.95
08:20	39.4
08:21	35.28
08:21	29.1
08:22	35.27
08:22	29.1
08:23	35.27
08:23	29.1

THC PASSED AT 29.1 PPM--BG [11-11-1993 -- 08:23:39]

08:24	34.78
08:24	27.7
08:25	25.00
08:25	0.3
08:26	24.86
08:26	-0.1
08:27	24.84
08:27	[illegible]

08:28	-0.1
08:29	24.83
08:29	-0.2
08:30	24.81
08:30	-0.2
08:31	24.82
08:31	-0.2
08:32	24.80
08:32	-0.3
08:33	24.82
08:33	-0.2
08:34	24.81
08:34	-0.2
10:26	66.95
10:26	118.0
10:27	55.40
10:27	35.6

10:28	49.11
10:28	67.9
10:29	47.72
10:29	64.0
10:30	46.85
10:30	61.6
10:31	46.32
10:31	60.1
10:32	46.59
10:32	60.9
10:33	47.15
10:33	62.4
10:34	47.67
10:34	63.9
10:35	48.32
10:35	65.7

BEGIN RUN 1--BG [11-11-1993 -- 10:35:56] Dryer Run 1

10:36	48.82	Data Logger Reading
10:36	67.1	ppm
10:37	49.20	
10:37	68.2	
10:38	49.57	
10:38	69.2	
10:39	49.43	
10:39	68.8	
10:40	49.39	
10:40	68.7	
10:41	49.58	
10:41	69.2	
10:42	49.77	
10:42	69.8	
10:43	49.76	
10:43	69.8	

10:44	[illegible]
10:45	50.05
10:45	70.6
10:46	50.45
[illegible]	[illegible]
10:49	50.77
10:49	72.6
10:50	51.21
10:50	73.8
10:51	51.58
10:51	74.9
10:52	52.07
10:52	76.2
10:53	51.78
10:53	75.4
10:54	51.48
10:54	74.6
10:55	50.98
10:55	73.2
10:56	50.65
10:56	72.2
10:57	50.35
10:57	71.4
10:58	49.86
10:58	70.0
10:59	49.20
10:59	68.2
11:00	49.35
11:00	68.6
11:01	49.08
11:01	67.8
11:02	48.68
11:02	66.7
11:03	48.33
11:03	65.8
11:04	48.35
11:04	65.8
11:05	48.12
11:05	65.1
11:06	47.89
11:06	64.5
11:07	47.77
11:07	64.2
11:08	47.64
11:08	63.8
11:09	47.34
11:09	63.0
11:10	47.64
11:10	63.8

11:1[illegible]	
11:12	[illegible]
11:13	46.63
11:13	61.1
11:14	46.60
11:14	60.9
11:15	46.45
11:15	60.5
11:16	46.52
11:16	60.7
11:17	46.37
11:17	60.2
11:18	46.47
11:18	60.5
11:19	46.53
11:19	60.7
11:20	46.47
11:20	60.5
11:21	46.38
11:21	60.3
11:22	46.39
11:22	60.3
11:23	46.22
11:23	59.8
11:24	46.23
11:24	59.9
11:25	46.14
11:25	59.6
11:26	45.95
11:26	59.1
11:27	45.14
11:27	56.8
11:28	44.72
11:28	55.6
11:29	45.14
11:29	56.8
11:30	42.24
11:30	48.7
11:31	42.92
11:31	50.6
11:32	52.25
11:32	76.7
11:33	56.19
11:33	87.8
11:34	55.26
11:34	85.2
11:35	55.56
11:35	86.0

[illegible]	58.79
11:37	95.1
11:38	59.11
[illegible]	[illegible]
11:44	59.08
11:44	95.9
11:45	59.17
11:45	96.2
11:46	58.73
11:46	94.9
11:47	58.70
11:47	94.8
11:48	58.81
11:48	95.1
11:49	58.63
11:49	94.6
11:50	58.41
11:50	94.0
11:51	58.46
11:51	94.1
11:52	58.27
11:52	93.6
11:53	58.72
11:53	94.9
11:54	58.84
11:54	95.2
11:55	58.53
11:55	94.4
11:56	58.55
11:56	94.4
11:57	58.57
11:57	94.5
11:58	58.28
11:58	93.6
11:59	58.83
11:59	95.2
12:00	58.78
12:00	95.1
12:01	59.14
12:01	96.1
12:02	59.15
12:02	96.1
12:03	59.64
12:03	97.5
12:04	59.73
12:04	97.7
12:05	59.64
12:05	97.5
[illegible]	[illegible]

12:07	59.34
12:07	98.0
12:08	59.97
12:08	98.4
12:09	59.83
12:09	98.0
12:10	59.44
12:10	96.9
12:11	58.87
12:11	95.3
12:12	59.12
12:12	96.0
12:13	59.34
12:13	96.6
12:14	59.62
12:14	97.4
12:15	59.07
12:15	95.9
12:16	59.38
12:16	96.7
12:17	59.88
12:17	98.1
12:18	59.68
12:18	97.6
12:19	59.11
12:19	96.0
12:20	59.43
12:2[illegible]	59[illegible]
12:23	59.31
12:23	96.5
12:24	59.71
12:24	97.7
12:25	59.68
12:25	97.6
12:26	59.37
12:26	96.7
12:27	59.42
12:27	96.8
12:28	59.39
12:28	96.8
12:29	59.39
12:29	96.8
12:30	59.48
12:30	97.0
12:31	59.12
12:31	96.0
12:32	58.[illegible]

12:33	[illegible]	
12:33	95.2	
12:34	58.75	
12:34	95.0	

[illegible]UN 1[illegible][11-11-1993 -- 12:37:39]

END RUN 1

12:40	43.05	
12:40	50.9	
12:41:0	25.44	
12:41:1	25.47	
12:41:2	25.42	
12:41:3	24.87	
12:41:4	24.71	
12:41:5	24.66	
12:42:0	24.64	
12:42:1	24.61	
12:42:2	24.76	
12:42:3	25.60	
12:42:4	25.86	
12:42:5	25.95	

12:42:5FINAL ZERO

0 THC	25.95	
12:46:0	58.55	
12:46:1	58.63	
12:46:2	58.50	
12:46:3	58.51	
12:46:4	58.67	
12:46:5	58.55	
12:47:0	57.76	

12:47:0FINAL SPAN

0 THC	57.76	90.20

Filename:RUN2

Name:RUN2

Date:11-11-1993 [illegible] BROOK01

Run 2 dryer

13:11	55.59
13:11	34.0
BEGIN RUN 2--BG [11-11-1993 -- 13:11:13]	
13:12	55.80
13:12	84.6
13:13	55.91
13:13	84.9
13:14	55.93
13:14	85.0
13:15	56.46
13:15	86.5
13:16	56.39
13:16	86.3
13:17	56.28
13:17	86.0
13:18	55.78
13:18	84.6
13:19	55.88
13:19	84.9
13:20	55.94
13:20	85.0
13:21	55.55
13:21	83.9
13:22	55.69
13:22	84.3
13:23	55.60
13:23	84.1
13:24	55.85
13:24	84.8
13:25	56.09
13:25	85.4
13:26	56.25
13:26	85.9
13:27	55.73
13:27	84.4

13:29	55.57
13:29	84.0
13:30	55.63
13:30	84.2
13:31	55.75
13:31	84.5
13:32	55.86
13:32	84.8
13:33	55.58
13:33	84.0
13:34	56.37
13:34	86.2
13:35	56.33
13:35	86.1
13:36	55.99
13:36	85.2
13:37	55.99
13:37	85.2
13:38	56.01
13:38	85.2
13:39	55.73
13:39	84.5
13:40	56.35
13:40	86.2
13:41	56.64
13:41	87.0
13:42	56.40
13:42	86.3
13:43	56.13
13:43	85.6
13:44	55.61
13:44	84.1
13:45	56.39
13:45	86.3
13:46	56.44
13:46	86.5
13:47	55.26
13:47	83.1
13:48	53.67
13:48	78.6
13:49	54.31
13:49	80.4
13:50	56.09
13:50	85.5
13:51	53.50
13:51	78.1
13:52	49.44
13:52	66.6
13:53	48.45
13:53	63.8
13:54	49.87
13:54	67.8

	[illegible]
13:56	52.55
13:56	75.4
13:57	54.98
13:57	82.3
13:58	56.23
13:58	85.9
13:59	55.96
13:59	85.1
14:00	56.29
14:00	86.0
14:01	57.23
14:01	88.7
14:02	57.31
14:02	88.9
14:03	57.24
14:03	88.7
14:04	57.03
14:04	88.1
14:05	56.64
14:05	87.0
14:06	56.85
14:06	87.6
14:07	57.03
14:07	88.1
14:08	57.35
14:08	89.0
14:09	57.20
14:09	88.6
14:10	57.51
14:10	89.5
14:11	57.22
14:11	88.7
14:12	56.86
14:12	87.7
14:13	56.35
14:13	86.2
14:14	56.01
14:14	85.2
14:15	56.22
14:15	85.8
14:16	56.50
14:16	86.6
14:17	56.14
14:17	85.6
14:18	56.05
14:18	85.4
14:19	56.09
14:19	85.5
14:20	55.89
14:20	84.9
14:21	56.04
14:21	85.3
14:22	56.22

[illegible]	[illegible]
14:23	86.0
14:24	55.91
14:24	85.0
14:25	55.72
14:25	84.4
14:26	55.91
14:26	85.0
14:27	56.30
14:27	86.1
14:28	55.94
14:28	85.0
14:29	55.72
14:29	84.4
14:30	55.59
14:30	84.0
14:31	55.75
14:31	84.5
14:32	55.89
14:32	84.9
14:33	56.31
14:33	86.1
14:34	56.13
14:34	85.6
14:35	55.73
14:35	84.4
14:36	55.75
14:36	84.5
14:37	56.40
14:37	86.3
14:38	56.32
14:38	86.1
14:39	56.85
14:39	87.6
14:40	57.30
14:40	88.9
14:41	57.19
14:41	88.6
14:42	56.49
14:42	86.6
14:43	56.60
14:43	86.9
14:44	57.16
14:44	88.5
14:45	57.07
14:45	88.2
14:46	57.26
14:46	88.8
14:47	57.56
14:47	89.6
14:48	57.10
14:48	88.3
14:49	57.19

14:50		
14:51	56.70	
14:51	87.2	
14:52	56.58	
14:52	86.8	
14:53	56.47	
14:53	86.5	
14:54	56.64	
14:54	87.0	
14:55	57.05	
14:55	88.2	
14:56	56.96	
14:56	87.9	
14:57	56.55	
14:57	86.8	
14:58	56.58	
14:58	86.9	
14:59	56.62	
14:59	87.0	
15:00	57.20	
15:00	88.6	
15:01	56.67	
15:01	87.1	
15:02	56.57	
15:02	86.8	
15:03	56.40	
15:03	86.3	
15:04	56.69	
15:04	87.2	
15:05	57.03	
15:05	88.1	
15:06	57.48	
15:06	89.4	
15:07	57.25	
15:07	88.7	
15:08	57.14	
15:08	88.4	
15:09	57.18	
15:09	88.6	
15:10	56.74	
15:10	87.3	
15:11	56.83	
15:11	87.6	END RUN #2 - dryer
15:12	57.12	
15:12	88.4	
15:13	56.65	
15:13	87.0	
15:14	57.00	
15:14	88.0	
15:15	57.37	
15:15	89.1	
15:16	57.57	
15:16	89.7	

[illegible]	88.1	
15:19	56.74	
15:19	87.3	
15:20	57.20	
15:20	88.6	
15:21	57.59	
15:21	89.7	
15:22	57.89	
15:22	90.6	
15:23	57.77	
15:23	90.2	
15:24	57.32	
15:24	88.9	
15:25	56.77	
15:25	87.4	
15:26	56.91	
15:26	87.8	
15:27	57.28	Begin Run 3 — Dryer
15:27	88.8	
15:28	57.45	
15:28	89.3	
15:29	57.53	
15:29	89.5	
15:30	57.30	
15:30	88.9	
15:31	57.88	
15:31	90.5	
15:32	58.09	
15:32	91.1	
15:33	57.17	
15:33	88.5	
15:34	56.85	
15:34	87.6	
15:35	57.10	
15:35	88.3	
15:36	57.57	
15:36	89.7	
15:37	57.70	
15:37	90.0	
15:38	58.07	
15:38	91.1	
15:39	57.73	
15:39	90.1	
15:40	57.51	
15:40	89.5	
15:41	57.27	
15:41	88.8	
15:42	57.88	
15:42	90.5	
15:43	58.44	
15:43	92.1	

15:45	57.27
15:45	88.8
15:46	56.79
15:46	87.4
15:47	57.18
15:47	88.6
15:48	57.02
15:48	88.1
15:49	57.15
15:49	88.5
15:50	57.22
15:50	88.7
15:51	57.03
15:51	88.1
15:52	56.93
15:52	87.8
15:53	57.36
15:53	89.1
15:54	57.31
15:54	88.9
15:55	57.21
15:55	88.6
15:56	57.21
15:56	88.6
15:57	57.19
15:57	88.6
15:58	57.49
15:58	89.4
15:59	57.89
15:59	90.6
16:00	58.03
16:00	90.9
16:01	58.13
16:01	91.3
16:02	58.14
16:02	91.3
16:03	58.09
16:03	91.1
16:04	57.86
16:04	90.5
16:05	57.88
16:05	90.5
16:06	58.03
16:06	91.0
16:07	57.95
16:07	90.7
16:08	57.46
16:08	89.4
16:09	57.86
16:09	90.5
16:10	58.10
16:10	91.2
16:11	49.51

16:12	61.4
16:13	51.46
16:13	72.3
16:14	56.23
16:14	85.9
16:15	55.83
16:15	84.7
16:16	57.74
16:16	90.1
16:17	58.16
16:17	91.3
16:18	58.49
16:18	92.3
16:19	58.48
16:19	92.2
16:20	58.49
16:20	92.3
16:21	58.81
16:21	93.2
16:22	58.82
16:22	93.2
16:23	58.84
16:23	93.3
16:24	58.94
16:24	93.5
16:25	58.93
16:25	93.5
16:26	59.06
16:26	93.9
16:27	59.15
16:27	94.1
16:28	59.26
16:28	94.4
16:29	59.01
16:29	93.7
16:30	58.99
16:30	93.7
16:31	58.98
16:31	93.6
16:32	58.64
16:32	92.7
16:33	58.70
16:33	92.8
16:34	58.88
16:34	93.4
16:35	58.81
16:35	93.2
16:36	58.77
16:36	93.1
16:37	58.81
16:37	93.2
16:38	58.75

[illegible]	
16:40	58.77
16:40	93.1
16:41	58.89
16:41	93.4
16:42	58.73
16:42	92.9
16:43	58.37
16:43	91.9
16:44	58.68
16:44	92.8
16:45	58.89
16:45	93.4
16:46	58.70
16:46	92.8
16:47	58.98
16:47	93.7
16:48	58.96
16:48	93.6
16:49	59.15
16:49	94.1
16:50	58.92
16:50	93.5
16:51	58.70
16:51	92.9
16:52	58.69
16:52	92.8
16:53	58.73
16:53	92.9
16:54	59.20
16:54	94.3
16:55	59.44
16:55	95.0
16:56	59.29
16:56	94.5
16:57	59.53
16:57	95.2
16:58	59.21
16:58	94.3
16:59	59.29
16:59	94.5
17:00	59.30
17:00	94.6
17:01	59.34
17:01	94.7
17:02	59.49
17:02	95.1
17:03	59.29
17:03	94.5
17:04	59.30
17:04	94.6
17:05	59.51
17:05	95.2

17:07	59.51
17:07	95.1
17:08	59.71
17:08	95.7
17:09	59.53
17:09	95.2
17:10	59.33
17:10	94.7
17:11	59.28
17:11	94.5
17:12	59.04
17:12	93.8
17:13	59.08
17:13	93.9
17:14	59.27
17:14	94.5
17:15	59.71
17:15	95.7
17:16	59.90
17:16	96.3
17:17	59.65
17:17	95.5
17:18	59.44
17:18	95.0
17:19	59.48
17:19	95.1
17:20	59.90
17:20	96.3
17:21	59.83
17:21	96.0
17:22	59.63
17:22	95.5
17:23	59.68
17:23	95.6
17:24	59.38
17:24	94.8
17:25	59.08
17:25	93.9
17:26	59.70
17:26	95.7
17:27	59.87
17:27	96.2

END RUN 3--BG [11-11-1993 -- 17:27:19] — End Run 3, dryer

17:28	48.83
17:28	64.9
17:30:1	26.43
17:30:2	26.41
17:30:3	26.42

17:30:3FINAL ZERO

0 THC	26.42
17:32:2	57.74
17:32:3	57.71
17:32:4	57.54
17:32:5	57.57

17:32:5FINAL SPAN

THC Analyzer

- Linearity check
- Response time check

16:30 0.27
16:30 0.04
Filename:prelim
Name:prelim
Date:11-10-1993
Location:SELDON BRICK
Project #:4601-01-05-01
Operator:BG

	0
	THC
16:35:2	0.00
16:35:3	0.00
16:35:4	0.00
16:35:5	0.00
16:36:0	1.20
16:36:1	1.45
16:36:2	2.59
16:36:3	3.71
16:36:4	3.70
16:36:5	3.70
16:36:5	INIT. ZERO
0 THC	3.70
17:01:4	26.91
17:01:5	26.94
17:02:0	26.93
17:02:1	26.91
17:02:2	26.90
17:02:3	26.90
17:02:4	26.89
17:02:5	~~26.87~~
17:03:0	26.88
17:03:0	INIT. ZERO
0 THC	26.88
17:05:1	65.22
17:05:2	65.16
17:05:3	65.29
17:05:4	65.40
17:05:5	65.20
17:05:5	INIT. SPAN
0 THC	65.20 90.20
17:07	~~54.47~~
17:07	64.9
17:08	48.52
17:08	50.9
17:09	48.52
17:09	50.9

LINEARITY ~~CHECK~~ PROPANE 51.3 PPM [11-10-1993 -- 17:09:35]

17:10	48.57
17:10	

... -- 17:10:04]

--	45.63
17:11	44.1
17:12	39.34
17:12	29.3

LINEARITY CHECK 29.5 PPM--BG [11-10-1993 -- 17:12:16]

17:13	39.36
17:13	~~29.4~~

THC PASSED AT 29.5 PPM--BG [11-10-1993 -- 17:13:04]

17:14	42.03
17:14	35.6
17:15	65.29
17:15	90.4
7:16	65.47
7:16	90.8
7:17	65.49
7:17	90.9
7:18	65.56
7:18	91.0
7:19	65.60
7:19	91.1
7:20	65.59
7:20	91.1
7:21	65.66
7:21	91.3
7:22	65.66
7:22	91.3
7:23	65.64
7:23	91.2
17:24	65.54
17:24	91.0
17:25	39.96
17:25	30.8
17:26	62.89
17:26	84.7
17:27	75.36
17:27	114.1
17:28	74.11
17:28	111.2

BEGIN RISE TIME [11-10-1993 -- 17:28:25]

17:29	64.92
17:29	89.5

END RISE TIME [11-10-1993 -- 17:30:00]

17:30	64.73
17:30	89.1

BEGIN FALL TIME [11-10-1993 -- 17:30:18]

~~17:31~~	63.71
17:31	86.7

BIAS CHECK WAS 89.5 PPM--PASS BG [11-10-1993 -- 17:31:01]

~~17:32~~	~~64.25~~
17:32	88.0
17:33	65.40
17:33	90.7

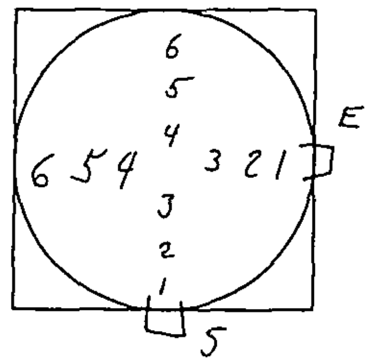
END FALL TIME [11-10-1993 -- 17:33:07]

ATTACHMENT 3

VELOCITY TRAVERSE DATA AND CALCULATIONS

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #1 Date 11/11/93
Plant Belden Brick
Sampling Location Dryer Stack
Operator(s) Edwards and Neil
Barometric Pressure, in. Hg
Site to Barometer Elevation ______ ft.
Corrected Barometric Pressure
Pitot No. ______ Pitot Cp .84
T/C No. ______ Temp. Meter No.
Stack Area, sq.ft.
Static Pressure, in. H_2O
Assumed Moisture, %
Assumed $\%CO_2$ ______ Assumed $\%O_2$
Initial Pitot Leak Check Pass
Final Pitot Leak Check Pass
Comments:



Traverse Point Layout

Start Time 1012 End Time 1020

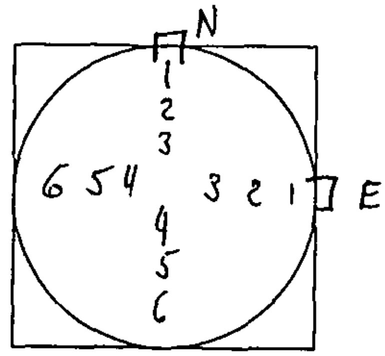
TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E1	0.75			
E2	0.71			
E3	0.74			
E4	0.77			
E5	0.75			
E6	0.52			
S1	~~0.37~~ .60			
S2	~~0.68~~ .66			
S3	~~0.68~~ .69			
S4	~~0.68~~ .68			
S5	0.62			
S6	0.37			

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	

93-3 SEV sur frm 020393

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #2 Date 11/11/93
Plant Belden Brick
Sampling Location Dryer Stack
Operator(s) Edwards + Neil
Barometric Pressure, in. Hg ______
Site to Barometer Elevation ______ ft.
Corrected Barometric Pressure ______
Pitot No. M 5 Pitot Cp .84
T/C No. 48-10 Temp. Meter No. ______
Stack Area, sq.ft. ______
Static Pressure, in. H_2O ______
Assumed Moisture, % ______
Assumed $\%CO_2$ ______ Assumed $\%O_2$ ______
Initial Pitot Leak Check PASS
Final Pitot Leak Check PASS
Comments:



Traverse Point Layout

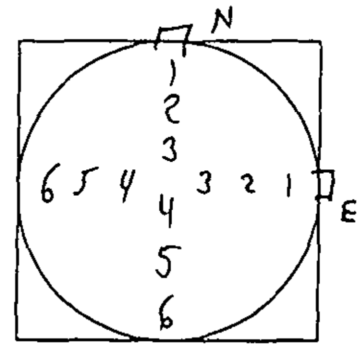
Start Time ______ End Time ______

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E 1	0.78	98		
2	0.76	100		
3	0.78	101		
4	0.84	101		
5	0.72	101		
6	0.42	96		

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
N 1	0.71	99		
2	0.74	100		
3	0.69	100		
4	0.49	101		
5	0.32	100		
6	0.17	99		

VELOCITY TRAVERSE DATA

Project No. 4601-01-05-01
Run No. Traverse #3 Date 11/11/93
Plant Belton Brick
Sampling Location Dryer Stack
Operator(s) Edwards + Neil
Barometric Pressure, in. Hg 29.126
Site to Barometer Elevation — ft.
Corrected Barometric Pressure —
Pitot No. M5 Pitot Cp .84
T/C No. 48-10 Temp. Meter No. ____
Stack Area, sq.ft. ____
Static Pressure, in. H_2O ____
Assumed Moisture, % ____
Assumed $\%CO_2$ ____ Assumed $\%O_2$ ____
Initial Pitot Leak Check PASS
Final Pitot Leak Check PASS
Comments:



Traverse Point Layout

Start Time ____ End Time ____

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
E 1	0.82	99		
2	0.74	100		
3	0.74	100		
4	0.81	100		
5	0.75	99		
6	0.44	98		

TRAVERSE POINT NUMBER	VELOCITY HEAD, Δp in. H_2O	STACK TEMP. °F	ROTATION ANGLE α	
N 1	0.72	100		
2	0.76	100		
3	0.72	100		
4	0.58	100		
5	0.38	99		
6	0.24	99		

FILE NAME - dryve12
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:03

Barometric Pressure (in Hg)=	29.13	
Static Pressure (Inches H2O)=	0.00	
Percent Oxygen=	17.6	
Percent Carbon Dioxide=	2.2	
Percent Water=	4.2	
Average Delta P (in H2O)=	0.618	
Average Stack Temperature (F)=	100	
Dry Molecular Weight=	29.06	
Wet Molecular Weight=	28.59	
Average Square Root of Delta P (in H2O)=	0.7719	
Pitot Coefficient=	0.84	
Stack Axis #1 (Inches)=	~~68.0~~	57.0
Stack Axis #2 (Inches)=	~~68.0~~	57.0
Circular Stack		
Stack Area (Square Feet)=	25.22	17.72
Stack Velocity (Actual, Feet/min)=	2,726	
Flow Rate (Actual, Cubic ft/min)=	~~68,760~~	48,305
Flow rate (Standard, Wet, Cubic ft/min)=	~~63,148~~	44,369
Flow Rate (Standard, Dry, Cubic ft/min)=	~~60,472~~	42,490

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740	
Static Pressure (mm H2O)=	0	
Percent Oxygen=	17.6	
Percent Carbon Dioxide=	2.2	
Percent Water=	4.2	
Average Delta P (mm H2O)=	15.7	
Average Stack Temperature (C)=	38	
Dry Molecular Weight=	29.06	
Wet Molecular Weight=	28.59	
Average Square Root of Delta P (mm H2O)=	3.8902	
Pitot Coefficient=	0.84	
Stack Axis #1 (Meters)=	~~1.727~~	1.448
Stack Axis #2 (Meters)=	~~1.727~~	1.448
Circular Stack		
Stack Area (Square Meters)=	~~2.343~~	1.646
Stack Velocity (Actual, m/min)=	831	
Flow rate (Actual, Cubic m/min)=	~~1,947~~	1368
Flow rate (Standard, Wet, Cubic m/min)=	~~1,788~~	1256
Flow rate (Standard, Dry, Cubic m/min)=	~~1,212~~	1,203

FILE NAME - dryvel2
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:04

Point #	Delta P (in. H2O)	Stack T (F)
1	0.780	98
2	0.760	100
3	0.780	101
4	0.840	101
5	0.720	101
6	0.420	96
7	0.710	99
8	0.740	100
9	0.690	100
10	0.490	101
11	0.320	100
12	0.170	99

FILE NAME - dryverv3
RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	0.00
Percent Oxygen=	17.6
Percent Carbon.Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H2O)=	0.642
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H2O)=	0.7910
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	~~68.0~~ 57.0
Stack Axis #2 (Inches)=	~~68.0~~ 57.0
Circular Stack	
Stack Area (Square Feet)=	~~25.22~~ 17.72
Stack Velocity (Actual, Feet/min)=	2,794
Flow Rate (Actual, Cubic ft/min)=	~~70,452~~ 49502
Flow rate (Standard, Wet, Cubic ft/min)=	~~64,721~~ 45,475
Flow Rate (Standard, Dry, Cubic ft/min)=	~~61,978~~ 43,548

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H2O)=	16.3
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H2O)=	3.9866
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	~~1.727~~ 1.448
Stack Axis #2 (Meters)=	~~1.727~~ 1.448
Circular Stack	
Stack Area (Square Meters)=	~~2.343~~ 1.646
Stack Velocity (Actual, m/min)=	851
Flow rate (Actual, Cubic m/min)=	~~1,995~~ 1,402
Flow rate (Standard, Wet, Cubic m/min)=	~~1,833~~ 1,288
Flow rate (Standard, Dry, Cubic m/min)=	~~1,755~~ 1,233

FILE NAME - dryvel3
RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:09:30

Point #	Delta P (in. H2O)	Stack T (F)
1	0.820	99
2	0.740	100
3	0.740	100
4	0.810	100
5	0.750	99
6	0.440	98
7	0.720	100
8	0.760	100
9	0.720	100
10	0.580	100
11	0.380	99
12	0.240	99

SUMMARY:	Run 1	Run 2	Run 3	Deviation (%)
Velocity,fpm				
Reported	2847	2727	2794	
Combustion Source	2805	2727	2794	
Air	2835	2727	2794	
Flowrate:				
Reported	44365	42487	43545	
Combustion Source	42668	41467	42500	-2.4
Air	46113	44350	45455	4.4

DRYER STACK --FLOWRATE CALCULATIONS

RUN:			1			2			3
DATE:			11/11/93			11/11/93			11/11/93
	DP	T	(DP)^.5	DP	T	(DP)^.5	DP	T	(DP)^.5
	0.75		0.866	0.78	98	0.883	0.82	99	0.906
	0.71		0.843	0.76	100	0.872	0.74	100	0.860
	0.74		0.860	0.78	101	0.883	0.74	100	0.860
	0.77		0.877	0.84	101	0.917	0.81	100	0.900
	0.75		0.866	0.72	101	0.849	0.75	99	0.866
	0.52		0.721	0.42	96	0.648	0.44	98	0.663
	0.6		0.775	0.71	99	0.843	0.72	100	0.849
	0.66		0.812	0.74	100	0.860	0.76	100	0.872
	0.69		0.831	0.69	100	0.831	0.72	100	0.849
	0.68		0.825	0.49	101	0.700	0.58	100	0.762
	0.62		0.787	0.32	100	0.566	0.38	99	0.616
	0.37		0.608	0.17	99	0.412	0.24	99	0.490
	0.655	99.6	0.805956	0.618333	99.7	0.772	0.641667	99.5	0.791
							0.801041		

Calculation of flowrate using Orsat and moisture from Kiln:

	1	2	3
Orsat:			
Oxygen	17.6	17.6	17.6
CO2	2.2	2.2	2.2
nitrogen	80.2	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	29.056	29.056	29.056
Moisture:	4.2	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	28.59165	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2846.619	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	44364.96	42486.96	43545.44

DRYER STACK --FLOWRATE CALCULATIONS

RUN:	1	2	3
DATE:	11/11/93	11/11/93	11/11/93
Calculation of flowrate using typical combustion source:			
Orsat:			
Oxygen	8	17.6	17.6
CO2	12	2.2	2.2
nitrogen	80	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	30.24	29.056	29.056
Moisture: (saturated)	6.5	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	29.4444	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2805.095	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	42668.21	41466.91	42499.99
Calculation of flowrate using air:			
Orsat:			
Oxygen	20.9	17.6	17.6
CO2	0	2.2	2.2
nitrogen	79.1	80.2	80.2
Md=.4440*CO2+.320*O2+.280*N2	28.836	29.056	29.056
Moisture:	0	4.2	4.2
Ms=Md(1-Bws)+18(Bws)	28.836	28.59165	28.59165
Velocity			
Vs=KpCp(DP^.5)(Ts/Ps/Ms)^.5	2834.532	2726.525	2793.619
Pb	29.126		
Ps	0		
Cp	0.84		
Kp	85.49		
Diameter (in)	57		
Area	17.71156		
Flowrate			
Qs=(1-Bws)*Vs*A*Tstd*Ps/Ts/Pstd	46113.35	44349.64	45454.53

ATTACHMENT 4

EXAMPLE CALCULATIONS

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11/28/94

Project Title Belden Brick

Signature R Neulicht Verified by ____ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Summary of ORSAT Results

Date	Run #	Location	CO_2	O_2
11/9	Metals 1	kiln	2.2	17.6
11/10	MM-2	kiln	1.0	18.4
11/10	MM-3	kiln	1.7	17.8
11/9	PH-1	kiln	1.1	17.8
11/10	PH-2	kiln	1.8	18.8

Summary of Moisture Results

Date	Run #	Location	% H_2O
11-09	BH-in 1	BH inlet	1.5
11-09	2	"	1.5
11-09	BH in 3	"	1.5 * Saturated
11-11	BH out 1	BH outlet	1.5
	BH out 2	"	1.5
11-11	PM-1	PM/PM-10 kiln	4.1
11-11	kiln 2	kiln	5.5
11-11	kiln 3	kiln	4.2
11-09	mm5-1	metals kiln	4.4
11-10	mm5-2		4.3
11-10	mm5-3		4.7
11-09	mm5-1	SV kiln	4.3
11-10	-2		4.3
11-10	3		4.8
11-09	HCl-1	HCl kiln	4.4
11-10	-2		4.6
11-10	3		4.7

MRI

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11-28-94

Project Title Belden Brick

Signature R. [illegible] Verified by ______ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Example Calculation - Dryer Stack THC (Run #2)

1. Concentration, ppm, as measured (wet basis)

From Data logger summary, ppm corrected for drift
Run 2 = 85.6 ppm, as propane

2. Concentration, ppm, dry basis

$$\text{ppm dry} = \frac{\text{ppm wet}}{1-\text{Bws}}$$

where Bws = moisture fraction
For Run 2, moisture = 4.2%
= .042

$$\text{ppm dry} = \frac{85.6}{(1-.042)} = \frac{85.6}{0.958}$$

= 89.4 ppm dry, as propane

3. Concentration, ppm, as methane

ppm as methane = (ppm as propane) x (3)
= 89.4 x 3
= 268

MRI

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4601-01 Date/Time 11-28-94

Project Title Belden Brick

Signature R. Neulicht Verified by ______ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

4. Pound Methane per hour

$$lb/hr = lb/dscf \times dscf/min \times 60\ min/hr$$

$$= \left[ppm\,(dry) \times MW\left(\frac{lb}{lb\text{-}mole}\right) \times \frac{lb\text{-}mole}{385\ ft^3/lb\text{-}mole} \times 10^{-6} \right] \times \frac{dscf}{min} \times 60$$

(NOTE: $385\ \frac{ft^3}{mole}$ @ 68°F)

$$= \left[268 \times 16 \times \frac{1}{385} \times 10^{-6} \right] \frac{lb}{dscf} \times 42{,}490\ \frac{dscf}{min} \times 60\ \frac{min}{hr}$$

$$= 28.3\ lb/hr \text{ as methane}$$

5. Emission Factor : lb methane / Ton product

$$\frac{lb\ methane}{Ton\ product} = lb/hr\ methane \div \frac{Ton\ product}{hr}$$

$$= 28.3\ \frac{lb}{hr} \div 3.7\ \frac{Ton}{hr}$$

$$= 7.7\ lb/Ton\ product$$

MRI

Rick — Please w/ Corrections
Necessary for final Report.

Corrected
11/2004

7/27 Report

TABLE 3-25. DRYER EMISSION TESTS RESULTS--
THC, METHANE AND ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, C	38	38	38	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, m/min	841	831	852	
Flowrate, ACM/min	1,385	1,368	1,402	
Flowrate, DSCM/min	1,204	1,203	1,205	
CONCENTRATION, ppm				Average
THC, as propane (b)	83.7	89.4	95.9	89.7
THC, as methane (b)	251	268	288	269
Methane (c)	106	95.0	111	104.0
Ethane (c)	9.6	7.0	7.9	8.2

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings; corrected to dry basis.
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively; corrected to dry basis.

TABLE 3-25. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, F	100	100	100	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, ft/min	2,760	2,726	2,794	
Flowrate, ACFM	48,904	48,305	49,502	
Flowrate, DSCFM	42,519	42,490	42,548	
CONCENTRATION, ppm				Average
THC, as propane (b)	83.7	89.4	95.9	89.7
THC, as methane (b)	251	268	288	269
Methane (c)	106	95	111	104
Ethane (c)	10	7.0	7.9	8.2

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings; corrected to dry basis.
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively; corrected to dry basis.

44364 = See Report Calculations

43,548

Will need to get K to Run A Computer Printout for Run 1

7/27 Report

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (METRIC)

Analyte	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
	1 (b)	2	3	Average	1 (b)	2	3	Average
THC, as methane	12	13	14	13	3.8	4.1	4.4	4.1
methane	5.1	4.6	5.3	5.0	1.6	1.4	1.7	1.6
ethane	0.87	0.63	0.72	0.74	0.27	0.20	0.23	0.23

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour
(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

3.36

Recalculate

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (ENGLISH)

Analyte	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
	1 (b)	2	3	Average	1 (b)	2	3	Average
THC, as methane	27	28	31	29	7.7	8.2	8.8	8.2
methane	11	10	12	11	3.2	2.9	3.4	3.2
ethane	1.9	1.4	1.6	1.6	0.55	0.40	0.45	0.47

(a) Emission factors based on process rate of 3.48 tons of brick produced per hour
(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

3.70

Recalculate

7/27 report

TABLE 3-12. SUMMARY OF PROCESS RATES FOR GRINDING/SCREENING OPERATION

Description		
Date	11/9/93	11/11/93
Start time	7:52	7:30
Finish time	12:14	11:30
No. of measurements	17	17
Minimum process rate, Mg/hr (ton/hr)	37.9 (41.7)	36.0 (39.6)
Maximum process rate, Mg/hr (ton/hr)	41.2 (45.3)	41.1 (45.2)
Average process rate, Mg/hr (ton/hr)	39.2 (43.1)	38.5 (42.3)

TABLE 3-13. SUMMARY OF DRYER PROCESS DATA

Date	Inlet temperature, °C (°F)	Outlet temperature, °C (°F)	Average feed rate, Mg/hr (ton/hr)	Average production rate, Mg/hr (ton/hr)
11/9/93	35 (95)	132 (269)	3.93 (4.33)	3.36 (3.70)
11/10/93	37.7 (100)	129 (265)	3.93 (4.33)	3.36 (3.70)
11/11/93	37.3 (100)	134 (274)	3.93 (4.33)	3.36 (3.70)

TABLE 3-14. SUMMARY OF KILN PROCESS DATA

Date	Inlet temperature, °C (°F)	Peak temperature, °C (°F)	Average feed rate, Mg/hr (ton/hr)	Average production rate, Mg/hr (ton/hr)	Gas consumption rate, m^3/hr (ft^3/hr)
11/9/93	41.1 (106)	1116 (2040)	3.36 (3.70)	3.16 (3.48)	272 (9,607)
11/10/93	51.1 (124)	1116 (2040)	3.36 (3.70)	3.16 (3.48)	269 (9,500)
11/11/93	60.0 (140)	1111 (2031)	3.36 (3.70)	3.16 (3.48)	258 (9,120)

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

November 11, 1994

To: Dennis Hooton

From: Rick Marinshaw

Subject: Belden Brick Emission Test--VOST Results

Enclosed is a copy of the analytical results for the VOST runs at Belden Brick and the revised table that presents the data in the report. If you recall, there was a problem with the footnotes for the VOST data in the draft report. I have revised the footnotes to be consistent with the comments made in the analytical report tables. I would appreciate if you could do the following:

1. Review the footnotes in the revised table (Table 3-19) and let me know if they are acceptable.

2. Comment on Margie's footnote No. 3 for Sample No. 1069. The footnote seems to pertain to chloroethane, yet it is iodomethane that is footnoted. Do you think the footnote is correct? Should we footnote the table in the test report accordingly? Note that iodomethane was detected at a high level in the first tenax sample, but was not detected in the tenax samples for the other two runs.

3. For which of the footnoted compounds should we not report the emission rates and emission factors? Or should we report the emission rates and factors for all of those compounds but footnote the emission rate/factor table in the report?

4. Regarding EMB's comment on the wide run-to-run range for 2-hexanone, the T/C sample in the first run (2.64 ng) is only slightly higher than the detection limit (1.78 ng); in the other two runs it was not detected in the T/C samples but was at relatively high levels in the Tnx samples. Should we consider the first run as a non-detect?

We would like to finalize this report soon. Please give Roy or me a call if you have any questions about what needs to be done to finalize it.

Thank you.

cc: Roy Neulicht

TABLE 3-3. SUMMARY OF GRINDING/SCREENING EMISSION RATES AND EMISSION FACTORS--FILTERABLE PM AND PM-10
(METRIC UNITS)

Source/analyte	Mass emission rate, kg/hr				Emission factor, kg/Mg material processed (a)			
	Run				Run			
	1	2	3	Average	1	2	3	Average
FABRIC FILTER INLET								
Filterable PM-10	11	11	10	10	0.27	0.27	0.26	0.27
Filterable PM	107	186	206	166	2.7	4.7	5.3	4.2
FABRIC FILTER OUTLET								
Filterable PM-10	0.024	0.020	(b)	0.022	0.00062	0.00053	(b)	0.00057
Filterable PM	0.12	0.082	(b)	0.10	0.0030	0.0021	(b)	0.0026
FABRIC FILTER HOPPER CATCH								
Total PM	305	343	(b)	324	7.8	8.9	(b)	8.3

(a) Emission factors based on average process rates of 39.2 Mg/hr (11/9/93) and 38.5 Mg/hr (11/11/92).
(b) Only two runs conducted.

TABLE 3-3. SUMMARY OF GRINDING/SCREENING EMISSION RATES AND EMISSION FACTORS--FILTERABLE PM AND PM-10
(ENGLISH UNITS)

Source/analyte	Mass emission rate, lb/hr				Emission factor, lb/ton material processed (a)			
	Run				Run			
	1	2	3	Average	1	2	3	Average
FABRIC FILTER INLET								
Filterable PM-10	24	23	22	23	0.55	0.54	0.51	0.53
Filterable PM	234	409	453	365	5.4	9.5	10.5	8.5
FABRIC FILTER OUTLET								
Filterable PM-10	0.053	0.045	(b)	0.049	0.0012	0.0011	(b)	0.0011
Filterable PM	0.26	0.18	(b)	0.22	0.0061	0.0043	(b)	0.0052
FABRIC FILTER HOPPER CATCH								
Total PM	672	754	(b)	713	16	18	(b)	17

(a) Emission factors based on average process rates of 43.1 ton/hr (11/9/93) and 42.3 ton/hr (11/11/92).
(b) Only two runs conducted.

TABLE 3-5. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--METALS (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
Cadmium (c)	5.1E-05	9.0E-05	1.6E-05	5.2E-05	1.6E-05	2.8E-05	5.2E-06	1.7E-05
Chromium	0.0055	0.024	0.0063	0.012	0.0017	0.0075	0.0020	0.0038
Cobalt (c)	8.3E-05	0.00031	0.00013	0.00018	2.6E-05	9.8E-05	4.2E-05	5.5E-05
Mercury	0.00027	0.00011	0.00036	0.00024	8.5E-05	3.5E-05	0.00011	7.8E-05
Manganese	0.00067	0.00200	0.00077	0.00115	0.00021	0.00063	0.00024	0.00036
Nickel	0.0027	0.013	0.0043	0.0067	0.00085	0.0041	0.0014	0.0021
Lead (c)	0.00015	0.00010	0.00012	0.00012	4.9E-05	3.2E-05	3.7E-05	3.9E-05
Antimony (c)	4.3E-05	2.2E-05	4.0E-05	3.5E-05	1.4E-05	6.9E-06	1.3E-05	1.1E-05
Selenium (c)	0.00049	0.00043	0.00081	0.00058	0.00016	0.00013	0.00026	0.00018

(a) Arsenic and beryllium not detected.
(b) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.
(c) Background corrections represent a significant portion of total amounts measured.

TABLE 3-5. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--METALS (ENGLISH UNITS)

	Emission rate, lb/hr				*Emission factor, lb/ton bricks produced (b)*			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
Cadmium (c)	0.00011	0.00020	3.6E-05	0.00012	3.2E-05	5.7E-05	1.0E-05	3.3E-05
Chromium	0.012	0.052	0.014	0.026	0.0035	0.0151	0.0040	0.0075
Cobalt (c)	0.00018	0.00069	0.00029	0.00039	5.2E-05	0.00020	8.4E-05	0.00011
Mercury	0.00059	0.00024	0.00078	0.00054	0.00017	7.0E-05	0.00023	0.00016
Manganese	0.0015	0.0044	0.0017	0.0025	0.00043	0.0013	0.00049	0.00073
Nickel	0.0059	0.029	0.0095	0.015	0.0017	0.0082	0.0027	0.0042
Lead (c)	0.00034	0.00022	0.00026	0.00027	9.8E-05	6.3E-05	7.5E-05	7.9E-05
Antimony (c)	9.5E-05	4.8E-05	8.8E-05	7.7E-05	2.7E-05	1.4E-05	2.5E-05	2.2E-05
Selenium (c)	0.0011	0.00094	0.0018	0.0013	0.00031	0.00027	0.00051	0.00036

(a) Arsenic and beryllium not detected.
(b) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.
(c) Background corrections represent a significant portion of total amounts measured.

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)				
	Run				Run				
Analyte	1	2	3	Ave.	1	2	3	Ave.	
Chloroethane	1.8E-03	3.1E-6 ND ✓	6.1E-04	9.0 ~~8.2E-04~~	5.8E-04	9.8E-7 ND ✓	1.9E-04	2.6E-04	2.8E-04
Methylene chloride	9.0E-06	1.5E-05	2.2E-06	8.8E-06	2.8E-06	4.8E-06	7.1E-07	2.8E-06	
Acetone	1.6E-03	2.1E-03	4.2E-03	2.6E-03	5.1E-04	6.5E-04	1.3E-03	8.3E-04	
Carbon disulfide	6.8E-05	8.3E-05	4.2E-05	6.5E-05	2.2E-05	2.6E-05	1.3E-05	2.0E-05	
2-Butanone	1.5E-04	3.5E-04	5.6E-04	3.5E-04	4.9E-05	1.1E-04	1.8E-04	1.1E-04	
1,1,1-Trichloroethane	1.2E-05	6.6E-7 ND	8.1E-06	7.3 ~~6.5E-06~~	3.7E-06	2.1E-7 ND	2.6E-06	2.1E-06	2.3E-6
Benzene	4.1E-03	7.1E-03	1.9E-03	4.4E-03	1.3E-03	2.2E-03	6.2E-04	1.4E-03	
?→ 4-Methyl-2-Pentanone	ND	5.5E-05	7.6E-06	2.1E-05	ND	1.7E-05	2.4E-06	6.6E-06	
2-Hexanone	4.3E-06	2.4E-04	1.6E-04	1.4E-04	1.4E-06	7.6E-05	5.1E-05	4.3E-05	
Tetrachloroethene	3.3E-6 ~~ND~~	5.9E-06	6.5E-06	5.3 ~~4.1E-06~~	1.0E-6 ~~ND~~	1.9E-06	2.0E-06	1.6 ~~1.3E-06~~	
Toluene	1.7E-04	2.6E-04	2.9E-04	2.4E-04	5.3E-05	8.2E-05	9.2E-05	7.6E-05	
Ethylbenzene	5.0E-05	6.7E-05	8.6E-05	6.8E-05	1.6E-05	2.1E-05	2.7E-05	2.1E-05	
Styrene	1.6E-05	7.5E-05	4.1E-06	3.2E-05	5.0E-06	2.4E-05	1.3E-06	1.0E-05	
m-/p-Xylene	7.6E-05	1.1E-04	1.3E-04	1.0E-04	2.4E-05	3.3E-05	4.0E-05	3.3E-05	
o-Xylene	6.5E-05	9.5E-05	1.1E-04	9.0E-05	2.1E-05	3.0E-05	3.5E-05	2.8E-05	
?→ 1,2-Dbromo-3-chloropropane	ND	1.9E-04	3.3E-05	7.4E-05	ND	6.0E-05	1.1E-05	2.4E-05	

ND = not detected

(a) Based on process rate of 3.16 Mg bricks per hour.

for 1,2- . . . . . .

Run 1 ND

Run 2 Tenax - 116.513 ng
Charcoal - ND

Run 3 Tenax - ND
Charcoal - 20.215 ng

Same type of problem for
4-methyl-2-pentanone

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run			Run	Run			
Analyte	1	2	3	Ave.	1	2	3	Ave.
Chloroethane	4.1E-03	6.8 E-6 ~~ND~~	1.3E-03	2.0 ~~1.8~~E-03	1.2E-03	2.0 E-6 ~~ND~~	3.8E-04	5.7 ~~5.2~~E-04
Methylene chloride	2.0E-05	3.3E-05	4.9E-06	1.9E-05	5.7E-06	9.6E-06	1.4E-06	5.6E-06
Acetone	3.6E-03	4.5E-03	9.2E-03	5.8E-03	1.0E-03	1.3E-03	2.6E-03	1.7E-03
Carbon disulfide	1.5E-04	1.8E-04	9.2E-05	1.4E-04	4.3E-05	5.3E-05	2.7E-05	4.1E-05
2-Butanone	3.4E-04	7.8E-04	1.2E-03	7.8E-04	9.7E-05	2.2E-04	3.5E-04	2.2E-04
1,1,1-Trichloroethane	2.5E-05	5.6 E-6 ~~ND~~	1.8E-05	1.6 ~~1.4~~E-05	7.3E-06	4.2E-7 ~~ND~~	5.1E-06	4.6 ~~4.1~~E-06
Benzene	9.0E-03	1.6E-02	4.3E-03	9.6E-03	2.6E-03	4.5E-03	1.2E-03	2.8E-03
? 4-Methyl-2-Pentanone	ND	1.2E-04	1.7E-05	4.6E-05	ND	3.5E-05	4.8E-06	1.3E-05
2-Hexanone	9.5E-06	5.3E-04	3.6E-04	3.0E-04	2.7E-06	1.5E-04	1.0E-04	8.6E-05
Tetrachloroethene	7.2E-6 ~~ND~~	1.3E-05	1.4E-05	1.1 ~~9.1~~E-0~~6~~5	2.1 E-6 ~~ND~~	3.8E-06	4.1E-06	3.3 ~~2.6~~E-06
Toluene	3.7E-04	5.7E-04	6.4E-04	5.3E-04	1.1E-04	1.6E-04	1.8E-04	1.5E-04
Ethylbenzene	1.1E-04	1.5E-04	1.9E-04	1.5E-04	3.1E-05	4.2E-05	5.5E-05	4.3E-05
Styrene	3.5E-05	1.7E-04	9.0E-06	7.0E-05	9.9E-06	4.8E-05	2.6E-06	2.0E-05
m-/p-Xylene	1.7E-04	2.3E-04	2.8E-04	2.3E-04	4.8E-05	6.7E-05	8.0E-05	6.5E-05
o-Xylene	1.4E-04	2.1E-04	2.4E-04	2.0E-04	4.1E-05	6.0E-05	6.9E-05	5.7E-05
? 1,2-Dbromo-3-chloropropane	ND	4.2E-04	7.3E-05	1.6E-04	ND	1.2E-04	2.1E-05	4.7E-05

ND = not detected.

(a) Based on process rate of 3.48 ton bricks per hour.

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SEMI-VOLATILES (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	1.6E-04	1.5E-04	1.0E-04	1.4E-04	5.0E-05	4.8E-05	3.1E-05	4.3E-05
1,4-Dichlorobenzene	5.8E-05	5.7E-05	1.1E-04	7.5E-05	1.8E-05	1.8E-05	3.5E-05	2.4E-05
Naphthalene (b)	7.3E-05	1.4E-04	9.7E-05	1.0E-04	2.3E-05	4.4E-05	3.1E-05	3.3E-05
2-Methylnaphthalene	5.8E-05	1.3E-04	8.5E-05	9.0E-05	1.8E-05	4.0E-05	2.7E-05	2.8E-05
Diethyl phthalate	6.4E-04	2.7E-04	2.1E-04	3.7E-04	2.0E-04	8.4E-05	6.5E-05	1.2E-04
Di-n-butyl phthalate	1.6E-04	1.6E-04	3.5E-04	2.2E-04	5.0E-05	5.1E-05	1.1E-04	7.1E-05
Butylbenzyl phthalate	2.4E-05	2.5E-05	3.4E-05	2.8E-05	7.7E-06	8.0E-06	1.1E-05	8.9E-06
Bis(2-ethylhexyl) phthalate (c)	9.3E-04	2.8E-03	5.8E-03	3.2E-03	3.0E-04	8.8E-04	1.8E-03	1.0E-03

(a) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.
(b) Naphthalene found in method blank at 25 to 50 percent of sample level.
(c) Bis(2-ethylhexyl) phthalate found in method blank at 3 to 22 percent of sample level.

TABLE 3-7. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SEMI-VOLATILES (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Phenol	3.5E-04	3.3E-04	2.2E-04	3.0E-04	1.0E-04	9.5E-05	6.3E-05	8.6E-05
1,4-Dichlorobenzene	1.3E-04	1.2E-04	2.4E-04	1.7E-04	3.7E-05	3.6E-05	7.0E-05	4.8E-05
Naphthalene (b)	1.6E-04	3.1E-04	2.1E-04	2.3E-04	4.6E-05	8.8E-05	6.2E-05	6.5E-05
2-Methylnaphthalene	1.3E-04	2.8E-04	1.9E-04	2.0E-04	3.7E-05	8.0E-05	5.4E-05	5.7E-05
Diethyl phthalate	1.4E-03	5.9E-04	4.5E-04	8.2E-04	4.1E-04	1.7E-04	1.3E-04	2.4E-04
Di-n-butyl phthalate	3.5E-04	3.6E-04	7.8E-04	5.0E-04	1.0E-04	1.0E-04	2.2E-04	1.4E-04
Butylbenzyl phthalate	5.3E-05	5.6E-05	7.6E-05	6.2E-05	1.5E-05	1.6E-05	2.2E-05	1.8E-05
Bis(2-ethylhexyl) phthalate (c)	2.1E-03	6.1E-03	1.3E-02	7.0E-03	5.9E-04	1.8E-03	3.7E-03	2.0E-03

(a) Emission factors based on process rate of 3.48 ton of bricks produced per hour.
(b) Naphthalene found in method blank at 25 to 50 percent of sample level.
(c) Bis(2-ethylhexyl) phthalate found in method blank at 3 to 22 percent of sample level.

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	3.9	5.2	5.2	4.8	1.2	1.7	1.7	1.5
NOx	1.1	1.6	1.6	1.4	0.35	0.51	0.50	0.45
CO	1.9	1.9	1.6	1.8	0.61	0.59	0.51	0.57
CO2	1,300	1,200	1,100	1,200	410	380	350	380
THC, as methane	0.15	0.079	0.16	0.13	0.046	0.025	0.051	0.041
Methane	0.17	0.12	0.11	0.13	0.053	0.037	0.036	0.042

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.

CO2 numbers revised on next page!

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	8.5	11.5	11.5	10.5	2.4	3.3	3.3	3.0
NOx	2.5	3.5	3.5	3.2	0.71	1.01	1.00	0.91
CO	4.2	4.1	3.6	4.0	1.2	1.2	1.0	1.1
CO2	2,900	2,700	2,500	2,700	830	780	720	780
THC, as methane	0.32	0.17	0.35	0.28	0.093	0.050	0.10	0.081
Methane	0.37	0.25	0.25	0.29	0.11	0.073	0.072	0.084

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.48 tons of bricks produced per hour.

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	3.9	5.2	5.2	4.8	1.2	1.7	1.7	1.5
NOx	1.1	1.6	1.6	1.4	0.35	0.51	0.50	0.45
CO	1.9	1.9	1.6	1.8	0.61	0.59	0.51	0.57
CO2	1,320	1,200	1,150	1,220	420	380	360	390
THC, as methane	0.15	0.079	0.16	0.13	0.046	0.025	0.051	0.041
Methane	0.17	0.12	0.11	0.13	0.053	0.037	0.036	0.042

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	8.5	11.5	11.5	10.5	2.4	3.3	3.3	3.0
NOx	2.5	3.5	3.5	3.2	0.71	1.01	1.00	0.91
CO	4.2	4.1	3.6	4.0	1.2	1.2	1.0	1.1
CO2	2,900	2,650	2,520	2,690	830	760	720	770
THC, as methane	0.32	0.17	0.35	0.28	0.093	0.050	0.10	0.081
Methane	0.37	0.25	0.25	0.29	0.11	0.073	0.072	0.084

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.48 tons of bricks produced per hour.

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (METRIC UNITS)

Analyte	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
	1	2	3	Average	1	2	3	Average
Filterable PM (b)	0.73	0.54	0.69	0.66	0.23	0.17	0.22	0.21
Filterable PM (c)	0.67	.50 0.42	1.03 1.1	0.73	0.21	0.16 ~~0.13~~	0.33 ~~0.34~~	0.23
Filterable PM (d)	0.56	0.52	0.35	0.48	0.18	0.16	0.11	0.15
Filterable PM-10	0.10	0.40	0.13	0.21	0.033	0.13	0.041	0.067
Cond. inorganic PM	5.2	5.0	4.5	4.9	1.7	1.6	1.4	1.6
Cond. organic PM	1.7	0.42	0.29	0.81	0.54	0.13	0.092	0.26
Total cond. PM	7.0	5.5	4.8	5.7	2.2	1.7	1.5	1.8

(a) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

Changed B$76 to C$76 (RUN 2) and D$76 (RUN 3)

Something wrong w/Run 2 + 3 efs. and emission rates

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (ENGLISH UNITS)

Analyte	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run				Run			
	1	2	3	Average	1	2	3	Average
Filterable PM (b)	1.6	1.2	1.5	1.4	0.46	0.35	0.44	0.42
Filterable PM (c)	1.5	1.1	2.3	1.6	0.43	0.32	0.65	0.47
Filterable PM (d)	1.2	1.1	0.8	1.1	0.35	0.33	0.23	0.30
Filterable PM-10	0.23	0.89	0.29	0.47	0.066	0.26	0.083	0.13
Cond. inorganic PM	12	11	10.0	11	3.3	3.2	2.9	3.1
Cond. organic PM	3.8	0.93	0.64	1.8	1.1	0.27	0.18	0.51
Total cond. PM	15	12	11	13	4.4	3.5	3.0	3.6

(a) Emission factors based on process rate of 3.48 ton of bricks produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

Updated Table 3-9 on next page!

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	0.73	0.54	0.69	0.66	0.23	0.17	0.22	0.21
Filterable PM (c)	0.67	0.50	1.03	0.74	0.21	0.16	0.33	0.23
Filterable PM (d)	0.56	0.52	0.35	0.48	0.18	0.16	0.11	0.15
Filterable PM-10	0.10	0.40	0.13	0.21	0.033	0.13	0.041	0.067
Cond. inorganic PM	5.2	5.0	4.5	4.9	1.7	1.6	1.4	1.6
Cond. organic PM	1.7	0.42	0.29	0.81	0.54	0.13	0.092	0.26
Total cond. PM	7.0	5.5	4.8	5.7	2.2	1.7	1.5	1.8

(a) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

TABLE 3-9. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--PM, PM-10 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
Filterable PM (b)	1.6	1.2	1.5	1.4	0.46	0.35	0.44	0.42
Filterable PM (c)	1.4830	1.1087	2.2780	1.6232	0.43	0.32	0.65	0.47
Filterable PM (d)	1.2	1.1	0.8	1.1	0.35	0.33	0.23	0.30
Filterable PM-10	0.23	0.89	0.29	0.47	0.066	0.26	0.083	0.13
Cond. inorganic PM	12	11	10.0	11	3.3	3.2	2.9	3.1
Cond. organic PM	3.8	0.93	0.64	1.8	1.1	0.27	0.18	0.51
Total cond. PM	15	12	11	13	4.4	3.5	3.0	3.6

(a) Emission factors based on process rate of 3.48 ton of bricks produced per hour.
(b) Measured simultaneously with Method 26A (HF, HCl) train.
(c) Measured simultaneously with Method 29 (metals) train.
(d) Based on Method 201A train.

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	0.47	0.50	0.43	0.47	0.15	0.16	0.14	0.15
HCl	0.031	0.028	0.027	0.029	0.010	0.0089	0.0084	0.0091
Cl2	0.0019	0.0025	0.0020	0.00211	0.00060	0.00079	0.00062	0.00067

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour.

TABLE 3-10. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--HF, HCl, CL2 (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Average	1	2	3	Average
HF	1.0	1.1	1.0	1.0	0.30	0.32	0.27	0.30
HCl	0.069	0.062	0.059	0.063	0.020	0.018	0.017	0.018
Cl2	0.0042	0.0055	0.0043	0.0047	0.0012	0.0016	0.0012	0.0013

(a) Emission factors based on process rate of 3.48 tons of brick produced per hour.

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (METRIC)

	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
Analyte	1	2	3	Average	1 (b)	2	3	Average
THC, as methane	13	13	14	13	4.0	4.1	4.5	4.2
methane	5.4	4.6	5.5	5.1	1.7	1.4	1.7	1.6
ethane	0.91	0.63	0.73	0.76	0.29	0.20	0.23	0.24

(a) Emission factors based on process rate of 3.36 Mg of bricks dried per hour.

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (ENGLISH)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1	2	3	Average	1 (b)	2	3	Average
THC, as methane	28	28	31	29	8.0	8.2	9.0	8.4
methane	12	10	12	11	3.4	2.9	3.5	3.2
ethane	2.0	1.4	1.6	1.7	0.57	0.40	0.46	0.48

(a) Emission factors based on process rate of 3.70 tons of bricks dried per hour.

TABLE 3-15. GRINDING/SCREENING AMBIENT PM-10 MEASUREMENTS (METRIC UNITS)

Inside building

Run No.	1	2
Date	11/09/93	11/09/93
Start time	10:42	12:50
Finish time	12:45	14:50
Sample time, min	120	120
Flow rate, ACM/min	1.186	1.188
Flow rate, DSCM/min	1.198	1.196
Mass collected, mg	321	448
Concentration, g/DSCM	0.00223	0.00312

Outside (East)

Run No.	1	2	3
Date	11/09/93	11/11/93	11/11/93
Start time	12:00	8:00	10:45
Finish time	14:00	10:00	12:45
Sample time, min	120	120	120
Flow rate, ACM/min	1.169	1.186	1.188
Flow rate, DSCM/min	1.173	1.198	1.196
Mass collected, mg	8.5	16.2	9.8
Concentration, g/DSCM	6.04E-05	0.000113	6.83E-05

Outside (West)

Run No.	1	2
Date	11/11/93	11/11/93
Start time	9:45	12:30
Finish time	11:45	14:30
Sample time, min	120	120
Flow rate, ACM/min	1.186	1.188
Flow rate, DSCM/min	1.198	1.196
Mass collected, mg	30.1	26.3
Concentration, g/DSCM	0.000209	0.000183

TABLE 3-15. (ENGLISH UNITS)

Inside building

Run No.	1	2
Date	11/09/93	11/09/93
Start time	10:42	12:50
Finish time	12:45	14:50
Sample time, min	120	120
Flow rate, ACFM	41.87	41.94
Flow rate, DSCFM	42.32	42.23
Mass collected, gr	4.9537	6.9135
Concentration, gr/DSCF	0.000975	0.00136

Outside (East)

Run No.	1	2	3
Date	11/09/93	11/11/93	11/11/93
Start time	12:00	8:00	10:45
Finish time	14:00	10:00	12:45
Sample time, min	120	120	120
Flow rate, ACFM	41.30	41.87	41.94
Flow rate, DSCFM	41.42	42.32	42.23
Mass collected, gr	0.1312	0.2500	0.1512
Concentration, gr/DSCF	2.64E-05	4.92E-05	2.98E-05

Outside (West)

Run No.	1	2
Date	11/11/93	11/11/93
Start time	9:45	12:30
Finish time	11:45	14:30
Sample time, min	120	120
Flow rate, ACFM	41.87	41.94
Flow rate, DSCFM	42.32	42.23
Mass collected, gr	0.4645	0.4059
Concentration, gr/DSCF	9.15E-05	8.01E-05

TABLE 3-16. GRINDING/SCREENING EMISSION TESTS RESULTS--
FABRIC FILTER INLET FILTERABLE PM, PM-10 (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/09/93	11/11/93
Start time	9:30	13:40	7:55
Finish time	11:21	14:40	8:55
Sample time, min	111	60	60
% isokinetic	94.5	97	97.8
Sample volume, ACM	1.497	0.785	0.774
Sample volume, DSCM	1.498	0.765	0.778
GAS PARAMETERS			
Gas temperature, C	15	18	13
Oxygen, %	21	21	21
Carbon dioxide, %	0	0	0
Moisture, %	1.5	1.5	1.5
Velocity, M/min	905	909	902
Flowrate, ACM/min	593.9	596.5	591.8
Flowrate, DSCM/min	578.8	576.3	580.9
FILTERABLE PM-10			
Mass collected, g	0.4604	0.234	0.2242
Concentration, g/DSCM	0.307	0.306	0.288
FILTERABLE PM			
Mass collected, g	4.5862	4.1066	4.5845
Concentration, g/DSCM	3.061	5.366	5.895

TABLE 3-16. (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/09/93	11/11/93
Start time	9:30	13:40	7:55
Finish time	11:21	14:40	8:55
Sample time, min	111	60	60
% isokinetic	94.5	97.0	97.8
Sample volume, ACF	52.878	27.738	27.347
Sample volume, DSCF	52.915	27.028	27.464
GAS PARAMETERS			
Gas temperature, F	59	64	55
Oxygen, %	21	21	21
Carbon dioxide, %	0	0	0
Moisture, %	1.5	1.5	1.5
Velocity, ft/min	2,967	2,980	2,957
Flowrate, ACFM	20,974	21,065	20,899
Flowrate, DSCFM	20,439	20,351	20,513
FILTERABLE PM-10			
Mass collected, gr	7.10	3.61	3.46
Concentration, gr/DSCF	0.134	0.134	0.126
FILTERABLE PM			
Mass collected, gr	70.8	63.4	70.7
Concentration, gr/DSCF	1.34	2.34	2.58

TABLE 3-17. GRINDING/SCREENING EMISSION TESTS RESULTS--
FABRIC FILTER OUTLET FILTERABLE PM, PM-10 (METRIC UNITS)

Run No.	1	2
Date	11/09/93	11/11/93
Start time	8:38	7:27
Finish time	14:46	14:27
Sample time, min	350	420
% isokinetic	92.1	91.1
Sample volume, ACM	5.153	6.057
Sample volume, DSCM	4.968	5.849
GAS PARAMETERS		
Gas temperature, C	14	13
Oxygen, %	21	21
Carbon dioxide, %	0	0
Moisture, %	1.5	1.5
Velocity, m/min	1,455	1,438
Flowrate, ACM/min	755	746
Flowrate, DSCM/min	740	734
FILTERABLE PM-10		
Mass collected, g	0.0027	0.0027
Concentration, g/DSCM	0.00054	0.00046
FILTERABLE PM		
Mass collected, g	0.0133	0.0109
Concentration, g/DSCM	0.00268	0.00186

TABLE 3-17. (ENGLISH UNITS)

Run No.	1	2
Date	11/09/93	11/11/93
Start time	8:38	7:27
Finish time	14:46	14:27
Sample time, min	350	420
% isokinetic	92.1	91.1
Sample volume, ACF	181.97	213.913
Sample volume, DSCF	175.437	206.567
GAS PARAMETERS		
Gas temperature, F	58	56
Oxygen, %	21	21
Carbon dioxide, %	0	0
Moisture, %	1.5	1.5
Velocity, ft/min	4,773	4,716
Flowrate, ACFM	26,656	26,337
Flowrate, DSCFM	26,140	25,925
FILTERABLE PM-10		
Mass collected, gr	0.0417	0.0417
Concentration, gr/DSCF	0.00024	0.00020
FILTERABLE PM		
Mass collected, gr	0.2052	0.1682
Concentration, gr/DSCF	0.00117	0.000814

TABLE 3-18. KILN EMISSION TESTS RESULTS--METALS (METRIC UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACM	2.891	3.724	2.990	
Sample volume, DSCM	2.809	3.594	2.867	
GAS PARAMETERS				
Gas temperature, C	221	221	224	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, m/min	354	422	339	
Flowrate, ACM/min	1,055	1,259	1,012	
Flowrate, DSCM/min	587	701	557	
MASS COLLECTED, ug (BLANK CORRECTED)				
Arsenic	<1.97	<1.96	<1.97	
Beryllium	<0.034	<0.034	<0.034	
Cadmium (a)	4.06	7.87	1.40	
Chromium	436	2084	544	
Cobalt (a)	6.6	27.2	11.33	
Mercury	21.4	9.66	30.5	
Manganese	53.6	175.2	65.8	
Nickel	215	1136	371	
Lead (a)	12.3	8.77	10.1	
Antimony (a)	3.43	1.92	3.42	
Selenium (a)	39.2	37.2	69.6	
CONCENTRATION, ug/DSCM				Average
Arsenic	ND	ND	ND	
Beryllium	ND	ND	ND	
Cadmium (a)	1.45	2.14	0.49	1.36
Chromium	155	567	190	304
Cobalt (a)	2.35	7.39	3.95	4.56
Mercury	7.63	2.63	10.6	6.97
Manganese	19.1	47.6	22.9	29.9
Nickel	76.5	309	129	172
Lead (a)	4.38	2.38	3.52	3.43
Antimony (a)	1.22	0.522	1.19	0.979
Selenium (a)	14.0	10.1	24.3	16.1

ND = not detected.

(a) Background corrections represent a significant portion of total amounts measured.

TABLE 3-18. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	92.7	99.3	99.5	
Sample, volume, ACF	102.1	131.5	105.6	
Sample volume, DSCF	99.2	126.9	101.3	
GAS PARAMETERS				
Gas temperature, F	429	429	435	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, ft/min	1,160	1,385	1,113	
Flowrate, ACFM	37,260	44,462	35,729	
Flowrate, DSCFM	20,713	24,738	19,683	
MASS COLLECTED, gr (BLANK CORRECTED)				
Arsenic	<7.2E-05	<7.2E-05	<7.2E-05	
Beryllium	<1.4E-06	<1.4E-06	<1.4E-06	
Cadmium (a)	6.27E-05	0.000121	2.15E-05	
Chromium	0.00673	0.03216	0.00840	
Cobalt (a)	0.000102	0.000420	0.000175	
Mercury	0.000331	0.000149	0.000471	
Manganese	0.000827	0.00270	0.00101	
Nickel	0.00332	0.0175	0.0057	
Lead (a)	0.000190	0.000135	0.000156	
Antimony (a)	5.29E-05	2.96E-05	5.28E-05	
Selenium (a)	0.000605	0.000574	0.001075	
CONCENTRATION, gr/DSCF				Average
Arsenic	ND	ND	ND	
Beryllium	ND	ND	ND	
Cadmium (a)	6.32E-07	9.35E-07	2.13E-07	5.93E-07
Chromium	6.78E-05	2.48E-04	8.30E-05	1.33E-04
Cobalt (a)	1.03E-06	3.23E-06	1.73E-06	1.99E-06
Mercury	3.34E-06	1.15E-06	4.65E-06	3.04E-06
Manganese	8.34E-06	2.08E-05	1.00E-05	1.31E-05
Nickel	3.34E-05	1.35E-04	5.65E-05	7.49E-05
Lead (a)	1.91E-06	1.04E-06	1.54E-06	1.50E-06
Antimony (a)	5.34E-07	2.28E-07	5.21E-07	4.28E-07
Selenium (a)	6.10E-06	4.42E-06	1.06E-05	7.04E-06

ND = not detected.

(a) Background corrections represent a significant portion of total amounts measured.

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACM	0.0200	0.0200	0.0200
Sample volume, DSCM	0.01996	0.02012	0.02017
GAS PARAMETERS			
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, m/min	351	321	327
Flowrate, ACM/min	1,048	958.1	975.1
Flowrate, DSCM/min	614.8	541.0	552.0
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	1475.956	88.518	192.644
Dichlorofluoromethane			
Bromomethane (a)	324.879		58.478
Acetonitrile	75.424 (b)		
Acrylonitrile			
Vinyl chloride			
Chloroethane	1132.853 (c)		368.637 (c)
Iodomethane	159.293	13.875	74.476
Trichlorofluoromethane			
Methylene chloride	5.532 (c)	9.259	1.362
Acetone	993.771 (b)	1261.417 (c)	2543.338 (c)
Carbon disulfide	42.116	51.006	25.523
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	94.625	216.682	338.132
1,1,1-Trichloroethane	7.106		4.913
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			

TABLE 3-19. (Metric units--continued)

Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	2522.718	4337.655 (d)	1184.394	
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		33.904	4.64	
2-Hexanone	2.64	147.467	98.485	
Tetrachloroethene		3.65	3.944	
1,1,2,2-Tetrachloroethane				
Toluene	103.442	159.558	176.358	
Chlorobenzene				
Ethylbenzene	30.577	41.073	52.656	
Styrene	9.654	46.172	2.492	
m-/p-Xylene	46.992	64.574	77.281	
o-Xylene	40.168	58.095	66.438	
Hexachloroethane				
1,2-Dbromo-3-chloropropane		116.513	20.215	
CONCENTRATION, ug/DSCM				Average
Chloromethane (a)	73.930895	4.3996363	9.5515938	29.29404
Dichlorofluoromethane				
Bromomethane (a)	16.273246		2.8994316	6.390893
Acetonitrile	3.7780014 (b)			
Acrylonitrile				
Vinyl chloride				
Chloroethane	56.744806 (c)		18.277605 (c)	
Iodomethane	7.9790143	0.6896332	3.6926377	4.120428
Trichlorofluoromethane				
Methylene chloride	0.2770989 (c)	0.4602028	0.0675301	0.268277
Acetone	49.778164 (b)	62.696581 (c)	126.10272 (c)	79.52582
Carbon disulfide	2.1095978	2.5351663	1.2654707	1.970078
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	4.7397829	10.769809	16.765119	10.75824
1,1,1-Trichloroethane	0.3559408		0.2435943	0.299768
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				

TABLE 3-19. (Metric units--continued)

1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	126.36339	215.59575 (d)	58.724125	133.5611
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		1.6851405	0.2300585	0.9576
2-Hexanone	0.1322381	7.3295958	4.8830419	4.114959
Tetrachloroethene		0.181417	0.1955498	0.188483
1,1,2,2-Tetrachloroethane				
Toluene	5.1814279	7.9305583	8.7441082	7.285365
Chlorobenzene				
Ethylbenzene	1.5316073	2.0414634	2.6107677	2.061279
Styrene	0.4835706	2.2949005	0.1235573	0.967343
m-/p-Xylene	2.3538375	3.2095406	3.8317141	3.131697
o-Xylene	2.0120222	2.8875129	3.294101	2.731212
Hexachloroethane				
1,2-Dbromo-3-chloropropane		5.79108	1.0022916	3.396686

(a) Results invalid due to contaminated blank sample.

(b) High background coelutes with the target analyte; detection limit may be higher due to matrix-related interference; results biased high.

(c) Interference coeluted with analyte; mass spectrum did not meet criteria.

(d) Estimated value; sample concentration exceeded acceptable calibration range.

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACF	0.7063	0.7063	0.7063
Sample volume, DSCF	0.7050	0.7105	0.7122
GAS PARAMETERS			
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, ft/min	1,152	1,054	1,072
Flowrate, ACFM	37,001	33,836	34,435
Flowrate, DSCFM	21,711	19,104	19,493
MASS, gr (BLANK CORRECTED)			
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06
Dichlorofluoromethane			
Bromomethane (a)	5.01E-06		9.02E-07
Acetonitrile	1.16E-06 (b)		
Acrylonitrile			
Vinyl chloride			
Chloroethane	1.75E-05 (c)		5.69E-06 (c)
Iodomethane	2.46E-06	2.14E-07	1.15E-06
Trichlorofluoromethane			
Methylene chloride	8.54E-08 (c)	1.43E-07	2.10E-08
Acetone	1.53E-05 (b)	1.95E-05 (c)	3.92E-05 (c)
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	1.46E-06	3.34E-06	5.22E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			

TABLE 3-19. (English units--continued)

Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	3.89E-05	6.69E-05 (d)	1.83E-05	
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		5.23E-07	7.16E-08	
2-Hexanone	4.07E-08	2.28E-06	1.52E-06	
Tetrachloroethene		5.63E-08	6.09E-08	
1,1,2,2-Tetrachloroethane				
Toluene	1.60E-06	2.46E-06	2.72E-06	
Chlorobenzene				
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07	
Styrene	1.49E-07	7.13E-07	3.85E-08	
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06	
o-Xylene	6.20E-07	8.97E-07	1.03E-06	
Hexachloroethane				
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07	
CONCENTRATION, gr/DSCF				Average
Chloromethane (a)	3.2E-05	1.923E-06	4.174E-06	1.28E-05
Dichlorofluoromethane				
Bromomethane (a)	7.1E-06		1.267E-06	2.79E-06
Acetonitrile	1.7E-06 (b)			
Acrylonitrile				
Vinyl chloride				
Chloroethane	2.5E-05 (c)		7.987E-06 (c)	
Iodomethane	3.5E-06	3.014E-07	1.614E-06	1.8E-06
Trichlorofluoromethane				
Methylene chloride	1.2E-07 (c)	2.011E-07	2.951E-08	1.17E-07
Acetone	2.2E-05 (b)	2.74E-05 (c)	5.511E-05 (c)	3.48E-05
Carbon disulfide	9.2E-07	1.108E-06	5.53E-07	8.61E-07
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	2.1E-06	4.706E-06	7.326E-06	4.7E-06
1,1,1-Trichloroethane	1.6E-07		1.064E-07	1.31E-07
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				

TABLE 3-19. (English units–continued)

1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	5.5E-05	9.421E-05 (d)	2.566E-05	5.84E-05
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		7.364E-07	1.0E-07	4.18E-07
2-Hexanone	5.8E-08	3.203E-06	2.134E-06	1.8E-06
Tetrachloroethene		7.928E-08	8.545E-08	8.24E-08
1,1,2,2-Tetrachloroethane				
Toluene	2.3E-06	3.466E-06	3.821E-06	3.18E-06
Chlorobenzene				
Ethylbenzene	6.7E-07	8.921E-07	1.141E-06	9.0E-07
Styrene	2.1E-07	1.003E-06	5.399E-08	4.2E-07
m-/p-Xylene	1.0E-06	1.403E-06	1.674E-06	1.4E-06
o-Xylene	8.8E-07	1.262E-06	1.44E-06	1.2E-06
Hexachloroethane				
1,2-Dbromo-3-chloropropane		2.531E-06	4.38E-07	1.5E-06

(a) Results invalid due to contaminated blank sample.

(b) High background coelutes with the target analyte; detection limit may be higher due to matrix-related interference; results biased high.

(c) Interference coeluted with analyte; mass spectrum did not meet criteria.

(d) Estimated value; sample concentration exceeded acceptable calibration range.

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min	175	175	175
% isokinetic	94.8	100.5	100.5
Sample volume, ACM	3.004	2.966	3.294
Sample volume, DSCM	2.891	2.844	3.136
GAS PARAMETERS			
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Velocity, m/min	354	329	366
Flowrate, ACMM	1,055	982.8	1,091
Flowrate, DSCMM	584.3	547.2	598.0
MASS COLLECTED, ug			
Phenol	13	13	8.7
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	4.8	4.9	9.7
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	2.1	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	623
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene (a)	6	12	8.5
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

TABLE 3-20. (Metric units--continued)

MASS COLLECTED, ug			
2-Methylnaphthalene	4.8	11	7.4
Hexachlorocyclopentadiene	<2	<2	<2
2,4,6-Trichlorophenol	<2	<2	<2
2,4,5-Trichlorophenol	<2	<2	<2
2-Chloronaphthalene	<2	<2	<2
2-Nitroaniline	<2	<2	<2
Dimethylphthalate	<2	<2	<2
Acenaphthylene	<2	<2	<2
2,6-Dinitrotoluene	<2	<2	<2
2,3,4,6-Tetrachlorophenone	<2	<2	<2
3-Nitroaniline	<2	<2	<2
Acenaphthene	<2	<2	<2
2,4-Dinitrophenol	<2	<2	<2
4-Nitrophenol	<2	<2	<2
Dibenzofuran	<2	<2	<2
2,4-Dinitrotoluene	<2	<2	<2
Diethyl phthalate	53	23	18
4-Chlorophenylphenyl ether	<2	<2	<2
Fluorene	<2	<2	<2
4-Nitroaniline	<2	<2	<2
4,6-Dinitro-2-methylphenol	<2	<2	<2
N-Nitrosodiphenylamine	<2	<2	<2
4-Bromophenyl-phenylether	<2	<2	<2
Hexachlorobenzene	<2	<2	<2
Pentachlorophenol	<2	<2	<2
Phenanthrene	<2	<2	<2
Anthracene	<2	<2	<2
Carbazole	<2	<2	<2
Di-n-butyl phthalate	13	14	31
Fluoranthene	<2	<2	<2
Benzidine	<2	<2	<2
Pyrene	<2	<2	<2
Butylbenzyl phthalate	2	2.2	3
3,3'-Dichlorobenzidine	<2	<2	<2
Benzo(a)anthracene	<2	<2	<2
Chrysene	<2	<2	<2
Bis(2-ethylhexyl) phthalate (b)	77	240	510
Di-n-octyl phthalate	<2	<2	10
Benzo(b)fluoranthene	<2	<2	<2
Benzo(k)fluoroanthene	<2	<2	<2
Benzo(a)pyrene	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2	<2	<2
Dibenz(a,h)anthracene	<2	<2	<2
Benzo(g,h,i)perylene	<2	<2	<2

TABLE 3-20. (Metric units--continued)

CONCENTRATION, ug/DSCM				Ave.
Phenol	4.50	4.57	2.77	3.95
Aniline				
Bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene	1.66	1.72	3.09	2.16
Benzyl alcohol				
1,2-Dichlorobenzene				
2-Methylphenol	0.726			
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitrosodipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
Benzoic acid			199	
Bis(2-chloroethoxy)methane				
2-Chloroacetophenone				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene (a)	2.08	4.22	2.71	3.00
4-Chloroaniline				
2,6-Dichlorophenol				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Hydroxyacetophenone				
2-Methylnaphthalene	1.66	3.87	2.36	2.63
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
2,3,4,6-Tetrachlorophenone				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				

TABLE 3-20. (Metric units--continued)

CONCENTRATION, ug/DSCM				Ave.
2,4-Dinitrotoluene				
Diethyl phthalate	18.3	8.09	5.74	10.7
4-Chlorophenylphenyl ether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di-n-butyl phthalate	4.50	4.92	9.88	6.43
Fluoranthene				
Benzidine				
Pyrene				
Butylbenzyl phthalate	0.692	0.774	0.957	0.807
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
Bis(2-ethylhexyl) phthalate (b)	26.6	84.4	162.6	91.2
Di-n-octyl phthalate			3.2	
Benzo(b)fluoranthene				
Benzo(k)fluoroanthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

(a) Naphthalene found in method blank at 25 to 50 percent of sample level.
(b) Bis(2-ethylhexyl) phthalate found in method blank at 3 to 22 percent of sample level.

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min	175	175	175
% isokinetic	94.8	100.5	100.5
Sample volume, ACF	106.077	104.759	116.333
Sample volume, DSCF	102.084	100.421	110.755
GAS PARAMETERS			
Gas temperature, F	433	428	428
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACFM	37,260	34,708	38,537
Flowrate, DSCFM	20,635	19,325	21,118
MASS COLLECTED, gr			
Phenol	2.01E-04	2.01E-04	1.34E-04
Aniline	<3.1E-05	<3.1E-05	<3.1E-05
Bis(2-chloroethyl)ether	<3.1E-05	<3.1E-05	<3.1E-05
2-Chlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
1,3-Dichlorobenzene	<3.1E-05	<3.1E-05	<3.1E-05
1,4-Dichlorobenzene	7.41E-05	7.56E-05	1.50E-04
Benzyl alcohol	<3.1E-05	<3.1E-05	<3.1E-05
1,2-Dichlorobenzene	<3.1E-05	<3.1E-05	<3.1E-05
2-Methylphenol	3.24E-05	<3.1E-05	<3.1E-05
2,2'-oxybis(1-Chloropropane)	<3.1E-05	<3.1E-05	<3.1E-05
4-Methylphenol	<3.1E-05	<3.1E-05	<3.1E-05
N-Nitrosodipropylamine	<3.1E-05	<3.1E-05	<3.1E-05
Hexachloroethane	<3.1E-05	<3.1E-05	<3.1E-05
Nitrobenzene	<3.1E-05	<3.1E-05	<3.1E-05
Isophorone	<3.1E-05	<3.1E-05	<3.1E-05
2-Nitrophenol	<3.1E-05	<3.1E-05	<3.1E-05
2,4-Dimethylphenol	<3.1E-05	<3.1E-05	<3.1E-05
Benzoic acid	<3.1E-05	<3.1E-05	0.00961
Bis(2-chloroethoxy)methane	<3.1E-05	<3.1E-05	<3.1E-05
2-Chloroacetophenone	<3.1E-05	<3.1E-05	<3.1E-05
2,4-Dichlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
1,2,4-Trichlorobenzene	<3.1E-05	<3.1E-05	<3.1E-05
Naphthalene (a)	9.26E-05	0.000185	0.000131
4-Chloroaniline	<3.1E-05	<3.1E-05	<3.1E-05
2,6-Dichlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
Hexachlorobutadiene	<3.1E-05	<3.1E-05	<3.1E-05
4-Chloro-3-methylphenol	<3.1E-05	<3.1E-05	<3.1E-05
2-Hydroxyacetophenone	<3.1E-05	<3.1E-05	<3.1E-05

TABLE 3-20. (English units--continued)

MASS COLLECTED, gr			
2-Methylnaphthalene	7.41E-05	1.70E-04	1.14E-04
Hexachlorocyclopentadiene	<3.1E-05	<3.1E-05	<3.1E-05
2,4,6-Trichlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
2,4,5-Trichlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
2-Chloronaphthalene	<3.1E-05	<3.1E-05	<3.1E-05
2-Nitroaniline	<3.1E-05	<3.1E-05	<3.1E-05
Dimethylphthalate	<3.1E-05	<3.1E-05	<3.1E-05
Acenaphthylene	<3.1E-05	<3.1E-05	<3.1E-05
2,6-Dinitrotoluene	<3.1E-05	<3.1E-05	<3.1E-05
2,3,4,6-Tetrachlorophenone	<3.1E-05	<3.1E-05	<3.1E-05
3-Nitroaniline	<3.1E-05	<3.1E-05	<3.1E-05
Acenaphthene	<3.1E-05	<3.1E-05	<3.1E-05
2,4-Dinitrophenol	<3.1E-05	<3.1E-05	<3.1E-05
4-Nitrophenol	<3.1E-05	<3.1E-05	<3.1E-05
Dibenzofuran	<3.1E-05	<3.1E-05	<3.1E-05
2,4-Dinitrotoluene	<3.1E-05	<3.1E-05	<3.1E-05
Diethyl phthalate	0.000818	0.000355	0.000278
4-Chlorophenylphenyl ether	<3.1E-05	<3.1E-05	<3.1E-05
Fluorene	<3.1E-05	<3.1E-05	<3.1E-05
4-Nitroaniline	<3.1E-05	<3.1E-05	<3.1E-05
4,6-Dinitro-2-methylphenol	<3.1E-05	<3.1E-05	<3.1E-05
N-Nitrosodiphenylamine	<3.1E-05	<3.1E-05	<3.1E-05
4-Bromophenyl-phenylether	<3.1E-05	<3.1E-05	<3.1E-05
Hexachlorobenzene	<3.1E-05	<3.1E-05	<3.1E-05
Pentachlorophenol	<3.1E-05	<3.1E-05	<3.1E-05
Phenanthrene	<3.1E-05	<3.1E-05	<3.1E-05
Anthracene	<3.1E-05	<3.1E-05	<3.1E-05
Carbazole	<3.1E-05	<3.1E-05	<3.1E-05
Di-n-butyl phthalate	0.000201	0.000216	0.000478
Fluoranthene	<3.1E-05	<3.1E-05	<3.1E-05
Benzidine	<3.1E-05	<3.1E-05	<3.1E-05
Pyrene	<3.1E-05	<3.1E-05	<3.1E-05
Butylbenzyl phthalate	3.09E-05	3.40E-05	4.63E-05
3,3'-Dichlorobenzidine	<3.1E-05	<3.1E-05	<3.1E-05
Benzo(a)anthracene	<3.1E-05	<3.1E-05	<3.1E-05
Chrysene	<3.1E-05	<3.1E-05	<3.1E-05
Bis(2-ethylhexyl) phthalate (b)	0.00119	0.00370	0.00787
Di-n-octyl phthalate	<3.1E-05	<3.1E-05	0.00015
Benzo(b)fluoranthene	<3.1E-05	<3.1E-05	<3.1E-05
Benzo(k)fluoroanthene	<3.1E-05	<3.1E-05	<3.1E-05
Benzo(a)pyrene	<3.1E-05	<3.1E-05	<3.1E-05
Indeno(1,2,3-cd)pyrene	<3.1E-05	<3.1E-05	<3.1E-05
Dibenz(a,h)anthracene	<3.1E-05	<3.1E-05	<3.1E-05
Benzo(g,h,i)perylene	<3.1E-05	<3.1E-05	<3.1E-05

TABLE 3-20. (English units--continued)

CONCENTRATION, gr/DSCF				Ave.
Phenol	1.97E-06	2.00E-06	1.21E-06	1.73E-06
Aniline				
Bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene	7.26E-07	7.53E-07	1.35E-06	9.43E-07
Benzyl alcohol				
1,2-Dichlorobenzene				
2-Methylphenol	3.17E-07			
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitrosodipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
Benzoic acid			8.68E-05	
Bis(2-chloroethoxy)methane				
2-Chloroacetophenone				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene (a)	9.07E-07	1.84E-06	1.18E-06	1.31E-06
4-Chloroaniline				
2,6-Dichlorophenol				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Hydroxyacetophenone				
2-Methylnaphthalene	7.26E-07	1.69E-06	1.03E-06	1.15E-06
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
2,3,4,6-Tetrachlorophenone				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				

TABLE 3-20. (English units--continued)

CONCENTRATION, gr/DSCF				Ave.
2,4-Dinitrotoluene				
Diethyl phthalate	8.01E-06	3.53E-06	2.51E-06	4.68E-06
4-Chlorophenylphenyl ether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di-n-butyl phthalate	1.97E-06	2.15E-06	4.32E-06	2.81E-06
Fluoranthene				
Benzidine				
Pyrene				
Butylbenzyl phthalate	3.02E-07	3.38E-07	4.18E-07	3.53E-07
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
Bis(2-ethylhexyl) phthalate (b)	1.16E-05	3.69E-05	7.11E-05	3.99E-05
Di-n-octyl phthalate			1.4E-06	
Benzo(b)fluoranthene				
Benzo(k)fluoroanthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

(a) Naphthalene found in method blank at 25 to 50 percent of sample level.

(b) Bis(2-ethylhexyl) phthalate found in method blank at 3 to 22 percent of sample level.

TABLE 3-21. KILN EMISSION TESTS RESULTS--INORGANIC GASES
(METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, C	193	204	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min	351	321	327	
Flowrate, ACMM	1,048	958.1	975.1	
Flowrate, DSCMM	614.8	541.0	552.0	
CONCENTRATION, ppm (a)				Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.9	2.0	1.9	2.0

(a) Based on average of 120 one-minute readings.
(b) Concentration in percent.

TABLE 3-21. KILN EMISSION TESTS RESULTS--INORGANIC GASES
(ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min	1,152	1,054	1,072	
Flowrate, ACFM	37,001	33,836	34,435	
Flowrate, DSCFM	21,711	19,104	19,493	
CONCENTRATION, ppm (a)				Average
SO2	39.1	60.5	59.0	52.9
NOx	15.8	25.7	25.0	22.2
CO	44.5	49.0	41.9	45.1
CO2 (b)	1.9	2.0	1.9	2.0

(a) Based on average of 120 one-minute readings.
(b) Concentration in percent.

TABLE 3-22. KILN EMISSION TESTS RESULTS--THC, METHANE/ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, C	193	204	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min	351	321	327	
Flowrate, ACM/min	1,048	958.1	975.1	
Flowrate, DSCM/min	614.8	541.0	552.0	
CONCENTRATION, ppm				Average
THC, as propane (a)	2.1	1.3	2.5	2.0
THC, as methane (a)	6.2	3.8	7.5	5.9
Methane (b)	6.8	5.3	5.1	5.8
Ethane	<3	<3	<3	

(a) Based on average of 120 one-minute readings.

(b) Runs 1 and 2 based on average of 2 readings; run 3 based on average of 5 readings; corrected to dry basis.

TABLE 3-22. KILN EMISSION TESTS RESULTS--THC, METHANE/ETHANE (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time, min	121	120	120	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min	1,152	1,054	1,072	
Flowrate, ACFM	37,001	33,836	34,435	
Flowrate, DSCFM	21,711	19,104	19,493	
CONCENTRATION, ppm				Average
THC, as propane (a)	2.1	1.3	2.5	2.0
THC, as methane (a)	6.2	3.8	7.5	5.9
Methane (b)	6.8	5.3	5.1	5.8
Ethane	<3	<3	<3	

(a) Based on average of 120 one-minute readings.

(b) Runs 1 and 2 based on average of 2 readings; run 3 based on average of 5 readings; corrected to dry basis.

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (METRIC UNITS)

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSCM	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18	
Carbon dioxide, %	1.1	1.8	2	
Moisture, %	4.4	4.6	4.7	
Velocity, m/min	349	344	334	
Flowrate, ACM/min	1,042	1,026	998	
Flowrate, DSCM/min	575.0	567.4	545.6	
MASS COLLECTED, g				
Filterable PM	0.0496	0.0473	0.0600	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0212	0.0160	0.0212	0.0195

Method 29 train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACM	2.891	3.724	2.990	
Sample volume, DSCM	2.809	3.594	2.867	
GAS PARAMETERS				
Gas temperature, C	221	221	224	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, m/min	354	422	339	
Flowrate, ACM/min	1,055	1,259	1,012	
Flowrate, DSCM/min	587	701	557	
MASS COLLECTED, g				
Filterable PM	0.0537	0.0430	0.0886	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0191	0.0120	0.0309	0.0207

TABLE 3-23. (Metric units--continued)

Method 201A/202 train				
Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:55	14:59	17:07	
Finish time	12:27	16:42	18:39	
Sample time, min	90	90	90	
% isokinetic	106.8	99	97.4	
Sample volume, ACM	1.212	1.234	1.247	
Sample volume, DSCM	1.174	1.183	1.187	
GAS PARAMETERS				
Gas temperature, C	193	204	209	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, m/min	351.1	321.3	326.7	
Flowrate, ACM/min	1,048	958.1	975.1	
Flowrate, DSCM/min	614.8	541.0	552.0	
MASS COLLECTED, g				
Filterable PM	0.0177	0.0188	0.0127	
Filterable PM-10	0.0033	0.0147	0.0047	
Cond. inorganic PM	0.167	0.183	0.162	
Cond. organic PM	0.0548	0.0153	0.0104	
Total cond. PM	0.222	0.199	0.172	
CONCENTRATION, g/DSCM				Average
Filterable PM	0.0151	0.0159	0.0107	0.0139
Filterable PM-10	0.00281	0.01243	0.00396	0.00640
Cond. inorganic PM	0.142	0.155	0.136	0.144
Cond. organic PM	0.0467	0.0129	0.0088	0.0228
Total cond. PM	0.189	0.168	0.145	0.167

TABLE 3-23. KILN EMISSION TESTS RESULTS--PM, PM-10, CONDENSIBLE PM (ENGLISH UNITS)

Method 26A train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.15	109.20	105.78	
Sample volume, DSCF	82.57	104.34	100.10	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min	1,146	1,128	1,097	
Flowrate, ACFM	36,805	36,230	35,241	
Flowrate, DSCFM	20,307	20,036	19,269	
MASS COLLECTED, gr				
Filterable PM	0.765	0.730	0.926	
CONCENTRATION, gr/DSCF				Average
Filterable PM	0.00927	0.00700	0.00925	0.00851

TABLE 3-23. (English units--continued)

Method 29 train				
Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:30	09:42	15:53	
Finish time	19:15	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	92.7	99.3	99.5	
Sample volume, ACF	102.1	131.5	105.6	
Sample volume, DSCF	99.21	126.9	101.3	
GAS PARAMETERS				
Gas temperature, F	429	429	435	
Oxygen, %	17.6	18.4	17.8	
Carbon dioxide, %	2.2	1	1.7	
Moisture, %	4.4	4.3	4.7	
Velocity, ft/min	1,160	1,385	1,113	
Flowrate, ACFM	37,260	44,462	35,729	
Flowrate, DSCFM	20,713	24,738	19,683	
MASS COLLECTED, gr				
Filterable PM	0.829	0.664	1.367	
CONCENTRATION, gr/DSCF				Average
Filterable PM	0.00835	0.00523	0.0135	0.00903

Method 201A/202 train	Run			
Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:55	14:59	17:07	
Finish time	12:27	16:42	18:39	
Sample time, min	90	90	90	
% isokinetic	106.8	99.0	97.4	
Sample volume, ACF	42.79	43.57	44.04	
Sample volume, DSCF	41.46	41.76	41.93	
GAS PARAMETERS				
Gas temperature, F	380	400	409	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.1	5.5	4.2	
Velocity, ft/min	1,152	1,054	1,072	
Flowrate, ACFM	37,001	33,836	34,435	
Flowrate, DSCFM	21,711	19,104	19,493	
MASS COLLECTED, gr				
Filterable PM	0.273	0.290	0.196	
Filterable PM-10	0.051	0.227	0.073	
Cond. inorganic PM	2.573	2.830	2.497	
Cond. organic PM	0.846	0.236	0.160	
Total cond. PM	3.418	3.066	2.657	
CONCENTRATION, gr/DSCF				Average
Filterable PM	0.00659	0.00695	0.00467	0.00607
Filterable PM-10	0.00123	0.00543	0.00173	0.00280
Cond. inorganic PM	0.0620	0.0678	0.0596	0.0631
Cond. organic PM	0.02040	0.00565	0.00383	0.00996
Total cond. PM	0.0824	0.0734	0.0634	0.0731

TABLE 3-24. KILN EMISSION TEST RESULTS--HF, HCl, Cl2 (METRIC UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACM	2.439	3.092	2.995	
Sample volume, DSCM	2.338	2.955	2.835	
GAS PARAMETERS				
Gas temperature, C	224	222	227	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity M/min	349.4	343.9	334.5	
Flowrate, ACM/min	1,042	1,026	997.9	
Flowrate, DSCM/min	575.0	567.4	545.6	
MASS COLLECTED, ug				
HF	31,969	43,518	37,333	
HCl	2,117	2,449	2,302	
Cl2	128	216	169	
CONCENTRATION, ug/DSCM				Average
HF	13,673	14,729	13,171	13,858
HCl	905	829	812	849
Cl2	54.7	73.1	59.6	62.5

TABLE 3-24. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/09/93	11/10/93	11/10/93	
Start time	14:07	09:42	15:53	
Finish time	19:17	13:57	19:47	
Sample time, min	175	175	175	
% isokinetic	78.3	100.8	100.5	
Sample volume, ACF	86.148	109.203	105.783	
Sample volume, DSCF	82.567	104.337	100.101	
GAS PARAMETERS				
Gas temperature, F	436	431	440	
Oxygen, %	17.8	18.8	18.0	
Carbon dioxide, %	1.1	1.8	2.0	
Moisture, %	4.4	4.6	4.7	
Velocity, ft/min	1,146	1,128	1,097	
Flowrate, ACFM	36,805	36,230	35,241	
Flowrate, DSCFM	20,307	20,036	19,269	
MASS COLLECTED, gr				
HF	0.493	0.672	0.576	
HCl	0.0327	0.0378	0.0355	
Cl2	0.00198	0.00333	0.00261	
CONCENTRATION, gr/DSCF				Average
HF	0.00598	0.00644	0.00576	0.00606
HCl	0.000396	0.000362	0.000355	0.000371
Cl2	2.39E-05	3.19E-05	2.61E-05	2.73E-05

TABLE 3-25. DRYER EMISSION TESTS RESULTS--
THC, METHANE AND ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, C	38	38	38	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, m/min	841	831	852	
Flowrate, ACM/min	1,385	1,368	1,402	
Flowrate, DSCM/min	1,256	1,203	1,233	
CONCENTRATION, ppm				Average
THC, as propane (b)	83.7	89.4	95.9	89.7
THC, as methane (b)	251	268	288	269
Methane (c)	106	95.0	111	104
Ethane (c)	9.6	7.0	7.9	8.2

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 one-minute readings
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively.

TABLE 3-25. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS				
Gas temperature, F	100	100	100	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, ft/min	2,760	2,726	2,794	
Flowrate, ACFM	48,904	48,305	49,502	
Flowrate, DSCFM	44,364	42,490	43,548	
CONCENTRATION, ppm				Average
THC, as propane (a)	83.7	89.4	95.9	89.7
THC, as methane (a)	251	268	288	269
Methane (b)	106	95.0	111	104
Ethane (b)	9.6	7.0	7.9	8.2

(a) Based on average of 120 one-minute readings
(b) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively.

Interoffice Communication

MIDWEST RESEARCH INSITITUTE

12/5/94

TO: Roy Neulicht/Rick Marinshaw

FROM: Dennis Hooton

RE: Beldon Brick

The QA review and associated action items has been completed for the subject report. These items are summarized below:

1. VOST blank corrections really only impact a few compounds in the volatiles list. These have been summarized in the QA Report (enclosed). I also indicate in the QA report that undetected compounds would be reported as "< ~1-2 ug/dscm." You may want to include the "VOST RAW DATA-KILN" table, provided by Rick a few weeks ago, in the final report appendices, which lists the analytical detection limits (as ng per trap) for each chemical.

2. The SV Lab report was put in final form for the most recent draft.

3. VOST surrogate recoveries were calculated and added to the revised QA Section (Section 5 of the report). In addition, I added results of a performance audit sample to Section 5.

4. Cr and Ni results were verified for all runs and I added a statement to this effect in the QA report. Rick provided "historical" data for field blank metal trains. I could not tell if filters were included in all blank runs; however, Cr blank results for the Brick Kiln study are consistent with past tests and Ni did show a background level similiar to the Brick Kiln blank in 1 of 3 previous tests. These historical data are not discussed in the report and probably don't need to be discussed.

5. I reviewed and edited the QA Section of the Report. The text (4 pages) was retyped and 2 additional tables (VOST surrogate recoveries and VOST audit sample results) were added. The revised copy is enclosed.

6. A QA Audit Summary report is enclosed. I revised the text to reflect the additions and improvements that were made. The general finding of the QA Report is that, with few minor exceptions, the Test Data are complete, traceable, and accurately reported. In general, data quality objectives were met for all analyses.

7. Follow-up items from the draft audit report were addressed, specifically:

- Maximum emission rates for undetected volatile compounds are discussed in the final QA Report (see item 1 above).
- Footnotes in Table 3-19 actually refer to the "VOST RAW DATA" Table provided by Rick. I would recommend that all the footnote references be omitted and that the 4 compounds listed in the QA Report and benzene be simply flagged as "estimated" concentrations due to blank corrections and, in the case of benzene, the use of an extended calibration curve.
- Cd, Co, Pb, Sb, and Se should be flagged as estimated concentrations due to the relatively high background corrections (>50% of the total response in most cases).
- Semivolatile Detection limits should be calculated as English units for the table on page 3-36.

Regarding Rick's memo of 11/11/94, please note the following:

- Footnotes on Table 3-19 should be eliminated and the four chemicals listed in the QA report and benzene should be qualified as "estimated" values.

- Margie's footnote No. 3 for sample No. 1069 refers to chloromethane, not iodomethane. Footnote the chemicals listed below as "estimated" values.

- I would recommend that you report all data, but flag chloromethane, bromomethane, iodomethane, methylene chloride, and benzene as "estimated" values due to analytical difficulties.

- 2-Hexanone may be considered as a non-detect or trace amount (below calibration range) for the first run data.

In regard to EMB's comments (John Brown, Terry Harrison Memo to Ron Myers, received ~ 10/27/94), I reviewed their memo and believe that we will have addressed most of their concerns with the above actions.

In closing, I will try to collect the metals data from Avie Mainey and the semivolatile data from Marilyn Whitacre and, along with the VOST data, send these records to MRI archives in Kansas City. They may need you to fill out a form to authorize transfer of the records to archives; so I will forward this form to you when ready.

Good luck on wrapping up this project!

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (METRIC UNITS)

	Emission rate, kg/hr				Emission factor, kg/Mg bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	3.9	5.2	5.2	4.8	1.2	1.7	1.7	1.5
NOx	1.1	1.6	1.6	1.4	0.35	0.51	0.50	0.45
CO	1.9	1.9	1.6	1.8	0.61	0.59	0.51	0.57
CO2	1,320	1,200	1,150	1,220	420	380	360	390
THC, as methane	0.15	0.079	0.16	0.13	0.046	0.025	0.051	0.041
Methane	0.17	0.12	0.11	0.13	0.053	0.037	0.036	0.042

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.16 Mg of bricks produced per hour.

TABLE 3-8. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--
INORGANIC GASES, THC, AND METHANE (ENGLISH UNITS)

	Emission rate, lb/hr				Emission factor, lb/ton bricks produced (b)			
	Run				Run			
Analyte (a)	1	2	3	Average	1	2	3	Average
SO2	8.5	11.5	11.5	10.5	2.4	3.3	3.3	3.0
NOx	2.5	3.5	3.5	3.2	0.71	1.01	1.00	0.91
CO	4.2	4.1	3.6	4.0	1.2	1.2	1.0	1.1
CO2	2,900	2,650	2,520	2,690	830	760	720	770
THC, as methane	0.32	0.17	0.35	0.28	0.093	0.050	0.10	0.081
Methane	0.37	0.25	0.25	0.29	0.11	0.073	0.072	0.084

(a) Ethane not detected.
(b) Emission factors based on process rate of 3.48 tons of bricks produced per hour.

FAX TRANSMISSION

TO: John Hosenfeld, KCO

FROM: Rick Marinshaw, MRI

DATE: February 6, 1995

RECEIVING FAX NUMBER: 816-753-8420

SENDING FAX NUMBER: 919-677-0065

THIS FAX CONSISTS OF 3 PAGES (INCLUDING THIS PAGE)

Last November, we sent April some fax copies of calculation sheets and data forms for the Belden Brick test and asked her help in obtaining original copies for the final test report. We received a package from you back in December with replacement sheets that were complete with the exception of the calculation sheets for the "dryerv2" run. I am faxing you our copy of the sheets for that run; we would appreciate it if you could send us the originals as soon as possible so that we can finalize the report.

Thanks.

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

November 11, 1994

To: April Carender

From: Rick Marinshaw

Subject: Belden Brick Test Report

If you recall from your visit here last month, Roy and I would like you to help us out with the test report by locating and sending to us the originals for some of the data sheets, computer printouts, and other documentation needed for the test report. Enclosed is a copy of the documents in question; we currently have only fax copies of those documents.

Please give Roy or me a call if you have any questions about this. We are trying to finalize the report and your help would be greatly appreciated.

~~Missing Calc sheet - calc of emission rate for PM_{10}/condensible PM on Kiln for Run 3~~ included

12/6/94

Rick

Enclosed are better copies for your report. Some of what you sent had notations on them and I am returning them with the better copy. Call me if you need anything else.

Concentration of Methane and Ethane
determined by GC/FID in Dryer Stack Emissions November 11, 1993

	CONCENTRATION (ppmv)	
TIME	METHANE	ETHANE
1122	104	8.1
1133	123	9.1
1136	116	8.1
1138	120	8.8
1219	141	11
1225	117	10
1316	77	6.5
1319	116	9.2
1322	71	5.2
1358	117	9.2
1402	80	6.1
1405	80	3.9
1445	98	7.0
1448	86	6.5
1713	106	7.6

The Belden Brick Co.
P.O. Box 430
Sugarcreek, Ohio 44681

Phone: 216-852-2424
FAX Ext.: 297

FAX TRANSMITTAL

TO: Mr. Ron Myers
USEPA

FROM: John Jensen

DATE: 9-15-94

SUBJECT: CECM Analysis of Draft Report of Belden Brick Plant 6

Comments or Message:

Please Deliver - URGENT

NUMBER OF PAGES SENT (INCLUDING THIS SHEET): 3

College of Engineering

CENTER FOR ENGINEERED CERAMIC MANUFACTURING

September 14, 1994

Mr. John Jansen
Belden Brick Company
P. O. Box 430
Sugar Creek, OH 44701-0430

Re: EPA Draft Report of 7/14/94

Dear John:

As I mentioned to you in Washington yesterday, I have some major problems with the EPA report on *Plant 6*. I believe that these problems are sufficiently serious that a face to face meeting is appropriate with Ron Meyers of EPA. I suggest that the meeting should be September 22 or 23 at Research Triangle. For your convenience, Ron's office number is 919-541-5407. I also believe that Mr. Rick Marinshaw of MRI (919-677-0249) should be present at a meeting.

Since I am dashing out of town again, I ask you to set up a meeting and let me know the time and place. Here are my specific comments:

20-42

1. I am very upset with the last sentence in the *initial paragraph of Section 1.1* on page 1-1 which reads, in part, "that brick manufacturing facilities were responsible for a significant quantity of particulate matter. . ." This sentence is misleading and inflammatory, and I believe that it will do great harm to the brick industry when viewed by state regulatory agencies.

The fact is that EPA has found the opposite. So if you are going to report EPA's initial fear, then you ALSO have to report that you have found that the fears were not realized.

<u>I have reported this concern to Nelson Cooney, and he spoke to Mr. Meyers about it. I suggest we specifically request that the sentence is either removed or that it is qualified. This is a very unfair statement, and it (as an editorial conclusion) has no place in the report.</u>

I would also comment that the *technical literature relates* that particulate emissions are no problem in gas fired kilns in Europe. This makes the statement appear further *irresponsible when viewed by the* world regulatory community.

SEP-15-1994 08:01 FROM BELDEN BRICK CO. TO 297 P.03

Mr. John Jensen
Page 2

2. The dryer total hydrocarbons (THC) at 29 lb/hr. are 90 times that reported by EPA for Johnson City (0.324 lb/hr.). Mr. Barry Ellis of the Center reported significant equipment problems, including aborted runs, by the operator testing for THC. The results can not be accurate. If EPA's purpose is to correct AP-42, then they must do it with correct data. I believe that EPA should instruct MRI to go back to your plant for another test. I stress the significance to the brick industry of accurate tests for gas fired plants. *Incorrect data can result in tremendous emissions levies by states.*

3. The chromium emissions were two orders of magnitude or 100X that of Pine Hall or Johnson City. The reason for this is important to the industry. We must ask EPA to verify this data by having their contractor recheck the calculations.

4. The emissions of nickel reported in Table 3-5 at 0.015 lb/hr. (average) is inappropriate. Look at the data of 0.0056 lb/hr., 0.029 lb/hr., and 0.0093 lb/hr. Isn't it obvious that the data point 0.029 is inaccurate? It is not technically responsible to report this average.

Please let me know the disposition of a meeting at EPA.

With best regards,

Denis A. Brosnan

Denis A. Brosnan, Ph.D., PE

c: Walt Beahyes (by FAX)
Nelson Cooney (by FAX)

/deb

GALBRAITH LABORATORIES, INC.

PHONE 615/546-1335 FAX 615/546-7209

FAX TRANSMITTAL COVER SHEET

DATE 3/14/94

TO: Rick Marinshaw

Midwest Research Inst.

FAX #(919) 677-0065

MESSAGE Dear Mr. Marinshaw:

I don't know if this invoice has been faxed to you previously. Our Billing Manager has been out on medical leave. I am faxing this to you again in case you did not receive the first copy. If this fax is in duplicate please disregard.

TOTAL NUMBER OF PAGES INCLUDING COVER LETTER: 2

THANK YOU,

Bernadelle L. Mooney
Account Manager

GALBRAITH LABORATORIES, INC.

Galbraith Laboratories, Inc.
P.O. BOX 51610
KNOXVILLE, TENNESSEE 37950-1610
(615) 546-1335
FAX (615) 546-7209

PLEASE REFERENCE THIS INVOICE NUMBER ON ALL CORRESPONDENCE AND REMITTANCES

DATE	INVOICE NUMBER
94/01/28	86302

PURCHASE ORDER NUMBER
011064

SOLD TO
M0036
Midwest Research Inst.
Accounts Payable
425 Volker Blvd.
Kansas City.MO 64110

Fed Id# 62-0634707

YOUR ORDER NUMBER	OUR NO.	ANALYSIS AND PRICE								TOTALS
		CODE	AMOUNT	CODE	AMOUNT	CODE	AMOUNT	CODE	AMOUNT	
Szydlo										
.025	E3331	RD1s	20.00	163s	60.00					80.00
1027	E3332	RD1s	20.00	163s	60.00					80.00
2025	E3333	RD1s	20.00	163s	60.00					80.00
2027	E3334	RD1s	20.00	163s	60.00					80.00
3025	E3335	RD1s	20.00	163s	60.00					80.00
3027	E3336	RD1s	20.00	163s	60.00					80.00

RD1 Raw Data 163 HCl/Method 26
+

Y FROM INVOICE—

TERMS: NET 30 DAYS

INVOICE TOTAL

PLEASE PAY AMOUNT SHOWN IN THIS COLUMN →

INVOICE TOTAL
480.00

MRI

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

May 27, 1994

Mr. John Jensen
Belden Brick Company
Post Office Box 430
Sugarcreek, Ohio 44681

Dear Mr. Jensen:

Enclosed is a set of tables that summarizes the results of the emission test conducted at the Belden Brick facility during the week of November 8, 1993. Please note that these results are considered to be preliminary and must be subjected to additional quality control and review by the U. S. Environmental Protection Agency (EPA) before being considered final. We are planning to forward a copy of the complete draft test report in the near future. Following review by EPA, a copy of the draft report will be transmitted to you for your review.

Please feel free to contact me if you have any questions concerning the enclosed tables.

Sincerely,

Richard Marinshaw
Senior Environmental Engineer

Enclosure

cc: Ron Myers, EPA (MD-14)

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL	# of pages ► 2
To Rick Marenshaw	From Ron Myers
Dept./Agency MRI	Phone # (919) 541-5407
Fax #	Fax #
NSN 7540-01-317-7368 5099-101	GENERAL SERVICES ADMINISTRATION

MEMO

TO: Ron Myers, EIB

FROM: John Brown, Terry Harrison, EMB

SUBJECT: Review of Belden Brick Test Report

The Belden report prepared by MRI has been reviewed and is generally well done. The results appear to be reasonably accurat although direct comparison with tests at the coal and wood fired plants can only be approximated.

There is a problem with the indoor and outdoor ambient PM10 data reported. The concentrations given are extremely high and resemble numbers more like an uncontrolled stack. The data shown in Table 3-15 doesn't match what is summarized in Par. 3.3.21. T catch weights agree with the raw data so perhaps an error was mad in the flow calculations.

The grinding/screening baghouse results indicate good dust control. There are slight differences in the kiln metals results compared to Pine Hall and General Shale but these seem to be raw material related.

Data reported for PM, PM10, and condensible PM for the stack kiln seems reasonable. There is no calculation sheet for run PM-filterable PM in Appendix A.2.1. 13

The kiln data for THC, methane, HF, and the inorganic gases compare reasonably with the other plant tests. There is an apparent error in the calculation of the dryer THC, methane and ethane results as we discussed earlier over the fax from John Jensen. Any higher differences after calculation corrections may be attributable to the use of the vegetable oil extrusion lubricant.

Section 5 on QA/QC does not precisely match the EMB guide bu covers the subject material adequately. A reference to the App. material on calibration should be included in this section.

Terry Harrison's comments on the VOST and Semi-VOST results follow.

The range of within run results in Table 3-6 for 2-Hexanone and O-Xylene and in Table 3-7 for diethylphthalate and Bis(2-ethylhexyl)phthalate are large. Confirmation of the runs that were much different is suggested.

Questions suggesting footnotes for Table 3-6; 1- Should it b noted that the chloroethane methane found in the sample is 10x the method blank? See page 5-6. 2- Why is the level of blank for bromomethane not noted? see page 5-7. Suggested footnotes for Table 3-7; 1-
Naphthalene, found in method blank @ 0.03 to 2.0x sample level.

2- Bis(2-ethylhexyl)phthalate, found in method blank @ 0.5 sample level.

The method quality control discussion in Section 5.2 for VOS is well done but does not include a table of QA results as was do for Semi-VOST. Can this be added?

The identity of the last 3 samples in Table 5-5 (1038A, 2038 and 3038A) is not certain. This may be important as they are reported as failing the percent recovery objective of 50-150%.

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

November 11, 1994

To: April Carender

From: Rick Marinshaw

Subject: Belden Brick Test Report

If you recall from your visit here last month, Roy and I would like you to help us out with the test report by locating and sending to us the originals for some of the data sheets, computer printouts, and other documentation needed for the test report. Enclosed is a copy of the documents in question; we currently have only fax copies of those documents.

Please give Roy or me a call if you have any questions about this. We are trying to finalize the report and your help would be greatly appreciated.

F:\share\TOWP\BBACT

July 22, 1994

TO: Rick M.

FROM: Roy

SUBJECT: Belden Brick

1. The Appendix is assemble and on my desk; a few things need to be done. A list is attached. I have indicated the items that I think should be done before mailing, if possible.

2. A memo for Denny Hooten is attached (F:\share\towp\BBQA). Please review and edit. I could not find Delteks that had a breakdown to the subtask level, nor the spreadsheets we had done back in February indicating the budget status. If you don't have this info handy, call Joann.

3. Please call Denny and find out if our request is reasonable and when he might get to it. If you can convince Ron to go ahead and send the document to Jenson, but wait to send the document to EMB until after Denny does his review this would be better. EMB will probably do a very thorough review; I would like this report to be as complete as possible, since it probably is the first MRI report EMB is seeing. Also they (EMB) will not then have to review it a second time.

4. A found a few items that need to be fixed...and I haven't even completed my review:

a) Need to resolve the correct dates and times for Dryer CEMS runs. Although the computer printouts for flow, etc are provided for the dryer, no field data forms to support these are provided (i.e., traverse and orsat data). We need these. Furthermore, it appears that the incorrect stack diameter was used for the dryer stack in calculating flows (both runs) (See attached). According to the sample plan the dryer stack is 57 inches diameter not 68 (68 is kiln). This will decrease the flow and emission rates/factors by about 30%. Need to consult with MIRO and get this right.

b) Note on one of the dryer data sheets for Methane/ethane results a note indicates the results are on a wet basis. I assume this is also true for the kiln location; and possibly for THC. The drawing in the report leads me to believe the THC was a "Hot " system and the results are wet basis. Inorganic gases should be dry basis. Confirm with Miro. If they are wet, it probably is easiest to do the correction from the ppm (wet) tables in the appendix and on the spread sheet so that all ppm results reported in the body of the report are on a dry basis. i.e,, don't change the format of the current tables, simply recalculate the number. The tables in the appendix printed straight from MIro's data set can be on a wet basis but need to be identified as such (correction equation attached).

MIRO'S RESPONSE → INORG GASES ARE ON DRY BASIS
→ THC ON WET BASIS DIRECTLY TO ANALYZER AS SPECIFIED IN METHOD
HE'LL TALK TO BOB GULICK (GULIG ?)

FOR APPENDIX:

Please have WP type some sort of contents page for each Appendix to aid the reader. I also suggest a page dividing each sub heading within an appendix to assist the reader (i.e., a separator for kiln metal and kiln HCL field data sheets....your call

I suggest that before copying you have Kathy number the corner (or back) of each page with a blue pencil; otherwise if the machine jams, it would take hours to figure out the correct sequence.

✓ 1. Add sample log (i.e., take the one from the analytical request memo.

2. Do we have a clean version of Semivost results??

✓ 3. Decide what VOST data should go in the appendix; all?, I vote for just the sample results.

Need from MIRO:

1. New flow calculation sheets for dryer using correct stack diameter

I calculated, corrected, but need printout from MIRO

2. Try and get field data sheets for flow at dryer.

3. Any preliminary traverse field data sheets for baghouse or kiln

Many of the pages are FAXes; I think it looks pretty tacky to have fax transmittal date on these pages. Have WP white out??? or just leave. Ultimately, we need to get originals...maybe if your lucky you could actually get the orignals this week.

At a later date:

1. originals

2. Need information on claibration gases for CEMS; also better printouts of CEMS data...indicating dates for calibration checks, etc...I can discuss this with you when I get back.

ACTION---GENERAL

*** 1. Correct Dryer flow rates, etc.

*** 2. Correct Methane/ethane/THC, as appropriate to dry basis.

3. Check CEMS data diskette/correct dates and times for kiln and dryer runs.

4. Miro: review/confirm correct BH inlet run 1 end time and actual sample time (see attached)

5. Miro: review/confirm correct BH outlet run 1 sample volume and run time. (see attached)

6. Table 3-20 Correct Actual flow rates (see attached)

At later date:

1. have Miro initial/explain on original data sheeet) same sample number twice (see attached)

2. Add GC/FID to figure 4-8

3. Explain in text that Met/eth/thc were wet basis

4. Explain in text/footnote tables the appropriate filter temps for PM runs.

5. Add clarification on traverse points used for the different runs

6. Consider deleting ACF from tables

7. Consider changing english mass in tables from grains to g or mg.

8. Followup QA on VOST problems, high metals blank; revise sectioon 5 accordingly.

9. Provide better summary of QC results in Section 5

10. Reanalyze filter blank for metals??

11. resolve minor discrepancies in duct diameters (text vs. value used in calcualtions)

12. Confirm configuration of PM-10 train (fig.4-7) One or two filters? filter temps? same config at BH and Kiln?

13. Sample Calculations

14. Add note - that outlet HCl 26 Train Run ~~1~~ : only 78% isokinetic

$$\text{ppm dry} = \frac{\text{ppm wet}}{1 - \frac{\%\,\text{moisture}}{100}}$$

eg % moisture for Run 1 = 4.2%
(from "Flow" computer printout)

$$\text{ppm dry} = \frac{\text{ppm wet}}{1 - \frac{4.2}{100}} = \frac{\text{ppm wet}}{0.958}$$

FILE NAME - dryve13 PROG.=VER 06/09/8

04-11-1994 08:09:28

RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	0.00
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H2O)=	0.642
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H2O)=	0.7910
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	~~68.0~~
Stack Axis #2 (Inches)=	68.0
Circular Stack	
Stack Area (Square Feet)=	17.72 25.22
Stack Velocity (Actual, Feet/min)=	2,794
Flow Rate (Actual, Cubic ft/min)=	~~70,452~~ 49,444
Flow rate (Standard, Wet, Cubic ft/min)=	64,721
Flow Rate (Standard, Dry, Cubic ft/min)=	~~61,978~~ 43,384

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H2O)=	16.3
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H2O)=	3.9866
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Circular Stack	
Stack Area (Square Meters)=	2.343
Stack Velocity (Actual, m/min)=	851
Flow rate (Actual, Cubic m/min)=	1,995
Flow rate (Standard, Wet, Cubic m/min)=	1,833
Flow rate (Standard, Dry, Cubic m/min)=	1,755

17.7/25.22 = .70

According to test plan only 57 for dryer

This will have sign impact on E Rate

~ mild

Need to confirm these data really are dryer - not kiln

~ kiln

I expect these are not kiln stack kiln velocities only running @ 1160 fpm

.08 429F of Temp?

If these are kiln - what is dryer?

METHOD 29A / PM10 TRAIN

RUN NO. INLET #1
DATE 11-09-93

SAMPLING LOCATION BAGHOUSE INLET
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR NEAL

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft^3 INITIAL 847.042 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1	11:21/111		898.530	0.24	0.67	0.67	59	57	53	2.0	53					
2	11:16/106		896.195	0.54	0.67	0.67	59	57	54	2.0	53					
3	11:08/98		892.255	0.54	0.67	0.67	59	57	54	2.0	54					
4	11:00/90		888.325	0.75	0.67	0.67	59	57	54	2.0	53					
5	10:51/81		884.135	1.10	0.67	0.67	59°	57	54	2.0	53					
6	10:40/70		879.005	1.10	0.67	0.67	59°	57	54	2.0	53					
7	10:29/59		873.978	0.60	0.67	0.67	59°	56	53	2.8	52					
8	10:21/51		870.255	1.20	0.67	0.67	59°	57	53	2.0	52					
9	10:09/39		864.885	0.96	0.67	0.67	59°	57	54	2.0	52					
10	9:59/29		860.185	0.70	0.67	0.67	59°	57	54	2.0	54					
11	9:50/20		856.044	0.83	0.67	0.67	59°	52	48	2.0	55					
12	9:40/10		852.452	0.92	0.67	0.67	59°	51	46	2.0	55					
	9:30/0		~~852.452~~													

Final Leak Check = 0.005 at 2.8 psi

COMMENTS

INITIAL LEAK CHECK 0.001

Revision 9-4-86

FILE NAME - bagin1
RUN # - bagin1
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:56:03

Initial Meter Volume (Cubic Feet)=	847.042
Final Meter Volume (Cubic Feet)=	898.530
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	52.878
Gas Volume (Dry Standard Cubic Feet)=	52.915
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	54
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.790
Average Stack Temperature (F)=	59
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	0.8733
% Isokinetic=	94.5
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	120.0
Nozzle Diameter (Inches)=	0.172
Stack Axis #1 (Inches)=	36.0
Stack Axis #2 (Inches)=	36.0
Circular Stack	
Stack Area (Square Feet)=	7.07
Stack Velocity (Actual, Feet/min)=	2,967
Flow Rate (Actual, Cubic ft/min)=	20,974
Flow rate (Standard, Wet, Cubic ft/min)=	20,753
Flow Rate (Standard, Dry, Cubic ft/min)=	20,439

?

Particulate Loading - Front Half

Particulate Weight (g)=	0.4604
Particulate Loading, Dry Std. (gr/scf)=	0.1340
Particulate Loading, Actual (gr/cu ft)=	0.1305
Emission Rate (lb/hr)=	23.47

Corr. to 7% 02 & 12% C02
% 2.279735E+37
13.3991

No Back Half Analysis

PM-10

Method 201A / PM-10 Train

RUN NO. Outlet # 1
DATE 11-09-93

SAMPLING LOCATION Baghouse Outlet
PROJECT NO. [illegible]

p. 1 of 1
OPERATOR [illegible]

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 705.505 — DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O — DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE — INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1																
2																
3																
4	14:46/368		898.693	1.9	0.67	0.67	60°	85	79	5.0	64					
5	14:26/338		877.765	2.1	0.67	0.67	60°	84	77	5.0	64°					
6	13:26/288		857.105	1.9	0.67	0.67	59°	83	76	5.0	63°					
7	12:45/247		834.75	1.8	0.67	0.67	59°	82	75	5.0	60°					
8	12:04/206		813.075	1.8	0.67	0.67	57°	~~62~~ 81	~~62~~ 74	5.0	54°					
9	11:21/163		791.175	1.8	0.67	0.67	57°	~~62~~ 81	~~62~~ 73	5.0	53°					
10	10:40/122		769.595	2.3	0.67	0.67	57°	~~62~~ 79	~~62~~ 70	5.0	54°					
11	9:59\80		748.110	2.3	0.67	0.67	57°	~~62~~ 76	~~62~~ 65	5.0	54°					
12	9:17\39	~~728.455~~	728.455	1.9	0.67	0.67	57°	63	62	5.0	54°					
	8:39\0															

FINAL LEAK CHECK 0.004 @ 5 PSI

COMMENTS

Initial Leak Check = 0.001

Revision 9-4-86

FILE NAME - bagout1
RUN # - bagout1
LOCATION - baghouse
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:46:17

Initial Meter Volume (Cubic Feet)=	708.505
Final Meter Volume (Cubic Feet)=	888.673
Meter Factor=	1.010
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	181.970
Gas Volume (Dry Standard Cubic Feet)=	175.437
Barometric Pressure (in Hg)=	29.27
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	76
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	1.990
Average Stack Temperature (F)=	58
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	1.4092
% Isokinetic=	92.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	350.0
Nozzle Diameter (Inches)=	0.146
Stack Axis #1 (Inches)=	32.0
Stack Axis #2 (Inches)=	32.0
Circular Stack	
Stack Area (Square Feet)=	5.59
Stack Velocity (Actual, Feet/min)=	4,773
Flow Rate (Actual, Cubic ft/min)=	26,656
Flow rate (Standard, Wet, Cubic ft/min)=	26,541
Flow Rate (Standard, Dry, Cubic ft/min)=	26,140

898 ?

?

Particulate Loading - Front Half

Particulate Weight (g)=	0.0027	Corr. to 7% 02 & 12% C02
Particulate Loading, Dry Std. (gr/scf)=	0.0002	% 4.042677E+34
		0.0238
Particulate Loading, Actual (gr/cu ft)=	0.0002	
Emission Rate (lb/hr)=	0.05	

No Back Half Analysis

BLANKS (FRONT-HALF PARTICULATE MATTER) ANALYSIS DATA

MRI Project No. 4601.01.05.01 Client: EPA/Emission Measurement Branch
Sampling Location: Kiln Facility: Belden Brick, Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight. Filters heated at 105° C for 2-3 hours, desiccated, and weighed to a constant weight.

ACETONE BLANK DETERMINATION: Run No.(s): 1114-1 Beaker No. 1114-131 Sample No. 1065
Acetone Volume Evaporated: Beaker + Evaporated Acetone Residue Weights:

			Date	Time
Beaker + Acetone Wt.(g) 265.2	Gross Wt.(g)	116.3952	12-02-93	~~1400~~
Beaker Tare Wt.(g) ~~116.4001~~	Gross Wt.(g)	116.3946	"	1430
Acetone Wt.(g) 148.8	Gross Wt.(g)	116.3946	"	1500
Acetone Wt./0.79 = mLs Acetone (A): 188.35	Gross Wt.(g)	116.3946	"	1530

Beaker + Acetone Residue Gross Wt. used for blank determination (g) 116.3946
Beaker Tare Wt. from tare weight data (g) 116.3936,9
Net Wt.(B), Residue in Beaker (g) .0007

Acetone Blank (B x 1000/A): 0.0037 mg/mL for data entry or for computing combined blank
COMMENTS:

WATER BLANK DETERMINATION: Run No.(s): ——— Beaker No. ~~1114-132~~ Sample No. ~~2065~~
Water Volume Evaporated: Beaker + Evaporated Water Residue Weights:

			Date	Time
Beaker + Water Wt.(g)	Gross Wt.(g)			
Beaker Tare Wt.(g)	Gross Wt.(g)			
Water Wt.(g)	Gross Wt.(g)			
Water Wt. = mLs Water (A):	Gross Wt.(g)			

Beaker + Water Residue Gross Wt. used for blank determination (g)
Beaker Tare Wt. from tare weight data (g)
Net Wt.(B), Residue in Beaker (g)

Water Blank (B x 1000/A): mg/mL for data entry or for computing combined blank
COMMENTS:

FILTER BLANK: Run No.(s): 1 Filter No. LF19 Sample No. 1056

		Date	Time
Gross Wt.(g)	1.1129	12-02-93	1500
Gross Wt.(g)	1.1129	"	
Gross Wt.(g)	1.1128	"	
Gross Wt.(g)	1.1129	"	1600

Filter Gross Wt. (A) used for blank determination (g) 1.1129
Filter Tare Wt. (B) from tare weight data (g) 1.1129
Net Filter Wt. (A-B) Difference (g) 0.000

Filter Blank (±): grams for data entry (retain minus sign if value is negative)
COMMENTS:

NOTE: Control filter and beaker weight data and balance check data are on another form.

Mike Needs To initial original of These forms & write Note on Bottom to Explain

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01 Client: Emission Measurement Branch (EIB)
Sampling Location: Kiln Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. MM5-1 Beaker No. 1065 Sample No. 1065

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt.(g)	262.0	Gross Wt.(g)	92.6267	12-02-93	1230
Beaker Tare Wt.(g)	92.5	Gross Wt.(g)	92.6267	"	1300
Sample + Rinses Wt.(g)	169.5	Gross Wt.(g)	92.6266	"	1330
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g)	92.6266	"	1400
Acetone Wt.(g)	169.5				
Acetone Wt./0.79 = mLs Acetone (B):	214.5				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 92.~~6266~~ 5844
Beaker Tare Wt. from tare weight data (g) 92.5408
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. MM5-2 Beaker No. 2065 Sample No. 2065

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt.(g)	296.2	Gross Wt.(g)	103.7065	12-02-93	1235
Beaker Tare Wt.(g)	103.7	Gross Wt.(g)	103.7063	"	1305
Sample + Rinses Wt.(g)	192.5	Gross Wt.(g)	103.7064	"	1335
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g)	103.7066	"	1405
Acetone Wt.(g)	192.5				
Acetone Wt./0.79 = mLs Acetone (B):	243.7				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 103.7065
Beaker Tare Wt. from tare weight data (g) 103.6735
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. MM-5-3 Beaker No. 3065 Sample No. 3065

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt.(g)	226.9	Gross Wt.(g)	99.3347	12-02-93	1240
Beaker Tare Wt.(g)	99.3	Gross Wt.(g)	99.3345	"	1310
Sample + Rinses Wt.(g)	127.6	Gross Wt.(g)	99.3348	"	1340
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g)	99.3346	"	1410
Acetone Wt.(g)	127.6				
Acetone Wt./0.79 = mLs Acetone (B):	160.8				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 99.3346
Beaker Tare Wt. from tare weight data (g) 99.2743
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min	0	0	0
% isokinetic	94.8	100.5	100.5
Sample volume, ACM	3.004	2.966	3.294
Sample volume, DSCM	2.891	2.844	3.136
GAS PARAMETERS			
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Velocity, m/min			
Flowrate, ACMM	~~610.5~~	~~572.1~~	~~628.2~~
Flowrate, DSCMM	584.3	547.2	598.0
MASS COLLECTED, ug			
Phenol	13	13	8.7
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	4.8	4.9	9.7
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	2.1	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	623
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	6	12	8.5
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

1055, 983, 1091

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min			
% isokinetic	94.8	100.5	100.5
Sample volume, ACF	106.077	104.759	116.333
Sample volume, DSCF	102.084	100.421	110.755
GAS PARAMETERS			
Gas temperature, F	433	428	428
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACFM	21,559	20,202	22,184
Flowrate, DSCFM	20,635	19,325	21,118
MASS COLLECTED, gr			
Phenol	2.0E-04	2.0E-04	1.3E-04
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	7.4E-05	7.6E-05	1.5E-04
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	3.24E-05	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	0.0096
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	9.3E-05	0.00019	0.00013
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

37,260

34,709

38,537

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACF			
Sample volume, DSCF	0.7050085	0.7104962	0.7122403
GAS PARAMETERS			
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, ft/min			
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06
Dichlorofluoromethane			
Bromomethane (a)	5.01E-06		9.02E-07
Acetonitrile	1.16E-06		
Acrylonitrile			
Vinl chloride			
Chloroethane	1.75E-05		5.69E-06
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06
Trichlorofluoromethane			
Methylene chloride	8.54E-08	1.43E-07	2.10E-08
Acetone	1.53E-05	1.95E-05	3.92E-05
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	1.46E-06	3.34E-06	5.22E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	3.89E-05	6.69E-05	1.83E-05
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		5.23E-07	7.16E-08
2-Hexanone	4.07E-08	2.28E-06	1.52E-06
Tetrachloroethene		5.63E-08	6.09E-08
1,1,2,2-Tetrachloroethane			
Toluene	1.60E-06	2.46E-06	2.72E-06
Chlorobenzene			
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07
Styrene	1.49E-07	7.13E-07	3.85E-08
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06
o-Xylene	6.20E-07	8.97E-07	1.03E-06
Hexachloroethane			
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07

These are not correct

TABLE 3-19. KILN EMISSION TESTS RESULTS–VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACM	0	0	0
Sample volume, DSCM	0.019964	0.0201194	0.0201688
GAS PARAMETERS			
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, m/min			
Flowrate, ACM/min	572.3	574.3	576.4
Flowrate, DSCM/min	541.0	546.5	552.0
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	1475.956	88.518	192.644
Dichlorofluoromethane			
Bromomethane (a)	324.879		58.478
Acetonitrile	75.424		
Acrylonitrile			
Vinl chloride			
Chloroethane	1132.853		368.637
Iodomethane (a)	159.293	13.875	74.476
Trichlorofluoromethane			
Methylene chloride	5.532	9.259	1.362
Acetone	993.771	1261.417	2543.338
Carbon disulfide	42.116	51.006	25.523
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	94.629	216.682	338.132
1,1,1-Trichloroethane	7.108		4.913
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	2622.718	4337.655	1184.394
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		33.904	4.64
2-Hexanone	2.64	147.467	98.485
Tetrachloroethene		3.65	3.944
1,1,2,2-Tetrachloroethane			
Toluene	103.442	159.558	176.358
Chlorobenzene			
Ethylbenzene	30.577	41.073	52.656
Styrene	9.654	46.172	2.492
m-/p-Xylene	46.992	64.574	77.281
o-Xylene	40.168	58.095	66.438
Hexachloroethane			
1,2-Dbromo-3-chloropropane		116.513	20.215

delete — Conc Blank

Check

Should Be more like 1000

TABLE 3-25. DRYER EMISSION TESTS RESULTS--
THC, METHANE AND ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, C	38	38	38	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
~~Velocity, m/min~~	~~841~~	~~831~~	~~852~~	
Flowrate, ACM/min	1,971	1,947	1,995	
~~Flowrate, DSCM/min~~	~~1,734~~	~~1,712~~	~~1,755~~	
CONCENTRATION, ppm				Average
THC, as propane (b)	80.2	85.6	91.9	85.9
THC, as methane (b)	241	257	276	258
Methane (c)	102	91.0	106	99.7
Ethane (c)	9.2	6.7	7.6	7.8

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively

TABLE 3-25. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, F	100	100	100	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, ft/min	2,760	2,726	2,794	
Flowrate, ACFM	69,606	68,760	70,452	
Flowrate, DSCFM	61,225	60,472	61,978	
CONCENTRATION, ppm				Average
THC, as propane (b)	80.2	85.6	91.9	85.9
THC, as methane (b)	241	257	276	258
Methane (c)	102	91.0	106	99.7
Ethane (c)	9.2	6.7	7.6	7.8

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

July 22, 1994

TO: Dennis Hooton

FROM: Roy Neulicht

SUBJECT: Beldon Brick Test Report QA review/audit
MRI Project No. 4601-01, Task No. 05-05

Enclosed is the draft report with appendices. Please conduct a QA audit and prepare a brief summary of the audit. I believe your review woould be most beneficial if you would focus on:

- VOST analysis
- Metals analysis
- Semivolatiles analysis
- HCl/HF analysis

It would be useful if you would check the results of instrument calibrations and audit samples, as well as conduct a spot check that the correct mass of analyte was used in calculating the reported concentrations. The mass of analytes used in calculating concentrations are reported in the tables in section 3 of the report. I have checked the PM filter weights and subsequent calcualtions of concentration.

Any comments you have about blank corrections and reporting non-detect levels also would be useful. Your review of Section 5 -- Internal QA/QC results and assistance in succintly summarizing the key QC results would also be appreciated.

Note that a few anomolies have been reported by the analysts. Your assessment of the impact of these anomalies and how we should report results, qualify results, and discuss in the report also would be appreciated. These include:

- "Higher than normal" blanks for the filter blanks used in the metals train

- Observation of chloromethane, bromomethane, and iodomethane in the system blanks during VOST analysis

Please recall that this test was conducted in support of the emission factor development program for EPA (emission factors are used as emission estimating tools). Although we desire the results to be as accurate and precise as possible, these data will not be used for compliance purposes or regulatory development purposes. Your level of effort in conducting the audit should take this into consideration. Your budget for this project was 32 hours and $2,945. My records show that 12 hrs and $1,140 dollars have been expended to date.

I will be on vacation during the week of July 25; please contact Rick Marinshaw at ext 5359 if you have any questions or need additonal information. Thanks

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TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Chloroethane	1.8E-03		6.1E-04	1.2E-03	5.8E-04		1.9E-04	3.9E-04
Methylene chloride	9.0E-06	1.5E-05	2.2E-06	8.8E-06	2.8E-06	4.8E-06	7.1E-07	2.8E-06
Acetone	1.6E-03	2.1E-03	4.2E-03	2.6E-03	5.1E-04	6.5E-04	1.3E-03	8.3E-04
Carbon disulfide	6.8E-05	8.3E-05	4.2E-05	6.5E-05	2.2E-05	2.6E-05	1.3E-05	2.0E-05
2-Butanone	1.5E-04	3.5E-04	5.6E-04	3.5E-04	4.9E-05	1.1E-04	1.8E-04	1.1E-04
1,1,1-Trichloroethane	1.2E-05		8.1E-06	9.8E-06	3.7E-06		2.6E-06	3.1E-06
Benzene	4.1E-03	7.1E-03	1.9E-03	4.4E-03	1.3E-03	2.2E-03	6.2E-04	1.4E-03
4-Methyl-2-Pentanone		5.5E-05	7.6E-06	3.1E-05		1.7E-05	2.4E-06	9.9E-06
2-Hexanone	4.3E-06	2.4E-04	1.6E-04	1.4E-04	1.4E-06	7.6E-05	5.1E-05	4.3E-05
Tetrachloroethene		5.9E-06	6.5E-06	6.2E-06		1.9E-06	2.0E-06	2.0E-06
Toluene	1.7E-04	2.6E-04	2.9E-04	2.4E-04	5.3E-05	8.2E-05	9.2E-05	7.6E-05
Ethylbenzene	5.0E-05	6.7E-05	8.6E-05	6.8E-05	1.6E-05	2.1E-05	2.7E-05	2.1E-05
Styrene	1.6E-05	7.5E-05	4.1E-06	3.2E-05	5.0E-06	2.4E-05	1.3E-06	1.0E-05
m-/p-Xylene	7.6E-05	1.1E-04	1.3E-04	1.0E-04	2.4E-05	3.3E-05	4.0E-05	3.3E-05
o-Xylene	6.5E-05	9.5E-05	1.1E-04	9.0E-05	2.1E-05	3.0E-05	3.5E-05	2.8E-05
1,2-Dbromo-3-chloropropane		1.9E-04	3.3E-05	1.1E-04		6.0E-05	1.1E-05	3.5E-05

(a) Based on process rate of 3.16 Mg bricks per hour.

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--VOC'S (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run			Run	Run			
Source/analyte	1	2	3	Ave.	1	2	3	Ave.
Chloroethane	4.1E-03		1.3E-03	2.7E-03	1.2E-03		3.8E-04	7.8E-04
Methylene chloride	2.0E-05	3.3E-05	4.9E-06	1.9E-05	5.7E-06	9.6E-06	1.4E-06	5.6E-06
Acetone	3.6E-03	4.5E-03	9.2E-03	5.8E-03	1.0E-03	1.3E-03	2.6E-03	1.7E-03
Carbon disulfide	1.5E-04	1.8E-04	9.2E-05	1.4E-04	4.3E-05	5.3E-05	2.7E-05	4.1E-05
2-Butanone	3.4E-04	7.8E-04	1.2E-03	7.8E-04	9.7E-05	2.2E-04	3.5E-04	2.2E-04
1,1,1-Trichloroethane	2.5E-05		1.8E-05	2.2E-05	7.3E-06		5.1E-06	6.2E-06
Benzene	9.0E-03	1.6E-02	4.3E-03	9.6E-03	2.6E-03	4.5E-03	1.2E-03	2.8E-03
4-Methyl-2-Pentanone		1.2E-04	1.7E-05	6.9E-05		3.5E-05	4.8E-06	2.0E-05
2-Hexanone	9.5E-06	5.3E-04	3.6E-04	3.0E-04	2.7E-06	1.5E-04	1.0E-04	8.6E-05
Tetrachloroethene		1.3E-05	1.4E-05	1.4E-05		3.8E-06	4.1E-06	3.9E-06
Toluene	3.7E-04	5.7E-04	6.4E-04	5.3E-04	1.1E-04	1.6E-04	1.8E-04	1.5E-04
Ethylbenzene	1.1E-04	1.5E-04	1.9E-04	1.5E-04	3.1E-05	4.2E-05	5.5E-05	4.3E-05
Styrene	3.5E-05	1.7E-04	9.0E-06	7.0E-05	9.9E-06	4.8E-05	2.6E-06	2.0E-05
m-/p-Xylene	1.7E-04	2.3E-04	2.8E-04	2.3E-04	4.8E-05	6.7E-05	8.0E-05	6.5E-05
o-Xylene	1.4E-04	2.1E-04	2.4E-04	2.0E-04	4.1E-05	6.0E-05	6.9E-05	5.7E-05
1,2-Dbromo-3-chloropropane		4.2E-04	7.3E-05	2.5E-04		1.2E-04	2.1E-05	7.1E-05

(a) Based on process rate of 3.48 ton bricks per hour.

TABLE 3-19. KILN EMISSION TESTS RESULTS–VOC'S (METRIC UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACM	0	0	0
Sample volume, DSCM	0.019964	0.0201194	0.0201688
GAS PARAMETERS			
Gas temperature, C	204	207	209
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, m/min			
Flowrate, ACM/min	572.3	574.3	576.4
Flowrate, DSCM/min	541.0	546.5	552.0
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	1475.956	88.518	192.644
Dichlorofluoromethane			
Bromomethane (a)	324.879		58.478
Acetonitrile	75.424		
Acrylonitrile			
Vinl chloride			
Chloroethane	1132.853		368.637
Iodomethane (a)	159.293	13.875	74.476
Trichlorofluoromethane			
Methylene chloride	5.532	9.259	1.362
Acetone	993.771	1261.417	2543.338
Carbon disulfide	42.116	51.006	25.523
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	94.625	216.682	338.132
1,1,1-Trichloroethane	7.106		4.913
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	2522.718	4337.655	1184.394
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		33.904	4.64
2-Hexanone	2.64	147.467	98.485
Tetrachloroethene		3.65	3.944
1,1,2,2-Tetrachloroethane			
Toluene	103.442	159.558	176.358
Chlorobenzene			
Ethylbenzene	30.577	41.073	52.656
Styrene	9.654	46.172	2.492
m-/p-Xylene	46.992	64.574	77.281
o-Xylene	40.168	58.095	66.438
Hexachloroethane			
1,2-Dbromo-3-chloropropane		116.513	20.215

TABLE 3-19. (Continued)

CONCENTRATION, ug/DSCM				Average
Chloromethane (a)	73.930895	4.3996363	9.5515938	29.29404
Dichlorofluoromethane				
Bromomethane (a)	16.273246		2.8994316	6.390893
Acetonitrile	3.7780014			
Acrylonitrile				
Vinl chloride				
Chloroethane	56.744806		18.277605	
Iodomethane (a)	7.9790143	0.6896332	3.6926377	4.120428
Trichlorofluoromethane				
Methylene chloride	0.2770989	0.4602028	0.0675301	0.268277
Acetone	49.778164	62.696581	126.10272	79.52582
Carbon disulfide	2.1095978	2.5351663	1.2654707	1.970078
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	4.7397829	10.769809	16.765119	10.75824
1,1,1-Trichloroethane	0.3559408		0.2435943	0.299768
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	126.36339	215.59575	58.724125	133.5611
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		1.6851405	0.2300585	0.9576
2-Hexanone	0.1322381	7.3295958	4.8830419	4.114959
Tetrachloroethene		0.181417	0.1955498	0.188483
1,1,2,2-Tetrachloroethane				
Toluene	5.1814279	7.9305583	8.7441082	7.285365
Chlorobenzene				
Ethylbenzene	1.5316073	2.0414634	2.6107677	2.061279
Styrene	0.4835706	2.2949005	0.1235573	0.967343
m-/p-Xylene	2.3538375	3.2095406	3.8317141	3.131697
o-Xylene	2.0120222	2.8875129	3.294101	2.731212
Hexachloroethane				
1,2-Dbromo-3-chloropropane		5.79108	1.0022916	3.396686

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-19. KILN EMISSION TESTS RESULTS--VOC'S (ENGLISH UNITS)

Run No.	1	2	3
Date	11/11/93	11/11/93	11/11/93
Start time	15:50	16:50	17:45
Finish time	16:10	17:10	18:05
Sample time, min	20	20	20
Sample volume, ACF			
Sample volume, DSCF	0.7050085	0.7104962	0.7122403
GAS PARAMETERS			
Gas temperature, F	400	405	409
Oxygen, %	17.6	17.6	17.6
Carbon dioxide, %	2.2	2.2	2.2
Moisture, %	5.5	4.9	4.2
Velocity, ft/min			
Flowrate, ACFM	20,209	20,283	20,356
Flowrate, DSCFM	19,104	19,299	19,493
MASS, ng (BLANK CORRECTED)			
Chloromethane (a)	2.28E-05	1.37E-06	2.97E-06
Dichlorofluoromethane			
Bromomethane (a)	5.01E-06		9.02E-07
Acetonitrile	1.16E-06		
Acrylonitrile			
Vinl chloride			
Chloroethane	1.75E-05		5.69E-06
Iodomethane (a)	2.46E-06	2.14E-07	1.15E-06
Trichlorofluoromethane			
Methylene chloride	8.54E-08	1.43E-07	2.10E-08
Acetone	1.53E-05	1.95E-05	3.92E-05
Carbon disulfide	6.50E-07	7.87E-07	3.94E-07
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (total)			
t-1,2-Dichloroethene			
Chloroform			
1,2-Dichloroethane			
2-Butanone	1.46E-06	3.34E-06	5.22E-06
1,1,1-Trichloroethane	1.10E-07		7.58E-08
Carbon tetrachloride			
Vinyl acetate			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
2-Chloroethyl vinyl ether			
Dibromochloromethane			
Dibromomethane			
Dibromoethane			
1,1,2-Trichloroethane			
1,4-Dichloro-2-butene			
Benzene	3.89E-05	6.69E-05	1.83E-05
trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone		5.23E-07	7.16E-08
2-Hexanone	4.07E-08	2.28E-06	1.52E-06
Tetrachloroethene		5.63E-08	6.09E-08
1,1,2,2-Tetrachloroethane			
Toluene	1.60E-06	2.46E-06	2.72E-06
Chlorobenzene			
Ethylbenzene	4.72E-07	6.34E-07	8.13E-07
Styrene	1.49E-07	7.13E-07	3.85E-08
m-/p-Xylene	7.25E-07	9.97E-07	1.19E-06
o-Xylene	6.20E-07	8.97E-07	1.03E-06
Hexachloroethane			
1,2-Dbromo-3-chloropropane		1.80E-06	3.12E-07

X

TABLE 3-19. (Continued)

CONCENTRATION, gr/DSCF				Average
Chloromethane (a)	3.2E-05	1.923E-06	4.174E-06	1.28E-05
Dichlorofluoromethane				
Bromomethane (a)	7.1E-06		1.267E-06	2.79E-06
Acetonitrile	1.7E-06			
Acrylonitrile				
Vinl chloride				
Chloroethane	2.5E-05		7.987E-06	
Iodomethane (a)	3.5E-06	3.014E-07	1.614E-06	1.8E-06
Trichlorofluoromethane				
Methylene chloride	1.2E-07	2.011E-07	2.951E-08	1.17E-07
Acetone	2.2E-05	2.74E-05	5.511E-05	3.48E-05
Carbon disulfide	9.2E-07	1.108E-06	5.53E-07	8.61E-07
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
t-1,2-Dichloroethene				
Chloroform				
1,2-Dichloroethane				
2-Butanone	2.1E-06	4.706E-06	7.326E-06	4.7E-06
1,1,1-Trichloroethane	1.6E-07		1.064E-07	1.31E-07
Carbon tetrachloride				
Vinyl acetate				
Bromodichloromethane				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
2-Chloroethyl vinyl ether				
Dibromochloromethane				
Dibromomethane				
Dibromoethane				
1,1,2-Trichloroethane				
1,4-Dichloro-2-butene				
Benzene	5.5E-05	9.421E-05	2.566E-05	5.84E-05
trans-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone		7.364E-07	1.0E-07	4.18E-07
2-Hexanone	5.8E-08	3.203E-06	2.134E-06	1.8E-06
Tetrachloroethene		7.928E-08	8.545E-08	8.24E-08
1,1,2,2-Tetrachloroethane				
Toluene	2.3E-06	3.466E-06	3.821E-06	3.18E-06
Chlorobenzene				
Ethylbenzene	6.7E-07	8.921E-07	1.141E-06	9.0E-07
Styrene	2.1E-07	1.003E-06	5.399E-08	4.2E-07
m-/p-Xylene	1.0E-06	1.403E-06	1.674E-06	1.4E-06
o-Xylene	8.8E-07	1.262E-06	1.44E-06	1.2E-06
Hexachloroethane				
1,2-Dbromo-3-chloropropane		2.531E-06	4.38E-07	1.5E-06

(a) Results invalid due to contaminated blank sample.
(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.
(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related
(d) Interference coeluted with analyte; mass spectrum did not meet criteria.
(e) Results biased low due to mass peak saturating the mass spectrometric detector.

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (METRIC UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min	0	0	0
% isokinetic	94.8	100.5	100.5
Sample volume, ACM	3.004	2.966	3.294
Sample volume, DSCM	2.891	2.844	3.136
GAS PARAMETERS			
Gas temperature, C	223	220	220
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Velocity, m/min			
Flowrate, ACMM	610.5	572.1	628.2
Flowrate, DSCMM	584.3	547.2	598.0
MASS COLLECTED, ug			
Phenol	13	13	8.7
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	4.8	4.9	9.7
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	2.1	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	623
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	6	12	8.5
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

TABLE 3-20. KILN EMISSION TESTS RESULTS--SEMI-VOLATILES (ENGLISH UNITS)

Run No.	1	2	3
Date	11/09/93	11/10/93	11/10/93
Start time	14:30	09:42	15:53
Finish time	19:15	13:57	19:47
Sample time, min			
% isokinetic	94.8	100.5	100.5
Sample volume, ACF	106.077	104.759	116.333
Sample volume, DSCF	102.084	100.421	110.755
GAS PARAMETERS			
Gas temperature, F	433	428	428
Oxygen, %	17.8	18.8	17.8
Carbon dioxide, %	2.2	1.8	2.2
Moisture, %	4.3	4.3	4.8
Flowrate, ACFM	21,559	20,202	22,184
Flowrate, DSCFM	20,635	19,325	21,118
MASS COLLECTED, gr			
Phenol	2.0E-04	2.0E-04	1.3E-04
Aniline	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2
2-Chlorophenol	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2
1,4-Dichlorobenzene	7.4E-05	7.6E-05	1.5E-04
Benzyl alcohol	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
2-Methylphenol	3.24E-05	<2	<2
2,2'-oxybis(1-Chloropropane)	<2	<2	<2
4-Methylphenol	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2
Hexachloroethane	<2	<2	<2
Nitrobenzene	<2	<2	<2
Isophorone	<2	<2	<2
2-Nitrophenol	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2
Benzoic acid	<2	<2	0.0096
Bis(2-chloroethoxy)methane	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2
Naphthalene	9.3E-05	0.00019	0.00013
4-Chloroaniline	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2

TABLE 3-25. DRYER EMISSION TESTS RESULTS--
THC, METHANE AND ETHANE (METRIC UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, C	38	38	38	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, m/min	841	831	852	
Flowrate, ACM/min	1,971	1,947	1,995	
Flowrate, DSCM/min	1,734	1,712	1,755	
CONCENTRATION, ppm				Average
THC, as propane (b)	80.2	85.6	91.9	85.9
THC, as methane (b)	241	257	276	258
Methane (c)	102	91.0	106	99.7
Ethane (c)	9.2	6.7	7.6	7.8

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively

TABLE 3-25. (ENGLISH UNITS)

Run No.	1	2	3	
Date	11/11/93	11/11/93	11/11/93	
Start time	10:35	13:11	15:27	
Finish time	12:36	15:11	17:27	
Sample time	121	120	120	
GAS PARAMETERS (a)				
Gas temperature, F	100	100	100	
Oxygen, %	17.6	17.6	17.6	
Carbon dioxide, %	2.2	2.2	2.2	
Moisture, %	4.2	4.2	4.2	
Velocity, ft/min	2,760	2,726	2,794	
Flowrate, ACFM	69,606	68,760	70,452	
Flowrate, DSCFM	61,225	60,472	61,978	
CONCENTRATION, ppm				Average
THC, as propane (b)	80.2	85.6	91.9	85.9
THC, as methane (b)	241	257	276	258
Methane (c)	102	91.0	106	99.7
Ethane (c)	9.2	6.7	7.6	7.8

(a) Run 1 gas parameter data estimated as average of Runs 2 and 3 data.
(b) Based on average of 120 1-minute readings
(c) Runs 1, 2, and 3 based on 6, 8, and 1 readings, respectively

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (METRIC)

	Emission rate, kg/hr				Emission factor, kg/Mg (a)			
	Run				Run			
Analyte	1 (b)	2	3	Average	1 (b)	2	3	Average
THC, as methane	16.7	17.6	19.4	17.9	5.3	5.6	6.1	5.7
methane	7.1	6.2	7.5	6.9	2.2	2.0	2.4	2.2
ethane	1.2	0.86	1.0	1.0	0.38	0.27	0.32	0.32

(a) Emission factors based on process rate of 3.16 Mg of brick produced per hour
(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

TABLE 3-11. SUMMARY OF DRYER EMISSION RATES AND EMISSION FACTORS--
THC, METHANE AND ETHANE (ENGLISH)

	Emission rate, lb/hr				Emission factor, lb/ton			
	Run				Run			
Analyte	1 (b)	2	3	Average	1 (b)	2	3	Average
THC, as methane	37	39	43	39	10.6	11.1	12.3	11.3
methane	16	14	16	15	4.5	3.9	4.7	4.4
ethane	2.6	1.9	2.2	2.2	0.76	0.54	0.63	0.65

(a) Emission factors based on process rate of 3.48 tons of brick produced per hour
(b) Run 1 flow rate estimated as average of flow rates for Runs 2 and 3.

D.3 QA/QC AUDIT REPORT

(To be completed)

APPENDIX E.

SAMPLE CALCULATIONS

(To be completed)

Document Control Sheet

Project No.: 4601-01 (Subtask No.) 05
Document Name: Test Report Transmittal Letter
CBI: ☐ Yes ☒ No
Originator: Marinshaw Ext. 5355

WP COMMENTS:

WP ID No.: 3192

fle

①

Date to WP: 7/29
Due date/time: 7/29
☐ Flexible
☐ Firm
☑ RUSH

WP PROOF ☑ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☑ Draft ☑ Final ☑ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ____

REKEYED BY WP ☐

Receiving document by: ☐ Diskette–Filename ____ ☐ F:\share\towp____

Route: ____

Instructions/comments: NEED TO RAINBOW & TALK TO [illegible] MORNING

PROOFREADING/DOC. PROD.
__ Revisions only
__ Format only
__ Spellcheck only
__ Format & content
__ Total proof
__ Not proofed

②

Date to WP: ____
Due date/time: ____
☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ____

REKEYED BY WP ☐

Receiving document by: ☐ Diskette–Filename ____ ☐ F:\share\towp____

Route: ____

Instructions/comments: ____

③

Date to WP: ____
Due date/time: ____
☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ____

REKEYED BY WP ☐

Receiving document by: ☐ Diskette–Filename ____ ☐ F:\share\towp____

Route: ____

Instructions/comments: ____

J:\dms\450\dcontrol.pm4

Document Control Sheet (continued)

Project No.: ______________ (Subtask No.) _____ | WP ID No.: ______________________

4

Date to WP: ______________

Due date/time: ______________

☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ______

REKEYED BY WP ☐

Receiving document by: ☐ Diskette--Filename __________ ☐ F:\share\towp__________

Route: ______ Instructions/comments: ______________________________

5

Date to WP: ______________

Due date/time: ______________

☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ______

REKEYED BY WP ☐

Receiving document by: ☐ Diskette--Filename __________ ☐ F:\share\towp__________

Route: ______ Instructions/comments: ______________________________

6

Date to WP: ______________

Due date/time: ______________

☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ____ | ☐ Scan __ Text __ Figure __ Photo __ Other | ☐ Graphics __ General use __ 35 mm slides __ Transparency __ Satellite/other

WP INITIALS ______

REKEYED BY WP ☐

Receiving document by: ☐ Diskette--Filename __________ ☐ F:\share\towp__________

Route: ______ Instructions/comments: ______________________________

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

DRAFT

JUL 29 1994

Mr. John Jensen
Environmental Engineer
Belden Brick Company
Post Office Box 430
Sugarcreek, Ohio 44681

Dear Mr. Jensen:

Enclosed are two copies of the draft test report for the emission test conducted at Belden Brick Company (Belden) Plant 6 by Midwest Research Institute (MRI) on November 8 to 12, 1993. We would appreciate your reviewing the report for any errors or omissions. You may return a marked up copy of the draft report with your comments or provide written comments separately, if you wish. Please note that the results presented in the report are not considered final at this time; an independent quality control audit of the report is being conducted concurrently with your review. The report also will subjected to additional quality control and review by the U. S. Environmental Protection Agency prior to being finalized. Consequently, some of the test results may change, but we do not expect major changes to the report. A final copy of the report will be sent to you for your records.

We respectively request that you submit your review comments by September 16, 1994. If you need additional time to complete your review or have questions concerning the draft report please contact me at (919) 541-5407 or Richard Marinshaw of MRI at (919) 677-0249, extension 5359.

We appreciate the information provided by Belden and your assistance and cooperation in conducting the emission test.

Sincerely,

Ronald E. Myers
Emission Inventory Branch
Technical Support Division

Enclosure

9/19/94

CALL FROM RGV

- JOHN BROWN SAYS BELDEN THC FOR DRYER IS OFF BY 50%

- CHECK TO SEE IF CHROMIC ACID IS USED TO CLEAN GLASSWARE.
  COULD BE CAUSE OF HIGH Cr RATES

- ASK NCO ABOUT DOING ANALYSIS OF Methane/ethane/THC BY TEDLAR BAG

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

November 11, 1994

To: Dennis Hooton

From: Rick Marinshaw

Subject: Belden Brick Emission Test--VOST Results

Enclosed is a copy of the analytical results for the VOST runs at Belden Brick and the revised table that presents the data in the report. If you recall, there was a problem with the footnotes for the VOST data in the draft report. I have revised the footnotes to be consistent with the comments made in the analytical report tables. I would appreciate if you could do the following:

1. Review the footnotes in the revised table (Table 3-19) and let me know if they are acceptable.

2. Comment on Margie's footnote No. 3 for Sample No. 1069. The footnote seems to pertain to chloroethane, yet it is iodomethane that is footnoted. Do you think the footnote is correct? Should we footnote the table in the test report accordingly? Note that iodomethane was detected at a high level in the first tenax sample, but was not detected in the tenax samples for the other two runs.

3. For which of the footnoted compounds should we not report the emission rates and emission factors? Or should we report the emission rates and factors for all of those compounds but footnote the emission rate/factor table in the report?

4. Regarding EMB's comment on the wide run-to-run range for 2-hexanone, the T/C sample in the first run (2.64 ng) is only slightly higher than the detection limit (1.78 ng); in the other two runs it was not detected in the T/C samples but was at relatively high levels in the Tnx samples. Should we consider the first run as a non-detect?

We would like to finalize this report soon. Please give Roy or me a call if you have any questions about what needs to be done to finalize it.

Thank you.

cc: Roy Neulicht

VOST RAW DATA

Source/analyte	Catch, ng							
	Run						AW	AX
	AK 1	AM	AO 2	AQ	AS 3	AU	Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	<12.63	<3.85						
Bromomethane (a)	388.741	<12.06	23.256		12.912	108.12	63.862	49.642
Acetonitrile	75.424 c	<						
Acrylonitrile	<13.88	<4.76					6.262	
Vinyl chloride	<15.09	<3.35						
Chloroethane	<18.47	1132.853 d				368.637		
Iodomethane (a)	209.954 a	32.46		31.42		92.021	65.576	17.545 d
Trichlorofluoromethane	<5.02	<3.51						
Methylene chloride	<15.86	18.758 d		22.485		14.588	15.768	13.226 d
Acetone	993.771 a	<15.13	1261.417 a		2543.338 d			
Carbon disulfide	<22.72	42.116		51.006		25.523		
1,1-Dichloroethene	<22.62	<4.38						
1,1-Dichloroethane	<8.81	<2.19						
1,2-Dichloroethene (total)	< 0.00	< 0.0b						
t-1,2-Dichloroethene	<6.9	<1.28						
Chloroform	<5.96	<2.01						0.121 d
1,2-Dichloroethane	<6.90	<1.15						
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106				4.913		
Carbon tetrachloride	<7.49	<1.15						
Vinyl acetate	<3.94	<0.82						
Bromodichloromethane	<4.51	<1.08						
1,2-Dichloropropane	<1.68	<1.20						
cis-1,3-Dichloropropene	<3.82	<1.53						
Trichloroethene	<3.87	<0.87						
2-Chloroethyl vinyl ether	<7.69	<2.80						
Dibromochloromethano	<3.13	<1.28						
Dibromomethane	<5.47	<1.84						
Dibromoethane	<3.78	<1.29						
1,1,2-Trichloroethane	<3.87	<1.20						
1,4-Dichloro-2-butene	<8.41	<2.00						
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626		22.377
trans-1,3-Dichloropropene	<3.51	<0.98						
Bromoform	<2.88	<1.42						
4-Methyl-2-Pentanone	<3.95	<1.12	36.812			4.64	2.908	
2-Hexanone	<8.78	2.64	154.551	1.701 d	90.96	16.31	8.785	
Tetrachloroethene	<3.52	<0.91	3.65		3.944			
1,1,2,2-Tetrachloroethane	<10.18	<0.92						
Toluene	102.81	2.777	157.326	4.377	174.73	3.773		2.145
Chlorobenzene	<2.94	<0.78	31.433					
Ethylbenzene	27.219	5.972	41.073	1.303	45.63	9.64		2.614
Styrene	11.832	1.125	46.412	3.084		3.638	2.178	1.146 d
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	1.222	1.347
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411		0.444
Hexachloroethane	<2.48	<0.75						
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513			20.215		

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

VOST DATA--BLANK CORRECTED

Source/analyte	Catch, ng					
	Run					
	1		2		3	
	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1427.487 b	48.469 d		88.518	d	192.644
Dichlorofluoromethane						
Bromomethane (a)	324.879					58.478
Acetonitrile	75.424 c					
Acrylonitrile						
Vinl chloride						
Chloroethane		1132.853 d				368.637
Iodomethane (a)	144.378 a	14.915		13.875		74.476
Trichlorofluoromethane						
Methylene chloride		5.532 d		9.259		1.362
Acetone	993.771 a		1261.417 a		2543.338 d	
Carbon disulfide		42.116		51.006		25.523
1,1-Dichloroethene						
1,1-Dichloroethane						
1,2-Dichloroethene (total)						
t-1,2-Dichloroethene						
Chloroform						
1,2-Dichloroethane						
2-Butanone	90.74	3.885	205.924	10.758	330.505	7.627
1,1,1-Trichloroethane		7.106				4.913
Carbon tetrachloride						
Vinyl acetate						
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene						
2-Chloroethyl vinyl ether						
Dibromochloromethane						
Dibromomethane						
Dibromoethane						
1,1,2-Trichloroethane						
1,4-Dichloro-2-butene						
Benzene	2394.07	128.648	4249.583 a	88.072	1048.145 e	136.249
trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone			33.904			4.64
2-Hexanone		2.64	145.766	1.701 d	82.175	16.31
Tetrachloroethene			3.65		3.944	
1,1,2,2-Tetrachloroethane						
Toluene	102.81	0.632	157.326	2.232	174.73	1.628
Chlorobenzene						
Ethylbenzene	27.219	3.358	41.073		45.63	7.026
Styrene	9.654		44.234	1.938		2.492
m-/p-Xylene	45.595	1.397	61.78	2.794	74.202	3.079
o-Xylene	39.935	0.233	57.334	0.761	65.471	0.967
Hexachloroethane						
1,2-Dbromo-3-chloropropane			116.513			20.215

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

10/24/94

TO: Denny Hooton

FROM: Roy Neulicht

SUBJECT: Belden Brick

Thanks for your time on friday to discuss wrapping up Belden Brick. My notes indicate we agreed upon the following action items:

√ 1. Establish how blank corrections were done for VOST.
Roy obtain example calculation from Rick Marinshaw and forward to Dennis (see comment #3 of Hooton's memo of 8/11)

√ 2. Semivolatiles: prepare final lab report for appendix [currently have only draft]
Rick coordinate with Marilyn

3. VOST surrogate recoveries need to be calculated and summarized in report.
Dennis to prepare summary table format and request chemistry complete calculations; Dennis's time estimate for chemistry to complete is < 4 hrs.

4. Metals
Roy to check if we have complete files in NC (we do not; we only have summary report)
Dennis to check calculations of chromium and nickel for all three runs.
Roy to check with field programs to confirm whether glassware was/was not chromic acid washed. Roy will check today 11/9/94
√ Rick to send Dennis the "historical" blank data we received from Avie so that he may compare to blank data from this test.

5. QA section of report
Dennis to review entire section and add to/delete from, as appropriate.

6. QA audit report.
Dennis to prepare brief report of his audit for appendix.

7. Incorporate suggestions from Dennis' memo of 8/11.
Roy & Rick:
No a) Footnote tables to indicate maximum emission rate resulting from non-detects (Roy discuss with Rick....not sure we really need to do this)

Rick b) Table 3-19; apparent error in footnotes; check

c) Clarify chloromethane, bromomethane, benzene, results in footnote

see text

d) qualify results for Cd, Co, Pb, Sb, Se - high blanks

use footnote

e) Correct error in table on pg 3-36: less than values are presented in metric units not english

Correct to English

The correct billing number for the project is: 4602-01-02. You indicated it should take chemistry less than 4 hours to calculate the VOST surrogates data. We did not discuss an estimate for your time; is 8 hours reasonable? Please let me know in advance if you expect the KC billing to exceed these amounts. Thanks.

INTEROFFICE MEMORANDUM

MIDWEST RESEARCH INSTITUTE

November 9, 1994

To: Dennis Hooton

From: Rick Marinshaw

Subject: Belden Brick Emission Test

To follow up Roy Neulicht's October 24, 1994 memo to you I am forwarding to you the following:

- Metals historical data provided by Avie Mainey; and
- Printouts of the spreadsheet used to blank correct the VOST data.

The blank corrections were made by substracting the field blank mass from the sample mass for each run, then summing the net tenax and tenax/charcoal masses to yield the total blank-corrected mass. The following is an example.

Chloromethane--Run 1

Tnx-sample		Tnx-blank	=	Tnx-corrected mass
1,505.996	-	78.509	=	1,427.487

T/C-sample		T/C-blank	=	T/C-corrected mass
99.018	-	50.549	=	48.469

Tnx-corrected	+	T/C-corrected	=	Total blank-corrected mass
1,427.487	+	48.469	=	1,475.956

If the tenax blank or the tenax/charcoal blank were higher than the corresponding mass quantified in a sample, I used zero for that term in the blank corrections.

Either Roy or I will be contacting you soon regarding the other changes needed for finalizing the test report.

cc: Roy Neulicht

VOST RAW DATA--KILN

Source/analyte	Catch, ng							
	Run							
	1		2		3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	<12.63	<3.85						
Bromomethane (a)	388.741	<12.06	23.256		12.912	108.12	63.862	49.642
Acetonitrile	75.424 c	<						
Acrylonitrile	<13.88	<4.76					6.262	
Vinyl chloride	<15.09	<3.35						
Chloroethane	<18.47	1132.853 d				368.637		
Iodomethane (a)	209.954 a	32.46		31.42		92.021	65.576	17.545 d
Trichlorofluoromethane	<5.02	<3.51						
Methylene chloride	<15.86	18.758 d		22.485		14.588	15.768	13.226 d
Acetone	993.771 a	<15.13	1261.417 a		2543.338 d			
Carbon disulfide	<22.72	42.116		51.006		25.523		
1,1-Dichloroethene	<22.62	<4.38						
1,1-Dichloroethane	<8.81	<2.19						
1,2-Dichloroethene (total)	<	<						
t-1,2-Dichloroethene	<6.9	<1.28						
Chloroform	<5.96	<2.01						0.121 d
1,2-Dichloroethane	<6.90	<1.15						
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106				4.913		
Carbon tetrachloride	<7.49	<1.15						
Vinyl acetate	<3.94	<0.82						
Bromodichloromethane	<4.51	<1.08						
1,2-Dichloropropane	<1.68	<1.20						
cis-1,3-Dichloropropene	<3.82	<1.53						
Trichloroethene	<3.87	<0.87						
2-Chloroethyl vinyl ether	<7.69	<2.80						
Dibromochloromethane	<3.13	<1.28						
Dibromomethane	<5.47	<1.84						
Dibromoethane	<3.78	<1.29						
1,1,2-Trichloroethane	<3.87	<1.20						
1,4-Dichloro-2-butene	<8.41	<2.00						
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626		22.377
trans-1,3-Dichloropropene	<3.51	<0.98						
Bromoform	<2.88	<1.42						
4-Methyl-2-Pentanone	<3.95	<1.12	36.812			4.64	2.908	
2-Hexanone	<8.78	2.64	154.551	1.701 d	90.96	16.31	8.785	
Tetrachloroethene	<3.52	<0.91	3.65		3.944			
1,1,2,2-Tetrachloroethane	<10.18	<0.92						
Toluene	102.81	2.777	157.326	4.377	174.73	3.773		2.145
Chlorobenzene	<2.94	<0.78	31.433					
Ethylbenzene	27.219	5.972	41.073	1.303	45.63	9.64		2.614
Styrene	11.832	1.125	46.412	3.084		3.638	2.178	1.146 d
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	1.222	1.347
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411		0.444
Hexachloroethane	<2.48	<0.75						
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513			20.215		

(a) Results invalid due to contaminated blank sample.

(b) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane.

(c) High background coelutes with the target analyte; detection limit may be higher due to matrix related interference; results biased high.

(d) Interference coeluted with analyte; mass spectrum did not meet criteria.

(e) Results biased low due to mass peak saturating the mass spectrometric detector.

VOST DATA–BLANK CORRECTED

Source/analyte	Catch, ng					
	Run					
	1		2		3	
	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1427.487 b	48.469 d		88.518	d	192.644
Dichlorofluoromethane						
Bromomethane (a)	324.879					58.478
Acetonitrile	75.424 c					
Acrylonitrile						
Vinl chloride						
Chloroethane		1132.853 d				368.637
Iodomethane (a)	144.378 a	14.915		13.875		74.476
Trichlorofluoromethane						
Methylene chloride		5.532 d		9.259		1.362
Acetone	993.771 a		1261.417 a		2543.338 d	
Carbon disulfide		42.116		51.006		25.523
1,1-Dichloroethene						
1,1-Dichloroethane						
1,2-Dichloroethene (total)						
t-1,2-Dichloroethene						
Chloroform						
1,2-Dichloroethane						
2-Butanone	90.74	3.885	205.924	10.758	330.505	7.627
1,1,1-Trichloroethane		7.106				4.913
Carbon tetrachloride						
Vinyl acetate						
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene						
2-Chloroethyl vinyl ether						
Dibromochloromethane						
Dibromomethane						
Dibromoethane						
1,1,2-Trichloroethane						
1,4-Dichloro-2-butene						
Benzene	2394.07	128.648	4249.583 a	88.072	1048.145 e	136.249
trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone			33.904			4.64
2-Hexanone		2.64	145.766	1.701 d	82.175	16.31
Tetrachloroethene			3.65		3.944	
1,1,2,2-Tetrachloroethane						
Toluene	102.81	0.632	157.326	2.232	174.73	1.628
Chlorobenzene						
Ethylbenzene	27.219	3.358	41.073		45.63	7.026
Styrene	9.654		44.234	1.938		2.492
m-/p-Xylene	45.595	1.397	61.78	2.794	74.202	3.079
o-Xylene	39.935	0.233	57.334	0.761	65.471	0.967
Hexachloroethane						
1,2-Dbromo-3-chloropropane			116.513			20.215

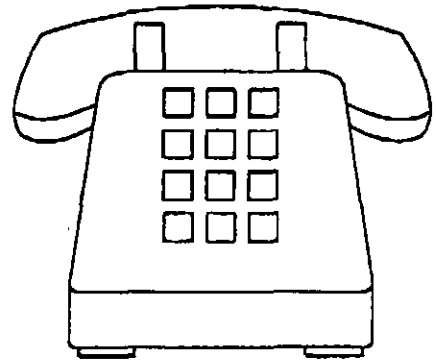
MRI FAX

MIDWEST RESEARCH INSTITUTE
425 Volker Boulevard
Kansas City, Missouri 64110-2299

FAX

(816) 753-5359, Chemical Sciences Dept.
(816) 753-8420, Institute

Telephone - (816) 753-7600



91363

Date 5/18 Time 9:35
To: Rich Manninhaw NCO
From: Dean Marbury
Overhead #, or Project, Task + Sub-Task
This transmission consists of 6 pages (including cover)
Receiving Facsimile Telephone Number 919-677-0065
Verification Telephone Number

MRI Facsimile Machine Number: (816) 753-5359 or (816) 753-8420

MRI Verification: (816) 753-7600 Ext. 1229, 1417, 1353

MESSAGE: See Attached

CALL FROM TOM ONSTOT 3/17/95
– THEY ARE REGENERATING MDL'S STARTING NEXT WEEK (NGO) & IT WILL TAKE 3-4 DAYS. WE SHOULD USE THOSE MDL'S RATHER THAN THESE. TOM WILL SEND ME A COPY WHEN HE'S FINISHED.

MIDWEST RESEARCH INSTITUTE

RAPID COMMUNICATION — FAX 09:30
919-677-0065

Date: 5/18/94

TO: Rick Marinshaw, NCO

FROM: Dean Marbury

Subject: DL's FOR EIB BRICK KILN

ATTACHED ARE THE MDL TABLES FOR THE BRICK KILN STUDY. THE MDL'S ARE IN ng/TRAP. WE ~~will~~ work TODAY TO PROVIDE A REDUCED DATA SET that simplifies ~~tes~~ these tables (EG reports only the POHC'S, PIC'S, etc OF INTEREST to the study).

I've let the Director KNOW WE'VE BEEN holding things up inordinately, AND WE WILL HAVE THE REDUCED SET COMPLETED TODAY FOR TRANSFER TO YOU THURS A.M. I hope this full table will allow you to MOVE FORWARD ON YOUR REPORT

Thanks

Dean Marbury
X1363

TENAX.XLS

ng/TRAP

COMPLETED BY			METHOD DETECTION LIMIT STUDY								
ROGER ROWAN				METHOD 8240 VOST							
11/14/93											
INST:MD800C											
MATRIX TENAX VOST											
NAME	STD1	STD2	STD3	STD4	STD5	STD6	STD7	MEAN	STDEV	%STDEV	MDL
Bromochloromethane	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
1,2-Dichloroethane-d4	26.86	31.93	29.50	26.01	25.17	23.80	28.97	27.46	2.70	9.82%	8.48
Chloromethane	81.99	56.30	63.88	62.81	47.75	58.63	81.77	68.52	10.33	16.71%	32.48
Dichlorofluoromethane	25.08	20.23	24.67	24.31	17.71	21.80	30.26	22.32	4.02	17.14%	12.63
Bromomethane	84.04	83.43	86.49	98.88	179.77	103.26	151.84	111.69	38.30	32.50%	114.10
Acetonitrile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
Acrylonitrile	43.57	35.14	37.37	34.30	30.59	36.48	41.66	37.01	4.42	11.83%	13.88
Vinyl Chloride	31.38	24.81	28.04	29.49	21.40	28.79	38.60	28.46	4.80	16.87%	15.09
Chloroethane	41.86	43.35	45.42	40.53	45.28	30.68	33.21	40.03	5.88	14.87%	18.47
Iodomethane	67.60	54.94	49.90	62.92	42.14	52.62	78.40	59.38	12.18	20.83%	38.22
Trichlorofluoromethane	34.33	37.69	36.49	38.49	34.06	33.56	38.70	35.62	1.60	4.48%	5.02
Methylene Chloride	64.69	53.81	56.82	54.21	47.63	56.26	68.85	55.74	5.05	9.08%	15.86
Acetone	21.20	24.30	24.85	22.20	20.38	29.66	35.35	25.43	5.35	21.02%	16.81
Carbon Disulfide	32.11	28.44	30.50	29.54	26.84	33.15	48.41	32.73	7.23	22.09%	22.72
1,1-Dichloroethene	35.38	34.30	32.59	37.60	31.27	42.92	51.83	37.98	7.20	18.95%	22.62
1,1-Dichloroethane	21.53	25.08	24.39	20.38	20.90	17.68	18.26	21.16	2.80	13.24%	8.81
1,2-Dichloroethene (total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
t-1,2-Dichloroethene	32.28	29.62	31.21	30.80	26.73	29.44	33.52	30.51	2.20	7.19%	6.90
Chloroform	31.29	31.12	31.93	28.59	27.14	27.62	29.63	29.60	1.90	6.40%	5.98
1,2-Dichloroethane	28.01	28.86	28.35	26.24	24.07	22.62	26.30	26.05	2.48	9.51%	7.79
1,4-Difluorobenzene	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
2-Butanone	32.91	34.11	32.72	33.72	30.59	30.86	33.71	32.67	1.39	4.27%	4.39
1,1,1-Trichloroethane	22.49	22.49	23.01	22.54	20.42	12.42	14.08	19.63	4.47	22.75%	14.04
Carbon Tetrachloride	19.75	19.89	19.42	19.52	17.82	14.33	14.79	17.87	2.38	13.34%	7.49
Benzene-d6	24.94	25.76	25.80	25.23	24.47	25.20	29.24	25.66	1.23	4.77%	3.85
Vinyl Acetate	21.11	22.80	22.43	19.96	21.89	21.31	19.28	21.21	1.25	5.92%	3.94
Bromodichloromethane	23.42	23.39	23.72	23.27	21.64	19.86	23.60	22.70	1.43	6.32%	4.51
1,2-Dichloropropane	21.59	21.32	21.50	20.74	20.53	20.86	21.89	21.20	0.50	2.37%	1.58
cis-1,3-Dichloropropene	25.01	26.15	28.44	25.80	23.67	24.23	27.17	25.50	1.26	4.90%	3.92
Trichloroethene	24.91	24.91	24.77	25.20	23.08	23.09	26.59	24.63	1.23	5.00%	3.87
2-Chloroethyl vinyl ether	23.57	21.02	26.17	25.59	19.14	23.09	22.77	23.05	2.45	10.62%	7.69
Dibromochloromethane	22.61	22.87	22.26	22.19	20.73	20.69	23.19	22.04	1.00	4.52%	3.13
Dibromomethane	23.54	27.59	26.32	26.71	26.49	23.49	27.64	25.82	1.74	6.74%	5.47
Dibromoethane	22.49	22.38	22.22	21.80	20.04	21.02	23.83	21.97	1.20	5.45%	3.76
1,1,2-Trichloroethane	24.56	24.61	24.63	24.88	22.76	23.45	26.72	24.46	1.23	5.03%	3.87
1,4-Dichloro-2-butene	18.73	20.40	18.44	22.10	18.32	15.52	14.73	18.04	2.68	14.84%	8.41
Benzene	24.19	23.39	23.55	24.46	21.90	22.08	24.81	23.49	1.16	4.93%	3.64
trans-1,3-Dichloropropene	24.91	23.87	24.82	24.40	22.07	23.01	26.19	24.01	1.12	4.65%	3.51
Bromoform	19.34	19.55	19.45	19.94	17.77	17.87	18.46	18.89	0.91	4.82%	2.86
Chlorobenzene-d5	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
4-Bromofluorobenzene	23.87	23.95	24.20	24.15	21.83	22.63	24.86	23.86	1.04	4.41%	3.28
Toluene-d8	26.09	24.84	25.51	25.19	23.93	23.80	26.15	24.89	0.90	3.63%	2.84
4-Methyl-2-Pentanone	35.63	35.04	35.55	34.84	32.79	32.80	35.33	34.83	1.28	3.63%	3.95

2

TENAX.XLS

Tenax vost (con't)

NAME	STD1	STD2	STD3	STD4	STD5	STD6	STD7	MEAN	STDEV	%STDEV	MDL
2-Hexanone	33.01	34.04	32.98	34.91	31.28	27.63	26.68	31.52	3.12	9.89%	9.79
Tetrachloroethene	21.88	22.01	22.27	23.47	21.46	21.14	24.27	22.36	1.12	5.00%	3.52
1,1,2,2-Tetrachloroethane	22.37	22.81	22.66	23.35	18.88	16.66	14.56	20.47	3.24	15.83%	10.18
Toluene	26.57	25.82	27.09	26.83	25.01	25.34	27.49	26.32	0.92	3.50%	2.90
Chlorobenzene	25.97	26.79	26.07	25.67	24.37	24.60	27.12	25.68	0.93	3.64%	2.94
Ethylbenzene	25.15	24.82	24.81	26.45	23.16	23.21	26.06	24.84	1.10	4.45%	3.45
Styrene	23.59	23.56	23.80	24.13	22.10	22.44	25.59	23.60	1.14	4.83%	3.59
m-/p-Xylene	24.20	23.59	24.18	24.34	22.53	22.65	25.60	23.90	1.03	4.30%	3.23
o-Xylene	24.17	24.11	24.28	24.59	22.78	22.92	25.90	24.10	1.06	4.38%	3.33
Hexachloroethane	3.39	3.28	2.09	4.48	3.20	4.15	2.98	3.37	0.78	23.24%	2.46
1,2-Dibromo-3-chloropropane	8.78	14.41	10.67	16.84	6.18	3.77	3.86	9.06	4.87	53.86%	15.32
GC CONDITIONS 10C 4MIN HOLD 6C/MIN 180C 4MIN HOLD											
ALL STANDARDS CONCENATIONS 20ng ON COLUMN											
MEAN= THE SUM OF THE CONCENTRATIONS DIVIDED BY 7											
STDEV=N-1											
%STDEV=STDEV DIVIDED BY THE AVERAGE TIMES 100											
MDL=STDEV*3.143											

3

VOST.XLS

COMPLETED BY			METHOD DETECTION LIMIT STUDY									
ROGER ROWAN				METHOD 8240 VOST								
11/12/93												
INST:MD800C												
MATRIX TENAX CHARCOAL VOST												
NAME	STD1	STD2	STD3	STD4	STD6	STD7	STD8	MEAN	STDEV	%STDEV	MDL	3MDL
Bromochloromethane	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
1,2-Dichloroethane-d4	24.72	26.00	26.13	24.52	26.89	25.26	26.61	25.55	0.86	3.36%	2.69	0.86
Chloromethane	81.64	71.29	56.62	55.75	108.10	87.76	34.25	74.32	18.76	25.62%	58.97	18.76
Dichlorofluoromethane	38.36	33.67	31.86	30.61	39.35	32.26	20.23	34.75	3.65	10.64%	11.48	3.65
Bromomethane	121.24	110.56	89.03	107.30	133.77	118.41	73.30	114.72	12.06	10.51%	37.90	12.06
Acetonitrile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
Acrylonitrile	39.04	26.99	27.87	24.61	28.67	25.97	38.20	28.73	4.76	16.58%	14.97	4.76
Vinyl Chloride	38.46	36.37	39.46	37.08	45.10	37.86	23.03	38.95	3.35	8.63%	10.54	3.35
Chloroethane	50.38	47.62	52.67	46.88	52.24	56.83	37.98	51.12	3.64	7.12%	11.44	3.64
Iodomethane	159.24	137.87	120.61	118.56	137.41	104.92	94.20	129.77	19.11	14.73%	60.06	19.11
Trichlorofluoromethane	45.67	36.03	38.41	41.44	42.94	38.98	32.41	40.63	3.51	8.65%	11.04	3.51
Methylene Chloride	49.79	46.92	48.98	46.20	44.50	50.19	77.12	47.93	1.99	4.15%	6.25	1.99
Acetone	16.57	20.61	32.86	23.15	58.27	25.06	26.17	29.42	15.13	51.44%	47.56	15.13
Carbon Disulfide	30.66	31.21	31.59	30.47	42.50	33.97	30.44	33.40	4.63	13.87%	14.56	4.63
1,1-Dichloroethene	39.16	39.34	43.31	38.71	49.91	44.68	23.70	42.52	4.38	10.30%	13.77	4.38
1,1-Dichloroethane	20.39	21.89	17.80	20.69	16.62	16.72	21.47	19.00	2.19	11.55%	6.90	2.19
1,2-Dichloroethene (total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
t-1,2-Dichloroethene	29.79	29.42	28.39	27.70	31.18	30.39	38.89	29.48	1.28	4.33%	4.01	1.28
Chloroform	31.56	29.86	27.48	29.85	31.29	28.59	28.92	29.44	2.01	6.83%	6.32	2.01
1,2-Dichloroethane	25.55	26.66	27.25	24.89	28.05	26.13	26.80	26.42	1.15	4.35%	3.61	1.15
1,4-Difluorobenzene	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
2-Butanone	16.01	15.40	15.13	16.83	17.72	15.66	18.67	16.13	0.98	6.07%	3.06	0.98
1,1,1-Trichloroethane	26.75	25.08	25.82	25.83	27.28	24.55	28.44	25.68	0.92	3.58%	2.89	0.92
Carbon Tetrachloride	26.87	26.42	26.07	24.68	25.75	23.79	25.18	25.59	1.15	4.51%	3.63	1.15
Benzene-d6	24.61	27.02	25.74	26.74	26.18	26.09	26.15	26.40	1.22	4.62%	3.84	1.22
Vinyl Acetate	24.53	22.78	23.95	25.03	23.48	22.77	24.04	23.74	0.92	3.88%	2.89	0.92
Bromodichloromethane	28.56	28.81	28.33	28.28	28.70	26.74	28.64	28.57	1.08	3.77%	3.39	1.08
1,2-Dichloropropane	24.95	24.02	24.08	23.98	24.04	21.38	24.47	23.72	1.20	5.07%	3.78	1.20
cis-1,3-Dichloropropene	29.33	27.61	28.31	26.11	28.00	25.57	25.36	27.84	1.53	5.56%	4.82	1.53
Trichloroethene	28.46	27.36	27.81	28.67	28.31	27.08	27.31	27.78	0.97	3.48%	3.04	0.97
2-Chloroethyl vinyl ether	36.54	34.69	32.43	31.65	27.59	31.50	33.57	32.27	2.80	8.68%	8.80	2.80
Dibromochloromethane	28.43	25.13	24.74	24.00	25.88	22.85	22.24	24.87	1.28	5.15%	4.03	1.28
Dibromomethane	28.80	27.21	24.20	27.35	24.85	22.94	23.88	25.57	1.84	7.20%	5.79	1.84
Dibromoethane	27.37	25.77	25.79	24.48	26.71	23.96	24.86	25.68	1.29	5.03%	4.06	1.29
1,1,2-Trichloroethane	27.07	25.72	25.23	24.74	26.19	23.60	23.74	25.43	1.20	4.73%	3.78	1.20
1,4-Dichloro-2-butene	27.31	25.81	26.10	23.60	26.80	22.17	21.23	25.28	2.00	7.91%	6.29	2.00
Benzene	28.30	28.28	28.98	27.69	27.91	25.03	28.65	27.40	1.26	4.58%	3.95	1.26
trans-1,3-Dichloropropene	27.79	27.08	28.61	26.27	28.11	25.49	24.76	26.69	0.98	3.64%	3.08	0.98
Bromoform	25.46	23.63	22.99	22.31	23.73	21.28	20.77	23.23	1.42	6.12%	4.47	1.42
Chlorobenzene-d5	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
4-Bromofluorobenzene	27.91	28.91	28.91	27.03	28.43	28.52	26.31	27.82	0.95	3.43%	2.97	0.95
Toluene-d8	28.83	30.82	28.91	28.92	30.94	28.75	30.34	29.51	0.99	3.36%	3.12	0.99

78/temp

2.69

58.97

4

VOST.XLS

CHARCOAL VOST cont'd

NAME	STD1	STD2	STD3	STD4	STD6	STD7	STD5	MEAN	STDEV	%STDEV	MDL	6MDL
4-Methyl-2-Pentanone	25.45	27.18	24.23	24.60	28.39	25.36	28.75	25.52	1.12	4.38%	3.51	1.12
2-Hexanone	29.87	30.35	28.70	26.38	28.19	28.40	26.83	27.98	1.78	6.38%	5.61	1.78
Tetrachloroethene	23.55	24.63	23.38	24.31	25.82	24.28	24.29	24.34	0.91	3.73%	2.86	0.91
1,1,2,2-Tetrachloroethane	28.93	27.29	28.77	26.64	28.50	25.70	24.07	28.97	0.92	3.40%	2.88	0.92
Toluene	27.34	28.88	27.32	27.25	28.03	27.12	26.98	27.78	0.84	3.01%	2.63	0.84
Chlorobenzene	28.61	27.52	25.11	26.30	27.60	25.98	25.72	26.74	0.78	2.92%	2.46	0.78
Ethylbenzene	27.33	26.64	26.74	26.93	28.71	28.50	28.28	27.48	0.85	3.44%	2.97	0.85
Styrene	29.65	30.44	28.24	29.07	29.74	27.75	28.64	28.98	1.10	3.80%	3.46	1.10
m-/p-Xylene	28.52	28.84	27.49	27.30	28.98	27.02	27.82	28.16	1.05	3.72%	3.28	1.06
o-Xylene	29.69	30.95	28.98	28.98	30.12	28.24	28.78	29.49	0.96	3.27%	3.03	0.96
Hexachloroethane	6.48	5.67	4.83	4.55	5.73	4.72	4.57	5.33	0.75	14.13%	2.37	0.75
1,2-Dbromo-3-chloropropane	38.87	35.34	32.19	28.89	38.76	27.13	18.88	33.70	5.19	15.41%	16.32	5.19
GC CONDITIONS 10C 4MIN HOLD 6C/MIN 160C 4MIN HOLD												
ALL STANDARDS CONCENATIONS 20ng ON COLUMN												
MEAN= THE SUM OF THE CONCENTRATIONS DIVIDED BY 7												
STDEV=N-1												
%STDEV=STDEV DIVIDED BY THE AVERAGE TIMES 100												
MDL=STDEV*3.143												
6MDL IS THE STDEV OF THE 6 STD'S LEAVING OUT STD5												

5

VOST RAW DATA

Source/analyte	Catch, ng							
	Run							
	1		2		3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85
Bromomethane	388.741	<12.06	23.256	<12.06	12.912	108.12	63.862	49.642
Acetonitrile	75.424 c	<	<0	<0	<0	<0	<0	<0
Acrylonitrile	<13.88	<4.76	<13.88	<12.06	<13.88	<4.76	6.262	<4.76
Vinyl chloride	<15.09	<3.35	<15.09	<3.35	<15.09	<3.35	<15.09	<3.35
Chloroethane	<18.47	1132.853 d	<18.47	<3.64 f	<18.47	368.637 d	<18.47	<3.64
Iodomethane (a)	209.954 a	~~32.46~~	<38.22	~~31.42~~	<38.22	92.021	65.576	17.545 d
Trichlorofluoromethane	<5.02	<3.51	<5.02	<3.51	<5.02	<3.51	<5.02	<3.51
Methylene chloride	<15.86	18.758 d	<15.86	22.485	<15.86	14.588 d	15.768	13.226 d
Acetone	993.771 a	<15.13	1261.417 a	<15.13	2543.338 d	<15.13	<16.81	<15.13
Carbon disulfide	<22.72	42.116	<22.72	51.006	<22.72	25.523	<22.72	<4.83
1,1-Dichloroethene	<22.62	<4.38	<22.62	<4.38	<22.62	<4.38	<22.62	<4.38
1,1-Dichloroethane	<8.81	<2.19	<8.81	<2.19	<8.81	<2.19	<8.81	<2.19
1,2-Dichloroethene (total)	<	<	<0	<0	<0	<0	<0	<0
t-1,2-Dichloroethene	<6.9	<1.28	<6.9	<1.28	<6.9	<1.28	<6.9	<1.28
Chloroform	<5.96	<2.01	<5.96	<2.01	<5.96	<2.01	<5.96	0.121 d
1,2-Dichloroethane	<6.90	<1.15	<6.9	<1.15	<6.9	<1.15	<6.9	<1.15
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106	<14.04	<0.82 f	<14.04	4.913	<14.04	<0.82
Carbon tetrachloride	<7.49	<1.15	<7.49	<1.15	<7.49	<1.15	<7.49	<1.15
Vinyl acetate	<3.94	<0.82	<3.94	<0.82	<3.94	<0.82	<3.94	<0.82
Bromodichloromethane	<4.51	<1.08	<4.51	<1.08	<4.51	<1.08	<4.51	<1.08
1,2-Dichloropropane	<1.68	<1.20	<1.68	<1.2	<1.68	<1.2	<1.68	<1.2
cis-1,3-Dichloropropene	<3.82	<1.53	<3.82	<1.53	<3.82	<1.53	<3.82	<1.53
Trichloroethene	<3.87	<0.87	<3.87	<0.87	<3.87	<0.87	<3.87	<0.87
2-Chloroethyl vinyl ether	<7.69	<2.80	<7.69	<2.8	<7.69	<2.8	<7.69	<2.8
Dibromochloromethane	<3.13	<1.28	<3.13	<1.28	<3.13	<1.28	<3.13	<1.28
Dibromomethane	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84
Dibromoethane	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29
1,1,2-Trichloroethane	<3.87	<1.20	<3.87	<1.2	<3.87	<1.2	<3.87	<1.2
1,4-Dichloro-2-butene	<8.41	<2.00	<8.41	<2	<8.41	<2	<8.41	<2
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626	<3.85	22.377
trans-1,3-Dichloropropene	<3.51	<0.98	<3.51	<0.98	<3.51	<0.98	<3.51	<0.98
Bromoform	<2.88	<1.42	<2.88	<1.42	<2.88	<1.42	<2.88	<1.42
4-Methyl-2-Pentanone	<3.95	<1.12	36.812	<1.12	<3.95	4.64	2.908	<1.12
2-Hexanone	<8.78	~~2.64~~	154.551	~~1.701~~ d	90.96	16.31	8.785	<1.78
Tetrachloroethene	<3.52 f	<0.91	3.65	<0.91	3.944	<0.91	<3.52	<0.91
1,1,2,2-Tetrachloroethane	<10.18	<0.92	<10.18	<0.92	<10.18	<0.92	<10.18	<0.92
Toluene	102.81	2.777	157.326	4.377	174.73	3.773	<2.84	2.145
Chlorobenzene	<2.94	<0.78	31.433	<0.78	<2.94	<0.78	<2.94	<0.78
Ethylbenzene	27.219	5.972	41.073	~~1.805~~	45.63	9.64	<3.45	~~2.614~~
Styrene	11.832	~~1.125~~	46.412	~~3.084~~	<3.59	~~3.658~~	2.178	1.146 d
m-/p-Xylene	46.817	~~2.744~~	63.002	4.141	75.424	4.426	1.222	~~1.347~~
o-Xylene	39.935	~~0.677~~	57.334	~~1.295~~	65.471	~~1.411~~	<3.33	~~0.494~~
Hexachloroethane	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

VOST DETECTION LIMITS

Source/analyte	ng/trap		
	Tenax	T/C	
Chloromethane	<32.48	<18.76	58.87
Dichlorofluoromethane	<12.63	<3.85	11.48
Bromomethane	<114.1	<12.06	37.8
Acetonitrile	<0	<0	0
Acrylonitrile	<13.88	<4.76	14.87
Vinyl chloride	<15.09	<3.35	10.54
Chloroethane	<18.47	<3.64	11.44
Iodomethane	<38.22	<19.11	60.06
Trichlorofluoromethane	<5.02	<3.51	11.04
Methylene chloride	<15.86	<1.99	6.25
Acetone	<16.81	<15.13	47.56
Carbon disulfide	<22.72	<4.83	14.56
1,1-Dichloroethene	<22.62	<4.38	13.77
1,1-Dichloroethane	<8.81	<2.19	6.9
1,2-Dichloroethene (total)	<0	<0	0
t-1,2-Dichloroethene	<6.9	<1.28	4.01
Chloroform	<5.96	<2.01	6.32
1,2-Dichloroethane	<6.9	<1.15	3.61
2-Butanone	<4.38	<0.88	3.08
1,1,1-Trichloroethane	<14.04	<0.82	2.88
Carbon tetrachloride	<7.49	<1.15	3.63
Vinyl acetate	<3.94	<0.82	2.88
Bromodichloromethane	<4.51	<1.08	3.38
1,2-Dichloropropane	<1.68	<1.2	3.78
cis-1,3-Dichloropropene	<3.82	<1.53	4.82
Trichloroethene	<3.87	<0.87	3.04
2-Chloroethyl vinyl ether	<7.69	<2.8	8.8
Dibromochloromethane	<3.13	<1.28	4.03
Dibromomethane	<5.47	<1.84	5.79
Dibromoethane	<3.78	<1.29	4.06
1,1,2-Trichloroethane	<3.87	<1.2	3.78
1,4-Dichloro-2-butene	<8.41	<2	6.29
Benzene	<3.85	<1.22	3.95
trans-1,3-Dichloropropene	<3.51	<0.98	3.08
Bromoform	<2.88	<1.42	4.47
4-Methyl-2-Pentanone	<3.95	<1.12	3.51
2-Hexanone	<8.78	<1.78	5.81
Tetrachloroethene	<3.52	<0.91	2.96
1,1,2,2-Tetrachloroethane	<10.18	<0.92	2.88
Toluene	<2.84	<0.84	2.63
Chlorobenzene	<2.94	<0.78	2.45
Ethylbenzene	<3.45	<0.95	2.97
Styrene	<3.59	<1.1	3.46
m-/p-Xylene	<3.23	<1.06	3.29
o-Xylene	<3.33	<0.96	3.03
Hexachloroethane	<2.48	<0.75	2.37
1,2-Dbromo-3-chloropropan	<15.32	<5.19	16.32

VOST RAW DATA

Source/analyte	Catch, ng							
	Run 1		Run 2		Run 3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane	1,505.996	99.018	53.379	139.067	28.994	243.193	78.509	50.549
Bromomethane	388.741	<12.06	23.256	<12.06	12.912	108.120	63.862	49.642
Chloroethane	<18.47	1,132.853	<18.47	<3.64	<18.47	368.637	<18.47	<3.64
Iodomethane	209.954	32.460	<38.22	31.420	<38.22	92.021	65.576	<19.11
Methylene chloride	<15.86	18.758	<15.86	22.485	<15.86	14.588	<15.86	13.226
Acetone	993.771	<15.13	1,261.417	<15.13	2,543.338	<15.13	<16.81	<15.13
Carbon disulfide	<22.72	42.116	<22.72	51.006	<22.72	25.523	<22.72	<4.83
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	<4.36	5.696
1,1,1-Trichloroethane	<14.04	7.106	<14.04	<0.82	<14.04	4.913	<14.04	<0.82
Benzene	2,394.070	151.025	4,249.583	110.449	1,048.145	158.626	<3.85	22.377
4-Methyl-2-Pentanone	<3.95	<1.12	36.812	<1.12	<3.95	4.640	<3.95	<1.12
2-Hexanone	<9.79	2.640	154.551	<1.78	90.960	16.310	<9.79	<1.78
Tetrachloroethene	<3.52	<0.91	3.650	<0.91	3.944	<0.91	<3.52	<0.91
Toluene	102.810	2.777	157.326	4.377	174.730	3.773	<2.84	2.145
Ethylbenzene	27.219	5.972	41.073	1.303	45.630	9.640	<3.45	2.614
Styrene	11.832	1.125	46.412	3.084	<3.59	3.638	<3.59	1.146
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	<3.23	1.347
o-Xylene	39.935	<0.96	57.334	1.205	65.471	1.411	<3.33	<0.96
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

BLANK-CORRECTED

	Source/analyte	Catch, ng						Detection limit, ng	
		Run 1		Run 2		Run 3			
		Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
	Chloromethane	1,427.487	48.469	(25.130)	88.518	(49.515)	192.644	<32.48	<18.76
	Bromomethane	324.879	(49.642)	(40.606)	(49.642)	(50.950)	58.478	<114.1	<12.06
2	Chloroethane	0.000	1,132.853	0.000	0.000	0.000	368.637	<18.47	<3.64
	Iodomethane	144.378	32.460	(65.576)	31.420	(65.576)	92.021	<38.22	<19.11
2	Methylene chloride	0.000	5.532	0.000	9.259	0.000	1.362	<15.86	<1.99
1 *	Acetone	993.771	0.000	1,261.417	0.000	2,543.338	0.000	<16.81	<15.13
2	Carbon disulfide	0.000	42.116	0.000	51.006	0.000	25.523	<22.72	<4.83
1 *	2-Butanone	92.093	3.885	207.277	10.758	331.858	7.627	<4.36	<0.88
2	1,1,1-Trichloroethane	0.000	7.106	0.000	0.000	0.000	4.913	<14.04	<0.82
1 *	Benzene	2,394.070	128.648	4,249.583	88.072	1,048.145	136.249	<3.85	<1.22
	4-Methyl-2-Pentanone	0.000	0.000	36.812	0.000	0.000	4.640	<3.95	<1.12
	2-Hexanone	0.000	2.640	154.551	0.000	90.960	16.310	<9.79	<1.78
1	Tetrachloroethene	0.000	0.000	3.650	0.000	3.944	0.000	<3.52	<0.91
1 *	Toluene	102.810	0.632	157.326	2.232	174.730	1.628	<2.84	<0.84
1 *	Ethylbenzene	27.219	3.358	41.073	(1.311)	45.630	7.026	<3.45	<0.95
	Styrene	11.832	(0.021)	46.412	1.938	0.000	2.492	<3.59	<1.1
1 *	m-/p-Xylene	46.817	1.397	63.002	2.794	75.424	3.079	<3.23	<1.06
1 *	o-Xylene	39.935	0.000	57.334	1.205	65.471	1.411	<3.33	<0.96
	1,2-Dbromo-3-chloropropane	0.000	0.000	116.513	0.000	0.000	20.215	<15.32	<5.19

Blank corrections
- If blank is BDL subtract ∅
- If blank is ADL subtract blank
- If blank corrected value < ∅ assume ∅
- I

VOST DATA--BLANK CORRECTED

	Analyte	Catch, ng							
		Run						Detection limit	
		1		2		3			
		Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
*	Chloromethane (a)	1427.487	48.469		88.518		192.644	<32.48	<18.76
*	Bromomethane (a)	324.879					58.478	<114.1	<12.06
	Chloroethane		1132.853				368.637	<18.47	<3.64
*	Iodomethane (a)	144.378	14.915		13.875		74.476	<38.22	<19.11
	Methylene chloride		5.532		9.259		1.362	<15.86	<1.99
	Acetone	993.771		1261.417		2543.338		<16.81	<15.13
	Carbon disulfide		42.116		51.006		25.523	<22.72	<4.83
	2-Butanone	90.74	3.885	205.924	10.758	330.505	7.627	<4.38	<0.88
	1,1,1-Trichloroethane		7.106				4.913	<14.04	<0.82
	Benzene	2394.07	128.648	4249.583	88.072	1048.145	136.249	<3.85	<1.22
?	4-Methyl-2-Pentanone			33.904			4.64	<3.95	<1.12
*	2-Hexanone		2.64	145.766	1.701	82.175	16.31	<8.78	<1.78
	Tetrachloroethene			3.65		3.944		<3.52	<0.91
	Toluene	102.81	0.632	157.326	2.232	174.73	1.628	<2.84	<0.84
	Ethylbenzene	27.219	3.358	41.073		45.63	7.026	<3.45	<0.95
*	Styrene	9.654		44.234	1.938		2.492	<3.59	<1.1
	m-/p-Xylene	45.595	1.397	61.78	2.794	74.202	3.079	<3.23	<1.06
	o-Xylene	39.935	0.233	57.334	0.761	65.471	0.967	<3.33	<0.96
*	1,2-Dbromo-3-chloropropane			116.513			20.215	<15.32	<5.19

VOSTRAW2. WΦ1
3/7/95

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September 12, 1986

Mr. Wilbur L. Sellers
Environmental Engineer
U.S. Environmental Protection
Agency Region II
Edison, New Jersey 08837

Subject: Distribution of Compounds (POHCs) on VOST Traps.

Dear Mr. Sellers:

Several people from EPA, including yourself, participated in a meeting at the EPA Regional offices in New York on August 13, 1986, to discuss the Trial Burn Plan for the MSD incinerator in Puerto Rico. During that meeting you indicated that at least one pair of VOST traps should be analyzed individually, to assess the relative distribution of the POHC on the front trap (Tenax) and back trap (Tenax/charcoal) used in the VOST train.

I believe you stated that if more than 10% of the total POHC amount from both traps was present on the back trap it could indicate that "breakthrough" had occurred. Further, if that were the case, the backup integrated bag samples would need to be analyzed and used for quantifying the POHC emissions, rather than the VOST traps.

I understand your concern about possible breakthrough, but I believe the 10% criteria you mentioned is too restrictive, and that is the reason I am writing to you, since it could impact all trial burn activity in Region II and perhaps other regions.

During our meeting you did not mention what the 10% criteria was based on, but it could possibly have been taken from one of the conclusions presented on pg. 9 of Ref. 1, which states:

> "For the five organics studied, greater than 90% of the CCl_4, chloroform, perchloroethylene, and benzene were collected on the Tenax cartridge."

That conclusion was stated in the report and was generally correct based on the data in Table 7 to which it referred (see attached copy of Table 7). However, this table shows that in at least two of the

[1] Jayanty, R. K. M., et al. "Performance Audit Results for POHC: VOST and Bag Measurement Methods." A report prepared for EPA by Research Triangle Institute, January 1984.

runs for CCl_4, the 10% criterion was not met. Most notably, in Run 3, the amount of CCl_4 on the T/C traps was 8.4 ppb out of a total of 30.4 ppb, or more than 25%. Moreover, all the data in Table 7 represents the work of only one laboratory (Lab B). I'm not sure why that is the only work cited in the report, since four laboratories participated in the referenced work.

A later report (Ref. 2) presents considerably more data on the POHC distribution, as part of a VOST Laboratory Validation sponsored by EPA. Table 4-2 from Ref. 2 presents quite a bit of data for chloroform, CCl_4, benzene and perchloro ethylene, as well as two other very volatile compounds (i.e., vinyl chloride and trichlorofluoromethane). It is not surprising that the table shows a relatively low percentage on the front (Tenax) trap for those latter two compounds. But, for the other four compounds, including CCl_4, the percent found on the front trap is in the 70 to 90% range in several cases. There are several experiments where the percentage is above 90%, but several others where it is in the 70 to 90% range. Companion data, in Table 4-5, shows that the recovery values (i.e., accuracy) was quite good for all four of the compounds; better than the 50 to 150% accuracy that is usually considered acceptable for VOST audit cylinder results.[3]

In my opinion, these two reports do not support a 10% criterion as indicative of VOST breakthrough. The data discussed above, and our own experience with VOST, show that the amount of a POHC found on the back trap can often exceed 10%, without necessarily indicating breakthrough. This is especially true when the total amounts are low or for compounds like benzene.

I have also discussed this 10% criterion with Dr. Larry Johnson at EPA/RTP. He agreed that a 10% limit was probably too restrictive, and that a limit in the 25-30% range would be more reasonable.

Based on all of the above, I am not sure that any criterion can be adopted for front/back distribution, as indicative of breakthrough. As is obvious for compounds like vinyl chloride, any such criterion probably has to be compound specific. Even for a compound like CCl_4, I think it would still be very uncertain if any criterion, such as a 30% limit on the back trap, were applied to make a judgement from results for a single pair of traps. That is, the average for all pairs could likely meet 30%, but not all individual pairs.

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[2] Logan, T. J., et al. "Validation of the Volatile Organic Sampling Train (VOST) Protocol; Volume I - Laboratory Validation Phase." A report prepared for EPA by PEI Associates, Inc., January 1986 (PB86-145547).

[3] Ref. 1, pg. 6.

The purpose of my writing you is, of course, to try to provide convincing data for relaxing the 10% criterion you mentioned. In any event, I would be glad to discuss it further, and learn the basis for the 10% criterion that you mentioned during our meeting.

Sincerely yours,

Paul Gorman

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PG:kh

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TABLE 7. AMOUNTS OF AUDIT GASES FOUND ON TENAX VS TENAX/CHARCOAL CARTRIDGES[1]

Activity Audited	Audit Gases	NBS[2] conc. ppb	Run 1			Run 2			Run 3		
			Tenax ppb	Tenax/ Char-coal ppb	Total ppb	Tenax ppb	Tenax/ Char-coal ppb	Total ppb	Tenax ppb	Tenax/ Char-coal ppb	Total ppb
VOST (Both sampling & analysis)	carbon tetra-chloride	21	21.9	2.6	24.5	23.2	1.7	24.9	22.0	8.4	30.4
	chloroform	23	28.4	0.4	28.8	29.1	0.5	29.6	25.4	4.4	29.8
	perchloro-ethylene	29	39.5	0.1	39.6	41.0	0.4	41.4	34.8	0.6	35.4
	vinyl chloride	31	0.9	9.9	10.8	1.1	6.7	7.8	1.5	11.5	13.0
	benzene	18	22.7	0.2	22.9	24.5	0.3	24.8	22.2	1.3	23.5
VOST Car-tridges (analysis only)	carbon tetra-chloride	21	20.4	NO DATA[3]	NO DATA[3]	21.3	1.3	22.6	21.5	2.5	24.0
	chloroform	23	27.0	NO DATA[3]	NO DATA[3]	25.5	0.2	25.7	26.8	0.2	27.0
	perchloro-ethylene	29	32.8	NO DATA[3]	NO DATA[3]	29.6	1.3	30.9	35.7	0.1	35.8
	vinyl chloride	31	1.5	NO DATA[3]	NO DATA[3]	1.2	6.5	7.7	0.4	21.0	21.4
	benzene	18	21.5	NO DATA[3]	NO DATA[3]	21.1	0.4	21.5	23.1	0.3	23.4

(1) Results reported by Laboratory B.

(2) NBS values were obtained by direct GC analyses.

(3) Sample cartridge was broken.

TABLE 4-2. ANALYTICAL RESULTS FOR VOST PRECISION AND ACCURACY RUNS

				Amount of species in sample																	
				Vinyl chloride			Trichloro-fluoromethane			Chloroform			Carbon tetrachloride			Benzene			Tetrachloro-ethylene (perc)		
Date (1984)	Run No.	Sample No.	Trap No.	ng per trap	total ng	% on Tenax	ng per trap	total ng	% on Tenax	ng per trap	total ng	% on Tenax	ng per trap	total ng	% on Tenax	ng per trap	total ng	% on Tenax	ng per trap	total ng	% on Tenax
5/9	Q1	L15MD111	MD-T-147 MD-TC-128	25.0 589.9	614.9	4.1	690.3 601.2	1292	53.4	1412 0.0	1412	100	1043 1.9	1045	99.9	983.0 5.3	988.3	99.5	2151 9.8	2161	99.5
5/9	Q1	L15MD222	MD-T-113 MD-TC-43	16.1 686.7	702.8	2.3	357.7 795.0	1153	31.0	1428 1.9	1430	99.9	1244 289.8	1534	81.1	994.1 6.7	1001	99.4	2088 15.1	2103	99.3
5/9	Q1	L15ST333	ST-T-61 ST-TC-40	25.3 103.3	128.6	19.7	416.6 598.9	1016	41.0	1348 103.5	1452	92.8	1219 211.9	1431	85.2	999.9 43.8	1044	95.8	1972 125.2	2097	94.0
5/9	Q1	L15ST444	ST-T-47 ST-TC-45	33.4 61.9	95.3	35.0	510.9 658.8	1170	43.7	1325 120.3	1445	91.7	1294 211.5	1506	85.9	1029 38.4	1067	96.4	2344 62.8	2407	97.4
5/9	Q2	L15MD412	MD-T-11 MD-TC-40	38.4 821.9	860.3	4.5	553.0 971.8	1525	36.3	1844 335.3	2179	84.6	1868 515.2	2383	78.4	1585 56.2	1641	96.6	3499 25.4	3524	99.3
5/9	Q2	L15MD321	MD-T-149 MD-TC-20	34.4 a	34.4	N/A[b]	486.5 a	486.5	N/A	1374 a	1374	N/A	1359 a	1359	N/A	983.9 a	983.9	N/A	2134 a	2134	N/A
5/9	Q2	L15ST234	ST-T-110 ST-TC-70	30.8 65.5	96.4	32.0	529.0 511.5	1040	50.9	1445 40.5	1486	97.2	1385 155.3	1540	89.9	1019 14.9	1034	98.5	1984 87.2	2071	95.8
5/9	Q2	L15ST143	ST-T-30 ST-TC-142	11.6 71.0	82.6	14.0	350.3 427.8	778.1	45.0	1398 58.2	1456	96.0	1287 206.0	1493	86.2	979.6 17.9	997.5	98.2	1902 111.1	2013	94.5
5/9	Q3	L15MD144	MD-T-47 MD-TC-110	58.1 628.6	686.7	8.5	325.1 607.3	932.4	34.8	1122 327.3	1449	77.4	1098 390.9	1489	73.7	941.2 73.5	1015	92.7	2630 24.1	2654	99.1
5/9	Q3	L15MD322	MD-T-128 MD-TC-76	103.0 646.2	749.2	13.7	363.2 616.7	979.9	37.1	1472 6.5	1478	99.6	1411 299.3	1710	82.5	1030 5.3	1035	99.5	2638 1.6	2640	99.9
5/9	Q3	L15ST233	ST-T-160 ST-TC-135	134.9 16.2	151.1	89.3	281.8 349.8	631.6	44.6	1132 174.2	1306	86.7	1069 297.2	1366	78.2	965 59.9	1025	94.1	2588 103.6	2692	96.1
5/9	Q3	L15ST411	ST-T-111 ST-TC-43	24.8 30.9	55.7	44.5	354.1 439.4	793.5	44.8	1175 157.5	1332	88.2	1172 261.5	1434	81.7	938.7 54.2	992.9	94.5	2282 76.2	2358	96.8
5/11	Q4	L15MD221	MD-T-119 MD-TC-50	18.1 249.2	267.9	6.8	525.3 462.2	987.5	53.2	1148 222.1	1370	83.8	1041 487.2	1528	68.1	914.0 75.7	989.7	92.4	2212 20.8	2233	99.0
5/11	Q4	L15MD143	MD-T-2 MD-TC-82	8.5 315.7	324.2	2.6	509.2 355.0	864.2	58.9	1309 74.2	1383	94.6	1219 311.4	1530	79.7	1044 31.2	1075	97.1	2270 11.6	2281	99.5
5/11	Q4	L15ST412	ST-T-29 ST-TC-167	18.4 119.1	137.5	13.4	480.7 90.0	570.7	84.2	1026 156.3	1182	86.8	1044 266.7	1310	79.7	810.2 76.2	886.4	91.4	1859 164.3	2023	91.9
5/11	Q4	L15ST334	ST-T-4 ST-TC-21	17.9 128.3	146.2	12.2	587.5 55.8	643.3	91.3	1446 12.2	1458	99.2	1346 162	1508	89.2	966.1 9.7	975.8	99.0	1713 137	1850	92.6

(continued)

TABLE 4-2 (continued)

Date (1984)	Run No.	Sample No.	Trap No.	Vinyl chloride: ng per trap	Vinyl chloride: total ng	Vinyl chloride: % on Tenax	Trichloro-fluoromethane: ng per trap	Trichloro-fluoromethane: total ng	Trichloro-fluoromethane: % on Tenax	Chloroform: ng per trap	Chloroform: total ng	Chloroform: % on Tenax	Carbon tetrachloride: ng per trap	Carbon tetrachloride: total ng	Carbon tetrachloride: % on Tenax	Benzene: ng per trap	Benzene: total ng	Benzene: % on Tenax	Tetrachloro-ethylene (perc): ng per trap	Tetrachloro-ethylene (perc): total ng	Tetrachloro-ethylene (perc): % on Tenax
6/12	Q5	L15ND144	ND-T-35 ND-TC-28	8.5 277.3	285.8	3.0	413.8 565.0	978.8	42.3	1191 96.6	1288	92.5	1118 432.6	1551	72.1	945.1 23.5	968.6	97.6	2151 15.8	2167	99.3
6/12	Q5	L15ND222	ND-T-63 ND-TC-94	3.7 125.0	128.7	2.9	432.9 520.9	953.8	45.4	1424 8.3	1432	99.4	1262 349.9	1612	78.3	970.1 19.2	989.3	98.1	2686 16.6	2703	99.4
6/12	Q5	L15ST333	ST-T-83 ST-TC-88	10.0 182.6	192.6	5.2	525.5 108.8	634.3	82.8	1356 31.7	1387	97.7	1236 164.1	1400	88.3	962.5 20.0	982.5	98.0	1834 161.7	1996	91.9
6/12	Q5	L15ST444	ST-T-22 ST-TC-16	5.8 49.8	55.6	10.4	427.7 83.8	511.5	83.6	1178 76.7	1255	93.9	1141 180.0	1321	86.4	901.5 60.0	961.5	93.8	2247 101.8	2349	95.7
6/5	Q6	L.5ND111	ND-T-8 ND-TC-24	0.2 7.9	8.1	2.5	10.9 43.6	54.5	20.0	33.5 3.1	36.6	91.5	37.2 13.1	50.3	74.0	33.2 3.2	36.4	91.2	69.7 5.0	74.7	93.3
6/5	Q6	L.5ND222	ND-T-115 ND-TC-109	0.7 10.4	11.1	6.3	9.2 57.8	67.0	13.7	32.2 3.1	35.3	91.2	36.8 12.6	49.4	74.5	58.4 24.9	83.3	70.1	64.7 10.4	75.1	86.2
6/5	Q6	L.5ST333	ST-T-109[c] ST-TC-1	ND[b] 1.9	1.9	0	34.0 56.6	90.6	37.5	24.6 9.1	33.7	73.0	23.2 10.8	34.0	68.2	69.1 13.4	82.5	83.8	117.8 15.2	133.0	88.6
6/5	Q6	L.5ST444	ST-T-33 ST-TC-139	0.3 1.6	1.9	15.8	17.1 18.6	35.7	47.9	32.3 5.9	38.2	84.6	37.1 7.2	44.3	83.7	30.7 8.1	38.8	79.1	53.6 10.2	63.8	84.0
6/5	Q7	L.5ND443	ND-T-62 ND-TC-107	0.7 10.6	11.3	6.2	8.7 19.3	28.0	28.6	30.9 3.3	34.2	90.4	35.8 13.4	49.2	72.8	44.6 16.2	60.8	73.4	65.3 2.8	68.1	95.9
6/5	Q7	L.5ND221	ND-T-44 ND-TC-34	1.7 13.4	15.1	11.3	9.3 14.7	24.0	38.8	34.6 3.4	38.0	91.1	39.1 12.4	51.5	75.9	65.4 3.8	69.2	94.5	64.4 2.8	67.4	95.8
6/5	Q7	L.5ST334	ST-T-48 ST-TC-118	0.4 3.5	3.9	10.3	21.5 19.7	41.2	52.2	30.4 6.1	36.5	83.3	38.2 6.9	45.1	84.7	45.4 6.3	51.7	87.8	56.3 9.0	65.3	86.2
6/5	Q7	L.5ST112	ST-T-20 ST-TC-54[d]	0.7 21.2[d]	21.9	3.2	22.9 41.7[d]	64.6	35.4	27.5 11.3[d]	38.8	70.9	36.8 4.1[d]	40.9	90.0	27.4 23.0[d]	50.4	54.4	55.2 19.3[d]	74.5	74.1
6/6	Q8	L.5ND444	ND-T-16 ND-TC-79	2.3 10.1	12.4	18.5	11.6 28.7	40.3	28.8	34.8 4.9	39.7	87.7	42.4 13.9	56.3	75.3	33.5 3.6	37.1	90.3	71.6 2.8	74.4	96.2
6/6	Q8	L.5ND333	ND-T-67 ND-TC-120	0.7 11.6	12.3	5.7	13.6 33.0	46.6	29.2	35.0 3.9	38.9	90.0	44.7 17.8	62.5	71.5	41.5 7.3	48.8	85.0	70.5 2.8	73.3	96.2
6/6	Q8	L.5ST222	ST-T-38 ST-TC-60	0.8 3.3	4.1	19.5	20.6 12.8	33.4	61.7	32.6 7.8	40.4	80.7	40.8 8.0	48.8	83.6	31.4 7.1	38.5	81.6	56.2 9.7	65.9	85.3
6/6	Q8	L.5ST111	ST-T-137 ST-TC-82	1.0 3.4	4.4	22.7	20.8 14.7	35.5	58.6	35.2 7.3	42.5	82.8	40.9 10.2	51.1	80.0	30.3 5.7	36.0	84.2	58.8 6.2	65.0	90.5

(continued)

TABLE 4-2 (continued)

Date (1984)	Run No.	Sample No.	Trap No.	Vinyl chloride: ng per trap	Vinyl chloride: total ng	Vinyl chloride: % on Tenax	Trichlorofluoromethane: ng per trap	Trichlorofluoromethane: total ng	Trichlorofluoromethane: % on Tenax	Chloroform: ng per trap	Chloroform: total ng	Chloroform: % on Tenax	Carbon tetrachloride: ng per trap	Carbon tetrachloride: total ng	Carbon tetrachloride: % on Tenax	Benzene: ng per trap	Benzene: total ng	Benzene: % on Tenax	Tetrachloroethylene (perc): ng per trap	Tetrachloroethylene (perc): total ng	Tetrachloroethylene (perc): % on Tenax
6/14	W1	L1SND333	ND-T-89 ND-TC-71	8.2 368.0	376.2	2.2	436.9 807.3	1244	35.1	1439 8.1	1447	99.4	1226 437.8	1664	73.7	1039 11.5	1050	99.0	2833 23.0	2856	99.2
6/14	W1	L1SND444	ND-T-113 ND-TC-170	10.3 429.0	439.3	2.3	458.0 892.1	1350	33.9	1250 192.5	1442	86.7	1100 545.3	1645	66.9	979.0 42.5	1021	95.9	2830 24.6	2855	99.1
6/14	W2	L1SST333	ST-T-102 ST-TC-154	11.6 349.0	360.6	3.2	456.9 359.0	815.9	56.0	1295 81.8	1377	94.0	756.9 323.0	1080	70.1	976.3 14.7	991.0	98.5	2831 57.1	2888	98.0
6/14	W2	L1SST444	ST-T-106 ST-TC-116	7.3 342.5	349.8	2.1	385.9 178.3	564.2	68.4	1123 125.6	1249	89.9	796.7 204.4	1001	79.6	949.1 30.3	979.4	96.9	2702 74.9	2777	97.3
6/15	W3	L1SST334	ST-T-148 ST-TC-44	11.9 492.7	504.2	2.3	476.6 177.6	654.2	72.9	1284 70.9	1355	94.8	889.2 188.8	1078	82.5	996.0 28.2	1024	97.3	2580 68.9	2649	97.4
6/15	W3	L1SST443	ST-T-9 ST-TC-24	11.5 343.1	355.0	3.4	402.3 219.1	621.4	64.7	884.1 263.6	1148	77.0	768.1 267.9	1036	74.1	746.7 134.1	880.8	84.8	2411 205.2	2616	92.2
6/15	W4	L1SND443	ND-T-70 ND-TC-154	7.6 353.0	360.6	2.1	459.7 695.6	1155	42.9	1463 23.3	1486	98.4	1230 490.2	1720	71.5	1027 11.3	1038	98.9	2830 18.4	2848	99.4
6/15	W4	L1SND334	ND-T-64 ND-TC-163	8.7 412.7	421.4	2.1	436.0 883.3	1319	33.0	1380 9.0	1389	99.4	1202 564.3	1766	68.0	1014 13.2	1027	98.7	2697 19.5	2716	99.3
6/20	W5	L.SND333	ND-T-38 ND-TC-155	0.2 9.0	9.2	2.2	12.9 27.8	40.7	31.7	38.5 4.1	42.6	90.4	39.8 16.0	55.8	71.3	34.8 6.8	41.6	83.7	67.5 2.7	70.2	96.2
6/20	W5	L.SND444	ND-T-60 ND-TC-118	0.4 12.9	13.3	3.0	12.9 34.8	47.7	27.0	38.1 4.1	42.2	90.3	42.2 11.7	53.9	78.3	48.2 6.9	55.1	87.5	70.1 1.9	72.0	97.4
6/20	W6	L.SST333	ST-T-14 ST-TC-53	0.4 5.4	5.8	6.9	10.8 19.6	30.4	35.5	26.5[e] 3.4	29.9	88.6	19.5[e] 8.8	28.3	68.9	35.8 7.6	43.4	82.5	56.7 5.6	62.3	91.0
6/20	W6	L.SST444	ST-T-130 ST-TC-56	0.8 8.4	9.2	8.7	21.6 24.9	46.5	46.5	32.1 8.2	40.3	79.7	32.6 7.4	40.0	81.5	33.4 11.4	44.8	74.6	70.2 6.0	76.2	92.1
6/20	W7	L.SST334	ST-T-31 ST-TC-98	0.6 6.0	6.6	9.1	21.3 22.6	43.9	48.5	25.7 11.2	36.9	69.6	18.7 8.8	27.5	68.0	26.4 8.6	35.0	75.4	59.1 8.4	67.5	87.6
6/20	W7	L.SST443	ST-T-172 ST-TC-94	0.2 6.3	6.5	3.1	23.6 56.4	80.0	29.5	30.7 7.9	38.6	79.5	24.6 8.1	32.7	75.2	30.3 4.9	35.2	86.1	66.9 8.3	75.2	89.0
6/20	W8	L.SND443	ND-T-179 ND-TC-193	- 11.0	11.0	0	13.5 51.8	65.3	20.7	37.2 3.6	40.8	91.2	49.3 11.9	61.2	80.6	29.1 8.0	37.1	78.4	78.9 4.4	83.3	94.7
6/20	W8	L.SND334	ND-T-149 ND-TC-20	0.1 7.7	7.8	1.3	12.5 52.7	65.2	19.2	26.8 8.7	35.5	75.5	30.8 13.7	44.5	69.2	52.7 10.6	63.3	83.3	70.5 5.5	76.0	92.8

[a] Analysis void due to wrong valve position during desorption. The total is biased low.

[b] N/A = Not applicable; ND = None detected.

[c] Improper amount of internal standard was added prior to analysis; therefore, representative internal standard values were used to calculate species amount.

[d] Tube was in desorber 10 minutes without purge flow; therefore, analysis is considered invalid.

[e] MS filament flickering during mid-portion of run; however, chloroform and carbon tetrachloride quantitations seem reasonable.

TABLE 4-5. RECOVERY VALUES FOR PRECISION AND ACCURACY RUNS (% EV)[a]

Date (1984)	Run No.	Sample No.	Vinyl chloride	Trichloro-fluoro-methane	Chloroform	Carbon tetra-chloride	Benzene	Tetrachloro-ethylene (perc)
5/9	Q1	L15ND111	36.3	76.3	103	96.0	100	100
		L15ND222	41.9	68.7	105	80.5	103	98.4
		L15ST333	7.7	61.2	108	75.9	108	99.3
		L15ST444	5.7	70.1	107	79.5	110	113
5/9	Q2	L15ND412[b]	107	96.2	167	131	176	173
		L15ND321[c]	(4.1)[d]	(29.4)	101	71.6	101	100
		L15ST234	12.2	65.8	116	86.1	113	103
		L15ST143	10.0	47.6	108	79.5	103	95.7
5/9	Q3	L15ND144	82.3	56.4	107	78.8	105	125
		L15ND322	90.2	59.3	109	90.5	107	125
		L15ST411	6.6	47.8	98.0	75.5	102	111
		L15ST233	18.3	38.6	97.6	73.0	107	128
5/11	Q4	L15ND221	32.4	60.3	102	81.6	103	106
		L15ND143	39.4	53.1	104	82.2	113	109
		L15ST412	16.8	35.3	89.3	70.8	93.5	97.5
		L15ST334	17.6	39.1	108	80.1	101	87.6
5/11	Q5	L15ND144	34.6	59.9	96.3	82.9	101	103
		L15ND222	15.8	59.3	109	87.5	105	131
		L15ST333	23.5	39.2	105	75.6	103	96.1
		L15ST411	6.7	31.4	94.0	70.8	101	112
6/6	Q6	L.5ND111	29.3	98.2	82.7	81.3	115	108
		L.5ND222	40.7	122	80.5	80.7	265	109
		L.5ST333	7.1	164	76.5	55.1	261	193
		L.5ST411	7.1	64.0	85.8	71.2	122	91.5
6/6	Q7	L.5ND221	54.9	43.6	84.8	82.3	216	95.8
		L.5ND443	40.8	51.1	76.5	78.9	190	97.2
		L.5ST112	(80.3)	(119)	(87.4)	(65.8)	(159)	(107)
		L.5ST334	14.1	74.8	81.3	71.7	161	92.8
6/7	Q8	L.5ND333	44.1	81.4	85.7	98.5	149	103
		L.5ND444	44.1	70.1	87.0	88.2	113	104
		L.5ST111	15.4	61.9	93.5	80.2	110	91.2
		L.5ST222	14.7	58.8	89.6	77.4	119	93.4

(continued)

TABLE 4-5 (continued)

Date (1984)	Run No.	Sample No.	Vinyl chloride	Trichloro-fluoro-methane	Chloroform	Carbon tetra-chloride	Benzene	Tetrachloro-ethylene (perc)
6/12	W1	L15N0333	45.3	73.8	108	88.5	109	135
		L15N0444	52.4	79.3	106	86.7	105	134
6/12	W2	L15ST333	43.4	48.6	102	57.4	103	137
		L15ST444	41.7	33.3	92.0	52.7	101	130
6/13	W3	L15ST334	60.1	38.4	99.7	56.7	105	124
		L15ST443	42.7	36.3	35.2	55.0	91.3	124
6/13	W4	L15N0334	50.3	77.3	102	93.0	106	128
		L15N0443	43.4	58.4	111	91.5	108	135
6/20	W5	L.5N0333	33.6	73.2	96.0	89.9	131	101
		L.5N0444	48.6	85.2	94.3	86.2	172	103
6/20	W6	L.5ST333	21.5	55.7	68.4	46.3	139	90.9
		L.5ST444	33.8	84.0	91.5	64.8	142	110
6/20	W7	L.5ST334	23.5	77.0	81.0	43.0	107	94.4
		L.5ST443	22.9	141	85.4	51.9	109	106
6/20	W8	L.5N0334	38.6	113	88.1	94.3	112	115
		L.5N0443	27.9	114	78.0	69.8	194	106

[a]Percent of expected value is the measured concentration expressed as a percentage of the expected concentration.

[b]High values were unexplained.

[c]Value represents amount detected on Tenax tube only.

[d]Values in parentheses were invalid.

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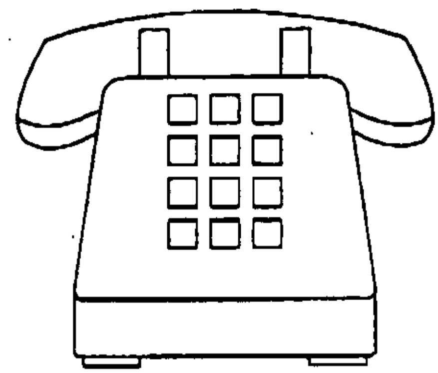

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FROM: Dean Marbury

Subject: DL's FOR E1B BRICK KILN

ATTACHED ARE THE MDL TABLES FOR THE BRICK KILN STUDY. THE MDL'S ARE IN ng/TRAP. ~~We will work~~ TODAY to PROVIDE A REDUCED DATA SET that simplifies ~~the~~ these tables (EG REPORTS ONLY THE POHC'S, PIC'S, etc OF INTEREST to THE STUDY).

I've let the Director Know we've BEEN holding things up inordinately, and we will have the reduced set completed TODAY FOR TRANSFER TO YOU Thurs A.M. I hope this full table will allow you to move forward on your report

Thanks

Dean Marbury
X1363

TENAX.XLS

ng/TRAP

COMPLETED BY			METHOD DETECTION LIMIT STUDY								
ROGER ROWAN				METHOD 8240 VOST							
11/14/93											
INST:MD800C											
MATRIX TENAX VOST											
NAME	STD1	STD2	STD3	STD4	STD5	STD6	STD7	MEAN	STDEV	%STDEV	MDL
Bromochloromethane	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
1,2-Dichloroethane-d4	26.86	31.83	28.50	28.01	26.17	23.80	26.97	27.46	2.70	9.82%	8.48
Chloromethane	61.99	56.30	83.66	62.61	47.75	58.63	81.77	58.52	10.93	18.71%	32.48
Dichlorofluoromethane	25.09	20.23	24.87	24.31	17.71	21.90	30.28	22.32	4.02	17.14%	12.63
Bromomethane	64.04	83.43	66.49	98.98	173.77	103.26	151.94	111.69	36.30	32.50%	114.10
Acetonitrile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
Acrylonitrile	43.67	36.14	37.37	34.30	30.59	36.48	41.65	37.01	4.42	11.93%	13.88
Vinyl Chloride	31.38	24.81	28.04	28.19	21.40	28.79	36.60	28.46	4.80	16.87%	15.09
Chloroethane	41.66	43.35	45.42	40.53	45.29	30.66	33.21	40.03	5.88	14.87%	18.47
Iodomethane	67.60	54.94	49.90	62.82	42.14	52.62	78.40	58.38	12.16	20.83%	38.22
Trichlorofluoromethane	34.33	37.69	39.49	36.49	34.06	33.56	36.70	35.62	1.60	4.48%	5.02
Methylene Chloride	64.59	63.81	56.62	54.21	47.63	56.25	56.85	55.74	5.05	9.06%	15.86
Acetone	21.20	24.30	24.85	22.20	20.38	28.66	35.35	25.43	5.35	21.02%	16.81
Carbon Disulfide	32.11	28.44	30.50	29.54	26.94	33.15	49.41	32.73	7.23	22.08%	22.72
1,1-Dichloroethene	35.36	34.30	32.59	37.80	31.27	42.92	51.83	37.98	7.20	18.95%	22.62
1,1-Dichloroethane	21.53	25.08	24.39	20.39	20.90	17.69	18.26	21.18	2.80	13.24%	8.81
1,2-Dichloroethene (total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
t-1,2-Dichloroethene	32.26	28.62	31.21	30.80	26.73	28.44	33.52	30.51	2.20	7.19%	6.90
Chloroform	31.29	31.12	31.93	28.59	27.14	27.62	29.53	29.60	1.90	6.40%	5.96
1,2-Dichloroethane	26.01	28.86	26.35	26.24	24.07	22.52	26.30	26.05	2.48	9.51%	7.79
1,4-Difluorobenzene	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
2-Butanone	32.91	34.11	32.72	33.72	30.68	30.95	33.71	32.67	1.39	4.27%	4.38
1,1,1-Trichloroethane	22.48	22.48	23.01	22.54	20.42	12.42	14.08	19.63	4.47	22.76%	14.04
Carbon Tetrachloride	19.75	19.69	19.42	19.52	17.62	14.33	14.78	17.87	2.38	13.34%	7.49
Benzene-d6	24.84	25.75	25.80	25.23	24.47	25.20	28.24	25.66	1.23	4.77%	3.85
Vinyl Acetate	21.11	22.80	22.43	19.86	21.89	21.31	19.28	21.21	1.25	5.92%	3.94
Bromodichloromethane	23.42	23.39	23.72	23.27	21.64	19.86	23.60	22.70	1.43	6.32%	4.51
1,2-Dichloropropane	21.58	21.32	21.50	20.74	20.63	20.86	21.89	21.20	0.50	2.37%	1.58
cis-1,3-Dichloropropene	25.01	26.15	26.44	25.60	23.67	24.23	27.17	25.50	1.25	4.90%	3.92
Trichloroethene	24.91	24.81	24.77	25.20	23.08	23.08	26.59	24.63	1.23	5.00%	3.87
2-Chloroethyl vinyl ether	23.57	21.02	26.17	25.58	19.14	23.09	22.77	23.05	2.45	10.62%	7.69
Dibromochloromethane	22.61	22.67	22.26	22.19	20.73	20.59	23.19	22.04	1.00	4.52%	3.13
Dibromomethane	23.64	27.59	26.32	26.71	25.49	23.49	27.84	25.82	1.74	6.74%	5.47
Dibromoethane	22.49	22.39	22.22	21.60	20.04	21.02	23.63	21.97	1.20	5.45%	3.76
1,1,2-Trichloroethane	24.58	24.51	24.53	24.89	22.78	23.46	26.72	24.48	1.23	5.03%	3.87
1,4-Dichloro-2-butene	19.73	20.40	19.44	22.10	16.32	15.52	14.73	18.04	2.68	14.84%	8.41
Benzene	24.19	23.39	23.56	24.48	21.90	22.09	24.81	23.49	1.16	4.93%	3.64
trans-1,3-Dichloropropene	24.91	23.87	24.62	24.40	22.07	23.01	26.19	24.01	1.12	4.65%	3.51
Bromoform	19.34	19.56	19.45	19.94	17.77	17.67	19.48	18.89	0.91	4.82%	2.86
Chlorobenzene-d5	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00
4-Bromofluorobenzene	23.97	23.95	24.20	24.15	21.83	22.63	24.86	23.66	1.04	4.41%	3.28
Toluene-d8	25.09	24.84	25.51	25.19	23.83	23.80	26.16	24.98	0.90	3.63%	2.84
4-Methyl-2-Pentanone	35.83	35.04	35.55	34.94	32.79	32.90	35.33	34.63	1.26	3.63%	3.95

2

TENAX.XLS

TENAX VOST (CON'T)

NAME	STD1	STD2	STD3	STD4	STD5	STD6	STD7	MEAN	STDEV	%STDEV	MDL
2-Hexanone	33.01	34.04	32.88	34.81	31.28	27.83	26.88	31.52	3.12	9.89%	9.78
Tetrachloroethene	21.88	22.01	22.27	23.47	21.46	21.14	24.27	22.38	1.12	5.00%	3.52
1,1,2,2-Tetrachloroethane	22.37	22.81	22.88	23.35	18.86	18.66	14.56	20.47	3.24	15.83%	10.18
Toluene	26.57	25.92	27.08	26.83	26.01	25.34	27.49	26.32	0.92	3.50%	2.90
Chlorobenzene	25.97	26.79	26.07	25.87	24.37	24.60	27.12	25.88	0.93	3.64%	2.94
Ethylbenzene	25.15	24.82	24.81	25.45	23.16	23.21	26.08	24.84	1.10	4.45%	3.45
Styrene	23.59	23.56	23.80	24.13	22.10	22.44	25.56	23.60	1.14	4.83%	3.59
m/p-Xylene	24.20	23.59	24.18	24.34	22.53	22.85	25.60	23.90	1.03	4.30%	3.23
o-Xylene	24.17	24.11	24.26	24.58	22.76	22.82	25.90	24.10	1.06	4.39%	3.33
Hexachloroethane	3.39	3.26	2.09	4.46	3.20	4.15	2.98	3.37	0.78	23.24%	2.46
1,2-Dibromo-3-chloropropane	8.79	14.41	10.87	15.84	6.18	3.77	3.66	9.06	4.87	53.86%	15.32
GC CONDITIONS 10C 4MIN HOLD 8C/MIN 180C 4MIN HOLD											
ALL STANDARDS CONCENATIONS 20ng ON COLUMN											
MEAN= THE SUM OF THE CONCENTRATIONS DIVIDED BY 7											
STDEV=N-1											
%STDEV=STDEV DIVIDED BY THE AVERAGE TIMES 100											
MDL=STDEV*3.143											

3

VOST.XLS

COMPLETED BY			METHOD DETECTION LIMIT STUDY									
ROGER ROWAN				METHOD 8240 VOST								
11/12/93												
INST:MD800C												
MATRIX TENAX CHARCOAL VOST												
NAME	STD1	STD2	STD3	STD4	STD6	STD7	STD5	MEAN	STDEV	%STDEV	MDL	6MDL
Bromochloromethane	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
1,2-Dichloroethane-d4	24.72	26.00	26.13	24.62	26.69	25.28	26.51	25.55	0.86	3.35%	2.69	0.86
Chloromethane	81.64	71.29	58.82	65.75	106.10	87.78	34.25	74.32	18.76	25.62%	58.97	18.76
Dichlorofluoromethane	36.36	33.67	31.88	30.51	39.35	32.28	20.23	34.75	3.65	10.64%	11.48	3.65
Bromomethane	121.24	110.55	98.03	107.30	133.77	118.41	73.30	114.72	12.06	10.51%	37.90	12.06
Acetonitrile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
Acrylonitrile	38.04	26.99	27.87	24.81	28.67	25.87	38.20	28.73	4.76	16.58%	14.97	4.76
Vinyl Chloride	38.46	35.37	39.46	37.08	45.10	37.65	23.03	38.85	3.35	8.63%	10.54	3.36
Chloroethane	50.38	47.62	52.67	46.98	52.24	56.83	37.98	51.12	3.64	7.12%	11.44	3.64
Iodomethane	159.24	137.97	120.61	118.56	137.41	104.82	94.20	129.77	19.11	14.73%	60.08	19.11
Trichlorofluoromethane	46.97	38.03	38.41	41.44	42.94	38.98	32.41	40.63	3.51	8.65%	11.04	3.51
Methylene Chloride	48.79	46.92	48.96	48.20	44.50	50.19	77.12	47.93	1.99	4.15%	6.25	1.99
Acetone	16.57	20.61	32.88	23.15	58.27	25.05	26.17	29.42	15.13	51.44%	47.56	15.13
Carbon Disulfide	30.66	31.21	31.58	30.47	42.50	33.97	30.44	33.40	4.63	13.87%	14.56	4.63
1,1-Dichloroethane	39.15	39.34	43.31	38.71	49.91	44.68	23.70	42.52	4.38	10.30%	13.77	4.38
1,1-Dichloroethene	20.39	21.69	17.80	20.69	16.62	16.72	21.47	19.00	2.19	11.55%	6.80	2.19
1,2-Dichloroethene (total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
t-1,2-Dichloroethene	29.79	28.42	28.39	27.70	31.19	30.39	38.88	29.48	1.28	4.33%	4.01	1.28
Chloroform	31.56	29.98	27.48	29.65	31.29	28.59	26.82	29.44	2.01	6.83%	6.32	2.01
1,2-Dichloroethane	25.55	26.88	27.25	24.89	29.05	28.13	26.80	26.42	1.15	4.35%	3.61	1.15
1,4-Difluorobenzene	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
2-Butanone	16.01	15.40	15.13	16.83	17.72	15.68	18.67	16.13	0.98	6.07%	3.08	0.98
1,1,1-Trichloroethane	25.75	25.09	25.62	26.93	27.29	24.55	26.44	25.89	0.92	3.58%	2.89	0.92
Carbon Tetrachloride	26.87	26.42	26.07	24.88	25.75	23.78	25.18	25.59	1.15	4.51%	3.63	1.15
Benzene-d6	24.61	27.02	25.74	26.74	26.19	26.09	26.16	26.40	1.22	4.62%	3.84	1.22
Vinyl Acetate	24.53	22.78	23.65	25.03	23.48	22.77	24.04	23.74	0.92	3.88%	2.89	0.92
Bromodichloromethane	29.56	26.91	28.33	28.28	29.70	28.74	26.64	28.57	1.08	3.77%	3.38	1.08
1,2-Dichloropropane	24.85	24.02	24.09	23.98	24.04	21.36	24.47	23.72	1.20	5.07%	3.78	1.20
cis-1,3-Dichloropropene	29.33	27.51	28.31	28.11	28.00	25.57	25.35	27.84	1.53	5.55%	4.82	1.53
Trichloroethene	28.46	27.36	27.81	28.67	29.31	27.08	27.31	27.78	0.97	3.49%	3.04	0.97
2-Chloroethyl vinyl ether	35.54	34.69	32.43	31.95	27.59	31.50	33.57	32.27	2.80	8.68%	8.80	2.80
Dibromochloromethane	26.43	25.13	24.74	24.00	25.99	22.85	22.24	24.87	1.28	5.15%	4.03	1.28
Dibromomethane	26.90	27.21	24.20	27.35	24.65	22.84	23.86	25.57	1.84	7.20%	5.79	1.84
Dibromoethane	27.37	25.77	25.79	24.48	26.71	23.96	24.68	25.68	1.29	5.03%	4.06	1.29
1,1,2-Trichloroethane	27.07	25.72	25.23	24.74	26.19	23.60	23.74	25.43	1.20	4.73%	3.78	1.20
1,4-Dichloro-2-butene	27.31	25.61	26.10	23.60	26.90	22.17	21.23	25.28	2.00	7.91%	6.29	2.00
Benzene	28.30	28.28	26.99	27.99	27.91	25.03	26.55	27.40	1.26	4.58%	3.95	1.26
trans-1,3-Dichloropropene	27.79	27.06	26.81	26.27	26.11	25.48	24.75	26.89	0.98	3.64%	3.09	0.98
Bromoform	25.46	23.93	22.99	22.31	23.73	21.28	20.77	23.23	1.42	6.12%	4.47	1.42
Chlorobenzene-d5	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	0.00	0.00%	0.00	0.00
4-Bromofluorobenzene	27.91	26.91	26.91	27.03	29.43	26.52	28.31	27.62	0.95	3.43%	2.97	0.95
Toluene-d8	29.93	30.62	28.91	28.92	30.94	28.75	30.34	29.51	0.99	3.36%	3.12	0.99

ng/tamp

4

VOST.XLS

CHARCOAL VOST con't

NAME	STD1	STD2	STD3	STD4	STD6	STD7	STD5	MEAN	STDEV	%STDEV	MDL	6MDL
4-Methyl-2-Pentanone	25.45	27.18	24.23	24.50	28.39	25.38	28.76	25.52	1.12	4.39%	3.51	1.12
2-Hexanone	28.87	30.35	26.70	28.38	28.19	26.40	28.83	27.98	1.78	6.36%	5.61	1.78
Tetrachloroethene	23.55	24.83	23.39	24.31	25.62	24.28	24.29	24.34	0.91	3.73%	2.85	0.91
1,1,2,2-Tetrachloroethane	28.93	27.29	26.77	26.64	28.50	25.70	24.07	26.97	0.92	3.40%	2.88	0.92
Toluene	27.34	28.89	27.32	27.25	29.03	27.12	26.96	27.79	0.84	3.01%	2.63	0.84
Chlorobenzene	26.91	27.52	26.11	26.30	27.80	25.89	25.72	26.74	0.78	2.92%	2.45	0.78
Ethylbenzene	27.33	26.54	26.74	26.93	28.71	26.50	28.26	27.46	0.95	3.44%	2.97	0.95
Styrene	29.65	30.44	28.24	28.07	29.74	27.75	28.54	28.99	1.10	3.80%	3.48	1.10
m-/p-Xylene	29.52	29.64	27.49	27.30	28.99	27.02	27.82	28.16	1.05	3.72%	3.29	1.05
o-Xylene	28.89	30.95	28.98	28.99	30.12	28.24	28.78	29.49	0.96	3.27%	3.03	0.96
Hexachloroethane	6.49	5.67	4.83	4.55	6.73	4.72	4.57	5.33	0.75	14.13%	2.37	0.75
1,2-Dbromo-3-chloropropane	39.87	35.34	32.19	28.89	38.76	27.19	18.88	33.70	5.19	15.41%	16.32	5.19
GC CONDITIONS 10C 4MIN HOLD 6C/MIN 160C 4MIN HOLD												
ALL STANDARDS CONCENATIONS 20ng ON COLUMN												
MEAN= THE SUM OF THE CONCENTRATIONS DIVIDED BY 7												
STDEV=N-1												
%STDEV=STDEV DIVIDED BY THE AVERAGE TIMES 100												
MDL=STDEV*3.143												
6MDL IS THE STDEV OF THE 6 STD'S LEAVING OUT STD5												

5

12/5/94

Roy -

2 copies of the cover memo are attached - 1 copy of all others for you & Rick.

Rick -

I did not have a chance to look at.

Roy

DENNIS

FAX TRANSMISSION

TO: Ron Myers, EFIG

FROM: Rick Marinshaw, MRI

DATE: January 23, 1995

RECEIVING FAX NUMBER: 541-0684

SENDING FAX NUMBER: 919-677-0065

THIS FAX CONSISTS OF 2 PAGES (INCLUDING THIS PAGE)

Here is an estimate for resampling the dryer exhaust for methane, ethane and TOC at Belden Brick. Please let me know how we should proceed.

MRI FAX

MIDWEST RESEARCH INSTITUTE
425 Volker Boulevard, Kansas City, Missouri 64110-2299

Telephone (816) 753-7600
FAX (816) 753-8420

Date 1-19-95

To Rick Marinshaw - MRI N.C.

From Bob Bulick - MRI K.C.

Overhead # or WBS # 465 -

This transmission consists of 2 pages (including cover)

Receiving Facsimile Telephone Number 919-677-0065

Verification Telephone Number 919-677-0249

MRI Facsimile Machine: RAPICOM 610 (816) 753-8420 GROUP III

MRI Verification: (816) 753-7600 Ext. 1361

MESSAGE:

INTEROFFICE COMMUNICATION

MIDWEST RESEARCH INSTITUTE

January 19, 1995

TO: Rick Marinshaw

FROM: Bob Gulick

SUBJECT: THC/Methane-Ethane Sampling at Beldon Brick

Based on our understanding of the sampling and analysis to be performed at Beldon Brick, the following assumptions were used to determine the cost of the project.

- Beldon Brick will perform their own sampling under the direction of MRI.
- MRI will supply all equipment and supplies necessary to collect and ship three forty-five liter samples.
- Samples will be shipped overnight to MRI for analysis.
- Each of the three samples will be analyzed in triplicate on a FID Chromatograph for methane and ethane (a total of nine samples). The remainder of the sample will then be analyzed on a THC for approximately 10 minutes and the results averaged.
- The results of the analysis will submitted in a data table.

The total cost for this project is $1908.00.

If you have any questions, please call.

BELDEN BRICK--VOST RAW DATA

	Mass collected, ng							
	Run 1		Run 2		Run 3		Field blank	
Analyte	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane	1,505.996	99.018	53.379	139.067	28.994	243.193	78.509	50.549
Bromomethane	388.741	<12.06	23.256	<12.06	12.912	108.120	63.862	49.642
Chloroethane	<18.47	1,132.853	<18.47	<3.64	<18.47	368.637	<18.47	<3.64
Iodomethane	209.954	32.460	<38.22	31.420	<38.22	92.021	65.576	<19.11
Methylene chloride	<15.86	18.758	<15.86	22.485	<15.86	14.588	<15.86	13.226
Acetone	993.771	<15.13	1,261.417	<15.13	2,543.338	<15.13	<16.81	<15.13
Carbon disulfide	<22.72	42.116	<22.72	51.006	<22.72	25.523	<22.72	<4.83
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	<4.36	5.696
1,1,1-Trichloroethane	<14.04	7.106	<14.04	<0.82	<14.04	4.913	<14.04	<0.82
Benzene	2,394.070	151.025	4,249.583	110.449	1,048.145	158.626	<3.85	22.377
4-Methyl-2-Pentanone	<3.95	<1.12	36.812	<1.12	<3.95	4.640	<3.95	<1.12
2-Hexanone	<9.79	2.640	154.551	<1.78	90.960	16.310	<9.79	<1.78
Tetrachloroethene	<3.52	<0.91	3.650	<0.91	3.944	<0.91	<3.52	<0.91
Toluene	102.810	2.777	157.326	4.377	174.730	3.773	<2.84	2.145
Ethylbenzene	27.219	5.972	41.073	1.303	45.630	9.640	<3.45	2.614
Styrene	11.832	1.125	46.412	3.084	<3.59	3.638	<3.59	1.146
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	<3.23	1.347
o-Xylene	39.935	<0.96	57.334	1.205	65.471	1.411	<3.33	<0.96
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

"<" indicates detection limit.

STILL WANT TO DECIDE ON WHETHER TO CONSIDER WHICH TARP THE COMPOUND SHOULD BE FOUND i.e. IF SHOULD BE IN TBMAX THEN DO NOT ASSUME 1/2 DL FOR THE T/C TARP.

REVISED TABLE 3-6 IS IN THE FILE BB_VOST2.WQ1

BELDEN BRICK--BLANK-CORRECTED VOST DATA

	Mass collected, ng						Detection limit, ng	
	Run 1		Run 2		Run 3			
Analyte	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane	1,427.487	48.469	(25.130)	88.518	(49.515)	192.644	<32.48	<18.76
Bromomethane	324.879	(49.642)	(40.606)	(49.642)	(50.950)	58.478	<114.1	<12.06
Chloroethane	0.000	1,132.853	0.000	0.000	0.000	368.637	<18.47	<3.64
Iodomethane	144.378	32.460	(65.576)	31.420	(65.576)	92.021	<38.22	<19.11
Methylene chloride	0.000	5.532	0.000	9.259	0.000	1.362	<15.86	<1.99
Acetone	993.771	0.000	1,261.417	0.000	2,543.338	0.000	<16.81	<15.13
Carbon disulfide	0.000	42.116	0.000	51.006	0.000	25.523	<22.72	<4.83
2-Butanone	92.093	3.885	207.277	10.758	331.858	7.627	<4.36	<0.88
1,1,1-Trichloroethane	0.000	7.106	0.000	0.000	0.000	4.913	<14.04	<0.82
Benzene	2,394.070	128.648	4,249.583	88.072	1,048.145	136.249	<3.85	<1.22
4-Methyl-2-Pentanone	0.000	0.000	36.812	0.000	0.000	4.640	<3.95	<1.12
2-Hexanone	0.000	2.640	154.551	0.000	90.960	16.310	<9.79	<1.78
Tetrachloroethene	0.000	0.000	3.650	0.000	3.944	0.000	<3.52	<0.91
Toluene	102.810	0.632	157.326	2.232	174.730	1.628	<2.84	<0.84
Ethylbenzene	27.219	3.358	41.073	(1.311)	45.630	7.026	<3.45	<0.95
Styrene	11.832	(0.021)	46.412	1.938	0.000	2.492	<3.59	<1.1
m-/p-Xylene	46.817	1.397	63.002	2.794	75.424	3.079	<3.23	<1.06
o-Xylene	39.935	0.000	57.334	1.205	65.471	1.411	<3.33	<0.96
1,2-Dbromo-3-chloropropane	0.000	0.000	116.513	0.000	0.000	20.215	<15.32	<5.19

Negative numbers in parentheses.

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SPECIATED VOC (METRIC UNITS)

	Mass emission rate, kg/hr				Emission factor, kg/Mg bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (b)	0.0027	0.00014	0.00032	0.0011	0.00086	4.5E-05	0.00010	0.00034
Bromomethane (b)	0.00060	0.0E+00 (c)	0.00010	0.00023	0.00019	0.0E+00 (c)	3.0E-05	7.3E-05
Chloroethane	0.0021	1.8E-05 (c)	0.00062	0.00092	0.00067	5.6E-06 (c)	0.00020	0.00029
Iodomethane (b)	0.00029	2.2E-05	0.00012	0.00015	9.3E-05	7.1E-06	3.9E-05	4.6E-05
Methylene chloride (b)	2.5E-05	2.8E-05	1.5E-05	2.3E-05	7.9E-06	8.8E-06	4.8E-06	7.2E-06
Acetone	0.0019	0.0020	0.0042	0.0027	0.00059	0.00065	0.0013	0.00085
Carbon disulfide	9.9E-05	1.0E-04	6.1E-05	8.7E-05	3.1E-05	3.2E-05	1.9E-05	2.7E-05
2-Butanone	0.00017	0.00035	0.00056	0.00036	5.5E-05	0.00011	0.00018	0.00011
1,1,1-Trichloroethane	2.6E-05	1.2E-05 (c)	2.0E-05	1.9E-05	8.3E-06	3.8E-06 (c)	6.2E-06	6.1E-06
Benzene (b)	0.0047	0.0070	0.0019	0.0045	0.0015	0.0022	0.00062	0.0014
4-Methyl-2-Pentanone	4.7E-06 (c)	5.6E-05	1.1E-05	2.4E-05	1.5E-06 (c)	1.8E-05	3.4E-06	7.5E-06
2-Hexanone	4.9E-06	0.00024	0.00016	0.00013	1.5E-06	7.5E-05	5.1E-05	4.3E-05
Tetrachloroethene	4.1E-06 (c)	6.6E-06	7.2E-06	6.0E-06	1.3E-06 (c)	2.1E-06	2.3E-06	1.9E-06
Toluene	0.00019	0.00026	0.00029	0.00025	6.0E-05	8.1E-05	9.2E-05	7.8E-05
Ethylbenzene	5.6E-05	6.6E-05	8.6E-05	7.0E-05	1.8E-05	2.1E-05	2.7E-05	2.2E-05
Styrene	1.8E-05	7.4E-05	5.0E-06	3.2E-05	5.6E-06	2.4E-05	1.6E-06	1.0E-05
m-/p-Xylene	8.7E-05	0.00010	0.00013	0.00011	2.7E-05	3.3E-05	4.0E-05	3.4E-05
o-Xylene	7.4E-05	9.4E-05	0.00011	9.2E-05	2.3E-05	3.0E-05	3.5E-05	2.9E-05
1,2-Dibromo-3-chloropropane	1.9E-05 (c)	0.00019	4.6E-05	8.6E-05	6.0E-06 (c)	6.1E-05	1.4E-05	2.7E-05

(a) Based on process rate of 3.16 Mg bricks per hour.

(b) Estimated values, all runs.

(c) Estimated as one-half the detection limit.

Adjusted to account for front and back half, 1/2 detection limit, 0 if blank>sample.

TABLE 3-6. SUMMARY OF KILN EMISSION RATES AND EMISSION FACTORS--SPECIATED VOC (ENGLISH UNITS)

	Mass emission rate, lb/hr				Emission factor, lb/ton bricks produced (a)			
	Run				Run			
Analyte	1	2	3	Ave.	1	2	3	Ave.
Chloromethane (b)	0.0060	0.00031	0.00070	0.0023	0.0017	9.0E-05	0.00020	0.00067
Bromomethane (b)	0.0013	0.00000 (c)	0.00021	0.00051	0.00038	0.0E+00 (c)	6.1E-05	0.00015
Chloroethane	0.0047	3.9E-05 (c)	0.0014	0.0020	0.0013	1.1E-05 (c)	0.00039	0.00058
Iodomethane (b)	0.00065	4.9E-05	0.00027	0.00032	0.00019	1.4E-05	7.7E-05	9.3E-05
Methylene chloride (b)	5.5E-05	6.1E-05	3.4E-05	5.0E-05	1.6E-05	1.8E-05	9.7E-06	1.4E-05
Acetone	0.0041	0.0045	0.0092	0.0059	0.0012	0.0013	0.0027	0.0017
Carbon disulfide	0.00022	0.00022	1.3E-04	0.00019	6.3E-05	6.4E-05	3.8E-05	5.5E-05
2-Butanone	0.00039	0.00077	0.0012	0.00079	0.00011	0.00022	0.00035	0.00023
1,1,1-Trichloroethane	5.8E-05	2.6E-05 (c)	4.3E-05	4.2E-05	1.7E-05	7.6E-06 (c)	1.2E-05	1.2E-05
Benzene (b)	0.010	0.015	0.0043	0.010	0.0030	0.0044	0.0012	0.0029
4-Methyl-2-Pentanone	1.0E-05 (c)	0.00012	2.4E-05	5.2E-05	3.0E-06 (c)	3.5E-05	6.9E-06	1.5E-05
2-Hexanone	1.1E-05	0.00052	0.00036	0.00030	3.1E-06	0.00015	0.00010	8.5E-05
Tetrachloroethene	9.0E-06 (c)	1.5E-05	1.6E-05	1.3E-05	2.6E-06 (c)	4.2E-06	4.6E-06	3.8E-06
Toluene	0.00042	0.00057	0.00064	0.00054	0.00012	0.00016	0.00018	0.00016
Ethylbenzene	0.00012	0.00015	0.00019	0.00015	3.6E-05	4.2E-05	5.5E-05	4.4E-05
Styrene	3.9E-05	0.00016	1.1E-05	7.2E-05	1.1E-05	4.7E-05	3.2E-06	2.1E-05
m-/p-Xylene	0.00019	0.00023	0.00028	0.00023	5.5E-05	6.6E-05	8.0E-05	6.7E-05
o-Xylene	0.00016	0.00021	0.00024	0.00020	4.7E-05	5.9E-05	6.9E-05	5.9E-05
1,2-Dibromo-3-chloropropane	4.2E-05 (c)	0.00042	1.0E-04	0.00019	1.2E-05 (c)	0.00012	2.9E-05	5.4E-05

(a) Based on process rate of 3.48 ton bricks per hour.

(b) Estimated values, all runs.

(c) Estimated as one-half the detection limit.

Adjusted to account for front and back half, 1/2 detection limit, 0 if blank>sample.

VOST RAW DATA

Source/analyte	Catch, ng							
	Run							
	1		2		3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85
Bromomethane (a)	388.741	<12.06	23.256	<12.06	12.912	108.12	63.862	49.642
Acetonitrile	75.424 c	<	<0	<0	<0	<0	<0	<0
Acrylonitrile	<13.88	<4.76	<13.88	<4.76	<13.88	<4.76	6.262	<4.76
Vinyl chloride	<15.09	<3.35	<15.09	<3.35	<15.09	<3.35	<15.09	<3.35
Chloroethane	<18.47	1132.853 d	<18.47	<1.92 f	<18.47	368.637 d	<18.47	<3.64
Iodomethane (a)	209.954 a	32.46	<38.22	31.42	<ERR	92.021	65.576	17.545 d
Trichlorofluoromethane	<5.02	<3.51	<5.02	<3.51	<5.02	<3.51	<5.02	<3.51
Methylene chloride	<15.86	18.758 d	<15.86	22.485	<15.86	14.588 d	15.768	13.226 d
Acetone	993.771 a	<15.13	1261.417 a	<15.13	2543.338 d	<15.13	<16.81	<15.13
Carbon disulfide	<22.72	42.116	<22.72	51.006	<22.72	25.523	<22.72	<4.83
1,1-Dichloroethene	<22.62	<4.38	<22.62	<4.38	<22.62	<4.38	<22.62	<4.38
1,1-Dichloroethane	<8.81	<2.19	<8.81	<2.19	<8.81	<2.19	<8.81	<2.19
1,2-Dichloroethene (total)	<	<	<0	<0	<0	<0	<0	<0
t-1,2-Dichloroethene	<6.9	<1.28	<6.9	<1.28	<6.9	<1.28	<6.9	<1.28
Chloroform	<5.96	<2.01	<5.96	<2.01	<5.96	<2.01	<5.96	0.121 d
1,2-Dichloroethane	<6.90	<1.15	<6.9	<1.15	<6.9	<1.15	<6.9	<1.15
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106	<14.04	0.41 f	<14.04	4.913	<14.04	<0.82
Carbon tetrachloride	<7.49	<1.15	<7.49	<1.15	<7.49	<1.15	<7.49	<1.15
Vinyl acetate	<3.94	<0.82	<3.94	<0.82	<3.94	<0.82	<3.94	<0.82
Bromodichloromethane	<4.51	<1.08	<4.51	<1.08	<4.51	<1.08	<4.51	<1.08
1,2-Dichloropropane	<1.68	<1.20	<1.68	<1.2	<1.68	<1.2	<1.68	<1.2
cis-1,3-Dichloropropene	<3.82	<1.53	<3.82	<1.53	<3.82	<1.53	<3.82	<1.53
Trichloroethene	<3.87	<0.87	<3.87	<0.87	<3.87	<0.87	<3.87	<0.87
2-Chloroethyl vinyl ether	<7.69	<2.80	<7.69	<2.8	<7.69	<2.8	<7.69	<2.8
Dibromochloromethane	<3.13	<1.28	<3.13	<1.28	<3.13	<1.28	<3.13	<1.28
Dibromomethane	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84
Dibromoethane	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29
1,1,2-Trichloroethane	<3.87	<1.20	<3.87	<1.2	<3.87	<1.2	<3.87	<1.2
1,4-Dichloro-2-butene	<8.41	<2.00	<8.41	<2	<8.41	<2	<8.41	<2
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626	<3.85	22.377
trans-1,3-Dichloropropene	<3.51	<0.98	<3.51	<0.98	<3.51	<0.98	<3.51	<0.98
Bromoform	<2.88	<1.42	<2.88	<1.42	<2.88	<1.42	<2.88	<1.42
4-Methyl-2-Pentanone	<3.95	<1.12	36.812	<1.12	<3.95	4.64	2.908	<1.12
2-Hexanone	<8.78	2.64	154.551	1.701 d	90.96	16.31	8.785	<1.78
Tetrachloroethene	<3.52 ~~1.769~~ f	<0.91	3.65	<0.91	3.944	<0.91	<3.52	<0.91
1,1,2,2-Tetrachloroethane	<10.18	<0.92	<10.18	<0.92	<10.18	<0.92	<10.18	<0.92
Toluene	102.81	2.777	157.326	4.377	174.73	3.773	<2.84	2.145
Chlorobenzene	<2.94	<0.78	31.433	<0.78	<2.94	<0.78	<2.94	<0.78
Ethylbenzene	27.219	5.972	41.073	1.303	45.63	9.64	<3.45	2.614
Styrene	11.832	1.125	46.412	3.084	<3.59	3.638	2.178	1.146 d
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	1.222	1.347
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411	<3.33	0.444
Hexachloroethane	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

(a) Results invalid due to contaminated blank sample.

MRI FAX

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MESSAGE:

VOST Tenax/Charcoal MDL Summary
4/5/95

No.	Compound	Concentration (ng on-column) Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Avg	S	%RSD	MDL (ng)
1	1,2-Dichloroethane-d4	54.41	53.26	52.75	47.95	49.65	48.55	48.59	50.74	2.3	4.5	7.2
2	Chloromethane	52.45	41.77	40.04	39.87	40.71	37.83	33.16	40.83	3.1	7.6	9.7
3	Bromomethane	48.37	38.66	37.32	36.33	39.12	37.47	35.84	39.02	1.3	3.3	4.0
4	Vinyl Chloride	39.53	31.05	28.67	28.83	29.41	27.64	27.31	30.09	1.6	5.2	4.9
5	Chloroethane	39.07	38.44	36.09	35.29	38.40	35.65	35.21	36.59	1.2	3.3	3.6
6	Methylene Chloride	38.11	103.42	111.18	115.00	102.22	129.37	122.27	102.80	10.6	10.3	33.4
7	Acetone	64.62	64.93	62.35	62.30	44.18	52.94	53.46	57.83	7.9	13.7	24.9
8	Carbon Disulfide	35.58	42.50	40.72	41.58	42.77	41.01	40.77	40.71	0.9	2.2	2.6
9	1,1-Dichloroethene	41.32	43.71	42.28	43.51	46.71	43.84	42.76	43.45	1.5	3.5	4.8
10	1,1-Dichloroethane	46.82	48.46	47.11	47.25	47.88	46.77	47.57	47.57	1.0	2.0	3.0
11	cis-1,2-Dichloroethene	47.52	48.19	46.58	46.68	45.95	44.56	46.42	46.56	1.2	2.5	3.7
12	t-1,2-Dichloroethene	44.97	47.10	46.33	47.08	48.50	48.20	47.86	47.15	0.8	1.7	2.6
13	Chloroform	50.02	48.63	48.90	48.15	49.69	48.35	48.53	49.04	0.7	1.3	2.1
14	1,2-Dichloroethane	50.75	51.25	49.60	47.53	49.32	47.86	47.88	49.17	1.4	2.9	4.5
15	2-Butanone	76.77	68.28	61.08	62.29	54.62	55.82	62.29	62.74	4.4	7.0	13.8
16	Vinyl Acetate	32.17	40.66	38.82	38.65	40.37	41.79	40.75	39.06	1.2	3.0	3.7
17	1,1,1-Trichloroethane	46.94	49.20	48.26	49.23	49.47	48.89	48.67	48.69	0.4	0.9	1.3
18	Carbon Tetrachloride	44.75	49.78	48.61	47.93	46.93	46.27	47.93	47.46	1.2	2.8	3.9
19	Bromodichloromethane	49.33	49.72	49.61	49.83	49.97	49.30	49.65	49.63	0.2	0.5	0.7
20	1,2-Dichloropropane	49.37	51.11	50.60	50.51	50.21	49.72	49.76	50.18	0.5	1.1	1.7
21	cis-1,3-Dichloropropene	47.96	47.92	48.23	46.43	47.02	46.60	46.56	47.25	0.8	1.6	2.4
22	Trichloroethene	49.55	49.44	48.95	49.65	49.85	49.64	49.26	49.51	0.4	0.7	1.1
23	Dibromochloromethane	47.93	46.51	47.33	47.45	47.21	46.67	46.45	47.08	0.4	0.9	1.4
24	1,1,2-Trichloroethane	48.18	47.16	47.53	47.48	47.69	47.12	46.78	47.42	0.3	0.7	1.1
25	Benzene	69.86	70.23	68.93	67.29	64.54	66.85	61.80	66.78	2.8	4.3	8.9
26	trans-1,3-Dichloropropene	46.93	46.48	46.69	45.47	45.75	45.53	44.83	45.96	0.7	1.5	2.2
27	Bromoform	47.15	45.66	46.11	44.84	44.27	43.44	43.73	45.03	1.1	2.4	3.3
28	4-Bromofluorobenzene	49.20	45.94	45.36	46.69	46.03	45.61	44.94	46.25	0.6	1.3	1.9
29	Toluene-d8	48.36	48.84	47.66	47.76	47.97	47.44	47.35	47.91	0.5	1.1	1.7
30	4-Methyl-2-Pentanone	53.48	53.94	51.55	53.61	53.61	54.09	54.02	53.47	1.0	1.8	3.0
31	2-Hexanone	56.14	54.29	49.60	52.35	51.87	52.22	51.82	52.47	1.5	2.9	4.7
32	Tetrachloroethene	48.97	50.25	48.94	48.75	48.90	48.73	48.50	49.01	0.6	1.3	2.0
33	1,1,2,2-Tetrachloroethane	54.26	52.06	52.04	53.16	53.21	53.04	51.84	52.82	0.6	1.2	1.9
34	Toluene	48.90	49.81	49.52	50.98	50.93	50.64	50.99	50.30	0.7	1.3	2.1
35	Chlorobenzene	50.52	52.03	51.38	51.49	51.51	51.33	51.17	51.35	0.3	0.5	0.9
36	Ethylbenzene	49.96	49.81	49.52	49.13	49.48	48.95	48.75	49.37	0.4	0.8	1.3
37	Styrene	50.31	49.92	49.46	48.98	49.09	48.46	48.33	49.22	0.6	1.2	1.9
38	m-/p-Xylene	50.93	50.81	50.47	50.57	50.69	50.25	50.32	50.58	0.2	0.4	0.7
39	o-Xylene	50.50	50.17	49.77	49.85	49.85	49.44	49.25	49.83	0.3	0.7	1.0
40	Trichlorofluoromethane	45.35	48.45	45.95	46.87	47.71	47.88	46.19	46.91	1.0	2.1	3.1
41	1,3-Dichlorobenzene	48.09	47.76	46.52	45.38	46.43	45.92	44.86	46.42	1.0	2.2	3.2
42	1,4-Dichlorobenzene	48.22	47.63	46.42	44.83	45.86	45.59	44.34	46.14	1.2	2.5	3.6
43	1,2-Dichlorobenzene	50.38	48.89	46.71	45.84	46.61	46.34	45.75	47.26	1.2	2.5	3.7

Note: Data generated on MD800C

REP #	FILE
1	D05CQ04
2	D05CQ08
3	D05CQ09
4	D05CQ11
5	D05CQ12
6	D05CQ13
7	D05CQ14

MRI FAX

MIDWEST RESEARCH INSTITUTE
425 Volker Boulevard, Kansas City, Missouri 64110-2299

Telephone (816) 753-7600
FAX (816) 753-8420

Date 4/4/95

To Rick ~~Hop~~ Marinshaw

From

Overhead # or WBS # 314 -

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MESSAGE:

Interoffice Communication
MIDWEST RESEARCH INSTITUTE
Tuesday, April 04, 1995

To: Rick Marinshaw
From: Jon Onstot
Subject: VOST MDL
cc:

Rick, I am sending you a copy of the VOST Tenax MDLs which were generated yesterday, April 3. These MDLs were based on an initial calibration curve range of 50-1000 ng on-column.

As you can see, the MDLs look good, i.e. all fall well below the quantitation limit of 50 ng on-column, with the exception of methylene chloride. There appeared to be a methylene chloride contamination present in the volatiles lab which adversely affected that compound's MDL determination. As a result, we will probably redo the entire MDL analysis at a later date. If you need a better MDL for methylene chloride before that time, I suggest that you use the MDL which you already have.

If you have any other questions, please feel free to call me.

Jon

VOST/Tenax MDL Summary
4/3/95

No.	Compound	Concentration (ng on-column) Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Avg	S	%RSD	MDL (ng)
1	1,2-Dichloroethane-d4	46.98	49.37	51.31	47.33	47.43	45.40	46.54	47.8	2.1	4.4	6.7
2	Chloromethane	29.69	33.99	36.30	30.79	32.23	30.96	30.57	32.1	2.3	7.1	7.1
3	Bromomethane	40.24	43.43	47.08	39.47	41.55	41.63	40.45	42.0	2.7	6.4	8.5
4	Vinyl Chloride	26.67	31.06	33.46	28.56	29.34	28.57	27.56	29.3	2.1	7.3	6.8
5	Chloroethane	33.18	38.83	40.33	34.12	33.05	35.21	34.73	35.3	2.6	7.3	8.1
6	Methylene Chloride	76.13	161.66	104.30	111.73	84.15	52.34	67.65	94.3	38.7	41.0	121.5
7	Acetone	71.43	55.16	46.97	61.84	73.45	68.50	56.38	62.2	9.1	14.6	28.5
8	Carbon Disulfide	35.39	37.77	40.84	35.93	32.79	33.92	36.30	36.1	2.8	7.9	9.0
9	1,1-Dichloroethene	44.46	45.04	48.94	43.34	40.61	41.50	44.26	44.0	3.0	6.7	9.3
10	1,1-Dichloroethane	42.50	43.64	48.18	41.73	41.44	41.88	42.39	43.1	2.6	5.9	8.0
11	cis-1,2-Dichloroethene	45.93	45.62	49.72	43.08	43.49	45.45	45.70	45.6	2.4	5.2	7.4
12	t-1,2-Dichloroethene	44.88	45.27	50.21	43.04	43.73	43.77	44.76	45.1	2.6	5.8	8.2
13	Chloroform	50.06	53.01	57.96	50.13	50.51	50.08	50.57	51.8	3.1	6.0	9.7
14	1,2-Dichloroethane	45.44	47.35	52.50	45.48	45.42	44.99	46.47	46.7	2.9	6.2	9.1
15	2-Butanone	61.88	46.81	51.36	53.18	62.53	59.61	56.58	56.0	5.7	10.2	18.0
16	Vinyl Acetate	39.38	38.64	38.67	39.65	36.23	40.69	39.79	39.0	1.5	3.9	4.8
17	1,1,1-Trichloroethane	46.64	47.74	48.12	47.20	45.80	46.94	46.75	47.0	0.8	1.7	2.6
18	Carbon Tetrachloride	43.72	43.94	43.79	43.94	43.25	43.81	45.19	43.9	0.6	1.5	2.0
19	Bromodichloromethane	52.49	52.93	53.16	53.07	52.96	52.62	53.27	53.0	0.2	0.3	0.5
20	1,2-Dichloropropane	47.65	49.25	49.29	48.87	48.85	48.57	48.39	48.7	0.4	0.7	1.1
21	cis-1,3-Dichloropropene	48.53	51.05	50.86	50.29	50.34	49.92	49.56	50.1	0.6	1.1	1.7
22	Trichloroethene	52.07	52.85	53.00	52.31	52.57	52.65	52.59	52.6	0.2	0.5	0.8
23	Dibromochloromethane	50.65	51.16	51.12	50.73	51.94	51.35	50.83	51.1	0.4	0.8	1.4
24	1,1,2-Trichloroethane	49.82	51.20	51.16	50.48	51.26	50.54	50.39	50.7	0.4	0.8	1.3
25	Benzene	56.63	57.21	56.60	56.62	56.46	56.73	59.61	57.4	1.2	2.1	3.8
26	trans-1,3-Dichloropropene	48.47	50.76	50.79	50.23	50.27	49.67	48.88	49.9	0.7	1.6	2.3
27	Bromoform	50.90	51.22	50.59	51.19	52.39	51.04	50.60	51.1	0.7	1.3	2.1
28	4-Bromofluorobenzene	48.43	48.47	48.09	48.03	48.10	47.32	46.63	47.9	0.7	1.4	2.1
29	Toluene-d8	47.22	46.28	46.77	46.87	46.71	46.54	46.69	46.7	0.2	0.4	0.7
30	4-Methyl-2-Pentanone	52.23	48.51	49.10	49.11	49.11	49.38	50.06	49.6	0.5	1.0	1.6
31	2-Hexanone	51.93	47.62	48.63	48.36	49.31	49.24	52.38	49.6	1.7	3.3	5.2
32	Tetrachloroethene	48.50	48.32	48.78	48.48	48.28	48.59	48.56	48.5	0.2	0.4	0.6
33	1,1,2,2-Tetrachloroethane	60.67	57.79	57.42	57.85	58.00	57.22	56.44	57.9	0.6	1.0	1.8
34	Toluene	52.42	54.96	52.49	51.44	50.76	51.00	50.84	52.0	1.6	3.1	5.1
35	Chlorobenzene	51.39	50.44	50.64	50.89	50.65	50.46	50.34	50.7	0.2	0.4	0.6
36	Ethylbenzene	51.30	50.03	49.90	50.57	50.48	50.66	50.10	50.5	0.4	0.7	1.3
37	Styrene	51.46	49.87	49.57	49.83	49.74	49.16	48.75	49.8	0.4	0.9	1.4
38	m-/p-Xylene	51.79	50.24	50.33	50.62	50.65	50.29	50.39	50.6	0.2	0.3	0.6
39	o-Xylene	51.80	50.44	50.37	50.34	50.43	50.20	50.14	50.6	0.1	0.2	0.4
40	Trichlorofluoromethane	45.70	48.00	52.10	45.17	41.51	46.07	46.24	46.4	3.5	7.5	10.9
41	1,3-Dichlorobenzene	50.25	50.67	49.08	48.94	48.99	47.75	47.56	49.0	1.1	2.3	3.5
42	1,4-Dichlorobenzene	50.04	50.03	48.60	48.46	48.45	46.85	47.01	48.5	1.2	2.4	3.7
43	1,2-Dichlorobenzene	51.35	48.34	47.10	47.14	46.77	45.69	45.48	47.4	1.1	2.2	3.3

Note: Data generated on MD800C

VOST DATA--BLANK CORRECTED

Source/analyte	Catch, ng					
	Run					
	1		2		3	
	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1427.487 b	48.469 d		88.518	d	192.644
Dichlorofluoromethane						
Bromomethane (a)	324.879					58.478
Acetonitrile	75.424 c					
Acrylonitrile						
Vinl chloride						
Chloroethane		1132.853 d		f		368.637 d
Iodomethane (a)	144.378 a	14.915		13.875		74.476
Trichlorofluoromethane						
Methylene chloride		d				d
Acetone	993.771 a		1261.417 a		2543.338 d	
Carbon disulfide		42.116		51.006		25.523
1,1-Dichloroethene						
1,1-Dichloroethane						
1,2-Dichloroethene (total)						
t-1,2-Dichloroethene						
Chloroform						
1,2-Dichloroethane						
2-Butanone	90.74		205.924	10.758	330.505	
1,1,1-Trichloroethane		7.106		f		4.913
Carbon tetrachloride						
Vinyl acetate						
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene						
2-Chloroethyl vinyl ether						
Dibromochloromethane						
Dibromomethane						
Dibromoethane						
1,1,2-Trichloroethane						
1,4-Dichloro-2-butene						
Benzene	2394.07	128.648	4249.583 a	88.072	1048.145 e	136.249
trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone			33.904			4.64
2-Hexanone			145.766	d	82.175	16.31
Tetrachloroethene			3.65		3.944	
1,1,2,2-Tetrachloroethane						
Toluene	102.81	0.632	157.326	2.232	174.73	1.628
Chlorobenzene						
Ethylbenzene	27.219	3.358	41.073		45.63	7.026
Styrene	9.654		44.234	1.938		2.492
m-/p-Xylene	45.595	1.397	61.78	2.794	74.202	3.079
o-Xylene	39.935		57.334	0.761	65.471	0.967
Hexachloroethane						
1,2-Dbromo-3-chloropropane			116.513			20.215

4/18/95

VOST RAW DATA

Source/analyte	Catch, ng							
	Run							
	1		2		3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85	<12.63	<3.85
Bromomethane (a)	388.741	<4.0	23.256	<4.0	12.912	108.12	63.862	49.642
Acetonitrile	75.424 c	<	<0	<0	<0	<0	<0	<0
Acrylonitrile	<13.88	<4.76	<13.88	<4.76	<13.88	<4.76	6.262	<4.76
Vinyl chloride	<15.09	<3.35	<6.8	<4.9	<6.8	<4.9	<6.8	<4.9
Chloroethane	<18.47	1132.853 d	<8.1	<3.64 f	<8.1	368.637 d	<8.1	<3.8
Iodomethane (a)	209.954 a	32.46	<38.22	31.42	<38.22	92.021	65.576	17.545 d
Trichlorofluoromethane	<5.02	<3.1	<10.9	<3.1	<10.9	<3.1	<10.9	<3.1
Methylene chloride	<15.86	~~18.756~~ d	<15.86	~~22.485~~	<15.86	~~14.688~~ d	15.768	13.226 d
Acetone	993.771 a	<24.9	1261.417 a	<24.9	2543.338 d	<24.9	<28.5	<24.9
Carbon disulfide	<22.72	42.116	<9	51.006	<9	25.523	<9	<2.8
1,1-Dichloroethene	<22.62	<4.8	<9.3	<4.8	<9.3	<4.8	<9.3	<4.8
1,1-Dichloroethane	<8.81	<3	<8	<3	<8	<3	<8	<3
1,2-Dichloroethene (total)	<	<	<0	<0	<0	<0	<0	<0
t-1,2-Dichloroethene	<6.9	<2.6	<8.2	<2.6	<8.2	<2.6	<8.2	<2.6
Chloroform	<5.96	<2.1	<9.7	<2.1	<9.7	<2.1	<9.7	0.121 d
1,2-Dichloroethane	<6.90	<4.5	<9.1	<4.5	<9.1	<4.5	<9.1	<4.5
2-Butanone	92.093	~~9.681~~	207.277	16.454	331.858	~~13.823~~	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106	<2.6	<0.82 f	<2.6	4.913	<2.6	<1.3
Carbon tetrachloride	<7.49	<3.9	<2	<3.9	<2	<3.9	<2	<3.9
Vinyl acetate	<3.94	<3.7	<4.8	<3.7	<4.8	<3.7	<4.8	<3.7
Bromodichloromethane	<4.51	<0.7	<0.5	<0.7	<0.5	<0.7	<0.5	<0.7
1,2-Dichloropropane	<1.68	<1.7	<1.1	<1.7	<1.1	<1.7	<1.1	<1.7
cis-1,3-Dichloropropene	<3.82	<2.4	<1.7	<2.4	<1.7	<2.4	<1.7	<2.4
Trichloroethene	<3.87	<1.1	<0.8	<1.1	<0.8	<1.1	<0.8	<1.1
2-Chloroethyl vinyl ether	<7.69	<2.8	<7.69	<2.8	<7.69	<2.8	<7.69	<2.8
Dibromochloromethane	<3.13	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
Dibromomethane	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84
Dibromoethane	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29
1,1,2-Trichloroethane	<3.87	<1.1	<1.3	<1.1	<1.3	<1.1	<1.3	<1.1
1,4-Dichloro-2-butene	<8.41	<2	<8.41	<2	<8.41	<2	<8.41	<2
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626	<3.8	22.377
trans-1,3-Dichloropropene	<3.51	<2.2	<2.3	<2.2	<2.3	<2.2	<2.3	<2.2
Bromoform	<2.88	<3.3	<2.1	<3.3	<2.1	<3.3	<2.1	<3.3
4-Methyl-2-Pentanone	<3.95	<3.0	36.812	<3.0	<1.6	4.64	2.908	<3.0
2-Hexanone	<8.78	2.64	154.551	1.701 d	90.96	16.31	8.785	<4.7
Tetrachloroethene	<3.52 f	<2.0	3.65	<2.0	3.944	<2.0	<0.8	<2.0
1,1,2,2-Tetrachloroethane	<10.18	<1.9	<1.8	<1.9	<1.8	<1.9	<1.8	<1.9
Toluene	102.81	2.777	157.326	4.377	174.73	3.773	<0.6	2.145
Chlorobenzene	<2.94	<0.9	31.433	<0.9	<0.6	<0.9	<0.6	<0.9
Ethylbenzene	27.219	5.972	41.073	1.303	45.63	9.64	<1.2	2.614
Styrene	11.832	1.125	46.412	3.084	<1.4	3.638	2.178	1.146 d
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	1.222	1.347
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411	<0.4	0.444
Hexachloroethane	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75
1,2-Dbromo-3-chloropropane	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

(a) Results invalid due to contaminated blank sample.

delete T/c

delete T/c

VOST DETECTION LIMITS

Source/analyte	ng/trap	
	Tenax	T/C
Chloromethane	<7.1	<9.7
Dichlorofluoromethane	<12.63	<3.85
Bromomethane	<8.5	<4
Acetonitrile	<0	<0
Acrylonitrile	<13.88	<4.76
Vinyl chloride	<6.8	<4.9
Chloroethane	<8.1	<3.8
Iodomethane	<38.22	<19.11
Trichlorofluoromethane	<10.9	<3.1
Methylene chloride	<15.86	<33.4
Acetone	<28.5	<24.9
Carbon disulfide	<9	<2.8
1,1-Dichloroethene	<9.3	<4.8
1,1-Dichloroethane	<8	<3
1,2-Dichloroethene (total)	<0	<0
t-1,2-Dichloroethene	<8.2	<2.6
Chloroform	<9.7	<2.1
1,2-Dichloroethane	<9.1	<4.5
2-Butanone	<18	<13.8
1,1,1-Trichloroethane	<2.6	<1.3
Carbon tetrachloride	<2	<3.9
Vinyl acetate	<4.8	<3.7
Bromodichloromethane	<0.5	<0.7
1,2-Dichloropropane	<1.1	<1.7
cis-1,3-Dichloropropene	<1.7	<2.4
Trichloroethene	<0.8	<1.1
2-Chloroethyl vinyl ether	<7.69	<2.8
Dibromochloromethane	<1.4	<1.4
Dibromomethane	<5.47	<1.84
Dibromoethane	<3.78	<1.29
1,1,2-Trichloroethane	<1.3	<1.1
1,4-Dichloro-2-butene	<8.41	<2
Benzene	<3.8	<8.9
trans-1,3-Dichloropropene	<2.3	<2.2
Bromoform	<2.1	<3.3
4-Methyl-2-Pentanone	<1.6	<3.0
2-Hexanone	<5.2	<4.7
Tetrachloroethene	<0.8	<2.0
1,1,2,2-Tetrachloroethane	<1.8	<1.9
Toluene	<0.6	<2.1
Chlorobenzene	<0.6	<0.9
Ethylbenzene	<1.2	<1.3
Styrene	<1.4	<1.9
m-/p-Xylene	<0.6	<0.7
o-Xylene	<0.4	<1.0
Hexachloroethane	<2.48	<0.75
1,2-Dbromo-3-chloropropan	<15.32	<5.19

4/5/95

VOST RAW DATA

Source/analyte	Catch, ng							
	Run							
	1		2		3		Field blank	
	Tenax	T/C	Tenax	T/C	Tenax	T/C	Tenax	T/C
• Chloromethane (a)	1505.996 b	99.018 d	53.379	139.067	28.994 d	243.193	78.509	50.549 d
Dichlorofluoromethane	~~<12.63~~	~~<3.85~~	~~<12.63~~	~~<3.85~~	~~<12.63~~	~~<3.85~~	~~<12.63~~	~~<3.85~~
• Bromomethane (a)	388.741	<12.06	23.256	<12.06	12.912	108.12	63.862	49.642
~~Acetonitrile~~	~~75.424 c~~	~~<~~	~~<0~~	~~<0~~	~~<0~~	~~<0~~	~~<0~~	~~<0~~
~~Acrylonitrile~~	~~<13.88~~	~~<4.76~~	~~<13.88~~	~~<4.76~~	~~<13.88~~	~~<4.76~~	~~6.262~~	~~<4.76~~
~~Vinyl chloride~~	<15.09	<3.35	<6.8	<3.35	<6.8	<3.35	<6.8	<3.35
~~Chloroethane~~	<18.47	1132.853 d	<8.1	<3.64 f	<8.1	368.637 d	<8.1	<3.64
Iodomethane (a)	209.954 a	32.46	<38.22	31.42	<38.22	92.021	65.576	17.545 d
~~Trichlorofluoromethane~~	<5.02	<3.51	<10.9	<3.51	<10.9	<3.51	<10.9	<3.51
Methylene chloride	<15.86	18.758 d	<15.86	22.485	<15.86	14.588 d	15.768	13.226 d
Acetone	993.771 a	<15.13	1261.417 a	<15.13	2543.338 d	<15.13	<28.5	<15.13
Carbon disulfide	<22.72	42.116	<9	51.006	<9	25.523	<9	<4.83
~~1,1-Dichloroethene~~	<22.62	<4.38	<9.3	<4.38	<9.3	<4.38	<9.3	<4.38
~~1,1-Dichloroethane~~	<8.81	<2.19	<8	<2.19	<8	<2.19	<8	<2.19
~~1,2-Dichloroethene (total)~~	<	<	<0	<0	<0	<0	<0	<0
~~t-1,2-Dichloroethene~~	<6.9	<1.28	<8.2	<1.28	<8.2	<1.28	<8.2	<1.28
~~Chloroform~~	<5.96	<2.01	<9.7	<2.01	<9.7	<2.01	<9.7	0.121 d
~~1,2-Dichloroethane~~	<6.90	<1.15	<9.1	<1.15	<9.1	<1.15	<9.1	<1.15
2-Butanone	92.093	9.581	207.277	16.454	331.858	13.323	1.353	5.696 d
1,1,1-Trichloroethane	<14.04	7.106	<2.6	<0.82 f	<2.6	4.913	<2.6	<0.82
~~Carbon tetrachloride~~	<7.49	<1.15	<2	<1.15	<2	<1.15	<2	<1.15
~~Vinyl acetate~~	<3.94	<0.82	<4.8	<0.82	<4.8	<0.82	<4.8	<0.82
~~Bromodichloromethane~~	<4.51	<1.08	<0.5	<1.08	<0.5	<1.08	<0.5	<1.08
~~1,2-Dichloropropane~~	<1.68	<1.20	<1.1	<1.2	<1.1	<1.2	<1.1	<1.2
~~cis-1,3-Dichloropropene~~	<3.82	<1.53	<1.7	<1.53	<1.7	<1.53	<1.7	<1.53
~~Trichloroethene~~	<3.87	<0.87	<0.8	<0.87	<0.8	<0.87	<0.8	<0.87
~~2-Chloroethyl vinyl ether~~	<7.69	<2.80	<7.69	<2.8	<7.69	<2.8	<7.69	<2.8
~~Dibromochloromethane~~	<3.13	<1.28	<1.4	<1.28	<1.4	<1.28	<1.4	<1.28
~~Dibromomethane~~	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84	<5.47	<1.84
~~Dibromoethane~~	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29	<3.78	<1.29
~~1,1,2-Trichloroethane~~	<3.87	<1.20	<1.3	<1.2	<1.3	<1.2	<1.3	<1.2
~~1,4-Dichloro-2-butene~~	<8.41	<2.00	<8.41	<2	<8.41	<2	<8.41	<2
Benzene	2394.07	151.025	4249.583 a	110.449	1048.145 e	158.626	<3.8	22.377
~~trans-1,3-Dichloropropene~~	<3.51	<0.98	<2.3	<0.98	<2.3	<0.98	<2.3	<0.98
~~Bromoform~~	<2.88	<1.42	<2.1	<1.42	<2.1	<1.42	<2.1	<1.42
~~4-Methyl-2-Pentanone~~	<3.95	<1.12	36.812	<1.12	<1.6	4.64	2.908	<1.12
2-Hexanone	<8.78	2.64	154.551	1.701 d	90.96	16.31	8.785	<1.78
Tetrachloroethene	o-d <3.52 f	<0.91	3.65	<0.91	3.944	<0.91	<0.8	<0.91
~~1,1,2,2-Tetrachloroethane~~	<10.18	<0.92	<1.8	<0.92	<1.8	<0.92	<1.8	<0.92
Toluene	102.81	2.777	157.326	4.377	174.73	3.773	<0.6	2.145
~~Chlorobenzene~~	<2.94	<0.78	31.433	<0.78	<0.6	<0.78	<0.6	<0.78
Ethylbenzene	27.219	5.972	41.073	1.303	45.63	9.64	<1.2	2.614
Styrene	11.832	1.125	46.412	3.084	<1.4	3.638	2.178	1.146 d
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426	1.222	1.347
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411	<0.4	0.444
~~Hexachloroethane~~	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75	<2.48	<0.75
~~1,2-Dbromo-3-chloropropane~~	<15.32	<5.19	116.513	<5.19	<15.32	20.215	<15.32	<5.19

(a) Results invalid due to contaminated blank sample.

VOST DETECTION LIMITS

Source/analyte	ng/trap	
	Tenax	T/C
Chloromethane	<7.1	<18.76
Dichlorofluoromethane	<12.63	<3.85
Bromomethane	<8.5	<12.06
Acetonitrile	<0	<0
Acrylonitrile	<13.88	<4.76
Vinyl chloride	<6.8	<3.35
Chloroethane	<8.1	<3.64
Iodomethane	<38.22	<19.11
Trichlorofluoromethane	<10.9	<3.51
Methylene chloride	<15.86	<1.99
Acetone	<28.5	<15.13
Carbon disulfide	<9	<4.83
1,1-Dichloroethene	<9.3	<4.38
1,1-Dichloroethane	<8	<2.19
1,2-Dichloroethene (total)	<0	<0
t-1,2-Dichloroethene	<8.2	<1.28
Chloroform	<9.7	<2.01
1,2-Dichloroethane	<9.1	<1.15
2-Butanone	<18	<0.88
1,1,1-Trichloroethane	<2.6	<0.82
Carbon tetrachloride	<2	<1.15
Vinyl acetate	<4.8	<0.82
Bromodichloromethane	<0.5	<1.08
1,2-Dichloropropane	<1.1	<1.2
cis-1,3-Dichloropropene	<1.7	<1.53
Trichloroethene	<0.8	<0.87
2-Chloroethyl vinyl ether	<7.69	<2.8
Dibromochloromethane	<1.4	<1.28
Dibromomethane	<5.47	<1.84
Dibromoethane	<3.78	<1.29
1,1,2-Trichloroethane	<1.3	<1.2
1,4-Dichloro-2-butene	<8.41	<2
Benzene	<3.8	<1.22
trans-1,3-Dichloropropene	<2.3	<0.98
Bromoform	<2.1	<1.42
4-Methyl-2-Pentanone	<1.6	<1.12
2-Hexanone	<5.2	<1.78
Tetrachloroethene	<0.8	<0.91
1,1,2,2-Tetrachloroethane	<1.8	<0.92
Toluene	<0.6	<0.84
Chlorobenzene	<0.6	<0.78
Ethylbenzene	<1.2	<0.95
Styrene	<1.4	<1.1
m-/p-Xylene	<0.6	<1.06
o-Xylene	<0.4	<0.96
Hexachloroethane	<2.48	<0.75
1,2-Dbromo-3-chloropropan	<15.32	<5.19

VOST DATA--BLANK CORRECTED

Source/analyte	Catch, ng					
	Run					
	1		2		3	
	Tenax	T/C	Tenax	T/C	Tenax	T/C
Chloromethane (a)						
Dichlorofluoromethane						
Bromomethane (a)						
Acetonitrile						
Acrylonitrile						
Vinl chloride						
Chloroethane	9.235	1132.85 d	9.235	1.82 f	9.235	368.637 d
Iodomethane (a)						
Trichlorofluoromethane						
Methylene chloride	7.93	5.532 d	7.93	9.259	7.93	1.362 d
Acetone	993.771 a	7.565	1261.42 a	7.565	2543.34 d	7.565
Carbon disulfide	11.36	42.116	11.36	51.006	11.36	25.523
1,1-Dichloroethene						
1,1-Dichloroethane						
1,2-Dichloroethene (total)						
t-1,2-Dichloroethene						
Chloroform						
1,2-Dichloroethane						
2-Butanone	92.093	3.885	207.277	10.758	331.858	7.627
1,1,1-Trichloroethane	7.02	7.106	7.02	0.41 f	7.02	4.913
Carbon tetrachloride						
Vinyl acetate						
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene						
2-Chloroethyl vinyl ether						
Dibromochloromethane						
Dibromomethane						
Dibromoethane						
1,1,2-Trichloroethane						
1,4-Dichloro-2-butene						
Benzene	2394.07	128.648	4249.58 a	88.072	1048.15 e	136.249
trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone	1.975	0.56	36.812	0.56	1.975	4.64
2-Hexanone		2.64	154.551	1.701 d	90.96	16.31
Tetrachloroethene	1.76	0.455	3.65	0.455	3.944	0.455
1,1,2,2-Tetrachloroethane						
Toluene	102.81	2.777	157.326	4.377	174.73	3.773
Chlorobenzene						
Ethylbenzene	27.219	5.972	41.073		45.63	9.64
Styrene	11.832		46.412	3.084	0.555	3.638
m-/p-Xylene	46.817	2.744	63.002	4.141	75.424	4.426
o-Xylene	39.935	0.677	57.334	1.205	65.471	1.411
Hexachloroethane						
1,2-Dbromo-3-chloropropane						

3/7/95

CALL TO GARY MCALLISTER ABOUT VOST DATA FOR BOLDON

- HE DOESN'T KNOW OF ANY GUIDANCE ON WHERE (IE. TNX or T/C) (SUM OF TNX & T/C) SAMPLES SHOULD BE FOUND, SUGGESTS CHECKING METHOD
- GENERALLY IF 2 RUNS DETECTED & FOUND IN BOTH THEN ASSUME TOTAL DL FOR 3RD RUN
-

- IF NOT TNX BUT IS ON T/C FOR 2-3 RUNS THEN USE
- IF TNX & ≥30% ON T/C, REPORT AS ">"
- IF TNX & <30% ON T/C, REPORT AS SUM
- IF BLNK < DL THEN SUBTRACT "0" IE. NO BLANK CORRECTION

MIDWEST RESEARCH INSTITUTE

INTEROFFICE COMMUNICATION

To: Rick Marinshaw and Roy Neulicht **Date:** December 20, 1993

From: Margie St. Germain

Subject: EIB Brick Kiln, VOST Analysis Report, Project No. 4601-0105-02

The quantitation data for the submitted samples from the EIB Brick Kiln are attached. As indicated in the test plan, dated October 22, 1993, SW-846 Method 5041 was followed using the target analyte listing from SW-846 Method 8240. The method objectives listed in Sections 7.16 and 7.17 were met, except for those objectives that appear as footnotes on the attached data forms. All supporting raw data are organized according to analysis dates, are stored in Room 300-W, and are ready for archival.

The following chronological listing is a summary of key events that affect the data reporting and quality.

1. Roy Neulicht approved three requested method changes on October 29, 1993.
   a. Bromoform does not have to meet the method objective of the minimum average relative response factor (RRF) of 0.250. The average RRF for bromoform on the Tenax/charcoal traps was 0.193 for the calibration curve. All other standards met the minimum RRF for bromoform.
   b. Standards from a previous project were available for use so that costs for EIB could be reduced. One client-requested compound (1,2-dichloroethene) was not in the standard. We reviewed data for indications of the presence of 1,2-dichloroethene and did not find any in the field samples.
   c. d6-Benzene was substituted for d4-Benzene.

2. Samples were received on November 15, 1993, in good condition. Eleven trap pairs were received, including two field blank pairs, two trip blank pairs, and seven sample pairs.

3. The 48-hour preliminary report was waived due to instrument difficulties, as discussed with Roy Neulicht on November 16, 1993. Roy Neulicht and Rick Marinshaw were briefed on the project status on a daily basis.

4. Tenax calibration curve was extended with two standards on November 18, 1993, and two more standards on November 19, 1993. The purpose was to bracket the

high levels of benzene in the samples. The addition of calibration points to the curve for high level samples is allowed by Method 5041.

5. The preliminary results for Sample 1069 were facsimiled to Rick Marinshaw for review on November 19, 1993. The results for the sample were comparable to the previous studies, as discussed with Rick Marinshaw on November 19, 1993.

6. As discussed with Rick Marinshaw on November 20, 1993, the benzene results on the Tenax traps ranged from 1,048 ng to 25,800 ng (est.). The remaining analyte amounts on the Tenax traps were reproducible. Rick indicated that we will not be analyzing the remaining samples.

7. Sample 1073 contained very high levels of benzene and the instrument detector was saturated. The benzene result should be considered a minimum value.

8. Since the Tenax samples contained high levels of analytes, several system blanks were required to ensure that the analytical system was free of sample contamination.

9. Sample analyses were completed on November 23, 1993; all analyses were performed within the 14-day holding time.

Assessment of Data Quality

The method was followed and the objectives were met except for the following:

1. Chloromethane, bromomethane, and iodomethane were observed in the system blank samples. The source of the contamination was identified as the methanol which was used to prepare the internal standard solution and the internal standard/surrogate solution. Chloromethane was observed in the samples at 10 times the amount found in the system blanks. Bromomethane was observed in the samples at the same level or below that found in the system blank. Iodomethane was not required by the client.

2. The calibration curve ranged from 20 ng to 3,000 ng for the Tenax trap analysis, with an extension for benzene up to 15,000 ng. Four compounds (chloromethane, bromomethane, 1,1,2-trichlorotrifluoroethane, and methylene chloride) did not meet the calibration curve objective of 30% RSD.

   The calibration curve ranged from 20 ng to 1,000 ng for the Tenax/charcoal trap curve. Eight compounds (chloromethane, bromomethane, dichlorodifluoromethane, methylene chloride, carbon disulfide, benzene, 1,1,2-trichloroethane, and chloroethane) did not meet the 30% RSD objective.

All values below 20 ng are considered estimates.

3. Two additional standards with benzene and internal standards were analyzed in order to quantitate the high level of benzene in one sample. Since the benzene peak was saturated in these two standards, the average response factor was not calculated for these two points. The calibration standards were used to estimate the level of benzene found in the sample using a single point calibration.

4. A high bias was observed in the performance audit samples (PAS) for several analytes.

   For the Tenax trap analysis, three compounds (carbon tetrachloride, *cis*-1,3-dichloropropene, and *trans*-1,3-dichloropropene) did not meet the 70% to 130% objective listed in the project plan. As discussed with D. Hooton, the analysis proceeded since it was a screening analysis for emission factors. These three analytes were not observed in the samples.

   For the Tenax/charcoal trap analysis, five compounds in one PAS and eight compounds in a second PAS did not meet the 70% to 130% objective listed in the project plan. The results for the two PAS were consistent with each other. The affected compounds were 1,1-dichloroethane, 1,2-dichloroethane, *trans*-1,2-dichloroethane, carbon tetrachloride, 1,2-dichloropropane, *cis*-1,3-dichloropropene, dibromochloromethane, and *trans*-1,3-dichloropropene. The results were discussed with D. Hooton on November 24, 1993. These compounds were not observed in the samples.

The attached data are organized into four sections.

A. Sample Receipt
B. Quality Control Sample Data: Tenax Only
C. Quality Control Sample Data: Tenax/Charcoal
D. Sample Data

4601-01-05-02

VOST Sample Receipt

7 Wargel St. Gerhman

☐ CHAIN OF CUSTODY RECORD ☑ SAMPLE TRACEABILITY RECORD Container (Cooler) No. V05T Page 1 of 1	Field Sample Custodian: James Surman	Storage Requirements: ☑ Ice water, ≤ 4°C ☐ Dry ice ☐ Room Temp., ≤ 26°C ☐ Other:

Transfer No.						
Checked by (Initials)/Date						
Lock or Seal Intact (Yes or No)/Time						
1067 Pr 1 Tnx 4601-01 ✓ · 1068 Pr 1 T/C 4601-01 ✓ · 1069 Pr 2 Tnx 4601-01 ✓	✓					
	Remarks:					
1070 Pr 2 T/C 4601-01 ✓ · 1071 Pr 3 Tnx 4601-01 ✓ · 1072 Pr 3 T/C 4601-01 ✓	✓					
	Remarks:					
1073 Pr 4 Tnx 4601-01 ✓ · 1074 Pr 4 T/C 4601-01 ✓ · 1075 Fd B Tnx 4601-01 ✓	✓					
	Remarks:					
1076 Fd B T/C 4601-01 ✓ · 1077 Tr B Tnx 4601-01 ✓ · 1078 Tr B T/C 4601-01 ✓	✓					
	Remarks:					
2067 Pr 1 Tnx 4601-01 ✓ · 2068 Pr 1 T/C 4601-01 ✓ · 2069 Pr 2 Tnx 4601-01 ✓	✓					
	Remarks:					
2070 Pr 2 T/C 4601-01 ✓ · 2071 Pr 3 Tnx 4601-01 ✓ · 2072 Pr 3 T/C 4601-01 ✓	✓					
	Remarks:					
2075 Fd B Tnx 4601-01 ✓ · 2076 Fd B T/C 4601-01 ✓ · 2077 Tr B Tnx 4601-01 ✓	✓					
	Remarks:					
2078 Tr B T/C 4601-01 ✓	✓					
	Remarks:					
*11-24-93 Sample numbers match, but pair # designations do not match. Mccy the internal communications Mccy 12-14-93						
	Remarks:					
No condensate samples						
	Remarks:					
Note! Samples 2073 & 2074 were not collected, Traps are blank, Sampling stopped after 7th pair.						
	Remarks:					

Sample Transfers:

Relinquished By:	Received By:	Date	Time	No.	Reason for Transfer:
J Surman	L Alford	11/15/93	0930	1	
				2	
				3	
				4	

SAMPLE RECEIPT CHECKLIST

MRI Project No. 4601-01-05

Instructions are on the back of the checklist.

Samples Received by: ROD HENRY Date: 11/15/93

Airbill No. N/A Chain-of-Custody No. N/A

Yes/No

Y 1. Is the shipping container intact?

What kind of container is it? COOLER

Y 2. Chain-of-custody form present? Record number above.

N 3. Chain-of-custody form properly filled out?

N/A 4. Airbill present? Record number above.

N 5. Were samples under some kind of custody seal?

What kind of custody seals were used:

____ a. Bottle sealed?

____ b. Bag sealed?

____ c. Cooler sealed?

____ d. Other? Specify____

If there are custody seal numbers verify them versus the chain-of-custody form or if they are not on the form, record them on the form or versus the sample number.

N/A 6. Were the custody seals intact?

Y 7. All sample containers intact, none broken or leaking?

Y 8. Does the chain-of-custody form or sample inventory indicate the type of sample and the sample container? If not, indicate on the form or below.

Y 9. Ice packs or ice still frozen?

____ If no, are samples still cold? Contact project leader to see if the sample temperature needs to be measured.

Y 10. All samples on chain-of-custody form, sample inventory, or packing list accounted for? Do the actual sample labels or tags match all the paperwork? If not, describe on the form or below any discrepancies by listing the numbers on the containers versus the numbers on the chain-of-custody form.

Y 11. Sample labels permanently affixed? If not, affix the label permanently.

Y 12. Did you sign, date, and complete all areas of every form received with the samples?

Y 13. Did you store samples as indicated by the project leader?

N 14. Did you indicate where samples are stored on the chain-of-custody form?

COMMENTS AND ANY REMARKS AS SPECIFIED ABOVE:

THIS FORM HAS BEEN COMPLETED ON 12-14-93 FROM NOTES AND SAMPLE TRACEABILITY RECORD.

#3 - ONE FILTER WAS NUMBERED INCORRECTLY - 2018, AND CHANGED TO READ 2018 LF14.

SAMPLES WERE STORED IN 315E

Attach any additional pages needed for comments.

ORIGINALS TO M. ST. GERMAIN
12-14-93

INSTRUCTIONS

1. Fill in the form completely. For areas where a Yes/No response is not applicable, mark the area "N/A".

2. Wherever possible indicate all problems on the chain-of-custody form or sample inventory. Any negative answer to the questions should be explained. If there is not enough room on the chain-of-custody form, write the explanations on this form and attach any additional sheets needed.

3. Check off each sample received on the sample inventory or chain-of-custody form. If there is not a client-supplied inventory, generate an inventory by listing:

   a. Shipper.

   b. Sample type.

   c. Sample shipping container.

   d. Sample container.

   e. Each sample name with the information on the sample label.

4. Indicate on the chain-of-custody form where samples are stored.

5. If there are any problems that affect the integrity of the sample (e.g., unsigned chain-of-custody form, chain-of-custody form in error, mislabeled samples, broken samples, contaminated samples, leaking samples, etc.), tell the project leader immediately. The sample custodian or project leader must:

   a. Inform the client immediately.

   b. Take any action indicated by client.

   c. Document the action in a telephone contact report and telefax the report that day to the client.

   d. File the phone contact report in the sample receipt file.

6. Create a sample receipt file. Place this form, accompanying comments, the packing list, chain-of-custody forms, the airbill, and any phone contact reports in the sample receipt file. Within one working day, deliver the sample receipt file to the document control officer.

MRI

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Telephone (919) 677-0249
FAX (919) 677-0065

November 11, 1993

To: M. St. Germain, M. Whitacre, A. Mainey

From: R. Marinshaw

Subject: Request for Analysis of Samples From Belden Brick Emission Test
MRI Project No. 4601-01

Under EPA Contract No. 68-D2-0159, Work Assignment I-01, an emission test was conducted at the Belden Brick Company Plant No. 6, Sugarcreek, Ohio, during the week of November 8, 1993. The attached tables list all of the samples and analyses required. Please refer to the site-specific test plan, dated October 22, 1993, for a detailed description of the test locations, test methods, and QA requirements for the test.

Please take note that the complete charge numbers for this emission test are as follows:

Field test	4601-01-05-01
VOST analysis	4601-01-05-02
Semi-VOST analysis	4601-01-05-03
Metals analysis	4601-01-05-04
QA/QC	4601-01-05-05
Reporting	4601-01-05-06

1.0 PARTICULATE MATTER

Three Method 201A runs were conducted on the inlet to the baghouse for the grinding/screening room, and two Method 201A runs were conducted on the outlet to the grinding/screening room fabric filter. These samples are to be analyzed for PM less than or equal to 10 micrometers (μm) and PM greater than 10 μm. In addition, Hi-Vol samplers were used to sample ambient PM-10 inside the grinding/screening room (three runs) and outside the grinding/screening room (three runs on the east side and two runs on the west side). The Hi-Vol filters must be analyzed for two runs at each of the three locations.

The kiln was sampled for PM emissions using three sampling trains. Three Method 201/202 runs were conducted. These samples must be analyzed for PM less than or equal to 10 μm, PM greater than 10 μm, condensible inorganic PM, and condensible organic PM. Three Method 26A runs were conducted, and the samples from this train must be analyzed for filterable PM. Finally, three Method 0029 runs were conducted. The samples from these runs must also be analyzed for filterable PM. Please note that the filters for the Method 201A train are to be weighed, heated to 320°F, and reweighed. Table 1 summarizes the PM samples from the grinding/screening room and kiln that must be analyzed.

3.0 VOST

The kiln was sampled for volatile organic compounds using a Method 0030 (VOST) sampling train. Three runs were conducted. Trap pairs 2, 4, and 6 must be analyzed according to Method 8240 for the compounds listed in Figure 5-9 of the test plan. In addition, one pair of field blank traps and one pair of trip blank traps must be analyzed. There was no VOST condensate. Table 3 summarizes the VOST samples for analysis.

TABLE 3. VOST SAMPLES FOR ANALYSIS

Sample	Sample
Kiln Stack--Method 0030 (VOST)	
Pair 1 Tnx	1067
Pair 1 T/C	1068
Pair 2 Tnx[a]	1069
Pair 2 T/C[a]	1070
Pair 3 Tnx	1071
Pair 3 T/C	1072
Pair 4 Tnx[a]	1073
Pair 4 T/C[a]	1074
Pair 5 Tnx	2067
Pair 5 T/C	2068
Pair 6 Tnx[a]	2069
Pair 6 T/C[a]	2070
Pair 7 Tnx	2071
Pair 7 T/C	2072
Field blank Tnx[b]	1075
Field blank T/C[b]	1076
Trip blank Tnx[b]	1077
Trip blank T/C[b]	1078
Field blank Tnx[b]	2075
Field blank T/C[b]	2076
Trip blank Tnx[b]	2077
Trip blank T/C[b]	2078

[a]Trap pairs 2, 4 and 6 to be analyzed.
[b]One pair of field and trip blanks to be analyzed.

4.0 Semi-VOST

The kiln was sampled for semi-volatile organic compounds using a Method 0010 (semi-VOST) sampling train. Three runs were conducted. Please note that the back half samples were split into two fractions. The two sample fractions for Run 1 (1038 and 1038A) should be analyzed separately; for each of the other two runs, the two fractions should be combined for the analysis. The samples must be analyzed for the compounds listed in Figure 5-11 of the test plan. Table 4 summarizes the semi-VOST samples for analysis.

TABLE 4. SEMI-VOST SAMPLES FOR ANALYSIS.

Sample	Run 1	Run 2	Run 3
Kiln Stack--Method 0010 (semi-VOST)			
Front-half rinse	1036	2036	3036
Filter	1037	2037	3037
Back-half rinse	1038[a]	2038[b]	3038[b]
Back-half rinse	1038A[a]	2038A[b]	3038A[b]
XAD Cartridge #______	1039	2039	3039
Condensate	1040	2040	3040
Blanks			
Methanol	1061	NA	NA
Methylene chloride	1062	NA	NA
XAD Cartridge #______	1063	NA	NA

[a]Analyze each fraction of back half rinse sample separately.
[b]Combine both back half rinse sample fractions for analysis.

3218-78

MRI Project No.: 4601-01 **Performed by (name/date):** R Rowan 11-18-93
Title/Purpose: Vost - TNX

Continued from: start **Continued to:** 3218-79 **Entered by:** REN 11-19-93 **Verified by:**
Witnessed by: **Reviewed by:** [signature] **Validated by:**
Witnessed by:
(signature/date) (initials/date) (initials/date)

K18CC1 (741) Auto static mass calibration S.D= 0.0196 passed
ΔM: 320

M18CC2 (745) Dynamic mass calibration S.D = 0.0182 passed
ΔM = 320 RR 11-18-93
IS ref # = 2615-~~[illegible]~~ 15-5
M18Q1 (0751) BFB Tuning 50ng/ml, 2615-13-6, 2nd Air Inj
passed 527+528+529 -500
had Steve Cummins: check out vost Desorber added a heated line to vost
M18C1 (0809) Blank vost Tube checking to see it's clean
Low level contamination Rerunning

M18C2 (0844) Blank vost Tube checking to see it's clean with
IS + surrogate IS(128) 255044 @ 658, IS(114) 2239714 @ 915, IS(117) 2393326 @ 1168
Low contamination Bromomethane chloromethane
M18C3 (931) Blank vost 2nd methanol
appears to have Bromomethane 2 to low STD tuning curve

M18Q2 (1009) 20ng on column vost
IS(128) 527106 @ 695, I , IS(114) 4155873 @ 812 , IS(117) 3931895 @ 1165

M18Q3 (1046) 50ng STD on column vost
IS(128) 293857 @ 702 , IS(114) 2222945 @ 816 , IS(117) 1847606 @ 1168

M18Q4 (1126) 100ng on column vost
IS(128) 2522248 @ 708, IS(114) 1581001 @ 816 , IS(119) 1730839 @ 1168

M18Q5 (1204) 250ng on column vost
IS(128) 226221 @ 695 , IS(114) 1789548 @ 810 , IS(117) 1717177 @ 1166

M18Q6 (1238) 500ng on column vost
IS(128) 163028 @ 682 , IS(114) 1629708 @ 799 , IS(117) 1419246 @ 1162

M18Q7 (1312) 1000ng on column vost
IS(128) 211705 @ 691 , IS(114) 1709194 @ 794, IS(114) 1515573 curved passed

MRI Project No.: 4601-01 **Performed by (name/date):** R Rowan 11-19-97
Title/Purpose: VOST - TUX

Continued from: 3218-78 **Continued to:**
Entered by: MER 11-19-97 **Verified by:**
Witnessed by:
Reviewed by: [signature] **Validated by:**
Witnessed by:
MER 11-19-93 (signature/date) (initials/date) (initials/date)

M18C4 (1437) check STD VOST 2nd injected
IS(128) 198387 @ 695 , IS(114) 1941937 @ 810 , IS(117) 1520606 @ 1163
Did not add surrogate 3 above 130% all between 90-144%

M18C5 (1553) VOST Method Blank
IS(128) 198829 @ 691 , IS(114) 1759472 @ 805 , IS(117) 1808170 @ 1164

M18C6 ( ) VOST Method Blank no I.S.
IS(128) , IS(114) , IS(117)

M18C7 (1725) VOST Method Blank
IS(128) 144151 @ 682, IS(114) 1174243 @ 802, IS(117) 1235798 @ 1162

M18C8 (1822) Sample PR2 TUX 4601-01 1069 TNX 239 E
IS(128) 171812 @ 695, IS(114) 1448840 @ 810, IS(117) 1591158 1ul 15 ~~ul~~ 2645-18-4

M18Q8 (1920) BFB Tuning 50 ng/ul, 2615-18-6, 2nd dir inj
passed 523 +524 +525 -550

M18Q9 (1951) 200 ng STD may have spike IS + Surr mix Run over
IS(128) 218027 @ 719, IS(114) 1051745 @ 822 , IS(117) 464504

M18Q10 (2010) 2000 ng STD extending curve due to high conc in sample
IS(128) 276123 @ 714, IS(114) 1409006 @ 821, IS(117) 614111

M18Q11 (2052) 3000 ng STD
IS(128) 341548 @ 715, IS(114) 544495 @ 826, IS(117) 854143

MER
11-19-97

3218- 80

MRI Project No.: 4601-01 Performed by (name/date): R Rowan 11-15-93
Title/Purpose: VOST

Continued from: start Continued to: 3218-81 Entered by: RBR 11-20-93 Verified by:
Witnessed by: Reviewed by: Validated by:
Witnessed by:

(signature/date) (initials/date) (initials/date)

M19Q1 (759) 50ng/ul, 2615-17-6, 2nd Dir Inj
passed 471 + 472 + 473 - 450 No FC-43 Run

M19C1 (824) VOST Method Blank some contamination IS 2615-18-4
IS(128) 125243 e 761, IS(114) 1027341 e 876, IS(117) ~~FC~~ 501784 e 1230

M19C2 (925) VOST Method Blank IS 2615-18-41
IS(128) 156676 e 754, IS(114) 1410775 e 870, IS(119) 759446 e 1225
RBR 11-15-93

IS for +surr samples + Blanks = 2615-18-4 250ng std = 2615-18-1
IS for STD = 2615-16-5

M19C3 (1015) VOST Method Blank
IS(128) 151909 e 754, IS(114) 1642630 e 871, IS(117) 930667 @ 1225

K19Q2 (11:21) 250ng std 2615-18-1 + 1µl IS
IS(128) = 147800 @ 754 IS(114) = 1,195,033 @ 870 IS(117) = 1,042,894 @ 1224 low IS areas
K19Q3 (12:31) 250ng std 2615-18-1 + 1µl IS
IS(128) = 249502 @ 752 IS(114) = 2,265,653 @ 867 IS(117) = 2,249,307 @ 1221 ok
CCC + SPCC passed objectives; std looks good.
M19C4 (1352) VOST Method Blank 1ul I.S. 2615-18-4
IS(128) 124828 e 754, IS(114) 1154102 @ 869, IS(112) 659284 e 1220
IS's are low - clean, except for 4 gases and 2 water-sol cpds
M19C5 (1437) VOST Method ~~Trip~~ Blank RBR 11-
IS(128) = 222521 @ 753 IS(114) 1957132 @ 869 IS(117) = 1983142 @ 1222
Clean + IS are ok

K19C6 (1514) Sample 1075 FBK TNX#1556 + 1µl IS
IS(128) 223952 e 755, IS(114) 2041605 2 e 870, IS(117) 2070270 e 1224
M19C7 (1550) Sample 1072 Tr BLK TNX # ~~1~~ 2776 1ul IS
IS(128) 219787 e 755, IS(114) 2641324 e 871, IS(117) 2072217
K19C8 (1632) Sample 1073 Run 1 Pr 4 TNX#612 + 1µl IS
IS(128) 332053 @ 715, IS(114) 392 4647 e 867, IS(117) 7543584 @ 1222

MRI Project No.: 4601-01 **Performed by (name/date):** R Rowan 11-19-93
Title/Purpose: VOST

Continued from: 3218-80 **Continued to:** End **Entered by:** ARR 11-19-93 MWG **Verified by:**
Witnessed by: **Reviewed by:** **Validated by:**
Witnessed by:
(signature/date) (initials/date) (initials/date)

M19C9(1751) VOST Method Blank
IS(128)= 223376 IS(114)= 179846 IS(117)= 2006558
Benzene = 450,000 cts ≅ 40ng
M19C10(18) sample 2069 P/Z TRX A 635
IS(128)= 516561 IS(114)= 3590238 IS(117)= 3481499
Benzene = 21862166 ~2500ng
K19Q4(1900) High level benzene std + 1µl IS/Surr 3µl = 9000ng
IS(128)= 532058 IS(114)=5071501 IS(117)=4658345
ϕ = 78,010,496 saturated 5µl = 15,000ng
K19Q5(1922) High level benzene std + 1µl IS/Surr
IS(128)= 680973 IS(114)= IS(117)=
ϕ = saturated

ARR 11-29-93

Run additional standards due to high level of benzene in sample also IS running high in sample & last two stds believe due to Benzene.

Standard preparation for high level benzene. MWG $\boxed{3218:81A}$

Methanol: Lot No BC367 B+J
Benzene: Lot No 9522#2 Baychemeo

Balance check Before 50mg = 0.0498g
20mg = 0.0200g
After 30mg = 0.0300g

Add ~5ml methanol to a clean 10ml volumetric. Weigh in 30mg pure benzene. Dilute to the mark with methanol.

Actual weight = 0.0318g Conc = 3.18mg/ml

3218- 82

MRI Project No.: 7401-01-05-02 Performed by (name/date): R Rowan 11-22-93

Title/Purpose: VOST curve - T/C

Continued from: start Continued to: 3219-93

Entered by: mwg Verified by:

Witnessed by: Reviewed by: Mwg Validated by:

Witnessed by:

(signature/date) (initials/date) (initials/date)

7 22CC1(725) Autostatic Mass Calibration Scan 15 SD: 0.0179
DM-320 passed

M22CC2(0730) Dynamic Mass Calibration SD: 0.0155 passed
DM-320

M22Q1(735) BFB Tunning 50ng/ul, 2615-17-4, 2nd Dir Inj
passed 468+469+470 - 450 DM: 320

M22C1(753) VOST Blank checking system
IS(128) 97844 e 755, IS(114) 523580 e 972, IS(117) 462141 e 1225
Is low so ~~rerunning~~ up DM to 340 + running BFB again

M22Q2(0830) BFB Tunning 50ng/ul, 2615-17-4 2nd Dir Inj
passed 474+477+478 - 450 DM = 340

M22C2(0850) VOST Blank checking system
IS(128) 119443 e 763, IS(114) 696981 e 980, IS(117) 617870 e 1235

M22C3(953) VOST Blank checking system
IS(128) 172491 e 760, IS(114) 1022515 e 972, IS(117) 882454 e 1232
spiker flow was not on
r

M22C4( ) VOST Blank
128= 300800 114= 2211403 117= 2360455
78= 218055 ≅ 16ng ok Blank Clean

✓ K22 ~~Q2~~3 (13:19) mwg 20 ng std: 1μl 2615-18-2 + 1μl 2615-16-5, T/C
128= 300921 114= 3,250,255 117=

✓ K22 Q4 (13:49) T/C 50ng std: 1μl 2615-17-1 + 1μl (D6) 2615-17-5 + 1μl (IS) 2615-16-5
128= 529543 114= 4719087 117= 3944074

MRI Project No.: 4601-01-05-02 Performed by (name/date): R Rowan 11-23-93
Title/Purpose: Vost curve T/C

Continued from: Continued to: Entered by: RER 11-23-93 Verified by:
Witnessed by: Reviewed by: MLLey Validated by:
Witnessed by:
(signature/date) (initials/date) (initials/date)

✓ K22 Q5 (1540) T/C 250ng std: ~~tut~~ 15,µl 2615-16-5 + 1.2µl 2615-18-1
128= 426273 114= 3775898 117= 3229264

noted high silicone bkg – what happened!
– high in Q3 & dropping –

K22 Q6 (1618) T/C 500ng std: 2.4µl 2615-18-1 + 15, µl 2615-16-5
128= 410475 114= 3208680 117= 2322969

K22 Q7 (1654) T/C 1000ng std: 5µl 2615-18-1 + 15, µl 2615-16-5
128= 386027 114= 2539252 117=

K22 Q5 (1737) T/C System blank: 1µl 2615-18-4
128= 347274 @ 764 114= 3164412 @ 977 117= 3071521 @ 1277

~~2-He~~ 2-Hexanone, 4-Methyl-2 Pentanone high in 1,2 Dibromo-3-chloropropane contamination

K22 C6 (1875) performance sample
128: 273152 @ 766 IS(114) = 2118788 @ 977, IS(117) = 1473596 @ 1236

H curve had high background did not pass as is.

MRI Project No.: 4601-01-05-02 Performed by (name/date): K Romero 11-23-93
Title/Purpose: Vost T/C

Continued from: Start Continued to: 3218-45 Entered by: RER 11-23-93 Verified by:
Witnessed by: Reviewed by: [signature] Validated by:
Witnessed by:

(signature/date) (initials/date) (initials/date)

√ N23A1 (0907) BFB Tuning Sample, 2415-17-6, 2nd air Inj passed scan A 538-500 No FC in Run

N23C1 (0939) System Blank : Int ISV Surr Soln 2415-15-4
IS(128): 408736 e 825, IS(114) 438 1472 e 937, IS(117): 4306 450 e 1247

√ N23Q2 (1056) 20ng STD 2415-18-2, Int IS 2415-16-5 Int
IS(128) 459625 e 821, IS(114) 3907310 e 935, IS(117) 3305,55 e 1244

√ N23Q3 (1135) 50ng STD 2415-17-1 Int IS 2415-16-5 Int
IS(128) 348918 e 821, IS(114) 3530731 e 935, IS(117) 2807620 e 1243
Curve passes using N23Q2 + N23Q3 for low STDs
N23C3 (1221) Vost method Blank IS 2415-17-4
IS(128) 345175 e 821, IS(114) 3121283 e 936, IS(117) 2557506 e 1224

√ N23Q4 (134) 1240 ng STD 2415-14-5, IS 2415-18-1 Int passed
IS(128) 355141 e 819, IS(114) 2465909 e 934, IS(117) 2747441 e 1251

√ N23C4 (1421) Performance audit sample 2nd + Int IS + Surr Sol 2415-18-4
IS(128) 347729 e 822, IS(114) 2862684 e 934, IS(117) 2,572227 e 1232 passed

√ N23C5 (1515) Vost Blank IS Surr Mix Int 2415-18-4
IS(128) 272339 e 817, IS(114) 2438936 e 932, IS(117) 231554 e 1240
Vost blank clean

N23C6 (1705) Tr B T/C 2078 IS + Surr 2415-18-4 Int
IS(128) = 349635, IS(114) = 3159425, IS(117) = 3133246 e 1287
T/C 1906

N23C7 (1745) Fb B T/C 2074 IS + Surrogate 2415-18-4 Int (1743)
IS(128) = 375785 e 815, IS(114) = 3175546 e 931, IS(117) : 3065066 e 1258
1826 RER 11-23-93

√ N23C8 (~~1826~~) Sample PR2 T/C 2070 IS + Surrogate 2415-18-4 Int Inj 1815
IS(128) 566699 e 818 814, IS(114) 3647848 e 930, IS(117) 3685436

MRI Project No.: 4601-01-05-02 **Performed by (name/date):** R Rosario 11-23-93
Title/Purpose:

Continued from: 3218-84 **Continued to:** End **Entered by:** RR 11-23-93 **Verified by:**
Witnessed by: **Reviewed by:** Mulley **Validated by:**
Witnessed by:
(signature/date) (initials/date) (initials/date)

✓ H23 C9(1918) Sample TR B T/C 1078 IS + Surrogate ~~2415-18-1~~
IS(128) = 420752 @ 913 , IS(114) = 287441 @ 930 , IS(117) 3018467 @ 1288
Tube 230 E

✓ H23 C10(1951) FD B T/C = 1076 IS + surrogate 2415-18-4 Tube # 469
IS(128): 347487 @ 914 , IS(114) = 272561 @ 930 , IS(117) 2843317 @ 1288

✓ H23 C11 (2027) P/2 T/C # 1064 IS + Sur 2415-18-4 Tube # 652
IS(128): 439 405 @ 911 , IS(114) = 4123464 @ 928 , IS(117) = 3885421 @ 1287

✓ H23 C12 (2101) P/4 T/C # 1074 IS + Sur 2415-18-4 Tube # 3064
IS(128): 745378 @ 913 , IS(114): 445584 @ 930, IS(117) 4143188 @ 1287

* Top of vost tube was not screwed on tight

✓ H23 Q5(~2138) 2 ng STD 2415-18-1 ES 2415-16-5 ...
Lost header file will copy header file from H2304
Ran STD due to increase in I.S. Area in sample
BFB passed within this Run
IS(128): 404754 @ 918 , IS(117): 3,415606 @ 1287, IS(114): 3549502 @ 932

VOST Desorber
Sparger Temp = 180
VOST 1 hunter Temp 170
heated purged line coming off desorber ≥ 120 °C
The sparger vessel on OI wrapped with heat tape ≥ 40 °C

4601-01-05-02

Quality Control Sample Results
Tenax Only

BFB TUNE CHECK REPORT
1986 CLP Criteria

Datafile : K18Q1

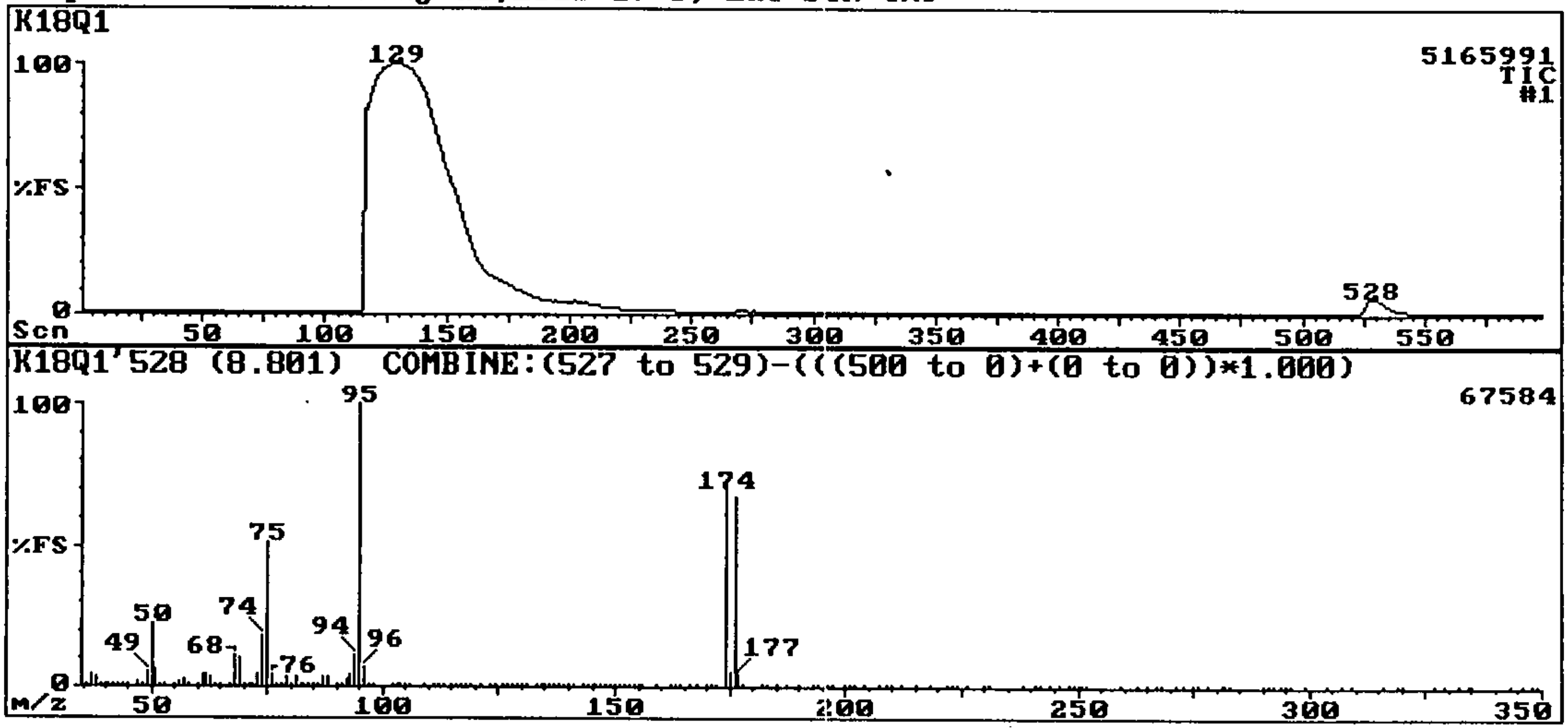
Analysis Date : 11/18/93
Analysis Time : 0751

BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ

M/E	ION ABUNDANCE CRITERIA	ABUNDANCE		TUNE
50	15.0 - 40.0% OF MASS 95	22.54		PASS
75	30.0 - 60.0% OF MASS 95	51.14		PASS
95	Base Peak, 100% relative abundance	100.00		PASS
96	5.0 - 9.0% of mass 95	7.01		PASS
173	Less than 2.0% of mass 174	0.00(	0.0)1	PASS
174	Greater then 50.0% of mass 95	70.08		PASS
175	5.0 - 9.0% of mass 174	5.45(	7.8)1	PASS
176	>95.0 but < 101.0% of mass 174	67.80(	96.8)1	PASS
177	5.0 - 9.0% of mass 176	4.29(	6.3)2	PASS

ok mun 11/24/93

11/18/93 MIDWEST RESEARCH INSTITUTE VOA MD800 S/N 14046 Inst:MD800-C 0751
Sample:BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ



BFB TUNE CHECK REPORT
1986 CLP Criteria

Datafile : K18Q8

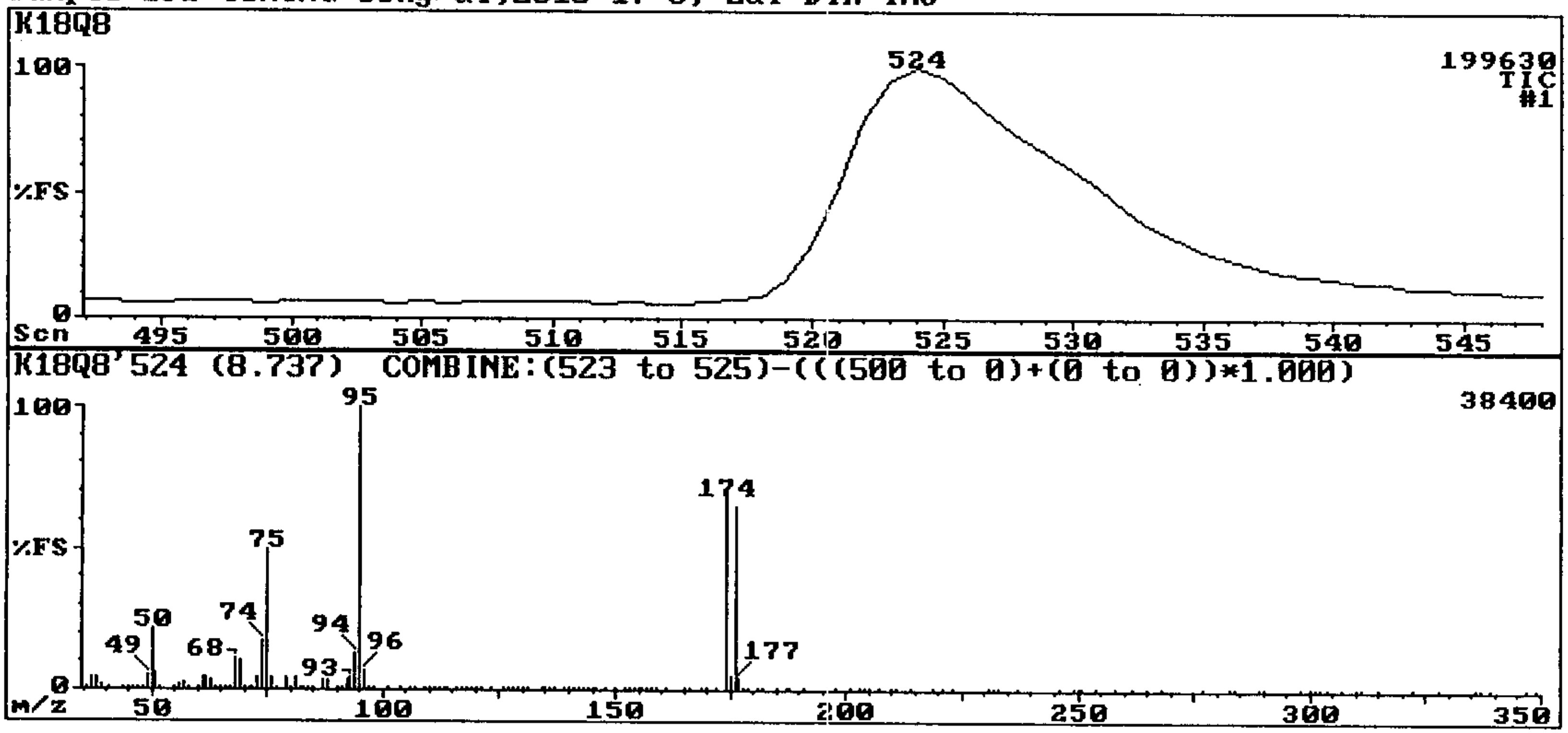
Analysis Date : 11/18/93
Analysis Time : 1920

BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ

M/E	ION ABUNDANCE CRITERIA	ABUNDANCE		TUNE
50	15.0 - 40.0% OF MASS 95	21.00		PASS
75	30.0 - 60.0% OF MASS 95	50.00		PASS
95	Base Peak, 100% relative abundance	100.00		PASS
96	5.0 - 9.0% of mass 95	6.63		PASS
173	Less than 2.0% of mass 174	0.00(	0.0)1	PASS
174	Greater then 50.0% of mass 95	68.67		PASS
175	5.0 - 9.0% of mass 174	5.04(	7.3)1	PASS
176	>95.0 but < 101.0% of mass 174	65.33(	95.1)1	PASS
177	5.0 - 9.0% of mass 176	4.42(	6.8)2	PASS

mwg
11-24-93

11/18/93 MIDWEST RESEARCH INSTITUTE VOA MD800 S/N 14046 Inst:MD800-C 1920
Sample:BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ



INITIAL CALIBRATION CHECK

Result Filename: ICAL_K18 TNX trap VOST
Date proccessed: 11/18/93
Time proccessed: 1439
Date analyzed : 11/18/93
Time injected : 1009

Reviewed 11/24/93 [signature]

LAB FILE ID: RF20.0=K18Q2 RF50.0=K18Q3 RF250.0=K18Q5 RF500.0=K18Q6
RF999.9=K18Q7

	COMPOUND	FG	RF 20.0	RF 50.0	RF 250.0	RF 500.0	RF 999.9	RF MEAN	LINEARITY* (1)
3	Chloromethane	SPC	21.958	54.605	8.470	11.675	6.974	$\boxed{20.736}$ ✓	95.6 % G (2)
4	Dichlorofluoromethane		1.788	1.474	1.215	1.093	0.836	1.281	28.5 % G (5)
5	Bromomethane		11.639	24.446	3.575	4.891	2.568	9.424	96.7 % G (2)
6	Acetonitrile		2.845	2.946	3.035	3.030	1.672	2.706	21.5 % W (5)
7	Acrylonitrile		4.315	2.827	2.139	2.446	1.523	2.650	39.5 % W (6)
8	Vinyl Chloride	C(1)	3.327	3.754	2.929	3.508	3.021	3.308	$\boxed{10.3 \%}$ ✓ G
9	Chloroethane		1.218	2.353	1.860	2.067	1.849	1.869	22.3 % G
10	Iodomethane		7.135	6.385	1.154	1.522	0.813	3.402	90.8 % G (2) (5)
11	~~Trichlorofluoromethan~~		~~2.096~~	~~2.515~~	~~1.854~~	~~1.218~~	~~1.205~~	~~1.778~~	~~32.0~~ % G
12	Methylene Chloride		5.594	2.381	1.899	1.896	1.684	2.691	61.1 % (3)
13	Acetone		4.863	5.013	3.582	4.525	3.528	4.302	16.4 % W
14	Carbon Disulfide		9.344	6.197	6.177	6.795	5.954	6.893	20.4 % G
15	1,1-Dichloroethene	C	2.525	3.270	2.639	3.265	2.314	2.803	$\boxed{15.7 \%}$ ✓
16	1,1-Dichloroethane	SPC	2.306	2.322	3.251	2.807	2.591	$\boxed{2.655}$ ✓	14.8 %
17	1,2-Dichloroethene (t		2.186	1.456	0.000	0.000	0.000	1.821	28.4 %
18	t-1,2-Dichloroethene		2.671	1.456	1.742	2.263	1.828	1.992	24.0 %
19	Chloroform	C	3.996	4.978	4.367	4.374	3.134	4.170	$\boxed{16.2 \%}$ ✓
20	1,2-Dichloroethane		3.488	3.527	4.076	4.894	3.227	3.842	17.3 %
22	2-Butanone		0.621	0.501	0.762	0.768	0.553	0.641	18.9 % W
23	1,1,1-Trichloroethane		0.550	0.412	0.476	0.471	0.287	0.439	22.4 %
24	Carbon Tetrachloride		0.346	0.327	0.328	0.323	0.288	0.323	6.6 %
26	Vinyl Acetate		0.380	0.155	0.121	0.092	0.074	0.164	75.7 % W (4)
27	Bromodichloromethane		0.571	0.526	0.525	0.495	0.302	0.484	21.8 %
28	1,2-Dichloropropane	C	0.348	0.253	0.334	0.325	0.294	0.311	$\boxed{12.2 \%}$ ✓
29	cis-1,3-Dichloroprope		0.578	0.480	0.429	0.437	0.357	0.456	17.8 %
30	Trichloroethene		0.430	0.375	0.387	0.398	0.445	0.407	7.2 %
31	2-Chloroethyl vinyl e		0.054	0.017	0.016	0.035	0.009	0.026	69.6 % (5)
32	Dibromochloromethane		0.420	0.354	0.392	0.335	0.211	0.343	23.5 %
33	Dibromomethane		0.221	0.180	0.204	0.119	0.208	0.186	21.8 % ✓ (5)
34	Dibromoethane		0.485	0.372	0.433	0.369	0.313	0.395	16.7 % (6)
35	1,1,2-Trichloroethane		0.400	0.310	0.356	0.306	0.211	0.317	22.2 %
36	1,4-Dichloro-2-butene		0.003	0.003	0.005	0.010	0.005	0.005	53.7 % (5)
37	Benzene		1.585	1.396	1.288	1.374	1.613	1.451	9.7 %
38	trans-1,3-Dichloropro		0.483	0.362	0.318	0.326	0.249	0.348	24.8 %
39	Bromoform	SPC	0.321	0.237	0.308	0.288	0.226	$\boxed{0.276}$ ✓	15.4 %
43	4-Methyl-2-Pentanone		0.380	0.515	0.530	0.732	0.404	0.512	27.3 % W
44	2-Hexanone		0.273	0.370	0.383	0.526	0.312	0.373	25.9 % W
45	Tetrachloroethene		0.339	0.444	0.338	0.349	0.516	0.397	20.1 %
46	1,1,2,2-Tetrachloroet	SPC	0.401	0.308	0.321	0.508	0.467	$\boxed{0.401}$ ✓	22.0 %
47	Toluene	C	1.581	1.902	1.525	1.725	2.041	1.755	$\boxed{12.3 \%}$ ✓
48	Chlorobenzene	SPC	0.950	0.981	1.042	1.080	1.088	$\boxed{1.028}$ ✓	5.9 %
49	Ethylbenzene	C	0.360	0.324	0.300	0.373	0.397	0.351	$\boxed{11.1 \%}$ ✓
50	Styrene		0.403	0.298	0.367	0.508	0.477	0.411	20.5 %
51	m-/p-Xylene		0.863	0.821	0.927	1.218	1.164	0.998	18.1 %

52	o-Xylene		0.373	0.323	0.392	0.529	0.501	0.424	20.7 %
53	Hexachloroethane		0.126	0.118	0.126	0.194	0.208	0.154	27.8 % 5
54	1,2-Dbromo-3-chloropr		0.020	0.029	0.033	0.061	0.024	0.033	47.7 % 5
2	1,2-Dichloroethane-d4	S	3.081	3.029	3.792	4.006	2.635	3.309	17.3 % ✓
25	Benzene-d6	S	1.619	1.270	1.515	1.282	1.022	1.342	17.4 % ✓
41	4-Bromofluorobenzene	S	0.338	0.238	0.291	0.337	0.337	0.308	14.3 % ✓
42	Toluene-d8	S	1.477	1.576	1.348	1.508	1.809	1.544	11.0 % ✓

% = %Relative Standard Deviation, C_TYPE = 0;
# = Corelation Coefficient, C_TYPE = 1;
* = Mean Square Error, C_TYPE = 2.

G = Gaseous analyte.
W = Water-soluble analyte.

1. Method objective for CCC compounds includes %RSD less than 30%.
2. Presence of the analyte in the methanol and Internal Standard solution affected the calcution of the relative response factors (RRFs) in the two low standards
3. Same as 2. Methylene chloride not observed in samples
4. Response was linear over the calibration range
5. Compound not required by the client.

Extended calibration curve for benzene on TNX UOST

mcway 11/24/93

		Benzene Area	IS Area (DFB)	RRF	
11/18	20 ng			1.585	
	50 ng			1.396	
	250 ng			1.288	
	500 ng			1.374	
	1000 ng	9,026,136	1398971	1.613	
	2000 ng	17,525,530 ~~16,232,059~~	1,057,806 ~~1,109,421~~	2.074 1.440	
	3000 ng	24,278,490	960,122	2.107	
11/19	9000 ng	77,916,666	5,075,360	0.426	saturated
11/19	15,000 ng	98,096,448	6,833,599	0.239	saturated

Quantitation Results

Date : 12/01/93
Time : 1539

Raw Filename : K18C4
Sample Description: CHECK STD 2ul INJECTION ON VOST

Analysis Time: 1437
Analysis Date: 11/18/93

Lab Name: MRI
User: RER

Mtg 11-18-93
Verbal w/ D. Horton
ok. to run samples
%A = Conc/4 (1)

Compound	RT	QM	AREA	Conc		REV	
Chloromethane	4.32	50	1854283	115.105	ng	30 (2)	
Dichlorofluoromethane	4.05	85	0	0.000	ng	0	
Bromomethane	5.37	94	887869	121.274	ng	81 (2)	
Acetonitrile	8.07	41	0	0.000	ng	0	
Acrylonitrile	9.15	53	168755	81.974	ng	91	
Vinyl Chloride	4.50	62	0	0.000	ng	0	
Chloroethane	6.00	64	0	0.000	ng	0	
Iodomethane	7.75	142	422556	159.890	ng	68 (2)	
Trichlorofluoromethane	6.53	101	0	0.000	ng	0	
Methylene Chloride	8.60	84	672128	321.540	ng	93	80✓
Acetone	8.07	43	0	0.000	ng	0	
Carbon Disulfide	7.83	76	0	0.000	ng	0	
1,1-Dichloroethene	7.35	96	1029557	472.878	ng	91	118✓
~~1,1-Dichloroethane~~	~~9.95~~	~~63~~	~~1065782~~	~~516.655~~	~~ng~~	~~98~~	129✓
1,2-Dichloroethene (total)	9.05	96	698791	493.923	ng	96	124✓
t-1,2-Dichloroethene	9.05	96	774094	500.184	ng	88	125✓
Chloroform	11.77	83	1647997	508.713	ng	99	127✓
1,2-Dichloroethane	12.80	62	1395290	467.436	ng	93	117✓
2-Butanone	11.30	43	428032	95.761	ng	98 (3)	
1,1,1-Trichloroethane	12.03	97	1550763	506.501	ng	97	126✓
Carbon Tetrachloride	12.35	117	1238399	550.709	ng	98	138
Vinyl Acetate	10.18	43	0	0.000	ng	0	
Bromodichloromethane	14.99	83	1510885	447.871	ng	99	112✓
1,2-Dichloropropane	14.44	63	955772	441.057	ng	97	110✓
cis-1,3-Dichloropropene	15.85	75	1733705	545.269	ng	99	136
Trichloroethene	14.02	130	23981	8.451	ng✓	96	
2-Chloroethyl vinyl ether	15.64	63	7179	39.222	ng	74	
Dibromochloromethane	18.15	129	1074224	449.859	ng	98	112✓
Dibromomethane	14.65	93	15229	11.727	ng✓	0	
Dibromoethane	18.39	107	15407	5.602	ng✓	87	
1,1,2-Trichloroethane	17.34	97	973291	440.925	ng	66	110✓
1,4-Dichloro-2-butene	22.44	124	23566	671.046	ng	89 (3)	
Benzene	12.72	78	33261	3.287	ng	54	
trans-1,3-Dichloropropene	16.97	75	1420303	586.035	ng	99	144
Bromoform	21.24	173	821218	427.108	ng	97	107
4-Methyl-2-Pentanone	16.18	43	2369381	764.868	ng	95 (3)	
2-Hexanone	17.89	43	2084937	924.585	ng	95 (3)	
Tetrachloroethene	17.65	164	12197	5.076	ng✓	96	100✓
1,1,2,2-Tetrachloroethane	22.30	83	970178	399.914	ng	99	
Toluene	16.54	91	50317	4.740	ng✓	94	
Chlorobenzene	19.47	112	41239	6.631	ng✓	89	
Ethylbenzene	19.70	106	62460	29.446	ng	99 (3)	
Styrene	20.85	104	337238	135.771	ng	90 (3)	
m-/p-Xylene	19.97	106	264140	43.737	ng	94 (3)	
o-Xylene	20.84	106	206787	80.659	ng	98 (3)	
Hexachloroethane	23.85	117	0	0.000	ng	0	
1,2-Dbromo-3-chloropropane	27.49	157	368162	1820.383	ng	99	
1,2-Dichloroethane-d4	12.80	65	44976	17.498	ng	40 (4)	

Benzene-d6	12.65	84	7196	0.769	ng	76	
4-Bromofluorobenzene	21.99	95	63081	33.853	ng	100	(4)
Toluene-d8	16.40	98	28844	3.089	ng	78	

1) %A = % Accuracy, where circled values were outside of the test objective

2) Methanol ~~contained~~ used for the internal standard contained several impurities

3) Carryover of analyte in instrumental system. The high level standard was analyzed immediately prior to this analysis.

4) Analyst did not add surrogate to the sample.

Quantitation Results

Date : 12/01/93
Time : 1539

Raw Filename : K18C7
Sample Description: VOST METHOD BLANK, TNX

Analysis Time: 1725
Analysis Date: 11/18/93

Lab Name: MRI
User: RER

ok mucy 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	4.10	50	493652	43.204	ng	22
Dichlorofluoromethane	3.48	85	0	0.000	ng	0
Bromomethane	5.07	94	193280	37.221	ng ✓	53
Acetonitrile	8.52	41	0	0.000	ng	0
Acrylonitrile	9.43	53	0	0.000	ng	0
Vinyl Chloride	4.32	62	0	0.000	ng	0
Chloroethane	5.67	64	0	0.000	ng	0
Iodomethane	7.82	142	0	0.000	ng	0
Trichlorofluoromethane	6.27	101	0	0.000	ng	0
Methylene Chloride	8.38	84	0	0.000	ng	0
Acetone	7.62	43	0	0.000	ng	0
Carbon Disulfide	7.88	76	0	0.000	ng	0
1,1-Dichloroethene	7.42	96	0	0.000	ng	0
1,1-Dichloroethane	10.03	63	0	0.000	ng	0
1,2-Dichloroethene (total)	9.18	96	0	0.000	ng	0
t-1,2-Dichloroethene	9.18	96	0	0.000	ng	0
Chloroform	11.78	83	0	0.000	ng	0
1,2-Dichloroethane	12.52	62	12459	5.885	ng	70
2-Butanone	11.10	43	0	0.000	ng	0
1,1,1-Trichloroethane	12.12	97	0	0.000	ng	0
Carbon Tetrachloride	12.45	117	0	0.000	ng	0
Vinyl Acetate	10.18	43	0	0.000	ng	0
Bromodichloromethane	15.04	83	0	0.000	ng	0
1,2-Dichloropropane	14.50	63	0	0.000	ng	0
cis-1,3-Dichloropropene	15.94	75	0	0.000	ng	0
Trichloroethene	14.08	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	15.64	63	0	0.000	ng	0
Dibromochloromethane	18.24	129	0	0.000	ng	0
Dibromomethane	14.73	93	0	0.000	ng	0
Dibromoethane	18.47	107	0	0.000	ng	0
1,1,2-Trichloroethane	17.42	97	0	0.000	ng	0
1,4-Dichloro-2-butene	22.54	124	0	0.000	ng	0
Benzene	12.58	78	30890	4.575	ng ✓	66
trans-1,3-Dichloropropene	17.05	75	0	0.000	ng	0
Bromoform	21.32	173	0	0.000	ng	0
4-Methyl-2-Pentanone	16.24	43	0	0.000	ng	0
2-Hexanone	17.84	43	10692	5.798	ng ✓	85
Tetrachloroethene	17.74	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	22.40	83	0	0.000	ng	0
Toluene	16.89	91	7144	0.823	ng	52
Chlorobenzene	19.55	112	0	0.000	ng	0
Ethylbenzene	19.67	106	899	0.518	ng	65
Styrene	20.89	104	3141	1.546	ng	67
m-/p-Xylene	19.97	106	2056	0.416	ng ✓	84
o-Xylene	20.82	106	2337	1.115	ng ✓	80
Hexachloroethane	23.85	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	27.50	157	1330	8.042	ng ✓	62
1,2-Dichloroethane-d4	12.48	65	483977	265.468	ng	74 ✓

Benzene-d6	12.50	84	1322398	211.895	ng	100✓
4-Bromofluorobenzene	21.99	95	557877	366.133	ng	100✓
Toluene-d8	16.32	98	1503846	196.962	ng	92✓

BFB TUNE CHECK REPORT
1986 CLP Criteria

Datafile : K19Q1

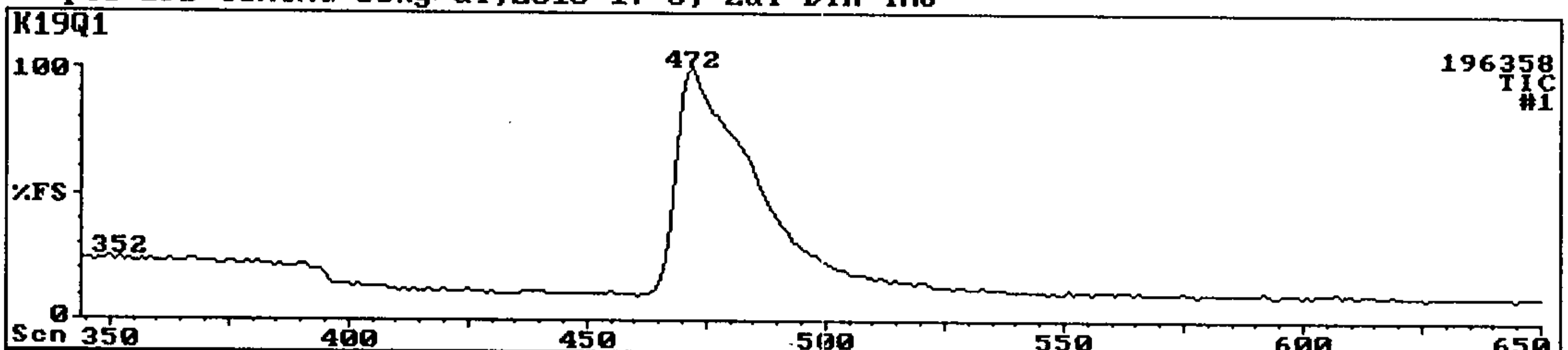
Analysis Date : 11/19/93
Analysis Time : 0759

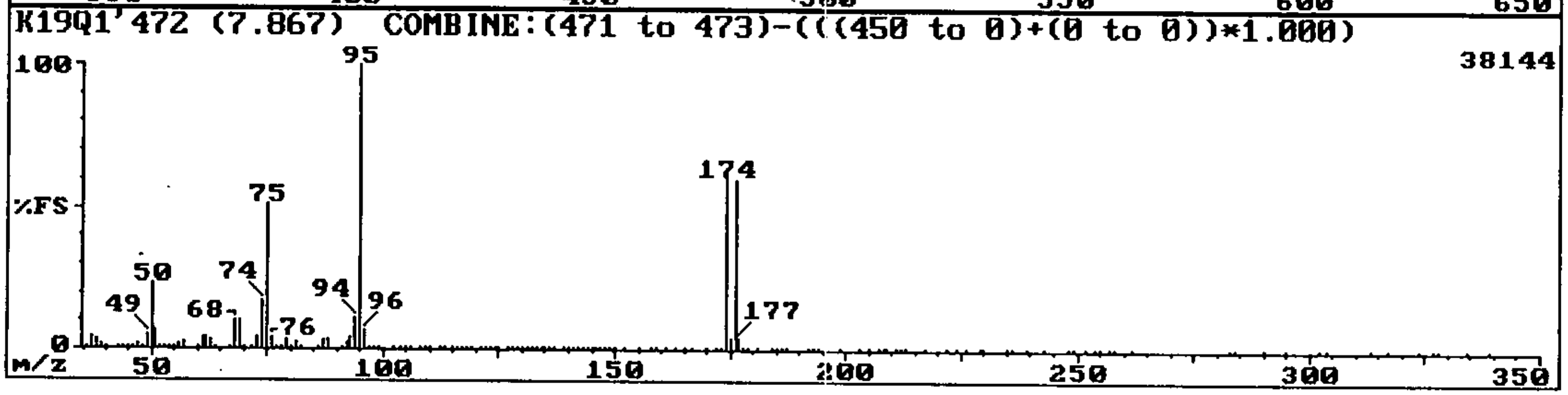
BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ

M/E	ION ABUNDANCE CRITERIA	ABUNDANCE	TUNE
50	15.0 - 40.0% OF MASS 95	22.82	PASS
75	30.0 - 60.0% OF MASS 95	51.68	PASS
95	Base Peak, 100% relative abundance	100.00	PASS
96	5.0 - 9.0% of mass 95	6.75	PASS
173	Less than 2.0% of mass 174	0.16(0.3)1	PASS
174	Greater then 50.0% of mass 95	61.07	PASS
175	5.0 - 9.0% of mass 174	4.70(7.7)1	PASS
176	>95.0 but < 101.0% of mass 174	59.73(97.8)1	PASS
177	5.0 - 9.0% of mass 176	4.15(7.0)2	PASS

Mueller
11-24-93

11/19/93 MIDWEST RESEARCH INSTITUTE VOA MD800 S/N 14046 Inst:MD800-C 0759
Sample:BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ





Quantitation Results
===================

Date : 12/01/93
Time : 1543

Raw Filename : K19C5
Sample Description: VOST METHOD BLANK I.S.2615-18-4, TNX

Analysis Time: 1437
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

ok mlw 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.13	50	1470197	81.447	ng	28
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.32	94	552261	67.320	ng	69✓
Acetonitrile	10.98	41	0	0.000	ng	0
Acrylonitrile	10.13	53	10381	4.500	ng	80
Vinyl Chloride	6.82	62	0	0.000	ng	0
Chloroethane	7.22	64	0	0.000	ng	0
Iodomethane	8.62	142	248562	83.937	ng	46✓(1)
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	9.48	84	31277	13.353	ng	85✓
Acetone	8.48	43	0	0.000	ng	0
Carbon Disulfide	8.63	76	0	0.000	ng	0
1,1-Dichloroethene	7.00	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.67	62	0	0.000	ng	0
2-Butanone	12.23	43	20205	4.022	ng	80✓
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	11.08	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	15.40	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	15.35	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	14.00	78	0	0.000	ng	0
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0
Bromoform	22.20	173	0	0.000	ng	0
~~4-Methyl-2-Pentanone~~	~~17.15~~	~~43~~	~~15805~~	~~3.893~~	~~ng~~	~~94~~ (2) ND
2-Hexanone	18.84	43	32783	11.093	ng	95✓
Tetrachloroethene	18.62	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene	17.79	91	0	0.000	ng	0
Chlorobenzene	20.42	112	0	0.000	ng	0
Ethylbenzene	20.69	106	3200	1.151	ng	86✓
Styrene	21.82	104	5755	1.768	ng	78✓
m-/p-Xylene	20.92	106	7196	0.909	ng	86✓
o-Xylene	21.82	106	4095	1.219	ng	85✓
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.74	157	2612	9.855	ng	65✓
1,2-Dichloroethane-d4	13.63	65	788264	273.689	ng	80✓

Benzene-d6	13.67	84	2380656	226.493	ng	100 ✓
4-Bromofluorobenzene	22.95	95	864531	354.016	ng	100 ✓
Toluene-d8	17.37	98	2322695	189.807	ng	93 ✓

(1) Compound not required by client

~~(2) False positive result~~ mw y

ND = not detected

DAILY CALIBRATION CHECK

Date proccessed: 11/19/93
Time proccessed: 1323

CCAL Filename	: K19Q3	Date analyzed	:	11/19/93
		Time injected	:	1231
ICAL Filename	: ICAL_K18	Date analyzed	:	11/18/93
		Time injected	:	1009

ok meuuoz 11-19-93

	COMPOUND	FLAG	RF MEAN	RF 250	%D
3	Chloromethane	SPC	20.736	$\boxed{13.823}$ ✓	33.3 -
4	Dichlorofluoromethane		1.281	0.922	28.0
5	Bromomethane		9.424	5.319	43.6 G
6	Acetonitrile		2.705	3.912	-44.6 W
7	Acrylonitrile		2.650	2.935	-10.7
8	Vinyl Chloride	C	3.308	2.509	24.2 ✓
9	Chloroethane		1.869	1.979	-5.9
10	Iodomethane		3.402	3.505	-3.0
11	Trichlorofluoromethane		1.778	2.125	-19.6
12	Methylene Chloride		2.691	1.897	29.5 -
13	Acetone		4.302	3.151	26.7 -
14	Carbon Disulfide		6.893	4.933	28.4 -
15	1,1-Dichloroethene	C	2.803	2.598	7.3 ✓
16	1,1-Dichloroethane	SPC	2.655	$\boxed{2.893}$ ✓	-8.9
17	1,2-Dichloroethene (total)		1.821	1.679	7.8
18	t-1,2-Dichloroethene		1.992	1.743	12.5
19	Chloroform	C	4.170	4.468	-7.1 ✓
20	1,2-Dichloroethane		3.842	4.191	-9.1
22	2-Butanone		0.641	0.771	-20.2
23	1,1,1-Trichloroethane		0.439	0.432	1.5
24	Carbon Tetrachloride		0.322	0.277	14.0
26	Vinyl Acetate		0.164	0.169	-3.1
27	Bromodichloromethane		0.484	0.464	4.1
28	1,2-Dichloropropane	C	0.311	0.295	5.1 ✓
29	cis-1,3-Dichloropropene		0.456	0.400	12.3
30	Trichloroethene		0.407	0.384	5.5
31	2-Chloroethyl vinyl ether		0.026	0.021	20.1
32	Dibromochloromethane		0.343	0.363	-6.0
33	Dibromomethane		0.186	0.180	3.6
34	Dibromoethane		0.394	0.379	3.9
35	1,1,2-Trichloroethane		0.317	0.320	-1.0
36	1,4-Dichloro-2-butene		0.005	0.010	-107.9 low RRF (1)
37	Benzene		1.451	1.222	15.8
38	trans-1,3-Dichloropropene		0.348	0.314	9.7
39	Bromoform	SPC	0.276	$\boxed{0.284}$ ✓	-3.1
43	4-Methyl-2-Pentanone		0.512	0.546	-6.6
44	2-Hexanone		0.373	0.404	-8.3
45	Tetrachloroethene		0.397	0.337	15.2
46	1,1,2,2-Tetrachloroethane	SPC	0.401	$\boxed{0.493}$ ✓	-23.0
47	Toluene	C	1.755	1.360	22.5 ✓
48	Chlorobenzene	SPC	1.028	$\boxed{0.941}$ ✓	8.5
49	Ethylbenzene	C	0.351	0.382	-9.0 ✓

50	Styrene		0.411	0.515	-25.4
51	m-/p-Xylene		0.998	1.023	-2.5
52	o-Xylene		0.424	0.476	-12.4
53	Hexachloroethane		0.154	0.150	3.0
54	1,2-Dbromo-3-chloropropane		0.033	0.050	-49.1 (1)
2	1,2-Dichloroethane-d4	S	3.309	3.751	-13.4
25	Benzene-d6	S	1.342	1.527	-13.9
41	4-Bromofluorobenzene	S	0.308	0.340	-10.2
42	Toluene-d8	S	1.543	1.169	24.3

G = gaseous analyte
W = water soluble analyte
(1) compound not required by the client.

Quantitation Results
==================

Date : 12/01/93
Time : 1543

Raw Filename : K19C9
Sample Description: VOST METHOD BLANK, TAX (After high level sample)

Analysis Time: 1721
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

MW 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	4.83	50	1673052	90.299	ng	27
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.10	94	463446	55.039	ng	89✓
Acetonitrile	10.60	41	0	0.000	ng	0
Acrylonitrile	10.18	53	0	0.000	ng	0
Vinyl Chloride	5.37	62	0	0.000	ng	0
Chloroethane	6.97	64	0	0.000	ng	0
Iodomethane	8.62	142	134819	44.355	ng	60✓
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	9.47	84	17439	7.254	ng	83
Acetone	8.32	43	0	0.000	ng	0
Carbon Disulfide	10.30	76	0	0.000	ng	0
1,1-Dichloroethene	6.87	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.67	62	0	0.000	ng	0
2-Butanone	12.22	43	29460	6.388	ng	89✓
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	12.22	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	15.40	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	15.57	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	13.73	78	373633	35.789	ng	95✓
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0
Bromoform	22.20	173	0	0.000	ng	0
4-Methyl-2-Pentanone	17.75	43	0	0.000	ng	0
2-Hexanone	18.84	43	23295	7.786	ng	84✓
Tetrachloroethene	18.62	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene'	17.52	91	20869	1.482	ng	82✓
Chlorobenzene	20.45	112	75569	9.159	ng	93✓
Ethylbenzene	20.67	106	4955	1.761	ng	89✓
Styrene	21.84	104	12984	3.940	ng	73✓
m-/p-Xylene	20.94	106	11758	1.467	ng	86✓
o-Xylene	21.80	106	3892	1.144	ng	83✓
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.74	157	5139	19.151	ng	66✓
1,2-Dichloroethane-d4	13.62	65	749266	253.451	ng	88✓

Benzene-d6	13.67	84	2214826	229.508	ng	100
4-Bromofluorobenzene	22.97	95	1045472	422.872	ng	100
Toluene-d8	17.37	98	2230384	180.034	ng	95

4601-01-05-02

Quality Control Sample Results
Tenax/Charcoal

BFB TUNE CHECK REPORT
1986 CLP Criteria

Datafile : K22Q2

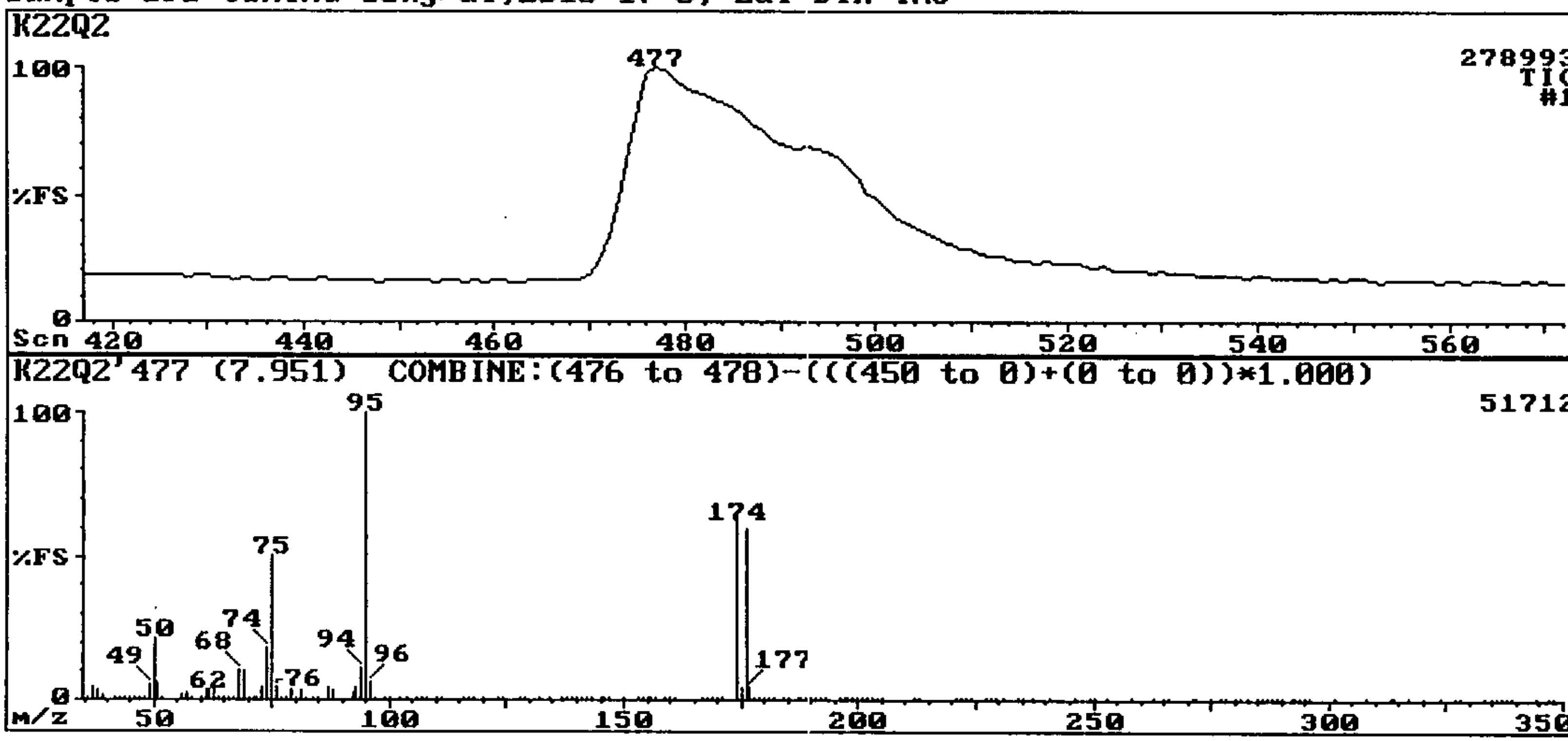
Analysis Date : 11/22/93
Analysis Time : 0830

BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ

M/E	ION ABUNDANCE CRITERIA	ABUNDANCE	TUNE
50	15.0 - 40.0% OF MASS 95	21.53	PASS
75	30.0 - 60.0% OF MASS 95	50.50	PASS
95	Base Peak, 100% relative abundance	100.00	PASS
96	5.0 - 9.0% of mass 95	6.25	PASS
173	Less than 2.0% of mass 174	0.00(0.0)1	PASS
174	Greater then 50.0% of mass 95	62.38	PASS
175	5.0 - 9.0% of mass 174	4.67(7.5)1	PASS
176	>95.0 but < 101.0% of mass 174	59.90(96.0)1	PASS
177	5.0 - 9.0% of mass 176	3.96(6.6)2	PASS

MW 11-24-93

11/22/93 MIDWEST RESEARCH INSTITUTE VOA MD800 S/N 14046 Inst:MD800-C 0830
Sample:BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ



BFB TUNE CHECK REPORT
1986 CLP Criteria

Datafile : K23Q1

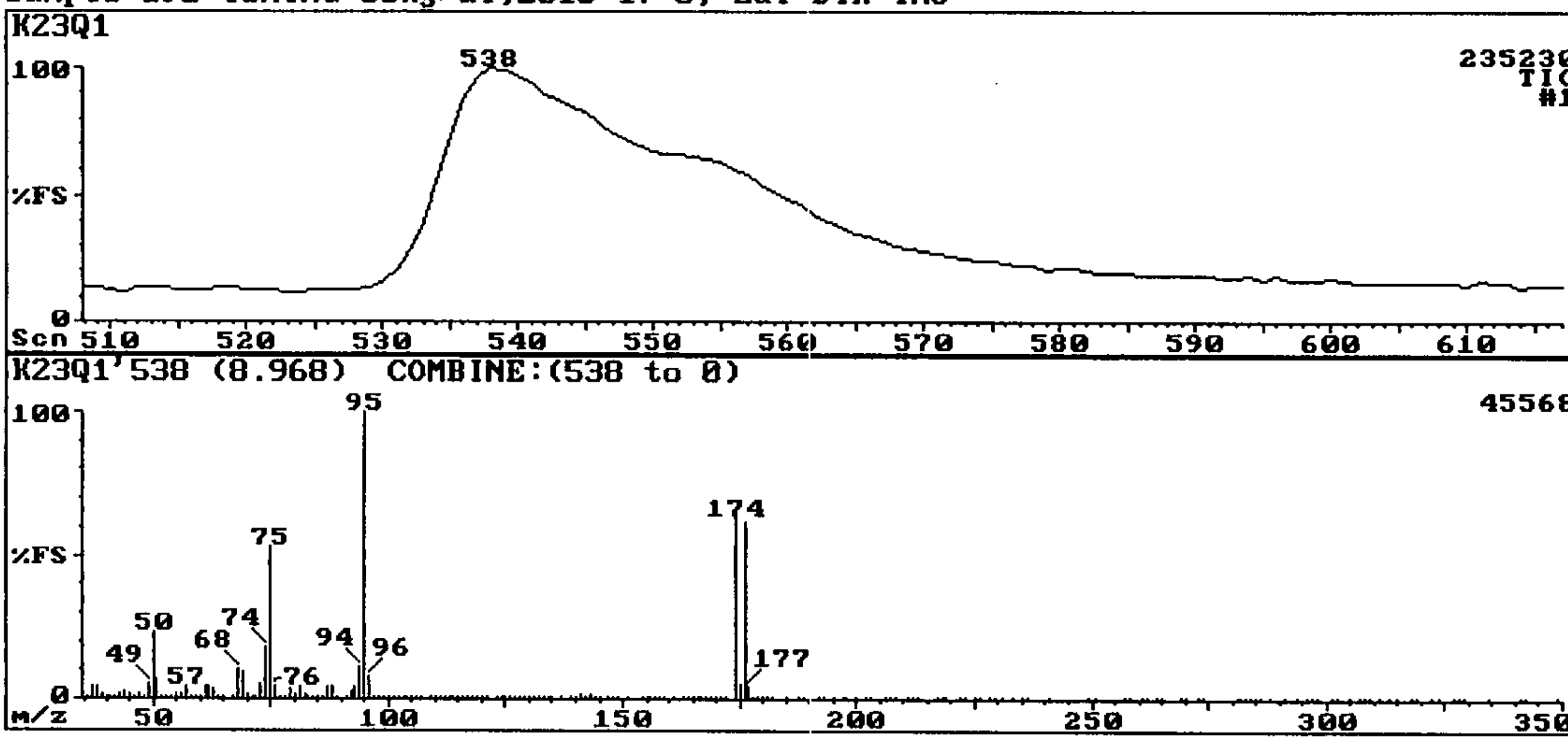
Analysis Date : 11/23/93
Analysis Time : 0907

BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ

M/E	ION ABUNDANCE CRITERIA	ABUNDANCE	TUNE
50	15.0 - 40.0% OF MASS 95	22.75	PASS
75	30.0 - 60.0% OF MASS 95	53.37	PASS
95	Base Peak, 100% relative abundance	100.00	PASS
96	5.0 - 9.0% of mass 95	7.51	PASS
173	Less than 2.0% of mass 174	0.00(0.0)1	PASS
174	Greater then 50.0% of mass 95	63.48	PASS
175	5.0 - 9.0% of mass 174	5.06(8.0)1	PASS
176	>95.0 but < 101.0% of mass 174	61.24(96.5)1	PASS
177	5.0 - 9.0% of mass 176	4.32(7.1)2	PASS

mwy 11-24-93

11/23/93 MIDWEST RESEARCH INSTITUTE VOA MD800 S/N 14046 Inst:MD800-C 0907
Sample:BFB TUNING 50ng/ul,2615-17-6, 2ul DIR INJ



INITIAL CALIBRATION CHECK

Result Filename: ICAL_K22
Date proccessed: 11/23/93
Time proccessed: 1339
Date analyzed : 11/23/93
Time injected : 1056

T/C

LAB FILE ID: RF20.0=K23Q2 RF50.0=K23Q3 RF240.0=K22Q5 RF500.0=K22Q6
RF999.9=K22Q7

COMPOUND	FG	RF 20.0	RF 50.0	RF 240.0	RF 500.0	RF 999.9	RF MEAN	LINEARITY*
✓3 Chloromethane	SPC	85.719	53.595	8.640	5.244	5.676	31.775 ✓	114.6 % G 2
4 Dichlorofluoromethane		4.485	0.820	0.499	0.492	0.492	1.358	129.2 % G 4
✓5 Bromomethane		22.706	15.240	2.925	1.755	1.881	8.901	107.6 % G 2
6 Acetonitrile		3.363	3.664	1.946	1.544	1.109	2.325	48.6 % W 4
7 Acrylonitrile		3.374	3.151	2.211	1.957	1.539	2.446	32.2 % W 4
✓ 8 Vinyl Chloride	C 1	4.028	2.865	2.406	2.165	2.321	2.757	27.5 % G
✓ 9 Chloroethane		3.965	2.617	1.554	1.344	1.352	2.166	52.4 % G
10 Iodomethane		8.150	4.809	0.813	0.593	0.507	2.974	114.7 % G 2 4
✓11 Trichlorofluoromethan		2.042	1.396	0.964	1.035	0.677	1.223	42.9 % G
✓12 Methylene Chloride		3.284	2.158	1.495	1.534	1.501	1.995	38.8 % 3
✓13 Acetone		3.205	4.107	0.682	1.586	4.311	2.778	57.2 % W
✓14 Carbon Disulfide		7.341	6.091	3.421	3.898	3.830	4.916	34.8 % G
✓15 1,1-Dichloroethene	C	2.112	2.286	2.074	1.722	1.659	1.971	13.6 % ✓
✓16 1,1-Dichloroethane	SPC	2.679	2.603	2.364	2.399	2.196	2.448 ✓	7.9 %
✓17 1,2-Dichloroethene (t		2.149	2.517	1.540	1.438	1.705	1.870	24.2 %
✓18 t-1,2-Dichloroethene		2.149	2.535	1.540	1.438	1.705	1.873	24.5 %
✓19 Chloroform	C	4.260	4.217	3.141	3.110	2.782	3.502	19.6 % ✓
✓20 1,2-Dichloroethane		3.604	4.538	3.698	3.082	2.472	3.479	22.1 %
✓22 2-Butanone		0.728	0.851	0.495	0.364	0.324	0.553	41.5 % W
✓23 1,1,1-Trichloroethane		0.361	0.425	0.363	0.383	0.379	0.382	6.8 %
✓24 Carbon Tetrachloride		0.216	0.247	0.250	0.242	0.226	0.236	6.1 %
✓26 Vinyl Acetate		0.093	0.122	0.169	0.052	0.021	0.091	63.4 % W
✓27 Bromodichloromethane		0.495	0.497	0.417	0.339	0.231	0.396	28.5 %
✓28 1,2-Dichloropropane	C	0.254	0.280	0.273	0.241	0.217	0.253	10.1 % ✓
✓29 cis-1,3-Dichloroprope		0.409	0.473	0.387	0.342	0.279	0.378	19.3 %
✓30 Trichloroethene		0.435	0.432	0.361	0.374	0.409	0.402	8.4 %
31 2-Chloroethyl vinyl e		0.030	0.017	0.010	0.016	0.046	0.024	61.7 % RRF 4
✓32 Dibromochloromethane		0.314	0.331	0.307	0.234	0.140	0.265	29.8 %
33 Dibromomethane		0.201	0.177	0.158	0.117	0.116	0.154	24.2 % 4
34 Dibromoethane		0.364	0.389	0.362	0.298	0.196	0.322	24.2 % 4
✓35 1,1,2-Trichloroethane		0.331	0.317	0.282	0.214	0.140	0.257	30.9 %
36 1,4-Dichloro-2-butene		0.012	0.011	0.012	0.011	0.011	0.012	5.3 % 4
✓37 Benzene		2.449	1.749	1.216	1.244	1.452	1.622	31.4 %
✓38 trans-1,3-Dichloropro		0.273	0.333	0.300	0.249	0.183	0.267	21.2 %
✓39 Bromoform	SPC	0.185	0.207	0.234	0.196	0.143	0.193	17.4 %
✓43 4-Methyl-2-Pentanone		0.587	0.870	0.487	0.534	0.510	0.598	26.2 % W
✓44 2-Hexanone		0.420	0.554	0.341	0.395	0.403	0.422	18.7 % W
✓45 Tetrachloroethene		0.367	0.582	0.359	0.428	0.495	0.446	21.0 %
✓46 1,1,2,2-Tetrachloroet	SPC	0.456	0.479	0.412	0.420	0.419	0.437 ✓	6.7 %
✓47 Toluene	C	1.808	2.131	1.417	1.632	1.959	1.789	15.5 % ✓
✓48 Chlorobenzene	SPC	0.927	1.012	0.916	0.924	0.941	0.944 ✓	4.1 %
✓49 Ethylbenzene	C	0.415	0.443	0.375	0.408	0.440	0.416	6.6 % ✓
✓50 Styrene		0.470	0.497	0.418	0.445	0.481	0.462	6.7 %
✓51 m-/p-Xylene		1.107	1.170	1.011	1.071	1.102	1.092	5.3 %

✓52	o-Xylene		0.482	0.519	0.443	0.469	0.504	0.483	6.1 %
53	Hexachloroethane		0.119	0.145	0.154	0.160	0.168	0.149	12.5 %
54	1,2-Dbromo-3-chloropr		0.066	0.084	0.071	0.078	0.090	0.078	12.5 %
✓ 2	1,2-Dichloroethane-d4	S	3.459	4.117	3.150	2.598	2.102	3.085	25.2 % ✓
✓25	Benzene-d6	S	1.576	1.071	1.218	1.125	1.720	1.342	21.5 %
✓41	4-Bromofluorobenzene	S	0.403	0.335	0.296	0.285	0.294	0.323	15.2 %
✓42	Toluene-d8	S	1.530	1.705	1.293	1.508	1.814	1.570	12.7 %

% = %Relative Standard Deviation, C_TYPE = 0;
# = Corelation Coefficient, C_TYPE = 1;
* = Mean Square Error, C_TYPE = 2.

G = gaseous analytes
W = water-soluble analytes

① Method objective for CCC compounds includes %RSD less than 30%.

② Presence of the analyte in the methanol and internal standard solution affected the calculation of the relative response factors (RRFs) in the low level standards.

③ Same as ②. Methylene chloride not observed in the samples.

④ Compound not required by the client.

DAILY CALIBRATION CHECK

Date proccessed: 11/23/93
Time proccessed: 1450

T/C

CCAL Filename :	K23Q4	Date analyzed :	11/23/93
		Time injected :	1341
ICAL Filename :	ICAL_K22	Date analyzed :	11/23/93
		Time injected :	1056

Mewes 11-23-93 ok to run. see end of day standa

	COMPOUND	FLAG	RF MEAN	RF 240	%D
3	Chloromethane	SPC	31.775	$\boxed{9.845}$ ✓	69.0
4	Dichlorofluoromethane		1.358	0.728	46.4
5	Bromomethane		8.901	2.987	66.4
6	Acetonitrile		2.325	4.325	-86.0
7	Acrylonitrile		2.446	2.305	5.8
8	Vinyl Chloride	C	2.757	2.802	-1.6 ✓
9	Chloroethane		2.166	1.803	16.8
10	Iodomethane		2.974	0.965	67.6 -
11	Trichlorofluoromethane		1.223	1.678	-37.3 -
12	Methylene Chloride		1.995	1.623	18.6
13	Acetone		2.778	2.799	-0.7
14	Carbon Disulfide		4.916	5.192	-5.6
15	1,1-Dichloroethene	C	1.970	1.945	1.3 ✓
16	1,1-Dichloroethane	SPC	2.448	$\boxed{2.891}$ ✓	-18.1
17	1,2-Dichloroethene (total)		1.870	1.781	4.7
18	t-1,2-Dichloroethene		1.873	1.946	-3.9
19	Chloroform	C	3.502	3.991	-14.0 ✓
20	1,2-Dichloroethane		3.479	4.256	-22.3
22	2-Butanone		0.553	0.877	-58.6 -
23	1,1,1-Trichloroethane		0.382	0.404	-5.8
24	Carbon Tetrachloride		0.236	0.271	-14.9
26	Vinyl Acetate		0.091	0.075	17.7
27	Bromodichloromethane		0.396	0.491	-24.1
28	1,2-Dichloropropane	C	0.253	0.322	-27.5 - high
29	cis-1,3-Dichloropropene		0.378	0.406	-7.5
30	Trichloroethene		0.402	0.415	-3.3
31	2-Chloroethyl vinyl ether		0.024	0.030	-24.9
32	Dibromochloromethane		0.265	0.380	-43.1 -
33	Dibromomethane		0.154	0.186	-21.3
34	Dibromoethane		0.322	0.417	-29.7
35	1,1,2-Trichloroethane		0.257	0.341	-32.9 -
36	1,4-Dichloro-2-butene		0.012	0.011	3.0
37	Benzene		1.622	1.381	14.8
38	trans-1,3-Dichloropropene		0.267	0.282	-5.5
39	Bromoform	SPC	0.193	$\boxed{0.278}$ ✓	-43.8
43	4-Methyl-2-Pentanone		0.598	0.674	-12.8
44	2-Hexanone		0.422	0.441	-4.5
45	Tetrachloroethene		0.446	0.397	11.1
46	1,1,2,2-Tetrachloroethane	SPC	0.437	$\boxed{0.454}$ ✓	-3.9
47	Toluene	C	1.789	1.543	13.8 ✓
48	Chlorobenzene	SPC	0.944	$\boxed{1.014}$ ✓	-7.5
49	Ethylbenzene	C	0.416	$\boxed{0.395}$ ✓	5.1 ✓

50	Styrene		0.462	0.449	2.8
51	m-/p-Xylene		1.092	1.066	2.4
52	o-Xylene		0.483	0.484	-0.1
53	Hexachloroethane		0.149	0.157	-5.2
54	1,2-Dbromo-3-chloropropane		0.078	0.075	2.9
2	1,2-Dichloroethane-d4	S	3.085	3.764	-22.0
25	Benzene-d6	S	1.342	1.588	-18.3
41	4-Bromofluorobenzene	S	0.323	0.337	-4.5
42	Toluene-d8	S	1.570	1.354	13.7

Quantitation Results

Date : 12/01/93
Time : 1552

Raw Filename : K23C5
Sample Description: VOST BLANK IS SUR MIX 1ul 2615-28-4, T/C

Analysis Time: 1515
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

mwy 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.73	50	2269221	65.502	ng	22 (1)
Dichlorofluoromethane	5.40	85	0	0.000	ng	0
Bromomethane	7.13	94	782628	80.640	ng	64 (1)
Acetonitrile	10.98	41	0	0.000	ng	0
Acrylonitrile	11.15	53	37497	14.058	ng	86 (1)
Vinyl Chloride	6.25	62	0	0.000	ng	0
Chloroethane	7.88	64	0	0.000	ng	0
Iodomethane	9.73	142	145202	44.776	ng	30 (1)
Trichlorofluoromethane	8.30	101	0	0.000	ng	0
Methylene Chloride	10.55	84	55159	25.365	ng	73
Acetone	10.47	43	0	0.000	ng	0
Carbon Disulfide	9.77	76	0	0.000	ng	0
1,1-Dichloroethene	8.57	96	0	0.000	ng	0
1,1-Dichloroethane	12.02	63	0	0.000	ng	0
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0
t-1,2-Dichloroethene	11.12	96	0	0.000	ng	0
Chloroform	13.93	83	0	0.000	ng	0
1,2-Dichloroethane	14.87	62	0	0.000	ng	0
2-Butanone	13.22	43	0	0.000	ng	0
1,1,1-Trichloroethane	14.14	97	0	0.000	ng	0
Carbon Tetrachloride	14.47	117	0	0.000	ng	0
Vinyl Acetate	12.13	43	0	0.000	ng	0
Bromodichloromethane	17.05	83	0	0.000	ng	0
1,2-Dichloropropane	16.50	63	0	0.000	ng	0
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0
Trichloroethene	16.10	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.45	63	0	0.000	ng	0
Dibromochloromethane	20.27	129	0	0.000	ng	0
Dibromomethane	16.77	93	0	0.000	ng	0
Dibromoethane	20.54	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.97	97	0	0.000	ng	0
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0
Benzene	14.83	78	198065	12.514	ng	85 ✓
trans-1,3-Dichloropropene	19.00	75	0	0.000	ng	0
Bromoform	23.35	173	6519	3.461	ng	74
4-Methyl-2-Pentanone	18.18	43	74330	11.436	ng	93 ✓
2-Hexanone	19.89	43	140233	30.529	ng	94 ✓
Tetrachloroethene	19.74	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	24.37	83	35948	7.561	ng	96 ✓
Toluene	18.82	91	0	0.000	ng	0
Chlorobenzene	21.59	112	0	0.000	ng	0
Ethylbenzene	21.77	106	2371	0.524	ng	79 ✓
Styrene	22.94	104	26077	5.185	ng	90 ✓
m-/p-Xylene	22.02	106	11589	0.976	ng	89 ✓
o-Xylene	22.90	106	7786	1.481	ng	84 ✓
Hexachloroethane	25.90	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	30.34	157	12226	14.460	ng	88 ✓
1,2-Dichloroethane-d4	14.70	65	1061080	315.451	ng	85 ✓

Benzene-d6	14.75	84	3382591	258.254	ng	100 ✓
4-Bromofluorobenzene	24.09	95	1122291	319.788	ng	100 ✓
Toluene-d8	18.47	98	3163660	185.249	ng	93 ✓

(1) False positive

Quantitation Results   Date : 12/01/93
====================   Time : 1552

Raw Filename : K23C4
Sample Description: PREFORMANCE ADUIT SAMPLE 2ul + 1ulIS, T/C

Analysis Time: 1421   Lab Name: MRI   nominal amount = 400ng
Analysis Date: 11/23/93   User: RER   mecq 11-23-93

Compound	RT	QM	AREA	Conc		REV	% A = Conc/4
Chloromethane	5.73	50	2751051	62.339	ng	29	
Dichlorofluoromethane	5.40	85	0	0.000	ng	0	
Bromomethane	7.15	94	968512	78.341	ng	61	
Acetonitrile	10.62	41	89824	27.813	ng	15	
Acrylonitrile	11.15	53	72771	21.418	ng	79	
Vinyl Chloride	6.25	62	0	0.000	ng	0	
Chloroethane	7.80	64	0	0.000	ng	0	
Iodomethane	9.72	142	248315	60.111	ng	78	
Trichlorofluoromethane	8.13	101	0	0.000	ng	0	
Methylene Chloride	10.62	84	1305476	471.280	ng	97	118
Acetone	9.40	43	0	0.000	ng	0	
Carbon Disulfide	9.77	76	0	0.000	ng	0	
1,1-Dichloroethene	8.75	96	20144	7.361	ng	0	
1,1-Dichloroethane	12.05	63	2026479	596.023	ng	98	149
1,2-Dichloroethene (total)	11.13	96	1363192	524.965	ng	96	131
t-1,2-Dichloroethene	11.15	96	1474374	566.658	ng	92	142
Chloroform	13.84	83	2400061	493.485	ng	99	123
1,2-Dichloroethane	14.90	62	2290804	474.147	ng	95	118
2-Butanone	13.29	43	31180	4.918	ng ✓	71	
1,1,1-Trichloroethane	14.15	97	2044185	466.526	ng	98	116
Carbon Tetrachloride	14.49	117	1464108	540.381	ng	98	135
Vinyl Acetate	12.13	43	0	0.000	ng	0	
Bromodichloromethane	17.07	83	2104587	463.798	ng	99	116
1,2-Dichloropropane	16.54	63	1531215	527.680	ng	97	132
cis-1,3-Dichloropropene	17.95	75	2354791	543.156	ng	99	136
Trichloroethene	16.12	130	30929	6.704	ng	96	
2-Chloroethyl vinyl ether	17.72	63	12871	47.407	ng	74	
Dibromochloromethane	20.29	129	1589541	522.416	ng	98	131
Dibromomethane	16.77	93	0	0.000	ng	0	
Dibromoethane	20.54	107	0	0.000	ng	0	
1,1,2-Trichloroethane	19.43	97	1500296	509.303	ng	65	127
1,4-Dichloro-2-butene	24.54	124	615	4.681	ng ✓	68	
Benzene	14.85	78	225361	12.112	ng ✓	48	
trans-1,3-Dichloropropene	19.04	75	1853117	604.105	ng	99	151
Bromoform	23.39	173	1112792	502.511	ng	97	125
4-Methyl-2-Pentanone	18.24	43	580540	110.717	ng	95	
2-Hexanone	19.92	43	588842	158.908	ng	96	
Tetrachloroethene	19.79	164	8510	2.174	ng	94	
1,1,2,2-Tetrachloroethane	24.39	83	1587775	413.984	ng	99	103
Toluene	18.84	91	37249	2.373	ng	69	
Chlorobenzene	21.59	112	0	0.000	ng	0	
Ethylbenzene	21.82	106	12603	3.450	ng	96	
Styrene	22.97	104	83054	20.471	ng	94	
m-/p-Xylene	22.07	106	46017	4.802	ng	91	
o-Xylene	22.95	106	34132	8.048	ng	91	
Hexachloroethane	25.90	117	14799	11.311	ng	46	
1,2-Dbromo-3-chloropropane	30.37	157	30777	45.121	ng	92	
1,2-Dichloroethane-d4	14.74	65	1193574	278.559	ng	75 ✓	

Benzene-d6	14.80	84	3999376	259.741	ng	100 ✓
4-Bromofluorobenzene	24.12	95	749763	264.825	ng	100 ✓
Toluene-d8	18.52	98	3310867	240.318	ng	94 ✓

DAILY CALIBRATION CHECK

Date proccessed: 11/24/93
Time proccessed: 0819 T/C

CCAL Filename : K23Q5 Date analyzed : 11/23/93
Time injected : 1341
ICAL Filename : ICAL_K22 Date analyzed : 11/23/93
Time injected : 1056

End of day standard passed ok [initials] 11/24/93

	COMPOUND	FLAG	RF MEAN	RF 240	%D
3	Chloromethane	SPC	31.775	$\boxed{11.376}$ ✓	64.2
4	Dichlorofluoromethane		1.358	0.652	52.0
5	Bromomethane		8.901	3.978	55.3
6	Acetonitrile		2.325	2.649	-13.9
7	Acrylonitrile		2.446	2.057	15.9
8	Vinyl Chloride	C	2.757	2.836	-2.9 ✓
9	Chloroethane		2.166	17.957	-729.0
10	~~Iodomethane~~		~~2.974~~	~~1.503~~	~~49.5~~
11	Trichlorofluoromethane		1.223	1.973	-61.4
12	Methylene Chloride		1.995	1.805	9.5
13	Acetone		2.778	2.005	27.8
14	Carbon Disulfide		4.916	5.810	-18.2
15	1,1-Dichloroethene	C	1.970	1.657	15.9 ✓
16	1,1-Dichloroethane	SPC	2.448	$\boxed{2.910}$ ✓	-18.9
17	1,2-Dichloroethene (total)		1.870	1.775	5.1
18	t-1,2-Dichloroethene		1.873	1.939	-3.5
19	Chloroform	C	3.502	4.052	-15.7 ✓
20	1,2-Dichloroethane		3.479	4.106	-18.0
22	2-Butanone		0.553	0.687	-24.3
23	1,1,1-Trichloroethane		0.382	0.378	1.0
24	Carbon Tetrachloride		0.236	0.257	-8.6
26	Vinyl Acetate		0.091	0.199	-117.7
27	Bromodichloromethane		0.396	0.457	-15.6
28	1,2-Dichloropropane	C	0.253	0.290	-14.5 ✓
29	cis-1,3-Dichloropropene		0.378	0.399	-5.5
30	Trichloroethene		0.402	0.418	-4.1
31	2-Chloroethyl vinyl ether		0.024	0.029	-21.0
32	Dibromochloromethane		0.265	0.356	-34.3
33	Dibromomethane		0.154	0.233	-51.7
34	Dibromoethane		0.322	0.386	-19.9
35	1,1,2-Trichloroethane		0.257	0.324	-26.3
36	1,4-Dichloro-2-butene		0.012	0.015	-33.7
37	Benzene		1.622	1.351	16.7
38	trans-1,3-Dichloropropene		0.267	0.305	-13.9
39	Bromoform	SPC	0.193	$\boxed{0.291}$ ✓	-50.8
43	4-Methyl-2-Pentanone		0.598	0.578	3.2
44	2-Hexanone		0.422	0.406	3.7
45	Tetrachloroethene		0.446	0.381	14.6
46	1,1,2,2-Tetrachloroethane	SPC	0.437	$\boxed{0.538}$ ✓	-23.0
47	Toluene	C	1.789	1.479	17.3 ✓
48	Chlorobenzene	SPC	0.944	$\boxed{1.042}$ ✓	-10.4
49	Ethylbenzene	C	0.416	0.406	2.6 ✓

50	Styrene		0.462	0.538	-16.4
51	m-/p-Xylene		1.092	1.141	-4.4
52	o-Xylene		0.483	0.526	-8.8
53	Hexachloroethane		0.149	0.174	-17.0
54	1,2-Dbromo-3-chloropropane		0.078	0.096	-23.9
2	1,2-Dichloroethane-d4	S	3.085	3.532	-14.5
25	Benzene-d6	S	1.342	1.657	-23.5
41	4-Bromofluorobenzene	S	0.323	0.368	-14.1
42	Toluene-d8	S	1.570	1.363	13.2

4601-01-05-02

Sample Results

Quantitation Results

Date : 12/01/93
Time : 1544

Raw Filename : K19C7
Sample Description: TR BL TNX 1077

Analysis Time: 1550
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.22	50	1674631	93.940	ng	31
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.32	94	584532	72.150	ng	81
Acetonitrile	10.97	41	0	0.000	ng	0
Acrylonitrile	10.18	53	14059	6.171	ng	85 trace
Vinyl Chloride	6.87	62	0	0.000	ng	0
Chloroethane	7.40	64	0	0.000	ng	0
Iodomethane	8.67	142	180363	61.673	ng	43
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	9.50	84	42240	18.261	ng	91
Acetone	8.52	43	0	0.000	ng	0
Carbon Disulfide	8.63	76	0	0.000	ng	0
1,1-Dichloroethene	7.02	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.72	62	0	0.000	ng	0
2-Butanone	12.27	43	29149	5.565	ng	84
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	12.27	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	15.40	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	16.54	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	13.78	78	106433	8.976	ng	82
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0
Bromoform	22.20	173	0	0.000	ng	0
4-Methyl-2-Pentanone	17.17	43	11323	2.670	ng	94
2-Hexanone	18.87	43	25130	8.141	ng	92
Tetrachloroethene	18.62	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene	17.57	91	0	0.000	ng	0
Chlorobenzene	20.42	112	0	0.000	ng	0
Ethylbenzene	20.70	106	2708	0.933	ng	84
Styrene	21.87	104	5142	1.512	ng	77
m-/p-Xylene	20.97	106	7131	0.863	ng	84
o-Xylene	21.84	106	3132	0.892	ng	85
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.80	157	0	0.000	ng	0
1,2-Dichloroethane-d4	13.67	65	820109	288.328	ng	76

RER 11-24-93

Benzene-d6	13.70	84	2517194	229.655	ng	100
4-Bromofluorobenzene	23.00	95	827928	324.600	ng	100
Toluene-d8	17.40	98	2424762	189.716	ng	94

Quantitation Results

Date : 12/01/93
Time : 1552

Raw Filename : K23C9
Sample Description: SAMPLE TR B T/C 1078 IS& SURROGATE 26

Analysis Time: 1914
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

mmg 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.55	50	4008813	76.037	ng	43
Dichlorofluoromethane	5.40	85	0	0.000	ng	0
Bromomethane	6.97	94	861536	58.332	ng	90 ✓
Acetonitrile	10.52	41	0	0.000	ng	0
Acrylonitrile	11.15	53	0	0.000	ng	0
Vinyl Chloride	6.78	62	0	0.000	ng	0
Chloroethane	7.38	64	0	0.000	ng	0
Iodomethane	9.62	142	143886	29.156	ng	67 ✓
Trichlorofluoromethane	8.00	101	0	0.000	ng	0
~~Methylene Chloride~~	~~10.48~~	~~84~~	~~19275~~	~~5.824~~	~~ng~~	~~74~~ (1) mmcg (1)
Acetone	9.70	43	0	0.000	ng	0
Carbon Disulfide	9.77	76	0	0.000	ng	0
1,1-Dichloroethene	8.63	96	0	0.000	ng	0
1,1-Dichloroethane	11.47	63	0	0.000	ng	0
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0
t-1,2-Dichloroethene	11.02	96	0	0.000	ng	0
~~Chloroform~~	~~13.94~~	~~83~~	~~229~~	~~0.039~~	~~ng~~	~~51~~ (2) mmg (1)
1,2-Dichloroethane	14.79	62	0	0.000	ng	0
2-Butanone	13.15	43	37264	5.821	ng	89 ✓
1,1,1-Trichloroethane	14.14	97	0	0.000	ng	0
Carbon Tetrachloride	14.47	117	0	0.000	ng	0
Vinyl Acetate	11.35	43	0	0.000	ng	0
Bromodichloromethane	17.05	83	0	0.000	ng	0
1,2-Dichloropropane	16.52	63	0	0.000	ng	0
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0
Trichloroethene	16.10	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.64	63	0	0.000	ng	0
Dibromochloromethane	20.27	129	0	0.000	ng	0
Dibromomethane	16.77	93	0	0.000	ng	0
Dibromoethane	20.54	107	0	0.000	ng	0
1,1,2-Trichloroethane	19.42	97	0	0.000	ng	0
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0
Benzene	14.79	78	2178751	115.970	ng	99 ✓
trans-1,3-Dichloropropene	19.04	75	0	0.000	ng	0
Bromoform	23.37	173	0	0.000	ng	0
4-Methyl-2-Pentanone	18.80	43	0	0.000	ng	0
2-Hexanone	19.85	43	0	0.000	ng	0
Tetrachloroethene	19.79	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	24.39	83	0	0.000	ng	0
Toluene	18.59	91	65677	3.036	ng	89 ✓
Chlorobenzene	21.59	112	0	0.000	ng	0
Ethylbenzene	22.00	106	20072	3.988	ng	93 ✓
Styrene	22.92	104	10647	1.905	ng	79 ✓
m-/p-Xylene	22.00	106	26653	2.019	ng	92 ✓
o-Xylene	22.89	106	4037	0.691	ng	81 ✓
Hexachloroethane	25.90	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	30.37	157	0	0.000	ng	0
1,2-Dichloroethane-d4	14.65	65	1200713	234.562	ng	93 ✓

Benzene-d6	14.72	84	3265062	210.006	ng	100 ✓
4-Bromofluorobenzene	24.07	95	1505852	386.058	ng	100 ✓
Toluene-d8	18.43	98	3606374	189.999	ng	93 ✓

~~(1) False positive [illegible]~~

(1)(2) Not dectected

Quantitation Results

Date : 12/01/93
Time : 1544

Raw Filename : K19C6
Sample Description: FD B TNX 1075

Analysis Time: 1514
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

mue 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.22	50	1433300	78.509	ng	33
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.28	94	529854	63.862	ng	74 ✓
Acetonitrile	11.04	41	0	0.000	ng	0
Acrylonitrile	10.14	53	14610	6.262	ng	81 trace
Vinyl Chloride	6.82	62	0	0.000	ng	0
Chloroethane	7.57	64	0	0.000	ng	0
Iodomethane	8.67	142	196403	65.576	ng	43 ✓
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	9.48	84	37353	15.768	ng	89 ✓
Acetone	8.43	43	0	0.000	ng	0
Carbon Disulfide	8.63	76	0	0.000	ng	0
1,1-Dichloroethene	6.75	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.70	62	0	0.000	ng	0
2-Butanone	12.25	43	7122	1.353	ng	84 ✓
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	12.25	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	15.40	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	16.54	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	13.77	78	0	0.000	ng	0
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0
Bromoform	22.20	173	0	0.000	ng	0
4-Methyl-2-Pentanone	17.15	43	12354	2.908	ng	94 ✓
2-Hexanone	18.87	43	27167	8.785	ng	92 ✓
Tetrachloroethene	18.62	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene	17.84	91	0	0.000	ng	0
Chlorobenzene	20.42	112	0	0.000	ng	0
Ethylbenzene	20.70	106	0	0.000	ng	0
Styrene	21.85	104	7419	2.178	ng	77 ✓
m-/p-Xylene	20.94	106	10120	1.222	ng	88 ✓
o-Xylene	21.82	106	0	0.000	ng	0
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.74	157	0	0.000	ng	0
1,2-Dichloroethane-d4	13.65	65	821898	282.154	ng	85 ✓

Benzene-d6	13.69	84	2492031	226.269	ng	100 ✓
4-Bromofluorobenzene	22.99	95	889258	348.016	ng	100 ✓
Toluene-d8	17.40	98	2427152	189.560	ng	94 ✓

Quantitation Results
===================

Date : 12/01/93
Time : 1553

Raw Filename : K23C10
Sample Description: SAMPLE FD B T/C 1076 IS & SURROGATE 2

Analysis Time: 1951
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

mues 11-24-93

Compound	RT	QM	AREA	Conc		REV
~~Chloromethane~~	~~5.82~~	~~50~~	~~2226493~~	~~50.549~~	~~ng~~	~~34~~ (1)
Dichlorofluoromethane	5.40	85	0	0.000	ng	0
Bromomethane	7.08	94	612537	49.642	ng	50 ✓
Acetonitrile	11.43	41	0	0.000	ng	0
Acrylonitrile	11.33	53	0	0.000	ng	0
Vinyl Chloride	6.25	62	0	0.000	ng	0
Chloroethane	7.60	64	0	0.000	ng	0
~~Iodomethane~~	~~9.58~~	~~142~~	~~72337~~	~~17.545~~	~~ng~~	~~0~~ (1)
Trichlorofluoromethane	8.57	101	0	0.000	ng	0
~~Methylene Chloride~~	~~10.43~~	~~84~~	~~36678~~	~~13.266~~	~~ng~~	~~70~~ (1)
Acetone	9.62	43	0	0.000	ng	0
Carbon Disulfide	9.77	76	0	0.000	ng	0
1,1-Dichloroethene	8.62	96	0	0.000	ng	0
1,1-Dichloroethane	12.02	63	0	0.000	ng	0
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0
t-1,2-Dichloroethene	11.12	96	0	0.000	ng	0
~~Chloroform~~	~~13.74~~	~~83~~	~~585~~	~~0.121~~	~~ng~~	~~30~~ (2)
1,2-Dichloroethane	14.72	62	0	0.000	ng	0
~~2-Butanone~~	~~13.22~~	~~43~~	~~36879~~	~~5.696~~	~~ng~~	~~61~~ (1)
1,1,1-Trichloroethane	14.14	97	0	0.000	ng	0
Carbon Tetrachloride	14.47	117	0	0.000	ng	0
Vinyl Acetate	12.13	43	0	0.000	ng	0
Bromodichloromethane	17.05	83	0	0.000	ng	0
1,2-Dichloropropane	16.52	63	0	0.000	ng	0
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0
Trichloroethene	16.10	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.75	63	0	0.000	ng	0
Dibromochloromethane	20.27	129	0	0.000	ng	0
Dibromomethane	16.77	93	0	0.000	ng	0
Dibromoethane	20.54	107	0	0.000	ng	0
1,1,2-Trichloroethane	19.42	97	0	0.000	ng	0
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0
Benzene	14.79	78	425173	22.377	ng	92 ✓
trans-1,3-Dichloropropene	19.04	75	0	0.000	ng	0
Bromoform	23.37	173	0	0.000	ng	0
4-Methyl-2-Pentanone	18.22	43	0	0.000	ng	0
2-Hexanone	19.92	43	0	0.000	ng	0
Tetrachloroethene	19.79	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	24.39	83	0	0.000	ng	0
Toluene	18.59	91	43654	2.145	ng	86 ✓
Chlorobenzene	21.59	112	0	0.000	ng	0
Ethylbenzene	22.00	106	12380	2.614	ng	92 ✓
~~Styrene~~	~~22.92~~	~~104~~	~~6028~~	~~1.146~~	~~ng~~	~~78~~ (1)
m-/p-Xylene	22.00	106	16735	1.347	ng	91 ✓
o-Xylene	22.92	106	2440	0.444	ng	69 ✓
Hexachloroethane	25.90	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	30.37	157	0	0.000	ng	0
1,2-Dichloroethane-d4	14.65	65	1172904	274.260	ng	89 ✓

Benzene-d6	14.72	84	3422922	217.684	ng	100
4-Bromofluorobenzene	24.05	95	1166369	317.819	ng	100
Toluene-d8	18.43	98	3479814	194.854	ng	94

(1) ~~False positive~~ Interference, mass spectrum did not meet criteria
(2) Not detected

Quantitation Results

Date : 12/01/93
Time : 1539

Raw Filename : K18C8
Sample Description: SAMPLE PR 2 TNX 4601-01, Sample # 1069

mlevy 11-19-93

Analysis Time: 1822
Analysis Date: 11/18/93

Lab Name: MRI
User: RER

Compound	RT	QM	AREA	Conc		REV
~~Chloromethane~~	~~4.35~~	~~50~~	~~21490170~~	~~1505.996~~	~~ng~~	~~30~~ (1)
Dichlorofluoromethane	3.48	85	0	0.000	ng	0
Bromomethane	5.47	94	2521017	388.741	ng	95✓
Acetonitrile	8.45	41	140422	75.424	ng	56(2)
Acrylonitrile	9.25	53	0	0.000	ng	0
Vinyl Chloride	3.95	62	0	0.000	ng	0
Chloroethane	4.23	64	0	0.000	ng	0
~~Iodomethane~~	~~7.68~~	~~142~~	~~491499~~	~~209.954~~	~~ng~~	~~55~~ (3)
Trichlorofluoromethane	6.27	101	0	0.000	ng	0
Methylene Chloride	8.62	84	0	0.000	ng	0
Acetone	7.87	43	2941974	993.771	ng	90 (2)
Carbon Disulfide	7.88	76	0	0.000	ng	0
1,1-Dichloroethene	7.40	96	0	0.000	ng	0
1,1-Dichloroethane	10.03	63	0	0.000	ng	0
1,2-Dichloroethene (total)	9.18	96	0	0.000	ng	0
t-1,2-Dichloroethene	9.18	96	0	0.000	ng	0
Chloroform	11.78	83	0	0.000	ng	0
1,2-Dichloroethane	12.75	62	0	0.000	ng	0
2-Butanone	11.32	43	342674	92.093	ng	98✓
1,1,1-Trichloroethane	12.12	97	0	0.000	ng	0
Carbon Tetrachloride	12.45	117	0	0.000	ng	0
Vinyl Acetate	10.18	43	0	0.000	ng	0
Bromodichloromethane	15.04	83	0	0.000	ng	0
1,2-Dichloropropane	14.50	63	0	0.000	ng	0
cis-1,3-Dichloropropene	15.94	75	0	0.000	ng	0
Trichloroethene	14.08	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	15.65	63	0	0.000	ng	0
Dibromochloromethane	18.24	129	0	0.000	ng	0
Dibromomethane	14.73	93	0	0.000	ng	0
Dibromoethane	18.47	107	0	0.000	ng	0
1,1,2-Trichloroethane	17.42	97	0	0.000	ng	0
1,4-Dichloro-2-butene	22.54	124	0	0.000	ng	0
Benzene	12.75	78	20164531	2394.070	ng	99✓
trans-1,3-Dichloropropene	17.05	75	0	0.000	ng	0
Bromoform	21.32	173	0	0.000	ng	0
4-Methyl-2-Pentanone	15.90	43	0	0.000	ng	0
2-Hexanone	17.87	43	0	0.000	ng	0
Tetrachloroethene	17.64	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	22.40	83	0	0.000	ng	0
Toluene	16.50	91	1147236	102.810	ng	98✓
Chlorobenzene	19.55	112	0	0.000	ng	0
Ethylbenzene	19.67	106	60693	27.219	ng	98✓
Styrene	20.84	104	30893	11.832	ng	76✓
m-/p-Xylene	19.94	106	297208	46.817	ng	95✓
o-Xylene	20.80	106	107623	39.935	ng	98✓
Hexachloroethane	23.85	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	27.47	157	0	0.000	ng	0
1,2-Dichloroethane-d4	12.65	65	598187	262.729	ng	66 ✓

Benzene-d6	12.67	84	1844778	236.941	ng	92 ✓
4-Bromofluorobenzene	21.97	95	687668	351.079	ng	100 ✓
* Toluene-d8	16.37	98	1881057	191.649	ng	94 ✓

(1) The ion ratio for m/z 50 and 52 does not positively confirm the presence of chloromethane

(2) ~~False positive result.~~ mmog 12/1/93 High background coelute with the target analyte. Detection limit may be higher than the method due to matrix related interference. The amount provided is a high estimate

(3) ~~False positive result.~~ mmog 12/1/93 Sulfur dioxide coelutes with chloroethane.

Quantitation Results
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Date : 12/01/93
Time : 1553

Raw Filename : K23C11
Sample Description: SAMPLE PR2 T/C 1070 IS & SURROGATE 26

Analysis Time: 2027
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

mmsq 11-24-93

Compound	RT	QM	AREA	Conc		REV
~~Chloromethane~~	~~5.84~~	~~50~~	~~8689950~~	~~99.018~~	~~ng~~	~~35~~ (1)
Dichlorofluoromethane	5.40	85	0	0.000	ng	0
Bromomethane	7.15	94	0	0.000	ng	0
Acetonitrile	11.02	41	0	0.000	ng	0
Acrylonitrile	11.37	53	0	0.000	ng	0
Vinyl Chloride	6.47	62	0	0.000	ng	0
~~Chloroethane~~	~~7.60~~	~~64~~	~~6777457~~	~~1132.853~~	~~ng~~	~~59~~ (1)
Iodomethane	9.70	142	266661	32.460	ng	63 ✓
Trichlorofluoromethane	8.62	101	0	0.000	ng	0
~~Methylene Chloride~~	~~10.45~~	~~84~~	~~103334~~	~~18.758~~	~~ng~~	~~35~~ (1)
Acetone	9.62	43	0	0.000	ng	0
Carbon Disulfide	9.80	76	571899	42.116	ng	91 ✓
~~1,1-Dichloroethene~~	~~9.37~~	~~96~~	~~906~~	~~0.166~~	~~ng~~	~~37~~ (2)
1,1-Dichloroethane	11.94	63	0	0.000	ng	0
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0
t-1,2-Dichloroethene	11.37	96	0	0.000	ng	0
Chloroform	13.69	83	0	0.000	ng	0
1,2-Dichloroethane	14.74	62	0	0.000	ng	0
2-Butanone	13.10	43	89776	9.581	ng	82 ✓
1,1,1-Trichloroethane	14.04	97	46018	7.106	ng	85 ✓
Carbon Tetrachloride	14.42	117	0	0.000	ng	0
Vinyl Acetate	12.72	43	0	0.000	ng	0
Bromodichloromethane	17.05	83	0	0.000	ng	0
1,2-Dichloropropane	16.52	63	0	0.000	ng	0
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0
Trichloroethene	16.10	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.02	63	0	0.000	ng	0
Dibromochloromethane	20.27	129	0	0.000	ng	0
Dibromomethane	16.77	93	0	0.000	ng	0
Dibromoethane	20.54	107	0	0.000	ng	0
1,1,2-Trichloroethane	19.42	97	0	0.000	ng	0
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0
Benzene	14.77	78	4152714	151.025	ng	99 ✓
trans-1,3-Dichloropropene	19.04	75	0	0.000	ng	0
Bromoform	23.37	173	0	0.000	ng	0
4-Methyl-2-Pentanone	18.22	43	0	0.000	ng	0
2-Hexanone	19.82	43	17368	2.640	ng	84 trace
Tetrachloroethene	19.79	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	24.39	83	0	0.000	ng	0
Toluene	18.55	91	77412	2.777	ng	83 ✓
Chlorobenzene	21.59	112	0	0.000	ng	0
Ethylbenzene	21.97	106	38731	5.972	ng	93 ✓
Styrene	22.89	104	8100	1.125	ng	80 ✓
m-/p-Xylene	21.97	106	46681	2.744	ng	95 ✓
o-Xylene	22.87	106	5097	0.677	ng	78 ✓
Hexachloroethane	25.90	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	30.37	157	0	0.000	ng	0
1,2-Dichloroethane-d4	14.62	65	1871803	219.666	ng	98

Benzene-d6	14.69	84	4744476	208.500	ng	100
4-Bromofluorobenzene	24.04	95	1873716	372.769	ng	100
Toluene-d8	18.42	98	5232962	213.941	ng	92

(1) ~~False positive~~ may Interference coeluted with analyte. Mass spectrum did not meet criteria

(2) Not detected

Quantitation Results
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Date : 12/01/93
Time : 1544

Raw Filename : K19C8
Sample Description: SAMPLE 1073 RUN1 PAR4 TNX 612 +1ul I.

Analysis Time: 1637
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

mllery 11-24-93

Compound	RT	QM	AREA	Conc		REV
Chloromethane	4.93	50	1584177	53.379	ng	43
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.10	94	313663	23.256	ng	86 ✓
Acetonitrile	10.05	41	0	0.000	ng	0
Acrylonitrile	10.07	53	0	0.000	ng	0
Vinyl Chloride	5.37	62	0	0.000	ng	0
Chloroethane	6.52	64	0	0.000	ng	0
Iodomethane	8.53	142	0	0.000	ng	0
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	10.98	84	0	0.000	ng	0
~~Acetone~~	~~8.70~~	~~43~~	~~7766489~~	~~1261.417~~	~~ng~~	~~98~~ (1)
Carbon Disulfide	8.63	76	0	0.000	ng	0
1,1-Dichloroethene	8.25	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.77	62	0	0.000	ng	0
2-Butanone	12.12	43	2088265	207.277	ng	97 ✓
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	12.12	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	13.77	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.09	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	13.84	78	96912008	4249.583	ng	79 (2)
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0.
Bromoform	22.20	173	0	0.000	ng	0
4-Methyl-2-Pentanone	17.09	43	267261	36.812	ng	93 ✓
2-Hexanone	18.80	43	816802	154.551	ng	96 ✓
Tetrachloroethene	18.64	164	20557	3.650	ng	92 ✓
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene	17.49	91	3914193	157.326	ng	98 ✓
Chlorobenzene	20.42	112	458138	31.433	ng	97 ✓
Ethylbenzene	20.67	106	204192	41.073	ng	99 ✓
Styrene	21.82	104	270184	46.412	ng	86 ✓
m-/p-Xylene	20.92	106	891734	63.002	ng	95 ✓
o-Xylene	21.79	106	344497	57.334	ng	99 ✓
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.72	157	55227	116.513	ng	84 ✓
1,2-Dichloroethane-d4	13.67	65	1661676	350.916	ng	34 ✓

Benzene-d6	13.68	84	4227901	200.558	ng	40
4-Bromofluorobenzene	22.95	95	1688253	386.581	ng	100
Toluene-d8	17.35	98	4192940	191.602	ng	93

(1) ~~False positive~~ Interference coeluted with analytes. Mass spectrum did not meet criteria

(2) Benzene estimation based on a single point calibration

$$\text{Calculation} = \frac{\text{Area of Benzene}}{\text{Area of IS (DFB)}} \times \frac{250\text{ ng}}{\text{RRF}} = \text{Amt of Benzene (ng)}$$

Based on 9,000 ng std:

$$\text{Amt of Benzene} = \frac{96,912,008}{3,928,651} \times \frac{250\text{ ng}}{0.426} = 14,476\text{ ng}$$

Based on 15,000 ng std:

$$\text{Amt of Benzene} = \frac{96,912,008}{3,928,651} \times \frac{250\text{ ng}}{0.239} = 25,803\text{ ng}$$

These estimates are biased low because the ~~mass~~ peak is saturating the mass spectrometer detector.

Quantitation Results

Date : 12/01/93
Time : 1554

Raw Filename : K23C12
Sample Description: PR4 T/C 1074 IS & SURROGATE 2815-18-4

Analysis Time: 2101
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

Compound	RT	QM	AREA	Conc		REV
Chloromethane	5.77	50	13491634	139.097	ng	30
Dichlorofluoromethane	5.40	85	0	0.000	ng	0
Bromomethane	7.15	94	0	0.000	ng	0
Acetonitrile	11.10	41	0	0.000	ng	0
Acrylonitrile	11.07	53	0	0.000	ng	0
Vinyl Chloride	6.60	62	0	0.000	ng	0
Chloroethane	7.58	64	0	0.000	ng	0
Iodomethane	9.73	142	285277	31.420	ng	71 ✓
Trichlorofluoromethane	8.60	101	0	0.000	ng	0
Methylene Chloride	10.48	84	136897	22.485	ng	47
Acetone	9.65	43	0	0.000	ng	0
Carbon Disulfide	9.82	76	765476	51.006	ng	93 ✓
1,1-Dichloroethene	9.32	96	0	0.000	ng	0
1,1-Dichloroethane	12.37	63	0	0.000	ng	0
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0
t-1,2-Dichloroethene	11.33	96	0	0.000	ng	0
Chloroform	13.72	83	0	0.000	ng	0
1,2-Dichloroethane	14.79	62	0	0.000	ng	0
2-Butanone	13.10	43	169501	16.454	ng	83 ✓
1,1,1-Trichloroethane	14.09	97	0	0.000	ng	0
Carbon Tetrachloride	14.47	117	0	0.000	ng	0
Vinyl Acetate	11.65	43	0	0.000	ng	0
Bromodichloromethane	17.05	83	0	0.000	ng	0
1,2-Dichloropropane	16.52	63	0	0.000	ng	0
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0
Trichloroethene	16.10	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	17.60	63	0	0.000	ng	0
Dibromochloromethane	20.27	129	0	0.000	ng	0
Dibromomethane	16.77	93	0	0.000	ng	0
Dibromoethane	20.54	107	0	0.000	ng	0
1,1,2-Trichloroethane	19.67	97	0	0.000	ng	0
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0
Benzene	14.80	78	3338979	110.449	ng	99 ✓
trans-1,3-Dichloropropene	19.04	75	0	0.000	ng	0
Bromoform	23.37	173	0	0.000	ng	0
4-Methyl-2-Pentanone	17.50	43	0	0.000	ng	0
~~2-Hexanone~~	~~19.87~~	~~43~~	~~11916~~	~~1.701~~	~~ng~~	~~77~~ (1)
Tetrachloroethene	19.79	164	0	0.000	ng	0
1,1,2,2-Tetrachloroethane	24.39	83	0	0.000	ng	0
Toluene	18.59	91	129877	4.377	ng	80 ✓
Chlorobenzene	21.59	112	0	0.000	ng	0
Ethylbenzene	21.79	106	8997	1.303	ng	94 ✓
Styrene	22.92	104	23648	3.084	ng	85 ✓
m-/p-Xylene	22.02	106	75014	4.141	ng	94 ✓
o-Xylene	22.90	106	9659	1.205	ng	82 ✓
Hexachloroethane	25.90	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	30.37	157	0	0.000	ng	0
1,2-Dichloroethane-d4	14.65	65	1974792	209.692	ng	97 ✓

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Benzene-d6	14.74	84	5834115	233.198	ng	100 ✓
4-Bromofluorobenzene	24.07	95	2019056	377.290	ng	100 ✓
Toluene-d8	18.45	98	5754170	220.963	ng	93 ✓

(1) ~~False positive~~ Matrix Interference coeluted with analyte. Mass spectrum did not meet objective

Quantitation Results

Date : 12/01/93
Time : 1545

Raw Filename : K19C10
Sample Description: SAMPLE 2069 PR2 TNX 635

Analysis Time: 1803
Analysis Date: 11/19/93

Lab Name: MRI
User: RER

mw 11-24-93

Compound	RT	QM	AREA	Conc		REV
~~Chloromethane~~	~~5.00~~	~~50~~	~~1215303~~	~~28.994~~	~~ng~~	~~45~~ (1)
Dichlorofluoromethane	4.53	85	0	0.000	ng	0
Bromomethane	6.08	94	245951	12.912	ng	75 ✓
Acetonitrile	10.07	41	0	0.000	ng	0
Acrylonitrile	10.08	53	0	0.000	ng	0
Vinyl Chloride	5.37	62	0	0.000	ng	0
Chloroethane	6.52	64	0	0.000	ng	0
Iodomethane	8.53	142	0	0.000	ng	0
Trichlorofluoromethane	7.10	101	0	0.000	ng	0
Methylene Chloride	9.48	84	0	0.000	ng	0
~~Acetone~~	~~8.85~~	~~43~~	~~22116248~~	~~2543.338~~	~~ng~~	~~98~~ (1)
Carbon Disulfide	8.63	76	0	0.000	ng	0
1,1-Dichloroethene	8.25	96	0	0.000	ng	0
1,1-Dichloroethane	10.92	63	0	0.000	ng	0
1,2-Dichloroethene (total)	10.02	96	0	0.000	ng	0
t-1,2-Dichloroethene	10.02	96	0	0.000	ng	0
Chloroform	12.72	83	0	0.000	ng	0
1,2-Dichloroethane	13.72	62	0	0.000	ng	0
2-Butanone	12.12	43	3057771	331.858	ng	98 ✓
1,1,1-Trichloroethane	13.02	97	0	0.000	ng	0
Carbon Tetrachloride	13.33	117	0	0.000	ng	0
Vinyl Acetate	12.12	43	0	0.000	ng	0
Bromodichloromethane	15.94	83	0	0.000	ng	0
1,2-Dichloropropane	15.40	63	0	0.000	ng	0
cis-1,3-Dichloropropene	16.80	75	0	0.000	ng	0
Trichloroethene	14.97	130	0	0.000	ng	0
2-Chloroethyl vinyl ether	16.54	63	0	0.000	ng	0
Dibromochloromethane	19.12	129	0	0.000	ng	0
Dibromomethane	15.64	93	0	0.000	ng	0
Dibromoethane	19.35	107	0	0.000	ng	0
1,1,2-Trichloroethane	18.29	97	0	0.000	ng	0
1,4-Dichloro-2-butene	23.37	124	0	0.000	ng	0
Benzene	13.72	78	21861060	1048.145	ng	99 ✓
trans-1,3-Dichloropropene	17.90	75	0	0.000	ng	0
Bromoform	22.20	173	0	0.000	ng	0
4-Methyl-2-Pentanone	16.57	43	0	0.000	ng	0
2-Hexanone	18.79	43	472509	90.960	ng	95 ✓
Tetrachloroethene	18.62	164	21831	3.944	ng	91 ✓
1,1,2,2-Tetrachloroethane	23.24	83	0	0.000	ng	0
Toluene	17.49	91	4272875	174.730	ng	98 ✓
Chlorobenzene	20.42	112	0	0.000	ng	0
Ethylbenzene	20.65	106	222968	45.630	ng	98 ✓
Styrene	21.80	104	0	0.000	ng	0
m-/p-Xylene	20.90	106	1049303	75.424	ng	95 ✓
o-Xylene	21.79	106	386663	65.471	ng	99 ✓
Hexachloroethane	24.72	117	0	0.000	ng	0
1,2-Dbromo-3-chloropropane	28.70	157	0	0.000	ng	0
1,2-Dichloroethane-d4	13.58	65	1545385	231.074	ng	91 ✓

Benzene-d6	13.63	84	4423584	229.441	ng	100 ✓
4-Bromofluorobenzene	22.95	95	1676817	390.641	ng	100 ✓
Toluene-d8	17.35	98	4064813	188.978	ng	93 ✓

(1) ~~False positive~~ Matrix interference coeluted with analyte. Mass spectrum did not meet criteria. Amount provided is a high value.

Quantitation Results

Date : 12/01/93
Time : 1554

Raw Filename : K23C8
Sample Description: SAMPLE PR2 T/C 2070 IS& SURROGATE 261

Analysis Time: 1826
Analysis Date: 11/23/93

Lab Name: MRI
User: RER

Compound	RT	QM	AREA	Conc		REV	
Chloromethane	5.75	50	17478092	243.193	ng	47	
Dichlorofluoromethane	5.40	85	0	0.000	ng	0	
Bromomethane	7.02	94	2176831	108.120	ng	85	
Acetonitrile	11.05	41	0	0.000	ng	0	
Acrylonitrile	11.37	53	0	0.000	ng	0	
Vinyl Chloride	6.63	62	0	0.000	ng	0	
~~Chloroethane~~	~~7.58~~	~~64~~	~~1806049~~	~~368.637~~	~~ng~~	~~60~~	(1)
Iodomethane	9.73	142	619062	92.021	ng	64	
Trichlorofluoromethane	8.52	101	0	0.000	ng	0	
~~Methylene Chloride~~	~~10.48~~	~~84~~	~~65811~~	~~14.588~~	~~ng~~	~~31~~	(3)
Acetone	9.72	43	0	0.000	ng	0	
Carbon Disulfide	9.80	76	283818	25.523	ng	89	
1,1-Dichloroethene	8.85	96	0	0.000	ng	0	
1,1-Dichloroethane	12.35	63	0	0.000	ng	0	
1,2-Dichloroethene (total)	11.12	96	0	0.000	ng	0	
t-1,2-Dichloroethene	11.35	96	0	0.000	ng	0	
Chloroform	13.80	83	0	0.000	ng	0	
1,2-Dichloroethane	14.79	62	0	0.000	ng	0	
2-Butanone	13.12	43	107614	13.323	ng	91	
1,1,1-Trichloroethane	14.09	97	27427	4.913	ng	78	trace
Carbon Tetrachloride	14.47	117	0	0.000	ng	0	
Vinyl Acetate	11.47	43	0	0.000	ng	0	
Bromodichloromethane	17.05	83	0	0.000	ng	0	
1,2-Dichloropropane	16.52	63	0	0.000	ng	0	
cis-1,3-Dichloropropene	17.93	75	0	0.000	ng	0	
Trichloroethene	16.10	130	0	0.000	ng	0	
2-Chloroethyl vinyl ether	17.82	63	0	0.000	ng	0	
Dibromochloromethane	20.27	129	0	0.000	ng	0	
Dibromomethane	16.77	93	0	0.000	ng	0	
Dibromoethane	20.54	107	0	0.000	ng	0	
1,1,2-Trichloroethane	20.04	97	0	0.000	ng	0	
1,4-Dichloro-2-butene	24.50	124	0	0.000	ng	0	
Benzene	14.79	78	3760026	158.626	ng	99	
trans-1,3-Dichloropropene	19.04	75	0	0.000	ng	0	
Bromoform	23.37	173	0	0.000	ng	0	
4-Methyl-2-Pentanone	18.15	43	40922	4.640	ng	88	
2-Hexanone	19.85	43	101659	16.310	ng	95	
Tetrachloroethene	19.79	164	0	0.000	ng	0	
1,1,2,2-Tetrachloroethane	24.39	83	0	0.000	ng	0	
Toluene	18.59	91	99641	3.773	ng	87	
Chlorobenzene	21.59	112	0	0.000	ng	0	
Ethylbenzene	22.00	106	59234	9.640	ng	94	
Styrene	22.92	104	24824	3.638	ng	82	
m-/p-Xylene	22.00	106	71343	4.426	ng	94	
o-Xylene	22.90	106	10068	1.411	ng	82	
Hexachloroethane	25.90	117	0	0.000	ng	0	
1,2-Dbromo-3-chloropropane	30.30	157	23193	20.215	ng	88	
1,2-Dichloroethane-d4	14.65	65	1590172	227.882	ng	92	

mwsy 11-24-93

Benzene-d6	14.72	84	4213728	214.809	ng	100
4-Bromofluorobenzene	24.05	95	1823288	382.871	ng	100
Toluene-d8	18.43	98	4539925	195.910	ng	93

(1) ~~False positive~~ May interference coeluted with analyte. Mass spectrum did not meet criteria.

Document Control Sheet

Project No.: 1/601-01 (Subtask No.) 05-06

Document Name: Tost Report Appendix Title / Pages

CBI: ☐ Yes ☑ No

Originator: Morrison Ext. 5359

WP COMMENTS:

WP ID No.: 2885

①

Date to WP: 7/25

Due date/time: 7/26 AM

mg

☐ Flexible
☑ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ___ | ☐ Scan ___ Text ___ Figure ___ Photo ___ Other | ☐ Graphics ___ General use ___ 35 mm slides ___ Transparency ___ Satellite/other

WP INITIALS LKS

REKEYED BY WP ☐

Receiving document by: ☐ Diskette—Filename ______ ☐ F:\share\towp______

Route:

Instructions/comments: For each Appendix we need 1 title page with all sections listed and a 1 title page for each subsection to serve as a separator - See Lynn

~~To~~ Hull title page ↑

②

Date to WP: ______

Due date/time: ______

☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ___ | ☐ Scan ___ Text ___ Figure ___ Photo ___ Other | ☐ Graphics ___ General use ___ 35 mm slides ___ Transparency ___ Satellite/other

WP INITIALS ______

REKEYED BY WP ☐

Receiving document by: ☐ Diskette—Filename ______ ☐ F:\share\towp______

Route:

Instructions/comments: ______

③

Date to WP: ______

Due date/time: ______

☐ Flexible
☐ Firm
☐ RUSH

WP PROOF ☐ Yes ☐ No

FORMAT: ☐ EPA ☐ MRI ☐ Note below ☐ Format only

SPACING: ☐ 1 ☐ 1.5 ☐ 2

OUTPUT: ☐ Draft ☐ Final ☐ Rainbow ☐ Copies ___ | ☐ Scan ___ Text ___ Figure ___ Photo ___ Other | ☐ Graphics ___ General use ___ 35 mm slides ___ Transparency ___ Satellite/other

WP INITIALS ______

REKEYED BY WP ☐

Receiving document by: ☐ Diskette—Filename ______ ☐ F:\share\towp______

Route:

Instructions/comments: ______

Document Control Sheet (continued)

Project No.: ______ (Subtask No.) ____	WP ID No.: ______

④	FORMAT	SPACING	OUTPUT			WP INITIALS ____
Date to WP: ____	☐ EPA	☐ 1	☐ Draft	☐ Scan	☐ Graphics	
Due date/time: ____	☐ MRI	☐ 1.5	☐ Final	__ Text	__ General use	REKEYED BY WP ☐
☐ Flexible	☐ Note below	☐ 2	☐ Rainbow	__ Figure	__ 35 mm slides	
☐ Firm WP PROOF	☐ Format only		☐ Copies ____	__ Photo	__ Transparency	
☐ RUSH				__ Other	__ Satellite/other	
☐ Yes ☐ No	Receiving document by: ☐ Diskette--Filename ____ ☐ F:\share\towp____					

Route: ____ Instructions/comments: ____

⑤	FORMAT	SPACING	OUTPUT			WP INITIALS ____
Date to WP: ____	☐ EPA	☐ 1	☐ Draft	☐ Scan	☐ Graphics	
Due date/time: ____	☐ MRI	☐ 1.5	☐ Final	__ Text	__ General use	REKEYED BY WP ☐
☐ Flexible	☐ Note below	☐ 2	☐ Rainbow	__ Figure	__ 35 mm slides	
☐ Firm WP PROOF	☐ Format only		☐ Copies ____	__ Photo	__ Transparency	
☐ RUSH				__ Other	__ Satellite/other	
☐ Yes ☐ No	Receiving document by: ☐ Diskette--Filename ____ ☐ F:\share\towp____					

Route: ____ Instructions/comments: ____

⑥	FORMAT	SPACING	OUTPUT			WP INITIALS ____
Date to WP: ____	☐ EPA	☐ 1	☐ Draft	☐ Scan	☐ Graphics	
Due date/time: ____	☐ MRI	☐ 1.5	☐ Final	__ Text	__ General use	REKEYED BY WP ☐
☐ Flexible	☐ Note below	☐ 2	☐ Rainbow	__ Figure	__ 35 mm slides	
☐ Firm WP PROOF	☐ Format only		☐ Copies ____	__ Photo	__ Transparency	
☐ RUSH				__ Other	__ Satellite/other	
☐ Yes ☐ No	Receiving document by: ☐ Diskette--Filename ____ ☐ F:\share\towp____					

Route: ____ Instructions/comments: ____

FILENAME: F:\SHARE\TOWP\BB_APP

APPENDIX A--FIELD DATA FORMS

A.1	Grinding/Screening Operation Field Data Forms
A.1.1	Grinding/Screening Baghouse Inlet PM/PM-10
A.1.2	Grinding/Screening Baghouse Outlet PM/PM-10
A.1.3	Grinding/Screening Ambient PM-10
A.2	Kiln Field Data Forms
A.2.1	Kiln PM/PM-10/Condensible PM
A.2.2	Kiln Multiple Metals/PM
A.2.3	Kiln Semivolatile Organic Compounds
A.2.4	Kiln Volatile Organic Compounds
A.2.5	Kiln Inorganic/Organic Gases
A.2.6	Kiln HCl/HF/PM
A.3	Dryer Field Data Forms
A.3.1	Dryer Organic Gases

APPENDIX B--PROCESS OPERATING DATA

APPENDIX C--ANALYTICAL RESULTS

C.1	Sample Log
C.2	Filter and Beaker Tare Weights
C.3	Grinding/Screening Results
C.3.1	Grinding/Screening Baghouse Inlet PM/PM-10
C.3.2	Grinding/Screening Baghouse Outlet PM/PM-10
C.3.3	Grinding/Screening Ambient PM-10
C.3.4	Grinding/Screening Product Material Sieve/Moisture Analysis
C.4	Kiln Results
C.4.1	Kiln PM/PM-10
C.4.2	Kiln Condensible PM
C.4.3	Kiln Multiple Metals/PM
C.4.4	Kiln Semivolatile Organic Compounds
C.4.5	Kiln Volatile Organic Compounds
C.4.6	Kiln HCl/HF/PM

APPENDIX D--QUALITY ASSURANCE RECORDS

D.1	Ambient Filter Equilibrium/Calibration Data
D.2	Sample Train Calibration Data
D.3	QA/QC Audit Report

APPENDIX E--SAMPLE CALCULATIONS

Appendix A

Field Data Forms

- Grinding Screening Operation
  - Baghouse Inlet PM-10
  - Baghouse outlet PM-10
  - Ambient PM-10
- Kiln
  - PM-10
  - Multiple Metals / PM-10
  - Semi Volatile [illegible]
  - Volatile Organic
  - Inorganic / organic Gases
  - HCL / HF / PM-10
- Dryer
  - organic gases

Grinding Screening Operations

from . . .

ROY NEULICHT

PM-10 inlet

METHOD 201 A / PM10 TRAIN

RUN NO. INLET #1
DATE 11-09-93

SAMPLING LOCATION BAGHOUSE INLET
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR NEAL

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 847.042		VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
		DESIRED	ACTUAL		DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F							
1	11:21/111		898.530	0.24	0.67	0.67	59	57	53	2.0	53					
2	11:16/106		896.175	0.54	0.67	0.67	59	57	54	2.0	53					
3	11:08/98		892.255	0.54	0.67	0.67	59	57	54	2.0	54					
4	11:00/90		888.325	0.75	0.67	0.67	59	57	54	2.0	53					
5	10:51/81		884.135	1.10	0.67	0.67	59°	57	54	2.0	53					
6	10:40/70		879.005	1.10	0.67	0.67	59°	57	54	2.0	53					
7	10:39/59		873.978	0.60	0.67	0.67	59°	56	53	2.8	52					
8	10:31/51		870.255	1.20	0.67	0.67	59°	57	53	2.0	52					
9	10:29/39		864.820	0.96	0.67	0.67	59°	57	54	2.0	52					
10	9:59/29		860.185	0.70	0.67	0.67	59°	57	54	2.0	54					
11	9:50/20		856.044	0.83	0.67	0.67	59°	52	48	2.0	55					
12	9:40/10		852.452	0.92	0.67	0.67	59°	51	46	2.0	55					
	9:30/0		~~852.452~~													
		Final Leak Check = 0.005 at 2.8 psi														

COMMENTS

INITIAL LEAK CHECK 0.001

METHOD 201A/202

FIELD LABORATORY SETUP DATA Inlet

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: ~~Kiln Stack No. 3~~ Baghouse Inlet 1 [illegible].

Run No. 1 Sampling Train No. P10-2 Sample Box No. ______ ______
Set up person(s): [illegible] Date 11-8-93
Transfer to Sampler: Sample Box Leak Check: ______cfm @ ______in.Hg vacuum

Relinquished By [illegible] Received By [illegible] Date/Time 11-9-93 1230

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator	*	+ In Stack Filter		
~~Probe~~ (Liner-Glass)	*			
Female ~~Probe~~ Blank-off				
~~90° Bypass~~	*	Filter Type:		
~~Filter Holder Front~~		Whatman QM-A		
~~Filter Holder~~ Back		Filter I.D.No.:		
~~Short 90°~~ Connector		SF2		
1st Impinger (Short-stem Mod-GBS)		100 ~~50~~ mLs	469.9	571.4
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	472.5	575.9
U-Connector (B)		H_2O		
3rd Impinger Mod (GBS)	Alumwnck	Empty	—	461.1
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating silica gel		675.7
Impinger Outlet Connector	UH-2			

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (<u>not sealed</u>) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Inlet

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Baghouse Inlet

Run No. 1 Sampling Train No. PID-2 Sample Box No. ________ ________
Transfer for Recovery:

Relinquished By M. Szdolo Received By J. McC Date/Time 11-9-93 1150
Sample box recovery person(s): J. McC Date: 11-9-93
Probe recovery person(s): ________ Date: ________

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	572.1	576.8	462.2	684.9					
Initial Wt.(g)	571.4	575.9	461.1	675.7					
Net Wt.(g)	.7	.9	1.1	9.2					

[Total Condensate Collected (g): 11.9]

Description
and color: ________

Impingers: >>>>>>>>>>>>> 1-3 <<<
Sample Number: ________ ________ ________ >>>> ________
Sample Bottle Tare Wt.(g) ________ ________ ________ ________
Sample Bottle Gross Wt.(g) ________ ________ ________ <------------Before Rinses
Rinse Solution: MethChlrd
Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C
Sample Bottle Final Wt.(g) ________ ________ ________ ________ After Rinses
Net Sample Wt.(g) ________ ________ ________ ________

FRONT HALF RECOVERY

Sample Number:	1001	1002	1003
Sample Bottle Tare Wt.(g)	98.5	99.3	IN-STK FILTER ________
Sample Bottle Gross Wt.(g)	228.9	130.5	
Rinse Solution	Acetone	Acetone	

Sample Number: ________ ________
Sample Bottle Tare Wt.(g) ________ ________ Filter
Rinse Solution: Acetone Description and Color:
Components Rinsed****: probe liner, filter holder front
Sample Bottle Gross Wt.(g) ________ w/Acetone
Net Acetone Sample Wt.(g) ________
Sample Bottle Final Wt.(g) ________
Net Sample Wt.(g) ________

COMMENTS:

FILE NAME - bagin1
RUN # - bagin1
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:56:03

Initial Meter Volume (Cubic Feet)=	847.042
Final Meter Volume (Cubic Feet)=	898.530
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	52.878
Gas Volume (Dry Standard Cubic Feet)=	52.915
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	54
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.790
Average Stack Temperature (F)=	59
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	0.8733
% Isokinetic=	94.5
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	120.0
Nozzle Diameter (Inches)=	0.172
Stack Axis #1 (Inches)=	36.0
Stack Axis #2 (Inches)=	36.0
Circular Stack	
Stack Area (Square Feet)=	7.07
Stack Velocity (Actual, Feet/min)=	2,967
Flow Rate (Actual, Cubic ft/min)=	20,974
Flow rate (Standard, Wet, Cubic ft/min)=	20,753
Flow Rate (Standard, Dry, Cubic ft/min)=	20,439

Particulate Loading - Front Half

Particulate Weight (g)=	0.4604	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.1340	% 2.279735E+37
		13.3991
Particulate Loading, Actual (gr/cu ft)=	0.1305	
Emission Rate (lb/hr)=	23.47	

No Back Half Analysis

Pm-10

* * METRIC UNITS * *

FILE NAME - bagin1
RUN # - bagin1
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:56:04

Initial Meter Volume (Cubic Meters)=	23.985
Final Meter Volume (Cubic Meters)=	25.443
Meter Factor=	1.027
Final Leak Rate (cu m/min)=	0.0000
Net Meter Volume (Cubic Meters)=	1.497
Gas Volume (Dry Standard Cubic Meters)=	1.498
Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	-9
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (C)=	12
Average Delta H (mm H2O)=	17.0
Average Delta P (mm H2O)=	20.1
Average Stack Temperature (C)=	15
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (mm H2O)=	4.4014
% Isokinetic=	94.5
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	120.0
Nozzle Diameter (mm)=	4.37
Stack Axis #1 (Meters)=	0.914
Stack Axis #2 (Meters)=	0.914
Circular Stack	
Stack Area (Square Meters)=	0.657
Stack Velocity (Actual, m/min)=	904
Flow rate (Actual, Cubic m/min)=	594
Flow rate (Standard, Wet, Cubic m/min)=	588
Flow rate (Standard, Dry, Cubic m/min)=	579

Particulate Loading - Front Half

Particulate Weight (g)=	0.4604	Corr. to 7% O2 & 12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	307.3	% 1.701412E+38
		30727.2
Particulate Loading, Actual (mg/cu m)=	299.3	
Emission Rate (kg/hr)=	10.66	

No Back Half Analysis

PM-10

FILE NAME - bagin1
RUN # - bagin1
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:56:05

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.240	0.67	59	57	53
2	0.540	0.67	59	57	54
3	0.540	0.67	59	57	54
4	0.750	0.67	59	57	54
5	1.100	0.67	59	57	54
6	1.100	0.67	59	57	54
7	0.600	0.67	59	56	53
8	1.200	0.67	59	57	53
9	0.960	0.67	59	57	54
10	0.700	0.67	59	57	54
11	0.830	0.67	59	52	48
12	0.920	0.67	59	51	46

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.3705	0.2889	0.0000	0.0816

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	109.2394	108.8606	120.0	0.3788
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

PM-10

FILE NAME - bagin1t
RUN # - bagin1t
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-05-1994 11:15:56

Initial Meter Volume (Cubic Feet)=	847.042
Final Meter Volume (Cubic Feet)=	898.530
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	52.878
Gas Volume (Dry Standard Cubic Feet)=	52.915
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	54
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.790
Average Stack Temperature (F)=	59
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	0.8733
% Isokinetic=	94.5
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	120.0
Nozzle Diameter (Inches)=	0.172
Stack Axis #1 (Inches)=	36.0
Stack Axis #2 (Inches)=	36.0
Circular Stack	
Stack Area (Square Feet)=	7.07
Stack Velocity (Actual, Feet/min)=	2,967
Flow Rate (Actual, Cubic ft/min)=	20,974
Flow rate (Standard, Wet, Cubic ft/min)=	20,753
Flow Rate (Standard, Dry, Cubic ft/min)=	20,439

Particulate Loading - Front Half

Particulate Weight (g)=	4.5862	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	1.3347	% 1.701412E+38
		133.4729
Particulate Loading, Actual (gr/cu ft)=	1.3001	
Emission Rate (lb/hr)=	233.80	

No Back Half Analysis

Filterable PM

METHOD 201A / PM.10 TRAIN

RUN NO. INLET ~~[illegible]~~ #2
DATE 11-09-93

SAMPLING LOCATION Baghouse Inlet
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR Neal

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 899.746 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1	14:40/60		926.755	0.24	0.67	0.67	64	71	69	3.0	71					
2	14:35/55		924.445	0.54	0.67	0.67	64	71	68	3.0	75					
3	14:30/50		922.145	0.54	0.67	0.67	63	71	68	3.0	79					
4	14:25/45		919.865	0.75	0.67	0.67	64	71	68	3.0	85					
5	14:20/40		917.580	1.10	0.67	0.67	64	71	68	3.0	86					
6	14:15/35		915.385	1.10	0.67	0.67	63	71	67	3.0	84					
7	14:10/30		913.010	0.60	0.67	0.67	64	70	67	3.0	82					
8	14:05/25		911.230	1.20	0.67	0.67	64	70	67	3.0	82					
9	14:00/20		908.950	0.96	0.67	0.67	63	69	66	3.0	79					
10	13:55/15		906.540	0.70	0.67	0.67	63	68	65	3.0	77					
11	13:50/10		904.360	0.83	0.67	0.67	63	66	65	3.0	76					
12	13:45/5		902.087	0.92	0.67	0.67	63	65	64	3.0	73					
	13:40/0															
			FINAL LEAK CHECK 0.005 AT 3 PSI													

COMMENTS

INITIAL LEAK CHECK = 0.001

Revision 9-4-88

METHOD 201A/202

FIELD LABORATORY SETUP DATA Inlet

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: ~~Kiln Stack No. 3~~ Baghouse Inlet #2

Run No. 2 Sampling Train No. P10-2 Sample Box No. ______
Set up person(s): J. M. C. Date 11-9-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By J. M. C. Received By D. Neal Date/Time 11-9-93 1330

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back		Filter I.D.No.:		
Short 90° Connector		SF8		
1st Impinger (Short-stem Mod-GBS)		~~50~~ 100 mLs	469.9	572.1
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	472.5	576.8
U-Connector (B)		H_2O		
3rd Impinger (GBS)		Empty	—	461.1
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating		697.9
Impinger Outlet Connector	VH-2	silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202

FIELD LABORATORY SAMPLE RECOVERY DATA Inlet

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Baghouse Inlet

Baghouse Inlet #2

Run No. 2 Sampling Train No. P10-2 Sample Box No.

Transfer for Recovery:

Relinquished By Dan Neal Received By Jay McC Date/Time 11-9-93 1700

Sample box recovery person(s): Jay McC Date: 11-9-93

Probe recovery person(s): Jay McC Date: 11-9-93

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	568.1	575.6	961.9	706.9					
Initial Wt.(g)	572.1	576.8	961.1	697.9					
Net Wt.(g)	(4.0)	(1.2)	.8	9.0					

[Total Condensate Collected (g): 4.6]

Description and color:

Impingers: >>>>>>>>>>>>> 1-3 <<<

Sample Number: >>>>

Sample Bottle Tare Wt.(g)

Sample Bottle Gross Wt.(g) <------------Before Rinses

Rinse Solution: MethChlrd

Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C

Sample Bottle Final Wt.(g) After Rinses

Net Sample Wt.(g)

FRONT HALF RECOVERY

Sample Number:	2001	2002	003
Sample Bottle Tare Wt.(g)		44	IN-STK FILTER
Sample Bottle Gross Wt.(g)	231.0	120.6	
Rinse Solution	Acetone	Acetone	

Sample Number:

Sample Bottle Tare Wt.(g)

Rinse Solution: Acetone

Components Rinsed****: probe liner, filter holder front

Sample Bottle Gross Wt.(g) w/Acetone

Net Acetone Sample Wt.(g)

Sample Bottle Final Wt.(g)

Net Sample Wt.(g)

gray

Filter Description and Color:

COMMENTS:

FILE NAME - bagin2
RUN # - bagin2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:59:35

Initial Meter Volume (Cubic Feet)=	899.746
Final Meter Volume (Cubic Feet)=	926.755
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	27.738
Gas Volume (Dry Standard Cubic Feet)=	27.028
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	68
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.790
Average Stack Temperature (F)=	64
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	0.8733
% Isokinetic=	97.0
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	60.0
Nozzle Diameter (Inches)=	0.172
Stack Axis #1 (Inches)=	36.0
Stack Axis #2 (Inches)=	36.0
Circular Stack	
Stack Area (Square Feet)=	7.07
Stack Velocity (Actual, Feet/min)=	2,980
Flow Rate (Actual, Cubic ft/min)=	21,065
Flow rate (Standard, Wet, Cubic ft/min)=	20,663
Flow Rate (Standard, Dry, Cubic ft/min)=	20,351

Particulate Loading - Front Half

Particulate Weight (g)=	0.2340	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.1333	% 2.268297E+37
		13.3319
Particulate Loading, Actual (gr/cu ft)=	0.1287	
Emission Rate (lb/hr)=	23.25	

No Back Half Analysis

PM-10

* * METRIC UNITS * *

FILE NAME - bagin2
RUN # - bagin2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:59:37

Initial Meter Volume (Cubic Meters)=	25.477
Final Meter Volume (Cubic Meters)=	26.242
Meter Factor=	1.027
Final Leak Rate (cu m/min)=	0.0000
Net Meter Volume (Cubic Meters)=	0.785
Gas Volume (Dry Standard Cubic Meters)=	0.765
Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	-9
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (C)=	20
Average Delta H (mm H2O)=	17.0
Average Delta P (mm H2O)=	20.1
Average Stack Temperature (C)=	18
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (mm H2O)=	4.4014
% Isokinetic=	97.0
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	60.0
Nozzle Diameter (mm)=	4.37
Stack Axis #1 (Meters)=	0.914
Stack Axis #2 (Meters)=	0.914
Circular Stack	
Stack Area (Square Meters)=	0.657
Stack Velocity (Actual, m/min)=	908
Flow rate (Actual, Cubic m/min)=	596
Flow rate (Standard, Wet, Cubic m/min)=	585
Flow rate (Standard, Dry, Cubic m/min)=	576

Particulate Loading - Front Half

Particulate Weight (g)=	0.2340	Corr. to 7% O2 & 12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	305.7	% 1.701412E+38
		30573.0
Particulate Loading, Actual (mg/cu m)=	295.2	
Emission Rate (kg/hr)=	10.56	

No Back Half Analysis

PM-10

FILE NAME - bagin2
RUN # - bagin2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:59:38

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.240	0.67	64	71	69
2	0.540	0.67	64	71	68
3	0.540	0.67	63	71	68
4	0.750	0.67	64	71	68
5	1.100	0.67	64	71	68
6	1.100	0.67	63	71	67
7	0.600	0.67	64	70	67
8	1.200	0.67	64	70	67
9	0.960	0.67	63	69	66
10	0.700	0.67	63	68	65
11	0.830	0.67	63	66	65
12	0.920	0.67	63	65	64

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.3323	0.2874	0.0000	0.0449

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	86.4034	86.2143	97.0	0.1891
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

FILE NAME - bagin2t
RUN # - bagin2t
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-05-1994 11:17:40

Initial Meter Volume (Cubic Feet)=	899.746
Final Meter Volume (Cubic Feet)=	926.755
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	27.738
Gas Volume (Dry Standard Cubic Feet)=	27.028
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	68
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.790
Average Stack Temperature (F)=	64
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	0.8733
% Isokinetic=	97.0
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	60.0
Nozzle Diameter (Inches)=	0.172
Stack Axis #1 (Inches)=	36.0
Stack Axis #2 (Inches)=	36.0
Circular Stack	
Stack Area (Square Feet)=	7.07
Stack Velocity (Actual, Feet/min)=	2,980
Flow Rate (Actual, Cubic ft/min)=	21,065
Flow rate (Standard, Wet, Cubic ft/min)=	20,663
Flow Rate (Standard, Dry, Cubic ft/min)=	20,351

Particulate Loading - Front Half

Particulate Weight (g)=	4.1066
Particulate Loading, Dry Std. (gr/scf)=	2.3398
Particulate Loading, Actual (gr/cu ft)=	2.2596
Emission Rate (lb/hr)=	408.08

Corr. to 7% 02 & 12% CO2
% 1.701412E+38
233.9809

No Back Half Analysis

Filterable PM

METHOD 201A / PM-10 TRAIN

RUN NO. INLET #3
DATE 9-11-93

SAMPLING LOCATION BAGHOUSE INLET
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR NEAL

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)		GAS METER READING (V_m), ft³ INITIAL 926.807 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1	8:55	60		953.435	0.24	0.67	0.67	56	57	54	4	52					
2	8:50	55		951.200	0.54	0.67	0.67	56	57	54	4	51					
3	8:45	50		948.945	0.54	0.67	0.67	56	57	53	4	50					
4	8:40	45		946.683	0.75	0.67	0.67	56	56	53	4	50					
5	8:35	40		944.395	1.10	0.67	0.67	56	55	52	4	49					
6	8:30	35		942.175	1.10	0.67	0.67	56	54	51	4	48					
7	8:25	30		940.035	0.60	0.67	0.67	55	54	51	4	47					
8	8:20	25		937.885	1.20	0.67	0.67	55	53	51	4	46					
9	8:15	20		935.723	0.96	0.67	0.67	55	52	50	4	46					
10	8:10	15		933.538	0.70	0.67	0.67	54	51	49	4	44					
11	8:05	10		931.330	0.83	0.67	0.67	54	50	48	4	44					
12	8:00	5		929.058	0.92	0.67	0.67	54	49	48	4	46					
	7:55	0							~~50~~	~~4~~							

COMMENTS

INITIAL LEAK CHECK = 0.001
Final Leak check = 0.005

Revision 9-4-86

METHOD 201A/202

FIELD LABORATORY SETUP DATA Inlet

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: ~~Kiln Stack~~ Baghouse No. 3

Run No. 3 Sampling Train No. P10-2 Sample Box No. ____
Set up person(s): J. M. C. Date 11-9-93
Transfer to Sampler: Sample Box Leak Check: ____ cfm @ ____ in.Hg vacuum

Relinquished By ____ Received By ____ Date/Time ____

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back		Filter I.D.No.:		
Short 90° Connector		SF6		
1st Impinger (Short-stem Mod-GBS)		50 mLs	469.9	568.1
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	472.5	575.6
U-Connector (B)		H_2O		
3rd Impinger (GBS)		Empty	—	461.9
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating		706.9
Impinger Outlet Connector		silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (<u>not sealed</u>) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Inlet

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Baghouse Inlet

Run No. 3 Sampling Train No. P10-2 Sample Box No. ______ ______
Transfer for Recovery:

Relinquished By ______ Received By J McC Date/Time 11-11-93 1000
Sample box recovery person(s): J. McC Date: ______
Probe recovery person(s): [signature] Date: 11-11-93

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	569.3	578.5	462.1	717.6					
Initial Wt.(g)	568.1	575.6	461.9	706.9					
Net Wt.(g)	1.2	2.9	.2	10.7					

[Total Condensate Collected (g): 15.0]

Description and color: clear clear clear 25%

Impingers: >>>>>>>>>>>>> 1-3 <<<
Sample Number: ______ ______ ______>>>>______
Sample Bottle Tare Wt.(g) ______ ______ ______ ______
Sample Bottle Gross Wt.(g) ______ ______ ______ <------------Before Rinses
Rinse Solution: MethChlrd
Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C
Sample Bottle Final Wt.(g) ______ ______ ______ ______ After Rinses
Net Sample Wt.(g) ______ ______ ______ ______

FRONT HALF RECOVERY

Sample Number:	3001	3002	3003
Sample Bottle Tare Wt.(g)	92.7	98.6	IN-STK FILTER SF6
Sample Bottle Gross Wt.(g)	149.7	130.6	
Rinse Solution	Acetone	Acetone	

Sample Number: ______ ______ ______
Sample Bottle Tare Wt.(g) ______ ______
Rinse Solution: Acetone
Components Rinsed****: probe liner, filter holder front
Sample Bottle Gross Wt.(g) ______ w/Acetone
Net Acetone Sample Wt.(g) ______
Sample Bottle Final Wt.(g) ______
Net Sample Wt.(g) ______

Filter Description and Color: Gray

COMMENTS: CAE 2CC14
Filter SF6

FILE NAME - bagin3
RUN # - bagin3
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 13:01:02

Initial Meter Volume (Cubic Feet)=	926.807	
Final Meter Volume (Cubic Feet)=	953.435	
Meter Factor=	1.027	
Final Leak Rate (cu ft/min)=	0.001	
Net Meter Volume (Cubic Feet)=	27.347	
Gas Volume (Dry Standard Cubic Feet)=	27.464	
Barometric Pressure (in Hg)=	29.13	
Static Pressure (Inches H20)=	-0.37	
Percent Oxygen=	21.0	
Percent Carbon Dioxide=	0.0	
Percent Water=	1.5	**Saturated Stack**
Average Meter Temperature (F)=	52	
Average Delta H (in H20)=	0.67	
Average Delta P (in H20)=	0.790	
Average Stack Temperature (F)=	55	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.68	
Average Square Root of Delta P (in H20)=	0.8733	
% Isokinetic=	97.8	
Pitot Coefficient=	0.84	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter (Inches)=	0.172	
Stack Axis #1 (Inches)=	36.0	
Stack Axis #2 (Inches)=	36.0	
Circular Stack		
Stack Area (Square Feet)=	7.07	
Stack Velocity (Actual, Feet/min)=	2,957	
Flow Rate (Actual, Cubic ft/min)=	20,899	
Flow rate (Standard, Wet, Cubic ft/min)=	20,828	
Flow Rate (Standard, Dry, Cubic ft/min)=	20,513	

Particulate Loading - Front Half

Particulate Weight (g)=	0.2242	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.1257	% 2.138926E+37
		12.5715
Particulate Loading, Actual (gr/cu ft)=	0.1233	
Emission Rate (lb/hr)=	22.10	

No Back Half Analysis

PM-10

*** * METRIC UNITS * ***

FILE NAME - bagin3
RUN # - bagin3
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 13:01:03

Initial Meter Volume (Cubic Meters)=	26.243	
Final Meter Volume (Cubic Meters)=	26.997	
Meter Factor=	1.027	
Final Leak Rate (cu m/min)=	0.0000	
Net Meter Volume (Cubic Meters)=	0.774	
Gas Volume (Dry Standard Cubic Meters)=	0.778	
Barometric Pressure (mm Hg)=	740	
Static Pressure (mm H2O)=	-9	
Percent Oxygen=	21.0	
Percent Carbon Dioxide=	0.0	
Percent Water=	1.5	**Saturated Stack**
Average Meter Temperature (C)=	11	
Average Delta H (mm H2O)=	17.0	
Average Delta P (mm H2O)=	20.1	
Average Stack Temperature (C)=	13	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.68	
Average Square Root of Delta P (mm H2O)=	4.4014	
% Isokinetic=	97.8	
Pitot Coefficient=	0.84	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter (mm)=	4.37	
Stack Axis #1 (Meters)=	0.914	
Stack Axis #2 (Meters)=	0.914	
Circular Stack		
Stack Area (Square Meters)=	0.657	
Stack Velocity (Actual, m/min)=	901	
Flow rate (Actual, Cubic m/min)=	592	
Flow rate (Standard, Wet, Cubic m/min)=	590	
Flow rate (Standard, Dry, Cubic m/min)=	581	

Particulate Loading - Front Half

Particulate Weight (g)=	0.2242	Corr. to 7% O2 & 12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	288.3	% 1.701412E+38
		28829.3
Particulate Loading, Actual (mg/cu m)=	282.9	
Emission Rate (kg/hr)=	10.03	

No Back Half Analysis

PM-10

FILE NAME - bagin3
RUN # - bagin3
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 13:01:04

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.240	0.67	56	57	54
2	0.540	0.67	56	57	54
3	0.540	0.67	56	57	53
4	0.750	0.67	56	56	53
5	1.100	0.67	56	55	52
6	1.100	0.67	56	54	51
7	0.600	0.67	55	54	51
8	1.200	0.67	55	53	51
9	0.960	0.67	55	52	50
10	0.700	0.67	54	51	49
11	0.830	0.67	54	50	48
12	0.920	0.67	54	49	48

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.3241	0.2794	0.0000	0.0447

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	115.8773	115.6978	68.0	0.1795
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

PM-10

FILE NAME - bagin3t			PROG.=VER 06/09/89
RUN # - bagin3t			05-05-1994 11:20:19
LOCATION - baghouse			
DATE - 11-09-93			
PROJECT # - 4601.01.05.01			

Initial Meter Volume (Cubic Feet)=	926.807	
Final Meter Volume (Cubic Feet)=	953.435	
Meter Factor=	1.027	
Final Leak Rate (cu ft/min)=	0.001	
Net Meter Volume (Cubic Feet)=	27.347	
Gas Volume (Dry Standard Cubic Feet)=	27.464	
Barometric Pressure (in Hg)=	29.13	
Static Pressure (Inches H20)=	-0.37	
Percent Oxygen=	21.0	
Percent Carbon Dioxide=	0.0	
Percent Water=	1.5	**Saturated Stack**
Average Meter Temperature (F)=	52	
Average Delta H (in H20)=	0.67	
Average Delta P (in H20)=	0.790	
Average Stack Temperature (F)=	55	
Dry Molecular Weight=	28.84	
Wet Molecular Weight=	28.68	
Average Square Root of Delta P (in H20)=	0.8733	
% Isokinetic=	97.8	
Pitot Coefficient=	0.84	
Sampling Time (Minutes)=	60.0	
Nozzle Diameter (Inches)=	0.172	
Stack Axis #1 (Inches)=	36.0	
Stack Axis #2 (Inches)=	36.0	
Circular Stack		
Stack Area (Square Feet)=	7.07	
Stack Velocity (Actual, Feet/min)=	2,957	
Flow Rate (Actual, Cubic ft/min)=	20,899	
Flow rate (Standard, Wet, Cubic ft/min)=	20,828	
Flow Rate (Standard, Dry, Cubic ft/min)=	20,513	

Particulate Loading - Front Half

Particulate Weight (g)=	4.5845	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	2.5707	% 1.701412E+38
		257.0683
Particulate Loading, Actual (gr/cu ft)=	2.5223	
Emission Rate (lb/hr)=	451.93	

No Back Half Analysis

Filterable PM

from . . .

ROY NEULICHT

Outlet

Method 201A / PM-10 Train

RUN NO. Outlet # 1
DATE 11-09-93

SAMPLING LOCATION Baghouse Outlet
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR Neil

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr.) / SAMPLING TIME, min	GAS METER READING (V_m), ft³ INITIAL 705.505 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1																
2																
3																
4	14:46/368		898.683	1.9	0.67	0.67	60°	85	79	5.0	64					
5	14:06/328		877.765	2.1	0.67	0.67	60°	84	77	5.0	64°					
6	13:26/288		857.105	1.9	0.67	0.67	59°	83	76	5.0	63°					
7	12:45/247		834.75	1.8	0.67	0.67	59°	82	75	5.0	60°					
8	12:04/206		813.075	1.8	0.67	0.67	57°	~~62~~ 81	~~62~~ 74	5.0	54°					
9	11:21/163		791.175	1.8	0.67	0.67	57°	~~62~~ 81	~~62~~ 73	5.0	53°					
10	10:40/122		769.525	2.3	0.67	0.67	57°	~~62~~ 79	~~62~~ 70	5.0	54°					
11	9:59\90		748.110	2.3	0.67	0.67	57°	~~62~~ 76	~~62~~ 65	5.0	54°					
12	9:17\30	~~728.455~~	728.455	1.9	0.67	0.67	57°	63	62	5.0	54°					
	8:39\0															
			FINAL	LEAK CHECK			0.004 @ 5 PSI									

COMMENTS

Initial Leak Check = 0.001

Revision 9-4-86

METHOD 201A/202

FIELD LABORATORY SETUP DATA ~~Inlet~~ Out

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 1 Sampling Train No. P10-1 Sample Box No. ________ ________
Set up person(s): J. M. C. Date 11-8-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By D. Neal Received By J. M. C. Date/Time 11-9-93 1900

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator	*			
~~Probe (Liner-Glass)~~	*			
Female ~~Probe Blank-off~~				
~~90° Bypass~~	*	Filter Type:		
~~Filter Holder Front~~		Whatman QM-A		
~~Filter Holder Back~~		Filter I.D.No.:		
~~Short 90° Connector~~				
1st Impinger (Short-stem Mod-GBS)		~~150~~ 100 mLs	469.9	579.9*
U-Connector (A)		H_2O		
2nd Impinger (GBS)	I-120	100 mLs H_2O	474.1	574.7
U-Connector (B)				
3rd Impinger (Mod-GBS)		Empty	—	463.1
U-Connector (C)				
4th Impinger (Mod-GBS)	I-302	~200 g indicating		654.1
Impinger Outlet Connector	UH-32	silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

* Calculated

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA   Outlet

MRI Project No.   4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Baghouse Inlet

Run No. 1   Sampling Train No. P10-1   Sample Box No. ______
Transfer for Recovery:

Relinquished By Don Neal   Received By J. McC   Date/Time 11-9-93 1700
Sample box recovery person(s): J. McC   Date:
Probe recovery person(s): J. McC   Date: 11-9-93

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt. (g)	565.2	572.3	464.6	682.4*					
Initial Wt. (g)	579.9	574.7	463.1	654.1					
Net Wt. (g)	(14.9)	(2.4)	1.5	28.3					

[Total Condensate Collected (g): 12.5]

Description and color:
Impingers: >>>>>>>>>>>>> 1-3 <<<
Sample Number: ______ ______ ______>>>>______
Sample Bottle Tare Wt. (g)
Sample Bottle Gross Wt. (g) <------------Before Rinses
Rinse Solution: MethChlrd
Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C
Sample Bottle Final Wt. (g) After Rinses
Net Sample Wt. (g)

FRONT HALF RECOVERY

Sample Number:	1006	1007	1008 IN-STK FILTER
Sample Bottle Tare Wt. (g)	173.4	98.1	
Sample Bottle Gross Wt. (g)	231.9	121.7	
Rinse Solution	Acetone	Acetone	

Sample Number:
Sample Bottle Tare Wt. (g)
Rinse Solution: Acetone
Components Rinsed****: probe liner, filter holder front w/Acetone
Sample Bottle Gross Wt. (g)
Net Acetone Sample Wt. (g)
Sample Bottle Final Wt. (g)
Net Sample Wt. (g)

gray
Filter Description and Color:

COMMENTS:

Saturated

FILE NAME - bagout1
RUN # - bagout1
LOCATION - baghouse
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:46:17

Initial Meter Volume (Cubic Feet)=	708.505
Final Meter Volume (Cubic Feet)=	888.673
Meter Factor=	1.010
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	181.970
Gas Volume (Dry Standard Cubic Feet)=	175.437
Barometric Pressure (in Hg)=	29.27
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	76
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	1.990
Average Stack Temperature (F)=	58
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	1.4092
% Isokinetic=	92.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	350.0
Nozzle Diameter (Inches)=	0.146
Stack Axis #1 (Inches)=	32.0
Stack Axis #2 (Inches)=	32.0
Circular Stack	
Stack Area (Square Feet)=	5.59
Stack Velocity (Actual, Feet/min)=	4,773
Flow Rate (Actual, Cubic ft/min)=	26,656
Flow rate (Standard, Wet, Cubic ft/min)=	26,541
Flow Rate (Standard, Dry, Cubic ft/min)=	26,140

Particulate Loading - Front Half

Particulate Weight (g)=	0.0027	Corr. to 7% 02 & 12% CO:
Particulate Loading, Dry Std. (gr/scf)=	0.0002	% 4.042677E+34
		0.0238
Particulate Loading, Actual (gr/cu ft)=	0.0002	
Emission Rate (lb/hr)=	0.05	

No Back Half Analysis

PM-10

* * METRIC UNITS * *

FILE NAME - bagout1
RUN # - bagout1
LOCATION - baghouse
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:46:18

Initial Meter Volume (Cubic Meters)=	20.062
Final Meter Volume (Cubic Meters)=	25.164
Meter Factor=	1.010
Final Leak Rate (cu m/min)=	0.0000
Net Meter Volume (Cubic Meters)=	5.153
Gas Volume (Dry Standard Cubic Meters)=	4.968
Barometric Pressure (mm Hg)=	743
Static Pressure (mm H2O)=	-9
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (C)=	25
Average Delta H (mm H2O)=	17.0
Average Delta P (mm H2O)=	50.5
Average Stack Temperature (C)=	15
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (mm H2O)=	7.1019
% Isokinetic=	92.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	350.0
Nozzle Diameter (mm)=	3.71
Stack Axis #1 (Meters)=	0.813
Stack Axis #2 (Meters)=	0.813
Circular Stack	
Stack Area (Square Meters)=	0.519
Stack Velocity (Actual, m/min)=	1,455
Flow rate (Actual, Cubic m/min)=	755
Flow rate (Standard, Wet, Cubic m/min)=	752
Flow rate (Standard, Dry, Cubic m/min)=	740

Particulate Loading - Front Half

Particulate Weight (g)=	0.0027	Corr. to 7% O2 & 12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	0.5	% 9.270783E+37
		54.5
Particulate Loading, Actual (mg/cu m)=	0.5	
Emission Rate (kg/hr)=	0.02	

No Back Half Analysis

PM-10

FILE NAME - bagout1
RUN # - bagout1
LOCATION - baghouse
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:46:19

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	1.900	0.67	57	63	62
2	2.300	0.67	57	76	65
3	2.300	0.67	57	79	70
4	1.800	0.67	57	81	73
5	1.800	0.67	57	81	74
6	1.800	0.67	59	82	75
7	1.900	0.67	59	83	76
8	2.100	0.67	60	84	77
9	1.900	0.67	60	85	79
10	2.100	0.67	60	85	79

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.2894	0.2868	0.0000	0.0026

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	101.3541	101.3540	56.0	0.0001
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

PM-10

FILE NAME - bagout1t
RUN # - bagout1t
LOCATION - baghouse
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-05-1994 11:23:08

Initial Meter Volume (Cubic Feet)=	708.505
Final Meter Volume (Cubic Feet)=	888.673
Meter Factor=	1.010
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	181.970
Gas Volume (Dry Standard Cubic Feet)=	175.437
Barometric Pressure (in Hg)=	29.27
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	76
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	1.990
Average Stack Temperature (F)=	58
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	1.4092
% Isokinetic=	92.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	350.0
Nozzle Diameter (Inches)=	0.146
Stack Axis #1 (Inches)=	32.0
Stack Axis #2 (Inches)=	32.0
Circular Stack	
Stack Area (Square Feet)=	5.59
Stack Velocity (Actual, Feet/min)=	4,773
Flow Rate (Actual, Cubic ft/min)=	26,656
Flow rate (Standard, Wet, Cubic ft/min)=	26,541
Flow Rate (Standard, Dry, Cubic ft/min)=	26,140

Particulate Loading - Front Half

Particulate Weight (g)=	0.0133	Corr. to 7% O2 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.0012	% 1.986977E+35
		0.1168
Particulate Loading, Actual (gr/cu ft)=	0.0011	
Emission Rate (lb/hr)=	0.26	

No Back Half Analysis

Filtrable PM

METHOD 201A / PM-10 TRAIN

RUN NO. OUTLET #2
DATE 9-11-93

SAMPLING LOCATION BAGHOUSE OUTLET
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR NEAL

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 898.745 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1	14:27		1110.540	1.9	0.67	0.67	58	85	80	3	52					
2	~~14:30~~		~~1110.540~~	2.3	0.67	0.67	58	85	80	3	52					
3	14.15		~~1110.540~~	2.3	0.67	0.67	58	85	80	3	52					
4	13:30			1.8	0.67	0.67	58	84	79	3	52					
5	12:50			1.8	0.67	0.67	58	82	75	3	52					
6	12:10			1.8	0.67	0.67	58	82	74	3	51					
7	11:31			1.9	0.67	0.67	58	81	72	3	49					
8	10:53			2.1	0.67	0.67	58	80	70	3	50					
9	10:10 163			1.9	0.67	0.67	56	79	71	3	54					
10	9:29 122			2.0	0.67	0.67	55	76	68	3	54					
11	8:47 80		939.005	1.9	0.67	0.67	53	70	61	3	54					
12	8:08 39		918.250	1.7	0.67	0.67	50	62	54	3	56					
	7:27 0															

COMMENTS

INITIAL LEAK CHECK = 0.001
Final Leak Check = 0.001

Revision 9-4-86

METHOD 201A/202

FIELD LABORATORY SETUP DATA ~~Inlet~~ Outlet

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 2 Sampling Train No. P10-3 Sample Box No. ______ ______
Set up person(s): Joy McC Date 11-8-93
Transfer to Sampler: ✓ Sample Box Leak Check: ______cfm @ ______in.Hg vacuum

Relinquished By ______ Received By ______ Date/Time ______ ______

TRAIN COMPONENT	COMPONENT NO.		LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator		*			
~~Probe (Liner Glass)~~		*			
~~Female Probe Blank-off~~					
~~90° Bypass~~		*	Filter Type:		
~~Filter Holder Front~~			Whatman QM-A		
~~Filter~~ Holder Back			Filter I.D.No.:		
~~Short 90° Connector~~			SF4		
1st Impinger (Short-stem Mod-GBS)			~~50~~ 100 mLs	470.7	570.4
U-Connector (A)			H_2O		
2nd Impinger (GBS)	I-112		100 mLs	474.8	574.8
U-Connector (B)			H_2O		
3rd Impinger (Mod-GBS)		B-143	Empty	—	462.6
U-Connector (C)					
4th Impinger (Mod-GBS)		~~B-143~~	~200 g indicating		721.1
Impinger Outlet Connector	UH-2		silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Outlet

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Baghouse Inlet

Run No. 2 Sampling Train No. P10-3 Sample Box No. ______ ______
Transfer for Recovery:

Relinquished By ______ Received By ______ Date/Time ______ ______
Sample box recovery person(s): ______ Date: ______
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	560.8	571.5	465.7	759.5					
Initial Wt.(g)	570.4	574.8	462.6	721.1					
Net Wt.(g)	(9.6)	(3.3)	3.1	38.4					

[Total Condensate Collected (g): 28.6]

Description and color: ______ ______ ______ 17. ______ ______ ______ ______ ______

Impingers: >>>>>>>>>>>>> 1-3 <<<

Sample Number: ______ ______ ______>>>> ______
Sample Bottle Tare Wt.(g) ______ ______ ______ ______
Sample Bottle Gross Wt.(g) ______ ______ ______ <------------Before Rinses
Rinse Solution: MethChlrd
Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C
Sample Bottle Final Wt.(g) ______ ______ ______ ______ After Rinses
Net Sample Wt.(g) ______ ______ ______ ______

FRONT HALF RECOVERY

Sample Number:	2006	2007	008
Sample Bottle Tare Wt.(g)	165.7	97.9	IN-STK FILTER ______
Sample Bottle Gross Wt.(g)	267.3	142.6	
Rinse Solution	Acetone	Acetone	

Sample Number: ______ ______ ______
Sample Bottle Tare Wt.(g) ______ ______
Rinse Solution: Acetone
Components Rinsed****: probe liner, filter holder front
Sample Bottle Gross Wt.(g) ______ w/Acetone
Net Acetone Sample Wt.(g) ______
Sample Bottle Final Wt.(g) ______
Net Sample Wt.(g) ______

Filter
Description and Color: ______

COMMENTS:

FILE NAME - bagout2
RUN # - bagout2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:51:08

Initial Meter Volume (Cubic Feet)=	898.745
Final Meter Volume (Cubic Feet)=	1110.540
Meter Factor=	1.010
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	213.913
Gas Volume (Dry Standard Cubic Feet)=	206.567
Barometric Pressure (in Hg)=	29.27
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	76
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	1.950
Average Stack Temperature (F)=	56
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	1.3949
% Isokinetic=	91.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	420.0 ✓
Nozzle Diameter (Inches)=	0.146
Stack Axis #1 (Inches)=	32.0
Stack Axis #2 (Inches)=	32.0
Circular Stack	
Stack Area (Square Feet)=	5.59
Stack Velocity (Actual, Feet/min)=	4,716
Flow Rate (Actual, Cubic ft/min)=	26,337
Flow rate (Standard, Wet, Cubic ft/min)=	26,322
Flow Rate (Standard, Dry, Cubic ft/min)=	25,925

Particulate Loading - Front Half

Particulate Weight (g)=	0.0027	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.0002	% 3.428217E+34
		0.0201
Particulate Loading, Actual (gr/cu ft)=	0.0002	
Emission Rate (lb/hr)=	0.04	

No Back Half Analysis

PM-10

* * METRIC UNITS * *

FILE NAME - bagout2
RUN # - bagout2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:51:10

Initial Meter Volume (Cubic Meters)=	25.449
Final Meter Volume (Cubic Meters)=	31.446
Meter Factor=	1.010
Final Leak Rate (cu m/min)=	0.0000
Net Meter Volume (Cubic Meters)=	6.057
Gas Volume (Dry Standard Cubic Meters)=	5.849
Barometric Pressure (mm Hg)=	743
Static Pressure (mm H20)=	-9
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (C)=	24
Average Delta H (mm H20)=	17.0
Average Delta P (mm H20)=	49.5
Average Stack Temperature (C)=	14
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (mm H20)=	7.0301
% Isokinetic=	91.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	420.0
Nozzle Diameter (mm)=	3.71
Stack Axis #1 (Meters)=	0.813
Stack Axis #2 (Meters)=	0.813
Circular Stack	
Stack Area (Square Meters)=	0.519
Stack Velocity (Actual, m/min)=	1,437
Flow rate (Actual, Cubic m/min)=	746
Flow rate (Standard, Wet, Cubic m/min)=	745
Flow rate (Standard, Dry, Cubic m/min)=	734

Particulate Loading - Front Half

Particulate Weight (g)=	0.0027	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	0.5	% 7.861686E+37
		46.2
Particulate Loading, Actual (mg/cu m)=	0.5	
Emission Rate (kg/hr)=	0.02	

No Back Half Analysis

PM-10

FILE NAME - bagout2
RUN # - bagout2
LOCATION - baghouse
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
05-04-1994 12:51:11

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	1.700	0.67	50	62	54
2	1.900	0.67	53	70	61
3	2.000	0.67	53	76	68
4	1.900	0.67	56	78	71
5	2.100	0.67	58	80	70
6	1.900	0.67	58	81	72
7	1.800	0.67	58	82	74
8	1.800	0.67	58	82	75
9	1.800	0.67	58	84	79
10	2.300	0.67	58	85	80
11	2.300	0.67	58	85	80
12	1.900	0.67	58	85	80

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.2882	0.2861	0.0000	0.0021

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	85.1247	85.1241	98.0	0.0006
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

PM-10

FILE NAME - bagout2t		PROG.=VER 06/09/89
RUN # - bagout2t		05-05-1994 11:25:34
LOCATION - baghouse		
DATE - 11-09-93		
PROJECT # - 4601.01.05.01		

Initial Meter Volume (Cubic Feet)=	898.745
Final Meter Volume (Cubic Feet)=	1110.540
Meter Factor=	1.010
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	213.913
Gas Volume (Dry Standard Cubic Feet)=	206.567
Barometric Pressure (in Hg)=	29.27
Static Pressure (Inches H20)=	-0.37
Percent Oxygen=	21.0
Percent Carbon Dioxide=	0.0
Percent Water=	1.5
Average Meter Temperature (F)=	76
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	1.950
Average Stack Temperature (F)=	56
Dry Molecular Weight=	28.84
Wet Molecular Weight=	28.68
Average Square Root of Delta P (in H20)=	1.3949
% Isokinetic=	91.1
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	420.0
Nozzle Diameter (Inches)=	0.146
Stack Axis #1 (Inches)=	32.0
Stack Axis #2 (Inches)=	32.0
Circular Stack	
Stack Area (Square Feet)=	5.59
Stack Velocity (Actual, Feet/min)=	4,716
Flow Rate (Actual, Cubic ft/min)=	26,337
Flow rate (Standard, Wet, Cubic ft/min)=	26,322
Flow Rate (Standard, Dry, Cubic ft/min)=	25,925

Particulate Loading - Front Half

Particulate Weight (g)=	0.0109	Corr. to 7% 02 & 12% CO2
Particulate Loading, Dry Std. (gr/scf)=	0.0008	% 1.383142E+35
		0.0813
Particulate Loading, Actual (gr/cu ft)=	0.0008	
Emission Rate (lb/hr)=	0.18	

No Back Half Analysis

Fi Hrrabk PM

from . . .

ROY NEULICHT

Ambient Samples

Temperature (T_a) 62 °F

Barometric Pressure (P_a) 29.4 **in Hg**

MIDWEST RESEARCH INSTITUTE

WEST Run #1

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01
Date: 11-11-93
By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
1598	0.945		1.2	0.95918	41.98	42.43
"	0.950		1.3	0.95578	41.87	42.32
"	1015		1.3	0.95578	41.87	42.32
"	1030		1.3	0.95578	41.87	42.32
"	1045		1.3	0.95578	41.87	42.32
"	1100		1.3	0.95578	41.87	42.32
"	1110		1.3	0.95578	41.87	42.32
"	1120		1.3	0.95578	41.87	42.32
"	1130		1.3	0.95578	41.87	42.32
"	1145		1.3	0.95578	41.87	42.32

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\ P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

Temperature (T_a) 64 °F

Barometric Pressure (P_a) 29.4 in Hg

MIDWEST RESEARCH INSTITUTE

WEST Run # 2

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01
Date: 11-11-93
By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
1598	1230		1.4	0.952	41.66	41.95
"	1240		1.3	0.956	41.94	42.23
"	1250		1.4	0.952	41.66	41.95
"	1300		1.3	0.956	41.94	42.23
"	1320		1.3	0.956	41.94	42.23
"	1335		1.3	0.956	41.94	42.23
"	1345		1.3	0.956	41.94	42.23
"	1355		1.3	0.956	41.94	42.23
"	1415		1.3	0.956	41.94	42.23
"	1430		1.3	0.956	41.94	42.23

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\, P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

Temperature (T_a) 659 °F

Barometric Pressure (P_a) 29.0 in Hg

MIDWEST RESEARCH INSTITUTE

EAST Run # 1

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01

Date: 11-09-94

By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
1600	1200		1.3	0.955	41.30	41.42
"	1210		1.3	0.955	41.30	41.42
"	1220		1.3	0.955	41.30	41.42
"	1230		1.3	0.955	41.30	41.42
"	1240		1.3	0.955	41.30	41.42
"	1250		1.3	0.955	41.30	41.42
"	1300		1.3	0.955	41.30	41.42
"	1320		1.3	0.955	41.30	41.42
"	1340		1.3	0.955	41.30	41.42
"	1400		1.3	0.955	41.30	41.42

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\ P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

Temperature (T_a) 62 °F

Barometric Pressure (P_a) 29.4 in Hg

MIDWEST RESEARCH INSTITUTE

EAST Run # 2

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01
Date: 11-11-93
By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
1600	0800		1.3	0.95578	41.87	42.32
"	0815		1.2	0.95918	42.06	42.52
"	0825		1.3	0.95578	41.87	42.32
"	0840		1.3	0.95578	41.87	42.32
"	0900		1.3	0.95578	41.87	42.32
"	0910		1.3	0.95578	41.87	42.32
"	0920		1.3	0.95578	41.87	42.32
"	0940		1.3	0.95578	41.87	42.32
"	1000		1.3	0.95578	41.87	42.32

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\,P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

MRI MWFE1 640.SOP

Temperature (T_a) 64 °F

Barometric Pressure (P_a) 29.4 in Hg

MIDWEST RESEARCH INSTITUTE

EAST # 3

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01
Date: 11-11-93
By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
1600	1045		1.3	0.95518	41.94	42.23
"	1055		1.4	0.9520	41.66	41.95
"	1110		1.3	0.95518	41.94	42.23
"	1120		1.3	0.95518	41.94	42.23
"	1130		1.3	0.95518	41.94	42.23
"	1140		1.3	0.95518	41.94	42.23
"	1150		1.3	0.95518	41.94	42.23
"	1160		1.3	0.95518	41.94	42.23
"	~~1200~~ 1200		1.3	0.95518	41.94	42.23
"	1220		1.3	0.95518	41.94	42.23
"	1245		1.3	0.95518	41.94	42.23

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\ P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$

Screening & Grinding
Inside Run 1

MIDWEST RESEARCH INSTITUTE

PM$_{10}$ Sampler Flow Determination

Temperature (T_a) 70 °F

Barometric Pressure (P_a) 29.38 in Hg

Project No.: 4601.01.05.01

Date: 11-09-93

By: Szyllo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
10.42		1.2				
10.45		1.3				
11.00		1.3				
11.30		1.3				
12.00		1.3				
12.45		1.3				

[a] Does not apply to Wedding and Associates PM$_{10}$ sampler.

[b] $P_f = (.979 P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

MRI-M\EE1 640.SOP

Temperature (T_a) 70 °F

Barometric Pressure (P_a) 29.4 in Hg

MIDWEST RESEARCH INSTITUTE

PM_{10} Sampler Flow Determination

Project No.: 4601.01.05.01
Date: 11-03-93
By: Szydlo

Sampler No.	Flow Controller Serial No.	Throat pressure[a] P_t (in H_2O)	Filter pressure[b] P_f (in Hg)	Pressure ratio[c] P_o/P_a	Flow rate[d] Q_a (acfm)	Std. flow rate[e] Q_{std} (scfm)
12.50		1.3				
13.15		1.3				
14.00		1.3				
14.50		1.3				

[a] Does not apply to Wedding and Associates PM_{10} sampler.

[b] $P_f = (.979\ P_t + .14)/13.61$

[c] $P_o/P_a = 1 - P_f/P_a$. P_f and P_a must have consistent units.

[d] From Look-Up Table.

[e] $$Q_{std} = Q_a \cdot \frac{P_a}{29.92\ inHg} \cdot \frac{537°\ R}{460° + T_a}$$

K, W

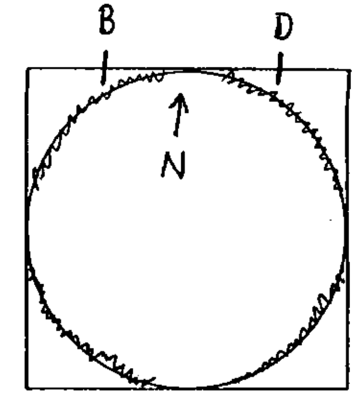
from . . .

ROY NEULICHT

Pm / Pm-10

FIELD DATA

RUN NO.	KILN STACK #1	PROBE NO.	VL-7	NOZZLE DIA.	~~H/A~~ .342
PROJECT NO.	4601-01-05-01	PROBE LENGTH AND TYPE	STANDARD 8'	ASSUMED MOISTURE %	—
PLANT	BELDON BRICK	SAMPLE BOX NO.	011995	METER ΔH@	1.715
DATE	11-11-93	METER BOX NO.	N12	METER CORRECTION	1.027
SAMPLING LOCATION	KILN STACK	TEMP. CONTROLLER NO.	N12	PITOT NO.	P-15
SAMPLE TYPE	METHOD 201A/PM-10	TEMP. METER NO.	N12	PITOT COEFFICIENT	0.8339
OPERATOR	NEAL	THERMOCOUPLE I.D. NO.	96-4	BAROMETRIC PRESSURE	29.126
FILTER NO.	LF 8	UMBILICAL CORD I.D. NO.	N-125-5	SITE TO BARO. ELEVATION (ft.)	—
RECORD DATA EVERY	VAR. MIN.	UMBILICAL CORD I.D. NO.	N-125-5	CORRECTED B.P. (0.1 in./100 ft.)	—
UMBILICAL/SAMPLER HOOKUP	~~[illegible]~~	NOZZLE NO.	N/A	STATIC PRESSURE	-.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1045	12:30				
PASS/FAIL		Pass.				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1045	12:29			
VACUUM, in. Hg	≥15"	≥3	≥15"		≥15"
CFM	0.001	0.001			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, in. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME ______

FINAL VOLUME ______

LEAK CHECK VOLUME ______

ADJUSTED FINAL VOLUME ______

COMMENTS

Revision 11/18/88

METHOD 201A / PM-10 TRAIN

RUN NO. KILN STACK #1
DATE 9-11-93

SAMPLING LOCATION KILN STACK
PROJECT NO. 4601-01-05-01

p. 1 of 1
OPERATOR NEAL

TRAVERSE POINT NUMBER	SAMPLING TIME, min (0.00)	CLOCK TIME (24-hr.) (10:55)	GAS METER READING (V_m), ft^3 INITIAL 327.801 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
1-D	13	11:08		333.775	.010	0.67	0.67	107	65	63	3	52	248	252	257		
2-D	25	11:20		339.295	.140	0.67	0.67	439	71	65	3	55	239	255	256		
3-D	33	11:28		343.038	.130	0.67	0.67	375	73	67	3	55	243	253	258		
4-D	38	11:33		345.365	.065	0.67	0.67	417	74	67	3	55	244	251	259		
5-D	41	11:36		346.760	.030	0.67	0.67	432	74	68	3	55	237	252	254		
6-B	13	11:51		352.765	.010	0.67	0.67	246	74	69	3	54	236	252	254		
7-B	26	12:04		358.765	.135	0.67	0.67	444	76	70	3	54	234	252	253		
8-B	40	12:18		363.450	.125	0.67	0.67	447	78	71	3	54	236	252	254		
9-B	43	12:21		365.32	.080	0.67	0.67	447	77	71	3	55	236	252	254		
10-B	49	12:27		369.465	.060	0.67	0.67	445	77	72	3	55	234	251	252		

PORT CHG. 11:38

COMMENTS
PROBE # VL-7
PROBE T.C. 96-4
PITOT # P-15
AVG. CP - 0.8339

METHOD 201A/202

FIELD LABORATORY SETUP DATA Stack

Kiln Stack - PM10 1

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 1 Sampling Train No. SV-1 Sample Box No. 011995
Set up person(s): J. M. C. Date 11-12-93
Transfer to Sampler: Sample Box Leak Check: ____ cfm @ ____ in.Hg vacuum

Relinquished By ____ Received By ____ Date/Time ____

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
PM-10 Preseparator	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front	—	Whatman QM-A		
Filter Holder Back	—	Filter I.D.No.:		
Short 90° Connector		LF8		
1st Impinger (Short-stem Mod-GBS)		~~50~~ 100 mLs	468.0	568.7
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	475.8	576.5
U-Connector (B)		H_2O		
3rd Impinger (Mod GBS)		Empty	—	470.8
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating		703.9
Impinger Outlet Connector		silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (<u>not sealed</u>) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Stack

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3 - PM101

Kiln Stack - PM101

Run No. 1 Sampling Train No. SV-1 Sample Box No. 011995
Transfer for Recovery:

Relinquished By ______ Received By J McC Date/Time 11-11-93 1300
Sample box recovery person(s): ______ Date: ______
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	585.4	585.0	471.7	715.3					
Initial Wt.(g)	568.7	576.5	470.8	703.9					
Net Wt.(g)	16.7	8.5	.9	11.4					

[Total Condensate Collected (g): 37.5]

Description and color:	clear	clear	clear	40					

Impingers: >>>>>>>>>>>>> 1-3 <<<

Sample Number:	1019 *		1020 Back-Half Rinses*	
Sample Bottle Tare Wt.(g)	~~176.7~~ 262.4		176.7	
Sample Bottle Gross Wt.(g)	~~489.2~~ 470.4			<------------Before Rinses
Rinse Solution:	MethChlrd			

Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C

Sample Bottle Final Wt.(g)			345.0		After Rinses
Net Sample Wt.(g)	226.8		168.3		

FRONT HALF RECOVERY

Sample Number:	1014	1015	1016
Sample Bottle Tare Wt.(g)	170.9	174.8	IN-STK FILTER SF7
Sample Bottle Gross Wt.(g)	183.2	281.3	
Rinse Solution	Acetone	Acetone	

Sample Number:	1017	1019	1018 / #
Sample Bottle Tare Wt.(g)	172.3	262.4	Filter
Rinse Solution:	Acetone		Description and Color:
Components Rinsed****:	probe liner, filter holder front		gry
Sample Bottle Gross Wt.(g)	490.5 w/Acetone		
Net Acetone Sample Wt.(g)	304.8		
Sample Bottle Final Wt.(g)			
Net Sample Wt.(g)			

COMMENTS:

* Included rinse of filter support

RUN # - kilnp1
04-01-1994 10:00:36
LOCATION - kiln
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PM-10

Initial Meter Volume (Cubic Feet)=	327.801
Final Meter Volume (Cubic Feet)=	369.465
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	42.789
Gas Volume (Dry Standard Cubic Feet)=	41.464
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	-0.12
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	37.5
Percent Water=	4.1
Average Meter Temperature (F)=	71
Average Delta H (in H2O)=	0.67
Average Delta P (in H2O)=	0.082
Average Stack Temperature (F)=	380
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.60
Average Square Root of Delta P (in H2O)=	0.2663
% Isokinetic=	106.8
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	90.0
Nozzle Diameter (Inches)=	0.342
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,152
Flow Rate (Actual, Cubic ft/min)=	37,001
Flow rate (Standard, Wet, Cubic ft/min)=	22,636
Flow Rate (Standard, Dry, Cubic ft/min)=	21,711

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0033		
Particulate Loading, Dry Std. (gr/scf)=	0.0012	0.0050	0.0067
Particulate Loading, Actual (gr/cu ft)=	0.0007		
Emission Rate (lb/hr)=	0.23	→ PROBE + FILTER	PM-10

No Back Half Analysis

RUN # - kilnp1 04-01-1994 10:54:07
LOCATION - kiln
DATE - 11-11-93
PROJECT # - 4601.01.05.01

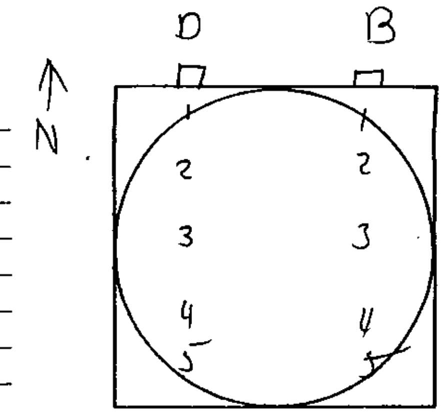
Initial Meter Volume (Cubic Feet)=	327.801		
Final Meter Volume (Cubic Feet)=	369.465		
Meter Factor=	1.027		
Final Leak Rate (cu ft/min)=	0.001		
Net Meter Volume (Cubic Feet)=	42.789		
Gas Volume (Dry Standard Cubic Feet)=	41.464		
Barometric Pressure (in Hg)=	29.13		
Static Pressure (Inches H2O)=	-0.12		
Percent Oxygen=	17.6		
Percent Carbon Dioxide=	2.2		
Moisture Collected (ml)=	37.5		
Percent Water=	4.1		
Average Meter Temperature (F)=	71		
Average Delta H (in H2O)=	0.67		
Average Delta P (in H2O)=	0.082		
Average Stack Temperature (F)=	380		
Dry Molecular Weight=	29.06		
Wet Molecular Weight=	28.60		
Average Square Root of Delta P (in H20)=	0.2663		
% Isokinetic=	106.8		
Pitot Coefficient=	0.84		
Sampling Time (Minutes)=	90.0		
Nozzle Diameter (Inches)=	0.342		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,152		
Flow Rate (Actual, Cubic ft/min)=	37,001		
Flow rate (Standard, Wet, Cubic ft/min)=	22,636		
Flow Rate (Standard, Dry, Cubic ft/min)=	21,711		
Particulate Loading - Front Half			
Particulate Weight (g)=	0.0055	Corr. to 7% O2 & 12% CO2	
Particulate Loading, Dry Std. (gr/scf)=	0.0020	0.0084	0.0111
Particulate Loading, Actual (gr/cu ft)=	0.0012		
Emission Rate (lb/hr)=	0.38	← DOESN'T MEAN ANYTHING HERE	
Particulate Loading - Total Catch Including Impingers			
Particulate Weight (g)=	0.0177		
Particulate Loading, Dry Std. (gr/scf)=	0.0066	0.0270	0.0358
Particulate Loading, Actual (gr/cu ft)=	0.0039		
Emission Rate (lb/hr)=	1.22	PROBE + FILTER + CYCLONE = FILT. PM	
Percent Impinger Catch=	69.0		

FIELD DATA

RUN NO. PM #2
PROJECT NO. 4601
PLANT Belden Brick
DATE 11/1/93
SAMPLING LOCATION Kiln Stack
SAMPLE TYPE PM 10
OPERATOR Edwards
FILTER NO. LF14
RECORD DATA EVERY Var MIN.
UMBILICAL/SAMPLER HOOKUP UH-30

PROBE NO. VL-5
PROBE LENGTH AND TYPE 8 ft Quartz
SAMPLE BOX NO. 012002
METER BOX NO. N-12
TEMP. CONTROLLER NO. N12
TEMP. METER NO. N12
THERMOCOUPLE I.D. NO. 96-7
UMBILICAL CORD I.D. NO. N-125-5
UMBILICAL CORD I.D. NO. —
NOZZLE NO. PM-10

NOZZLE DIA. .380
ASSUMED MOISTURE % 4
METER ΔH @ 1.715
METER CORRECTION 1.027
PITOT NO. 5-8
PITOT COEFFICIENT .8162
BAROMETRIC PRESSURE 29.126
SITE TO BARO. ELEVATION (ft.) —
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1456	1641			
VACUUM, In. Hg	≥15"	≥4"	≥15"		≥15"
CFM	.003	.001			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME
FINAL VOLUME
LEAK CHECK VOLUME
ADJUSTED FINAL VOLUME

COMMENTS

Revision 11/18/88

RUN NO. 2, Pm 10
DATE 11/11/93

SAMPLING LOCATION Kiln Stack
PROJECT NO. 4601

p. 1 of 1
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 373.900 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	1459															
D1	13	1512		380.00	0.010	0.67		168	70	69	2.0	54					
2	25	1524		385.68	0.120	0.67		446	75	70	2.0	56					
3	33	1532		389.40	0.130	0.67		450	78	72	2.0	61					
4	38	1537		391.28	0.040	0.67		445	80	73	2.0	54					
5	41	1540		393.23	0.020	0.67		442	81	74	2.0	53					
		~~1543~~															
~~6~~ X	0	1543		393.23		~~0.67~~											
~~7~~ B1	13	1556		399.48	0.015	0.67		280	79	74	2.0	53					
~~7~~ 2	26	1609		405.52	0.155	0.67		445	83	76	2.0	53					
~~4~~ 3	40	1623		411.23	0.130	0.67		442	83	77	2.0	54					
~~5~~ 4	43	1636		413.80	0.060	0.67		442	84	77	2.0	54					
~~6~~ 5	49	1642		416.323	0.040	0.67		443	85	78	2.0	52					

COMMENTS

METHOD 201A/202

FIELD LABORATORY SETUP DATA Stack

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Kiln Stack - PM10 2

Run No. 2 Sampling Train No. PH-3 Sample Box No. 012002
Set up person(s): J. McC Date 11-11-93
Transfer to Sampler: Sample Box Leak Check: ____cfm @ ____in.Hg vacuum

Relinquished By J. McC Received By ________ Date/Time 11-11-93 1200

TRAIN COMPONENT	COMPONENT NO.		LOADING DATA	
			Initial Weights (grams)**	
			Empty	Loaded
PM-10 Preseparator	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	•	Filter Type:		
Filter Holder Front	F-115	Whatman QM-A		
Filter Holder Back		Filter I.D.No.:		
Short 90° Connector		~~LF13~~ LF14		
1st Impinger (Short-stem Mod-GBS)		~~50~~ 100 mLs	461.8	562.9
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	493.2	593.3
U-Connector (B)		H_2O		
3rd Impinger (Mod-GBS)		Empty		468.3
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating		725.0 ~~742.5~~
Impinger Outlet Connector		silica gel		

• Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Stack

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3

Kiln Stack - PM10 2 Hr.

Run No. 2 Sampling Train No. PH-3 Sample Box No. ______
Transfer for Recovery:

Relinquished By ______ Received By ______ Date/Time ______
Sample box recovery person(s): ______ Date: ______
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	580.1	609.1	474.0	737.6					
Initial Wt.(g)	562.9	593.3	468.3	725.0					
Net Wt.(g)	17.2	15.8	5.7	12.6					

[Total Condensate Collected (g): 51.3]

Description and color:	clear	clear	clear	50'					

	Impingers: >>>>>>>>>>>>> 1-3 <<<		Back Half Rinses		
Sample Number:	2019*		2020		
Sample Bottle Tare Wt.(g)	258.9		262.8		
Sample Bottle Gross Wt.(g)	490.3				<------------Before Rinses
Rinse Solution:	MethChlrd				

Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C

Sample Bottle Final Wt.(g)			416.8		After Rinses
Net Sample Wt.(g)	231.4		~~152~~ 154.0		

FRONT HALF RECOVERY

Sample Number:	2014	2015	016 IN-STK FILTER
Sample Bottle Tare Wt.(g)	171.5	171.2	
Sample Bottle Gross Wt.(g)	241.7	212.7	
Rinse Solution	Acetone	Acetone	

Sample Number:	2017	019	018 / #
Sample Bottle Tare Wt.(g)	262.4		Filter Description and Color:
Rinse Solution:	Acetone		
Components Rinsed****:	probe liner, filter holder front		
Sample Bottle Gross Wt.(g)	~~319.9~~ w/Acetone		
Net Acetone Sample Wt.(g)	322.8		
Sample Bottle Final Wt.(g)			
Net Sample Wt.(g)	~~57.0~~ 60.4		

COMMENTS:

RUN # - kiln2 04-01-1994 10:21:23
LOCATION - kiln
DATE - 11-11-93
PROJECT # - 4601.01.05.01

Initial Meter Volume (Cubic Feet)=	373.900
Final Meter Volume (Cubic Feet)=	416.323
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	43.568
Gas Volume (Dry Standard Cubic Feet)=	41.763
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	-0.12
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	51.3
Percent Water=	5.5
Average Meter Temperature (F)=	77
Average Delta H (in H2O)=	0.67
Average Delta P (in H2O)=	0.072
Average Stack Temperature (F)=	400
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.45
Average Square Root of Delta P (in H2O)=	0.2470
% Isokinetic=	99.0
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	90.0
Nozzle Diameter (Inches)=	0.380
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,054
Flow Rate (Actual, Cubic ft/min)=	33,836
Flow rate (Standard, Wet, Cubic ft/min)=	20,209
Flow Rate (Standard, Dry, Cubic ft/min)=	19,104

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0147		
Particulate Loading, Dry Std. (gr/scf)=	0.0054	0.0223	0.0296
Particulate Loading, Actual (gr/cu ft)=	0.0031		
Emission Rate (lb/hr)=	0.89	PROBE + FILTER	(PM-10)

Particulate Loading - Total Catch Including Impingers

Particulate Weight (g)=	0.0148		
Particulate Loading, Dry Std. (gr/scf)=	0.0055	0.0224	0.0297
Particulate Loading, Actual (gr/cu ft)=	0.0031	← IGNORE	
Emission Rate (lb/hr)=	0.89		
Percent Impinger Catch=	0.6		

RUN # - kiln2 04-01-1994 10:36:08
LOCATION - kiln
DATE - 11-11-93
PROJECT # - 4601.01.05.01

Initial Meter Volume (Cubic Feet)=	373.900
Final Meter Volume (Cubic Feet)=	416.323
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	43.568
Gas Volume (Dry Standard Cubic Feet)=	41.763
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	-0.12
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	51.3
Percent Water=	5.5
Average Meter Temperature (F)=	77
Average Delta H (in H2O)=	0.67
Average Delta P (in H2O)=	0.072
Average Stack Temperature (F)=	400
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.45
Average Square Root of Delta P (in H2O)=	0.2470
% Isokinetic=	99.0
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	90.0
Nozzle Diameter (Inches)=	0.380
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,054
Flow Rate (Actual, Cubic ft/min)=	33,836
Flow rate (Standard, Wet, Cubic ft/min)=	20,209
Flow Rate (Standard, Dry, Cubic ft/min)=	19,104

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% CO2
Particulate Weight (g)=	0.0187		
Particulate Loading, Dry Std. (gr/scf)=	0.0069	0.0284	0.0376
Particulate Loading, Actual (gr/cu ft)=	0.0039		
Emission Rate (lb/hr)=	1.13		

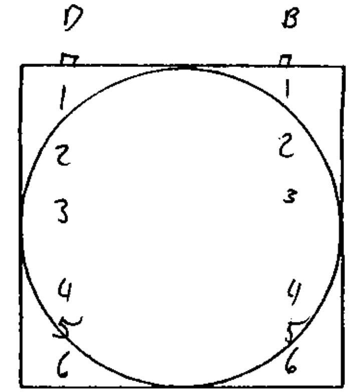
Particulate Loading - Total Catch Including Impingers

Particulate Weight (g)=	0.0188		
Particulate Loading, Dry Std. (gr/scf)=	0.0069	0.0285	0.0378
Particulate Loading, Actual (gr/cu ft)=	0.0039		
Emission Rate (lb/hr)=	1.13		
Percent Impinger Catch=	0.5		

PROBE + FILTER + CYCLONE (FILT PM)

FIELD DATA

RUN NO.	PM #3	PROBE NO.	UL-7	NOZZLE DIA.	0.380
PROJECT NO.	4601	PROBE LENGTH AND TYPE	8ft Quartz	ASSUMED MOISTURE %	—
PLANT	Belden Brick	SAMPLE BOX NO.	011995	METER ΔH @	1.715
DATE	11/11/93	METER BOX NO.	N 12	METER CORRECTION	1.027
SAMPLING LOCATION	Kiln Stack	TEMP. CONTROLLER NO.	N 12	PITOT NO.	P-15
SAMPLE TYPE	PM-10	TEMP. METER NO.	N 12	PITOT COEFFICIENT	.8339
OPERATOR	Edwards	THERMOCOUPLE I.D. NO.	96-4	BAROMETRIC PRESSURE	29.126
FILTER NO.	1	UMBILICAL CORD I.D. NO.	N-125-5	SITE TO BARO. ELEVATION (ft.)	—
RECORD DATA EVERY ___ MIN.	Var	UMBILICAL CORD I.D. NO.	—	CORRECTED B P. (0.1 in./100 ft.)	—
UMBILICAL/SAMPLER HOOKUP	UH-12	NOZZLE NO.	pm 10	STATIC PRESSURE	-0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1700	1850				
PASS/FAIL		Pass.				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1706	1846			
VACUUM, in. Hg	≥15"	≥5"	≥15"		≥15"
CFM	.013	.010			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, in. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME ______

FINAL VOLUME ______

LEAK CHECK VOLUME ______

ADJUSTED FINAL VOLUME ______

COMMENTS

Revision 11/18/86

RUN NO. PM #3
DATE 11/11/93

SAMPLING LOCATION Kiln Stack
PROJECT NO. 4601

p. 1 of
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.) 1707	GAS METER READING (V_m), ft³ INITIAL 417.076 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
B 1	13	1720		423.20	0.020	0.67		231	76	75	2.5	44					
2	25	1732		429.04	0.155	0.67		448	78	75	2.5	46					
3	33	1740		432.86	0.100	0.67		449	82	76	2.5	48					
4	38	1745		435.14	0.060	0.67		446	84	78	2.5	49					
5	41	1748		436.5	0.030	0.67		446	85	79	2.5	49					
		1750															
D 1	13	1803		442.93	0.010	0.67		315	83	78	2.5	49					
D2	26	1816		448.91	0.100	0.67		440	85	79	2.5	50					
D3	40	1830		455.66	0.140	0.67		442	86	80	2.5	50					
D4	43	1833		457.11	0.055	0.67		438	86	80	2.5	50					
D5	49	1839		459.958	0.020	0.67		437	86	81	2.5	49					

COMMENTS

METHOD 201A/202

FIELD LABORATORY SETUP DATA Stack

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Kiln Stack - PM10 3

Run No. 3 Sampling Train No. SV-1 Sample Box No. ______ ______
Set up person(s): J. McC Date 11-11-93
Transfer to Sampler: Sample Box Leak Check: ______cfm @ ______in.Hg vacuum

Relinquished By ______ Received By ______ Date/Time ______ ______

TRAIN COMPONENT	COMPONENT NO.		LOADING DATA	
			Initial Weights (grams)•*	
			Empty	Loaded
PM-10 Preseparator	*			
Probe (Liner-Glass)	•			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back		Filter I.D.No.:		
Short 90° Connector		~~LF14~~ LF15		
1st Impinger (Short-stem Mod-GBS)		50 mLs	469.9	569.3
U-Connector (A)		H_2O		
2nd Impinger (GBS)		100 mLs	472.5	578.5
U-Connector (B)		H_2O		
3rd Impinger (GBS)		Empty		462.1
U-Connector (C)				
4th Impinger (Mod-GBS)		~200 g indicating		679.1
Impinger Outlet Connector		silica gel		

• Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

METHOD 201A/202
FIELD LABORATORY SAMPLE RECOVERY DATA Stack

Kiln Stack - PM103

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3

Run No. 3 Sampling Train No. SV-1 Sample Box No. ______ ______
Transfer for Recovery:

Relinquished By ______ Received By ______ Date/Time ______ ______
Sample box recovery person(s): ______ Date: ______
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	8th-2
Final Wt.(g)	583.9	590.0	465.4	689.1					
Initial Wt.(g)	569.3	578.5	462.1	679.1					
Net Wt.(g)	14.6	11.5	3.3	10.0					

[Total Condensate Collected (g): 39.4]

Description
and color: ______ ______ ______ 157

Impingers: >>>>>>>>>>>>> 1-3 <<<

Sample Number:	3019 *		3020 *>>>> Back Half Rinses		
Sample Bottle Tare Wt.(g)	262.5		262.8		
Sample Bottle Gross Wt.(g)	490.7			<-------------	Before Rinses

Rinse Solution: MethChlrd
Components Rinsed: ** filter support, *** 1th-3th impingers, filter holder back, 45/90° connector U-connectors A-C

Sample Bottle Final Wt.(g)			511.4		After Rinses
Net Sample Wt.(g)	228.2		248.6		

FRONT HALF RECOVERY

Sample Number:	3014	3015	016
Sample Bottle Tare Wt.(g)	175.3	171.5	IN-STK FILTER ______
Sample Bottle Gross Wt.(g)	235.6	~~212.7~~ 216.2	
Rinse Solution	Acetone	Acetone	

Sample Number:	3017	019	018 / #
Sample Bottle Tare Wt.(g)	263.1		Filter Description and Color:
Rinse Solution:	Acetone		
Components Rinsed****:	probe liner, filter holder front		
Sample Bottle Gross Wt.(g)	366.9 w/Acetone		
Net Acetone Sample Wt.(g)			
Sample Bottle Final Wt.(g)			
Net Sample Wt.(g)	103.8		

COMMENTS:

FILE NAME - kilnp3
RUN # - Kilnp3
LOCATION - kiln
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-01-1994 12:40:22

Initial Meter Volume (Cubic Feet)=	417.076
Final Meter Volume (Cubic Feet)=	459.958
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.001
Net Meter Volume (Cubic Feet)=	44.040
Gas Volume (Dry Standard Cubic Feet)=	41.926
Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H20)=	-0.12
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	39.4
Percent Water=	4.2
Average Meter Temperature (F)=	81
Average Delta H (in H20)=	0.67
Average Delta P (in H20)=	0.069
Average Stack Temperature (F)=	409
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H20)=	0.2436
% Isokinetic=	97.4
Pitot Coefficient=	0.84
Sampling Time (Minutes)=	90.0
Nozzle Diameter (Inches)=	0.380
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,072
Flow Rate (Actual, Cubic ft/min)=	34,435
Flow rate (Standard, Wet, Cubic ft/min)=	20,356
Flow Rate (Standard, Dry, Cubic ft/min)=	19,493

Particulate Loading - Front Half

PM-10

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0047		
Particulate Loading, Dry Std. (gr/scf)=	0.0017	0.0071	0.0094
Particulate Loading, Actual (gr/cu ft)=	0.0010		
Emission Rate (lb/hr)=	0.29		

PROBE + FILTER

No Back Half Analysis

from . . .

ROY NEULICHT

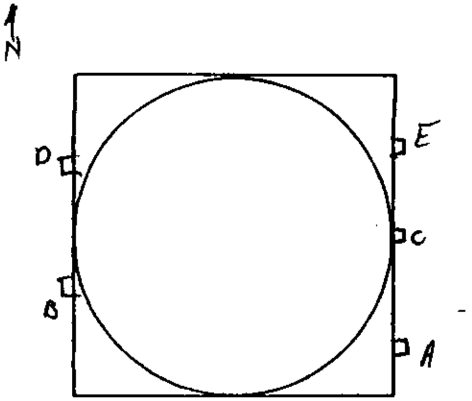
HCL / HF / pm

FIELD DATA

RUN NO. Run 1
PROJECT NO. 4601
PLANT Belden Brick #6
DATE 11/9/93
SAMPLING LOCATION Kiln Stack
SAMPLE TYPE PH-1
OPERATOR Edwards
FILTER NO.
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP U/H-9

PROBE NO. VL-4
PROBE LENGTH AND TYPE 8ft glass
SAMPLE BOX NO. ~~011996~~ 01515
METER BOX NO. N-13
TEMP. CONTROLLER NO. N-13
TEMP. METER NO. N-13
THERMOCOUPLE I.D. NO. 96-2
UMBILICAL CORD I.D. NO. N-R5-4
UMBILICAL CORD I.D. NO. —
NOZZLE NO.

NOZZLE DIA .418
ASSUMED MOISTURE % 10
METER ΔH@ 1.829
METER CORRECTION 1.016
PITOT NO. 5-12
PITOT COEFFICIENT .8159
BAROMETRIC PRESSURE 29.3
SITE TO BARO. ELEVATION (ft.) —
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1302	1925				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1311	1725	1735	1926	
VACUUM, In. Hg	≥15"	≥12	≥15"	≥12	≥15"
CFM	.004	.006	0.005	0.002	
VOLUMES					
FINAL					
INITIAL				286.871	
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 202.080
FINAL VOLUME 286.871
LEAK CHECK VOLUME ~~0.015 ft~~
ADJUSTED FINAL VOLUME 286.~~856 ft~~ 871

COMMENTS

Revision 11/18/88

RUN NO. PH 1
DATE 11/9/93

SAMPLING LOCATION Kiln Stack
PROJECT NO. 4601

p. 1 of
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 202.080 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	1407																
	3.5			203.23	0.035			432	75	74	3.5	51	360	256	360		
A-1	7.0	1439	204.46	204.48	0.065	0.37	0.37	430	75	75	5.0	49	350	257	356		
						~~[illegible]~~											
2	14.0	1444	207.71	207.74	0.13	0.70	0.70	432	75	76	8.0	51	332	256	342		
3	21.0	1451	212.31	212.25	0.16	1.40	1.40	432	79	75	11.0	49	329	255	345		
4	28.0	1458	217.42	217.36	0.115	1.73	1.75	433	83	76	7.5	53	337	254	335		
5	35.0	1505	221.77	221.78	—	1.24	1.25	—	—	—	—	—	—	—	—		
		1517		221.781			0.10										
C-1	7.0	1524	222.19	223.02	0.001	0.01	~~0.01~~	420	79	78	2.0	56	348	255	349		
2	14.0	1531	224.01	224.07	0.020	0.21	0.10	422	80	78	2.2	54	358	255	346		
3	21.0	1538	226.24	226.11	0.030	0.32	0.32	429	81	78	3.0	54	333	253	345		
4	28.0	1545	229.87	229.82	0.080	0.86	0.87	435	82	79	6.0	47	340	257	345		
5	35.0	1552	234.86	234.65	0.150	1.63	1.63	438	86	80	9.5	48	328	253	339		
+		1643		234.663	~~0.005~~	~~0.05~~											
E 1	7.0	1650	235.57	235.58	0.005	0.05	0.05	428	78	77	2.0	52	353	252	361		
2	14.0	1657	237.59	237.48	0.025	0.29	0.27	430	78	77	3.0	47	346	251	363		
3	21.0	1704	240.45	240.36	0.050	0.53	0.53	436	79	77	4.0	45	334	255	358		
4	28.0	1711	244.09	244.05	0.080	0.86	0.86	439	81	78	6.0	48	332	253	355		
5	35.0	1718	249.36	249.228	0.170	1.83	1.80	441	85	79	11.0	44	351	257	346		
		1753		249.228													
B 1	7.0	1800	253.98	524.12	0.130	1.40	1.40	439	81	80	8.0	41	365	252	370		
2	14.0	1807	258.86	258.97	0.145	1.56	1.55	440	82	79	9.0	39	366	258	372		
3	21.0	1814	262.92	263.10	0.100	1.08	1.08	444	86	80	7.0	40	375	259	369		
4	28.0	1821	266.07	266.36	0.060	0.64	0.65	445	88	81	5.0	42	362	256	372		
5	35.0	1828	268.65	268.90	0.040	0.43	0.43	443	88	81	4.0	41	364	256	362		

1→

COMMENTS

1) Due to train problem with other samplers we have shut down
Restart @ 14:31

RUN NO. PH - 1
DATE

SAMPLING LOCATION
PROJECT NO.

p. 2 of
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min (0)	CLOCK TIME (24-hr.) (1840)	GAS METER READING (V_m), ft³ INITIAL 268.906 DESIRED	GAS METER READING ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
D 1	7.0	1847	273.55	273.58	0.130	1.41	1.40	437	83	82	6.5	39	383	252	392		
2	14.0	1854	278.37	278.48	0.140	1.52	1.54	441	86	82	9.0	38	364	253	377		
3	21.0	1903	282.45	282.53	0.100	1.08	1.04	443	88	82	7.0	39	363	254	378		
4	28.0	1910	285.03	285.12	0.040	0.43	0.40	442	89	82	4.0	40	380	259	385		
5	35.0	1917	286.86	286.871	0.02	0.21	0.20	438	87	82	3.0	38	377	256	381		

COMMENTS

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601-01-05-01 RUN NO. N/A

SAMPLE NO. Ambient Check DATE 11/9/93

PLANT SAMPLING LOCATION Belden Brick Testing Trailer

ANALYSIS TIME (24hr-CLOCK) 1935

SAMPLE TYPE (BAG, GRAB) Grab

OPERATOR Edwards

ORSAT LEAK CHECK BEFORE ANALYSIS:

BURETTE -0- CHANGE IN 4 MIN.

PIPETTES -0- CHANGE IN 4 MIN.

ORSAT LEAK CHECK AFTER ANALYSIS:

BURETTE -0- CHANGE IN 4 MIN.

PIPETTES -0- CHANGE IN 4 MIN.

GAS \ RUN	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 0.0 2 0.0 3 0.0	0.0	1 0.0 2 0.0 3 0.0	0.0	1 0.0 2 0.0 3 0.0	0.0	0.0
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 20.8 2 20.8 3 20.8	20.8	1 20.8 2 20.8 3 20.8	20.8	1 20.8 2 20.8 3 20.8	20.8	20.8

01-19 SEV SURMAN 092191

Acceptance Criteria

CO_2 >4% .3% by Volume
≤4% .2% by Volume

O_2 ≥15% .2% by Volume
<15% .3% by Volume

Comments:

Sample consists of ambient air sucked within the testing trailer as a Quality check of the Hays Republic ORSAT device.

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601-01-05-01 RUN NO. PH-1
SAMPLE NO. ______ DATE 11/9/93
PLANT SAMPLING LOCATION Kiln Stack
ANALYSIS TIME (24hr-CLOCK) 2025
SAMPLE TYPE (BAG, GRAB) Bag
OPERATOR Edwards

ORSAT LEAK CHECK BEFORE ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.
ORSAT LEAK CHECK AFTER ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.

GAS \ RUN	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 ~~1.4~~ 1.0 2 1.0 3 1.0	1.0	1 1.0 2 1.0 3 1.0	1.0	1 1.2 2 1.2 3 1.2	1.2	1.1
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 18.8 2 19.0 3 19.0	17.9	1 19.0 2 19.0 3 19.0	18.0	1 18.8 2 18.8 3 18.8	17.6	17.8

91-16 SEV SURMAN wksht 052191

Acceptance Criteria

CO_2	> 4%	.3% by Volume	O_2	≥ 15%	.2% by Volume
	≤ 4%	.2% by Volume		< 15%	.3% by Volume

Comments:

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2 , AND HF TRAIN (MM5PH)

FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 1 Sampling Train No. PH-1 Sample Box No. 010515
Set up person(s): J. McC Date 11-8-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By J. McC Received By J. Sur Date/Time 11-9-93 7:30

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
Sampling Nozzle (Quartz)	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front	—	Whatman QM-A		
Filter Holder Back	—	Filter I.D.No.:		
Short 90° Connector		/		
1st Impinger (Short-stem Mod-GBS)	I-221	50 mLs	482.5	529.5
U-Connector (A)		0.1 N H_2SO_4		
2nd Impinger (GBS)		100 mLs	477.9	576.0
U-Connector (B)		0.1 N H_2SO_4		
3rd Impinger (GBS)		100 mLs	471.7	570.2
U-Connector (C)		0.1 N H_2SO_4		
4th Impinger (Mod-GBS)		Empty	466.6	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs	451.7	552.2
U-Connector (E)		0.1 N NaOH		
6th Impinger (Mod-GBS)		100 mLs	486.8	586.4
U-Connector (F)		0.1 N NaOH		
7th Impinger (Mod-GBS)		~200 g indicating		762.4
Impinger Outlet Connector		silica gel		

- Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2, AND HF TRAIN (MM5PH)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 1 Sampling Train No. PH-1 Sample Box No. 011515

TRAIN PURGE WITH ASCARITE-FILTERED AIR

Condensation in front-half? No Purged By ______
Date/Start Time ______ ______ Stop Time ______ Purge Rate: (delta H = ______)
Transfer for Recovery: Moisture Removed? ______

Relinquished By ______ Received By J. McC Date/Time 11-9-93 2000
Sample box recovery person(s): J. McC Date 11-9-93
Probe recovery person(s): Mark Whitmire Date 11-9-93

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th
Final Wt. (g)	558.8	601.9	577.5	468.2	551.9	587.8	777.4
Initial Wt. (g)	529.5	576.0	570.2	466.6	552.2	586.4	762.4
Net Wt. (g)	29.3	25.9	7.3	1.6	(0.3)	1.4	15.0

[Total Condensate Collected (g): 80.8]

Description and color:	clear	clear	clear	clear	clear	clear	90
Impingers:	>>>>>>>>>>>>>	1-3	<<<<<<<<	>>>>>>>	4-6	<<<<<<<<<<<<<<<	% Blue

	1-3		4-6		
Sample Number:	1024		1026		
Sample Bottle Tare Wt. (g)	259.9		262.2		
Sample Bottle Gross Wt. (g)	558.5		458.8		Before Rinses
Components Rinsed*:	filter support, filter holder back, short 90° connector, 1st-3rd impingers, U-connectors A-C		4th-6th impingers, U-connectors D-F		
Sample Bottle Gross Wt. (g)	627.3		524.7		After Rinses
Net Sample Wt. (g)	367.4		262.5		For HCl, Cl_2, and HF Computations
Sample Mixed, Then:					
Aliquot Sample Number:	>>>>>>>>>>>	1025	>>>>>>>>>>>	1027	For Chloride
Sample Bottle Tare Wt. (g)		99.1		99.2	
Sample Bottle Final Wt. (g)	524.2	202.1	419.6	204.5	After Aliquots
Net Sample Wt. (g)	264.3	103.0	157.4	105.3	

FRONT HALF RECOVERY

Sample Number: 1022 — 1023
Sample Bottle Tare Wt. (g) 173.2 — Filter
Components Rinsed**: nozzle, probe liner, bypass, filter holder front — Description and Color: dirty white
Sample Bottle Gross Wt. (g) 368.6 w/Acetone Rinses
Net Acetone Sample Wt. (g) 195.4
Sample Bottle Final Wt. (g) ______ w/~~added Water Rinses~~
Net Water Sample Wt. (g) ______

* ASTM Type I water rinses (2X). Thoroughly mix sample and rinses before aliquoting.
** Acetone rinses with brushing (3X or more) until clean. If any residue remains, follow with ASTM Type I water rinses with brushing.

COMMENTS:

FILE NAME - phcl1
RUN # - M5PCLKN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:50:43

Initial Meter Volume (Cubic Feet)=	202.080		
Final Meter Volume (Cubic Feet)=	286.871		
Meter Factor=	1.016		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Feet)=	86.148		
Gas Volume (Dry Standard Cubic Feet)=	82.567		
Barometric Pressure (in Hg)=	29.30		
Static Pressure (Inches H20)=	-0.12		
Percent Oxygen=	17.8		
Percent Carbon Dioxide=	1.1		
Moisture Collected (ml)=	80.8		
Percent Water=	4.4		
Average Meter Temperature (F)=	80		
Average Delta H (in H20)=	0.87		
Average Delta P (in H20)=	0.081		
Average Stack Temperature (F)=	436		
Dry Molecular Weight=	28.89		
Wet Molecular Weight=	28.41		
Average Square Root of Delta P (in H20)=	0.2640		
% Isokinetic=	78.3		
Pitot Coefficient=	0.82		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (Inches)=	0.418		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,146		
Flow Rate (Actual, Cubic ft/min)=	36,805		
Flow rate (Standard, Wet, Cubic ft/min)=	21,243		
Flow Rate (Standard, Dry, Cubic ft/min)=	20,307		

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0496		
Particulate Loading, Dry Std. (gr/scf)=	0.0092	0.0405	0.1009
Particulate Loading, Actual (gr/cu ft)=	0.0051		
Emission Rate (lb/hr)=	1.61		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - phcl1
RUN # - M5PCLKN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:50:44

Initial Meter Volume (Cubic Meters)=	5.722	
Final Meter Volume (Cubic Meters)=	8.123	
Meter Factor=	1.016	
Multiple leak checks, see end of printout		Leak Correction= 0.0000
Net Meter Volume (Cubic Meters)=	2.439	
Gas Volume (Dry Standard Cubic Meters)=	2.338	
Barometric Pressure (mm Hg)=	744	
Static Pressure (mm H2O)=	-3	
Percent Oxygen=	17.8	
Percent Carbon Dioxide=	1.1	
Moisture Collected (ml)=	80.8	
Percent Water=	4.4	
Average Meter Temperature (C)=	27	
Average Delta H (mm H2O)=	22.0	
Average Delta P (mm H2O)=	2.1	
Average Stack Temperature (C)=	224	
Dry Molecular Weight=	28.89	
Wet Molecular Weight=	28.41	
Average Square Root of Delta P (mm H2O)=	1.3306	
% Isokinetic=	78.3	
Pitot Coefficient=	0.82	
Sampling Time (Minutes)=	175.0	
Nozzle Diameter (mm)=	10.62	
Stack Axis #1 (Meters)=	1.727	
Stack Axis #2 (Meters)=	1.727	
Rectangular Stack		
Stack Area (Square Meters)=	2.983	
Stack Velocity (Actual, m/min)=	349	
Flow rate (Actual, Cubic m/min)=	1,042	
Flow rate (Standard, Wet, Cubic m/min)=	602	
Flow rate (Standard, Dry, Cubic m/min)=	575	

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0496		
Particulate Loading, Dry Std. (mg/cu m)=	21.2	92.8	231.3
Particulate Loading, Actual (mg/cu m)=	11.7		
Emission Rate (kg/hr)=	0.73		

No Back Half Analysis

FILE NAME - phcl1
RUN # - M5PCLKN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:50:45

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.035	0.37	432	75	74
2	0.065	0.70	430	75	75
3	0.130	1.40	432	75	76
4	0.160	1.73	432	79	75
5	0.115	1.25	433	83	76
6	0.001	0.10	420	79	78
7	0.020	0.10	422	80	78
8	0.030	0.32	429	81	78
9	0.080	0.87	435	82	79
10	0.150	1.63	438	86	80
11	0.005	0.05	428	78	77
12	0.025	0.27	430	78	77
13	0.050	0.53	436	79	77
14	0.080	0.86	439	81	78
15	0.170	1.80	441	85	79
16	0.130	1.40	439	81	80
17	0.145	1.55	440	82	79
18	0.100	1.08	444	86	80
19	0.060	0.65	445	88	81
20	0.040	0.43	443	88	81
21	0.130	1.40	437	83	82
22	0.140	1.54	441	86	82
23	0.100	1.04	443	88	82
24	0.040	0.40	442	89	82
25	0.020	0.20	438	87	82

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.0962	1.0916	0.0002	0.0044

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	91.8015	91.7563	230.0	0.0452
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0001
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

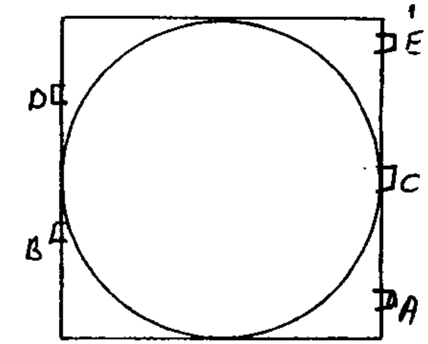
Lk Rate (cfm)	Time (min)
0.0060	35.0000
0.0050	35.0000
0.0020	105.0000

FIELD DATA

RUN NO. 2
PROJECT NO. 4601-01-05-01
PLANT Beldon Brick
DATE 11/10/93
SAMPLING LOCATION Kiln Stack
SAMPLE TYPE PH
OPERATOR Edwards
FILTER NO.
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP UH 9

PROBE NO. UC-4
PROBE LENGTH AND TYPE Quartz / 8'
SAMPLE BOX NO. 011515
METER BOX NO. N13
TEMP. CONTROLLER NO. N13
TEMP. METER NO. N13
THERMOCOUPLE I.D. NO. 96-2
UMBILICAL CORD I.D. NO. N1254
UMBILICAL CORD I.D. NO. —
NOZZLE NO. PHCl-1

NOZZLE DIA. .417
ASSUMED MOISTURE % 4.4
METER ΔH@ 1.829
METER CORRECTION 1.016
PITOT NO. S-12
PITOT COEFFICIENT .8159
BAROMETRIC PRESSURE 29.26
SITE TO BARO. ELEVATION (ft.) —
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	0842	1215				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	0838	1210		1408	
VACUUM, In. Hg	≥15"	≥19	≥15"	≥15"	≥15"
CFM	.008	.007		.010	
VOLUMES					
FINAL		~~347.866~~ H			
INITIAL		~~287.300~~			
DIFFERENCE		~~60.566~~ ~~0.434~~			

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 287.300
FINAL VOLUME 394.783
LEAK CHECK VOLUME ~~0.434~~ H
ADJUSTED FINAL VOLUME 394. ~~349~~ H 783

COMMENTS SU 97.0 PH 80.8

Revision 11/18/86

RUN NO. 2
DATE 11/10/93

SAMPLING LOCATION Kiln Stack
PROJECT NO. 4601

p. 1 of
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	0942	INITIAL 287.300														
E1	7	0949	289.33	289.50	0.015	0.27	0.28	390	76	75	3.0	43	317	252	383		
E2	14	0956	291.96	292.10	0.025	0.45	0.43	390	76	75	4.0	42	353	257	359		
E3	21	1003	296.15	296.13	0.065	1.15	1.10	410	77	75	7.0	42	349	259	357		
E4	28	1010	301.30	301.15	0.100	1.73	1.70	433	81	76	10.0	44	321	256	340		
E5	35	1017	306.45	306.245	0.100	1.73	1.75	439	81	76	10.0	46	331	260	335		
		1026															
A1	7	1033	309.05	309.00	0.025	0.44	0.44	420	81	78	4.0	53	322	251	331		
A2	14	1040	312.89	312.85	0.055	0.96	0.98	429	82	~~78~~ 79	6.5	50	314	255	330		
A3	21	1047	318.79	318.52	0.130	2.26	2.26	437	85	79	14.0	48	322	258	321		
A4	28	1054	325.46	325.24	0.165	2.88	2.90	437	89	80	19.0	50	310	253	311		
A4	35	1101	331.15	331.166	0.120	2.09	2.10	440	89	81	14.0	55	298	258	331		
		1128															
C1	7	1135	333.16	333.16	0.015	0.26	0.26	422	80	79	3.0	59	353	252	345		
C2	14	1142	335.48	335.52	0.020	0.35	0.35	422	79	78	3.0	55	324	254	322		
C3	21	1149	338.31	338.36	0.030	0.52	0.52	431	80	79	4.0	56	300	264	312		
C4	28	1156	341.97	342.01	0.050	0.87	0.87	433	83	79	6.0	55	312	255	320		
C5	35	1203	347.99	347.866	0.135	2.35	2.35	436	86	80	15.0	55	302	254	307		
		1236		348.300													
D1	7	1243	353.85	353.81	0.115	2.00	2.00	430	80	80	12	50	301	253	308		
D2	14	1250	359.26	359.18	0.110	1.90	1.90	439	83	80	11.5	49	346	259	323		
D3	21	1257	365.88	365.80	0.080	1.38	1.40	445	87	80	7.5	52	322	260	318		
D4	28	1304	367.17	367.22	0.040	0.69	0.69	440	89	81	5.0	53	321	254	318		
D5	35	1311	370.02	370.088	0.030	0.52	0.52	439	89	82	4.0	53	322	258	319		
		1322															
B1	7	1329	375.80	375.84	0.125	2.16	2.16	443	85	83	14.0	51	335	255	350		
B2	14	1336	381.73	381.75	0.130	2.26	2.25	442	88	84	15.0	51	325	252	328		
B3	21	1343	386.81	386.81	0.095	1.66	1.65	443	92	84	10.0	57	320	254	326		
B4	28	1350	391.34	391.40	0.075	1.31	1.31	442	94	85	8.0	57	327	257	332		
COMMENTS																	
B5	35	1357	394.66	394.783	0.040	0.70	0.70	439	95	86	5.0	57	316	253	335		

Revision 9-4-88

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601 RUN NO. PH 2
SAMPLE NO. DATE 11/10/93
PLANT SAMPLING LOCATION Kiln Stack
ANALYSIS TIME (24hr-CLOCK) 2043
SAMPLE TYPE (BAG, GRAB) BAG
OPERATOR Edwards

ORSAT LEAK CHECK BEFORE ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.
ORSAT LEAK CHECK AFTER ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 1.8 2 1.8 3 1.8	1.8	1 1.8 2 1.8 3 1.8	1.8	1 1.8 2 1.8 3 1.8	1.8	1.8
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 19.6 2 19.8 3 19.8	17.9/	1 19.8 2 19.8 3 19.8	18.0	1 19.8 2 19.8 3 19.8	18.0	18.8

91-16 SEV SURMAN wksht 052191

Acceptance Criteria

CO_2	> 4%	.3% by Volume	O_2	≥ 15%	.2% by Volume
	≤ 4%	.2% by Volume		< 15%	.3% by Volume

Comments:

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2 , AND HF TRAIN (MM5PH)

FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 2 Sampling Train No. PH-1 Sample Box No. 01515
Set up person(s): J. McC Date 11-9-93
Transfer to Sampler: Sample Box Leak Check: ____ cfm @ ____ in.Hg vacuum

Relinquished By J. McC Received By ____ Date/Time 11-10-93 715

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
Sampling Nozzle (Quartz)	•			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front	—	Whatman QM-A		
Filter Holder Back	—	Filter I.D.No.:		
Short 90° Connector		10		
1st Impinger				
(Short-stem Mod-GBS)	I-221	50 mLs	482.5	534.9
U-Connector (A)		0.1 N H_2SO_4		
2nd Impinger (GBS)		100 mLs	477.9	577.6
U-Connector (B)		0.1 N H_2SO_4		
3rd Impinger (GBS)		100 mLs	471.7	571.0
U-Connector (C)		0.1 N H_2SO_4		
4th Impinger (Mod-GBS)		Empty	466.6	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs	451.7	550.0
U-Connector (E)		0.1 N NaOH		
6th Impinger (Mod-GBS)		100 mLs	486.8	589.1
U-Connector (F)		0.1 N NaOH		
7th Impinger (Mod-GBS)		~200 g indicating		777.5
Impinger Outlet Connector	UH-9	silica gel		

* *Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.*

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2, AND HF TRAIN (MM5PH)

FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 2 Sampling Train No. PH-1 Sample Box No. 011515

TRAIN PURGE WITH ASCARITE-FILTERED AIR

Condensation in front-half? ______ Purged By ______
Date/Start Time ______ ______ Stop Time ______ Purge Rate: (delta H = ______)
Transfer for Recovery: Moisture Removed? ______

Relinquished By ______ Received By J. M. C. Date/Time 11-10-93 1500
Sample box recovery person(s): J. M. C. / J. S. Date 11-10-93
Probe recovery person(s): ______ Date ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th
Final Wt. (g)	577.3	606.9	581.1	470.4	550.3	591.3	795.3
Initial Wt. (g)	534.9	577.6	571.0	466.6	550.0	589.1	777.5
Net Wt. (g)	42.4	29.3	10.1	3.8 ~~4.4~~	.3	2.2	17.8

[Total Condensate Collected (g): ~~106.5~~ 105.9]

Description and color: clear clear clear clear clear clear 20 % Blue

Impingers:	>>>>>>>>>>>>> 1-3 <<<<<<<<		>>>>>>> 4-6 <<<<<<<<<<<<<<		
Sample Number:	2024		2026		
Sample Bottle Tare Wt. (g)	262.5		260.7		
Sample Bottle Gross Wt. (g)	586.6		462.6*		Before Rinses
Components Rinsed*:	filter support, filter holder back, short 90° connector, 1st-3rd impingers, U-connectors A-C		4th-6th impingers, U-connectors D-F		
Sample Bottle Gross Wt. (g)	643.5		521.0		After Rinses
Net Sample Wt. (g)	381.0		260.3		For HCl, Cl_2, and HF Computations
Sample Mixed, Then:					
Aliquot Sample Number:	>>>>>>>>>>>	2025	>>>>>>>>>>>	2027	For Chloride
Sample Bottle Tare Wt. (g)		99.0		99.6	
Sample Bottle Final Wt. (g)	530.6	211.3	417.8	202.9	After Aliquots
Net Sample Wt. (g)	268.1	112.3	157.1	103.3	

FRONT HALF RECOVERY

Sample Number: 2022 — 2023
Sample Bottle Tare Wt. (g) 173.2 — Filter
Components Rinsed**: nozzle, probe liner, bypass, filter holder front — Description and Color:
Sample Bottle Gross Wt. (g) 298.8 w/Acetone Rinses — dirty white
Net Acetone Sample Wt. (g) ______
Sample Bottle Final Wt. (g) ______ w/added Water Rinses
Net Water Sample Wt. (g) 125.6

* ASTM Type I water rinses (2X). Thoroughly mix sample and rinses before aliquoting.
** Acetone rinses with brushing (3X or more) until clean. If any residue remains, follow with ASTM Type I water rinses with brushing.

COMMENTS:
* calculated from impinger weights (3.8 + 98.6 + 104.5 + 260.7) − 5.0 = 462.6

FILE NAME - phcl2
RUN # - M5HCLKN2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:11:07

Initial Meter Volume (Cubic Feet)=	287.300		
Final Meter Volume (Cubic Feet)=	394.783		
Meter Factor=	1.016		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Feet)=	109.203		
Gas Volume (Dry Standard Cubic Feet)=	104.337		
Barometric Pressure (in Hg)=	29.26		
Static Pressure (Inches H20)=	-0.12		
Percent Oxygen=	18.8		
Percent Carbon Dioxide=	1.8		
Moisture Collected (ml)=	105.9		
Percent Water=	4.6		
Average Meter Temperature (F)=	82		
Average Delta H (in H20)=	1.31		
Average Delta P (in H20)=	0.076		
Average Stack Temperature (F)=	431		
Dry Molecular Weight=	29.04		
Wet Molecular Weight=	28.54		
Average Square Root of Delta P (in H20)=	0.2610		
% Isokinetic=	100.8		
Pitot Coefficient=	0.82		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (Inches)=	0.417		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,128		
Flow Rate (Actual, Cubic ft/min)=	36,230		
Flow rate (Standard, Wet, Cubic ft/min)=	20,994		
Flow Rate (Standard, Dry, Cubic ft/min)=	20,036		

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0473		
Particulate Loading, Dry Std. (gr/scf)=	0.0070	0.0444	0.0465
Particulate Loading, Actual (gr/cu ft)=	0.0039		
Emission Rate (lb/hr)=	1.20		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - phcl2
RUN # - M5HCLKN2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:11:09

Initial Meter Volume (Cubic Meters)=	8.135		
Final Meter Volume (Cubic Meters)=	11.179		
Meter Factor=	1.016		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Meters)=	3.092		
Gas Volume (Dry Standard Cubic Meters)=	2.954		
Barometric Pressure (mm Hg)=	743		
Static Pressure (mm H20)=	-3		
Percent Oxygen=	18.8		
Percent Carbon Dioxide=	1.8		
Moisture Collected (ml)=	105.9		
Percent Water=	4.6		
Average Meter Temperature (C)=	28		
Average Delta H (mm H20)=	33.4		
Average Delta P (mm H20)=	1.9		
Average Stack Temperature (C)=	222		
Dry Molecular Weight=	29.04		
Wet Molecular Weight=	28.54		
Average Square Root of Delta P (mm H20)=	1.3154		
% Isokinetic=	100.8		
Pitot Coefficient=	0.82		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (mm)=	10.59		
Stack Axis #1 (Meters)=	1.727		
Stack Axis #2 (Meters)=	1.727		
Rectangular Stack			
Stack Area (Square Meters)=	2.983		
Stack Velocity (Actual, m/min)=	344		
Flow rate (Actual, Cubic m/min)=	1,026		
Flow rate (Standard, Wet, Cubic m/min)=	594		
Flow rate (Standard, Dry, Cubic m/min)=	567		

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% C02
Particulate Weight (g)=	0.0473		
Particulate Loading, Dry Std. (mg/cu m)=	16.0	101.9	106.7
Particulate Loading, Actual (mg/cu m)=	8.8		
Emission Rate (kg/hr)=	0.54		

No Back Half Analysis

FILE NAME - phcl2
RUN # - M5HCLKN2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:11:10

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.015	0.28	390	76	75
2	0.025	0.43	390	76	75
3	0.065	1.10	410	77	75
4	0.100	1.70	433	81	76
5	0.100	1.75	439	81	76
6	0.025	0.44	420	81	78
7	0.055	0.98	429	82	78
8	0.130	2.26	437	85	79
9	0.165	2.90	437	89	80
10	0.120	2.10	440	89	81
11	0.015	0.26	422	80	79
12	0.020	0.35	422	79	78
13	0.030	0.52	431	80	79
14	0.050	0.87	433	83	79
15	0.135	2.35	436	86	80
16	0.115	2.00	430	80	80
17	0.110	1.90	439	83	80
18	0.080	1.40	445	87	80
19	0.040	0.69	440	89	81
20	0.030	0.52	439	89	82
21	0.125	2.16	443	85	83
22	0.130	2.25	442	88	84
23	0.095	1.65	443	92	84
24	0.075	1.31	442	94	85
25	0.040	0.70	439	95	86

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.1240	1.1171	0.0002	0.0067

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	88.5456	88.5050	177.0	0.0406
IMPINGERS	0.0000	0.0000	0.0	0.0000

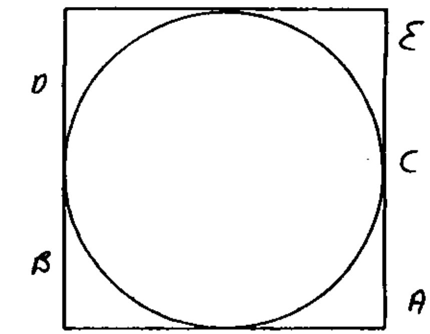
Probe Rinse Blank (mg/ml)= 0.0001
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

Lk Rate (cfm)	Time (min)
0.0070	70.0000
0.0100	105.0000

FIELD DATA

RUN NO.	3	PROBE NO.	VL-4	NOZZLE DIA.	.417
PROJECT NO.	4601	PROBE LENGTH AND TYPE	8ft Quartz	ASSUMED MOISTURE %	4.4
PLANT	Belden Brick	SAMPLE BOX NO.	012003	METER ΔH@	1.829
DATE	11/10/93	METER BOX NO.	N-13	METER CORRECTION	1.016
SAMPLING LOCATION	Brick Kiln Stack	TEMP. CONTROLLER NO.	N-13	PITOT NO.	5-12
SAMPLE TYPE	PH-3	TEMP. METER NO.	N-13	PITOT COEFFICIENT	.8159
OPERATOR	Edwards	THERMOCOUPLE I.D. NO.	96-2	BAROMETRIC PRESSURE	29.26
FILTER NO.		UMBILICAL CORD I.D. NO.	N-125-4	SITE TO BARO. ELEVATION (ft.)	
RECORD DATA EVERY	7 MIN.	UMBILICAL CORD I.D. NO.		CORRECTED B.P. (0.1 in./100 ft.)	
UMBILICAL/SAMPLER HOOKUP	UH-33	NOZZLE NO.	PHCL-1	STATIC PRESSURE	-0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3''\ H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1538	1955				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3''\ H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1534	1955			
VACUUM, In. Hg	≥15"	12	≥15"		≥15"
CFM	.005	.006			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 395.400

FINAL VOLUME 499.517

LEAK CHECK VOLUME - 0 -

ADJUSTED FINAL VOLUME 495.517

COMMENTS

RUN NO. PH-3
DATE 11/10/93

SAMPLING LOCATION Kiln Stack
PROJECT NO. 4601

p. 1 of ____
OPERATOR Edwards

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 395.400 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	1553															
B 1	7	1600	401.13	401.08	0.125	2.14	2.14	442	78	78	9.0	47	314	259	331		
B 2	14	1609	406.98	406.98	0.130	2.23	2.25	443	81	78	10.0	49	313	258	330		
B 3	21	1618 ~~1614~~	412.40	412.96	~~0.140~~	1.90	2.00	444	88	79	10.0	48	320	256	326		
B 4	28	1625 ~~1621~~	416.24	416.80	0.055	0.95	0.90	439	86	81	6.0	53	320	254	342		
B 5	35	1632 ~~1628~~	419.52	420.090	0.040	0.69	0.65	439	87	81	5.0	53	323	254	346		
	0	1639															
D 1	7	1646 ~~1634~~	424.97	425.11	0.110	1.92	1.90	433	84	81	8.0	48	333	259	358		
D 2	14	1653 ~~1646~~	430.66	430.60	0.120	2.09	2.05	441	89	82	9.0	49	325	257	343		
D 3	21	~~16~~ 1700	435.61	435.59	0.090	1.57	1.57	440	93	83	7.0	47	321	255	343		
D 4	28	1707	438.91	438.97	0.040	0.70	0.70	442	94	84	5.0	46	318	254	347		
D 5	35	1714	441.77	441.778	0.030	0.52	0.50	441	92	84	4.0	46	327	253	359		
		1737		441.900													
C 1	7	1744	443.55	443.51	0.010	0.17	0.17	433	86	85	3.0	48	324	258	347		
C 2	14	1751	445.20	445.18	0.010	0.17	0.18	436	86	85	3.0	46	319	257	353		
C 3	21	1758	447.52	447.54	0.020	0.34	0.35	441	87	85	4.0	45	325	255	361		
C 4	28	1805	451.55	451.28	0.06	1.04	1.05	446	89	86	8.0	43	330	257	358		
C 5	35	1812	457.50	456.310	0.130	2.26	2.26	448	93	87	11.0	44	329	256	351		
		1829															
A 1	7	1836	460.11	459.52	0.025	0.43	0.43	439	88	87	4.0	39	327	253	362		
A 2	14	1843	464.48	464.40	0.070	1.23	1.23	437	89	87	7.0	39	328	259	363		
A 3	21	1850	469.97	469.98	0.110	1.93	1.95	443	93	88	9.0	41	324	260	357		
A 4	28	1857	476.41	476.47	0.150	2.64	2.65	442	94	87	11.5	43	314	256	348		
A 5	35	1904	480.82	481.415	0.070	1.23	1.25	442	99	89	6.0	43	318	260	344		
		1912															
E 1	7	1919 ~~1912~~	482.48	482.95	0.010	0.17	0.15	439	91	88	3.0	40	321	253	354		
2	14	1926	485.38	485.39	0.030	0.54	0.54	416	90	88	4.0	39	319	253	356		
3	21	1933	489.09	489.10	0.050	0.88	0.88	439	91	88	5.5	39	323	256	359		
4	28	1940	494.32	494.23	0.100	1.75	1.75	441	91	88	8.0	40	325	260	358		

A →

COMMENTS A) - SHUTdown at 1609, Restart 1613

~~Δp = 0.55 At B3~~
Δp = 0.110 AT B5

E 5	35	1947	499.58	499.517	0.100	1.76	1.77	444	99	88	8.0	42	318	259	349

Revision 9-4-86

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2 , AND HF TRAIN (MM5PH)

FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 3 Sampling Train No. PH-2 Sample Box No. 012003
Set up person(s): J. McC / J. S. Date 11-10-93
Transfer to Sampler: Sample Box Leak Check: ____ cfm @ ____ in.Hg vacuum

Relinquished By J McC Received By ____ Date/Time 11-10-93 1400

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)** Empty	Loaded
Sampling Nozzle (Quartz)	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
90° Bypass	*	Filter Type:		
Filter Holder Front	—	Whatman QM-A		
Filter Holder Back	—	Filter I.D.No.:		
Short 90° Connector		LF9		
1st Impinger (Short-stem Mod-GBS)		50 mLs	488.0	538.0
U-Connector (A)		0.1 N H_2SO_4		
2nd Impinger (GBS)		100 mLs	472.2	572.2
U-Connector (B)		0.1 N H_2SO_4		
3rd Impinger (GBS)		100 mLs	477.6	577.4
U-Connector (C)		0.1 N H_2SO_4		
4th Impinger (Mod-GBS)		Empty	470.1	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs	457.6	558.6
U-Connector (E)		0.1 N NaOH		
6th Impinger (Mod-GBS)		100 mLs	477.7	578.4
U-Connector (F)		0.1 N NaOH		
7th Impinger (Mod-GBS)		~200 g indicating		742.3
Impinger Outlet Connector		silica gel		

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil before and after sampling.

** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/26A/0050 - PARTICULATES, HCl, Cl_2 , AND HF TRAIN (MM5PH)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 3   Sampling Train No. PH-2   Sample Box No. 012003

TRAIN PURGE WITH ASCARITE-FILTERED AIR

Condensation in front-half? ______ Purged By ______
Date/Start Time ______ ______ Stop Time ______ Purge Rate: (delta H = ______)
Transfer for Recovery: Moisture Removed? ______

Relinquished By ______ Received By J. M. C. Date/Time 11-10-93 2030
Sample box recovery person(s): J. M. C. Date 11-11-93
Probe recovery person(s): ______ Date ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th
Final Wt. (g)	545.9	617.9	597.1	475.6	559.9	581.3	762.0
Initial Wt. (g)	538.0	572.2	577.4	470.1	558.6	578.4	742.3
Net Wt. (g)	7.9	45.7	19.7	5.5	1.3	2.9	19.7

[Total Condensate Collected (g): 102.7]

Description and color: ______ ______ ______ ______ ______ ______ 50 % Blue

Impingers:	>>>>>>>>>>>>> 1-3 <<<<<<<<		>>>>>>> 4-6 <<<<<<<<<<<<<<<	
Sample Number:	3024		3026	
Sample Bottle Tare Wt. (g)	262.2		261.9	
Sample Bottle Gross Wt. (g)	576.6		465.9	Before Rinses

Components Rinsed*: filter support, filter holder back, short 90° connector, 1st-3rd impingers, U-connectors A-C — 4th-6th impingers, U-connectors D-F

	1-3		4-6		
Sample Bottle Gross Wt. (g)	675.0		549.7		After Rinses
Net Sample Wt. (g)	412.8		287.8		For HCl, Cl_2 , and HF Computations
Sample Mixed, Then: Aliquot Sample Number:	>>>>>>>>>>>	3025	>>>>>>>>>>>	3027	For Chloride
Sample Bottle Tare Wt. (g)		99.6		99.0	
Sample Bottle Final Wt. (g)	549.9	215.0	435.9	~~244~~ 212.8	After Aliquots
Net Sample Wt. (g)	287.7	115.4	174.0	113.8	

FRONT HALF RECOVERY

Sample Number: 3022 — 3023
Sample Bottle Tare Wt. (g) 173.0 — Filter
Components Rinsed**: nozzle, probe liner, bypass, filter holder front — Description and Color: light beige
Sample Bottle Gross Wt. (g) 310.9 w/Acetone Rinses
Net Acetone Sample Wt. (g) ______
Sample Bottle Final Wt. (g) ______ w/added Water Rinses
Net Water Sample Wt. (g) 137.9

* ASTM Type I water rinses (2X). Thoroughly mix sample and rinses before aliquoting.
** Acetone rinses with brushing (3X or more) until clean. If any residue remains, follow with ASTM Type I water rinses with brushing.
COMMENTS:

FILE NAME - PHCL3
RUN # - M5HCLKN3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:49:59

Initial Meter Volume (Cubic Feet)=	395.400
Final Meter Volume (Cubic Feet)=	499.517
Meter Factor=	1.016
Final Leak Rate (cu ft/min)=	0.006
Net Meter Volume (Cubic Feet)=	105.783
Gas Volume (Dry Standard Cubic Feet)=	100.101
Barometric Pressure (in Hg)=	29.26
Static Pressure (Inches H2O)=	-0.12
Percent Oxygen=	18.0
Percent Carbon Dioxide=	2.0
Moisture Collected (ml)=	105.1
Percent Water=	4.7
Average Meter Temperature (F)=	87
Average Delta H (in H2O)=	1.25
Average Delta P (in H2O)=	0.072
Average Stack Temperature (F)=	440
Dry Molecular Weight=	29.04
Wet Molecular Weight=	28.52
Average Square Root of Delta P (in H2O)=	0.2526
% Isokinetic=	100.5
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	175.0
Nozzle Diameter (Inches)=	0.417
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,097
Flow Rate (Actual, Cubic ft/min)=	35,241
Flow rate (Standard, Wet, Cubic ft/min)=	20,222
Flow Rate (Standard, Dry, Cubic ft/min)=	19,269

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0600		
Particulate Loading, Dry Std. (gr/scf)=	0.0092	0.0431	0.0554
Particulate Loading, Actual (gr/cu ft)=	0.0050		
Emission Rate (lb/hr)=	1.52		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - PHCL3
RUN # - M5HCLKN3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:50:00

Initial Meter Volume (Cubic Meters)=	11.196
Final Meter Volume (Cubic Meters)=	14.144
Meter Factor=	1.016
Final Leak Rate (cu m/min)=	0.0002
Net Meter Volume (Cubic Meters)=	2.995
Gas Volume (Dry Standard Cubic Meters)=	2.834
Barometric Pressure (mm Hg)=	743
Static Pressure (mm H2O)=	-3
Percent Oxygen=	18.0
Percent Carbon Dioxide=	2.0
Moisture Collected (ml)=	105.1
Percent Water=	4.7
Average Meter Temperature (C)=	31
Average Delta H (mm H2O)=	31.8
Average Delta P (mm H2O)=	1.8
Average Stack Temperature (C)=	226
Dry Molecular Weight=	29.04
Wet Molecular Weight=	28.52
Average Square Root of Delta P (mm H2O)=	1.2729
% Isokinetic=	100.5
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	175.0
Nozzle Diameter (mm)=	10.59
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Rectangular Stack	
Stack Area (Square Meters)=	2.983
Stack Velocity (Actual, m/min)=	335
Flow rate (Actual, Cubic m/min)=	998
Flow rate (Standard, Wet, Cubic m/min)=	573
Flow rate (Standard, Dry, Cubic m/min)=	546

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0600		
Particulate Loading, Dry Std. (mg/cu m)=	21.2	98.7	126.9
Particulate Loading, Actual (mg/cu m)=	11.6		
Emission Rate (kg/hr)=	0.69		

No Back Half Analysis

FILE NAME - PHCL3
RUN # - M5HCLKN3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 10:50:01

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.125	2.14	442	78	78
2	0.130	2.25	443	81	78
3	0.110	2.00	444	88	79
4	0.055	0.90	439	86	81
5	0.040	0.65	439	87	81
6	0.110	1.90	433	84	81
7	0.120	2.05	441	89	82
8	0.090	1.57	440	93	83
9	0.040	0.70	442	94	84
10	0.030	0.50	441	92	84
11	0.010	0.17	433	86	85
12	0.010	0.18	436	86	85
13	0.020	0.35	441	87	85
14	0.060	1.05	446	89	86
15	0.130	2.26	448	93	87
16	0.025	0.43	439	88	87
17	0.070	1.23	437	89	87
18	0.110	1.95	443	93	88
19	0.150	2.65	442	97	87
20	0.070	1.25	442	99	89
21	0.010	0.15	439	91	88
22	0.030	0.54	416	90	88
23	0.050	0.88	439	91	88
24	0.100	1.75	441	91	88
25	0.100	1.77	444	99	88

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.0873	1.0844	0.0002	0.0027

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	110.8962	110.8388	189.0	0.0573
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0007
Impinger Blank (mg/ml)= 0.0000

from . . .

ROY NEULICHT

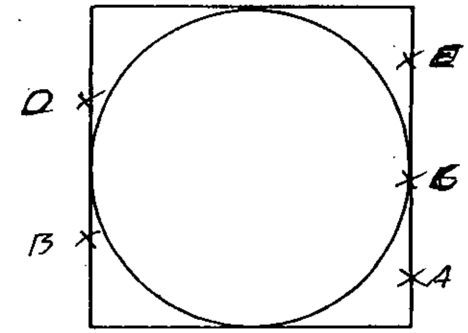
Metals / PM

FIELD DATA

RUN NO. MM-1
PROJECT NO. 4601
PLANT Belden
DATE 11-09-93
SAMPLING LOCATION Kiln
SAMPLE TYPE Metals
OPERATOR Szydlo
FILTER NO. 5
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP VH-35

PROBE NO. BL-5
PROBE LENGTH AND TYPE Quartz - 8'
SAMPLE BOX NO. 011996
METER BOX NO. N-12
TEMP. CONTROLLER NO. N-12
TEMP. METER NO. N-12
THERMOCOUPLE I.D. NO. 96-7
UMBILICAL CORD I.D. NO. N-125-2
UMBILICAL CORD I.D. NO. —
NOZZLE NO. MM-1

NOZZLE DIA. 0.417
ASSUMED MOISTURE % 10%
METER ΔH@ 1.715
METER CORRECTION 1.027
PITOT NO. S-8
PITOT COEFFICIENT .84
BAROMETRIC PRESSURE 29.3
SITE TO BARO. ELEVATION (ft.) 29.27
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1307	1920				
PASS/FAIL		Pass				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1309	1615	1640	1923	
VACUUM, In. Hg	≥15"	≥5"	≥15"	≥6"	≥15"
CFM	.009	0.005	0.005	0.001	
VOLUMES					
FINAL		986.568		1044.423	
INITIAL		986.359		1044.399	
DIFFERENCE		.209		.024	

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 944.772
FINAL VOLUME 1044.399
LEAK CHECK VOLUME .209
ADJUSTED FINAL VOLUME 1044.19

COMMENTS

Revision 11/18/88

RUN NO. MM-1
DATE 11-09-93

SAMPLING LOCATION Kiln
PROJECT NO. 4601.01.05.01

p. 1 of 1
OPERATOR SZYDLO

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 944.772 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	1430															
B 1	7	1437	949.601	950.126	0.16	1.42	2.40	433	71	70	5	41	223	250	258		
B 2	14	1444	955.689	956.119	0.13	1.46	1.46	432	70	70	5	41	223	250	255		
B 3	21	1451	960.600	959.992	0.10	1.52	1.52	431	77	71	5	45	206	224	252		
B 4	28	1458	964.574	964.421	0.065	0.99	1.00	429	78	71	5	46	211	252	248		
B 5	35	1305	967.499	967.370	0.035	0.53	0.53	427	79	72	5	47	211	253	255		
D 6	42	1524	973.103	973.024	0.13	1.98	1.98	431	74	73	5	41	217	250	254		
D 7	49	1531	978.488	978.523	0.12	1.82	1.82	434	76	73	5	41	209	252	255		
D 8	56	1538	983.673	983.621	0.11	1.68	1.70	434	81	74	5	41	212	248	245		
D 9	63	1545	985.894	985.825	0.02	0.30	0.30	431	83	75	1	41	215	242	242		
D 10	70	1552	986.389	986.359	0.001	0.01	0.01	429	79	75	0	43	213	253	253		
C 11	77	1650	988.768	988.562	0.02	0.30	0.30	422	72	71	1	41	213	253	253		
C 12	84	1657	990.974	991.214	0.02	0.30	0.30	422	73	72	1	40	249	255	263		
C 13	91	1704	993.659	993.725	0.03	0.45	0.45	432	73	72	1	41	240	251	255		
C 14	98	1711	997.909	997.825	0.075	1.13	1.13	437	75	74	1	42	242	250	257		
C 15	105	1718	1003.713	1003.737	0.14	2.12	2.10	438	77	72	6	42	225	253	250		
A 16	112	1800	1006.433	1006.297	0.03	0.46	0.46	406	72	71	1	41	229	250	252		
A 17	119	1807	1008.632	1008.456	0.02	0.3	0.30	422	72	70	1	42	232	248	250		
A 18	126	1814	1014.099	1014.125	~~0.125~~	1.89	1.90	437	72	70	5	41	252	250	252		
A 19	133	1821	1020.468	1020.826	.17	2.56	2.60	442	76	72	6	41	250	254	254		
A 20	140	1828	1027.743	1026.527	.22	3.32	3.30	442	80	72	6	42	247	252	252		
E 21	147	1847	1029.313	1028.524	.01	0.15	0.15	412	74	72	1	39	229	249	253		
E 22	154	1854	1031.535	1030.025	.02	0.31	0.30	408	74	71	1	40	232	245	250		
E 23	161	1901	1035.169	1034.925	.055	0.83	0.80	433	74	71	2	38	226	251	252		
E 24	168	1908	1040.413	1040.425	.115	1.74	1.70	437	75	70	4	37	219	252	251		
E 25	175	1915	1044.934	1044.399	.085	1.29	1.30	436	77	70	4	37	220	254	250		

L.C

COMMENTS

Revision 9-4-88

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kin Stack No. 3

Run No. 1 Sampling Train No. MM-1 Sample Box No. 010996
Set up person(s): J McCann Date 11-8-93
Transfer to Sampler: J Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By J M C Received By J. Surman Date/Time 11-9-93 7:30

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
[redacted]*	•			
[redacted]				
90° Bypass[redacted]	•	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back	F-210	Filter I.D.No.: 5		
[redacted]				
Short 90° Connector[redacted]				
1st Impinger ([redacted] Short-stem Mod-GBS)		Empty	466.8	
U-Connector (A)				
2nd Impinger (Mod-GBS)		100 mLs ± 2 mLs	472.7	573.1
U-Connector (B)		5% HNO_3/10% H_2O_2		
3rd Impinger (GBS)		100 mLs ± 2 mLs	476.4	577.0
U-Connector (C)		5% HNO_3/10% H_2O_2		
4th Impinger (Mod-GBS)		Empty	467.3	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	458.7	569.5
U-Connector (E)		4% $KMnO_4$/10% H_2SO_4		
6th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	497.8	608.5
U-Connector (F)		4% $KMnO_4$/10% H_2SO_4		
7th Impinger (Mod-GBS)		100 mLs*****	660.4	
U-Connector (G)		1.0 N NaOH		
8th Impinger (Mod-GBS)		~200 g indicating	738.0	
Impinger Outlet Connector		silica gel		
[redacted]*		<--Exchange when necessary		

Note: Components in italics used only when mercury is a target metal.

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil after sampling.

[redacted]

*** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm or Teflon tape.

**** Use 200 mLs ± 2 mLs and document below if reagent is exhausted before the end of a previous run. Prepare additional reagent blanks accordingly.

***** Used for acid trap and is not recovered as a sample. Replace with acidic $KMnO_4$ if the acidic $KMnO_4$ in the previous impinger is exhausted before the end of a previous run, and prepare additional reagent blanks accordingly.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack, No. 3

Run No. 1 Sampling Train No. MM-1 Sample Box No. 010996
Transfer for Recovery:

Relinquished By: ________ Received By J McC[illegible] Date/Time 11-9-93 2000
Sample box recovery person(s): J McC[illegible] J. S[illegible] Date: 11-10-93
Probe recovery person(s): M. Whitm[illegible] Date: 11-9-93

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	~~8th-2~~
Final Wt.(g)	498.3	612.0	586.1	468.1	570.9	608.5	660.2	752.5	
Initial Wt.(g)	466.8	573.1	577.0	467.3	569.5	608.5	660.4	738.0	
Net Wt.(g)	31.5	38.9	9.1	.8	1.4	.0	(.2)	14.5	

[Total Condensate Collected (g): 96.0]

Description and color:	clear	clear	clear	clear	purple	purple	clear	20	
Impingers:	>>>>>> 1-3 <<<<<			4	>>>> 5-6 <<<<			~~5-8~~	~~8~~ Blue

Sample Number:	1031 *	1032	1033 *>>>>	1034
~~Sample Bottle Tare Wt.(g)~~	498.4	172.8	262.7	172.8
Sample Bottle Gross Wt.(g	769.6	173.5	478.5	<------Before Rinses
Rinse Solution:	0.1N HNO_3	0.1N HNO_3	acidic $KMnO_4$	8 N HCl

Components Rinsed: ** filter support, filter holder back, 45/90° connector or short 90° connector, 1st-3rd impingers, U-connectors A-C; ** 4th impinger; *** 5th-6th impingers, U-connectors D-F

907.6 rerinsed (soaked) filter support to remove condensed residue

Sample Bottle Final Wt.(g)	872.0	277.2	684.3	396.4	After Rinses
Net Sample Wt.(g)	373.6	104.4	421.6	223.6	

FRONT HALF RECOVERY

Sample Number:	1065	1029	1030
Sample Bottle Tare Wt.(g)	175.6	171.1	Filter
Rinse Solution:	Acetone	0.1 N HNO_3	Description and Color:

Components Rinsed****: nozzle, probe liner, cyclone and flask or bypass, filter holder front ________

Sample Bottle Gross Wt.(g)	________	w/Acetone	
Net Acetone Sample Wt.(g)	________		
Sample Bottle Final Wt.(g)	293.6	~~w/added Water~~	263.4
Net Sample Wt.(g)	118.0		92.3

- * Do not fill bottle; vent pressure after recovery (before and after shipment). Keep samples iced to minimize pressure buildup.
- ** Using 100 mLs 0.1 N HNO_3, rinse components (2X).
- *** Check pH with a glass rod and pH indicator strips; adjust with conc. HNO_3 .
- **** Using a total of 150 mLs (250 mLs if cyclone and flask are used) acetone, rinse components (3X or more with brushing) until clean. If some residue cannot be removed, rinse components again with a total of 100 mLs (200 mLs if cyclone and flask are used) ASTM Type I water (3X or more with brushing). Combine water and acetone rinses. Then, using a total of 100 mLs (200 mLs if cyclone and flask are used) 0.1 N HNO_3, rinse components (3X or more with brushing); combine these rinses and keep separate. Follow with water, then acetone rinses and discard those rinses.

COMMENTS:

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601
RUN NO. Metals 1
SAMPLE NO.
DATE 11/9/93
PLANT SAMPLING LOCATION Kiln Stack
ANALYSIS TIME (24hr-CLOCK) 2105
SAMPLE TYPE (BAG, GRAB) Bag
OPERATOR Edwards

ORSAT LEAK CHECK BEFORE ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.
ORSAT LEAK CHECK AFTER ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.

GAS \ RUN	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 2.2 2 2.2 3 2.2	2.2	1 2.2 2 2.2 3 2.4	2.3	1 2.2 2 2.2 3 2.2	2.2	2.2
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 19.8 2 19.8 3 19.8	~~18.6~~ 17.6	1 19.8 2 19.8 3 19.8	17.5	1 19.8 2 20.0 3 20.0	~~19.9~~ 17.7	17.6

91-18 SEV SURMAN wksht 052191

Acceptance Criteria

CO_2 > 4% .3% by Volume
≤ 4% .2% by Volume

O_2 ≥ 15% .2% by Volume
< 15% .3% by Volume

Comments:

FILE NAME - metals1
RUN # - MM5KILN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 15:05:13

Initial Meter Volume (Cubic Feet)=	944.772		
Final Meter Volume (Cubic Feet)=	1044.190		
Meter Factor=	1.027		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Feet)=	102.102		
Gas Volume (Dry Standard Cubic Feet)=	99.211		
Barometric Pressure (in Hg)=	29.30		
Static Pressure (Inches H2O)=	-0.12		
Percent Oxygen=	17.6		
Percent Carbon Dioxide=	2.2		
Moisture Collected (ml)=	96.0		
Percent Water=	4.4		
Average Meter Temperature (F)=	74		
Average Delta H (in H2O)=	1.22		
Average Delta P (in H2O)=	0.081		
Average Stack Temperature (F)=	429		
Dry Molecular Weight=	29.06		
Wet Molecular Weight=	28.57		
Average Square Root of Delta P (in H2O)=	0.2613		
% Isokinetic=	92.7		
Pitot Coefficient=	0.84		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (Inches)=	0.417		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,160		
Flow Rate (Actual, Cubic ft/min)=	37,260		
Flow rate (Standard, Wet, Cubic ft/min)=	21,657		
Flow Rate (Standard, Dry, Cubic ft/min)=	20,713		

Particulate Loading - Front Half

		Corr. to 7% O2 & 12% CO2	
Particulate Weight (g)=	0.0537		
Particulate Loading, Dry Std. (gr/scf)=	0.0083	0.0343	0.0455
Particulate Loading, Actual (gr/cu ft)=	0.0046		
Emission Rate (lb/hr)=	1.48		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - metals1
RUN # - MM5KILN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 15:05:15

Initial Meter Volume (Cubic Meters)=	26.752		
Final Meter Volume (Cubic Meters)=	29.567		
Meter Factor=	1.027		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Meters)=	2.891		
Gas Volume (Dry Standard Cubic Meters)=	2.809		
Barometric Pressure (mm Hg)=	744		
Static Pressure (mm H20)=	-3		
Percent Oxygen=	17.6		
Percent Carbon Dioxide=	2.2		
Moisture Collected (ml)=	96.0		
Percent Water=	4.4		
Average Meter Temperature (C)=	23		
Average Delta H (mm H20)=	30.9		
Average Delta P (mm H20)=	2.0		
Average Stack Temperature (C)=	221		
Dry Molecular Weight=	29.06		
Wet Molecular Weight=	28.57		
Average Square Root of Delta P (mm H20)=	1.3168		
% Isokinetic=	92.7		
Pitot Coefficient=	0.84		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (mm)=	10.59		
Stack Axis #1 (Meters)=	1.727		
Stack Axis #2 (Meters)=	1.727		
Rectangular Stack			
Stack Area (Square Meters)=	2.983		
Stack Velocity (Actual, m/min)=	354		
Flow rate (Actual, Cubic m/min)=	1,055		
Flow rate (Standard, Wet, Cubic m/min)=	613		
Flow rate (Standard, Dry, Cubic m/min)=	587		

Particulate Loading - Front Half

Particulate Weight (g)=	0.0537	Corr. to 7% O2 &	12% CO2
Particulate Loading, Dry Std. (mg/cu m)=	19.1	78.7	104.3
Particulate Loading, Actual (mg/cu m)=	10.6		
Emission Rate (kg/hr)=	0.67		

No Back Half Analysis

FILE NAME - metals1
RUN # - MM5KILN1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 15:05:15

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.160	2.40	433	71	70
2	0.130	1.96	432	70	70
3	0.100	1.52	431	77	71
4	0.065	1.00	429	78	71
5	0.035	0.53	427	79	72
6	0.130	1.98	431	74	73
7	0.120	1.82	434	76	73
8	0.110	1.70	434	81	74
9	0.020	0.30	431	83	75
10	0.001	0.01	429	79	75
11	0.020	0.30	422	72	71
12	0.020	0.30	422	73	72
13	0.030	0.45	432	73	72
14	0.075	1.13	437	75	74
15	0.140	2.10	438	77	72
16	0.030	0.46	406	72	71
17	0.020	0.30	422	72	70
18	0.125	1.90	437	72	70
19	0.170	2.60	442	76	72
20	0.220	3.30	442	80	72
21	0.020	0.30	408	74	71
22	0.020	0.30	408	74	71
23	0.055	0.80	433	74	71
24	0.115	1.70	437	75	70
25	0.085	1.30	436	77	70

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.0939	1.0830	0.0000	0.0109

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	92.5844	92.5408	214.5	0.0428
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0037
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

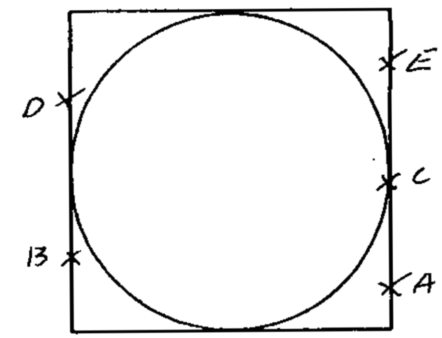
Lk Rate (cfm)	Time (min)
0.0010	70.0000
0.0050	105.0000

FIELD DATA

RUN NO. MM- 2
PROJECT NO. 4601.01.05.01
PLANT Belden Brick
DATE 11-10-93
SAMPLING LOCATION Kiln
SAMPLE TYPE Integrated MMS
OPERATOR Szydlo
FILTER NO. 4
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP VH-11

PROBE NO. ~~8' quartz~~ BL-5
PROBE LENGTH AND TYPE 8' quartz
SAMPLE BOX NO. ~~5R~~ 0
METER BOX NO. N-12
TEMP. CONTROLLER NO. N-12
TEMP. METER NO. N-12 96-7
THERMOCOUPLE I.D. NO. ~~N-12~~ 2
UMBILICAL CORD I.D. NO. N-12-2
UMBILICAL CORD I.D. NO. —
NOZZLE NO. MMS #1/MMS #2

NOZZLE DIA. .417
ASSUMED MOISTURE % 5%
METER ΔH@ 1.715
METER CORRECTION 1.027
PITOT NO. 5-8
PITOT COEFFICIENT .8162
BAROMETRIC PRESSURE 29.3
SITE TO BARO. ELEVATION (ft.) ~~29~~
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	0910	1407				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	0908	1107	1122	1405	
VACUUM, in. Hg	≥15"	≥5"	~~≥15"~~ 19"	≥6	≥15"
CFM	.010	0.001	0.01	.001	
VOLUMES					
FINAL		94.495		94.789	
INITIAL		94.240		94.495	
DIFFERENCE		.255		.294	

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, in. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 49.800
FINAL VOLUME 178.093
LEAK CHECK VOLUME ~~.549~~ .255
ADJUSTED FINAL VOLUME ~~122.744~~ ~~177.544~~ 177.838

COMMENTS

Revision 11/18/88

RUN NO. MM5/Run#2/Kiln SAMPLING LOCATION Kiln p. 1 of 1

DATE 11-10-93 PROJECT NO. 4601.01.05.01 OPERATOR Szydlo

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 49.800 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	0942															
B-1	7	0949	55.132	55.235	0.115	1.80	1.80	433	68	67	4	44	240	251	257		
B-2	14	0956	60.941	60.792	.135	2.13	2.10	430	71	68	5	44	240	250	255		
B-3	21	1003	65.970	65.895	.100	1.59	1.60	428	76	69	5	43	242	250	250		
B-4	28	1010	69.879	69.915	.06	0.95	0.95	430	78	71	2	43	240	250	250		
B-5	35	1017	73.072	72.974	.04	0.63	0.63	431	79	71	1	46	220	254	255		
D-1	42	1033	78.762	78.425	.125	1.98	2.00	432	75	73	4	50	246	252	253		
D-2	49	1040	84.359	83.998	.125	1.99	2.00	432	79	74	4	51	220	254	250		
D-3	56	1047	89.281	88.932	.100	1.54	1.50	436	75	51	4	50	205	255	255		
D-4	63	1054	92.501	92.237	.04	0.64	0.64	431	84	75	1	52	220	255	255		
D-5	70	1101	94.473	94.240	.015	0.24	0.24	431	83	76	1	51	225	250	250		
1	77	1135	~~94.789~~ 100.044	100.927	.150	2.44	2.50	409	75	74	5	48	252	253	262		
2	84	1142	107.279	107.217	.150	2.42	2.50	421	79	74	6	48	250	252	258		
3	91	1149	113.509	113.521	.150	2.40	2.50	431	83	75	6	48	252	256	252		
4	98	1156	119.549	119.256	.140	2.25	2.30	431	86	76	5	48	256	259	260		
5	105	1203	125.489	125.475	.135	2.17	2.20	432	87	77	5	48	252	255	255		
C 1	112	1243	130.980	131.127	.115	1.87	2.00	414	78	77	5	55	238	249	253		
C 2	119	1250	136.445	136.412	.115	1.85	1.80	423	79	76	4	54	224	252	253		
C 3	126	1257	141.904	142.024	.115	1.84	1.80	431	82	77	4	57	247	255	251		
C 4	133	1304	147.358	147.325	.115	1.84	1.80	436	84	77	4	58	247	256	258		
C 5	140	1311	152.819	152.525	.115	1.84	1.80	439	86	78	4	55	259	252	255		
1	147	1329	157.769	157.892	.105	1.70	1.70	425	81	80	4	55	242	250	256		
2	154	1336	162.915	162.815	.100	1.63	1.60	420	84	80	4	52	236	253	255		
3	161	1343	168.031	168.002	.100	1.61	1.60	434	86	80	4	51	235	253	253		
4	168	1350	173.144	173.025	.100	1.60	1.60	438	88	80	4	51	232	252	254		
5	175	1357	178.258	178.093	.100	1.60	1.60	438	88	80	4	51	234	250	252		

COMMENTS

Revision 9-4-88

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kin Stack No. 3

Run No. 2 Sampling Train No. MM-2 Sample Box No. 012001
Set up person(s): Jy M. C Date 11-8-93
Transfer to Sampler: ✓ Sample Box Leak Check: ________ cfm @ ________ in.Hg vacuum

Relinquished By ________ Received By Jy M. C Date/Time 11-10-93 715

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
Cyclone**	*			
Flask**				
90° Bypass**	*	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back		Filter I.D.No.: 4		
45/90° Connector**		L4		
Short 90° Connector**				
1st Impinger (2-L** Short-stem Mod-GBS)		Empty	466.3	
U-Connector (A)				
2nd Impinger (Mod-GBS)		100 mLs ± 2 mLs	459.3	559.7
U-Connector (B)		5% HNO_3/10% H_2O_2		
3rd Impinger (GBS)		100 mLs ± 2 mLs	475.2	575.0
U-Connector (C)		5% HNO_3/10% H_2O_2		
4th Impinger (Mod-GBS)		Empty	471.8	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	457.3	567.8
U-Connector (E)		4% $KMnO_4$/10% H_2SO_4		
6th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	468.5	579.2
U-Connector (F)		4% $KMnO_4$/10% H_2SO_4		
7th Impinger (Mod-GBS)		100 mLs*****	755.4	
U-Connector (G)		1.0 N NaOH		
8th Impinger (Mod-GBS)	B-142	~200 g indicating	743.6	
Impinger Outlet Connector		silica gel		
Replacement 8th Impinger**	UH-11	<--Exchange when necessary ______		

Note: Components in italics used only when mercury is a target metal.

- * Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil after sampling.
- ** Optional for low/high particulate/moisture gas streams as applicable.
- *** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm or Teflon tape.
- **** Use 200 mLs ± 2 mLs and document below if reagent is exhausted before the end of a previous run. Prepare additional reagent blanks accordingly.
- ***** Used for acid trap and is not recovered as a sample. Replace with acidic $KMnO_4$ if the acidic $KMnO_4$ in the previous impinger is exhausted before the end of a previous run, and prepare additional reagent blanks accordingly.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack, No. 3

Run No. 2 Sampling Train No. MM-2 Sample Box No. 012001
Transfer for Recovery:

Relinquished By: ______ Received By Jg McC Date/Time 11-10-93 1430
Sample box recovery person(s): Jg McC Date: 11-10-93
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	~~8th-2~~
Final Wt.(g)	482.5	614.3	592.4	475.9	573.7	581.9	750.7	771.4	
Initial Wt.(g)	466.3	559.7	575.0	471.8	567.8	579.2	755.4	743.6	
Net Wt.(g)	16.2	54.6	17.4	4.1	1.9	2.7	(4.7)	27.8	

[Total Condensate Collected (g): 120.0]

Description and color: clear clear clear clear purple purple clear 15

Impingers: >>>>>> 1-3 <<<<<	4	>>>> 5/6 <<<<	5-6 % Blue
Sample Number: 2031 •	2032	2033 *>>>>	2034
Sample Bottle Tare Wt.(g) 497.4	175.8	261.5	172.3
Sample Bottle Gross Wt.(g 778.6	178.2	483.0 <---------------------------Before Rinses	
Rinse Solution: 0.1N HNO_3	0.1N HNO_3	acidic $KMnO_4$	8 N HCl

Components Rinsed: ** filter support, filter holder back, 45/90° connector or short 90° connector, 1st-3rd impingers, U-connectors A-C | ** 4th impinger | *** 5th-6th impingers, U-connectors D-F

	1-3	4	5-6	HCl	
Sample Bottle Final Wt.(g)	923.8	277.2	688.9	399.3	After Rinses
Net Sample Wt.(g)	425.4	101.4	427.4	654.4	

FRONT HALF RECOVERY

Sample Number: 2065 2029 2030.
Sample Bottle Tare Wt.(g) 175.1 ~~172.~~ 171.8 Filter
Rinse Solution: Acetone 0.1 N HNO_3 Description and Color:
Components Rinsed****: nozzle, probe liner, cyclone and flask or bypass, filter holder front dirty white
Sample Bottle Gross Wt.(g) 285.5 w/Acetone
Net Acetone Sample Wt.(g) ______
Sample Bottle Final Wt.(g) ______ ~~w/added Water~~ 258.4 *
Net Sample Wt.(g) 110.4 86.6

- • Do not fill bottle; vent pressure after recovery (before and after shipment). Keep samples iced to minimize pressure buildup.
- ** Using 100 mLs 0.1 N HNO_3, rinse components (2X).
- *** Check pH with a glass rod and pH indicator strips; adjust with conc. HNO_3 .
- **** Using a total of 150 mLs (250 mLs if cyclone and flask are used) acetone, rinse components (3X or more with brushing) until clean. If some residue cannot be removed, rinse components again with a total of 100 mLs (200 mLs if cyclone and flask are used) ASTM Type I water (3X or more with brushing). Combine water and acetone rinses. Then, using a total of 100 mLs (200 mLs if cyclone and flask are used) 0.1 N HNO_3, rinse components (3X or more with brushing); combine these rinses and keep separate. Follow with water, then acetone rinses and discard those rinses.

COMMENTS:
* Not sure amount of rinses acetone ~ 175 ml HNO3 ~ 100 ml

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601 RUN NO. mm-2
SAMPLE NO. ______ DATE 11/10/93
PLANT SAMPLING LOCATION Brick Kiln Stack
ANALYSIS TIME (24hr-CLOCK) 2018
SAMPLE TYPE (BAG, GRAB) BAG
OPERATOR Edwards

ORSAT LEAK CHECK BEFORE ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -0- CHANGE IN 4 MIN.
ORSAT LEAK CHECK AFTER ANALYSIS:
BURETTE -0- CHANGE IN 4 MIN.
PIPETTES -00- CHANGE IN 4 MIN.

GAS \ RUN	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 1.0 2 1.0 3 1.0	1.0	1 1.0 2 1.0 3 1.0	1.0	1 1.0 2 1.0 3 1.0	1.0	1.0
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 19.2 2 19.4 3 19.4	18.3	1 19.4 2 19.4 3 19.4	18.4	1 19.4 2 19.4 3 19.4	18.4	18.4

91-16 SEV SURMAN wksht 052191

Acceptance Criteria

CO_2 > 4% .3% by Volume; ≤ 4% .2% by Volume
O_2 ≥ 15% .2% by Volume; < 15% .3% by Volume

Comments:

FILE NAME - metals2
RUN # - mm5k12
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 16:00:03

Initial Meter Volume (Cubic Feet)=	49.800		
Final Meter Volume (Cubic Feet)=	177.838		
Meter Factor=	1.027		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Feet)=	131.495		
Gas Volume (Dry Standard Cubic Feet)=	126.906		
Barometric Pressure (in Hg)=	29.30		
Static Pressure (Inches H20)=	-0.12		
Percent Oxygen=	18.4		
Percent Carbon Dioxide=	1.0		
Moisture Collected (ml)=	120.0		
Percent Water=	4.3		
Average Meter Temperature (F)=	78		
Average Delta H (in H20)=	1.71		
Average Delta P (in H20)=	0.106		
Average Stack Temperature (F)=	429		
Dry Molecular Weight=	28.90		
Wet Molecular Weight=	28.43		
Average Square Root of Delta P (in H20)=	0.3201		
% Isokinetic=	99.3		
Pitot Coefficient=	0.82		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (Inches)=	0.417		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,385		
Flow Rate (Actual, Cubic ft/min)=	44,462		
Flow rate (Standard, Wet, Cubic ft/min)=	25,840		
Flow Rate (Standard, Dry, Cubic ft/min)=	24,738		

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% C02
Particulate Weight (g)=	0.0430		
Particulate Loading, Dry Std. (gr/scf)=	0.0052	0.0281	0.0627
Particulate Loading, Actual (gr/cu ft)=	0.0029		
Emission Rate (lb/hr)=	1.11		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - metals2
RUN # - mm5k12
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 16:00:04

Initial Meter Volume (Cubic Meters)=	1.410		
Final Meter Volume (Cubic Meters)=	5.036		
Meter Factor=	1.027		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Meters)=	3.723		
Gas Volume (Dry Standard Cubic Meters)=	3.593		
Barometric Pressure (mm Hg)=	744		
Static Pressure (mm H20)=	-3		
Percent Oxygen=	18.4		
Percent Carbon Dioxide=	1.0		
Moisture Collected (ml)=	120.0		
Percent Water=	4.3		
Average Meter Temperature (C)=	25		
Average Delta H (mm H20)=	43.4		
Average Delta P (mm H20)=	2.7		
Average Stack Temperature (C)=	221		
Dry Molecular Weight=	28.90		
Wet Molecular Weight=	28.43		
Average Square Root of Delta P (mm H20)=	1.6131		
% Isokinetic=	99.3		
Pitot Coefficient=	0.82		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (mm)=	10.59		
Stack Axis #1 (Meters)=	1.727		
Stack Axis #2 (Meters)=	1.727		
Rectangular Stack			
Stack Area (Square Meters)=	2.983		
Stack Velocity (Actual, m/min)=	422		
Flow rate (Actual, Cubic m/min)=	1,259		
Flow rate (Standard, Wet, Cubic m/min)=	732		
Flow rate (Standard, Dry, Cubic m/min)=	700		

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% C02
Particulate Weight (g)=	0.0430		
Particulate Loading, Dry Std. (mg/cu m)=	12.0	64.5	143.7
Particulate Loading, Actual (mg/cu m)=	6.7		
Emission Rate (kg/hr)=	0.50		

No Back Half Analysis

FILE NAME - metals2
RUN # - mm5k12
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-04-1994 16:00:05

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.115	1.80	433	68	67
2	0.135	2.10	430	71	68
3	0.100	1.60	428	76	71
4	0.060	0.95	430	78	71
5	0.040	0.63	431	79	71
6	0.125	2.00	432	75	73
7	0.125	2.00	432	79	74
8	0.100	1.50	436	75	71
9	0.040	0.64	431	84	75
10	0.015	0.24	431	83	76
11	0.150	2.50	409	75	74
12	0.150	2.50	421	79	74
13	0.150	2.50	431	83	75
14	0.140	2.30	431	86	76
15	0.135	2.20	432	87	77
16	0.115	2.00	414	78	77
17	0.115	1.80	423	79	76
18	0.115	1.80	431	82	77
19	0.115	1.80	436	84	77
20	0.115	1.80	439	86	78
21	0.105	1.70	425	81	80
22	0.100	1.60	420	84	80
23	0.100	1.60	434	86	80
24	0.100	1.60	438	88	80
25	0.100	1.60	438	88	80

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.1205	1.1103	0.0000	0.0102

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	103.7065	103.6735	244.0	0.0328
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0007
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

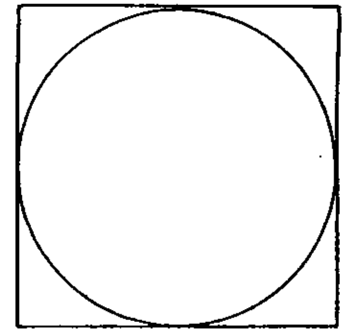
Lk Rate (cfm)	Time (min)
0.0010	70.0000
0.0010	105.0000

FIELD DATA

RUN NO. MM5 #3
PROJECT NO. 4601.01.05.01
PLANT Belden Brick
DATE 11-10-93
SAMPLING LOCATION Kiln
SAMPLE TYPE mm5 - integrated
OPERATOR Szydlo
FILTER NO. 6
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP UH-35

PROBE NO. BL-5
PROBE LENGTH AND TYPE 8' quartz
SAMPLE BOX NO.
METER BOX NO. N-12
TEMP. CONTROLLER NO. N-12
TEMP. METER NO. N-12
THERMOCOUPLE I.D. NO. 96-7
UMBILICAL CORD I.D. NO. N-12-2
UMBILICAL CORD I.D. NO. —
NOZZLE NO. MM5 #1 / MM5 #2

NOZZLE DIA. .417
ASSUMED MOISTURE % 5%
METER ΔH@ 1.715
METER CORRECTION 1.027
PITOT NO. 5-8
PITOT COEFFICIENT .8162
BAROMETRIC PRESSURE 29.3
SITE TO BARO. ELEVATION (ft.) —
CORRECTED B.P. (0.1 in./100 ft.) —
STATIC PRESSURE -.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1501	0804				
PASS/FAIL		Pass				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1520	1955			
VACUUM, In. Hg	≥15"	≥7"	≥15"		≥15"
CFM	.005	0.008			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 179.500
FINAL VOLUME 282.335
LEAK CHECK VOLUME ~~.00~~ 0.008
ADJUSTED FINAL VOLUME 282.327

COMMENTS

Revision 11/18/86

RUN NO. MM5 # 3 SAMPLING LOCATION Kiln p. 1 of 1

DATE 11-10-93 PROJECT NO. 4601.01.05.01 OPERATOR Szydlo

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 179.500 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F		
	0	1559															
E 1	7	1600	181.122	181.105	0.01	.16	.16	403	75	75	1	49	222	251	253		
E 2	14	1607	184.123	184.102	0.035	.56	.60	421	75	74	1	49	224	250	254		
E 3	21	1618	187.310	187.105	0.040	.63	.60	434	76	74	1	49	222	253	254		
E 4	28	1625	193.487	191.487	.15	2.37	2.40	438	78	75	7	49	225	254	252		
E 5	35	1632	199.159	198.582	.125	1.99	2.00	437	83	76	5	49	225	254	252		
C 1	42	1646	200.772	200.524	.010	.16	.16	425	80	77	1	51	222	234	254		
C 2	49	1653	202.730	202.639	.015	.24	.24	427	82	78	1	50	224	232	250		
C 3	56	1700	206.000	205.998	.040	.65	.67	416	82	78	1	50	225	238	260		
C 4	63	1707	210.556	210.426	0.08	1.28	1.28	435	84	78	4	45	217	252	254		
C 5	70	1714	216.364	215.865	0.13	2.07	2.10	440	84	81	5	45	222	254	255		
A 1	77	17[illegible]	218.919	218.625	.025	0.40	0.40	426	80	80	1	42	229	235	242		
A 2	84	1751	223.156	222.945	.070	1.10	1.10	442	81	79	4	42	218	253	253		
A 3	91	1758	228.229	227.952	.100	1.58	1.60	444	84	79	5	40	219	251	250		
A 4	98	1805	234.249	234.301	.140	2.23	2.20	444	86	80	5	40	224	242	245		
A 5	105	1812	238.512	238.123	.070	1.11	1.10	444	88	80	6	41	225	230	250		
B -1	112	1836	244.109	244.029	.14	2.21	2.20	444	80	80	5	40	217	251	254		
B -2	119	1843	249.905	249.252	.13	2.07	2.10	443	84	80	5	40	225	250	252		
B 3	126	1850	255.126	255.025	.105	1.67	1.70	441	86	80	5	40	232	245	250		
B 4	133	1857	259.400	259.872	.07	1.12	1.12	438	87	80	5	40	234	240	245		
B 5	140	1904	262.198	262.760	.03	.48	.48	438	87	80	1	42	240	252	250		
D -1	147	1919	268.526	262.916	.155	2.47	2.50	439	82	80	6	41	248	255	257		
D -2	154	1926	274.131	274.326	.120	1.93	1.90	432	85	80	5	41	224	252	254		
D -3	161	1933	278.393	278.723	.070	1.11	1.10	443	87	80	5	41	230	250	252		
D -4	168	1940	281.191	281.297	.030	.48	.48	438	87	80	1	41	232	253	257		
D -5	175	1947	282.335	282.335	.005	.08	.08	432	85	80	1	41	234	257	255		

4 min stop

COMMENTS 0755: ~~The system did not passed the first leak check.~~
~~The leak rate was 0.09 cfm.~~
~~The leak occurred because of loose nozzle.~~

Revision 9-4-88

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kin Stack No. 3

Run No. 3 Sampling Train No. MM-1 Sample Box No. 011996
Set up person(s): J. Surman Date 11-10-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By ______ Received By ______ Date/Time ______

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	*			
Probe (Liner-Glass)	*			
Female Probe Blank-off				
~~Cyclone**~~	*			
~~Flask**~~				
90° Bypass**	*	Filter Type:		
Filter Holder Front		Whatman QM-A		
Filter Holder Back	211	Filter I.D.No.:		
~~45/90° Connector**~~		LF-6		
Short 90° Connector**				
1st Impinger (~~2nd~~ Short-stem Mod-GBS)		Empty	474.2	
U-Connector (A)				
2nd Impinger (Mod-GBS)		100 mLs ± 2 mLs	472.7	581.4
U-Connector (B)		5% HNO_3/10% H_2O_2		
3rd Impinger (GBS)		100 mLs ± 2 mLs	476.4	578.5
U-Connector (C)		5% HNO_3/10% H_2O_2		
4th Impinger (Mod-GBS)		Empty	468.9	
U-Connector (D)				
5th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	458.7	571.3
U-Connector (E)		4% $KMnO_4$/10% H_2SO_4		
6th Impinger (Mod-GBS)		100 mLs ± 2 mLs****	497.8	611.0
U-Connector (F)		4% $KMnO_4$/10% H_2SO_4		
7th Impinger (Mod-GBS)		100 mLs*****	660.2	
U-Connector (G)		1.0 N NaOH		
8th Impinger (Mod-GBS)		~200 g indicating	747.9	
Impinger Outlet Connector	UH-35	silica gel		
~~Replacement 8th Impinger**~~		<--Exchange when necessary ______		

Note: Components in italics used only when mercury is a target metal.

* Nozzle openings covered with parafilm, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with aluminum foil after sampling.

~~** Optional for low/high particulate/moisture gas streams as applicable.~~

*** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with parafilm or Teflon tape.

**** Use 200 mLs ± 2 mLs and document below if reagent is exhausted before the end of a previous run. Prepare additional reagent blanks accordingly.

***** Used for acid trap and is not recovered as a sample. Replace with acidic $KMnO_4$ if the acidic $KMnO_4$ in the previous impinger is exhausted before the end of a previous run, and prepare additional reagent blanks accordingly.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED METHODS 5/29 - PARTICULATES AND MULTIPLE METALS TRAIN (MM5PM)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack, No. 3

Run No. 3 Sampling Train No. MM-1 Sample Box No. 011996
Transfer for Recovery:

Relinquished By: ______ Received By J. McC Date/Time 11-10-93 2030
Sample box recovery person(s): J. McC Date: 11-11-93
Probe recovery person(s): ______ Date: ______

BACK HALF RECOVERY

Impinger:	1st	2nd	3rd	4th	5th	6th	7th	8th-1	~~8th-2~~
Final Wt.(g)	498.5	626.7	590.3	470.8	575.5	611.2	660.1	765.5	
Initial Wt.(g)	474.2	581.4	578.5	468.9	571.3	611.0	660.2	747.9	
Net Wt.(g)	24.3	45.3	11.8	1.9	4.2	.2	(0.1)	17.6	

[Total Condensate Collected (g): 105.1]

Description and color: clear clear clear clear purple purple clear 40

Impingers: >>>>>>	1-3 <<<<<	4	>>>> 5-6 <<<<	5-6	% Blue
Sample Number:	3031 *	3032	3033 *>>>>	3034	3031A *
Sample Bottle Tare Wt.(g)	497.1	172.4	260.8	172.3	
Sample Bottle Gross Wt.(g	786.6	174.0	483.9 <----	----Before Rinses	174.7
Rinse Solution:	0.1N HNO_3	0.1N HNO_3	acidic $KMnO_4$	8 N HCl	
Components Rinsed: filter holder back, 45/90° connector or short 90° connector, 1st-3rd impingers, U-connectors A-C	** filter support,	** 4th impinger	*** 5th-6th impingers, U-connectors D-F		
Sample Bottle Final Wt.(g)	~~882.9~~ 905.8	270.7	683.5	396.6 After Rinses	214.5
Net Sample Wt.(g)	408.7	98.3	422.7	224.3	39.8

FRONT HALF RECOVERY

Sample Number:	3065	3029	3030
Sample Bottle Tare Wt.(g)	172.3	175.7	Filter
Rinse Solution:	Acetone	0.1 N HNO_3	Description and Color:

Components Rinsed****: nozzle, probe liner, cyclone and flask or bypass, filter holder front gray

Sample Bottle Gross Wt.(g)	274.2 w/Acetone		
Net Acetone Sample Wt.(g)	______	275.4	
Sample Bottle Final Wt.(g)	______ w/added Water	~~230.4~~	
Net Sample Wt.(g)	101.9	99.7	

* Do not fill bottle; vent pressure after recovery (before and after shipment). Keep samples iced to minimize pressure buildup.

** Using 100 mLs 0.1 N HNO_3, rinse components (2X).

*** Check pH with a glass rod and pH indicator strips; adjust with conc. HNO_3 .

**** Using a total of 150 mLs (250 mLs if cyclone and flask are used) acetone, rinse components (3X or more with brushing) until clean. If some residue cannot be removed, rinse components again with a total of 100 mLs (200 mLs if cyclone and flask are used) ASTM Type I water (3X or more with brushing). Combine water and acetone rinses. Then, using a total of 100 mLs (200 mLs if cyclone and flask are used) 0.1 N HNO_3, rinse components (3X or more with brushing); combine these rinses and keep separate. Follow with water, then acetone rinses and discard those rinses.

COMMENTS:

4 ml HNO_3 used +

OXYGEN AND CARBON DIOXIDE BY ORSAT

PROJECT NO. 4601 RUN NO. MM5-3
SAMPLE NO. ______ DATE 11/10/93
PLANT SAMPLING LOCATION Kiln
ANALYSIS TIME (24hr-CLOCK) 2112
SAMPLE TYPE (BAG, GRAB) BAG
OPERATOR Szydlo

ORSAT LEAK CHECK BEFORE ANALYSIS:
BURETTE 0 CHANGE IN 4 MIN.
PIPETTES 0 CHANGE IN 4 MIN.
ORSAT LEAK CHECK AFTER ANALYSIS:
BURETTE 0 CHANGE IN 4 MIN.
PIPETTES 0 CHANGE IN 4 MIN.

GAS \ RUN	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	1 1.7 2 1.7 3 1.8	1.7	1 1.8 2 1.7 3 1.8	1.8	1 1.5 2 1.7 3 1.8	1.7	1.73
O_2 (NET IS SECOND READING MINUS ACTUAL CO_2 READING)	1 19.6 2 19.7 3 19.7	17.9	1 19.5 2 19.8 3 19.6	17.8	1 18.9 2 19.5 3 19.6	17.6	17.8

91-18 SEV SURMAN wksht 052191

Acceptance Criteria

CO_2 > 4% .3% by Volume
≤ 4% .2% by Volume

O_2 ≥ 15% .2% by Volume
< 15% .3% by Volume

Comments:

FILE NAME - metals3
RUN #" - mm5k13
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:33:21

Initial Meter Volume (Cubic Feet)=	179.500
Final Meter Volume (Cubic Feet)=	282.327
Meter Factor=	1.027
Final Leak Rate (cu ft/min)=	0.008
Net Meter Volume (Cubic Feet)=	105.603
Gas Volume (Dry Standard Cubic Feet)=	101.263
Barometric Pressure (in Hg)=	29.30
Static Pressure (Inches H20)=	-0.12
Percent Oxygen=	17.8
Percent Carbon Dioxide=	1.7
Moisture Collected (ml)=	105.1
Percent Water=	4.7
Average Meter Temperature (F)=	81
Average Delta H (in H20)=	1.21
Average Delta P (in H20)=	0.076
Average Stack Temperature (F)=	435
Dry Molecular Weight=	28.99
Wet Molecular Weight=	28.48
Average Square Root of Delta P (in H20)=	0.2567
% Isokinetic=	99.5
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	175.0
Nozzle Diameter (Inches)=	0.417
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,113
Flow Rate (Actual, Cubic ft/min)=	35,729
Flow rate (Standard, Wet, Cubic ft/min)=	20,645
Flow Rate (Standard, Dry, Cubic ft/min)=	19,683

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0886		
Particulate Loading, Dry Std. (gr/scf)=	0.0135	0.0590	0.0935
Particulate Loading, Actual (gr/cu ft)=	0.0074		
Emission Rate (lb/hr)=	2.27		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - metals3
RUN # - mm5k13
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:33:22

Initial Meter Volume (Cubic Meters)=	5.083
Final Meter Volume (Cubic Meters)=	7.994
Meter Factor=	1.027
Final Leak Rate (cu m/min)=	0.0002
Net Meter Volume (Cubic Meters)=	2.990
Gas Volume (Dry Standard Cubic Meters)=	2.867
Barometric Pressure (mm Hg)=	744
Static Pressure (mm H2O)=	-3
Percent Oxygen=	17.8
Percent Carbon Dioxide=	1.7
Moisture Collected (ml)=	105.1
Percent Water=	4.7
Average Meter Temperature (C)=	27
Average Delta H (mm H2O)=	30.7
Average Delta P (mm H2O)=	1.9
Average Stack Temperature (C)=	224
Dry Molecular Weight=	28.99
Wet Molecular Weight=	28.48
Average Square Root of Delta P (mm H2O)=	1.2935
% Isokinetic=	99.5
Pitot Coefficient=	0.82
Sampling Time (Minutes)=	175.0
Nozzle Diameter (mm)=	10.59
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Rectangular Stack	
Stack Area (Square Meters)=	2.983
Stack Velocity (Actual, m/min)=	339
Flow rate (Actual, Cubic m/min)=	1,012
Flow rate (Standard, Wet, Cubic m/min)=	585
Flow rate (Standard, Dry, Cubic m/min)=	557

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0886		
Particulate Loading, Dry Std. (mg/cu m)=	30.9	135.2	214.3
Particulate Loading, Actual (mg/cu m)=	17.0		
Emission Rate (kg/hr)=	1.03		

No Back Half Analysis

FILE NAME - metals3
RUN # - mm5kl3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:33:23

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.010	0.16	403	75	75
2	0.035	0.60	421	75	74
3	0.040	0.60	434	76	74
4	0.150	2.40	438	78	75
5	0.125	2.00	437	83	76
6	0.010	0.16	425	80	77
7	0.015	0.24	427	82	78
8	0.040	0.65	416	82	78
9	0.080	1.28	435	84	78
10	0.130	2.10	440	84	81
11	0.025	0.40	426	80	80
12	0.070	1.10	442	81	79
13	0.100	1.60	444	84	79
14	0.140	2.20	444	86	80
15	0.070	1.10	444	88	80
16	0.140	2.20	444	80	80
17	0.130	2.10	443	84	80
18	0.105	1.70	441	86	80
19	0.070	1.12	438	87	80
20	0.030	0.48	438	87	80
21	0.155	2.50	439	82	80
22	0.120	1.90	432	85	80
23	0.070	1.10	443	87	80
24	0.030	0.48	438	87	80
25	0.005	0.08	432	85	80

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	1.1285	1.1002	0.0000	0.0283

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	99.3346	99.2743	0.0	0.0603
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0007
Impinger Blank (mg/ml)= 0.0000

from . . .

ROY NEULICHT

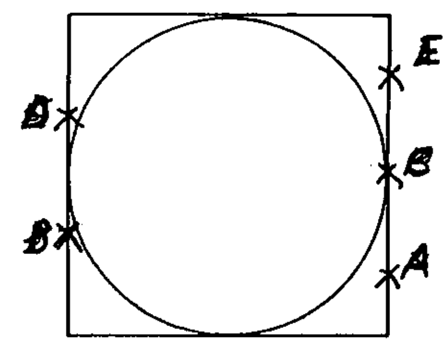
Semi Volatile

FIELD DATA

RUN NO. 5V- ~~2~~ # 1
PROJECT NO. 4601
PLANT BELDEN BRICK NO6
DATE 11/9/93
SAMPLING LOCATION
SAMPLE TYPE SEMIVOLATILE
OPERATOR WHITMIRE
FILTER NO.
RECORD DATA EVERY 7 MIN.
UMBILICAL/SAMPLER HOOKUP U/H-8

PROBE NO. UC-1
PROBE LENGTH AND TYPE
SAMPLE BOX NO. 011995
METER BOX NO. N-87
TEMP. CONTROLLER NO. N-87
TEMP. METER NO. N-87
THERMOCOUPLE I.D. NO. 96-6A
UMBILICAL CORD I.D. NO. N-125-5
UMBILICAL CORD I.D. NO. —
NOZZLE NO. 5V-3

NOZZLE DIA. 0.419
ASSUMED MOISTURE % 10%
METER ΔH @ 1.853
METER CORRECTION 1.021
PITOT NO. M-1
PITOT COEFFICIENT .8400
BAROMETRIC PRESSURE 29.3
SITE TO BARO. ELEVATION (ft.)
CORRECTED B.P. (0.1 in./100 ft.)
STATIC PRESSURE -0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1305	1927				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1323	1600	1640	1730	1740
VACUUM, In. Hg	≥15"	≥12	≥15"	12	≥15"
CFM	.001	0.01	0.01	0.006	0.005
VOLUMES					
FINAL		497.052		520.075	
INITIAL		496.700		519.709	
DIFFERENCE		0.352		0.366	

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg	≥13"	≥15"		≥15"	
CFM	0.003				
VOLUMES					
FINAL		564.68			
INITIAL					
DIFFERENCE					

INITIAL VOLUME 460.067 564.68
FINAL VOLUME ~~0.718~~ ~~539.018~~
LEAK CHECK VOLUME 0.718
ADJUSTED FINAL VOLUME ~~538.300~~ 563.962

COMMENTS

Revision 11/18/86

SEMIVOLATILES

RUN NO. SV-1 SAMPLING LOCATION KILN STACK p. 1 of 2

DATE 11/9/93 PROJECT NO. 4601 OPERATOR WHITMIRE

TRAVERSE POINT NUMBER	SAMPLING TIME, min (0.00)	CLOCK TIME (24-hr.) (1430)	GAS METER READING (V_m), ft³ INITIAL 460.067 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F	XAD	
C 1				460.067	0.005	0.08	0.08	425	72	71	2	49	238	251	257		
2	7	1437	461.182	461.460	0.015	0.25	0.21	422	74	73	3	55	246	251	253	52	
3	14	1444	463.125	463.250	0.025	0.42	0.40	426	73	73	5	50	240	254	248		
3	21	1451	465.626	465.770	0.085	1.44	1.40	428	75	74	8	47	242	259	255	52	
4	28	1458	470.244	470.210	0.165	2.80	2.80	430	78	75	12	46	243	254	248		
5	35	1505	476.695	476.70													
		~~1517~~															
E 1		1517		476.70	0.005	0.08	0.08	425	78	77	3	59	244	256	252		
E 1	7	1524	477.823	477.835	0.025	0.43	0.41	422	79	78	6	53	242	255	255	50	
2	14	1531	480.355	480.320	0.07	1.19	1.20	429	80	79	8	48	246	259	254		
3	21	1538	484.58	484.31	0.16	2.73	2.73	432	82	79	10	46	242	261	256	52	
4	28	1545	490.976	490.48	0.145	2.47	2.50	437	85	80	12	44	239	261	253		1600 leak check =0.01
5	35	1552	497.067	496.700													
A		1643		497.052	0.02	0.34	0.34	424	78	77	5	49	245	257	252		
A 1	7	1650	499.309	499.430	0.07	1.19	1.20	429	77	77	8	45	244	255	257	52	
2	14	1657	503.638	503.260	0.115	1.95	2.00	436	79	78	10	42	243	254	254		
3	21	1704	509.02	508.62	0.175	2.97	3.00	438	82	78	12	42	244	252	253	51	
4	28	1711	515.683	515.01	0.07	1.19	1.20	439	85	82	7	43	242	257	253		
5	35	1718	519.918	519.709													
D 1		1853		520.075	0.145	2.46	2.5	437	79	79	12	42	260	256	264	40	
2	7	1800	526.127	526.230	0.12	2.03	2.0	439	81	79	10	40	257	259	264		
3	14	1807	531.636	531.640	0.055	0.93	.85	441	82	79	7	41	247	257	257	41	
4	21	1814	535.366	535.430	0.025	0.42	0.42	441	82	80	5	41	240	258	256	41	
5	28	1821	537.883	537.88	0.005	0.08	0.08	438	82	80		41	239	256	256		
	35	1828	539.01														

COMMENTS

RUN NO. 1
DATE 11/9/93

SAMPLING LOCATION KILN STACK
PROJECT NO. 4601

p. 2 of 2
OPERATOR WHITMIRE

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 539.23 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F	XAD	
	0.00	1840															
B 1	7	1847	545.075	545.41	0.145	2.46	2.50	438	81	80	12	46	237	253	252	40	
2	14	1854	551.247	551.560	0.15	2.54	2.40	439	82	80	12	39	235	258	252	41	
3	21	1901	557.718	557.93	0.165	2.80	2.70	441	83	80	6	41	234	256	251	43	
4	28	1908	561.630	562.28	0.06	1.02	1.0	440	85	80	6	42	235	256	252	45	
6	35	1915	564.155	564.68	0.025	0.42	0.40	438	84	80	5	42	237	260	252	45	

COMMENTS

Revision 9-4-86

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SETUP DATA

MRI Project No.: 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3

Run No. 1 Sampling Train No. SV-1 Sample Box No. 011995
Set up person(s): Jy McC Date 11-8-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By Jy McC Received By J. Surm Date/Time 11-9-93 730

TRAIN COMPONENT	COMPONENT NO.		LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	*				
Probe (Liner-Glass)	*				
Female Probe Blank-off					
~~Cyclone**~~	*				
~~Flask*~~					
90° Bypass[redacted]	*				
Filter Holder Front	—		Filter Type: #2		
Filter Holder Back	—		Whatman QM-A		
~~Short 90° Connector~~ STL					
Condenser			Thermocouple No.:		
Thermowell ~~*U-Connector*~~					
XAD-2 Resin Cartridge			~65 grams XAD-2 Resin		484.1 ****
U-Connector (A)					
1st Impinger (condensate trap) ([redacted] Short-stem Mod-GBS)			Empty	466.7	
U-Connector (B)					
2nd Impinger (Mod-GBS)			100 mLs ASTM Type II Water	469.2	567.5
U-Connector (C)					
3rd Impinger (GBS)			100 mLs ASTM Type II Water	472.9	573.4
U-Connector (D)					
4th Impinger (Mod-GBS)			Empty	468.9	
U-Connector (E)					
5th [redacted]			~200 g indicating silica gel		741.8
[redacted]	—		~~~200 g indicating silica~~ gel		—
[redacted] Impinger (Mod-GBS)	—				
Impinger Outlet Connector					

Note: Components in italics used only with MRI-style organic module. Do not use for PAHs.

- * Nozzle openings covered with hexane-rinsed aluminum foil, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with hexane-rinsed aluminum foil before and after sampling.
- ~~** Optional for low/high particulate/moisture gas streams as applicable.~~
- *** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with hexane-rinsed aluminum foil.
- **** Cartridge weighed with blank-offs in place; then, covered with aluminum foil to seal out light during storage and sampling.

Component Changes After Setup And Before Recovery And Other Comments:

STL is glass sample transfer line from filter holder outlet to condenser inlet. Entire length is heated.

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 1 Sampling Train No. SV-1 Sample Box No. 011995
Transfer for Recovery:

Relinquished By ______ Received By J. M. L. Date/Time 11-9-93 2000
Sample box recovery person(s): J. McL. J. Surm Date 11-9-93
Probe recovery person(s): Mark Whitmire Date 11-9-93

RESIN CARTRIDGE AND IMPINGERS RECOVERY

Impinger:	XAD Cartridge	1st	2nd	3rd	4th	5th	~~6th~~
Final Wt.(g)	486.1	540.2	568.4	574.0	471.0	759.7	
Initial Wt.(g)	484.1	466.7	567.5	573.4	468.9	741.8	
Net Wt.(g)	2.0	73.5	.9	.6	2.1	17.9	

[Total Condensate Collected (g): 97.0]

Description and color:	white	clear	clear	clear	clear	20 % Blue	

>>>>>>
Impingers: XAD Cartridge >>>>>>>>>> 1-4 <<<<<<<<<<<

Sample Number: 1039 1040 <--Recovery of 2nd-4th Impingers and
Sample Bottle Tare Wt.(g) 498.4 U-connectors C-E Optional
Sample Bottle Gross Wt.(g) 762.0 Before Rinses
Components Rinsed**: 1st-4th impingers, U-connectors A-E

Sample Bottle Final Wt.(g) 869.7 After Rinses
Net Sample Wt.(g) 371.3

FILTER RECOVERY AND TRAIN RINSES

FILTER
Sample Number: 1037 Description and Color: dirty white

TRAIN RINSES Sample Number: 1036/038A 1038
Sample Bottle Tare Wt.(g) 171.3 174.6 175.0
Components Rinsed***: nozzle, probe liner, cyclone/flask or bypass, filter holder, short 90° connector, condenser, thermowell U-connector

Sample Bottle Final Wt.(g) 250.8 254.7 225.4
Net Sample Wt.(g) 79.5 80.1 50.4

- * Pour any residual condensate from condenser into cartridge inlet, replace blank-offs and remove aluminum foil, then weigh; replace aluminum foil to cover entire cartridge.
- ** Methanol/methylene chloride (1:1 v/v) rinses (3X).
- *** Methanol/methylene chloride (1:1 v/v) rinses with brushing (with 5 minute soaks of underlined components) 3X or more until clean.

COMMENTS: Greenish brown tacky material condensed on Teflon filter support on filter side. Some of this residue is on back side of filter. The rinse sample includes back half filter holder & support rinses (sample 1038A) Sample 1038 includes other component rinses

FILE NAME - semv1
RUN # - M5SVKL1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:12:38

Initial Meter Volume (Cubic Feet)=	460.067		
Final Meter Volume (Cubic Feet)=	563.962		
Meter Factor=	1.021		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Feet)=	106.077		
Gas Volume (Dry Standard Cubic Feet)=	102.084		
Barometric Pressure (in Hg)=	29.30		
Static Pressure (Inches H20)=	-0.12		
Percent Oxygen=	17.8		
Percent Carbon Dioxide=	2.2		
Moisture Collected (ml)=	97.0		
Percent Water=	4.3		
Average Meter Temperature (F)=	79		
Average Delta H (in H20)=	1.38		
Average Delta P (in H20)=	0.082		
Average Stack Temperature (F)=	433		
Dry Molecular Weight=	29.06		
Wet Molecular Weight=	28.59		
Average Square Root of Delta P (in H20)=	0.2608		
% Isokinetic=	94.8		
Pitot Coefficient=	0.84		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (Inches)=	0.419		
Stack Axis #1 (Inches)=	68.0		
Stack Axis #2 (Inches)=	68.0		
Rectangular Stack			
Stack Area (Square Feet)=	32.11		
Stack Velocity (Actual, Feet/min)=	1,160		
Flow Rate (Actual, Cubic ft/min)=	37,260		
Flow rate (Standard, Wet, Cubic ft/min)=	21,559		
Flow Rate (Standard, Dry, Cubic ft/min)=	20,635		

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (gr/scf)=	0.0000	0.0000	0.0000
Particulate Loading, Actual (gr/cu ft)=	0.0000		
Emission Rate (lb/hr)=	0.00		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - semv1
RUN # - M5SVKL1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:12:39

Initial Meter Volume (Cubic Meters)=	13.027	
Final Meter Volume (Cubic Meters)=	15.969	
Meter Factor=	1.021	
Multiple leak checks, see end of printout		Leak Correction= 0.0000
Net Meter Volume (Cubic Meters)=	3.004	
Gas Volume (Dry Standard Cubic Meters)=	2.891	
Barometric Pressure (mm Hg)=	744	
Static Pressure (mm H20)=	-3	
Percent Oxygen=	17.8	
Percent Carbon Dioxide=	2.2	
Moisture Collected (ml)=	97.0	
Percent Water=	4.3	
Average Meter Temperature (C)=	26	
Average Delta H (mm H20)=	35.0	
Average Delta P (mm H20)=	2.1	
Average Stack Temperature (C)=	223	
Dry Molecular Weight=	29.06	
Wet Molecular Weight=	28.59	
Average Square Root of Delta P (mm H20)=	1.3142	
% Isokinetic=	94.8	
Pitot Coefficient=	0.84	
Sampling Time (Minutes)=	175.0	
Nozzle Diameter (mm)=	10.64	
Stack Axis #1 (Meters)=	1.727	
Stack Axis #2 (Meters)=	1.727	
Rectangular Stack		
Stack Area (Square Meters)=	2.983	
Stack Velocity (Actual, m/min)=	354	
Flow rate (Actual, Cubic m/min)=	1,055	
Flow rate (Standard, Wet, Cubic m/min)=	610	
Flow rate (Standard, Dry, Cubic m/min)=	584	

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% C02
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (mg/cu m)=	0.0	0.0	0.0
Particulate Loading, Actual (mg/cu m)=	0.0		
Emission Rate (kg/hr)=	0.00		

No Back Half Analysis

FILE NAME - semv1
RUN # - M5SVKL1
LOCATION - KILN
DATE - 11-09-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:12:40

Point #	Delta P (in. H20)	Delta H (in. H20)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.005	0.08	425	72	71
2	0.015	0.21	422	74	73
3	0.025	0.40	426	73	73
4	0.085	1.40	428	75	74
5	0.165	2.80	430	78	75
6	0.005	0.08	425	78	77
7	0.025	0.41	422	79	78
8	0.070	1.20	429	80	79
9	0.160	2.73	432	82	79
10	0.145	2.50	437	85	80
11	0.020	0.34	424	78	77
12	0.070	1.20	429	77	77
13	0.115	2.00	436	79	78
14	0.175	3.00	438	82	78
15	0.070	1.20	439	85	82
16	0.145	2.50	437	79	79
17	0.120	2.00	439	81	79
18	0.055	0.85	441	82	79
19	0.025	0.42	441	82	80
20	0.005	0.08	438	82	80
21	0.145	2.50	438	81	80
22	0.150	2.40	439	82	80
23	0.165	2.70	441	83	80
24	0.060	1.00	440	85	80
25	0.025	0.40	438	84	80

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.0000	0.0000	0.0000	0.0000

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	0.0000	0.0000	0.0	0.0000
IMPINGERS	0.0000	0.0000	0.0	0.0000

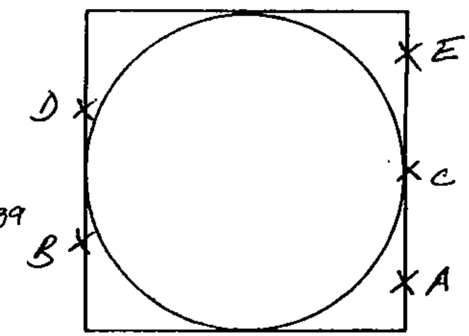
Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

Lk Rate (cfm)	Time (min)
0.0100	35.0000
0.0060	35.0000
0.0050	105.0000

FIELD DATA

RUN NO.	SV - 2	PROBE NO.	VL-1	NOZZLE DIA	0.417
PROJECT NO.	4601	PROBE LENGTH AND TYPE	8 ft GLASS	ASSUMED MOISTURE %	10%
PLANT	BELDEN BRICK 6	SAMPLE BOX NO.	~~[illegible]~~ 011512	METER ΔH@	1.853
DATE	11/10/93	METER BOX NO.	N-7	METER CORRECTION	1.021
SAMPLING LOCATION	KILN STACK	TEMP. CONTROLLER NO.	N-7	PITOT NO.	M-1
SAMPLE TYPE	SEMIVOLATILES	TEMP. METER NO.	N-7	PITOT COEFFICIENT	~~0.8400~~ 0.8339
OPERATOR	WHITMIRE	THERMOCOUPLE I.D. NO.	96-6A	BAROMETRIC PRESSURE	~~29.3~~ 29.26
FILTER NO.		UMBILICAL CORD I.D. NO.	N-125-5	SITE TO BAFO. ELEVATION (ft.)	
RECORD DATA EVERY	7 MIN.	UMBILICAL CORD I.D. NO.		CORRECTED B.P. (0.1 in./100 ft.)	
UMBILICAL/SAMPLER HOOKUP	U/H-~~0~~3	NOZZLE NO.	SV-1	STATIC PRESSURE	-0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	0930	1408				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	~~0825~~		0931	1215	1230
VACUUM, In. Hg	≥15"		≥15"	12	≥15"
CFM	~~.006~~		.007	0.008	0.006
VOLUMES					
FINAL			625.077		
INITIAL			624.065		
DIFFERENCE			1.012		

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1410				
VACUUM, In. Hg	≥13	≥15"		≥15"	
CFM	.005				
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME 565.23

FINAL VOLUME 668.846

LEAK CHECK VOLUME 1.012

ADJUSTED FINAL VOLUME 667.834

COMMENTS

RUN NO. 2　　SAMPLING LOCATION KILN STACK　　p. 1 of 1

DATE 11/10/93　　PROJECT NO. 4601　　OPERATOR WHITMIRE

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr.)	GAS METER READING (V_m), ft³ INITIAL 565.23 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F	XAD	
	0.00	0942															
1B	7.00	0949	566.394	566.270	0.005	0.09	0.09	417	73	72	3	50	237	254	250	48	
2	14	0956	570.443	570.23	0.085	1.39	1.45	462	74	72	7	49	242	255	252	47	
3	21	1003	576.696	~~583.116~~	0.15	2.2	2.6	407	75	73	10	46	248	256	257	47	
4	28	1010	583.116	582.110	0.16	1.99	2.2	435	81	74	11	50	243	257	244	46	
5	35	1017	588.572	588.037	0.10	1.92	2.0	434	83	77	11	50	246	253	256	46	
1C	7	1033	590.242	590.04	0.01	0.18	0.18	442	79	78	5	59	244	255	254	49	
	14	1040	591.911	592.08	0.01	0.18	0.22	414	80	78	5	55	246	258	255	49	
	21	1047	594.780	595.03	0.03	0.54	0.54	431	81	79	7	54	241	255	253	50	
	28	1054	598.484	598.48	0.05	0.91	0.91	434	81	79	7	53	247	257	255	50	
	35	1101	604.565	604.463	0.135	2.45	2.45	439	84	80	11	50	249	257	255	49	
1E	7	1135	605.654	605.70	0.005	0.09	0.09	400	80	78	4	62	246	255	251	55	
	14	1142	608.048	608.17	0.02	0.38	0.40	391	80	79	8	53	250	257	252	54	
	21	1149	612.272	612.10	0.065	0.18	1.10	431	81	79	11	54	245	258	247	52	
	28	1156	618.141	618.09	0.125	2.28	2.40	432	83	80	12	57	260	256	254	50	
	35	1203	624.025	624.065	0.125	2.28	2.40	434	86	81	12	53	245	258	255	50	
B	7	1243	630.942	630.82	0.125	2.28	2.30	433	82	82	12	50	252	257	256	49	
	14	1250	636.930	637.05	0.13	2.37	2.40	436	84	82	13	49	255	257	257	50	
	21	1257	641.619	641.810	0.08	1.45	1.45	441	85	82	12	51	238	262	253	49	
	28	1304	645.857	645.82	0.065	1.18	1.10	446	86	83	12	50	243	260	259	48	
	35	1311	648.737	648.805	0.03	0.54	0.54	439	86	83	12	50	246	259	257	48	
D	7	1329	654.660	654.70	0.125	2.27	2.30	442	84	84	12	48	238	255	252	48	
	14	1336	660.425	660.830	0.12	2.18	2.18	440	86	83	12	48	234	258	252	48	
	21	1343	664.505	664.93	0.06	1.09	0.97	441	88	84	7	50	235	259	254	45	
	28	1350	667.393	667.69	0.03	0.54	0.50	440	89	84	5	57	236	257	253	45	
	35	1357	668.574	668.846	0.005	0.05		436	87	85	5	51	241	262	253	50	

COMMENTS

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3

Run No. 2 Sampling Train No. SV-2 Sample Box No. 011512
Set up person(s): Jz McC Date 11-9-93
Transfer to Sampler: ✓ Sample Box Leak Check: ______cfm @ ______in.Hg vacuum

Relinquished By ________ Received By ________ Date/Time ________

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	•			
Probe (Liner-Glass)	•			
Female Probe Blank-off				
Cyclone**	•			
Flask**				
90° Bypass**	•			
Filter Holder Front	F-115	Filter Type:		
Filter Holder Back		Whatman QM-A #3		
Short 90° Connector				
Condenser		Thermocouple No.:		
Thermowell U-Connector				
XAD-2 Resin Cartridge		~65 grams XAD-2 Resin		472.2****
U-Connector (A)				
1st Impinger (2-L** Short-stem Mod-GBS)		Empty	493.0	
U-Connector (B)				
2nd Impinger (Mod-GBS)		100 mLs	473.9	573.1
U-Connector (C)		ASTM Type II Water		
3rd Impinger (GBS)		100 mLs	481.0	583.3
U-Connector (D)		ASTM Type II Water		
4th Impinger (Mod-GBS)		Empty	469.9	
U-Connector (E)				
5th Impinger (Mod-GBS)**		~200 g indicating silica gel		708.5
U-Connector (F)**		~200 g indicating silica gel		
6th Impinger (Mod-GBS)				
Impinger Outlet Connector				

Note: Components in italics used only with MRI-style organic module. Do not use for PAHs.
- • Nozzle openings covered with hexane-rinsed aluminum foil, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with hexane-rinsed aluminum foil before and after sampling.
- •• Optional for low/high particulate/moisture gas streams as applicable.
- *** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with hexane-rinsed aluminum foil.
- **** Cartridge weighed with blank-offs in place; then, covered with aluminum foil to seal out light during storage and sampling.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 2 Sampling Train No. SV-2 Sample Box No. 011512
Transfer for Recovery:

Relinquished By ________ Received By J. McCa Date/Time 11-10-93 1436
Sample box recovery person(s): J. McCa Date 11-10-93
Probe recovery person(s): ________ Date ________

RESIN CARTRIDGE AND IMPINGERS RECOVERY

Impinger:	XAD Cartridge	1st	2nd	3rd	4th	5th	6th
Final Wt.(g)	475.4	567.3	574.6	581.0	471.3	727.1	
Initial Wt.(g)	472.2	493.0	573.1	583.3	469.9	708.5	
Net Wt.(g)	3.2	74.3	1.5	(2.3)	1.4	18.6	

[Total Condensate Collected (g): 96.7]

Description and color:	white	clear	clear	clear	clear	20	
		>>>>>>				% Blue	

Impingers: XAD Cartridge >>>>>>>>>> 1-4 <<<<<<<<<<<

Sample Number: 2039 2040 <--Recovery of 2nd-4th Impingers and U-connectors C-E Optional
Sample Bottle Tare Wt.(g) 497.9
Sample Bottle Gross Wt.(g) 765.1 Before Rinses
Components Rinsed**: 1st-4th impingers, U-connectors A-E

Sample Bottle Final Wt.(g) 879.3 After Rinses **
Net Sample Wt.(g) 381.4

FILTER RECOVERY AND TRAIN RINSES

FILTER
Sample Number: 2037 Description and Color: dirty white*

TRAIN RINSES Sample Number: 2036/038 203PA***
Sample Bottle Tare Wt.(g) 174.6 172.7 175.2
Components Rinsed***: nozzle, probe liner, cyclone/flask or bypass, filter holder, short 90° connector, condenser, thermowell U-connector

Sample Bottle Final Wt.(g) 251.1 232.5 244.4
Net Sample Wt.(g) 76.5 59.8 69.2

- Pour any residual condensate from condenser into cartridge inlet, replace blank-offs and remove aluminum foil, then weigh; replace aluminum foil to cover entire cartridge.

** Methanol/methylene chloride (1:1 v/v) rinses (3X).

*** Methanol/methylene chloride (1:1 v/v) rinses with brushing (with 5 minute soaks of underlined components) 3X or more until clean.

COMMENTS:

* Filter support tacky on front, see sample 203PA

** Back half of filter holder rinsed into ~~carton~~ impinger solution

*** Filter support rinse using MeOH/MeCl

FILE NAME - semiv2
RUN # - m5svkn2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:20:31

Initial Meter Volume (Cubic Feet)=	565.230	
Final Meter Volume (Cubic Feet)=	667.834	
Meter Factor=	1.021	
Multiple leak checks, see end of printout		Leak Correction= 0.0000
Net Meter Volume (Cubic Feet)=	104.759	
Gas Volume (Dry Standard Cubic Feet)=	100.421	
Barometric Pressure (in Hg)=	29.30	
Static Pressure (Inches H2O)=	-0.12	
Percent Oxygen=	18.8	
Percent Carbon Dioxide=	1.8	
Moisture Collected (ml)=	96.7	
Percent Water=	4.3	
Average Meter Temperature (F)=	81	
Average Delta H (in H2O)=	1.32	
Average Delta P (in H2O)=	0.071	
Average Stack Temperature (F)=	428	
Dry Molecular Weight=	29.04	
Wet Molecular Weight=	28.56	
Average Square Root of Delta P (in H2O)=	0.2453	
% Isokinetic=	100.5	
Pitot Coefficient=	0.83	
Sampling Time (Minutes)=	175.0	
Nozzle Diameter (Inches)=	0.417	
Stack Axis #1 (Inches)=	68.0	
Stack Axis #2 (Inches)=	68.0	
Rectangular Stack		
Stack Area (Square Feet)=	32.11	
Stack Velocity (Actual, Feet/min)=	1,081	
Flow Rate (Actual, Cubic ft/min)=	34,708	
Flow rate (Standard, Wet, Cubic ft/min)=	20,202	
Flow Rate (Standard, Dry, Cubic ft/min)=	19,325	

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (gr/scf)=	0.0000	0.0000	0.0000
Particulate Loading, Actual (gr/cu ft)=	0.0000		
Emission Rate (lb/hr)=	0.00		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - semiv2
RUN # - m5svkn2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:20:33

Initial Meter Volume (Cubic Meters)=	16.005		
Final Meter Volume (Cubic Meters)=	18.910		
Meter Factor=	1.021		
Multiple leak checks, see end of printout		Leak Correction=	0.0000
Net Meter Volume (Cubic Meters)=	2.966		
Gas Volume (Dry Standard Cubic Meters)=	2.844		
Barometric Pressure (mm Hg)=	744		
Static Pressure (mm H20)=	-3		
Percent Oxygen=	18.8		
Percent Carbon Dioxide=	1.8		
Moisture Collected (ml)=	96.7		
Percent Water=	4.3		
Average Meter Temperature (C)=	27		
Average Delta H (mm H20)=	33.4		
Average Delta P (mm H20)=	1.8		
Average Stack Temperature (C)=	220		
Dry Molecular Weight=	29.04		
Wet Molecular Weight=	28.56		
Average Square Root of Delta P (mm H20)=	1.2362		
% Isokinetic=	100.5		
Pitot Coefficient=	0.83		
Sampling Time (Minutes)=	175.0		
Nozzle Diameter (mm)=	10.59		
Stack Axis #1 (Meters)=	1.727		
Stack Axis #2 (Meters)=	1.727		
Rectangular Stack			
Stack Area (Square Meters)=	2.983		
Stack Velocity (Actual, m/min)=	329		
Flow rate (Actual, Cubic m/min)=	983		
Flow rate (Standard, Wet, Cubic m/min)=	572		
Flow rate (Standard, Dry, Cubic m/min)=	547		

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (mg/cu m)=	0.0	0.0	0.0
Particulate Loading, Actual (mg/cu m)=	0.0		
Emission Rate (kg/hr)=	0.00		

No Back Half Analysis

FILE NAME - semiv2
RUN # - m5svkn2
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
03-07-1994 09:20:34

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.005	0.09	417	73	72
2	0.075	1.45	403	74	72
3	0.150	2.60	407	75	73
4	0.110	2.20	435	81	74
5	0.100	2.00	434	83	77
6	0.010	0.18	412	79	78
7	0.010	0.22	414	80	78
8	0.030	0.54	431	81	79
9	0.050	0.91	434	81	79
10	0.135	2.45	439	84	80
11	0.005	0.09	400	80	78
12	0.020	0.40	391	80	79
13	0.065	1.10	431	81	79
14	0.125	2.40	432	83	80
15	0.125	2.40	434	86	81
16	0.125	2.30	433	82	82
17	0.130	2.40	436	84	82
18	0.080	1.45	441	85	82
19	0.065	1.10	440	86	83
20	0.030	0.54	439	86	83
21	0.125	2.30	442	84	84
22	0.120	2.18	440	86	83
23	0.060	0.99	441	88	84
24	0.030	0.50	440	88	84
25	0.005	0.10	436	87	85

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.0000	0.0000	0.0000	0.0000

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	0.0000	0.0000	0.0	0.0000
IMPINGERS	0.0000	0.0000	0.0	0.0000

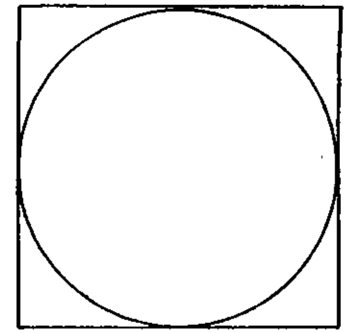
Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

Multiple leak checks used. Final readings for each segment are listed below

Lk Rate (cfm)	Time (min)
0.0080	70.0000
0.0060	105.0000

FIELD DATA

RUN NO.	SV-3	PROBE NO.	UL-1	NOZZLE DIA.	0.419
PROJECT NO.	4601.01.05.01	PROBE LENGTH AND TYPE	8' - Quartz	ASSUMED MOISTURE %	10%
PLANT	Belden Brick	SAMPLE BOX NO.	011995	METER ΔH@	1.853
DATE	11-10-93	METER BOX NO.	N-7	METER CORRECTION	1.021
SAMPLING LOCATION	Kiln	TEMP. CONTROLLER NO.	N-7	PITOT NO.	M-1
SAMPLE TYPE	SV-Integrated	TEMP. METER NO.	N-7	PITOT COEFFICIENT	.8400
OPERATOR	Whitmire	THERMOCOUPLE I.D. NO.	96-6A	BAROMETRIC PRESSURE	29.3
FILTER NO.		UMBILICAL CORD I.D. NO.	N-125-5	SITE TO BARO. ELEVATION (ft.)	—
RECORD DATA EVERY	7 MIN.	UMBILICAL CORD I.D. NO.	—	CORRECTED B.P. (0.1 in./100 ft.)	—
UMBILICAL/SAMPLER HOOKUP	UH-3	NOZZLE NO.	SV-3	STATIC PRESSURE	-0.12



SCHEMATIC OF TRAVERSE POINT LAYOUT

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)	1521	1956				
PASS/FAIL		PASS				

PITOT LEAK CHECK $\geq 3'' H_2O$

	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)						
PASS/FAIL						

SAMPLE TRAIN LEAK CHECKS

	INITIAL	FINAL	INITIAL	FINAL	INITIAL
TIME (24 hr)	1524	1957			
VACUUM, In. Hg	≥15"	≥14"	≥15"		≥15"
CFM	.002	.005			
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

SAMPLE TRAIN LEAK CHECKS

	FINAL	INITIAL	FINAL	INITIAL	FINAL
TIME (24 hr)					
VACUUM, In. Hg		≥15"		≥15"	
CFM					
VOLUMES					
FINAL					
INITIAL					
DIFFERENCE					

INITIAL VOLUME ~~760.0628~~ 670.062

FINAL VOLUME 784.002

LEAK CHECK VOLUME —

ADJUSTED FINAL VOLUME 784.002

COMMENTS

Revision 11/18/86

Dilution - 0.005

RUN NO. SV 3 SAMPLING LOCATION KILN STACK p. ____ of ____

DATE 11/10/93 PROJECT NO. ____ OPERATOR WHITMIRE

MT1 MT2

TRAVERSE POINT NUMBER	SAMPLING TIME, min (0.00)	CLOCK TIME (24-hr.) (1553)	GAS METER READING (V_m), ft³ INITIAL ~~760.062~~ 670.062 DESIRED	ACTUAL	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMP. (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VAC., in. Hg	IMPINGER TEMP., °F	SAMPLE BOX TEMP., °F	PROBE TEMP., °F	FILTER TEMP., °F	XA	
D-1	7	1600	676.106	676.22	0.135	2.43	2.43	440	80	78	10	60	240	256	254	57	
D-2	14	1607	772.158	682.50	0.135	2.43	2.43	441	81	79	11	48	233	259	253	46	
D-3	21	1618	689.767	687.85	0.135	2.44	2.43	443	84	80	11	49	235	256	254	46	
D-4	28	1625	692.639	691.10	0.030	0.54	0.55	436	83	81	4	47	228	257	250	48	
D-5	35	1632	695.260	694.21	0.025	0.45	0.50	436	83	81	5	50	229	255	252	50	
	0	1639			~~0.140~~	~~2.~~		~~438~~	~~82~~	~~81~~							
B-1	7	1646	701.451	701.295	0.140	2.54	2.54	438	82	81	13	46	232	257	254	49	
B-2	14	1653	707.779	707.445	0.145	2.64	2.64	440	86	83	12	49	227	258	255	49	
B-3	21	1700	713.174	711.985	0.105	1.91	1.91	440	87	84	6	51	226	259	254	49	
B-4	28	1707	717.416	716.610	0.065	1.18	1.18	443	88	84	9	49	225	258	253	49	
B-5	35	1714	720.048	719.631	0.025	0.45	0.45	442	88	84	5	50	228	258	253	50	
		1737			~~0.010~~			~~429~~	~~85~~								
E-1	7	1744	721.722	721.445	0.010	0.18	0.18	429	85	85	5	54	233	255	252	49	
E-2	14	1751	724.845	724.552	0.035	0.64	0.64	432	85	84	7	48	232	255	253	48	
E-3	21	1758	729.388	729.085	0.075	1.36	1.36	443	85	84	9	47	230	258	255	48	
E-4	28	1805	735.716	735.450	0.145	2.63	2.63	445	87	85	12	50	227	258	255	48	
E-5	35	1812	741.836	741.954	0.135	2.45	2.43	446	90	85	12	52	229	258	255	49	
		1829			~~0.010~~	~~0.18~~		~~431~~	~~87~~	~~86~~							
C-1	7	1836	743.512	743.935	0.010	0.18	0.18	431	87	86	5	47	233	255	251	45	
C-2	14	1843	745.186	745.655	0.010	0.18	0.18	430	86	86	5	45	232	255	255	45	
C-3	21	1850	747.829	748.240	0.025	0.45	0.45	436	86	86	6	45	234	255	253	45	
C-4	28	1858	752.970	753.505	0.095	1.73	1.73	440	87	86	9	45	233	258	254	46	
C-5	35	1904	759.539	759.372	0.155	2.83	2.83	441	88	86	13	49	228	257	255	47	
A-1	7	1919	761.910	761.789	0.020	0.36	0.36	431	87	86	5	47	227	257	249	47	
A-2	14	1926	766.218	766.250	0.065	1.22	1.22	417	87	86	8	47	232	259	253	48	
A-3	21	1933	771.994	771.995	0.120	2.19	2.19	442	88	86	11	49	227	259	254	49	
A-4	28	1940	779.176	779.350	0.185	3.39	3.39	443	90	86	14	53	229	258	254	49	
A-5	35	1947	784.188	784.002	0.090	1.64	1.64	444	91	86	8	56	225	258	255	52	

COMMENTS A SHUT DOWN AT 16:09 RESTORTED AT 16:13

A

Revision 9-4-88

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SETUP DATA

MRI Project No. 4601.01.05.01
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No.3

Run No. 3 Sampling Train No. SU-1 Sample Box No. 011995
Set up person(s): J. McC Date 11-10-93
Transfer to Sampler: Sample Box Leak Check: ______ cfm @ ______ in.Hg vacuum

Relinquished By J McC Received By ______ Date/Time 11-10-93 1700

TRAIN COMPONENT	COMPONENT NO.	LOADING DATA	Initial Weights (grams)*** Empty	Loaded
Sampling Nozzle (Quartz)	•			
Probe (Liner-Glass)	•			
Female Probe Blank-off				
Cyclone**	*			
Flask**				
90° Bypass**	*			
Filter Holder Front	F-102	Filter Type:		
Filter Holder Back		Whatman QM-A		
Short 90° Connector		LF7		
~~Condenser~~		~~Thermocouple No.:~~		
Thermowell U-Connector				
XAD-2 Resin Cartridge		~65 grams XAD-2 Resin		476.9****
U-Connector (A)				
1st Impinger (2-L** Short-stem Mod-GBS)		Empty	466.7	
U-Connector (B)				
2nd Impinger (Mod-GBS)		100 mLs ASTM Type II Water	469.2	569.2
U-Connector (C)				
3rd Impinger (GBS)		100 mLs ASTM Type II Water	472.9	571.7
U-Connector (D)				
4th Impinger (Mod-GBS)		Empty	468.9	
U-Connector (E)				
5th Impinger (Mod-GBS)**		~200 g indicating silica gel		733.4
U-Connector (F)**		~~~200 g indicating silica gel~~		
~~6th Impinger (Mod-GBS)~~				
Impinger Outlet Connector				

Note: Components in italics used only with MRI-style organic module. Do not use for PAHs.

* Nozzle openings covered with hexane-rinsed aluminum foil, and nozzle placed in ziplock bag before and after sampling. Probe liner outlet sealed with glass female blank-off, and probe liner inlet sealed with Teflon tape and Swagelok cap before and after sampling. Sample box inlet covered (not sealed) with hexane-rinsed aluminum foil before and after sampling.

** Optional for low/high particulate/moisture gas streams as applicable.

*** Initial weights of additional components exchanged during the run also entered here. All exchange component openings covered with hexane-rinsed aluminum foil.

**** Cartridge weighed with blank-offs in place; then, covered with aluminum foil to seal out light during storage and sampling.

Component Changes After Setup And Before Recovery And Other Comments:

MODIFIED SW-846, M0010 - SEMIVOLATILE ORGANICS TRAIN FOR SV-POHCs (MM5SV)
FIELD LABORATORY SAMPLE RECOVERY DATA

MRI Project No. 4601.01.05
Client/Source: Belden Brick Company
Source Location: Sugar Creek, Ohio
Sampling Location: Kiln Stack No. 3

Run No. 3 Sampling Train No. SV-1 Sample Box No. 011995
Transfer for Recovery:

Relinquished By ______ Received By J McC Date/Time 11-10-93 2040
Sample box recovery person(s): J McC / J. S Date 11-10-93
Probe recovery person(s): ______ Date ______

RESIN CARTRIDGE AND IMPINGERS RECOVERY

Impinger:	XAD Cartridge	1st	2nd	3rd	4th	5th	6th
Final Wt.(g)	477.4	546.8	571.1	572.1	473.2	764.9	
Initial Wt.(g)	~~479~~ 476.9	466.7	569.2	571.7	468.9	733.4	
Net Wt.(g)	0.5	80.1	1.9	.4	4.3	31.5	

[Total Condensate Collected (g): 118.7]

Description and color:	clear	clear	clear	clear	clear	15 % Blue	

>>>>>>
Impingers: XAD Cartridge >>>>>>>>> 1-4 <<<<<<<<<<<

Sample Number: 3039 3040 <--Recovery of 2nd-4th Impingers and
Sample Bottle Tare Wt.(g) 497.5 U-connectors C-E Optional
Sample Bottle Gross Wt.(g) 769.7 Before Rinses
Components Rinsed**: 1st-4th impingers, U-connectors A-E

Sample Bottle Final Wt.(g) 854.7 After Rinses
Net Sample Wt.(g) 357.2

FILTER RECOVERY AND TRAIN RINSES

FILTER
Sample Number: 3037 Description and Color: dirty white

TRAIN RINSES Sample Number: 3036/038 3038A
Sample Bottle Tare Wt.(g) 171.8 175.9 NR
Components Rinsed***: nozzle, probe liner, cyclone/flask or bypass, filter holder, short 90° connector, condenser, thermowell U-connector

Sample Bottle Final Wt.(g) 280.6 240.0 ~~[illegible]~~
Net Sample Wt.(g) ~~240.0~~ 108.8 64.1 237.8 Final wt.

- Pour any residual condensate from condenser into cartridge inlet, replace blank-offs and remove aluminum foil, then weigh; replace aluminum foil to cover entire cartridge.

** Methanol/methylene chloride (1:1 v/v) rinses (3X).

*** Methanol/methylene chloride (1:1 v/v) rinses with brushing (with 5 minute soaks of underlined components) 3X or more until clean.

COMMENTS:

FILE NAME - semiv3
RUN # - m5svkn3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:46:59

Initial Meter Volume (Cubic Feet)=	670.062
Final Meter Volume (Cubic Feet)=	784.002
Meter Factor=	1.021
Final Leak Rate (cu ft/min)=	0.005
Net Meter Volume (Cubic Feet)=	116.333
Gas Volume (Dry Standard Cubic Feet)=	110.755
Barometric Pressure (in Hg)=	29.30
Static Pressure (Inches H20)=	-0.12
Percent Oxygen=	17.8
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	118.7
Percent Water=	4.8
Average Meter Temperature (F)=	85
Average Delta H (in H20)=	1.54
Average Delta P (in H20)=	0.085
Average Stack Temperature (F)=	438
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.53
Average Square Root of Delta P (in H20)=	0.2707
% Isokinetic=	100.5
Pitot Coefficient=	0.83
Sampling Time (Minutes)=	175.0
Nozzle Diameter (Inches)=	0.419
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Rectangular Stack	
Stack Area (Square Feet)=	32.11
Stack Velocity (Actual, Feet/min)=	1,200
Flow Rate (Actual, Cubic ft/min)=	38,537
Flow rate (Standard, Wet, Cubic ft/min)=	22,184
Flow Rate (Standard, Dry, Cubic ft/min)=	21,118

Particulate Loading - Front Half

		Corr. to 7% 02	& 12% CO2
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (gr/scf)=	0.0000	0.0000	0.0000
Particulate Loading, Actual (gr/cu ft)=	0.0000		
Emission Rate (lb/hr)=	0.00		

No Back Half Analysis

* * METRIC UNITS * *

FILE NAME - semiv3
RUN # - m5svkn3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:47:01

Initial Meter Volume (Cubic Meters)=	18.973
Final Meter Volume (Cubic Meters)=	22.200
Meter Factor=	1.021
Final Leak Rate (cu m/min)=	0.0001
Net Meter Volume (Cubic Meters)=	3.294
Gas Volume (Dry Standard Cubic Meters)=	3.136
Barometric Pressure (mm Hg)=	744
Static Pressure (mm H20)=	-3
Percent Oxygen=	17.8
Percent Carbon Dioxide=	2.2
Moisture Collected (ml)=	118.7
Percent Water=	4.8
Average Meter Temperature (C)=	29
Average Delta H (mm H20)=	39.1
Average Delta P (mm H20)=	2.1
Average Stack Temperature (C)=	226
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.53
Average Square Root of Delta P (mm H20)=	1.3643
% Isokinetic=	100.5
Pitot Coefficient=	0.83
Sampling Time (Minutes)=	175.0
Nozzle Diameter (mm)=	10.64
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Rectangular Stack	
Stack Area (Square Meters)=	2.983
Stack Velocity (Actual, m/min)=	366
Flow rate (Actual, Cubic m/min)=	1,091
Flow rate (Standard, Wet, Cubic m/min)=	628
Flow rate (Standard, Dry, Cubic m/min)=	598

Particulate Loading - Front Half

		Corr. to 7% O2	& 12% CO2
Particulate Weight (g)=	0.0000		
Particulate Loading, Dry Std. (mg/cu m)=	0.0	0.0	0.0
Particulate Loading, Actual (mg/cu m)=	0.0		
Emission Rate (kg/hr)=	0.00		

No Back Half Analysis

FILE NAME - semiv3
RUN # - m5svkn3
LOCATION - KILN
DATE - 11-10-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/27/89
03-07-1994 08:47:01

Point #	Delta P (in. H2O)	Delta H (in. H2O)	Stack T (F)	Meter T In(F)	Meter T Out(F)
1	0.135	2.43	440	80	78
2	0.135	2.43	441	81	79
3	0.135	2.43	443	84	80
4	0.030	0.55	436	83	81
5	0.025	0.50	436	83	81
6	0.140	2.54	438	82	81
7	0.145	2.64	440	86	83
8	0.105	1.91	440	87	84
9	0.065	1.18	443	88	84
10	0.025	0.45	442	88	84
11	0.010	0.18	429	85	85
12	0.035	0.64	432	85	84
13	0.075	1.36	443	85	84
14	0.145	2.63	445	87	85
15	0.135	2.43	446	90	85
16	0.010	0.18	431	87	86
17	0.010	0.18	430	86	86
18	0.025	0.45	436	86	86
19	0.095	1.73	440	87	86
20	0.155	2.83	441	88	86
21	0.020	0.36	431	87	86
22	0.065	1.22	417	87	86
23	0.120	2.19	442	88	86
24	0.185	3.39	443	90	86
25	0.090	1.64	444	91	86

Fraction	Final Wt. (g)	Tare Wt. (g)	Blank Wt. (g)	Net Wt. (g)
DRY CATCH	0.0000	0.0000	0.0000	0.0000
FILTER	0.0000	0.0000	0.0000	0.0000

Fraction	Final Wt. (g)	Tare Wt. (g)	Vol. (ml)	Net Wt. (g)
PROBE RINSE	0.0000	0.0000	0.0	0.0000
IMPINGERS	0.0000	0.0000	0.0	0.0000

Probe Rinse Blank (mg/ml)= 0.0000
Impinger Blank (mg/ml)= 0.0000

from . . .

ROY NEULICHT

VOST

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01
Client US EPA EIB
Facility Belden Brick Co. Plant #6
Source Kiln #3
Sampling Location Kiln #3 Stack
Barometric Pressure (in. Hg) NA
Site to Barometer Elevation (ft) NA
Corrected BP (0.1 in/100 ft) 29.16
Desired Probe/STL Temperature (°C) 140
Desired Flow Rate (Liters/min) 1.0
Desired Sample Volume (Liters) 20
Heated Sample Transfer Line Length (in) 30

Run No. 1 Date 11-11-93
Operator J. Surman
VOST Console No. 1
VOST Unit No. 5
Meter Calibration Factor (Y) 1.007
Tenax Inlet Thermocouple No. V-2
Temperature Meter No. Y-0784
Temperature Controller No. NR-Dual Omega 6100
Temperature Meter No. Y-0784
Probe Length (in) 36
Probe Liner Material Glass
Liner Material Teflon

Tenax Tube No. 3697 Sample No. 1067
Tenax/Charcoal Tube No. 2155 Sample No. 1068

Field Blank Tenax Tube No. 1556 Sample No. 1075
Field Blank Tenax/Charcoal Tube No. 469 Sample No. 1076

Trip Blank Tenax Tube No. 277E Sample No. 1077
Trip Blank Tenax/Charcoal Tube No. 230E Sample No. 1078

Condensate Sample No. None collected

Leak Check from Probe Inlet:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.2 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1520	0.00	16.6	142	10.8	12.0	130
1525	4.98	16.3	141.3	10.4	12.0	130
1530	10.06	16.1	141.5	10.2	12.0	130
1535	15.10	15.9	141.1	10.1	12.0	130
1540	20.00					

93-19 SEV surm frm 052093

COMMENTS: Field Blanks exposed at 1544
Temp. meter for DGM - Y1336
Silica gel new & probe purged before sampling.

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01
Client US EPA EIB
Facility Belden Brick Co. Plant #6
Source Kiln #3
Sampling Location Kiln #3 Stack
Barometric Pressure (in. Hg) NA
Site to Barometer Elevation (ft) NA
Corrected BP (0.1 in/100 ft) 29.16
Desired Probe/STL Temperature (°C) 140
Desired Flow Rate (Liters/min) 1.0
Desired Sample Volume (Liters) 20
Heated Sample Transfer Line Length (in) 30

Run No. 1
Date 11-11-93
Operator J. Surman
VOST Console No. 1
VOST Unit No. 5
Meter Calibration Factor (Y) 1.007
Tenax Inlet Thermocouple No. V-2
Temperature Meter No. Y-0784
Temperature Controller No. NR-Dv21 Omega 6100
Temperature Meter No. Y-0784
Probe Length (in) 36
Probe Liner Material Glass
Liner Material Teflon

Tenax Tube No. 239E — Sample No. 1069
Tenax/Charcoal Tube No. 652 — Sample No. 1070

Field Blank Tenax Tube No. 1556 — Sample No. 1075
Field Blank Tenax/Charcoal Tube No. 469 — Sample No. 1076

Trip Blank Tenax Tube No. 277E — Sample No. 1077
Trip Blank Tenax/Charcoal Tube No. 280E — Sample No. 1078

Condensate Sample No. None collected.

Leak Check from Probe Inlet:
Before Sampling NA in. Hg change at ______ in. Hg vacuum for ______ sec.
After Sampling NA in. Hg change at ______ in. Hg vacuum for ______ sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.0 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1550	0.00	15.5	140.6	10.7	12.0	130
1555	5.02	15.2	145.3	10.2	12.0	130
1600	10.01	15.0	145.1	10.3	12.0	130
1605	14.99	14.6	144.7	10.1	12.0	130
1610	20.00					

93-18 SEV surm frm 052093

COMMENTS: Temp. meter for DGM - Y1336

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01 | Run No. 1 | Date 11-11-93
Client US EPA EIB | Operator J. Surman
Facility Bowden Brick Co. Plant #6 | VOST Console No. 1
Source Kiln #3 | VOST Unit No. 5
Sampling Location Kiln #3 Stack | Meter Calibration Factor (Y) 1.007
Barometric Pressure (in. Hg) NA | Tenax Inlet Thermocouple No. V-2
Site to Barometer Elevation (ft) NA | Temperature Meter No. Y-0784
Corrected BP (0.1 in/100 ft) 29.16 | Temperature Controller No. NR-Dual Omega 6100
Desired Probe/STL Temperature (°C) 140 | Temperature Meter No. Y-0784
Desired Flow Rate (Liters/min) 1.0 | Probe Length (in) 36
Desired Sample Volume (Liters) 20 | Probe Liner Material Glass
Heated Sample Transfer Line Length (in) 30 | Liner Material Teflon

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Tenax Tube No. 1890 | Sample No. 1071
Tenax/Charcoal Tube No. 191 | Sample No. 1072

Field Blank Tenax Tube No. 1556 | Sample No. 1075
Field Blank Tenax/Charcoal Tube No. 469 | Sample No. 1076

Trip Blank Tenax Tube No. 277E | Sample No. 1077
Trip Blank Tenax/Charcoal Tube No. 230E | Sample No. 1078

Condensate Sample No. None Collected

Leak Check from Probe Inlet:
Before Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.
After Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.2 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1620	0.00	13.9	144.7	10.5	12.0	130
1625	5.03	13.6	145.2	9.4	12.0	130
1630	9.99	13.5	145.0	9.3	120	130
1635	15.02	13.4	144.6	9.2	120	130
1640	20.00					

COMMENTS: Temp. meter for DGM - Y-1336

93-19 SEV surm frm 052093

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01 | Run No. 1 | Date 11-11-93
Client US EPA EIB | Operator J. Surman
Facility Belden Brick Co. Plant #6 | VOST Console No. 1
Source Kiln #3 | VOST Unit No. 5
Sampling Location Kiln #3 Stack | Meter Calibration Factor (Y) 1.007
Barometric Pressure (in. Hg) NA | Tenax Inlet Thermocouple No. V-2
Site to Barometer Elevation (ft) NA | Temperature Meter No. Y-0784
Corrected BP (0.1 in/100 ft) 29.16 | Temperature Controller No. NR-DV21 Omega 6100
Desired Probe/STL Temperature (°C) 140 | Temperature Meter No. Y-0784
Desired Flow Rate (Liters/min) 1.0 | Probe Length (in) 36
Desired Sample Volume (Liters) 20 | Probe Liner Material Glass
Heated Sample Transfer Line Length (in) 30 | Liner Material Teflon

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Tenax Tube No. 612 | Sample No. 1073
Tenax/Charcoal Tube No. 3066 | Sample No. 1074

Field Blank Tenax Tube No. 1556 | Sample No. 1075
Field Blank Tenax/Charcoal Tube No. 469 | Sample No. 1076

Trip Blank Tenax Tube No. 277E | Sample No. 1077
Trip Blank Tenax/Charcoal Tube No. 230E | Sample No. 1078

Condensate Sample No. None Collected

Leak Check from Probe Inlet:
Before Sampling NA in. Hg change at NA in. Hg vacuum for ____ sec.
After Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.0 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1650	0.00	13.2	144.7	9.8	12.0	130
1655	5.01	12.9	145.2	9.2	12.0	130
1700	10.04	12.7	145.5	8.8	12.0	130
1705	15.00	12.6	145.3	8.7	12.0	130
1710	20.00					

COMMENTS: Temp. Meter for DGM - Y-1336

93-19 SEV sum frm 052093

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01
Client US EPA EIB
Facility Beldin Brick Co. Plant #6
Source Kiln #3
Sampling Location Kiln #3 Stack
Barometric Pressure (in. Hg) NA
Site to Barometer Elevation (ft) NA
Corrected BP (0.1 in/100 ft) 29.16
Desired Probe/STL Temperature (°C) 140
Desired Flow Rate (Liters/min) 1.0
Desired Sample Volume (Liters) 20
Heated Sample Transfer Line Length (in) 30

Run No. 2 Date 11-11-93
Operator J. Surman
VOST Console No. 1
VOST Unit No. 5
Meter Calibration Factor (Y) 1.007
Tenax Inlet Thermocouple No. V-2
Temperature Meter No. Y-0784
Temperature Controller No. NR-Dual Omega 6100
Temperature Meter No. Y-0784
Probe Length (in) 36
Probe Liner Material Glass
Liner Material Teflon

Tenax Tube No. 955 Sample No. 2067
Tenax/Charcoal Tube No. 8190 Sample No. 2068

Field Blank Tenax Tube No. 2153 Sample No. 2075
Field Blank Tenax/Charcoal Tube No. 167 Sample No. 2076

Trip Blank Tenax Tube No. 2026 Sample No. 2077
Trip Blank Tenax/Charcoal Tube No. 1806 Sample No. 2078

Condensate Sample No. None Collected

Leak Check from Probe Inlet:
Before Sampling see Run #1 in. Hg change at ______ in. Hg vacuum for ______ sec.
After Sampling NA in. Hg change at ______ in. Hg vacuum for ______ sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.2 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1715	0.00	12.4	145.2	9.4	12.0	130
1720	5.01	12.1	145.1	9.3	12.0	130
1725	10.02	12.1	145.0	9.4	12.0	130
1730	15.05	12.0	145.2	9.2	12.0	130
1735	20.00					

93-19 SEV surm frm 052093

COMMENTS: Temp. meter for DGM - Y-1336
Probe purged before sampling.

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01
Client US EPA EIB
Facility Belden Brick Co. Plant #6
Source Kiln #3
Sampling Location Kiln #3 Stack
Barometric Pressure (in. Hg) NA
Site to Barometer Elevation (ft) NA
Corrected BP (0.1 in/100 ft) ~~29.16~~ 29.16
Desired Probe/STL Temperature (°C) 140
Desired Flow Rate (Liters/min) 1.0
Desired Sample Volume (Liters) 20
Heated Sample Transfer Line Length (in) 30

Run No. 2 Date 11-11-93
Operator J. Surmann
VOST Console No. 1
VOST Unit No. 5
Meter Calibration Factor (Y) 1.007
Tenax Inlet Thermocouple No. V-2
Temperature Meter No. Y-0784
Temperature Controller No. NR-Dual Omega 6100
Temperature Meter No. Y-0784
Probe Length (in) 36
Probe Liner Material Glass
Liner Material Teflon

Tenax Tube No. 635 Sample No. 2069
Tenax/Charcoal Tube No. 1819 Sample No. 2070

Field Blank Tenax Tube No. 2153 Sample No. 2075
Field Blank Tenax/Charcoal Tube No. 167 Sample No. 2076

Trip Blank Tenax Tube No. 2026 Sample No. 2077
Trip Blank Tenax/Charcoal Tube No. 1806 Sample No. 2078

Condensate Sample No. None Collected

Leak Check from Probe Inlet:
Before Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.
After Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling ____ in. Hg change at ____ in. Hg vacuum for ____ sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1745	0.00	12.1	145.3	9.1	12.0	130
1750	4.47	12.0	145.4	8.8	12.0	130
1755	9.99	12.2	145.3	8.3	12.0	130
1800	15.00	12.3	145.6	8.1	12.0	130
1805	20.00					

93-19 SEV surm frm 052093

COMMENTS: Temp. meter for DGM - Y-1336
Field Blanks exposed at 1810

VOST SAMPLING DATA
SW-846, METHOD 0030

Project No. 4601.01.05.01
Client US EPA EIB
Facility Bulldon Brick Co. Plant #6
Source Kiln #3
Sampling Location Kiln #3 Stack
Barometric Pressure (in. Hg) NA
Site to Barometer Elevation (ft) NA
Corrected BP (0.1 in/100 ft) 29.16
Desired Probe/STL Temperature (°C) 140
Desired Flow Rate (Liters/min) 1.0
Desired Sample Volume (Liters) 20
Heated Sample Transfer Line Length (in) 30

Run No. 2 Date 11-11-93
Operator J. Surman
VOST Console No. 1
VOST Unit No. 5
Meter Calibration Factor (Y) 1.007
Tenax Inlet Thermocouple No. ~~Y-0784~~ V-2
Temperature Meter No. ~~NA~~ Y-0784
Temperature Controller No. NA Dual Omega 6000
Temperature Meter No. Y-0784
Probe Length (in) 36
Probe Liner Material Glass
Liner Material Teflon

Tenax Tube No. 232E Sample No. 2071
Tenax/Charcoal Tube No. 2761 Sample No. 2072

Field Blank Tenax Tube No. 2153 Sample No. 2075
Field Blank Tenax/Charcoal Tube No. 167 Sample No. 2076

Trip Blank Tenax Tube No. 2026 Sample No. 2077
Trip Blank Tenax/Charcoal Tube No. 1806 Sample No. 2078

Condensate Sample No. None Collected

Leak Check from Probe Inlet:
Before Sampling NA in. Hg change at ____ in. Hg vacuum for ____ sec.
After Sampling 0 in. Hg change at 23.6 in. Hg vacuum for 60 sec.

Leak Check from Valve at Inlet to First Condenser:
Before Sampling 0 in. Hg change at 23.8 in. Hg vacuum for 60 sec.
After Sampling 0 in. Hg change at 12.4 in. Hg vacuum for 60 sec.

Clock Time 24-Hr	Dry Gas Meter Reading (L)	Dry Gas Meter Temp. (°C)	Probe/STL Temp. (°C)	Tenax Inlet Temp. (°C)	Pump Vacuum (in. Hg)	Rotameter Setting
1815	0.00	12.7	144.8	8.4	12.0	130
1820	5.05	12.5	145.5	8.0	12.0	130
1825	10.03	12.4	145.3	7.9	12.0	130
1830	15.02	12.4	145.4	7.8	12.0	130
1835	20.00					

93-19 SEV sum frm 052093

COMMENTS: Temp. meter for DGM - Y-1336
Silica gel ~15% exhausted.

from . . .

ROY NEULICHT

Kiln Inorganic / Organic gasses.

Name: Run 1 Kiln					
Date: 11/11/93					
Time	CO2 (%)	CO (ppm)	NOx (ppm)	SO2 (ppm)	THC (ppm)
1035	1.94	46.5	16.5	17.8	2.15
1036	1.93	47.5	16.5	19.3	2.15
1037	1.91	48.3	16.5	20.3	2.20
1038	1.91	48.5	16.5	21.3	1.95
1039	1.91	48.0	16.5	21.5	1.75
1040	1.93	47.5	16.5	21.5	1.75
1041	1.94	47.3	16.5	21.5	1.75
1042	1.95	46.5	16.5	22.0	1.85
1043	1.95	47.0	16.0	22.3	2.05
1044	1.94	47.3	16.0	22.8	1.85
1045	1.93	48.3	16.5	23.3	1.80
1046	1.94	51.5	16.0	22.5	1.80
1047	2.00	49.0	16.0	21.5	1.90
1048	2.01	46.0	16.5	24.0	1.80
1049	1.93	45.5	16.5	24.8	1.85
1050	1.90	45.8	16.5	24.5	2.05
1051	1.91	46.8	16.0	24.0	2.15
1052	1.93	46.8	16.5	23.3	2.15
1053	1.93	46.8	16.5	23.0	2.15
1054	1.93	46.3	16.0	22.5	2.15
1055	1.93	46.5	16.0	22.0	2.10
1056	1.93	46.0	16.0	21.8	2.05
1057	1.94	46.0	16.5	22.0	1.95
1058	1.94	46.3	16.0	22.0	1.90
1059	1.94	45.8	16.0	22.0	2.15
1100	1.93	45.3	16.5	22.0	2.05
1101	1.93	45.0	16.5	21.5	2.10
1102	1.93	45.0	16.5	21.0	2.05
1103	1.93	44.8	16.5	20.8	1.95

Name: Run 2 Kiln					
Date: 11/11/93					
Time	CO2 (%)	CO (ppm)	NOx (ppm)	SO2 (ppm)	THC (ppm
1311	2.04	48.5	26.0	55.8	1.05
1312	2.05	48.8	26.0	56.5	1.00
1313	2.06	49.8	26.0	57.8	1.05
1314	2.06	51.5	26.0	58.8	1.05
1315	2.08	51.5	26.0	59.8	1.00
1316	2.08	51.0	26.0	61.0	1.00
1317	2.08	50.8	26.0	61.0	1.05
1318	2.06	50.5	26.0	61.5	0.95
1319	2.05	51.3	26.0	61.8	0.95
1320	2.05	51.5	26.0	62.3	0.90
1321	2.05	52.5	26.0	62.5	0.90
1322	2.04	51.5	26.0	63.3	0.85
1323	2.01	50.3	26.0	63.3	0.85
1324	2.03	49.5	26.0	62.0	0.75
1325	2.03	49.3	26.0	61.8	0.75
1326	2.03	49.5	26.0	61.3	0.80
1327	2.03	49.5	26.0	61.3	0.80
1328	2.03	50.0	26.0	61.0	0.75
1329	2.03	50.3	26.0	61.0	0.80
1330	2.03	50.5	26.0	61.0	0.95
1331	2.03	50.8	26.0	61.0	0.95
1332	2.01	50.5	26.0	61.0	1.05
1333	2.00	50.3	26.0	61.5	1.00
1334	1.99	49.8	26.0	61.0	0.95
1335	1.99	50.0	26.0	61.0	1.00
1336	2.00	50.8	26.0	61.0	1.05
1337	2.00	51.0	26.0	61.5	1.20
1338	1.99	51.3	26.0	61.0	1.25
1339	1.99	52.0	26.0	60.5	1.20

Name: Run 3 Kiln					
Date: 11/11/93					
Time	CO2 (%)	CO (ppm)	NOx (ppm)	SO2 (ppm)	THC (ppm)
1527	1.98	44.0	25.5	61.5	1.90
1528	1.98	43.8	25.5	61.5	1.95
1529	1.98	43.5	25.5	61.5	1.80
1530	1.99	43.8	25.5	61.0	1.85
1531	1.96	43.3	25.5	60.5	1.80
1532	1.96	43.0	25.5	60.0	1.75
1533	1.96	43.3	25.5	59.3	1.65
1534	1.96	47.3	25.5	51.0	1.85
1535	2.04	44.3	25.5	59.5	2.00
1536	2.01	43.0	25.5	63.8	2.25
1537	1.94	44.3	25.5	60.8	2.15
1538	1.93	45.3	25.5	59.5	2.20
1539	1.94	45.5	25.5	59.5	1.95
1540	1.96	46.0	25.5	59.8	1.75
1541	1.95	44.8	25.5	60.0	1.70
1542	1.95	44.5	25.5	60.3	1.65
1543	1.93	43.3	25.5	60.3	1.85
1544	1.93	43.0	25.5	60.5	1.90
1545	1.93	42.8	25.5	60.3	1.90
1546	1.95	43.5	25.5	60.0	1.90
1547	1.94	42.8	25.5	60.0	1.95
1548	1.93	42.5	25.5	60.0	2.05
1549	1.93	42.5	25.5	60.3	2.15
1550	1.93	42.5	25.5	59.8	2.15
1551	1.93	42.5	25.5	59.8	2.05
1552	1.91	42.5	25.5	59.5	2.10
1553	1.93	42.3	25.5	60.0	1.90
1554	1.95	43.5	25.5	60.0	2.15
1555	1.93	42.3	25.5	60.5	2.25

1104	1.93	45.0	16.5	21.0	1.85	1340	2.00	53.5	26.0	60.8	1.10	1556	1.93	42.3	25.5	60.8	1.95
1105	1.91	45.8	16.0	21.3	1.65	1341	2.00	54.0	26.0	60.8	1.05	1557	1.93	42.0	25.5	61.0	1.60
1106	1.91	45.3	16.5	21.5	1.65	1342	2.01	52.0	26.0	60.5	1.05	1558	1.91	41.5	25.0	61.3	1.65
1107	1.91	45.0	16.0	21.8	1.65	1343	2.01	50.8	26.0	60.3	1.30	1559	1.90	42.3	25.0	60.8	1.75
1108	1.91	44.5	16.0	22.0	1.65	1344	2.01	50.5	26.0	60.5	1.65	1600	1.89	42.0	25.0	60.0	1.75
1109	1.90	44.3	16.0	22.0	1.80	1345	2.01	50.5	26.0	60.3	1.90	1601	1.89	42.3	25.0	59.0	1.80
1110	1.91	44.3	16.0	21.8	1.85	1346	2.01	50.3	26.0	60.3	1.75	1602	1.89	42.0	25.0	58.8	1.95
1111	1.91	44.5	16.0	21.5	1.90	1347	2.00	49.5	26.0	60.0	1.45	1603	1.89	41.8	25.0	58.5	2.15
1112	1.90	44.5	16.0	22.8	1.40	1348	2.00	48.5	26.0	60.0	1.25	1604	1.90	41.8	25.0	58.8	2.55
1113	0.86	20.3	12.0	24.0	1.55	1349	1.99	48.5	26.0	60.0	1.15	1605	1.89	41.8	25.0	59.0	2.35
1115	1.88	44.3	16.0	31.3	2.20	1350	2.00	48.8	26.0	60.5	1.50	1606	1.88	41.5	25.0	58.3	2.10
1116	1.89	44.5	16.0	30.0	2.25	1351	2.00	48.8	26.0	61.3	1.60	1607	1.85	41.5	25.0	58.3	2.15
1117	1.89	44.3	16.5	29.5	2.30	1352	1.53	43.0	25.0	44.5	1.95	1608	1.84	41.3	25.0	58.0	2.15
1118	1.89	44.5	16.0	30.5	2.00	1353	1.40	39.3	17.0	25.0	1.65	1609	1.89	43.5	25.0	58.3	2.15
1119	1.88	44.0	16.5	28.8	1.95	1354	1.38	37.5	20.0	32.8	1.85	1610	1.54	36.8	24.5	48.0	3.15
1120	1.88	44.8	16.0	30.8	1.85	1355	1.83	39.8	17.5	52.5	1.60	1611	1.49	34.5	17.0	33.3	2.50
1121	1.86	44.3	16.0	32.8	1.80	1356	2.19	47.0	22.5	78.3	1.60	1612	1.93	39.3	22.5	66.3	2.40
1122	1.86	44.0	16.0	32.0	2.00	1357	2.05	45.0	25.0	67.0	1.30	1613	1.45	34.8	20.0	40.5	2.60
1123	1.86	43.8	16.0	33.8	2.25	1358	2.04	45.0	26.0	64.8	1.35	1614	1.90	38.5	22.0	64.0	2.15
1124	1.86	43.5	16.0	35.5	2.65	1359	2.05	45.0	26.0	63.8	1.25	1615	1.85	40.3	24.5	59.0	1.90
1125	1.86	43.3	16.0	37.0	2.45	1400	2.05	44.8	26.0	63.3	1.20	1616	1.85	41.0	25.0	57.8	1.95
1126	1.85	43.5	16.0	36.5	2.20	1401	2.05	44.5	26.0	63.3	1.30	1617	1.88	41.3	25.0	58.5	2.05
1127	1.84	42.8	16.0	37.0	1.85	1402	2.04	43.8	26.0	63.5	1.35	1618	1.88	41.0	25.0	58.8	2.20
1128	1.84	42.5	16.0	37.0	1.85	1403	2.03	43.5	26.0	63.8	1.30	1619	1.89	41.5	25.0	58.8	2.15
1129	1.85	42.3	16.0	38.8	1.90	1404	2.00	43.5	26.0	62.8	1.20	1620	1.89	41.5	25.0	58.8	2.25
1130	1.64	40.3	16.0	35.8	2.80	1405	2.05	46.8	26.0	61.5	1.35	1621	1.89	41.5	25.0	58.8	2.15
1131	1.03	31.3	11.0	10.3	3.65	1406	2.01	45.3	26.0	61.3	1.30	1622	1.89	41.5	25.0	59.3	2.10
1132	1.70	36.0	11.0	35.8	2.85	1407	2.03	46.3	26.0	61.5	1.35	1623	1.89	41.5	25.0	59.0	2.30
1133	1.16	31.8	11.0	18.8	3.20	1408	2.00	46.0	26.0	61.0	1.30	1624	1.88	41.5	25.0	59.0	2.25
1134	1.94	37.3	11.5	44.5	2.20	1409	2.00	47.0	26.0	60.8	1.30	1625	1.88	41.5	25.0	58.8	2.20
1135	1.93	39.8	11.0	47.5	1.80	1410	2.00	48.3	26.0	60.8	1.30	1626	1.88	41.8	25.0	58.8	2.30
1136	1.86	40.3	13.5	43.3	1.75	1411	2.00	49.8	26.0	60.5	1.35	1627	1.88	41.8	25.0	58.8	2.25
1137	1.95	42.3	16.0	44.3	1.80	1412	2.01	49.5	26.0	60.5	1.15	1628	1.86	41.5	25.0	58.5	2.35

1138	2.04	44.8	16.0	47.3	1.85	1413	2.01	49.5	26.0	60.5	1.10	1629	1.98	46.5	25.0	58.5	2.30
1139	2.01	44.0	16.0	48.5	1.80	1414	2.01	49.3	26.0	60.5	1.10	1630	1.86	41.5	25.0	58.5	2.35
1140	1.99	44.8	16.0	48.3	1.95	1415	2.03	49.3	26.0	60.8	1.05	1631	1.86	41.3	25.0	58.3	2.35
1141	1.99	44.8	16.0	48.5	1.85	1416	2.04	49.5	26.0	61.0	0.95	1632	1.86	41.3	25.0	58.3	2.25
1142	1.99	44.3	16.0	48.3	1.90	1417	2.06	50.5	26.0	61.5	1.15	1633	1.88	41.8	25.0	58.5	2.35
1143	2.00	44.0	16.0	48.8	1.95	1418	2.05	49.8	26.0	61.0	1.25	1634	1.89	42.0	25.0	58.5	2.45
1144	2.00	44.0	16.0	48.5	1.85	1419	2.08	50.5	26.0	60.5	1.20	1635	1.90	41.8	25.0	58.5	2.40
1145	2.01	43.5	16.0	48.8	1.85	1420	2.16	53.5	26.0	60.5	1.10	1636	1.89	41.8	25.0	58.8	2.35
1146	2.01	43.3	16.0	49.5	1.90	1421	2.08	49.5	26.0	60.3	1.10	1637	1.89	41.8	25.0	58.8	2.30
1147	2.01	43.5	16.0	49.3	1.75	1422	2.09	49.3	26.0	60.8	1.15	1638	1.89	41.8	25.0	58.8	2.45
1148	2.01	43.5	16.0	49.3	1.65	1423	2.08	49.3	26.0	60.8	1.20	1639	1.88	42.0	25.0	58.8	2.65
1149	2.01	43.5	16.0	49.0	1.60	1424	2.04	48.3	26.0	60.8	1.30	1640	1.88	41.5	25.0	58.8	2.50
1150	2.01	43.5	16.0	49.3	1.70	1425	2.03	48.8	26.0	60.5	1.25	1641	1.88	42.0	25.0	58.8	2.45
1151	2.00	43.3	16.0	49.8	1.65	1426	2.18	57.5	26.0	60.3	1.25	1642	1.86	42.3	25.0	58.8	2.45
1152	2.01	43.5	16.0	50.0	1.70	1427	2.04	49.5	26.0	60.0	1.20	1643	1.86	42.3	25.0	58.5	2.50
1153	2.01	43.5	16.0	50.0	1.60	1428	2.09	56.0	26.0	60.0	1.15	1644	1.86	42.0	25.0	58.5	2.30
1154	2.04	44.8	16.0	49.8	1.55	1429	2.08	53.5	26.0	60.0	1.20	1645	1.86	42.0	25.0	58.3	2.40
1155	2.03	43.8	16.0	50.5	1.75	1430	2.05	52.5	26.0	60.3	1.20	1646	1.86	42.0	25.0	58.0	2.35
1156	2.03	43.8	16.0	50.8	1.70	1431	2.06	51.5	26.0	60.5	1.20	1647	1.88	42.0	25.0	57.8	2.40
1157	2.03	43.8	16.0	51.3	1.80	1432	2.05	51.0	26.0	60.5	1.35	1648	1.88	42.3	25.0	57.8	2.35
1158	2.03	43.8	16.0	51.3	1.70	1433	2.05	50.5	26.0	60.5	1.35	1649	1.88	42.5	25.0	57.8	2.55
1159	2.03	43.5	16.0	51.5	1.65	1434	2.11	53.3	26.0	61.0	1.20	1650	1.89	41.5	25.0	58.3	2.40
1200	2.04	43.5	16.0	51.5	1.55	1435	2.10	53.5	26.0	61.8	1.25	1651	1.91	41.0	25.0	58.8	2.40
1201	2.04	43.8	16.0	52.5	1.40	1436	2.06	50.3	26.0	62.5	1.35	1652	1.90	41.3	25.0	59.5	2.40
1202	2.04	44.0	16.0	52.5	1.45	1437	2.09	51.5	26.0	62.5	1.30	1653	1.90	41.3	25.0	59.8	2.45
1203	2.03	44.0	16.0	53.3	1.85	1438	2.06	49.3	26.0	62.8	1.35	1654	1.90	41.3	25.0	60.3	2.55
1204	2.03	44.3	16.0	53.3	2.05	1439	2.05	49.0	26.0	62.5	1.45	1655	1.90	41.0	25.0	60.5	2.50
1205	2.03	44.0	16.0	53.5	2.20	1440	2.08	49.8	26.0	63.0	1.30	1656	1.90	41.8	25.0	60.3	2.60
1206	2.03	44.3	16.0	53.5	2.25	1441	2.06	48.0	26.0	63.0	1.15	1657	1.89	41.3	25.0	60.5	2.50
1207	2.03	44.8	16.0	53.5	2.10	1442	2.06	47.0	26.0	63.0	1.25	1658	1.89	41.3	25.0	60.5	2.40
1208	2.01	45.0	16.0	53.5	1.90	1443	2.06	47.5	26.0	63.3	1.30	1659	1.89	41.8	25.0	60.5	4.20
1209	2.03	45.5	16.0	53.5	2.20	1444	2.05	47.5	26.0	62.8	1.20	1700	1.88	41.3	25.0	61.0	3.75
1210	2.03	46.3	16.0	53.5	2.30	1445	2.04	47.5	26.0	62.3	1.20	1701	1.88	41.0	25.0	60.5	3.00

1211	2.03	46.3	16.0	53.5	2.30	1446	2.04	46.8	26.0	61.5	1.25	1702	1.86	41.0	25.0	60.0	3.05
1212	2.03	46.0	16.0	53.8	2.20	1447	2.04	47.0	26.0	61.3	1.35	1703	1.86	41.3	25.0	60.0	3.10
1213	2.04	46.3	16.0	53.8	2.15	1448	2.08	49.0	26.0	60.5	1.25	1704	1.86	41.3	25.0	59.5	3.00
1214	2.04	46.8	16.0	54.0	2.15	1449	2.04	48.8	26.0	60.5	1.15	1705	1.86	41.0	25.0	59.0	3.05
1215	2.05	46.5	16.0	54.5	2.10	1450	2.05	50.5	26.0	60.8	1.15	1706	1.86	41.3	25.0	59.0	2.90
1216	2.06	46.5	16.0	55.3	2.00	1451	2.04	51.3	26.0	60.8	1.25	1707	1.86	41.3	25.0	58.8	2.90
1217	2.06	47.3	16.0	55.0	1.90	1452	2.04	50.0	25.5	60.5	1.10	1708	1.86	41.5	25.0	59.3	2.95
1218	2.08	46.5	16.0	55.3	1.85	1453	2.04	50.8	26.0	60.8	1.20	1709	1.85	41.5	25.0	59.5	3.10
1219	2.06	45.8	16.0	55.5	1.85	1454	2.09	53.0	26.0	61.0	1.20	1710	1.85	41.3	25.0	59.5	2.95
1220	2.08	45.5	16.0	55.5	2.00	1455	2.11	54.0	26.0	61.0	1.20	1711	1.85	41.3	25.0	59.5	2.90
1221	2.06	46.5	16.0	55.3	2.00	1456	2.03	49.3	26.0	61.0	1.20	1712	1.85	41.3	25.0	59.5	3.10
1222	2.06	46.3	16.0	55.3	1.95	1457	2.03	49.5	26.0	60.8	1.25	1713	1.86	41.8	25.0	59.5	3.05
1223	2.04	45.0	16.0	55.0	2.00	1458	2.03	50.0	26.0	60.5	1.30	1714	1.85	41.5	25.0	59.5	3.10
1224	2.04	45.0	16.0	54.3	2.20	1459	2.06	52.5	26.0	60.3	1.35	1715	1.85	41.8	25.0	59.8	3.00
1225	2.05	45.8	16.0	54.0	2.20	1500	2.04	49.0	26.0	60.8	1.30	1716	1.84	41.8	25.0	60.0	3.05
1226	2.05	47.0	16.0	54.0	2.15	1501	2.04	48.5	26.0	60.8	1.20	1717	1.85	41.8	25.0	60.0	3.05
1227	2.06	47.3	16.0	54.3	2.00	1502	2.04	47.5	25.5	60.5	1.15	1718	1.85	41.5	25.0	59.8	3.10
1228	2.08	46.5	16.0	54.5	2.05	1503	2.04	46.5	26.0	60.5	1.20	1719	1.84	41.5	25.0	59.8	3.00
1229	2.08	46.0	16.0	55.0	2.10	1504	2.03	46.0	25.5	60.5	1.25	1720	1.84	41.3	25.0	59.8	3.15
1230	2.08	45.8	16.0	55.5	2.10	1505	2.03	45.3	25.5	60.3	1.35	1721	1.84	41.3	25.0	59.5	3.15
1231	2.06	44.5	16.0	55.5	2.20	1506	2.01	44.8	26.0	60.3	1.30	1722	1.83	41.5	25.0	59.0	3.20
1232	2.06	44.8	16.0	55.3	2.30	1507	2.01	45.0	25.5	60.5	1.40	1723	1.84	41.3	25.0	59.0	3.20
1233	2.06	45.8	16.0	55.0	2.45	1508	2.01	45.3	25.5	60.8	1.35	1724	1.84	41.3	25.0	59.0	3.20
1234	2.06	45.5	16.0	54.8	2.20	1509	2.01	45.0	26.0	61.3	1.30	1725	1.84	41.0	25.0	59.3	3.30
1235	2.06	43.8	16.0	54.8	2.05	1510	2.01	44.8	26.0	61.3	1.30	1726	1.84	41.3	25.0	59.3	3.20
1236	2.06	43.8	16.0	55.0	2.10	1511	2.00	44.8	26.0	61.8	1.30	1727	1.83	41.0	25.0	59.3	3.25
Minim	0.86	20.30	11.00	10.30	1.40	Minim	1.38	37.50	17.00	25.00	0.75	Minim	1.45	34.50	17.00	33.30	1.60
Maxim	2.08	51.50	16.50	55.50	3.65	Maxim	2.19	57.50	26.00	78.30	1.95	Maxim	2.04	47.30	25.50	66.30	4.20
Avera	1.95	44.50	15.84	39.14	1.99	Avera	2.02	49.00	25.74	60.54	1.21	Avera	1.88	41.92	24.97	59.01	2.41

Concentration of Methane and Ethane
determined by GC/FID in Kiln Stack Emissions November 11, 1993

TIME	CONCENTRATION (ppmv)	
1203	5.7	< 3
1205	7.4	< 3
1352	5.5	< 3
1354	4.6	< 3
1612	4.6	< 3
1615	4.9	< 3
1658	4.8	< 3
1701	5.0	< 3
1707	5.3	< 3

REFERENCE METHOD MONITORS

PERFORMANCE SPECIFICATION

KILN

Calibration Error Check

Cal. gas value	Measured value	% Error	Pass/Fail
	CO_2		
6.20	6.20	0	Pass
11.98	11.95	0.3	Pass
0	0.13	1.1	Pass
	CO		
424	424	0	Pass
218	221	0.7	Pass
102	102	0	Pass
0	0.3	0.1	Pass
	NO_x		
448	454	1.3	Pass
248	254	1.3	Pass
124	127	0.7	Pass
0	6.5	1.6	Pass
	SO_2		
380	380	0	Pass
239	241	0.5	Pass
103	100	0.8	Pass
0	0.0	0	Pass
	THC		
90.2	90.7	0.6	Pass
51.3	50.4	1.6	Pass
29.5	29.4	0.3	Pass
0	0	0	Pass

KILN

Response Time Checks

Analyzer	Rise time (sec)	Fan time (sec)
CO_2	63	52
CO	65	75
NO_x	80	110
SO_2	74	69
THC	40	45

Dryer Response Time Check

Analyzer	Rise time (sec)	Fall time (sec)
THC	95	106

KILN

Bias Check

Cal. gas value	Measured value	% Error	Pass/Fail
	CO_2		
6.20	6.13	0.6	Pass
	CO		
216	225	1.7	Pass
	NO_x		
238	248	2.2	Pass
	SO_2		
230	239	2.7	Pass
	THC		
51.3	50.8	0.6	Pass

Percent Drift (Run 1)

	Initial	Final	% Error	Pass/Fail
		CO_2		
Zero	0.13	0.13	0	Pass
Span	11.95	11.93	0.2	Pass
		CO		
Zero	0.3	0.5	0.04	Pass
Span	425	426	0.2	Pass
		NO_x		
Zero	6.5	6.0	0.1	Pass
Span	454	454	0	Pass
		SO_2		
Zero	0.0	0.0	0	Pass
Span	380	380	0	Pass
		THC		
Zero	0.0	0.7	0.8	Pass
Span	90.7	90.6	0.1	Pass

KILN

Percent Drift (Run 2)

	Initial	Final	% Error	Pass/Fail
		CO_2		
Zero	0.13	0.12	0.1	Pass
Span	11.93	11.95	0.2	Pass
		CO		
Zero	0.5	0.8	0.1	Pass
Span	426	422	0.9	Pass
		NO_x		
Zero	6.0	5.4	0.3	Pass
Span	454	452	0.4	Pass
		SO_2		
Zero	0.0	0.2	0.1	Pass
Span	380	381	0.3	Pass
		THC		
Zero	0.7	0.6	0.1	Pass
Span	90.6	90.5	0.1	Pass

KILN

Percent Drift (Run 3)

	Initial	Final	% Error	Pass/Fail
		CO_2		
Zero	0.12	0.10	0.2	Pass
Span	11.95	11.94	0.1	Pass
		CO		
Zero	0.8	0.0	0.2	Pass
Span	422	423	0.2	Pass
		NO_x		
Zero	5.4	5.0	0.1	Pass
Span	452	446	1.3	Pass
		SO_2		
Zero	0.2	0.0	0.1	Pass
Span	381	378	0.8	Pass
		THC		
Zero	0.6	0.7	0.1	Pass
Span	90.5	90.6	0.1	Pass

from . . .

ROY NEULICHT

Dryer organic Gases

RUN 1 Dryer Time	THC (ppm)	RUN 2 Dryer Time	THC (ppm)	RUN 3 Dryer Time	THC (ppm)
1035	64.6	1311	84.3	1527	89.1
1036	66.0	1312	84.9	1528	89.6
1037	67.1	1313	85.2	1529	89.8
1038	68.1	1314	85.2	1530	89.2
1039	67.7	1315	86.8	1531	90.8
1040	67.6	1316	86.5	1532	91.4
1041	68.1	1317	86.2	1533	88.8
1042	68.7	1318	84.8	1534	87.9
1043	68.6	1319	85.1	1535	88.6
1044	68.8	1320	85.3	1536	89.9
1045	69.5	1321	84.1	1537	90.3
1046	70.6	1322	84.5	1538	91.4
1047	71.0	1323	84.3	1539	90.4
1048	71.4	1324	85.0	1540	89.8
1049	71.5	1325	85.7	1541	89.1
1050	72.7	1326	86.1	1542	90.8
1051	73.8	1327	84.7	1543	92.4
1052	75.2	1328	84.8	1544	90.6
1053	74.3	1329	84.2	1545	89.1
1054	73.5	1330	84.4	1546	87.7
1055	72.1	1331	84.7	1547	88.8
1056	71.1	1332	85.0	1548	88.4
1057	70.3	1333	84.2	1549	88.7
1058	68.9	1334	86.5	1550	88.9
1059	67.1	1335	86.4	1551	88.4
1100	67.5	1336	85.4	1552	88.1
1101	66.7	1337	85.4	1553	89.3
1102	65.6	1338	85.5	1554	89.2
1103	64.6	1339	84.7	1555	88.9
1104	64.7	1340	86.4	1556	88.9
1105	64.0	1341	87.3	1557	88.8
1106	63.4	1342	86.6	1558	89.7
1107	63.0	1343	85.8	1559	90.8
1108	62.7	1344	84.3	1600	91.2
1109	61.8	1345	86.5	1601	91.5
1110	62.7	1346	86.7	1602	91.6
1111	61.4	1347	83.3	1603	91.4
1112	60.6	1348	78.8	1604	90.8
1113	60.0	1349	80.6	1605	90.8
1114	59.7	1350	85.7	1606	91.2
1115	59.3	1351	78.3	1607	91.0
1116	59.5	1352	66.6	1608	89.6

1117	59.1	1353	63.8	1609	90.8
1118	59.4	1354	67.9	1610	91.4
1119	59.5	1355	73.8	1611	66.8
1120	59.4	1356	75.5	1612	61.3
1121	59.1	1357	82.5	1613	72.4
1122	59.1	1358	86.1	1614	86.1
1123	58.7	1359	85.3	1615	84.9
1124	58.7	1400	86.3	1616	90.4
1125	58.4	1401	89.0	1617	91.6
1126	57.9	1402	89.2	1618	92.6
1127	55.6	1403	89.0	1619	92.5
1128	54.4	1404	88.4	1620	92.6
1129	55.6	1405	87.3	1621	93.5
1130	47.4	1406	87.9	1622	93.5
1131	49.4	1407	88.4	1623	93.6
1132	75.7	1408	89.3	1624	93.9
1133	86.8	1409	88.9	1625	93.8
1134	84.1	1410	89.8	1626	94.2
1135	85.0	1411	88.9	1627	94.5
1136	91.5	1412	87.9	1628	94.8
1137	94.1	1413	86.4	1629	94.1
1138	95.0	1414	85.5	1630	94.0
1139	95.3	1415	86.1	1631	94.0
1140	94.8	1416	86.9	1632	93.0
1141	94.2	1417	85.8	1633	93.2
1142	93.8	1418	85.6	1634	93.7
1143	92.6	1419	85.7	1635	93.5
1144	94.9	1420	85.1	1636	93.4
1145	95.2	1421	85.5	1637	93.5
1146	93.9	1422	86.1	1638	93.3
1147	93.8	1423	86.2	1639	93.7
1148	94.2	1424	85.2	1640	93.4
1149	93.7	1425	84.6	1641	93.7
1150	93.0	1426	85.2	1642	93.3
1151	93.2	1427	86.3	1643	92.2
1152	92.6	1428	85.3	1644	93.1
1153	93.9	1429	84.6	1645	93.7
1154	94.2	1430	84.3	1646	93.2
1155	93.4	1431	84.7	1647	94.0
1156	93.4	1432	85.1	1648	93.9
1157	93.5	1433	86.3	1649	94.5
1158	92.7	1434	85.8	1650	93.8
1159	94.2	1435	84.7	1651	93.2
1200	94.1	1436	84.7	1652	93.1
1201	95.1	1437	86.6	1653	93.3

1202	95.1	1438	86.3	1654	94.6
1203	96.5	1439	87.9	1655	95.3
1204	96.8	1440	89.2	1656	94.9
1205	96.5	1441	88.8	1657	95.5
1206	96.8	1442	86.8	1658	94.6
1207	97.1	1443	87.2	1659	94.9
1208	97.4	1444	88.8	1700	94.9
1209	97.0	1445	88.5	1701	95.0
1210	95.9	1446	89.0	1702	95.4
1211	94.3	1447	89.9	1703	94.9
1212	95.0	1448	88.6	1704	94.9
1213	95.7	1449	88.8	1705	95.5
1214	96.4	1450	88.6	1706	95.1
1215	94.9	1451	87.4	1707	95.5
1216	95.8	1452	87.1	1708	96.1
1217	97.2	1453	86.8	1709	95.5
1218	96.6	1454	87.3	1710	95.0
1219	95.0	1455	88.4	1711	94.8
1220	95.9	1456	88.2	1712	94.1
1221	96.2	1457	87.0	1713	94.3
1222	95.3	1458	87.1	1714	94.8
1223	95.6	1459	87.2	1715	96.1
1224	96.7	1500	88.9	1716	96.6
1225	96.6	1501	87.4	1717	95.9
1226	95.7	1502	87.1	1718	95.3
1227	95.9	1503	86.6	1719	95.4
1228	95.8	1504	87.4	1720	96.6
1229	95.8	1505	88.4	1721	96.4
1230	96.0	1506	89.7	1722	95.8
1231	95.0	1507	89.0	1723	96.0
1232	94.2	1508	88.7	1724	95.1
1233	94.3	1509	88.8	1725	94.3
1234	94.0	1510	87.6	1726	96.0
1235	94.0	1511	87.8	1727	96.5
1236	94.0				
Average	80.2		85.6		91.9
Minimum	47.4		63.8		61.3
Maximum	97.4		89.9		96.6

Concentration of Methane and Ethane
determined by GC/FID in Dryer Stack Emissions November 11, 1993

	CONCENTRATION (ppmv)	
TIME	METHANE	ETHANE
1122	104	8.1
1133	123	9.1
1136	116	8.1
1138	120	8.8
1219	141	11
1225	117	10
1316	77	6.5
1319	116	9.2
1322	71	5.2
1358	117	9.2
1402	80	6.1
1405	80	3.9
1445	98	7.0
1448	86	6.5
1713	106	7.6

6 Run 1

8 Run 2

1 Run 3

This is on disk – Do you want text with a brief ~~GC~~ explanation of the method, certified std. lot #'s, description of temperature program, etc.?

Feel free to change titles, add footnotes...

The results are on a wet basis. I will say so in title or text in next draft.

WET BASIS?
if so need to [illegible]

FILE NAME - dryvel2
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:03

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	0.00
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H2O)=	0.618
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H2O)=	0.7719
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Circular Stack	
Stack Area (Square Feet)=	25.22
Stack Velocity (Actual, Feet/min)=	2,726
Flow Rate (Actual, Cubic ft/min)=	68,760
Flow rate (Standard, Wet, Cubic ft/min)=	63,148
Flow Rate (Standard, Dry, Cubic ft/min)=	60,472

X wrong stack Diam

* * METRIC UNITS * *

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H2O)=	15.7
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H2O)=	3.8902
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Circular Stack	
Stack Area (Square Meters)=	2.343
Stack Velocity (Actual, m/min)=	831
Flow rate (Actual, Cubic m/min)=	1,947
Flow rate (Standard, Wet, Cubic m/min)=	1,788
Flow rate (Standard, Dry, Cubic m/min)=	1,712

FILE NAME - dryvel2
RUN # - dryerv2
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:07:04

Point #	Delta P (in. H2O)	Stack T (F)
1	0.780	98
2	0.760	100
3	0.780	101
4	0.840	101
5	0.720	101
6	0.420	96
7	0.710	99
8	0.740	100
9	0.690	100
10	0.490	101
11	0.320	100
12	0.170	99

FILE NAME - [illegible]
RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/8[illegible]
04-11-1994 08:09:28

Barometric Pressure (in Hg)=	29.13
Static Pressure (Inches H2O)=	0.00
Percent Oxygen=	17.6
Percent Carbon. Dioxide=	2.2
Percent Water=	4.2
Average Delta P (in H2O)=	0.642
Average Stack Temperature (F)=	100
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (in H2O)=	0.7910
Pitot Coefficient=	0.84
Stack Axis #1 (Inches)=	68.0
Stack Axis #2 (Inches)=	68.0
Circular Stack	
Stack Area (Square Feet)=	25.22
Stack Velocity (Actual, Feet/min)=	2,794
Flow Rate (Actual, Cubic ft/min)=	70,452
Flow rate (Standard, Wet, Cubic ft/min)=	64,721
Flow Rate (Standard, Dry, Cubic ft/min)=	61,978

** METRIC UNITS **

Barometric Pressure (mm Hg)=	740
Static Pressure (mm H2O)=	0
Percent Oxygen=	17.6
Percent Carbon Dioxide=	2.2
Percent Water=	4.2
Average Delta P (mm H2O)=	16.3
Average Stack Temperature (C)=	38
Dry Molecular Weight=	29.06
Wet Molecular Weight=	28.59
Average Square Root of Delta P (mm H2O)=	3.9866
Pitot Coefficient=	0.84
Stack Axis #1 (Meters)=	1.727
Stack Axis #2 (Meters)=	1.727
Circular Stack	
Stack Area (Square Meters)=	2.343
Stack Velocity (Actual, m/min)=	851
Flow rate (Actual, Cubic m/min)=	1,995
Flow rate (Standard, Wet, Cubic m/min)=	1,833
Flow rate (Standard, Dry, Cubic m/min)=	1,755

FILE NAME - dryvel3
RUN # - dryerv3
LOCATION - dryer
DATE - 11-11-93
PROJECT # - 4601.01.05.01

PROG.=VER 06/09/89
04-11-1994 08:09:30

Point #	Delta P (in. H2O)	Stack T (F)
1	0.820	99
2	0.740	100
3	0.740	100
4	0.810	100
5	0.750	99
6	0.440	98
7	0.720	100
8	0.760	100
9	0.720	100
10	0.580	100
11	0.380	99
12	0.240	99

DRYER—TOTAL HYDROCARBON

Calibration Error Check

Cal. gas value	Measured value	% Error	Pass/Fail
90.20	90.2	0	Pass
51.3	50.8	1.0	Pass
29.5	29.1	1.4	Pass
0	0	0	Pass

Bias Check

Cal. gas value	Measured value	% Error	Pass/Fail
51.3	51.1	0.4	Pass

Percent Drift

Initial		Final	% Error	Pass/Fail
		Run 1		
Span	90.20	91.32	1.2	Pass
Zero	0	0.6	0.7	Pass
		Run 2		
Span	91.32	91.12	0.2	Pass
Zero	0.6	0.4	0.2	Pass
		Run 3		
Span	91.12	91.24	0.1	Pass
Zero	0.4	0.8	0.4	Pass

PROCESS DATA
============

THE BELDEN BRICK COMPANY

PLANT # 6

SUGARCREEK, OHIO 44681

FOR MONDAY 11/8/93

THROUGH FRIDAY 11/12/93

PREPARED BY:

JOHN C. JENSEN
ENVIRONMENTAL ENGINEER
THE BELDEN BRICK COMPANY

Filename:
PLT6_EPA

THE BELDEN BRICK COMPANY
SUGARCREEK OHIO
PLANT INFORMATION

DATE:
Tuesday
11/9/93

PLANT NUMBER........ 6

KILN NUMBER......... 3 DRYER TUNNELS #'S...6. 7. & 8 to 1 stack

RAW MATERIAL........ 50% # 4 Shale From Shanesville Pit # 2
50% # 4 Shale From Shanesville Pit # 3

PROCESS WEIGHT	BOTTOM	TOP 4 courses	TOTAL
TYPE OF BRICK.......	503-505	Acid Brick	
KILN SCHEDULE....... (cars/day)	10	10	
BRICK PER CAR.......	2496	976	3472
SIZE BRICK..........	Standard	Standard	
BRICK WEIGHT (lbs)..	4.7462	6.0525	
PROCESS WEIGHT...... (lbs/hr)	4936	2461	
TOTAL PROCESS WEIGHT (Kiln)...................................			7397

DRYER		Tues	Wed	Thur
Pull Times..........	Dryer # 8	5:50 AM		7:10 AM
	Dryer # 6	8:10 AM	5:30 AM	9:30 AM
	Dryer # 7	10:30 AM	7:50 AM	11:50 AM
	Dryer # 8	12:50 PM	10:10 AM	2:10 PM
	Dryer # 6	3:00 PM	12:30 PM	4:30 PM
	Dryer # 7	5:20 PM	2:50 PM	6:50 PM
	Dryer # 8	7:40 PM	5:10 PM	11:30 PM
	Dryer # 6		7:30 PM	
	Dryer # 7		9:50 PM	
	Dryer # 8			
Exit Temp......................		269	265	274
Inlet Temp (stack)............		95	100	100

KILN # 3	Tues	Wed	Thur
Gas Consumption (24hrs-cu.ft.)	230560	228,000	218,880
Inlet Temp.....................	106	124	140
Peak Temp......................	2040	2040	2031
Push Times.....................	5:50 AM	5:30 AM	7:10 AM
	8:10 AM	7:50 AM	9:30 AM
	10:30 AM	10:10 AM	11:50 AM
	12:50 AM	12:30 PM	2:10 PM
	3:00 PM	2:50 PM	4:30 PM
	5:20 PM	5:10 PM	6:50 PM
	7:40 PM	7:30 PM	11:30 PM
		9:50 PM	

503-505
Standard
Cored

THE BELDEN BRICK COMPANY
PLANT # 6 SUGARCREEK OHIO
BRICK WEIGHTS (LBS)

DATE:
Monday
11/8/93

	Green Brick B/4 Dryer	Dried Brick B/4 Kiln	Fired Brick
1	5.5492	4.7542	4.4690
2	5.5688	4.7422	4.4632
3	5.6050	4.7488	4.4656
4	5.5778	4.7362	4.4734
5	5.5836	4.7386	4.4718
6	5.5442	4.7264	4.4714
7	5.5628	4.7610	4.4592
8	5.5722	4.7404	4.4508
9	5.5720	4.7410	4.4726
10	5.5906	4.7736	4.4552
Average...	5.5726	4.7462	4.4652
Loss of wgt in dryer..........		0.8264	
% Wgt lost....................		14.83%	
loss of wgt in kiln..............................			0.2810
% Wgt lost....................................			5.92%

Acid
Singles
Solids

THE BELDEN BRICK COMPANY
PLANT # 6 SUGARCREEK OHIO
BRICK WEIGHTS (LBS)

DATE:
Monday
11/8/93

	Green Brick B/4 Dryer	Dried Brick B/4 Kiln	Fired Brick
1	7.0544	6.0860	5.6532
2	7.0124	6.0678	5.6586
3	7.0590	6.1132	5.6700
4	6.9950	6.0104	5.6910
5	6.9944	6.0244	5.6818
6	7.1330	6.0384	5.6560
7	7.0484	6.0186	5.7018
8	6.9942	6.0104	5.6506
9	7.0306	6.0858	5.6566
10	7.0132	6.0702	5.6720
Average...	7.0335	6.0525	5.6692
Loss of wgt in dryer..........		0.9809	
% Wgt lost....................		13.95%	
loss of wgt in kiln..................................			0.3834
% Wgt lost..			6.33%

Filename:
TRK_LOADS.EPA

Ave Load = 25 Ton

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
RECORD OF TRUCKLOADS RECEIVED

DATE:
Tuesday
11/9/93

	SHALE		CLAY		
TIME	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
7:20 AM	X				
7:70 AM					X
8:00 AM	X				
8:15 AM			X		
8:32 AM		X			
9:15 AM					X
9:25 AM	X				
9:40 AM				X	
10:00 AM		X			
10:30 AM	X				X
11:00 AM		X			
11:10 AM			X		
12:15 PM	X				
1:00 PM					X
1:10 PM			X		
1:45 PM			X		
2:00 PM					X
2:20 PM				X	
2:30 PM					X
TOTALS					
LOADS	5	3	4	2	6
TONS	125	75	100	50	150

TOTAL TONS FIRECLAY RECEIVED.. 300

CONDITION	THE BELDEN BRICK COMPANY	DATE:
Empty	PLANT # 6 - GRINDING PLANT	Tuesday
1/4 Full	RECORD OF BIN CONDITION	11/9/93
1/2 Full		
3/4 Full		
Full		

COARSE BINS

	SHALE		CLAY		
	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
Beginning of Shift			Full	Full	Full
End of Shift			1/2 Full	Full	1/2 Full

FINES BINS

Beginning of Shift					Empty
End of Shift					3/4 Full

NOTES:

Began grinding at 7:00 AM

Electrical power failure from 7:59 AM till 8:14 AM

Grinding plant worked straight through lunch

Shut down grinding plant at 3:00 PM

Grinding plant operated for 8 hours

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY SCREENS PRODUCTION

DATE:
Tuesday
11/9/93

Pully RPM.............	37.726
Pully Diameter inches..	16
Belt Width inches......	20
Belt Speed FPM.........	157
Empty Tub Wgt pounds...	20.25

*Sample should be taken every 15 minutes.
*Sample should be taken for 10 seconds.
*Part of sample should be bagged every 1-1/2 hours.
*Sampling should continue for 4 hours.

TIME	NET WEIGHT	SAMPLED BAGGED (Y/N)	SAMPLE NUMBER
7:52 AM	247.75		
8:29 AM	251.75	* Time extended due to power failure	
8:44 AM	232.25		
8:59 AM	234.75		
9:14 AM	233.75		
9:29 AM	241.75	Yes, time marked on bag	
9:44 AM	236.75		
9:59 AM	244.75		
10:14 AM	237.75		
10:29 AM	251.75		
10:44 AM	241.75		
10:59 AM	237.75	Yes, time marked on bag	
11:14 AM	231.75		
11:29 AM	236.25		
11:44 AM	245.75		
11:59 AM	227.75		
12:14 PM	234.75	Yes, time marked on bag	

Ave Wgt...... 239.34

Ton/Hr....... 43.08

Total tons of fireclay ground (in 8 hours).................... 344.65

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY DUST COLLECTOR

DATE:
TUESDAY
11/9/93

This represents the weight of dust collected during the above date

Hopper under dust collector should be emptied and cleaned before test begins.

Hopper under dust collector should be emptied and cleaned after test ends. That dust must also be weighed and logged on report.

Empty Weight Hopper # 1 12400

Empty Weight Hopper # 2 12400

HOPPER NUMBER	TIME HOPPER FILLED	GROSS HOPPER WEIGHT	FULL HOPPER WEIGHT
1	10:00 AM	14000	1600
2	1:00 PM	14080	1680
1	3:00 PM	14140	1740
2	3:15 PM	12920	520

Total dust removed from dust collector (lbs)......... 5540

Filename:
TRK_LOADS.EPA

Ave Load = 25 Ton

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
RECORD OF TRUCKLOADS RECEIVED

DATE:
Thursday
11/11/93

	SHALE		CLAY		
TIME	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
7:00 AM		X			
7:20 AM			X		
7:23 AM	X				
8:00 AM			X		
8:05 AM		X			
8:45 AM	X				X
9:33 AM				X	
10:00 AM					X
10:17 AM			X		
10:40 AM					X
10:55 AM			X		
11:25 AM		X			
12:01 PM					X
12:25 PM			X		
1:30 PM			X		
1:45 PM			X		
2:15 PM	X				
2:40 PM					X
TOTALS					
LOADS	3	3	7	1	5
TONS	75	75	175	25	125

TOTAL TONS FIRECLAY RECEIVED.. 325

CONDITION	THE BELDEN BRICK COMPANY	DATE:
Empty	PLANT # 6 - GRINDING PLANT	Thursday
1/4 Full	RECORD OF BIN CONDITION	11/11/93
1/2 Full		
3/4 Full		
Full		

COARSE BINS

	SHALE		CLAY		
	S'ville Pit # 2	S'ville Pit # 3	S'ville Pit # 2	Moomaw Pit # 1	Wallick Pit # 6
Beginning of Shift			1/2 Full	Full	3/4 Full
End of Shift			1/2 Full	1/2 Full	3/4 Full

FINES BINS

Beginning of Shift					3/4 Full
End of Shift					3/4 Full

NOTES:

Began grinding at 7:00 AM

Grinding plant worked straight through lunch

Shut down grinding plant at 2:40 PM

Grinding plant operated for 7-3/4 hours

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY SCREENS PRODUCTION

DATE:
Thursday
11/11/93

Pully RPM.............	37.726	*Sample should be taken every 15 minutes.
Pully Diameter inches..	16	*Sample should be taken for 10 seconds.
Belt Width inches......	20	*Part of sample should be bagged every 1-1/2 hours.
Belt Speed FPM.........	157	*Sampling should continue for 4 hours.
Empty Tub Wgt pounds...	20.25	

TIME	NET WEIGHT	SAMPLED BAGGED (Y/N)	SAMPLE NUMBER
7:30 AM	251.25		
7:45 AM	250.75		
8:00 AM	242.75		
8:15 AM	235.25		
8:30 AM	227.75		
8:45 AM	228.75	Yes, time marked on bag	
9:00 AM	236.25		
9:15 AM	226.75		
9:30 AM	226.25		
9:45 AM	242.25		
10:00 AM	241.75		
10:15 AM	238.75	Yes, time marked on bag	
10:30 AM	241.75		
10:45 AM	224.25		
11:00 AM	231.75		
11:15 AM	224.50		
11:30 AM	220.75	Yes, time marked on bag	

Ave Wgt...... 234.79

Ton/Hr....... 42.26

Total tons of fireclay ground (in 8 hours).................... 338.10

THE BELDEN BRICK COMPANY
PLANT # 6 - GRINDING PLANT
FIRECLAY DUST COLLECTOR

DATE:
Thursday
11/11/93

This represents the weight of dust collected during the above date

Hopper under dust collector should be emptied and cleaned before test begins.

Hopper under dust collector should be emptied and cleaned after test ends. That dust must also be weighed and logged on report.

Empty Weight Hopper # 1 12400

Empty Weight Hopper # 2 12400

HOPPER NUMBER	TIME HOPPER FILLED	GROSS HOPPER WEIGHT	FULL HOPPER WEIGHT
1	10:00 AM	13820	1420
2	12:30 PM	14040	1640
1	1:45 PM	13740	1340
2	2:50 PM	13780	1380
1	3:10 PM	12780	380

Total dust removed from dust collector (lbs)......... 6160

from . . .

ROY NEULICHT

Rich -- Add
Sample Log List
@ Front of
Analytical Section

(You had a typed List,
attached to memo
for Analysis -- I believe)

— Roy

Appendix C

Analytical Results

- Sample Log
  - ✓ Filter & Beaker Tare weights
  - ✓ Grinding / Screening PM / PM-10
  - ✓ Grinding / Screening Ambient PM-10
  - ✓ Kiln PM / PM-10
  - ✓ Kiln Condensible PM
  - ✓ Kiln metals
  - ? Kiln Semivolatile
  - ? Kiln ~~Semi~~ Volatile
  - ~~Clay / shale Analysis~~

Kiln HCl / HF / PM

~~NOTES~~

- ✓ ~~Grinding / Screening~~ Product Moisture / Sieve Analysis Grinding / Screening

~~CEMS - Not Applicable~~

MRI

MIDWEST RESEARCH INSTITUTE
Suite 350
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Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

November 11, 1993

To: M. St. Germain, M. Whitacre, A. Mainey

From: R. Marinshaw

Subject: Request for Analysis of Samples From Belden Brick Emission Test
MRI Project No. 4601-01.

Under EPA Contract No. 68-D2-0159, Work Assignment I-01, an emission test was conducted at the Belden Brick Company Plant No. 6, Sugarcreek, Ohio, during the week of November 8, 1993. The attached tables list all of the samples and analyses required. Please refer to the site-specific test plan, dated October 22, 1993, for a detailed description of the test locations, test methods, and QA requirements for the test.

Please take note that the complete charge numbers for this emission test are as follows:

Field test	4601-01-05-01
VOST analysis	4601-01-05-02
Semi-VOST analysis	4601-01-05-03
Metals analysis	4601-01-05-04
QA/QC	4601-01-05-05
Reporting	4601-01-05-06

1.0 PARTICULATE MATTER

Three Method 201A runs were conducted on the inlet to the baghouse for the grinding/screening room, and two Method 201A runs were conducted on the outlet to the grinding/screening room fabric filter. These samples are to be analyzed for PM less than or equal to 10 micrometers (μm) and PM greater than 10 μm. In addition, Hi-Vol samplers were used to sample ambient PM-10 inside the grinding/screening room (three runs) and outside the grinding/screening room (three runs on the east side and two runs on the west side). The Hi-Vol filters must be analyzed for two runs at each of the three locations.

The kiln was sampled for PM emissions using three sampling trains. Three Method 201/202 runs were conducted. These samples must be analyzed for PM less than or equal to 10 μm, PM greater than 10 μm, condensible inorganic PM, and condensible organic PM. Three Method 26A runs were conducted, and the samples from this train must be analyzed for filterable PM. Finally, three Method 0029 runs were conducted. The samples from these runs must also be analyzed for filterable PM. Please note that the filters for the Method 201A train are to be weighed, heated to 320°F, and reweighed. Table 1 summarizes the PM samples from the grinding/screening room and kiln that must be analyzed.

TABLE 1. PM SAMPLES FOR ANALYSIS

Sample	Run 1	Run 2	Run 3
Grinding/Screening Room fabric filter inlet--Method 201A			
Preseparator rinse (d > 10μ)	1001	2001	3001
Cyclone rinse (d ≤ 10μ)	1002	2002	3002
In-stack filter (d ≤ 10μ)	1003	2003	3003
Grinding/Screening Room fabric filter outlet--Method 201A			
Preseparator rinse (d > 10μ)	1006	2006	NA
Cyclone rinse (d ≤ 10μ)	1007	2007	NA
In-stack filter	1008	2008	NA
Grinding/Screening Room ambient--Hi-Vol sampler			
Hi-Vol filter #____ (Inside)	1011	2011	3011
Hi-Vol filter #____ (Outside--east)	1013	2013	3013
Hi-Vol filter #____ (Outside--west)	4011	5011	NA
Kiln Stack--Method 201A/202			
Preseparator rinse (d > 10μ)	1014	2014	3014
Cyclone rinse (d ≤ 10μ)	1015	2015	3015
Front-half rinse	1017	2017	3017
Out-stack filter (d ≤ 10μ) [a]	1018	2018	3018
Condensate and water rinse	1019	2019	3019
Back-half rinse (Methylene chloride)	1020	2020	3020
Kiln Stack--Method 26A			
Front-half rinse (acetone)	1022	2022	3022
Filter	1023	2023	3023
Kiln Stack--Method 0029 (Multi-metals)			
Front half rinse (acetone)	1065	2065	3065
Filter	1030	2030	3030

TABLE 2. (Continued)

Sample	Run 1	Run 2	Run 3
Reagent Blanks			
Acetone (Method 201A)	1047	NA	NA
Out-stack filter (Method 201A)	1049	NA	NA
Methylene chloride (Method 202)	1062	NA	NA
Hi-Vol filter	1050	NA	NA
Acetone (Method 26A)	1051	NA	NA
Filter (Method 26A)	1052	NA	NA
Filter (Method 0029)	1056	NA	NA

[a]Filters for Method 201A train must be weighed, heated to 320°F, and reweighed.

2.0 PROCESS SAMPLES

Three process samples were collected from the conveyor that transports from the grinding/screening room to the fine material storage bins. These samples must be analyzed for moisture. In addition, a sieve analysis must be conducted on these samples according to the procedures described in AP-42, Appendix E, *Procedures for Laboratory Analysis of Surface/Bulk Dust Loading Samples*. Table 2 summarizes the process samples to be analyzed.

TABLE 2. GRINDING/SCREENING ROOM PROCESS SAMPLES

Sample	Run 1	Run 2	Run 3
Grinding/Screening Room--fine material conveyor			
Process sample	1012	2012	3012
Process sample	1013	2013	3013

3.0 VOST

The kiln was sampled for volatile organic compounds using a Method 0030 (VOST) sampling train. Three runs were conducted. Trap pairs 2, 4, and 6 must be analyzed according to Method 8240 for the compounds listed in Figure 5-9 of the test plan. In addition, one pair of field blank traps and one pair of trip blank traps must be analyzed. There was no VOST condensate. Table 3 summarizes the VOST samples for analysis.

TABLE 3. VOST SAMPLES FOR ANALYSIS

Sample	Sample
Kiln Stack--Method 0030 (VOST)	
Pair 1 Tnx	1067
Pair 1 T/C	1068
Pair 2 Tnx[a]	1069
Pair 2 T/C[a]	1070
Pair 3 Tnx	1071
Pair 3 T/C	1072
Pair 4 Tnx[a]	1073
Pair 4 T/C[a]	1074
Pair 5 Tnx	2067
Pair 5 T/C	2068
Pair 6 Tnx[a]	2069
Pair 6 T/C[a]	2070
Pair 7 Tnx	2071
Pair 7 T/C	2072
Field blank Tnx[b]	1075
Field blank T/C[b]	1076
Trip blank Tnx[b]	1077
Trip blank T/C[b]	1078
Field blank Tnx[b]	2075
Field blank T/C[b]	2076
Trip blank Tnx[b]	2077
Trip blank T/C[b]	2078

[a]Trap pairs 2, 4 and 6 to be analyzed.
[b]One pair of field and trip blanks to be analyzed.

4.0 Semi-VOST

The kiln was sampled for semi-volatile organic compounds using a Method 0010 (semi-VOST) sampling train. Three runs were conducted. Please note that the back half samples were split into two fractions. The two sample fractions for Run 1 (1038 and 1038A) should be analyzed separately; for each of the other two runs, the two fractions should be combined for the analysis. The samples must be analyzed for the compounds listed in Figure 5-11 of the test plan. Table 4 summarizes the semi-VOST samples for analysis.

TABLE 4. SEMI-VOST SAMPLES FOR ANALYSIS.

Sample	Run 1	Run 2	Run 3
Kiln Stack--Method 0010 (semi-VOST)			
Front-half rinse	1036	2036	3036
Filter	1037	2037	3037
Back-half rinse	1038[a]	2038[b]	3038[b]
Back-half rinse	1038A[a]	2038A[b]	3038A[b]
XAD Cartridge #______	1039	2039	3039
Condensate	1040	2040	3040
Blanks			
Methanol	1061	NA	NA
Methylene chloride	1062	NA	NA
XAD Cartridge #______	1063	NA	NA

[a]Analyze each fraction of back half rinse sample separately.
[b]Combine both back half rinse sample fractions for analysis.

5.0 Hydrogen Fluoride/Hydrogen Chloride (HF/HCl)

The kiln was sampled for HF/HCl using Method 26A. Three runs were conducted. The front half of the sampling train is to be analyzed for PM as shown in Table 1. The HF/HCl aliquots from the sampling train are to be sent to Galbraith Laboratory for analysis. Table 5 summarizes the HF/HCl samples for analysis.

TABLE 5. HF/HCl SAMPLES FOR ANALYSIS

Sample	Run 1	Run 2	Run 3
Kiln Stack--Method 26A			
XX024 Aliquot (Cl_2/HF)	1025	2025	3025
XX026 Aliquot (Cl_2/HF)	1027	2027	3027
Blanks			
0.1N H_2SO_4	1053	NA	NA
0.1N NaOH	1054	NA	NA

6.0 Metals

The kiln was sampled for metals using Method 0029. Three runs were conducted. The front half of the sampling train is to be analyzed separately for PM as shown in Table 1 prior to the metals analysis. The front and back halves of the sampling train should be analyzed separately for the following 11 metals: arsenic, cadmium, cobalt, chromium, beryllium, antimony, lead, mercury, manganese, nickel, and selenium. Please note that the samples from the back half of the sampling train (Impingers 1 to 3) were split into two fractions. The two sample fractions for Run 1 (1031 and 1031A) should be analyzed separately; for each of the other two runs, the two back half fractions should be combined for the analysis. Table 5 summarizes the metals samples for analysis.

TABLE 6. METALS SAMPLES FOR ANALYSIS

Sample	Run 1	Run 2	Run 3
Kiln Stack--Method 0029			
Front-half 0.1N HNO_3	1029	2029	3029
Filter	1030	2030	3030
Acetone rinse residue	1065	2065	3065
Impingers 1-3 (HNO_3/H_2O_2)	1031[a]	2031[b]	3031[b]
Impingers 1-3 (HNO_3/H_2O_2)	1031A[a]	2031A[b]	3031A[b]
Impinger 4 + 0.1N HNO_3 rinse	1032	2032	3032
Impingers 5-6 Acid $KMnO_4$	1033	2033	3033
Impingers 5-6 8N HCl rinse	1034	2034	3034
Blanks			
0.1 N HNO_3	1055	NA	NA
Filter	1056	NA	NA
5% HNO_3/10% H_2O_2	1057	NA	NA
4% $KMnO_4$/10% H_2SO_4	1058	NA	NA
ASTM Type I water	1059	NA	NA
8N HCl + 200ml H_2O	1060	NA	NA

[a]Analyze each fraction of back half (Impingers 1 to 3) sample separately.
[b]Combine both back half (Impingers 1 to 3) sample fractions for analysis.

Filter & Beaker Tare Weights

BEAKER TARE WEIGHT DATA

MRI Project No. 4601.01.05.01
Sampling Team Leader: Szydlo Analyst: Szydlo
Beaker Size and Type: 150-mL borosilicate glass
Beaker Treatment: Following cleaning according to test protocol, heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11-19-93 1300	11-19-93 1315	11-19-93 1330	
Balance Check Weight Value:	100	100	100	
Balance Reads:	100.0076	100.0076	100.0076	
Beaker No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
1015	92.9929	92.9930	92.9930	92.9930
1014	98.9159	98.9160	98.9160	98.9160
2002	86.2143	86.2143	86.2143	86.2143
2006	106.5735	106.5736	106.5736	106.5736
2017	102.5881	102.5881	102.5881	102.5881
~~1017~~	~~88.5529~~	~~88.5530~~	~~88.5530~~	~~88.5530~~
2014	102.5185	102.5186	102.5187	102.5186
1001	82.0441	82.0441	82.0442	82.0441
3001	102.0715	102.0715	102.0716	102.0715
2015	83.9239	83.9240	83.9241	83.9240
3014	84.1140	84.1140	84.1141	84.1140
3017	106.6630	106.6631	106.6632	106.6631
3002	115.6979	115.6979	115.6978	115.6978
1017	117.3722	117.3723	117.3722	117.3722
Balance Check Balance Reads:	100.0079	100.0078	100.0079	

COMMENTS:

BEAKER TARE WEIGHT DATA

MRI Project No. 4601.01.05.01
Sampling Team Leader: Szydlo Analyst: Szydlo
Beaker Size and Type: 150-mL borosilicate glass
Beaker Treatment: Following cleaning according to test protocol, heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11-19-99/1300	11-19-99/1315	11-19-99/1330	
Balance Check Weight Value:	100g	100g	100.g	
Balance Reads:	100.0076g	100.0076	100.0076	
Beaker No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
3065	99.2742	99.2743	99.2743	99.2743
1065	92.5408	92.5408	92.5409	92.5408
2065	103.6734	103.6735	103.6735	103.6735
MM-13	116.3934	116.3934	116.3935	116.3939
1022	91.7563	91.7563	91.7564	91.7563
2022	88.5049	88.5050	88.5051	88.5050
3022	110.8388	110.8388	110.8388	110.8388
1051	89.0244	89.0245	89.0245	89.0245
3002	115.6771	115.6770	115.6770	115.6770
3015	112.9871	112.9872	112.9872	112.9872
2001	112.0051	112.0051	112.0051	112.0051
1006	103.3151	103.3150	103.3151	103.3151
1002	108.8607	108.8606	108.8606	108.8606
2007	85.1241	85.1241	85.1240	85.1241
1007	101.3539	101.3540	101.3540	101.3540
~~1017~~	~~117.3722~~	~~117.3722~~	~~117.3721~~	~~117.3722~~
1022	114.6456	114.6455	114.6455	114.6455
Balance Check Balance Reads:	100.0076	100.0076	100.0076	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 9601-01-05-01
Sampling Team Leader: Szullo
Analyst: EDWARDS / HARMON
Filter Size and Type: 4.9-inch diameter Whatman QM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 0911	11/3/93 1431	11/4/93 0950	
Balance Check Weight Value:	1.0000 g	1.0000 g	1.0000 g	
Balance Reads:	1.0000	1.0000 g	1.0000 g	
Filter No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
SF 1	0.2867	0.2868	0.2868	
2	0.2888	0.2889	0.2889	
3	0.2873	0.2874	0.2874	
4	0.2861	0.2861	0.2861	
5	0.2880	0.2880	0.2880	
6	0.2794	0.2794	0.2794	
7	0.2841	0.2842	0.2842	
8	0.2873	0.2874	0.2873	
9	0.2875	0.2876	0.2875	
10	0.2912	0.2913	0.2913	
Balance Check Balance Reads:	1.0000 g	1.0001 g	1.0000 g	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 4601-01-05-01
Sampling Team Leader: Sevilla
Analyst: Edwards / Harmon
Filter Size and Type: 4.9-inch diameter Whatman QM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 0911	11/3/93 1440	11/4/93 0943	
Balance Check Weight Value:	1.0000g	1.0000 g	1.0000 g	
Balance Reads:	1.0000g	1.0000 g	1.0000 g	
Filter No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
SF 11	0.2822	0.2822	0.2821	
12	0.2835	0.2835	0.2835	
13	0.2857	0.2858	0.2858	
14	0.2834	0.2835	0.2835	
15	0.2842	0.2843	0.2842	
16	0.2860	0.2861	0.2861	
17	0.2863	0.2863	0.2864	
18	0.2865	0.2866	0.2866	
19	0.2862	0.2862	0.2863	
20	0.2905	0.2906	0.2906	
Balance Check Balance Reads:	1.0000 g	1.0000 g	1.0000 g	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 4601-01-05-01
Sampling Team Leader: Szydlo
Analyst: Edwards/HARMON
Filter Size and Type: 4.9-inch diameter Whatman GM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 0838	11/3/93 1354	11/4/93 1015	
Balance Check Weight Value:	1.0000 g	1.0000 g	1.0000 g	
Balance Reads:	1.0000 g	1.0009 g	1.0000 g	
Filter No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
LF 1	1.0912	1.0915	1.0916	
2	1.0673	1.0676	1.0677	
3	1.1065	1.1067	1.1067	
4	1.1101	1.1103	1.1103	
5	1.0829	1.0831	1.0830	
6	1.1000	1.1002	1.1002	
7	1.0927	1.0928	1.0929	
8	1.1021	1.1022	1.1024	
9	1.0843	1.0844	1.0846	
10	1.1170	1.1171	1.1172	
Balance Check Balance Reads:	1.0000 g	1.0010 g	1.0000 g	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 4601-01-05-01
Sampling Team Leader: [illegible] Szydlo   Analyst: Edwards / HARMON
Filter Size and Type: 4.9-inch diameter Whatman GM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 [illegible]	11/3/93 1417	11/4/93 1006	
Balance Check Weight Value:	1.0000 g	1.0000 g	1.0000 g	
Balance Reads:	1.0000	1.0000 g	1.0000 g	
Filter No.	**First Weighing**	**Second Weighing**	**Third Weighing**	**Average Weight or Weight to be Used as the Tare**
CF 11	1.1081	1.1086	1.1085	
12	1.0778	1.0783	1.0789	
13	1.1028	1.1033	1.1034	
14	1.1056	1.1061	1.1060	
15	1.0933	1.0937	1.0937	
16	1.0978	1.0982	1.0981	
17	1.1008	1.1011	1.1010	
18	1.0965	1.0970	1.0968	
19	1.1127	1.1131	1.1129	
20	1.1098	1.1102	1.1101	
Balance Check Balance Reads:	1.0000 g	1.0001 g	1.0000 g	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 4601-01-05-01
Sampling Team Leader: SZYDLO Analyst: HARMON
Filter Size and Type: 4.9-inch diameter Whatman QM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 1505	11/3/93 1620	11/4/93 0935	
Balance Check Weight Value:	1.0000 g	1.0000 g	1.0000 g	
Balance Reads:	1.0000 g	1.0000 g	1.0000 g	
Filter No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
SSF-1	0.1484	0.1485	0.1485	
SSF-2	0.1541	0.1542	0.1541	
SSF-3	0.1477	0.1479	0.1478	
SSF-4	0.1466	0.1467	0.1467	
SSF-5	0.1526	0.1526	0.1526	
SSF-6	0.1504	0.1505	0.1505	
SSF-7	0.1460	0.1460	0.1459	
SSF-8	0.1487	0.1488	0.1486	
SSF-9	0.1485	0.1485	0.1484	
SSF-10	0.1483	0.1484	0.1483	
Balance Check Balance Reads:	1.0000 g	1.0000 g	1.0000 g	

COMMENTS:

FILTER TARE WEIGHT DATA

MRI Project No. 4601-01-05-C1
Sampling Team Leader: SZYDLO Analyst: HARMON
Filter Size and Type: 4.9-inch diameter Whatman GM-A, quartz fiber
Filter Treatment: Heat at 105° C for 3 hours; desiccate; weigh to a constant weight
Weight Unit: grams

Date/Time:	11/3/93 1514	11/3/93 1634	11/4/93 0927	
Balance Check Weight Value:	1.0000 g	1.0000 g	1.0000 g	
Balance Reads:	1.0000 g	1.0000 g	1.0000 g	
Filter No.	First Weighing	Second Weighing	Third Weighing	Average Weight or Weight to be Used as the Tare
SSF-11	0.1486	0.1485	0.1485	
SSF-12	0.1542	0.1541	0.1542	
SSF-13	0.1525	0.1524	0.1525	
SSF-14	0.1495	0.1494	0.1496	
SSF-15	0.1541	0.1540	0.1541	
SSF-16	0.1485	0.1486	0.1486	
SSF-17	0.1446	0.1447	0.1446	
SSF-18	0.1446	0.1447	0.1446	
SSF-19	0.1487	0.1488	0.1487	
SSF-20	0.1510	0.1511	0.1510	
Balance Check Balance Reads:	1.0000 g	1.0000 g	1.0000 g	

COMMENTS:

Grinding and Screening
Filterable PM-10
Filterable PM

from . . .

ROY NEULICHT

Inlet

FILTER PARTICULATE MATTER ANALYSIS DATA

MRI Project No. 4601.01.05.01 **Client:** EPA - Emission Inventory Branch (EIB)

Sampling Location: ~~Kiln~~ Baghouse Inlet **Facility:** Belden Brick Co., Sugar Creek, Ohio

Analyst: Szydlo

Filter samples ~~heated at 160° C for 2-3 hours~~, desiccated, and weighed to a constant weight. dessicated for 48 hours

FILTER + SAMPLE: Run No. B Inlet #1 Filter No. SF2 Sample No. 1003

		Date	Time
Gross Wt. (g)	.3705	11-22-93	0800
Gross Wt. (g)	.3706	11-22-93	1400
Gross Wt. (g)	.3705	11-23-93	0800
Gross Wt. (g)	.3705	11-23-93	1400

Filter + Sample Gross Wt. used for data entry (g) .3705
Filter Tare Wt. from tare weight data (g) .2889

COMMENTS:

FILTER + SAMPLE: Run No. B Inlet #2 Filter No. SF3 Sample No. 2003

		Date	Time
Gross Wt. (g)	.3323	11-22-93	0800
Gross Wt. (g)	.3322	11-22-93	1400
Gross Wt. (g)	.3323	11-23-93	0800
Gross Wt. (g)	.3323	11-23-93	1400

Filter + Sample Gross Wt. used for data entry (g) .3323
Filter Tare Wt. from tare weight data (g) .2874

COMMENTS:

FILTER + SAMPLE: Run No. B Inlet #3 Filter No. SF6 Sample No. 303

		Date	Time
Gross Wt. (g)	0.3842	11-22-93	0800
Gross Wt. (g)	0.3841	11-22-93	1400
Gross Wt. (g)	0.3843	11-23-93	0800
Gross Wt. (g)	0.3842	11-23-93	1400

Filter + Sample Gross Wt. used for data entry (g) . ~~3842~~ . ~~8~~3241
Filter Tare Wt. from tare weight data (g) .2794

COMMENTS:

NOTE: Control filter weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: ~~Kiln~~ Baghouse Inlet 1

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. 1 Beaker No. 1001 Sample No. 1001

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	232.0	Gross Wt. (g)	86.1700	12-06-93	0800
Beaker Tare Wt. (g)	82.0	Gross Wt. (g)	86.1699	12-06-93	1200
Sample + Rinses Wt. (g)	150	Gross Wt. (g)	86.1699	12-06-93	1700
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)			
Acetone Wt. (g)	150				
Acetone Wt./0.79 = mLs Acetone (B):	190				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 86.1699
Beaker Tare Wt. from tare weight data (g) 82.0441
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 1 Beaker No. 1002 Sample No. 1002

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	228.9	Gross Wt. (g)	109.2394	12-06-93	0800
Beaker Tare Wt. (g)	109.9	Gross Wt. (g)	109.2394	12-06-93	1200
Sample + Rinses Wt. (g)	120	Gross Wt. (g)	109.2394	12-06-93	1700
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)			
Acetone Wt. (g)	120				
Acetone Wt./0.79 = mLs Acetone (B):	150				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 109.2394
Beaker Tare Wt. from tare weight data (g) 108.8606
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 1 Beaker No. ____ Sample No. ____

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)		Gross Wt. (g)			
Beaker Tare Wt. (g)		Gross Wt. (g)			
Sample + Rinses Wt. (g)		Gross Wt. (g)			
Water Wt. (A) from Recovery Data: (g)		Gross Wt. (g)			
Acetone Wt. (g)					
Acetone Wt./0.79 = mLs Acetone (B):					

Beaker + Acetone Residue Gross Wt. used for data entry (g) ____
Beaker Tare Wt. from tare weight data (g) ____
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ____ mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: ~~Kiln~~ Baghouse Inlet 2

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH
Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. 2 Beaker No. 2001 Sample No. 2001

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	232.0
Beaker Tare Wt.(g)	112.0
Sample + Rinses Wt.(g)	120
Water Wt.(A) from Recovery Data:(g)	—
Acetone Wt.(g)	120
Acetone Wt./0.79 = mLs Acetone (B):	151.9

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)	115.8779	12-06-93	0800
Gross Wt.(g)	115.8777	12-06-93	1200
Gross Wt.(g)	115.8775	12-06-93	1700
Gross Wt.(g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 115.8777
Beaker Tare Wt. from tare weight data (g) 112.0051
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 2 Beaker No. 2002 Sample No. 2002

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	162.8
Beaker Tare Wt.(g)	86.2
Sample + Rinses Wt.(g)	76.6
Water Wt.(A) from Recovery Data:(g)	—
Acetone Wt.(g)	76.6
Acetone Wt./0.79 = mLs Acetone (B):	97

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)	86.4035	12-06-93	0800
Gross Wt.(g)	86.4033	12-06-93	1200
Gross Wt.(g)	86.4034	12-06-93	1700
Gross Wt.(g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 86.4034
Beaker Tare Wt. from tare weight data (g) 86.2143
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No.____ Beaker No.____ Sample No.____

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	
Beaker Tare Wt.(g)	
Sample + Rinses Wt.(g)	
Water Wt.(A) from Recovery Data:(g)	
Acetone Wt.(g)	
Acetone Wt./0.79 = mLs Acetone (B):	

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)			
Gross Wt.(g)			
Gross Wt.(g)			
Gross Wt.(g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g)
Beaker Tare Wt. from tare weight data (g)
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: ~~Kiln~~ Baghouse Inlet 3

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH
Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. 3 Beaker No. 3001 Sample No. 3001

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	164.6	Gross Wt. (g)	106.4319	12-06-97	0815
Beaker Tare Wt. (g)	102.1	Gross Wt. (g)	106.4318	12-06-97	1215
Sample + Rinses Wt. (g)	62.5	Gross Wt. (g)	106.4318	12-06-97	1715
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)			
Acetone Wt. (g)	62.5				
Acetone Wt./0.79 = mLs Acetone (B):	79.1				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 106.4318
Beaker Tare Wt. from tare weight data (g) 102.0715
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 3 Beaker No. 3002 Sample No. 3002

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
~~Beaker + Sample + Rinses Wt. (g)~~	169.4	Gross Wt. (g)	115.8773	12-06-97	0815
Beaker Tare Wt. (g)	115.7	Gross Wt. (g)	115.8773	12-06-97	1215
Sample + Rinses Wt. (g)	53.7	Gross Wt. (g)	115.8773	12-06-97	1715
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)			
Acetone Wt. (g)	53.7				
Acetone Wt./0.79 = mLs Acetone (B):	68				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 115.8773
Beaker Tare Wt. from tare weight data (g) 115.6978
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. ___ Beaker No. ___ Sample No. ___

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)		Gross Wt. (g)			
Beaker Tare Wt. (g)		Gross Wt. (g)			
Sample + Rinses Wt. (g)		Gross Wt. (g)			
Water Wt. (A) from Recovery Data: (g)		Gross Wt. (g)			
Acetone Wt. (g)					
Acetone Wt./0.79 = mLs Acetone (B):					

Beaker + Acetone Residue Gross Wt. used for data entry (g)
Beaker Tare Wt. from tare weight data (g)
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

from . . .

ROY NEULICHT

Outlet

FILTER PARTICULATE MATTER ANALYSIS DATA

MRI Project No. 4601.01.05.01 Client: EPA - Emission Inventory Branch (EIB)

Sampling Location: ~~Kiln~~ Baghouse Outlet Facility: Belden Brick Co., Sugar Creek, Ohio

Analyst: Szydlo

Filter samples ~~heated at 120° C for 2-3 hours~~, desiccated, and weighed to a constant weight. dessicated for 48 hours

FILTER + SAMPLE: Run No. B.Outlet #1 Filter No. SF1 Sample No. 1008

		Date	Time
Gross Wt. (g)	0.2895	11-22-93	0800
Gross Wt. (g)	0.2894	11-22-93	1400
Gross Wt. (g)	0.2894	11-23-93	0800
Gross Wt. (g)	0.2894	11-23-93	1400

Filter + Sample Gross Wt. used for data entry (g) 0.2894
Filter Tare Wt. from tare weight data (g) 0.2868

COMMENTS:

FILTER + SAMPLE: Run No. B.Outlet #2 Filter No. SF4 Sample No. 3008

		Date	Time
Gross Wt. (g)	.2882	11-22-93	0800
Gross Wt. (g)	.2881	11-22-93	1400
Gross Wt. (g)	.2883	11-23-93	0800
Gross Wt. (g)	.2882	11-23-93	1400

Filter + Sample Gross Wt. used for data entry (g) .2882
Filter Tare Wt. from tare weight data (g) .2861

COMMENTS:

FILTER + SAMPLE: Run No. ___ Filter No. ___ Sample No. ___

		Date	Time
Gross Wt. (g)			
Gross Wt. (g)			
Gross Wt. (g)			
Gross Wt. (g)			

Filter + Sample Gross Wt. used for data entry (g) ___
Filter Tare Wt. from tare weight data (g) ___

COMMENTS:

NOTE: Control filter weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: ~~Kiln~~ Baghouse Outlet 1

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. 1 Beaker No. 1006 Sample No. 1006

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	
Beaker Tare Wt. (g)	
Sample + Rinses Wt. (g)	
Water Wt. (A) from Recovery Data: (g)	
Acetone Wt. (g)	
Acetone Wt./0.79 = mLs Acetone (B):	

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)	103.3258	12-06-93	0830
Gross Wt. (g)	103.3257	"	1230
Gross Wt. (g)	103.3257	"	1730
Gross Wt. (g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 103.3257
Beaker Tare Wt. from tare weight data (g) 103.3151
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ________ mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 1 Beaker No. 1007 Sample No. 1007

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	146.7
Beaker Tare Wt. (g)	101.3
Sample + Rinses Wt. (g)	45.3
Water Wt. (A) from Recovery Data: (g)	—
Acetone Wt. (g)	45.3
Acetone Wt./0.79 = mLs Acetone (B):	57.0

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)	101.3540	12-06-93	0830
Gross Wt. (g)	101.3541	12-06-93	1230
Gross Wt. (g)	101.3541	12-06-93	1730
Gross Wt. (g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 101.3541
Beaker Tare Wt. from tare weight data (g) 101.3540
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. ________ Beaker No. ________ Sample No. ________

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	
Beaker Tare Wt. (g)	
Sample + Rinses Wt. (g)	
Water Wt. (A) from Recovery Data: (g)	
Acetone Wt. (g)	
Acetone Wt./0.79 = mLs Acetone (B):	

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)			
Gross Wt. (g)			
Gross Wt. (g)			
Gross Wt. (g)			

Beaker + Acetone Residue Gross Wt. used for data entry (g) ________
Beaker Tare Wt. from tare weight data (g) ________
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ________ mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01 Client: Emission Measurement Branch (EIB)
Sampling Location: ~~Kiln~~ Baghouse Outlet #2 Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. 2 Beaker No. 2006 Sample No. 2006

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)	193.1	Gross Wt.(g) 106.5817	12-06-93	0830
Beaker Tare Wt.(g)	106.6	Gross Wt.(g) 106.5818	"	1230
Sample + Rinses Wt.(g)	86.5	Gross Wt.(g) 106.5817	"	1730
Water Wt.(A) from Recovery Data:(g)	—	Gross Wt.(g)		
Acetone Wt.(g)	86.5			
Acetone Wt./0.79 = mLs Acetone (B):	109.5			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 106.5817
Beaker Tare Wt. from tare weight data (g) 106.5735
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. 2 Beaker No. 2007 Sample No. 2007

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)	135.7	Gross Wt.(g) 85.1248	12-06-93	0830
Beaker Tare Wt.(g)	85.1	Gross Wt.(g) 85.1246	"	1230
Sample + Rinses Wt.(g)	30.6	Gross Wt.(g) 85.1247	"	1730
Water Wt.(A) from Recovery Data:(g)	—	Gross Wt.(g)		
Acetone Wt.(g)	30.6			
Acetone Wt./0.79 = mLs Acetone (B):	39			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 85.1247
Beaker Tare Wt. from tare weight data (g) 85.1241
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No.___ Beaker No.___ Sample No.___

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)		Gross Wt.(g)		
Beaker Tare Wt.(g)		Gross Wt.(g)		
Sample + Rinses Wt.(g)		Gross Wt.(g)		
Water Wt.(A) from Recovery Data:(g)		Gross Wt.(g)		
Acetone Wt.(g)				
Acetone Wt./0.79 = mLs Acetone (B):				

Beaker + Acetone Residue Gross Wt. used for data entry (g)
Beaker Tare Wt. from tare weight data (g)
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

from . . .

ROY NEULICHT

Ambient Filters

4601-01-05-01

Tare Weights

Ru.	Filter Number	First Weigh Weight (mg)	By	Date	Audit Weight (mg)	Difference (mg)	Meets Q.A. ?	By	Date	Reweigh Weight (mg)	By	Date
1 IN	9342001	4321.60	DG	10-29-93	4321.55	0.05	Yes	JJ	11/1/93			
1 E	002	4353.90			4353.90	0.00						
2 IN	003	4308.90			4309.00	0.10						
2 E	004	4347.25			4347.20	0.05						
1 W	005	4332.45			4332.30	0.15						
2 W	006	4313.40			4313.20	0.20						
	007	4339.45			4339.45	0.00						
Blank	008	4374.85			4374.75	0.10						
3 E	009	4322.25			4322.25	0.00						
3 E	010	4322.90			4322.80	0.10						

Note: * By Audit Weight Indicates Audit of Reweigh

Comments:

Filter Number	First Weigh			Audit					Reweigh		
	Weight (mg)	By	Date	Weight (mg)	Difference (mg)	Meets Q.A. ?	By	Date	Weight (mg)	By	Date

Note: * By Audit Weight Indicates Audit of Reweigh

Comments:

Final Weights

4601-01-05-01

Filter Number	First Weigh Weight (mg)	First Weigh By	First Weigh Date	Audit Weight (mg)	Audit Difference (mg)	Audit Meets Q.A. ?	Audit By	Audit Date	Reweigh Weight (mg)	Reweigh By	Reweigh Date
9342001	4643.10	DG	12-2-93	4642.80	0.30	Yes	[illegible]	12/3/93			
002	4362.35			4362.20	0.15						
003	4756.70			4756.40	0.30						
004	4363.45			4363.15	0.30						
005	4362.55			4362.50	0.05						
006	4339.70			4339.65	0.05						
007	4338.45			4338.55	0.10						
008	4373.45			4373.45	0.00						
009	4332.05			4331.80	0.25						
010	4364.10			4363.90	0.20						

Note: * By Audit Weight Indicates Audit of Reweigh

Comments:

Filter Number	First Weigh Weight (mg)	By	Date	Audit Weight (mg)	Difference (mg)	Meets Q.A. ?	By	Date	Reweigh Weight (mg)	By	Date

Note: * By Audit Weight Indicates Audit of Reweigh

Comments:

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. ______ Date/Time 7/12/94

Project Title Belden Brick

Signature [signature] Verified by ______ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Page ___ of ___

Run#

Filter #	Run#	TARE (mg)	Final (mg)	NET (mg)
001	1-IN	4321.60	4643.10	321.5
002	1E	4353.90	4362.35	8.45
003	2-IN	4308.90	4756.70	447.8
004	2E	4347.25	4363.45	16.2
005	1W	4332.45	4362.55	30.1
006	2W	4313.40	4339.70	26.3
007		4339.45	4338.45	(1)
008	BLANK	4374.85	4373.45	(1.4)
009	3E	4322.25	4332.05	9.8
010	3E ?	4322.90	4364.10	41.2

Ambient Air Sample, NET Filter weight calc.

MRI

kiln

from . . .

ROY NEULICHT

[illegible] PM/PM-10

FILTER PARTICULATE MATTER ANALYSIS DATA

MRI Project No. 4601.01.05.01 **Client:** EPA - Emission Inventory Branch (EIB)

Sampling Location: Kiln - PM10 **Facility:** Belden Brick Co., Sugar Creek, Ohio

Analyst: Szydlo

Filter samples heated at 160° C for 2-3 hours, desiccated, and weighed to a constant weight.

FILTER + SAMPLE: Run No. KPM-10 #1 Filter No. LF 8 Sample No. 1018

		Date	Time
Gross Wt. (g)	1.1037	12-01-93	0805
Gross Wt. (g)	1.1038	"	"
Gross Wt. (g)	1.1037	"	0835
Gross Wt. (g)	1.1037	"	"

Filter + Sample Gross Wt. used for data entry (g) 1.1037
Filter Tare Wt. from tare weight data (g) 1.1022

COMMENTS:

FILTER + SAMPLE: Run No. KPM-10 #2 Filter No. LF14 Sample No. 2018

		Date	Time
Gross Wt. (g)	1.1060	12-01-93	0807
Gross Wt. (g)	1.1061	"	"
Gross Wt. (g)	1.1060	"	0837
Gross Wt. (g)	1.1060	"	"

Filter + Sample Gross Wt. used for data entry (g) 1.1060
Filter Tare Wt. from tare weight data (g) 1.1059

COMMENTS:

FILTER + SAMPLE: Run No. KPM-10 #3 Filter No. LF15 Sample No. 3018

		Date	Time
Gross Wt. (g)	1.0952	12-01-93	0800
Gross Wt. (g)	1.0952	"	"
Gross Wt. (g)	1.0952	"	0830
Gross Wt. (g)	1.0952	"	"

Filter + Sample Gross Wt. used for data entry (g) 1.0952
Filter Tare Wt. from tare weight data (g) 1.0937

COMMENTS:

NOTE: Control filter weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: Kiln - PM101

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. Kiln P10-1 Beaker No. 1017 Sample No. 1017

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	249.0
Beaker Tare Wt.(g)	117.0
Sample + Rinses Wt.(g)	132.0
Water Wt.(A) from Recovery Data:(g)	—
Acetone Wt.(g)	132.0
Acetone Wt./0.79 = mLs Acetone (B):	167.1

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)	117.3745	12-03-93	1400
Gross Wt.(g)	117.3744	12-03-93	2000
Gross Wt.(g)	117.3744	12-04-93	0800
Gross Wt.(g)	117.3744	12-04-93	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 117.3744
Beaker Tare Wt. from tare weight data (g) 117.3722
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-1 Beaker No. 1015 Sample No. 1015

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	253.0
Beaker Tare Wt.(g)	93.0
Sample + Rinses Wt.(g)	160.0
Water Wt.(A) from Recovery Data:(g)	—
Acetone Wt.(g)	160.0
Acetone Wt./0.79 = mLs Acetone (B):	~~176.0~~ 202.5

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)	92.9950	12-03-93	1400
Gross Wt.(g)	92.9947	12-03-93	2000
Gross Wt.(g)	92.9947	12-04-94	0800
Gross Wt.(g)	92.9948	12-04-94	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 92.9948
Beaker Tare Wt. from tare weight data (g) 92.9930
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-1 Beaker No. 1014 Sample No. 1014

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt.(g)	197.2
Beaker Tare Wt.(g)	99.0
Sample + Rinses Wt.(g)	98.2
Water Wt.(A) from Recovery Data:(g)	—
Acetone Wt.(g)	98.2
Acetone Wt./0.79 = mLs Acetone (B):	124.3

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt.(g)	98.9283	12-03-93	1400
Gross Wt.(g)	98.9282	12-03-93	2000
Gross Wt.(g)	98.9282	12-04-94	0800
Gross Wt.(g)	98.9281	12-04-94	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 98.9282
Beaker Tare Wt. from tare weight data (g) 98.9160
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = — mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: Kiln

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. Kiln P10-2 Beaker No. 2017 Sample No. 2017

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	188.0
Beaker Tare Wt. (g)	102.6
Sample + Rinses Wt. (g)	85.4
Water Wt. (A) from Recovery Data: (g)	—
Acetone Wt. (g)	85.4
Acetone Wt./0.79 = mLs Acetone (B):	108.1

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)	102.6626	12-03-93	1400
Gross Wt. (g)	102.6628	12-03-93	2000
Gross Wt. (g)	102.6627	12-04-93	0800
Gross Wt. (g)	102.6627	12-04-93	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 102.6027

Beaker Tare Wt. from tare weight data (g) 102.5881

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0001 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-2 Beaker No. 2015 Sample No. 2015

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	156.4
Beaker Tare Wt. (g)	83.9
Sample + Rinses Wt. (g)	72.5
Water Wt. (A) from Recovery Data: (g)	—
Acetone Wt. (g)	72.5
Acetone Wt./0.79 = mLs Acetone (B):	197.9

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)	83.9242	12-03-93	1400
Gross Wt. (g)	83.9241	12-03-93	2000
Gross Wt. (g)	83.9240	12-04-93	0800
Gross Wt. (g)	83.9241	12-04-93	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 83.9241

Beaker Tare Wt. from tare weight data (g) 83.9240

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0001 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-2 Beaker No. 2014 Sample No. 2014

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	166.1
Beaker Tare Wt. (g)	102.5
Sample + Rinses Wt. (g)	63.6
Water Wt. (A) from Recovery Data: (g)	—
Acetone Wt. (g)	63.6
Acetone Wt./0.79 = mLs Acetone (B):	80.5

Beaker + Sample Residue Weights:

		Date	Time
Gross Wt. (g)	102.5228	12-03-93	1400
Gross Wt. (g)	102.5226	12-03-93	2000
Gross Wt. (g)	102.5224	12-04-93	0800
Gross Wt. (g)	102.5225	12-04-93	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 102.5226

Beaker Tare Wt. from tare weight data (g) 102.5186

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0001 mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: Kiln

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. Kiln P10-3 Beaker No. 3017 Sample No. 3017

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	248.7	Gross Wt. (g)	106.6633	12-03-93	1400
Beaker Tare Wt. (g)	106.7	Gross Wt. (g)	106.6634	12-03-93	2000
Sample + Rinses Wt. (g)	142.0	Gross Wt. (g)	106.6634	12-04-93	0800
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)	106.6634	12-04-93	1400
Acetone Wt. (g)	142.0				
Acetone Wt./0.79 = mLs Acetone (B):	179.7				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 106.6634
Beaker Tare Wt. from tare weight data (g) 106.6631
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ~~NA~~ 0.0001 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-3 Beaker No. 3015 Sample No. 3015

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	199.7	Gross Wt. (g)	112.9900	12-03-93	1400
Beaker Tare Wt. (g)	113.0	Gross Wt. (g)	112.9902	12-03-93	2000
Sample + Rinses Wt. (g)	86.7	Gross Wt. (g)	112.9901	12-04-93	0800
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)	112.9901	12-04-93	1400
Acetone Wt. (g)	86.7				
Acetone Wt./0.79 = mLs Acetone (B):	109.7				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 112.9901
Beaker Tare Wt. from tare weight data (g) 112.9872
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ~~NA~~ 0.0001 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. Kiln P10-3 Beaker No. ~~3015~~ 3014 Sample No. ~~3015~~ 3014

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:		Date	Time
Beaker + Sample + Rinses Wt. (g)	167.4	Gross Wt. (g)	84.1221	12-03-93	1400
Beaker Tare Wt. (g)	84.1	Gross Wt. (g)	84.1219	12-03-93	2000
Sample + Rinses Wt. (g)	83.3	Gross Wt. (g)	84.1220	12-04-93	0800
Water Wt. (A) from Recovery Data: (g)	—	Gross Wt. (g)	84.1220	12-04-93	1400
Acetone Wt. (g)	83.3				
Acetone Wt./0.79 = mLs Acetone (B):	105.4				

Beaker + Acetone Residue Gross Wt. used for data entry (g) 84.1220
Beaker Tare Wt. from tare weight data (g) ~~112.9872~~ 84.1140
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = ~~NA~~ 0.0001 mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

from . . .

ROY NEULICHT

Condensible Pm

GALBRAITH LABORATORIES, INC.

PHONE 615/546-1335 FAX 615/546-7209

LABORATORY REPORT

S. Szydlo
Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

Sample Received: 12/06/93
Report Date: 12/21/93
Purchase Order #: 011064

Sample ID	Lab ID	Analysis	Results	
1019	E-3337	Volume Received	198	mls.
		pH	2.52	
		Aqueous Layer mc	1.40	mg.
		Aqueous Layer mr	164.7	mg.
		Aqueous Layer mi	168.1	mg.
		Organic Layer mo	N.A.	
		CPM = (mo+mi-mc)	166.7	mg.
1020	E-3338	Volume Received	211	mls.
		pH	1.91	
		Aqueous Layer mc	N.A.	
		Aqueous Layer mr	N.A.	
		Aqueous Layer mi	N.A.	
		Organic Layer mo	54.8	mg.
		CPM = (mo+mi-mc)	54.8	mg.
2019	E-3339	Volume Received	233	mls.
		pH	2.55	
		Aqueous Layer mc	1.53	mg.
		Aqueous Layer mr	181.7	mg.
		Aqueous Layer mi	184.9	mg.
		Organic Layer mo	N.A.	
		CPM = (mo+mi-mc)	183.4	mg.
2020	E-3340	Volume Received	191	mls.
		pH	2.56	
		Aqueous Layer mc	N.A.	
		Aqueous Layer mr	N.A.	
		Aqueous Layer mi	N.A.	
		Organic Layer mo	15.3	mg.
		CPM = (mo+mi-mc)	15.3	mg.

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PHONE 615/546-1335 FAX 615/546-7209

LABORATORY REPORT
S. Szydlo/Midwest Research Institute

Sample ID	Lab ID	Analysis	Results	
3019	E-3341	Volume Received	230	mg.
		pH	2.61	
		Aqueous Layer mc	0.47	mg.
		Aqueous Layer mr	159.5	mg.
		Aqueous Layer mi	162.3	mg.
		Organic Layer mo	N.A.	
		CPM = (mo+mi-mc)	161.8	mg.
3020	E-3342	Volume Received	212	mg.
		pH	2.60	
		Aqueous Layer mc	N.A.	
		Aqueous Layer mr	N.A.	
		Aqueous Layer mi	N.A.	
		Organic Layer mo	10.4	mg.
		CPM = (mo+mi-mc)	10.4	mg.
1066A	E-3343	Volume Received	115	mls.
1066B	E-3344	Volume Received	110	mls.

mc = 0.0205 x conc. SO_4 mg/ml x mls. of sample

$$mi = mr \times \frac{\text{vol. of sample}}{\text{volume of sample - mls. aliquot taken for } SO_4}$$

Authorized Release of Data:

Carol B. Mann

Project Manager

CM:sla

from . . .

ROY NEULICHT

HCL / HF / PM

FILTER PARTICULATE MATTER ANALYSIS DATA

MRI Project No. 4601.01.05.01

Client: EPA - Emission Inventory Branch (EIB)

Sampling Location: Kiln

Facility: Belden Brick Co., Sugar Creek, Ohio

Analyst: Szydlo

Filter samples ~~heated at 120° C for 2-3 hours~~, desiccated, and weighed to a constant weight. *dessicated for 48 hrs.*

FILTER + SAMPLE: Run No. *PHCl-1* Filter No. *LF1* Sample No. *1023*

		Date	Time
Gross Wt. (g)	*1.0968*	*11-21-93*	*1200*
Gross Wt. (g)	*1.0962*	*11-21-93*	*1800*
Gross Wt. (g)	*1.0962*	*11-22-93*	*0800*
Gross Wt. (g)	*1.0962*	*11-22-93*	*1300*

Filter + Sample Gross Wt. used for data entry (g) *1.0962*
Filter Tare Wt. from tare weight data (g) *1.0916*

COMMENTS:

FILTER + SAMPLE: Run No. *PHCl-2* Filter No. *LF10* Sample No. *2023*

		Date	Time
Gross Wt. (g)	*1.1247*	*11-21-93*	*1200*
Gross Wt. (g)	*1.1240*	*11-21-93*	*1800*
Gross Wt. (g)	*1.1240*	*11-22-93*	*0800*
Gross Wt. (g)	*1.1240*	*11-22-93*	*1300*

Filter + Sample Gross Wt. used for data entry (g) *1.1240*
Filter Tare Wt. from tare weight data (g) *1.1171*

COMMENTS:
The Petri dish for this filter was broken during storage. There is a possibility that small pieces of glass were imbedded in the filter fabric.

FILTER + SAMPLE: Run No. *PHCl-3* Filter No. *LF9* Sample No. *3023*

		Date	Time
Gross Wt. (g)	*1.0883*	*11-21-93*	*1200*
Gross Wt. (g)	*1.0873*	*11-21-93*	*1800*
Gross Wt. (g)	*1.0872*	*11-22-93*	*0800*
Gross Wt. (g)	*1.0873*	*11-22-93*	*1300*

Filter + Sample Gross Wt. used for data entry (g) *1.0873*
Filter Tare Wt. from tare weight data (g) *1.0844*

COMMENTS:

NOTE: Control filter weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: Kiln

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. PH-1 Beaker No. 1022 Sample No. 1022

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)	296.2	Gross Wt.(g) 91.8016	12-03-94	0800
Beaker Tare Wt.(g)	114.6	Gross Wt.(g) 91.8014	"	0900
Sample + Rinses Wt.(g)	181.6	Gross Wt.(g) 91.8015	"	1000
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g) 91.8015	"	1100
Acetone Wt.(g)	181.6			
Acetone Wt./0.79 = mLs Acetone (B):	229.9			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 91.8015
Beaker Tare Wt. from tare weight data (g) 91.7563
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0007 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. PH-2 Beaker No. 2022 Sample No. 2022

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)	228.1	Gross Wt.(g) 88.5456	12-03-94	0800
Beaker Tare Wt.(g)	88.5	Gross Wt.(g) 88.5457	"	0900
Sample + Rinses Wt.(g)	139.6	Gross Wt.(g) 88.5456	"	1000
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g) 88.5455	"	1100
Acetone Wt.(g)	139.6			
Acetone Wt./0.79 = mLs Acetone (B):	176.7			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 88.5456
Beaker Tare Wt. from tare weight data (g) 88.5050
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0007 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. PH-3 Beaker No. 3022 Sample No. 3022

Sample Volume + Acetone Rinses of Bottle:		Beaker + Sample Residue Weights:	Date	Time
Beaker + Sample + Rinses Wt.(g)	260.0	Gross Wt.(g) 110.8963	12-03-94	0800
Beaker Tare Wt.(g)	110.8	Gross Wt.(g) 110.8962	"	0900
Sample + Rinses Wt.(g)	149.2	Gross Wt.(g) 110.8962	"	1000
Water Wt.(A) from Recovery Data:(g)	0.0	Gross Wt.(g) 110.8962	"	1100
Acetone Wt.(g)	149.2			
Acetone Wt./0.79 = mLs Acetone (B):	188.8			

Beaker + Acetone Residue Gross Wt. used for data entry (g) 110.8962
Beaker Tare Wt. from tare weight data (g) 110.8388
Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0007 mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

BLANKS (FRONT-HALF PARTICULATE MATTER) ANALYSIS DATA

MRI Project No. 4601.01.05.01   Client: EPA/Emission Measurement Branch
Sampling Location: Kiln   Facility: Belden Brick, Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight. Filters heated at 105° C for 2-3 hours, desiccated, and weighed to a constant weight.

ACETONE BLANK DETERMINATION: Run No.(s): PH-1   Beaker No. 1051   Sample No. 1022
Acetone Volume Evaporated: Beaker + Evaporated Acetone Residue Weights:

				Date	Time
Beaker + Acetone Wt.(g)	203.9	Gross Wt.(g)	89.0246	12-03-94	1300
Beaker Tare Wt.(g)	89.0	Gross Wt.(g)	89.0247	"	|
Acetone Wt.(g)	114.9	Gross Wt.(g)	89.0245	"	|
Acetone Wt./0.79 = mLs Acetone (A):	145.4	Gross Wt.(g)	89.0245	"	1500

Beaker + Acetone Residue Gross Wt. used for blank determination (g) 89.0246
Beaker Tare Wt. from tare weight data (g) 89.0245
Net Wt.(B), Residue in Beaker (g) .0001

Acetone Blank (B x 1000/A): 0.0007 mg/mL for data entry or for computing combined blank
COMMENTS:

WATER BLANK DETERMINATION: Run No.(s): ——   Beaker No. ——   Sample No. ____
Water Volume Evaporated: Beaker + Evaporated Water Residue Weights:

				Date	Time
Beaker + Water Wt.(g)	——	Gross Wt.(g)			
Beaker Tare Wt.(g)		Gross Wt.(g)			
Water Wt.(g)		Gross Wt.(g)			
Water Wt. = mLs Water (A):		Gross Wt.(g)			

Beaker + Water Residue Gross Wt. used for blank determination (g) ____
Beaker Tare Wt. from tare weight data (g) ____
Net Wt.(B), Residue in Beaker (g) ____

Water Blank (B x 1000/A): ____ mg/mL for data entry or for computing combined blank
COMMENTS: No DI water was used for particulates removal.

FILTER BLANK: Run No.(s): 1023   Filter No. LF12   Sample No. 1052

		Date	Time
Gross Wt.(g)	1.0792	11-21-93	1200
Gross Wt.(g)	1.0786	11-21-93	1800
Gross Wt.(g)	1.0785	11-22-93	0800
Gross Wt.(g)	1.0785	11-22-93	1300

Filter Gross Wt. (A) used for blank determination (g) 1.0785
Filter Tare Wt. (B) from tare weight data (g) 1.0783
Net Filter Wt. (A-B) Difference (g) .0002

Filter Blank (±): ____ grams for data entry (retain minus sign if value is negative)
COMMENTS:

NOTE: Control filter and beaker weight data and balance check data are on another form.

GALBRAITH LABORATORIES, INC.

PHONE 615/546-1335 FAX 615/546-7209

LABORATORY REPORT

S. Szydlo
Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

Sample Received: 12/06/93
Report Date: 12/15/93

Sample ID	Lab ID	Analysis	Sample Vol. ml	Results	
1025	E-3331	Chloride	110	18.7	µg/ml
		HCl/Sample		2117	µg
2025	E-3333	Chloride	112	21.3	µg/ml
		HCl/Sample		2449	µg
3025	E-3335	Chloride	114	19.6	µg/ml
		HCl/Sample		2302	µg
Independent Check Standard			98.4% Recovery		
Matrix Spike			97.0% Recovery		
1027	E-3332	Chloride	106	0.6	µg/ml
		Cl_2		128	µg
2027	E-3334	Chloride	110	1.0	µg/ml
		Cl_2		216	µg
3027	E-3336	Chloride	120	0.7	µg/ml
		Cl_2		169	µg
Independent Check Standard			102.5% Recovery		
Matrix Spike			94.1% Recovery		

Notes: The remainder of your results will follow.

CM:le

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LABORATORY REPORT

S. Szydlo
Midwest Research Institute
425 Volker Blvd.
Kansas City, Missouri 64110

Reanalysis Request: 04/28/94
Previous Lab I.D. E-3331-36
Report Date: 05/03/94

SAMPLE ID	LAB ID	ANALYSIS	RESULTS		
					mg
1025	G-460	Fluoride	276	mg/L	31969
1027	G-461	Fluoride	5.5	mg/L	613.9
2025	G-462	Fluoride	369	mg/L	43518
2027	G-463	Fluoride	6.4	mg/L	741
3025	G-464	Fluoride	311	mg/L	37333
3027	G-465	Fluoride	4.3	mg/L	543

CM:yd

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ROY NEULICHT

Metals / Pm

FILTER PARTICULATE MATTER ANALYSIS DATA

MRI Project No. 4601.01.05.01 **Client:** EPA - Emission Inventory Branch (EIB)

Sampling Location: Kiln **Facility:** Belden Brick Co., Sugar Creek, Ohio

Analyst: Szydlo

Filter samples ~~heated at 160° C for 2-3 hours~~, desiccated, and weighed to a constant weight. desiccated for 24hrs

FILTER + SAMPLE: Run No. MM5MM-1 Filter No. LF5 Sample No. 1030

		Date	Time
Gross Wt. (g)	1.0942	11-21-93	1200
Gross Wt. (g)	1.0939	11-21-93	1800
Gross Wt. (g)	1.0939	11-22-93	0800
Gross Wt. (g)	1.0939	11-22-93	1300

Filter + Sample Gross Wt. used for data entry (g) 1.0939
Filter Tare Wt. from tare weight data (g) 1.0830

COMMENTS:

FILTER + SAMPLE: Run No. MM5MM-3 Filter No. LF6 Sample No. 3030

		Date	Time
Gross Wt. (g)	1.1287	11-21-93	1200
Gross Wt. (g)	1.1284	11-21-93	1800
Gross Wt. (g)	1.1283	11-22-93	0800
Gross Wt. (g)	1.1284	11-22-93	1300

Filter + Sample Gross Wt. used for data entry (g) 1.1285
Filter Tare Wt. from tare weight data (g) 1.1002

COMMENTS:

FILTER + SAMPLE: Run No. MM5MM-2 Filter No. LF4 Sample No. 2030

		Date	Time
Gross Wt. (g)	1.1212	11-21-93	1200
Gross Wt. (g)	1.1205	11-21-93	1800
Gross Wt. (g)	1.1204	11-22-93	0800
Gross Wt. (g)	1.1205	11-22-93	1300

Filter + Sample Gross Wt. used for data entry (g) 1.1205
Filter Tare Wt. from tare weight data (g) 1.1103

COMMENTS:

NOTE: Control filter weight data and balance check data are on another form.

FRONT-HALF RINSES PARTICULATE MATTER ANALYSIS DATA

MRI Project No.: 4601.01.05.01
Sampling Location: Kiln

Client: Emission Measurement Branch (EIB)
Facility: Belden Brick Co., Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight.

FRONT-HALF RINSES: Run No. MM5-1 Beaker No. 1065 Sample No. 1065

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	262.0
Beaker Tare Wt. (g)	92.5
Sample + Rinses Wt. (g)	169.5
Water Wt. (A) from Recovery Data: (g)	0.0
Acetone Wt. (g)	169.5
Acetone Wt./0.79 = mLs Acetone (B):	214.5

Beaker + Sample Residue Weights:

	Gross Wt. (g)	Date	Time
Gross Wt. (g)	92.6267	12-02-93	1230
Gross Wt. (g)	92.6267	"	1300
Gross Wt. (g)	92.6266	"	1330
Gross Wt. (g)	92.6266	"	1400

Beaker + Acetone Residue Gross Wt. used for data entry (g) 92.~~6266~~ 5844

Beaker Tare Wt. from tare weight data (g) 92.5408

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. MM5-2 Beaker No. 2065 Sample No. 2065

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	296.2
Beaker Tare Wt. (g)	103.7
Sample + Rinses Wt. (g)	192.5
Water Wt. (A) from Recovery Data: (g)	0.0
Acetone Wt. (g)	192.5
Acetone Wt./0.79 = mLs Acetone (B):	243.7

Beaker + Sample Residue Weights:

	Gross Wt. (g)	Date	Time
Gross Wt. (g)	103.7065	12-02-93	1235
Gross Wt. (g)	103.7063	"	1305
Gross Wt. (g)	103.7064	"	1335
Gross Wt. (g)	103.7066	"	1405

Beaker + Acetone Residue Gross Wt. used for data entry (g) 103.7065

Beaker Tare Wt. from tare weight data (g) 103.6735

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS:

FRONT-HALF RINSES: Run No. MM-5-3 Beaker No. 3065 Sample No. 3065

Sample Volume + Acetone Rinses of Bottle:

Beaker + Sample + Rinses Wt. (g)	226.9
Beaker Tare Wt. (g)	99.3
Sample + Rinses Wt. (g)	127.6
Water Wt. (A) from Recovery Data: (g)	0.0
Acetone Wt. (g)	127.6
Acetone Wt./0.79 = mLs Acetone (B):	160.8

Beaker + Sample Residue Weights:

	Gross Wt. (g)	Date	Time
Gross Wt. (g)	99.3347	12-02-93	1240
Gross Wt. (g)	99.3345	"	1310
Gross Wt. (g)	99.3348	"	1340
Gross Wt. (g)	99.3346	"	1410

Beaker + Acetone Residue Gross Wt. used for data entry (g) 99.3346

Beaker Tare Wt. from tare weight data (g) 99.2743

Combined Blank = ((Water Blank x A) + (Acetone Blank x B))/(A + B) = 0.0037 mg/mL

COMMENTS

NOTE: Control beaker weight data and balance check data are on another form.

BLANKS (FRONT-HALF PARTICULATE MATTER) ANALYSIS DATA

MRI Project No. 4601.01.05.01 Client: EPA/Emission Measurement Branch
Sampling Location: Kiln Facility: Belden Brick, Sugar Creek, OH

Analyst: Szydlo

Acetone and water samples evaporated at ambient temperature and pressure in an enclosure with filtered air; then, desiccated and weighed to a constant weight. Filters heated at 105° C for 2-3 hours, desiccated, and weighed to a constant weight.

ACETONE BLANK DETERMINATION: Run No.(s): MM-1 Beaker No. MM-131 Sample No. 1065

Acetone Volume Evaporated:		Beaker + Evaporated Acetone Residue Weights:	Date	Time
Beaker + Acetone Wt.(g)	265.2	Gross Wt.(g) 116.3952	12-02-93	1400
Beaker Tare Wt.(g)	~~116.4001~~	Gross Wt.(g) 116.3946	"	1430
Acetone Wt.(g)	148.8	Gross Wt.(g) 116.3946	"	1500
Acetone Wt./0.79 = mLs Acetone (A):	188.35	Gross Wt.(g) 116.3946	"	1530

Beaker + Acetone Residue Gross Wt. used for blank determination (g) 116.3946
Beaker Tare Wt. from tare weight data (g) 116.3936,9
Net Wt.(B), Residue in Beaker (g) .0007

Acetone Blank (B x 1000/A): 0.0037 mg/mL for data entry or for computing combined blank
COMMENTS:

WATER BLANK DETERMINATION: Run No.(s): —— Beaker No. ~~MM-132~~ Sample No. ~~2065~~

Water Volume Evaporated:		Beaker + Evaporated Water Residue Weights:	Date	Time
Beaker + Water Wt.(g)		Gross Wt.(g)	
Beaker Tare Wt.(g)		Gross Wt.(g)	
Water Wt.(g)		Gross Wt.(g)	
Water Wt. = mLs Water (A):		Gross Wt.(g)	

Beaker + Water Residue Gross Wt. used for blank determination (g) ______
Beaker Tare Wt. from tare weight data (g) ______
Net Wt.(B), Residue in Beaker (g) ______

Water Blank (B x 1000/A): ______ mg/mL for data entry or for computing combined blank
COMMENTS:

FILTER BLANK: Run No.(s): 1 Filter No. LF19 Sample No. 1056

	Date	Time
Gross Wt.(g) 1.1129	12-02-93	1500
Gross Wt.(g) 1.1129	"	
Gross Wt.(g) 1.1128	"	
Gross Wt.(g) 1.1129	"	1600

Filter Gross Wt. (A) used for blank determination (g) 1.1129
Filter Tare Wt. (B) from tare weight data (g) 1.1129
Net Filter Wt. (A-B) Difference (g) 0.000

Filter Blank (±): ______ grams for data entry (retain minus sign if value is negative)
COMMENTS:

NOTE: Control filter and beaker weight data and balance check data are on another form.

Interoffice Communication

MIDWEST RESEARCH INSTITUTE

March 14, 1994

To: R. Morenshaw cc. R. Neulicht, A. Carender

From: A. Mainey

Re: **Metals analysis Summary for the EIB Emissions Test at Plant 6 Belden Brick Company in Sugarcreek, Ohio (Project No. 4601-01-05-04)**

INTRODUCTION

The Emissions Inventory Branch (EIB) emissions test for the Belden Brick kiln required metals analysis of the kiln stack gases. These samples were digested using Method 29 and SW-846 methods as specified in the Draft Test Plan, dated October 22, 1993.

A total of eleven metals are reported as analyzed in the stack gas samples received from the emissions test (Reference Tables 1 and 2). All data were obtained using CVAA (for Hg) and ICP-AES for all other analytes.

SAMPLE PREPARATION METHODS

The stack gas samples and blank reagents from the emissions test at the Belden brick kiln were digested using Draft Method 29 as indicated in the Draft Test Plan. Boric acid addition was not utilized as specified in the Test Plan, since the ICP was fitted with a Hydrofluoric acid (HF) resistant inlet system prior to analysis. The boric addition was previously used to allow ICP analysis without risk of damaging (HF etching) the torch.

In addition, the front-half filter, probe rinse and back-half impinger samples were digested and analyzed separately as requested by the program manager. The flow chart presented in the test plan (page 5-15) designates that these FH and BH samples are proportionally combined and then analyzed.

Further digestion was performed for mercury (Hg) in the stackgas samples using SW-846 Method 7470. This method was slightly modified in order to allow sufficient digest volume for multimetals analysis by ICP.

STACK GAS ANALYSIS

Multiple metals analysis was performed on a Thermo-Jarrell Ash Model 61E ICP-AES and Hg was analyzed using a PSA Merlin Plus Mercury Analyzer. Analysis methods utilized for multiple metals and mercury are SW-846 Methods 6010A and 7470, respectively. Each instrument was calibrated and verified using a calibration check standard (from an alternate supplier), prior to analysis of stackgas samples. In addition, method continuing calibration standards and blanks were routinely analyzed to verify calibration of the instrument.

An HF resistant inlet system to the ICP was utilized for the analysis of front-half digests containing HF, in order to prevent damage to the standard inlet system of the ICP.

Quarterly instrumental detection limits (IDL's) for each analytical system were utilized during these analyses. The quarterly IDLs are determined from seven analyses of a low standard on three non-consecutive days.

METALS ANALYTICAL RESULTS

Tables 1 and 2 present metals analysis results for the Belden Brick emissions test. There was a discrepancy between the traceability records and the identifier on the samples. Results are reported using the identifier on the actual samples.

The method blanks are used for monitoring potential laboratory contribution during processing and analysis. Levels of analytes in the method blank were beneath the detection limit for most analytes. The few analytes detected were close to the detection limit (i.e. less than approximately 2 times the MDL).

Reagent blanks were also analyzed to monitor potential for contribution from reagent supplies and equipment used in sample collection. All backhalf and Hg impinger reagents were detected near or less than the instrumental DL. Results for the filter and acetone rinse reagent blanks were detected near concentrations found in the train samples. These levels, as reported in Table 1 (1056/MMBI R. Blanks) were not expected. Available historical data for the front-half reagent blank results were faxed to you on March 10, 1994 to provide background information.

INSTRUMENTAL QUALITY CONTROL

Instrument calibration was verified using multielement standards obtained from an alternate supplier than those used for calibration. In addition, all correlation coefficient requirements were met per the analytical method. Instrumental drift was monitored throughout each analysis at less than 7% for all analytes (method criteria is $\pm 10\%$ from target). All initial calibration verification analyses met SW-846 Method 6010A and Method 7470 criteria and were within 5% from the target concentration (method criteria is $\pm 10\%$ from target).

In addition, the interference check standard results (ICP only) were within the limits set by Method 6010A (method criteria is $\pm$20% from target). Serial dilution tests were not required per Method 6010A, due to the low levels in the resulting digest by ICP.

METHOD QUALITY CONTROL

Method quality control results are reported in Table 3 (for ICP analytes) and Table 5 (for Hg). Accuracy was monitored using spiked laboratory reagents (LCS), recoveries ranged 93% to 111% (criteria is 70 - 130%). Further accuracy was monitored using a front-half representative NIST filter containing certified levels of Cd, Mn and Pb. The resulting front-half recoveries ranged 70% to 110%, with the exception of Pb, which was at a target level below ICP detection capability.

Precision, based on duplicate samples were not a requirement for this work, based on QA/QC objectives in the Draft test plan. However, precision was monitored for Hg analysis, results for duplicate analysis were less than 5% relative percent difference.

GENERAL SUMMARY

Metals analyses were performed for all samples from the Belden Brick kiln stack gases for the Emissions Inventory Branch. These results as reported in appended Tables, met all QA/QC objectives in the test plan. One difficulty is noted; results for the filter/acetone reagent blank had higher levels than expected, for most analytes. These levels are near those reported for the stackgas samples.

Project No.: 4601-01-05-04
Preparation Method: Draft Method 29
Analysis Method: SW-846 Methods 6010A/7470
Instrumentation: TJA Model 61E ICP-AES and PSA Merlin Plus Hg Analyzer
Analytes: See below

TABLE 1. EIB WA#1 BELDON BRICK EMISSIONS TEST -- Metals Analysis Summary

Front-half Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se	CVAA Hg
Microwave Method Blank	02881	ug	< 4.67	< 0.09	< 0.24	< 1.17	< 1.23	< 0.28	< 1.26	< 8.51	< 2.33	< 3.23	1.18
Microwave Method Blank	02894	ug	< 4.67	< 0.09	< 0.24	< 1.17	< 1.23	< 0.28	< 1.26	< 8.51	< 2.33	< 3.23	2.43
1056/MMBI (Filter/Acet. R.Blk)*	**02883**	**ug**	**< 4.67**	**< 0.09**	**5.93***	**5.62***	**4.40***	**2.18***	**22.5***	**155***	**19.6***	**12.9***	**2.15**
1055 (0.1N HNO3 R. Blank)	**02895**	**ug**	**< 4.67**	**< 0.09**	**< 0.24**	**< 1.17**	**< 1.23**	**< 0.28**	**3.51**	**< 8.51**	**< 2.33**	**< 3.23**	**< 1.00**
1029/1030/1065	**02884**	**ug**	**< 4.67**	**< 0.09**	**7.52**	**6.01**	**35.8**	**7.70**	**32.5**	**152**	**21.0**	**23.4**	**1.73**
2029/2030/2065	**02885**	**ug**	**< 4.67**	**< 0.09**	**7.65**	**5.56**	**21.9**	**5.63**	**27.2**	**156**	**18.6**	**17.2**	**1.37**
3029/3030/3065	**02886**	**ug**	**< 4.67**	**< 0.09**	**6.36**	**5.56**	**22.2**	**5.48**	**27.2**	**157**	**17.9**	**18.1**	**11**
Hg Prep Method Blank	02921	ug											2.26

* **Results are higher than expected for sample 1056/MMBI (filter and acetone reagent blanks), since levels for these reagent blanks are elevated compared to historical data.**

Back-half Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se	CVAA Hg
Method Blk/Cookdown Blk	02888	ug	2.49	< 0.030	0.099	< 0.350	< 0.340	0.047	< 0.520	< 2.88	< 1.46	< 3.03	< 1.00
1057/1055	02890	**ug**	**< 1.89**	**< 0.033**	**0.160**	**< 0.382**	**0.589**	**0.228**	**2.08**	**< 3.14**	**< 1.59**	**< 3.31**	**0.637**
1031	02889	**ug**	**< 1.97**	**< 0.034**	**2.63**	**6.21**	**405**	**48.3**	**207**	**12.3**	**2.03**	**28.7**	**15.9**
2031	02891	**ug**	**< 1.96**	**0.034**	**6.31**	**27.2**	**2067**	**172**	**1133**	**7.77**	**1.92**	**32.9**	**4.86**
3031	02892	**ug**	**< 1.97**	**< 0.034**	**0.593**	**0.430**	**7.13**	**5.99**	**9.11**	**6.15**	**2.44**	**57.1**	**17.3**
3031A	02893	**ug**	**< 2.33**	**< 0.040**	**0.533**	**10.9**	**520**	**56.7**	**359**	**< 3.870**	**< 1.962**	**7.33**	**0.098**

Notes:

"<" indicates a sample result below the method DL.
All analyses reported are from ICP analysis results except for Hg which is taken from CVAA analyis results.
Bold values represent field samples, all others are laboratory generated QC samples.

Project No.: 4601-01-05-04
Preparation Method: Draft Method 29/SW-846 7470
Analysis Method: SW-846 Method 7470
Instrumentation: PSA Merlin Plus Hg Analyzer
Analytes: Hg

TABLE 2. EIB WA # 1 BELDON BRICK EMISSIONS TEST -- Metals Analysis Summary

Impingers 4 - 6, Hg Results:

Sample ID	Barcode ID	CVAA Hg	Units
Method Blank	02921	2.26*	ug
1058 Reagent Blank	**02904**	**0.150**	**ug**
1059 Reagent Blank	**02905**	**< 0.20**	**ug**
1060 Reagent Blank	**02906**	**0.294**	**ug**
1032	**02907**	**0.353**	**ug**
2032	**02908**	**0.132**	**ug**
3032	**02909**	**0.394**	**ug**
1033	**02910**	**5.72**	**ug**
2033	**02911**	**5.04**	**ug**
3033	**02912**	**4.28**	**ug**
1034	**02913**	**< 0.22**	**ug**
2034	**02914**	**0.264**	**ug**
3034	**02915**	**0.238**	**ug**

"<" indicates a sample result is below the method DL.
Bold values represent field samples, all others are laboratory generated QC samples.

*** The method blank level is near the DL**

Project: 4601-01-05-04
Analyst: S. Cogbill
Data Analyst: R. Friesen
Analytes: See below
Analysis Date: 12/93

Preparation Method: Draft Method 29
Analysis Method: SW-846 Method 6010A
Instrumentation.: TJA Model 61E ICP-AES

TABLE 3 QC Summary for Multiple Metals ICP Analysis of FH and BH Samples for EIB WA#1 BELDON BRICK EMISSIONS TEST

Front-Half QC Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se
LCS	02882	ug	100.090	97.839	108.330	105.460	105.340	106.960	109.580	110.330	106.820	102.250
LCS Spike Level		ug	100	100	100	100	100	100	100	100	100	100
LCS % Recovery:			**100.1%**	**97.8%**	**108.3%**	**105.5%**	**105.3%**	**107.0%**	**109.6%**	**110.3%**	**106.8%**	**102.3%**
NIST 2676c lc**	02896	ug	< 4.67	< 0.09	0.672	< 1.17	< 1.23	2.315	< 1.26	< 8.51	< 2.33	< 3.23
NIST 2676c lc Spike Level		ug	NA	NA	0.954	NA	NA	2.11	NA	7.47	NA	NA
NIST % Recovery:			**NA**	**NA**	**70.4%**	**NA**	**NA**	**109.7%**	**NA**	**0.0%**	**NA**	**NA**

** The NIST filter digested was low level. The Pb concentration was below the quarterly IDL and therefore shows low recovery.

Back-Half QC Results:

Sample ID	Barcode ID	Units	As	Be	Cd	Co	Cr	Mn	Ni	Pb	Sb	Se
LCS	02897	ug	101.690	96.588	107.730	104.530	103.990	104.340	107.180	107.560	103.640	101.040
LCS Spike Level		ug	100	100	100	100	100	100	100	100	100	100
LCS % Recovery:			**101.7%**	**96.6%**	**107.7%**	**104.5%**	**104.0%**	**104.3%**	**107.2%**	**107.6%**	**103.6%**	**101.0%**

"<" indicates a sample result below the method DL.

% RPD = | Found 1 - Found 2 | / ((Found 1 + Found 2) / 2) * 100

LCS % Recovery = LCS Found / LCS Spike Level * 100

Project: 4601-01-05-04
Analyst: R. Friesen
Data Analyst: R. Friesen
Analyte: Hg
Analysis Date: 12/01/93

Preparation Method: SW-846 Method 7470A (Modified)
Instrumentation: PSA Merlin Plus Mercury Analyzer
Instrument ID No.: 012111-5
Instrument Datafile: HGDC01.R01
Lotus File: 4601HG.WK1

TABLE 4 QC Summary for Hg CVAA Analysis of FH and BH Samples for EIB WA # 1 BELDON BRICK EMISSIONS TEST

Sample ID	Reported Average Conc.	Units	% Recovery	% RPD*	
1055 (digest) MS	49.2	ug	98.3%	----	
7470 LCS	49.3	ug	98.6%	----	**Front-half Results**
FH LCS (digest)	1074	ug	107.4%	----	
3029/3030/3065 (digest)	**11.0**	ug	----	4.3%	
BH MB/Ckdn Blk (digest)	< 1.00	ug	----	----	
BH LCS (digest)	985	ug	98.5%	----	
1031	**15.9**	ug	----	1.5%	**Back-half Results**
2031	**4.86**	ug	----	1.3%	
3031	**17.3**	ug	----	0.8%	
1055/1057 BH Blank	**0.637**	ug	----	----	
1055/1057 MS	49.2	ug	94.2%	----	
1033	**5.72**	ug	----	4.6%	
2033	**5.04**	ug	----	1.7%	
3033	**4.28**	ug	----	1.9%	**Impinger 4 - 6 Results**
1058 MS	48.4	ug	93.3%	----	
1059 MS	50.3	ug	98.4%	----	
1060 MS	48.7	ug	94.8%	----	

Bold Sample IDs represent field samples, all others are lab QC samples.
"<" indicates a sample result below the method DL.
"digest" means that the Hg aliquot is taken from a previously digested sample.
*RPD Relative Percent Difference. This is calculated only if the instrument response is greater than 10 times the IDL.

from . . .

ROY NEULICHT

Semi Volatile

DOCUMENT CONTROL SHEET

Project No.: 4601 (Subtask No.) 01-05-06

Document Name: Semi VOST Results Belden Brick Test

Originator: Marvin Shaw

WP ID No.: V8807

WP COMMENTS:

1 DATE TO WP: 3/16

DESIRED DUE DATE: 3/17
Flexible ( )
Firm (✓)

OPERATOR'S INITIALS: AB

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: (✓) Draft ( ) Final Draft ( ) Final ( ) Rainbow

W9

COMMENTS: Please key text, Table 2 and Table 4 in WordPerfect. Tables 1 and 3 must be in Quattro.

ROUTE:	ACTION:	DATE:	COMMENTS:

2 DATE TO WP:

DESIRED DUE DATE:
Flexible ( )
Firm ( )

OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow

COMMENTS:

ROUTE:	ACTION:	DATE:	COMMENTS:

3 DATE TO WP:

DESIRED DUE DATE:
Flexible ( )
Firm ( )

OPERATOR'S INITIALS:

FORMAT: ( ) EPA ( ) MRI ( ) Special

PREPARE: ( ) Envelope ( ) Label

SPACING: ( ) Single ( ) 1 1/2 ( ) Double

WP PROOF: ( ) Yes ( ) No

OUTPUT: ( ) Draft ( ) Final Draft ( ) Final ( ) Rainbow

COMMENTS:

ROUTE:	ACTION:	DATE:	COMMENTS:

Project No.: ______________ Document name: ______________

4
DATE TO WP: ______________
DESIRED DUE DATE: ______________
Flexible (___)
Firm (___)
OPERATOR'S INITIALS: ______________

FORMAT: (___) EPA (___) MRI (___) Special
SPACING: (___) Single (___) 1 1/2 (___) Double
OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow
PREPARE: (___) Envelope (___) Label
WP PROOF: (___) Yes (___) No

COMMENTS: ______________

ROUTE:	ACTION:	DATE:	COMMENTS:

5
DATE TO WP: ______________
DESIRED DUE DATE: ______________
Flexible (___)
Firm (___)
OPERATOR'S INITIALS: ______________

FORMAT: (___) EPA (___) MRI (___) Special
SPACING: (___) Single (___) 1 1/2 (___) Double
OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow
PREPARE: (___) Envelope (___) Label
WP PROOF: (___) Yes (___) No

COMMENTS: ______________

ROUTE:	ACTION:	DATE:	COMMENTS:

6
DATE TO WP: ______________
DESIRED DUE DATE: ______________
Flexible (___)
Firm (___)
OPERATOR'S INITIALS: ______________

FORMAT: (___) EPA (___) MRI (___) Special
SPACING: (___) Single (___) 1 1/2 (___) Double
OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow
PREPARE: (___) Envelope (___) Label
WP PROOF: (___) Yes (___) No

COMMENTS: ______________

ROUTE:	ACTION:	DATE:	COMMENTS:

7
DATE TO WP: ______________
DESIRED DUE DATE: ______________
Flexible (___)
Firm (___)
OPERATOR'S INITIALS: ______________

FORMAT: (___) EPA (___) MRI (___) Special
SPACING: (___) Single (___) 1 1/2 (___) Double
OUTPUT: (___) Draft (___) Final Draft (___) Final (___) Rainbow
PREPARE: (___) Envelope (___) Label
WP PROOF: (___) Yes (___) No

COMMENTS: ______________

ROUTE:	ACTION:	DATE:	COMMENTS:

Rick,

Here is the semivolatile data for the Belden Brick Kiln - EIB Project 4601. As you can see the draft is pretty rough. I would like to review it after you get it typed and before it goes to the client.

Call me at extension 1321 if you have questions.

Sincerely,
Marilyn Whitacre

TABLE 1. SEMIVOLATILE RESULTS (ug)

Analyte	Run 1	Run I RI	Run 2	Run 3	1038a(a)	2038a(a)	3038a(a)
Phenol	13	13	13	8.7	<2	<2	<2
Aniline	<2	<2	<2	<2	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2	<2	<2	<2	<2
2-Chlorophenol	<2	<2	<2	<2	<2	<2	<2
1,3-Dichlorobenzene	<2	<2	<2	<2	<2	<2	<2
1,4-Dichlorobenzene	4.8	4.8	4.9	9.7	<2	<2	<2
Benzyl alcohol	<2	<2	<2	<2	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2	<2	<2	<2	<2
2-Methylphenol	2.1	2.2	<2	<2	<2	<2	<2
2,2'-oxybis(1-Chloropropan	<2	<2	<2	<2	<2	<2	<2
4-Methylphenol	<2	<2	<2	<2	<2	<2	<2
N-Nitrosodipropylamine	<2	<2	<2	<2	<2	<2	<2
Hexachloroethane	<2	<2	<2	<2	<2	<2	<2
Nitrobenzene	<2	<2	<2	<2	<2	<2	<2
Isophorone	<2	<2	<2	<2	<2	<2	<2
2-Nitrophenol	<2	<2	<2	<2	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2	<2	<2	<2	<2
Benzoic acid	<2	<2	<2	623	<2	<2	<2
Bis(2-chloroethoxy)methan	<2	<2	<2	<2	<2	<2	<2
2-Chloroacetophenone	<2	<2	<2	<2	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2	<2	<2	<2	<2
1,2,4-Trichlorobenzene	<2	<2	<2	<2	<2	<2	<2
Naphthalene	6	6	12	8.5	<2	<2	<2
4-Chloroaniline	<2	<2	<2	<2	<2	<2	<2
2,6-Dichlorophenol	<2	<2	<2	<2	<2	<2	<2
Hexachlorobutadiene	<2	<2	<2	<2	<2	<2	<2
4-Chloro-3-methylphenol	<2	<2	<2	<2	<2	<2	<2
2-Hydroxyacetophenone	<2	<2	<2	<2	<2	<2	<2
2-Methylnaphthalene	4.8	4.9	11	7.4	<2	<2	<2
Hexachlorocyclopentadien	<2	<2	<2	<2	<2	<2	<2
2,4,6-Trichlorophenol	<2	<2	<2	<2	<2	<2	<2
2,4,5-Trichlorophenol	<2	<2	<2	<2	<2	<2	<2
2-Chloronaphthalene	<2	<2	<2	<2	<2	<2	<2
2-Nitroaniline	<2	<2	<2	<2	<2	<2	<2
Dimethylphthalate	<2	<2	<2	<2	<2	<2	<2
Acenaphthylene	<2	<2	<2	<2	<2	<2	<2
2,6-Dinitrotoluene	<2	<2	<2	<2	<2	<2	<2
2,3,4,6-Tetrachlorophenon	<2	<2	<2	<2	<2	<2	<2
3-Nitroaniline	<2	<2	<2	<2	<2	<2	<2
Acenaphthene	<2	<2	<2	<2	<2	<2	<2
2,4-Dinitrophenol	<2	<2	<2	<2	<2	<2	<2
4-Nitrophenol	<2	<2	<2	<2	<2	<2	<2
Dibenzofuran	<2	<2	<2	<2	<2	<2	<2
2,4-Dinitrotoluene	<2	<2	<2	<2	<2	<2	<2
Diethyl phthalate	53	53	23	18	<2	<2	<2
4-Chlorophenylphenyl ethe	<2	<2	<2	<2	<2	<2	<2
Fluorene	<2	<2	<2	<2	<2	<2	<2
4-Nitroaniline	<2	<2	<2	<2	<2	<2	<2
4,6-Dinitro-2-methylphenol	<2	<2	<2	<2	<2	<2	<2
N-Nitrosodiphenylamine	<2	<2	<2	<2	<2	<2	<2
4-Bromophenyl-phenylethe	<2	<2	<2	<2	<2	<2	<2
Hexachlorobenzene	<2	<2	<2	<2	<2	<2	<2
Pentachlorophenol	<2	<2	<2	<2	<2	<2	<2
Phenanthrene	<2	<2	<2	<2	<2	<2	<2
Anthracene	<2	<2	<2	<2	<2	<2	<2
Carbazole	<2	<2	<2	<2	<2	<2	<2
Di-n-butyl phthalate	13	13	14	31	<2	<2	<2
Fluoranthene	<2	<2	<2	<2	<2	<2	<2
Benzidine	<2	<2	<2	<2	<2	<2	<2
Pyrene	<2	<2	<2	<2	<2	<2	<2
Butylbenzyl phthalate	2	<2	2.2	3	<2	<2	<2
3,3'-Dichlorobenzidine	<2	<2	<2	<2	<2	<2	<2
Benzo(a)anthracene	<2	<2	<2	<2	<2	<2	<2
Chrysene	<2	<2	<2	<2	<2	<2	<2
Bis(2-ethylhexyl) phthalate	77	77	240	510	<2	<2	<2
Di-n-octyl phthalate	<2	<2	<2	10	<2	<2	<2
Benzo(b)fluoranthene	<2	<2	<2	<2	<2	<2	<2
Benzo(k)fluoroanthene	<2	<2	<2	<2	<2	<2	<2
Benzo(a)pyrene	<2	<2	<2	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2	<2	<2	<2	<2	<2	<2
Dibenz(a,h)anthracene	<2	<2	<2	<2	<2	<2	<2
Benzo(g,h,i)perylene	<2	<2	<2	<2	<2	<2	<2

(a) These samples are filtered support rises. The extracts were black and the sample matrix interfered with analysis. The internal standard areas were low and surrogate recovery did not meet objectives.

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TABLE 3. QA RESULTS (ug)

Analyte	Method Bl	00481	% Recover	00482	% Recover	00483	% Recover
Phenol	<2	308	92	39	58	10	30
Aniline	<2	<2		<2		<2	
Bis(2-chloroethyl)ether	<2	<2		<2		<2	
2-Chlorophenol	<2	316	95	39	58	22	67
1,3-Dichlorobenzene	<2	597	90	76	57	34	50
1,4-Dichlorobenzene	<2	615	92	79	59	36	55
Benzyl alcohol	<2	597	90	77	57	29	45
1,2-Dichlorobenzene	<2	589	88	74	55	35	54
2-Methylphenol	<2	<2		<2		<2	
2,2'-oxybis(1-Chloroprop	<2	<2		<2		<2	
4-Methylphenol	<2	5.3		<2		<2	
N-Nitrosodipropylamine	<2	<2		<2		<2	
Hexachloroethane	<2	592	89	71	53	30	45
Nitrobenzene	<2	584	88	80	60	46	70
Isophorone	<2	584	88	86	64	50	76
2-Nitrophenol	<2	320	96	43	64	23	71
2,4-Dimethylphenol	<2	337	101	15	22	17	52
Benzoic acid	64	<2		85		<2	
Bis(2-chloroethoxy)meth	<2	<2		<2		<2	
2-Chloroacetophenone	<2	<2		<2		<2	
2,4-Dichlorophenol	<2	331	99	<2	65	24	74
1,2,4-Trichlorobenzene	<2	606	91	82	61	41	62
Naphthalene	3.1	326	98	46	69	24	71
4-Chloroaniline	<2	<2		<2		<2	
2,6-Dichlorophenol	<2	<2		<2		<2	
Hexachlorobutadiene	<2	617	93	82	61	37	56
4-Chloro-3-methylphenol	<2	323	97	49	73	25	77
2-Hydroxyacetophenone	3.2	<2		<2		<2	
2-Methylnaphthalene	<2	554	83	81	60	45	68
Hexachlorocyclopentadi	<2	607	91	42	3	18	27
2,4,6-Trichlorophenol	<2	350	105	54	81	27	83
2,4,5-Trichlorophenol	<2	<2		<2		<2	
2-Chloronaphthalene	<2	604	91	93	70	51	76
2-Nitroaniline	<2	<2		<2		<2	
Dimethylphthalate	<2	<2		<2		<2	
Acenaphthylene	<2	360	108	59	88	31	94
2,6-Dinitrotoluene	<2	662	99	128	96	58	88
2,3,4,6-Tetrachlorophen	<2	<2		<2		<2	
3-Nitroaniline	<2	<2		<2		<2	
Acenaphthene	<2	337	101	57	85	29	88
2,4-Dinitrophenol	<2	200	60	<2	0	167	5
4-Nitrophenol	<2	289	87	57	85	9	27
Dibenzofuran	<2	574	86	104	78	56	85
2,4-Dinitrotoluene	<2	632	95	128	96	58	88
Diethyl phthalate	<2	<2		<2		<2	
4-Chlorophenylphenyl et	<2	<2		<2		<2	
Fluorene	<2	354	106	67	100	33	100
4-Nitroaniline	<2	<2		<2		<2	
4,6-Dinitro-2-methylphen	<2	280	84	19	29	21	65
N-Nitrosodiphenylamine	<2	<2		<2		<2	
4-Bromophenyl-phenylet	<2	<2		<2		<2	
Hexachlorobenzene	<2	620	93	119	89	63	95
Pentachlorophenol	<2	365	110	38	57	29	88
Phenanthrene	<2	345	104	66	99	32	97
Anthracene	<2	339	102	63	94	31	92
Carbazole	<2	<2		<2		<2	
Di-n-butyl phthalate	<2	<2		<2		<2	
Fluoranthene	<2	358	108	71	106	35	106
Benzidine	<2	<2		<2		<2	
Pyrene	<2	342	103	69	103	35	105
Butylbenzyl phthalate	<2	<2		<2		<2	
3,3'-Dichlorobenzidine	<2	<2		<2		<2	
Benzo(a)anthracene	<2	314	94	62	93	30	90
Chrysene	<2	292	88	58	87	28	86
Bis(2-ethylhexyl) phthala	17	<2		14		<2	
Di-n-octyl phthalate	<2	<2		<2		<2	
Benzo(b)fluoranthene	<2	352	106	73	109	31	92
Benzo(k)fluoroanthene	<2	318	95	63	94	29	89
Benzo(a)pyrene	<2	336	101	59	88	27	82
Indeno(1,2,3-cd)pyrene	<2	332	100	62	93	28	85
Dibenz(a,h)anthracene	<2	352	106	65	97	29	88
Benzo(g,h,i)perylene	<2	265	80	49	73	22	70

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INTEROFFICE COMMUNICATION

MIDWEST RESEARCH INSTITUTE

January 5, 1994

TO: R. Marinshaw

FROM: M. Whitacre

SUBJECT: Results of Semivolatile Analysis, EIB, Belden Brick Emission Test, MRI Project No. 4601-01.

This memo describes the analysis for semivolatile organic analytes in samples collected from the Belden Brick Kiln. Supporting information is attached to this memo in tabular format.

SAMPLE RECEIPT

Samples were received on November 15, 1993. the samples were stored at 4 °C prior to extraction. Reagent blanks were received with the MM5 samples. These blanks were archived in the cold room.

SAMPLE PREPARATION

The MM5 samples were extracted according to EPA SW-846 Method ~~8270.~~ 0010

For the MM5 samples, the XAD/filter were combined, fortified with the 8270 Base/Neutral and Acid surrogate spiking mix, and Soxhlet-extracted with methylene chloride (method 3540). The front half rinse, back half rinse, and condensate were combined in a separatory funnel and extracted with methylene chloride (method 3510). The two extracts were combined and concentrated using Kuderna-Danish and nigrogen evaporation to a volume of 10 mL. The samples were split, 5 mL for archive and 5 mL were further concentrated to 1 mL.

Three additional samples labeled filter support rinse were collected in the field. These rinses were spiked with the surrogate spiking mixes and concentrated by Kuderna-Danish and nitrogen evaporation to 10 mL. The samples were split, 5 mL for archive and 5 mL were further concentrated to 1 mL.

The samples were analyzed by quadrupole gas chromatography/mass spectormetry (GC/MS), on the TRIO-1A using a DB-5 60-m column according to SW-846 Method 8270. Two of the MM5 sample trains were diluted. Run 1 was injected twice for an duplicate injection.

[illegible] Soxhlet of the XAD (Method 3540) and separatory funnel extraction of the condensate (Method 3510). Sample fractions were combined and analyzed by GC/MS using Method 8270.

RESULTS

The results of the semivolatile analysis and the surrogate

Detection limits are based upon the concentration of the lowest calibration standard.

recoveries of the MM5 and filter support rinse samples are presented in Tables 1 and 2. All surrogate recoveries meet the Quality Assurance Project Plan (QAPjP) objective of 50%-150% for the MM5 ~~samples~~ set. During the analysis of the filter support rinses, the internal standard areas decreased by a factor of three. This is attributed to sample matrix effects since the extracts were a black color with visible particles suspended in the solvent. The ~~decrease~~ lower internal standard areas affected the surrogate recoveries and the majority were outside the method objective.

QUALITY CONTROL ~~SAMPLES~~

During the extraction of the XAD/filter samples, a XAD method blank, 28425, and one XAD QA spike, 00482, were also extracted. A water QA spike, 00483, was extracted with the condensate samples. The method blank contained 5 compounds. A Performance Audit Sample (PAS), 00481, provided by D. Hooton was analyzed by GC/MS. The results and surrogate recoveries of the blank and QA samples are given in Tables 3 and 4. Both the PAS and the spikes met the objective of 50% to 150%.

For the initial calibration curve analyzed on 10/25/93, all CCC's and SPCC's passed Method criteria. Two analytes were greater than 30% RRF (Benzidine @ 42% and 3,3'-Dichlorobenzidine @ 30.1%)

All CCC's and SPCC's for the CCAL (continuing calibration check) analyzed on 11/30/93 passed Method criteria. Four analytes were greater than 30% difference from the initial calibration curve (Benzoic acid @ 47% , 2,4-Dinitrophenol @ 30.3% , 3,3'Dichlorobenzidine @ 30.1% , and Benzidine @ 86%).

All CCC's and SPCC's for the CCAL (continuing calibration check) analyzed on 12/01/93 passed Method criteria. One analyte was greater than 30% difference from the initial calibration curve (Benzidine @ 62%).

to cleanup (e.g. Florisil or GPC) and reanalyzed to improve surrogate recovery and internal standard response. This additional work is outside the scope of this project.

The method blank contained 4 compounds, 3 of which were also found in the samples. The ~~levels~~ amounts in the blank are lower than the samples. The compounds and amounts in the blank are: Benzoic acid 64 µg, Naphthalene 3.1 µg, 2-Hydroxyacetophenone 3.2 µg, and bis(2-ethylhexyl)phthalate 17 µg. Benzoic acid is found Run 3 at 623 µg, Napthalene Runs 1-3 at 6 to 12 µg, and bis(2-ethylhexyl)phthalate Runs 1-3 at 77 to 510 µg. Benzoic acid and bis(2-ethylhexyl)phthalate were found in the XAD spike sample 00482.

Table 1
Semivolatile Results (µg)

	Run 1	Run 1 RI	Run 2	Run 3	1038A[a]	2038A[a]	3038A[a]
ienol	13	13	13	8.7	<2	<2	<2
iline	<2	<2	<2	<2			
s(2-chloroethyl) ether	<2						
Chlorophenol	<2						
3-Dichlorobenzene	<2						
4-Dichlorobenzene	4.8	4.8	4.9	9.7			
nzyl alcohol	<2	<2	<2	<2			
2-Dichlorobenzene	<2	<2	<2				
Methylphenol	2.1	2.2	<2				
2'-oxybis(1-Chloropropane)	<2	<2	<2				
Methylphenol							
Nitrosodipropylamine							
exachoroethane							
trobenzene							
ophorone							
Nitrophenol							
4-Dimethylphenol							
nzoic acid				623			
s(2-chloroethoxy)methane				<2			
Chloroacetophenone				<2			
4-Dichlorophenol				<2			
2,4-Trichlorobenzene							
aphthalene	6.0	6.0	12	8.5			
Chloroaniline	<2	<2	<2	<2			
6-Dichlorophenol	<2		<2	<2			
exachlorobutadiene	<2		<2	<2			
Chloro-3-methylphenol	<2		<2	<2			
Hydroxyacetophenone	<2		<2	<2			
Methylnaphthalene	7.8	4.9	11	7.4			
exachlorocyclopentadiene	<2	<2	<2	<2			
4,6-Trichlorophenol							
4,5-Trichlorophenol							
Chloronaphthalene							
Nitroaniline							
methylphthalate							
cenaphthylene							
6-Dinitrotoluene							
3,4,6-Tetrachlorophenone							

a. These samples are filter support rinses. The extracts were black and the sample matrix interfered with analysis. The internal standard areas were low and surrogate recovery did not meet objectives.

	Run 1	Run 1 RI	Run 2	Run 3	1038A	2038A	3038A
3-Nitroaniline	<2	<2	<2	<2	<2	<2	<2
Acenaphthene	<2						
2,4-Dinitrophenol	<2						
4-Nitrophenol	<2						
Dibenzofuran	<2						
2,4-Dinitrotoluene	<2						
Diethyl phthalate	53	53	23	18			
4-Chlorophenylphenyl ether	<2	<2	<2	<2			
Fluorene							
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine							
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene	1.3						
Anthracene	<2						
Carbazole	<2						
Di-*n*-butyl phthalate	13	13	14	81			
Fluoranthene	<2	<2	<2	<2			
Benzidine	<2						
Pyrene	<2						
Butylbenzyl phthalate	2.0		2.2	3.0			
3,3′-Dichlorobenzidine	<2		<2	<2			
Benzo[*a*]anthracene	<2		<2	<2			
Chrysene	<2		<2	<2			
Bis(2-ethylhexyl) phthalate	77	77	240	510			
Di-*n*-octyl phthalate	<2	<2	<2	10			
Benzo[*b*]fluoranthene				<2			
Benzo[*k*]fluoranthene							
Benzo[*a*]pyrene							
Indeno[1,2,3-*cd*]pyrene							
Dibenz[*a,h*]anthracene							
Benzo[*g,h,i*]perylene							

Table 2

Surrogate Recovery (%)

Sample ID

Analyte	Run 1	Run 1 RI	Run 2	Run 3	1038A	2038A	3038A
D4-1, 2-Dichlorobenzene	57	57	72	67	31[a]	29[a]	32[a]
D5-Nitrobenzene	63	61	73	67	64	49[a]	56
2-Fluorobiphenyl	76	76	83	82	128	340[a]	495[a]
D14-4-Terphenyl	94	91	91	102	280[a]	423[a]	485[a]
2-Fluorophenol	62	62	75	68	39[a]	42[a]	42[a]
D6-Phenol	60	61	75	68	13[a]	13[a]	10[a]
D4-2-Chlorophenol	60	61	71	67	6.4[a]	47[a]	48[a]
2, 4, 6-Tribromophenol	106	115	111	118	220[a]	528[a]	850[a]

a) Do not meet method objective of 50-150%. These samples extracts were dark in color and internal standard response was less than required. These difficulties are due to the sample matrix.

Table 3
QA Results (µg)

Analyte	Method Blank	00481	% recovery	00482	% recovery	00483	% recovery
Phenol	<2	308	92	39	58	10	30
Aniline		<2		<2		<2	
Bis(2-chloroethyl) ether		<2		<2		<2	
2-Chlorophenol		316	95	39	58	22	67
1,3-Dichlorobenzene		597	90	76	57	34	50
1,4-Dichlorobenzene		615	92	79	59	36	55
Benzyl alcohol		597	90	77	57	29	45
1,2-Dichlorobenzene		589	88	74	55	35	54
2-Methylphenol		<2		<2		<2	
2,2′-oxybis(1-Chloropropane)		53					
4-Methylphenol		<2					
N-Nitrosodipropylamine		<2					
		<2					
~~Hexachoroethane~~		592	89	71	53	30	45
Nitrobenzene		584	88	80	60	46	70
Isophorone		584	88	86	64	50	76
2-Nitrophenol		320	96	43	64	23	71
2,4-Dimethylphenol		337	101	75	22	17	52
Benzoic acid	64	<2		85		<2	
Bis(2-chloroethoxy)methane	<2	<2		<2		<2	
2-Chloroacetophenone		<2		<2		<2	
2,4-Dichlorophenol	<2	331	99	43	65	24	74
1,2,4-Trichlorobenzene	<2	606	91	82	61	41	62
Naphthalene	3.1	326	98	46	69	24	71
4-Chloroaniline	<2	<2		<2		<2	
2,6-Dichlorophenol		<2		<2		<2	
Hexachlorobutadiene	<2	617	93	82	61	37	56
4-Chloro-3-methylphenol	~~<2~~	323	97	49	73	25	77
2-Hydroxyacetophenone	3.2	<2		<2		<2	
2-Methylnaphthalene	<2	554	83	81	60	45	68
Hexachlorocyclopentadiene		607	91	4.2	3	18	27
2,4,6-Trichlorophenol		350	105	54	81 ~~72~~	27	83
2,4,5-Trichlorophenol		<2		<2		<2	
2-Chloronaphthalene		604	91	93	70	51	76
2-Nitroaniline		<2		<2		<2	
Dimethylphthalate		<2		<2		<2	
Acenaphthylene		360	108	59	88	31	94
2,6-Dinitrotoluene		662	99	128	96	58	88
2,3,4,6-Tetrachlorophenone		<2		<2		<2	

	Method Blank	00481	% recovery	00482	% recovery	00483	% recovery
3-Nitroaniline	<2	<2		<2		<2	
Acenaphthene		337	101	57	85	29	88
2,4-Dinitrophenol		200	60	<2	0	1.67	5
4-Nitrophenol		289	87	57	85	9	27
Dibenzofuran		574	86	104	78	56	85
2,4-Dinitrotoluene		632	95	128	96	58	88
Diethyl phthalate		<2		<2		<2	
4-Chlorophenylphenyl ether		<2		<2		<2	
Fluorene		354	106	67	100	33	100
4-Nitroaniline		<2		<2		<2	
4,6-Dinitro-2-methylphenol		280	84	19	29	21	65
N-Nitrosodiphenylamine		<2		<2		<2	
4-Bromophenyl-phenylether		"		↓		↓	
Hexachlorobenzene		620	93	119	89	63	95
Pentachlorophenol		365	110	38	57	29	88
Phenanthrene		345	104	66	99	32	97
Anthracene		339	102	63	94	31	92
Carbazole		<2		<2		<2	
Di-*n*-butyl phthalate		<2		<2		<2	
Fluoranthene		358	108	71	106	35	106
Benzidine		<2		<2		<2	
Pyrene		342	103	69	103	35	105
Butylbenzyl phthalate		<2		<2		<2	
3,3′-Dichlorobenzidine		<2		<2		<2	
Benzo[*a*]anthracene		314	94	62	93	30	90
Chrysene		292	88	58	87	28	86
Bis(2-ethylhexyl) phthalate	17	<2		14		<2	
Di-*n*-octyl phthalate	<2	<2		<2		<2	
Benzo[*b*]fluoranthene		352	106	73	109	31	92
Benzo[*k*]fluoranthene		318	95	63	94	29	89
Benzo[*a*]pyrene		336	101	59	88	27	82
Indeno[1,2,3-*cd*]pyrene		332	100	62	93	28	85
Dibenz[*a,h*]anthracene		352	106	65	97	29	88
Benzo[*g,h,i*]perylene		265	80	49	73	22	70

Table 4

QA Surrogate Recovery (%)

		Sample ID	
Analyte	Method Blank	00482	00483
D4-1, 2-Dichlorobenzene	51	56	45[a]
D5-Nitrobenzene	55	62	67
2-Fluorobiphenyl	60	73	66
D14-4-Terphenyl	100	93	87
2-Fluorophenol	49[a]	49[a]	41[a]
D6-Phenol	51	54	27[a]
D4-2-Chlorophenol	50	52	60
2, 4, 6-Tribromophenol	87	98	92

a) Do not meet method objective of 50-150%

Clay and Shale Analysis

DATE»»»» 06/09/93 TIME»»»» 13:57:03

Record # 1

Clay Pit Dept REPORT

Claypit Raw Material Analysis Report, To Dept __Clay/Shale Pit

Pit Num	Dept Num	Claypit Name	Material Name	Date Analysis	Hole No	Hole Depth	Ignt Loss	Silic	Alumn Oxide	Iron Oxide	Mang Oxide	Tot Sulfr	Tot Crbon	Org Carbn	Lab Num	Laboratory Name
101101	1011	WALLICK	#5 SHALE	11/02/89	1	17 4	7.84	62.60	25.73	5.10	0.06	0.02	0.33	0.18	193706	REAM & HAAGER
WALLICK PIT 5				11/14/90	1	15	7.96	64.80	24.83	1.93	0.03	0.11	0.53	0.21	201355	REAM & HAAGER
5A SHALE				10/22/91	1	15'	7.40	69.00	20.32	2.20	0.03	0.05	0.49	0.18	208290	REAM & HAAGER
101106	1011	WALLICK	#4 CLAY	01/27/89	1	6 2"	12.96	48.12	37.57	1.43	0.01	0.31	0.30	0.17	187991	REAM & HAAGER
PIT 6				11/02/89	1	5'6"	8.26	61.59	27.63	1.63	0.01	0.36	0.05	0.01	193699	REAM & HAAGER
				04/04/90	#1	5'6"	7.81	53.88	31.80	6.89	0.12	0.27	0.01	0.01	197269	REAM & HAAGER
				11/14/90	1	6'	8.95	66.60	23.87	0.44	0.01	0.27	0.05	0.01	201349	REAM & HAAGER
101107	1011	Wallick	#4 CLAY	11/14/90	1	18'	4.31	69.20	23.91	2.36	0.01	0.11	0.23	0.17	201350	REAM & HAAGER
PIT 7																
101108	1011	WALLICK	#4 CLAY	05/31/89	1	8'	9.18	61.84	25.27	2.17	0.04	1.14	0.10	0.05	190582	REAM & HAAGER
PIT 8				11/02/89	1	5'6"	6.91	64.40	27.77	1.47	0.01	0.17	0.20	0.08	193700	REAM & HAAGER
				04/04/90	#1	4'8"	7.18	62.84	28.03	1.09	0.02	0.22	0.32	0.10	197266	REAM & HAAGER
				11/14/90	1	5	7.40	68.50	23.85	0.39	0.01	0.22	0.02	0.01	201359	REAM & HAAGER
				05/28/91	W	5'6"	7.53	72.70	19.75	0.57	0.02	0.02	0.05	0.01	205728	REAM & HAAGER
				05/28/91	E	13'6	6.44	70.01	23.41	0.39	0.01	0.03	0.05	0.01	205729	REAM & HAAGER
				10/22/91	1	20'	7.35	65.00	34.39	0.39	0.01	0.10	0.01	0.01	208279	REAM & HAAGER
				05/27/92	1	0-25	5.35	71.10	20.75	0.33	0.01	0.12	0.33	0.11	212805	REAM & HAAGER
				10/28/92	1	24'	7.52	71.10	20.50	0.79	0.01	0.14	0.03	0.01	217084	REAM & HAAGER
101110	1011	WALLICK	#4 CLAY	01/27/89	1	8'8"	6.69	64.84	28.70	0.94	0.01	0.13	0.17	0.15	187992	REAM & HAAGER
PIT 10				11/02/89	1	8'7"	6.30	66.28	25.58	1.60	0.02	0.19	0.07	0.02	193698	REAM & HAAGER
101111	1011	WALLICK	#4 CLAY	01/27/89	S1	7'11	13.52	42.32	44.00	1.92	0.01	0.17	1.16	0.59	187993	REAM & HAAGER
PIT 11				01/27/89	1	6'6"	11.75	50.92	38.46	1.26	0.01	0.33	0.80	0.59	187994	REAM & HAAGER
				11/02/89	1N	5'3"	12.83	52.28	32.64	1.56	0.01	0.32	0.40	0.25	193701	REAM & HAAGER
				11/02/89	1S	5'2"	9.09	60.96	28.69	1.51	0.01	0.23	0.10	0.03	193702	REAM & HAAGER
				04/04/90	#1	4'3"	12.77	54.80	31.07	1.43	0.02	0.27	0.41	0.19	197264	REAM & HAAGER
				11/14/90	S	6'	13.34	58.20	26.72	0.47	0.01	0.36	0.71	0.39	201351	REAM & HAAGER
				11/14/90	E	6'	8.43	60.50	25.10	0.40	0.01	0.22	0.14	0.08	201352	REAM & HAAGER
				11/14/90	N	7'	6.90	65.20	26.99	0.58	0.01	0.06	0.17	0.08	201353	Ream & Haager
				05/28/91	S	5 2"	14.41	62.60	20.99	0.36	0.01	0.45	0.97	0.61	205730	REAM & HAAGER
				05/28/91	N	5'7"	9.98	54.10	34.81	0.49	0.01	0.13	0.35	0.10	205731	REAM & HAAGER
				10/22/91	W	5'	11.15	53.50	33.04	0.62	0.01	0.18	0.67	0.21	208280	REAM & HAAGER
				10/22/91	1N	6'	12.20	54.80	31.25	0.55	0.01	0.19	0.59	0.18	208281	REAM & HAAGER
				10/22/91	1S	5'	8.92	59.50	30.81	0.56	0.01	0.29	0.05	0.01	208282	REAM & HAAGER
				05/27/92	1N	0-8	11.40	71.80	15.60	0.40	0.01	0.23	0.41	0.19	212802	REAM & HAAGER
				05/27/92	1W	0-7	6.80	68.50	23.40	0.59	0.01	0.03	0.29	0.09	212803	REAM & HAAGER
				05/27/92	1S	0-7	10.59	60.40	28.08	0.41	0.01	0.15	0.19	0.07	212804	REAM & HAAGER
				10/28/92	1N	7'	7.74	67.70	22.30	1.54	0.01	0.21	0.20	0.09	217085	REAM & HAAGER
				10/28/92	1S	6'	7.70	71.40	19.81	0.59	0.01	0.22	0.07	0.01	217086	REAM & HAAGER
101131	1011	MOOMAW	#4 CLAY	05/27/92	1	0-8	8.33	62.70	27.80	0.37	0.01	0.10	0.48	0.15	212796	REAM & HAAGER
PIT 1																
101133	1011	MOOMAW	#4 CLAY	10/22/91	1	6'	8.48	68.00	23.02	0.34	0.01	0.15	0.01	0.01	208287	REAM & HAAGER
PIT 3																

				05/27/92	1	0-7	5.78	60.00	22.60	0.42	0.01	0.07	1.75	0.80	212797	REAM & HAAGER
				10/28/92	15	6	8.00	63.70	27.00	0.92	0.01	0.24	0.04	0.01	217080	REAM & HAAGER
101133	1011	MOOMAW	#4 SHALE	09/30/87	1	5'	5.67	68.42	22.95	4.61	0.03	0.01	0.07	0.06	176647	REAM & HAAGER
Pit 3				09/30/87	2	10'	6.57	65.92	24.12	4.00	0.03	0.01	0.10	0.01	176648	REAM & HAAGER
				09/30/87	1	15'"	6.50	63.60	26.85	4.99	0.06	0.01	0.35	0.04	176649	REAM & HAAGER
				09/30/87	1	18'	6.83	60.54	26.55	5.65	0.05	0.01	0.21	0.19	176650	REAM & HAAGER
				01/13/89	1	22'	5.79	61.44	27.50	4.56	0.06	0.01	0.18	0.09	187780	REAM & HAAGER
				11/14/90	1	19'	7.69	65.20	24.75	2.29	0.03	0.01	0.05	0.01	201344	REAM & HAAGER
				10/28/92	1	20	7.36	61.80	25.60	4.40	0.04	0.01	0.43	0.16	217079	REAM & HAAGER
101134	1011	Moomaw	#4 CLAY	01/27/89	1	7'4"	8.81	57.40	32.32	1.20	0.01	0.16	0.22	0.17	187995	REAM & HAAGER
Pit 4				04/04/90	1	6	10.95	57.56	30.06	0.99	0.02	0.21	0.22	0.09	197271	REAM & HAAGER
				11/14/90	1	11'	6.91	69.10	23.59	0.32	0.01	0.05	0.01	0.01	201345	REAM & HAAGER
				05/28/91	1	10'	6.34	75.01	18.80	0.41	0.01	0.01	0.05	0.01	205725	REAM & HAAGER
101134	1011	MOOMAW	#4 SHALE	01/13/89	1	22'	7.60	55.10	30.67	5.89	0.09	0.34	1.07	0.76	187782	REAM & HAAGER
Pit 4				11/02/89	1	16 4	7.36	61.48	24.14	7.03	0.09	0.07	0.52	0.43	193705	REAM & HAAGER
				04/04/90	1	6	13.52	59.40	24.93	1.08	0.04	0.01	1.01	0.21	197270	REAM & HAAGER
101135	1011	MOOMAW	#4 CLAY	01/27/89	1	7'7"	11.24	50.64	37.00	0.92	0.01	0.13	0.47	0.23	187996	REAM & HAAGER
Pit 5				11/02/89	1	4'4"	7.70	65.32	25.25	1.54	0.01	0.12	0.10	0.02	193703	REAM & HAAGER
				04/04/90	1	4 6"	8.61	58.36	31.04	1.07	0.02	0.12	0.07	0.01	197265	Ream & Haager
				11/14/90	1	9'	9.10	68.70	22.11	0.44	0.01	0.12	0.01	0.01	201348	REAM & HAAGER
				10/28/92	1N	8'	9.41	62.10	27.11	0.89	0.01	0.16	0.07	0.01	217081	REAM & HAAGER
101135	1011	MOOMAW	#4 SHALE	11/14/90	1	30'	9.38	63.90	25.00	1.66	0.03	0.04	0.17	0.06	201347	REAM & HAAGER
Pit 5				05/28/91	1	25	6.82	56.10	35.75	1.87	0.05	0.01	0.02	0.10	205726	REAM & HAAGER
				10/22/91	1	13'	6.98	58.70	31.58	2.09	0.04	0.01	0.52	0.19	208288	REAM & HAAGER
101135	1011	MOOMAW	3A SHALE	11/02/89	1	19'9	6.70	63.56	24.17	5.10	0.05	0.01	0.21	0.17	193704	REAM & HAAGER
Pit 5				04/04/90	1	14'6	6.51	61.96	27.00	5.03	0.05	1.01	0.04	0.01	197273	REAM & HAAGER
				11/14/90	1	19'	8.06	60.50	29.80	1.50	0.03	0.01	0.14	0.06	201346	REAM & HAAGER
				05/28/91	1	20'	8.12	62.40	28.01	1.70	0.03	0.15	0.11	0.04	205727	REAM & HAAGER
				10/22/91	1	18	6.94	66.40	24.80	1.80	0.04	0.02	0.32	0.10	208289	REAM & HAAGER
				05/27/92	1	0-21	10.34	60.00	27.34	1.89	0.03	0.02	0.35	0.13	212798	REAM & HAAGER
				10/28/92	1	17'	7.71	68.10	19.15	4.75	0.04	0.01	0.30	0.18	217082	REAM & HAAGER
101141	1011	BELDEN	3A SHALE	09/30/87	1	0-5	6.08	65.70	29.58	4.38	0.04	0.01	0.10	0.07	176635	REAM & HAAGER
Pit 1				09/30/87	1	5-10	6.58	61.54	33.40	4.28	0.04	0.01	0.19	0.13	176636	REAM & HAAGER
				09/30/87	1	1015	6.70	59.48	30.05	5.23	0.04	0.01	0.50	0.13	176637	REAM & HAAGER
				09/30/87	1	1519	7.75	59.48	25.92	6.44	0.10	0.01	0.66	0.49	176638	REAM & HAAGER
				01/13/89	1	22'	6.37	61.90	27.33	3.83	0.02	0.03	0.23	0.22	187777	REAM & HAAGER
				11/02/89	1	21'2	6.08	66.76	22.47	5.04	0.06	0.01	0.18	0.07	193712	REAM & HAAGER
				04/04/90	1	21'	6.08	61.72	29.19	4.12	0.05	0.01	0.01	0.01	197277	REAM & HAAGER
				11/14/90	1	13	7.26	65.90	24.48	1.56	0.02	0.01	0.57	0.40	201340	REAM & HAAGER
101142	1011	BELDEN	3A SHALE	01/13/89	1	22'	6.48	62.00	26.30	4.90	0.07	0.15	0.38	0.12	187778	REAM & HAAGER
Pit 2				05/28/91	1	12'	5.93	64.00	28.15	1.30	0.03	0.09	0.15	0.05	205732	REAM & HAAGER
				10/22/91	1	9'	6.25	61.60	30.45	1.51	0.03	0.06	0.10	0.02	208283	REAM & HAAGER
				05/27/92	1	0-21	6.95	62.20	28.60	1.60	0.03	0.04	0.36	0.12	212793	REAM & HAAGER
				10/28/92	1	23'	6.60	64.70	24.01	3.73	0.02	0.08	0.46	0.20	217072	REAM & HAAGER
101143	1011	BELDEN	#4 CLAY	11/14/90	1	9'	8.06	64.30	27.01	0.58	0.02	0.01	0.20	0.09	201342	REAM & HAAGER
Pit 3				05/28/91	1	6'	9.90	60.90	28.00	0.38	0.01	0.08	0.36	0.11	205733	REAM & HAAGER

		10/22/91	1S	10	8.19	64.90	26.39	0.37	0.01	0.15	0.06	0.01	208284	REAM & HAAGER
		10/22/91	1N	6	6.67	73.10	18.76	0.39	0.01	0.07	0.18	0.07	208286	REAM & HAAGER
		05/27/92	1	0-7	8.53	66.70	23.60	0.47	0.01	0.17	0.46	0.11	212795	REAM & HAAGER
		10/28/92	1S	6'	7.97	67.00	24.23	0.59	0.01	0.09	0.01	0.01	217071	REAM & HAAGER
		10/28/92	1N	10	7.24	64.20	27.45	0.89	0.01	0.05	0.05	0.01	217074	REAM & HAAGER
101143 1011 BELDEN	#4 SHALE	09/30/87	1	0-5	8.49	52.88	27.46	9.78	0.09	0.01	1.68	1.37	176639	REAM & HAAGER
Pit 3		09/30/87	1	5-10	5.14	63.40	29.68	3.92	0.03	0.02	0.04	0.02	176640	REAM & HAAGER
		09/30/87	1	1015	7.36	58.40	32.15	5.75	0.09	0.01	0.84	0.55	176641	REAM & HAAGER
		09/30/87	1	1520	8.46	58.74	27.89	5.95	0.10	0.09	1.24	0.86	176642	REAM & HAAGER
		01/13/89	1	22'	7.42	59.60	26.16	5.28	0.08	0.10	1.05	0.62	187779	REAM & HAAGER
		11/02/89	1N	17 2	7.13	61.44	23.45	7.45	0.09	0.02	0.33	0.19	193715	REAM & HAAGER
		11/02/89	1S	15'1	7.28	55.56	26.44	8.64	0.06	0.07	0.97	0.71	193716	REAM & HAAGER
		04/04/90	N1	15	7.04	56.60	28.95	7.37	0.09	0.01	0.27	0.07	197274	REAM & HAAGER
		04/04/90	1	14'	8.22	61.24	22.31	5.56	0.09	0.16	1.62	0.80	197279	REAM & HAAGER
		11/14/90	1	19'	9.57	60.60	25.01	2.08	0.05	0.17	1.60	1.21	201341	REAM & HAAGER
		05/28/91	1	13'	8.20	60.10	27.39	2.10	0.04	0.10	1.30	0.57	205734	REAM & HAAGER
		05/27/92	1	0-19	7.27	61.80	28.50	1.67	0.03	0.01	0.48	0.19	212794	REAM & HAAGER
		10/28/92	1	15'	7.82	65.60	20.33	4.42	0.04	0.11	1.19	0.69	217073	REAM & HAAGER
101144 1011 BELDEN Pit 4	#4 SHALE	11/02/89	1	16 4	7.11	68.16	18.77	5.77	0.09	0.03	1.02	0.70	193714	REAM & HAAGER
101145 1011 BELDEN	#5 CLAY	11/02/89	1	11'9	7.65	68.40	20.29	3.25	0.03	0.12	0.32	0.14	193713	REAM & HAAGER
Pit 3		04/04/90	1	12'	11.05	54.84	30.05	2.72	0.02	0.80	0.42	0.20	197272	REAM & HAAGER
		11/14/90	1	20'	13.47	58.00	25.39	1.06	0.02	0.59	0.98	0.69	201343	REAM & HAAGER
		05/28/91	1	15	11.52	57.40	28.98	1.18	0.02	0.38	0.50	0.22	205735	REAM & HAAGER
		10/22/91	1	12'	12.30	56.40	28.06	0.97	0.02	0.88	0.31	0.13	208285	REAM & HAAGER
101151 1011 SHANVILL	#4 CLAY	11/02/89	1	5'2"	10.89	56.44	31.42	1.33	0.01	0.18	0.17	0.08	193710	REAM & HAAGEF
Pit 1		04/04/90	1	4'9"	11.72	59.12	27.97	1.08	0.02	0.13	0.05	0.01	197267	REAM & HAAGER
		05/27/92	1	COMP	10.71	59.60	29.20	0.39	0.01	0.09	0.04	0.01	212799	REAM & HAAGER
		10/28/92	1	7'	10.47	58.20	30.20	0.78	0.01	0.08	0.05	0.01	217076	REAM & HAAGER
101151 1011 SHANVILL	#4 SHALE	09/30/87	1	0-5	7.42	62.60	24.00	5.28	0.05	0.01	0.41	0.09	176643	REAM & HAAGER
Pit 1		09/30/87	1	5-10	6.61	64.36	23.89	4.55	0.04	0.01	0.10	0.05	176644	REAM & HAAGER
		09/30/87	1	1015	5.94	63.06	26.14	4.30	0.03	0.01	0.27	0.05	176645	REAM & HAAGER
		09/30/87	1	1520	6.95	64.24	23.08	5.16	0.06	0.04	0.50	0.34	176646	REAM & HAAGER
		01/19/89	1	22'	5.62	61.62	26.15	5.52	0.09	0.02	0.80	0.44	187882	REAM & HAAGER
		01/19/89	2	22'	6.38	62.20	24.12	5.48	0.08	0.04	0.53	0.48	187883	REAM & HAAGER
		01/19/89	3	22	6.35	57.04	30.33	5.79	0.05	0.06	0.91	0.71	187884	REAM & HAAGER
		11/02/89	1N	21'	5.41	64.64	25.35	5.10	0.04	0.01	0.08	0.04	193708	REAM & HAAGER
		11/02/89	2S	14'9	7.27	62.92	23.40	6.41	0.08	0.01	0.27	0.10	193711	REAM & HAAGER
		04/04/90	1	21'	6.50	67.36	21.08	4.88	0.07	0.02	0.20	0.09	197276	REAM & HAAGER
		11/14/90	1	16'	7.95	65.30	24.95	1.83	0.03	0.01	0.13	0.04	201356	REAM & HAAGER
		05/28/91	1	15'	6.99	62.00	28.79	2.03	0.06	0.03	0.29	0.14	205722	REAM & HAAGER
		10/22/91	1	15	6.85	68.70	21.18	2.19	0.05	0.03	0.49	0.16	208291	REAM & HAAGER
101152 1011 SHANVILL	#4 CLAY	01/19/89	1	7'3"	9.15	53.84	36.36	1.37	0.01	0.16	0.77	0.11	187990	REAM & HAAGER
		11/02/89	1	7'2"	9.28	59.64	29.26	1.47	0.02	0.15	0.06	0.01	193709	REAM & HAAGER
Pit 2		04/04/90	1	4'11	10.47	62.80	25.34	1.62	0.01	0.14	0.17	0.05	197268	REAM & HAAGER
		11/14/90	1	6	11.11	63.50	24.97	0.51	0.01	0.09	0.01	0.01	201357	REAM & HAAGER
		05/28/91	1	6'	12.00	52.60	34.02	0.51	0.02	0.35	0.05	0.01	205724	REAM & HAAGER
		10/22/91	1	6	11.94	58.80	27.53	0.55	0.01	0.17	0.23	0.09	208293	REAM & HAAGER
		05/27/92	1	0-5	12.05	71.60	15.40	0.58	0.01	0.10	0.16	0.05	212801	REAM & HAAGER
		10/28/92	1	7'	9.59	64.20	25.10	0.81	0.02	0.18	0.03	0.01	217077	REAM & HAAGER

101152	1011	Shanvill	#4 SHALE	04/04/90	1	17	5.67	53.72	36.03	3.76	0.09	0.01	0.01	0.01	197275	REAM & HAAGER
	Plt 2			11/14/90	1	34	5.65	66.60	25.75	1.37	0.03	0.05	0.45	0.21	201358	REAM & HAAGER
				05/28/91	1	22'	6.14	70.01	21.98	1.89	0.05	0.01	0.05	0.01	205723	REAM & HAAGER
				10/22/91	1	21'	6.29	69.00	21.42	2.22	0.05	0.02	0.20	0.07	208292	REAM & HAAGER
				05/27/92	1	0-33	6.44	73.50	17.88	1.57	0.03	0.02	0.40	0.21	212800	REAM & HAAGER
				10/28/92	1	20	7.73	63.20	21.81	4.47	0.04	0.16	1.72	0.62	217078	REAM & HAAGER
101161	1011	BEAGLE	#4 CLAY	11/02/89	1	35'9	6.74	65.92	25.28	1.54	0.01	0.33	0.08	0.03	193707	REAM & HAAGER
				01/16/90	1	46 9	8.07	62.36	27.64	1.64	0.01	0.30	0.28	0.10	195520	REAM & HAAGER
				01/16/90	2	46'9	7.07	61.24	30.50	1.74	0.02	0.32	0.28	0.11	195521	REAM & HAAGER
				01/16/90	3	46'9	6.98	59.32	31.73	1.67	0.02	0.33	0.03	0.01	195522	REAM & HAAGER
				04/04/90	#1	35'	5.99	53.20	38.87	1.18	0.01	0.22	0.16	0.07	197278	Ream & Haager
				11/14/90	1	43'	6.80	65.70	26.90	0.43	0.01	0.27	0.07	0.01	201354	REAM & HAAGER

from . . .

ROY NEULICHT

Process Sample

Sieve + Moisture

Analysis

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 1
MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-9-93 @ 0929 (4012)

Total Sample Weight: 4251.6
(Excl. Container)
Number of Splits: 3

Oven Temperature 105°C
Date In 12-6-93 Date Out 12-7-93
Time In 1330 Time Out 1000
Drying Time 20hr 30min
Split Sample Balance:
Make Sartorius
Capacity 4100g
Smallest Division 0.1g.

Split Sample Weight (before drying)
Pan + Sample: 649.7
Pan: 163.4
Wet Sample: 486.3

Material Weight (after drying)
Pan + Material: 628.1
Pan: 163.4
Dry Sample: 464.7

MOISTURE CONTENT:
(A) Wet Sample Wt. 486.3
(B) Dry Sample Wt. 464.7
(C) Difference Wt. 21.6

$\frac{C \times 100}{A}$ = 4.44 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	460.7
20 min:	525.5
30 min:	530.4
40 min:	535.1

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				
10 mesh	467.4	469.6	2.2	0.47
20 mesh	416.3	553.6	137.3	29.5
40 mesh	393.5	502.3	108.8	23.4
100 mesh	352.6	458.2	105.6	22.7
140 mesh	347.6	369.4	21.8	4.69
200 mesh	498.5	513.4	14.9	3.20
Pan	460.7	535.1	74.4	16.0

Net Weight <20 mesh: 465.0
Net Weight <200 mesh:

% Silt: = $\frac{\text{Net Weight <200 Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 16.0 %

*Indicate Units with all Weights

4/78

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 1

MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-9-93 :1059 (4012)

Total Sample Weight: 3522.0g.
(Excl. Container)

Number of Splits: 3

Oven Temperature 105°C

Date In 12-6-93 Date Out 12-7-93

Time In 1345 Time Out 1000

Drying Time 20hr 15min

Split Sample Balance:

Make Sartorius

Capacity 4100g

Smallest Division 0.1g.

Split Sample Weight (before drying)

Pan + Sample: 741.7

Pan: 162.7

Wet Sample: 579.0

Material Weight (after drying)

Pan + Material: 716.5

Pan: 162.7

Dry Sample: 553.8

MOISTURE CONTENT:

(A) Wet Sample Wt. 579.0

(B) Dry Sample Wt. 553.8

(C) Difference Wt. 25.2

$\frac{C \times 100}{A}$ = 4.35 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	382.5
20 min:	424.6
30 min:	450.5
40 min:	459.4

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				
10 mesh	466.3	468.5	2.2	0.40
20 mesh	436.5	626.1	189.6	34.2
40 mesh	399.5	527.9	128.4	23.2
100 mesh	344.2	455.0	110.8	20.0
140 mesh	353.2	378.9	25.7	4.64
200 mesh	354.7	374.7	20.0	3.61
Pan	382.5	459.4	76.9	13.9

Net Weight <20 mesh: 553.6

Net Weight <200 mesh:

% Silt = $\frac{\text{Net Weight} < 200 \text{ Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 13.9 %

*Indicate Units with all Weights

4/78

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 1
MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-9-93 @ 1214 (4012)

Total Sample Weight: 3178.3 g.
(Excl. Container)
Number of Splits: 3

Oven Temperature 105 °C
Date In 12-6-93 Date Out 12-7-93
Time In 1350 Time Out 1000
Drying Time 20 hr 10 min
Split Sample Balance:
Make Sartorius
Capacity 4100 g
Smallest Division 0.1 g

Split Sample Weight (before drying)
Pan + Sample: 583.4
Pan: 161.0
Wet Sample: 422.4

Material Weight (after drying)
Pan + Material: 565.5
Pan: 161.0
Dry Sample: 404.5

MOISTURE CONTENT:
(A) Wet Sample Wt. 422.4
(B) Dry Sample Wt. 404.5
(C) Difference Wt. 17.9

$\frac{C \times 100}{A}$ = 4.24 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	460.7
20 min:	523.3
30 min:	527.4
40 min:	529.6

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				
10 mesh	467.5	469.1	1.6	0.39
20 mesh	416.3	536.9	120.6	29.8
40 mesh	393.9	487.2	93.3	23.0
100 mesh	352.9	442.8	89.9	22.2
140 mesh	347.8	364.9	17.1	4.22
200 mesh	498.6	512.3	13.7	3.38
Pan	460.7	529.6	68.9	17.0

Net Weight <20 mesh: 405.1
Net Weight <200 mesh:

% Silt: = $\frac{\text{Net Weight <200 Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 17.0 %

*Indicate Units with all Weights

4/78

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 2
MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-4-93 @ 0845 (4013)

Total Sample Weight: 4409.1 g.
(Excl. Container)
Number of Splits: 3

Oven Temperature 105 °C
Date In 12-6-93 Date Out 12-7-93
Time In 1415 Time Out 1000
Drying Time 19 hr 45 min
Split Sample Balance:
Make Sartorius
Capacity 4100 g
Smallest Division 0.1 g

Split Sample Weight (before drying)
Pan + Sample: 750.4
Pan: 160.5
Wet Sample: 589.9

Material Weight (after drying)
Pan + Material: 729.2
Pan: 160.5
Dry Sample: 568.7

MOISTURE CONTENT:
(A) Wet Sample Wt. 589.9
(B) Dry Sample Wt. 568.7
(C) Difference Wt. 21.2

$\frac{C \times 100}{A}$ = 3.59 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	382.5
20 min:	472.0
30 min:	483.7
40 min:	487.2

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				
10 mesh	465.0	467.4	2.4	0.42
20 mesh	436.0	615.8	179.8	31.6
40 mesh	400.0	520.5	120.5	21.2
100 mesh	344.4	454.0	109.6	19.3
140 mesh	353.3	381.7	28.4	5.00
200 mesh	354.8	377.7	22.9	4.03
Pan	382.5	487.2	104.7	18.4

Net Weight <20 mesh: 568.3
Net Weight <200 mesh:

% Silt = $\frac{\text{Net Weight < 200 Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 18.4 %

*Indicate Units with all Weights

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 2
MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-11-93 @ 1015 (4013)

Total Sample Weight: 4839.7
(Excl. Container)
Number of Splits: 3

Split Sample Weight (before drying)
Pan + Sample: 683.5
Pan: 165.6
Wet Sample: 517.9

Oven Temperature 105°c
Date In 12-6-93 Date Out 12-7-93
Time In 1440 Time Out 1000
Drying Time 19 hr 20 min
Split Sample Balance:
Make Sartorius
Capacity 4100
Smallest Division 0.1g.

Material Weight (after drying)
Pan + Material: 665.5
Pan: 165.6
Dry Sample: 499.9

MOISTURE CONTENT:
(A) Wet Sample Wt. 517.9
(B) Dry Sample Wt. 499.9
(C) Difference Wt. 18.0

$\frac{C \times 100}{A}$ = 3.48 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	460.7
20 min:	540.8
30 min:	543.0
40 min:	544.6

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				
10 mesh	467.9	470.0	2.1	0.42
20 mesh	416.2	600.8	184.6	36.9
40 mesh	394.3	503.0	108.7	21.7
100 mesh	352.9	441.8	88.9	17.8
140 mesh	347.7	364.7	17.0	3.40
200 mesh	498.5	513.8	15.3	3.06
Pan	460.7	544.6	83.9	16.8

Net Weight <20 mesh: 500.5
Net Weight <200 mesh:

% Silt = $\frac{\text{Net Weight} < 200 \text{ Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 16.8 %

*Indicate Units with all Weights

4/78

MIDWEST RESEARCH INSTITUTE

Silt and Moisture Analysis*

Run No. 2
MRI Project No. 4601-01

Recorded by DG

Material: Fire Clay

Sample No: 11-11-93 @ 1130 (4013)

Total Sample Weight: 4035.2 g
(Excl. Container)
Number of Splits: 3

Oven Temperature 105°C
Date In 12-6-93 Date Out 12-7-93
Time In 1425 Time Out 1000
Drying Time 19 hr 35 min
Split Sample Balance:
Make Sartorius
Capacity 4100 g
Smallest Division 0.1 g

Split Sample Weight (before drying)
Pan + Sample: 625.2
Pan: 159.2
Wet Sample: 466.0 g

Material Weight (after drying)
Pan + Material: 609.0
Pan: 159.2
Dry Sample: 449.8 g

MOISTURE CONTENT:
(A) Wet Sample Wt. 466.0 g
(B) Dry Sample Wt. 449.8 g
(C) Difference Wt. 16.2 g

$\frac{C \times 100}{A}$ = 3.48 % Moisture

Sieving

Time: Start:	Weight (Pan Only)
Initial (Tare):	382.4
20 min:	462.7
30 min:	465.0
40 min:	468.3

SIZE DISTRIBUTION

Screen	Tare Weight (Screen)	Final Weight (Screen + Sample)	Net Weight (Sample)	%
3/8 in.				
4 mesh				DG 12-7-93
10 mesh	465.5	467.1	1.6	~~3.56~~ 0.36
20 mesh	435.8	575.5	139.7	31.0
40 mesh	408.2	497.2	89.0	21.6
100 mesh	344.4	431.5	87.1	19.4
140 mesh	353.3	375.0	21.7	4.82
200 mesh	354.8	371.8	17.0	3.78
Pan	382.4	468.3	85.9	19.1

Net Weight <20 mesh: 450.0
Net Weight <200 mesh:

% Silt = $\frac{\text{Net Weight <200 Mesh}}{\text{Total Net Weight}}$ X 100 = ______ X 100 = 19.1 %

*Indicate Units with all Weights

Appendix D

~~QA/QC Audit Reports~~

~~To Be Completed~~

~~QA/QC~~

Quality Assurance Records

Ambient Filter Equilibration/Calibration data

HIVOL DATA

4601-01-05-01

Filter Equilibration Data

Equilibration Period End Date	End Time	Begin Date	Begin Time	Temperature (°C) Max.	Min.	Avg.	Meets Q.A. ?	Relative Humidity (%) Max.	Min.	Avg.	Meets Q.A. ?	By
10-29-93	0930	10-28-93	0930	23.2	23.1	23.1	Yes	47.0	46.1	46.6	Yes	DG
11/1/93	0930	10/31/93	0930	23.5	23.3	23.4	yes	46.9	45.1	46.0	yes	[illegible]
12-2-93	1300	12-1-93	1300	23.5	23.3	23.4	Yes	46.0	45.0	45.5	Yes	DH
12/3/93	1330	12/2/93	1330	23.5	23.3	23.4	yes	46.0	45.2	45.6	yes	[illegible]

Comments:

4601-01-05-01

Balance Check Data

Date	Time	Balance Data: Balance Type	Balance Data: MRI I.D. No.	Calibration Data: Class S Weight (mg)	Calibration Data: Balance Reading (mg)	Calibration Data: Difference (mg)	Calibration Data: Meets Q.A. ?	By
10-29-93	0930	Mettler	7216	1,000.00	1,000.00	.00	Yes	DG
				3,000.00	2,999.85	.15		
				5,000.00	4999.85	.15		
11/1/93	0930	Mettler	7216	1,000.00	1,000.00	0.00	Yes	[illegible]
				3,000.00	2999.85	0.15		
				5,000.00	4999.90	0.10		
12-2-93	1300	Mettler	7216	1,000.00	1,000.00	0.00	Yes	DG
				3,000.00	2,999.80	0.20		
				5,000.00	4999.85	0.15		
12/3/93	1330	Mettler	7216	1,000.00	1000.00	0.00	Yes	[illegible]
				3,000.00	EE 12/3/93 ~~2~~ 2999.85	0.15	Yes	[illegible]
				5,000.00	4999.90	0.10	Yes	[illegible]

Comments:

Sample Train Calibration Data

DRY GAS METER SAMPLE CALIBRATION DATA

DATE:		11/17/93
CALIBRATED BY:		HARMON
METER BOX NUMBER:		VOST-1
BAROMETER PRESSURE:	RUN1	29.47
	RUN2	29.47
	RUN3	29.47
WET TEST METER NUMBER:	X-2538	
WET TEST METER PRESSURE DROP:	RUN1	1.8
	RUN2	1.8
	RUN3	1.8
ROTAMETER SETTING:	RUN1	75
	RUN2	75
	RUN3	75
WET TEST METER GAS VOLUME:	RUN1	15
	RUN2	15
	RUN3	15
DRY TEST METER GAS VOLUME:	RUN1	
	INITIAL:	0
	FINAL:	15.01
	VOLUME=	15.01
	RUN2	
	INITIAL:	15.01
	FINAL:	29.97
	VOLUME=	14.96
	RUN3	
	INITIAL:	29.97
	FINAL:	45.11
	VOLUME=	15.14
WET TEST METER GAS TEMP:	RUN1	76
	RUN2	76
	RUN3	76

----------------DRY TEST METER----------------

INLET GAS TEMP:	RUN1	76.9			
	RUN2	77.3			
	RUN3	78			
TIME OF RUN:	RUN1	902.7	LITERS PER MINUTE=	RUN1	.9976736
	RUN2	914.5		RUN2	.98152
	RUN3	911.5		RUN3	.996599
AVERAGE RATIO:	RUN1	1.005507			
	RUN2	1.00962		Y=	1.004681
	RUN3	.998916			

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A4
Date:	11/15/93	Orifice K:	.46644
Operator:	NEAL	Previous Y:	1.027
Console #	N12		

	Run 1	Run 2	Run 3
Initial DGM Volume	507.400	513.445	519.515
Final DGM Volume	513.445	519.515	525.595
Net DGM Volume (Vm)	6.045	6.070	6.080
DGM Temperature, Deg.F:			
Initial Inlet	80	80	81
Final Inlet	80	81	82
Initial Outlet	73	74	75
Final Outlet	74	75	76
Average DGM Temperature (tm)	76.8	77.5	78.5
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	1.200	1.200	1.200
Barometric Pressure., in.Hg	29.47	29.47	29.47
Critical Orifice Inlet Temp., Deg.F:			
Initial	67	68	68
Final	68	68	68
Average Critical Orifice Inlet Temp.	67.5	68.0	68.0
Pump Vacuum, in.Hg	19	19	19
Critical Orifice Volume (Vcr (std))	5.987	5.984	5.984
DGM Volume (Vm (std))	5.874	5.890	5.889
DGM Calibration Factor (Y)	1.019	1.016	1.016
Orifice Delta H@	1.836	1.835	1.831
Average DGM Calibration Factor (Y)	1.017		
Average Orifice Delta H@	1.834		
+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.21	.11	.09
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	.97		
Tolerance (Average) Result	PASS		

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A5
Date:	11/15/93	Orifice K:	.42239
Operator:	HARMON	Previous Y:	1.016
Console #	N13		

	Run 1	Run 2	Run 3
Initial DGM Volume	569.300	574.863	580.438
Final DGM Volume	574.863	580.438	586.025
Net DGM Volume (Vm)	5.563	5.575	5.587
DGM Temperature, Deg.F:			
Initial Inlet	82	81	81
Final Inlet	81	82	82
Initial Outlet	75	77	78
Final Outlet	77	77	78
Average DGM Temperature (tm)	78.8	79.3	79.8
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	.925	.925	.930
Barometric Pressure., in.Hg	29.47	29.47	29.47
Critical Orifice Inlet Temp., Deg.F:			
Initial	67	68	68
Final	68	68	68
Average Critical Orifice Inlet Temp.	67.5	68.0	68.0
Pump Vacuum, in.Hg	19	19	19
Critical Orifice Volume (Vcr (std))	5.421	5.419	5.419
DGM Volume (Vm (std))	5.382	5.389	5.395
DGM Calibration Factor (Y)	1.007	1.006	1.004
Orifice Delta H@	1.717	1.717	1.724
Average DGM Calibration Factor (Y)	1.006		
Average Orifice Delta H@	1.719		
+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.15	.02	.14
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	1.01		
Tolerance (Average) Result	PASS		

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A5
Date:	11/16/93	Orifice K:	.42239
Operator:	HARMON	Previous Y:	1.003
Console #	N8		

	Run 1	Run 2	Run 3
Initial DGM Volume	54.900	60.506	66.128
Final DGM Volume	60.506	66.128	71.760
Net DGM Volume (Vm)	5.606	5.622	5.632
DGM Temperature, Deg.F:			
Initial Inlet	83	80	81
Final Inlet	81	81	81
Initial Outlet	77	77	78
Final Outlet	77	77	78
Average DGM Temperature (tm)	79.5	78.8	79.5
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	.980	.980	.980
Barometric Pressure., in.Hg	29.41	29.41	29.41
Critical Orifice Inlet Temp., Deg.F:			
Initial	69	70	70
Final	70	70	71
Average Critical Orifice Inlet Temp.	69.5	70.0	70.5
Pump Vacuum, in.Hg	19	19	19
Critical Orifice Volume (Vcr (std))	5.400	5.398	5.395
DGM Volume (Vm (std))	5.406	5.429	5.431
DGM Calibration Factor (Y)	.999	.994	.993
Orifice Delta H@	1.827	1.832	1.831
Average DGM Calibration Factor (Y)	.996		
Average Orifice Delta H@	1.830		
+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.34	.13	.21
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	.74		
Tolerance (Average) Result	PASS		

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A4
Date:	11/16/93	Orifice K:	.46644
Operator:	HARMON	Previous Y:	1.021
Console #	N7		

	Run 1	Run 2	Run 3
Initial DGM Volume	810.100	816.208	822.329
Final DGM Volume	816.208	822.329	828.456
Net DGM Volume (Vm)	6.108	6.121	6.127
DGM Temperature, Deg.F:			
Initial Inlet	83	82	82
Final Inlet	83	83	83
Initial Outlet	78	79	79
Final Outlet	79	79	80
Average DGM Temperature (tm)	80.8	80.8	81.0
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	1.200	1.200	1.200
Barometric Pressure., in.Hg	29.41	29.41	29.41
Critical Orifice Inlet Temp., Deg.F:			
Initial	69	70	70
Final	70	70	71
Average Critical Orifice Inlet Temp.	69.5	70.0	70.5
Pump Vacuum, in.Hg	19	19	19
Critical Orifice Volume (Vcr (std))	5.963	5.961	5.958
DGM Volume (Vm (std))	5.880	5.892	5.895
DGM Calibration Factor (Y)	1.014	1.012	1.011
Orifice Delta H@	1.833	1.834	1.835
Average DGM Calibration Factor (Y)	1.012		
Average Orifice Delta H@	1.834		
+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.21	.05	.15
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	.87		
Tolerance (Average) Result	PASS		

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A5
Date:	11/17/93	Orifice K:	.42239
Operator:	HARMON	Previous Y:	1.021
Console #	N6		

	Run 1	Run 2	Run 3
Initial DGM Volume	970.600	976.083	981.587
Final DGM Volume	976.083	981.587	987.103
Net DGM Volume (Vm)	5.483	5.504	5.516

DGM Temperature, Deg.F:			
Initial Inlet	78	78	79
Final Inlet	78	79	80
Initial Outlet	74	75	76
Final Outlet	75	75	76
Average DGM Temperature (tm)	76.3	76.8	77.8
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	1.000	1.000	1.000
Barometric Pressure., in.Hg	29.47	29.47	29.47
Critical Orifice Inlet Temp., Deg.F:			
Initial	69	70	70
Final	70	70	70
Average Critical Orifice Inlet Temp.	69.5	70.0	70.0
Pump Vacuum, in.Hg	19	19	19

Critical Orifice Volume (Vcr (std))	5.411	5.409	5.409
DGM Volume (Vm (std))	5.330	5.346	5.348
DGM Calibration Factor (Y)	1.015	1.012	1.011
Orifice Delta H@	1.872	1.872	1.869
Average DGM Calibration Factor (Y)	1.013		
Average Orifice Delta H@	1.871		

+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.23	.10	.13
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	.81		
Tolerance (Average) Result	PASS		

METHOD 5 CONSOLE CALIBRATION WITH CRITICAL ORIFICE

PROJECT #	4601010501	Orifice #	A4
Date:	11/17/93	Orifice K:	.46644
Operator:	HARMON	Previous Y:	1.010
Console #	N9		

	Run 1	Run 2	Run 3
Initial DGM Volume	129.200	135.255	141.300
Final DGM Volume	135.255	141.300	147.365
Net DGM Volume (Vm)	6.055	6.045	6.065
DGM Temperature, Deg.F:			
Initial Inlet	81	81	82
Final Inlet	82	82	83
Initial Outlet	77	77	78
Final Outlet	77	78	78
Average DGM Temperature (tm)	79.3	79.5	80.3
Time, seconds	600	600	600
Orifice Delta H, inches w.c.	1.250	1.250	1.250
Barometric Pressure., in.Hg	29.47	29.47	29.47
Critical Orifice Inlet Temp., Deg.F:			
Initial	69	70	70
Final	70	70	70
Average Critical Orifice Inlet Temp.	69.5	70.0	70.0
Pump Vacuum, in.Hg	19	19	19
Critical Orifice Volume (Vcr (std))	5.976	5.973	5.973
DGM Volume (Vm (std))	5.857	5.845	5.856
DGM Calibration Factor (Y)	1.020	1.022	1.020
Orifice Delta H@	1.911	1.912	1.909
Average DGM Calibration Factor (Y)	1.021		
Average Orifice Delta H@	1.911		
+/- 2% From Average Y Criteria:			
Percent Difference From Average Y	.05	.12	.07
Tolerance Result	PASS	PASS	PASS
+/- 5% From Previous Y Criteria:			
Percent Difference From Previous Y	1.05		
Tolerance (Average) Result	PASS		

ORIFICE BRACKETING WORKSHEET

Project	46010105	CONSOLE #	N9
Date	11/17/93	Orifice No. 1	A3
Operator	HARMON	Orifice NO.1 K factor	.5507
Orfice Number	A4	Orifice No. 2	A6
Orfice Y factor	1.021	Orifice NO.2 K factor	.3573

	Orfice #1	Orfice #2
Final DGM Volume	155.632	160.464
Inital DGM Volume	148.500	155.800
Net DGM Volume (Vm)	7.132	4.664
In/Out DGM Temp.		
Inlet		
initial	80.0	81.0
final	82.0	82.0
Outlet		
initial	78.0	78.0
final	79.0	79.0
Avg. DGM Temp	79.8	80.0
Time, sec.	600.0	600.0
Orifice DH, in. H2O	1.80	.69
Baro. Press., in. Hg	29.47	29.47
Room temp., Deg. F	70.0	70.0
Pump Vacuum, in. Hg	19	19
Vcr (std)	7.049	4.574
Vm (std)	6.900	4.498
Y Factor (bracket)	1.022	1.017
+/- 2% criteria		
Percent of Y	.07	.41
	PASS	PASS

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 4 ° (<10°), α_2 = 3 ° (<10°)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°)

γ = 2 °, θ = 0 °, A = 0.7100 (in.)

$z = A \sin \gamma$ = 0.0248 (in.); (<0.125 in.)

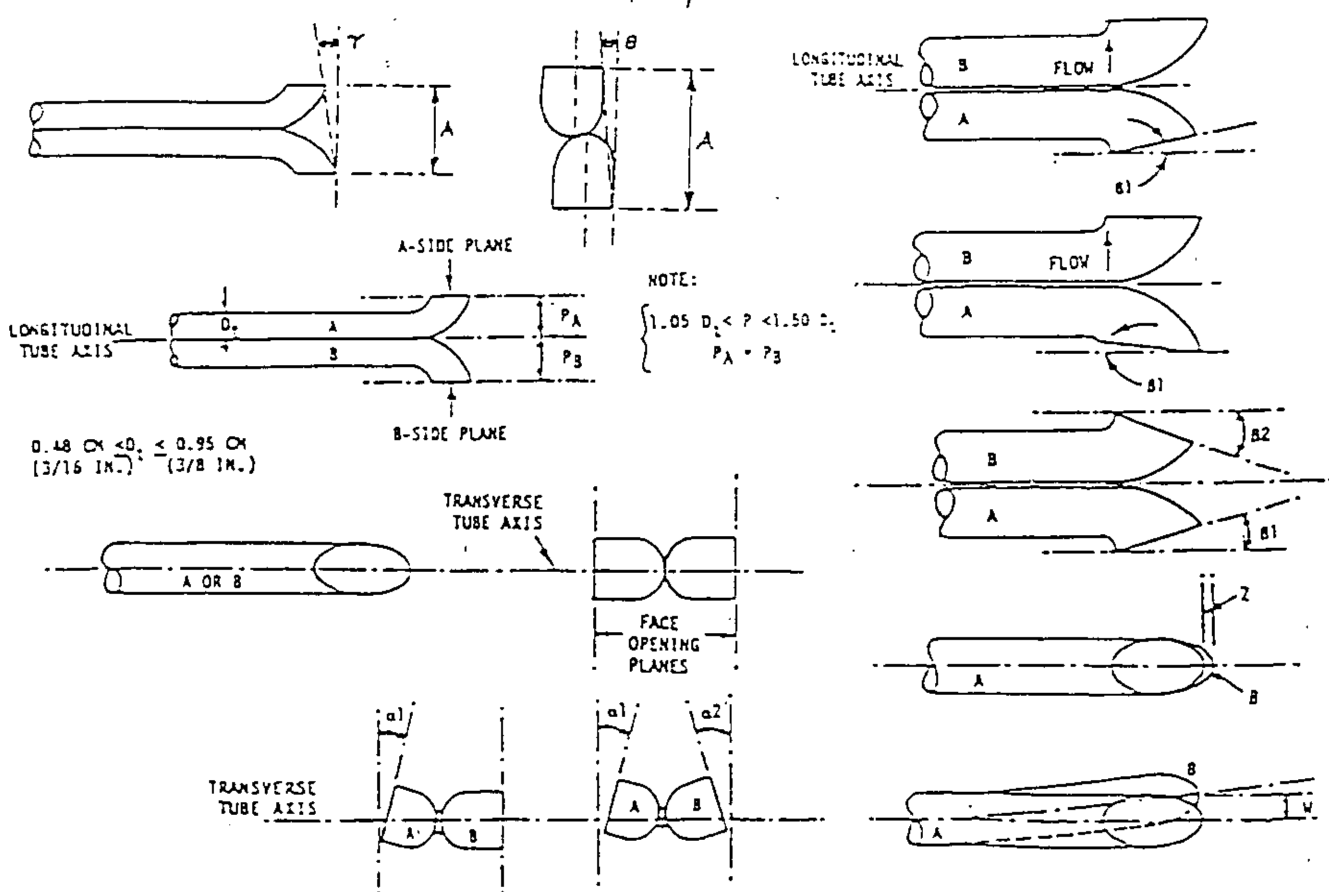
$w = A \sin \theta$ = 0 (in.); (<0.03125 in.)

P_A = 0.3550 (in.), P_B = 0.3550 (in.), D_t = 0.2505 (in.)

Comments: ______

Calibration required? ______ yes ✓ no

PITOT TUBE # M-2 DATE 11/16/93 NAME Edwards



TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 1 ° ($<10°$), α_2 = 2 ° ($<10°$)

β_1 = 0 ° ($<5°$), β_2 = 2 ° ($<5°$)

γ = 1 °, θ = 0 °, A = 0.6345 (in.)

$z = A \sin \gamma$ = 0.0111 (in.); (<0.125 in.)

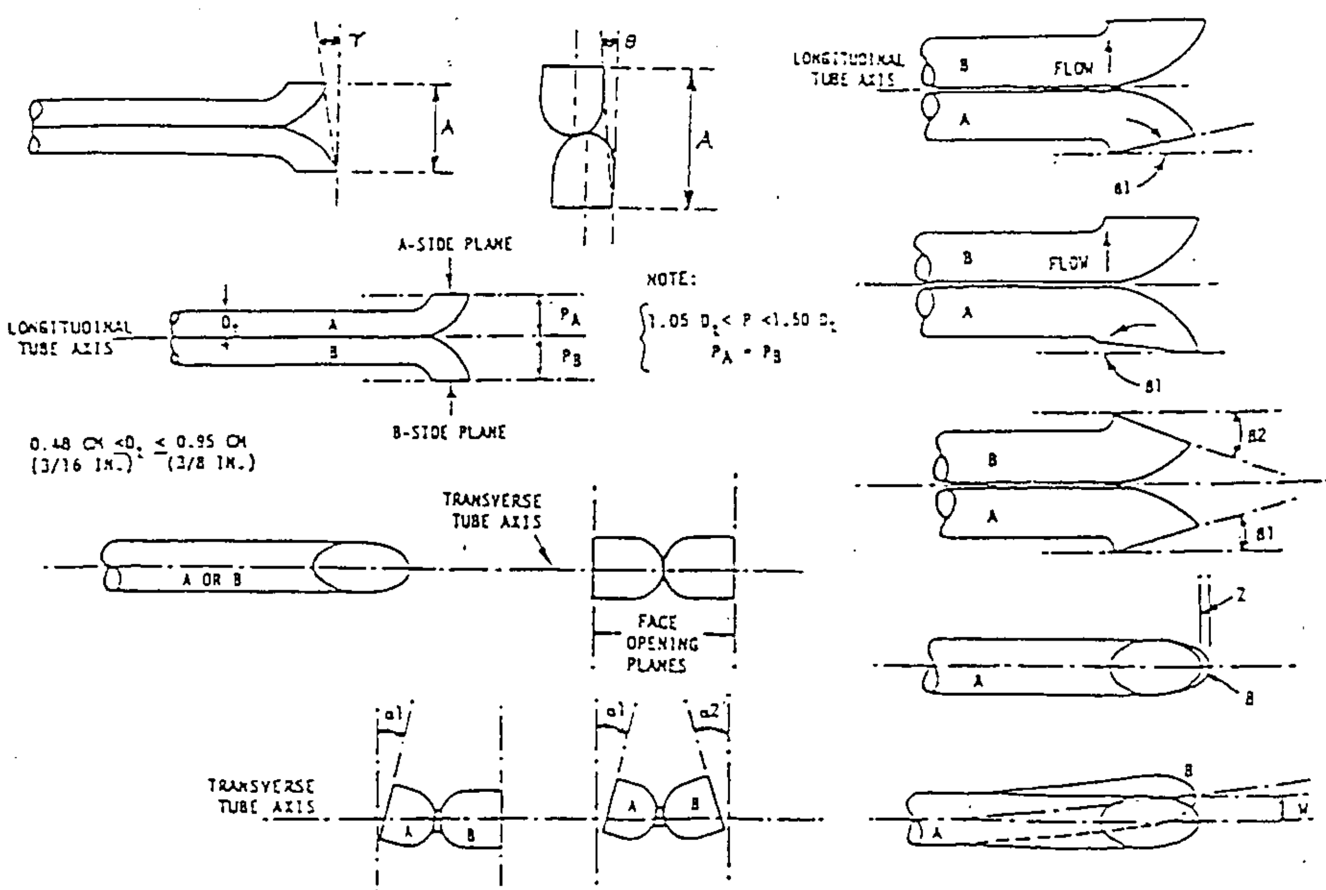
$w = A \sin \theta$ = 0 (in.); (<0.03125 in.)

P_A = 0.3170 (in.), P_B = 0.3175 (in.), D_t = 0.2655 (in.)

Comments: ______

Calibration required? ______ yes ✓ no

PITOT TUBE # M-1 DATE 11-16-93 NAME Edwards



TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 2 ° (<10°), α_2 = 3 ° (<10°)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°)

γ = 1 °, θ = 0 °, A = 0.7600 (in.)

z = A sin γ = 0.0133 (in.); (<0.125 in.)

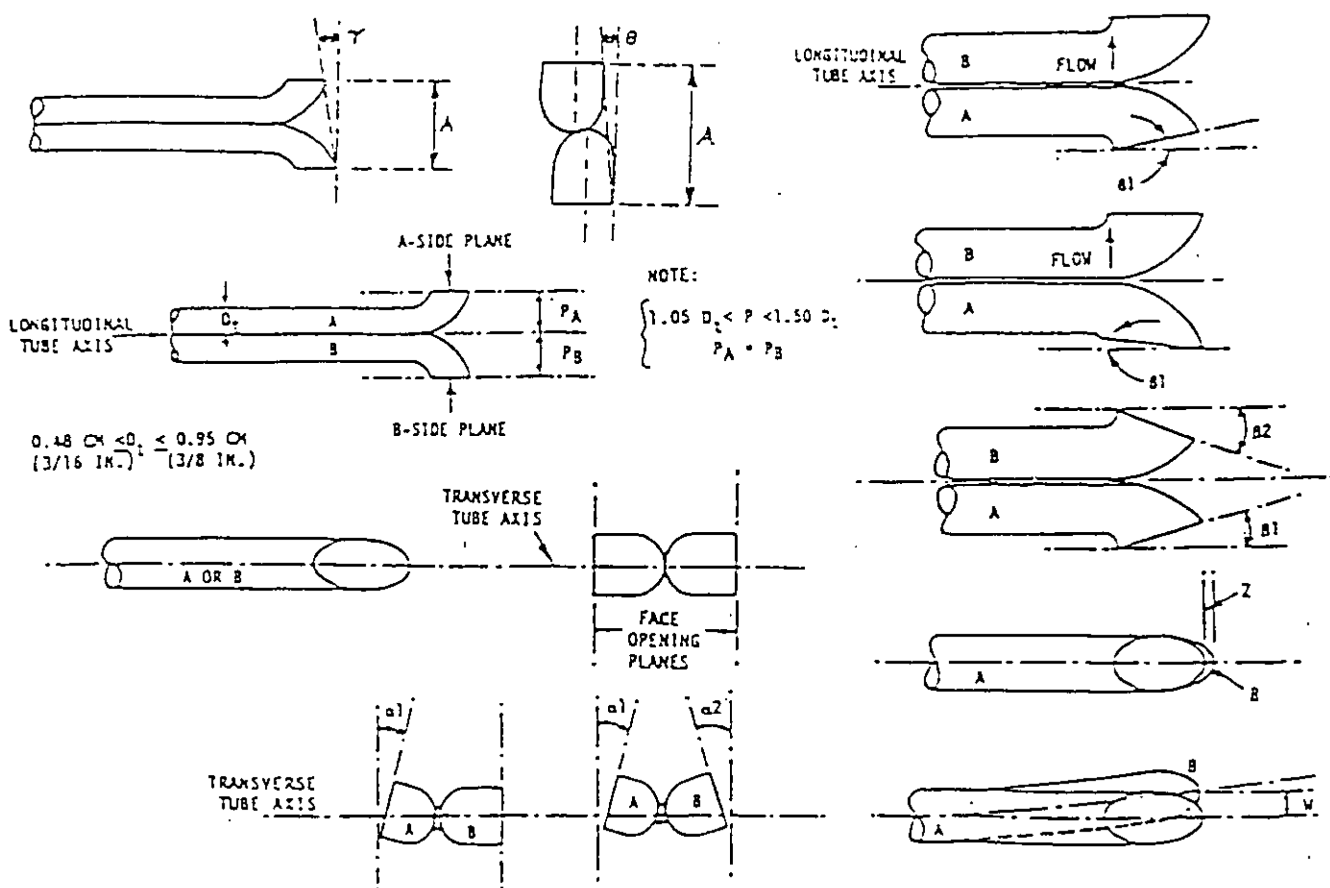
w = A sin θ = 0 (in.); (<0.03125 in.)

P_A = ________ (in.), P_B = ________ (in.), D_t = 0.2545 (in.)

Comments: ______________________________

Calibration required? ________ yes ✓ no

PITOT TUBE # 5-8 DATE 11/16/93 NAME Edwards



TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 4 ° (<10°), α_2 = 2 ° (<10°)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°)

γ = 2 °, θ = 0 °, A = 0.6350 (in.)

$z = A \sin \gamma$ = 0.0222 (in.); (<0.125 in.)

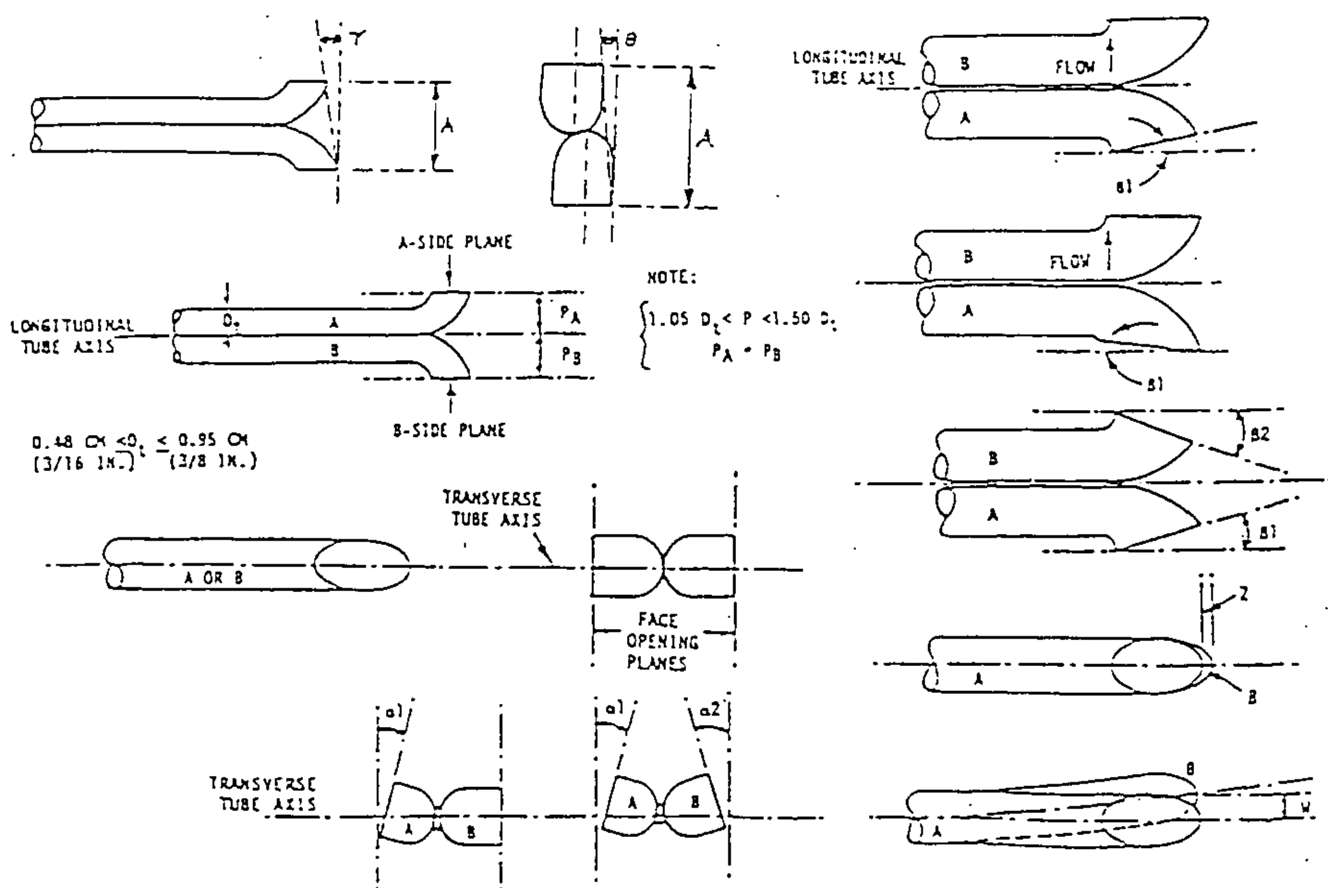
$w = A \sin \theta$ = 0.0 (in.); (<0.03125 in.)

P_A = 0.3170 (in.), P_B = 0.3180 (in.), D_t = 0.2550 (in.)

Comments: ______________________________

Calibration required? ______ yes ✓ no

PITOT TUBE # 5-12 DATE 11/16/93 NAME Edwards



TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 4 ° (<10°), α_2 = 2 ° (<10°)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°)

γ = 2 °, θ = 1 °, A = .6975 (in.)

z = A sin γ = 0.0243 (in.); (<0.125 in.)

w = A sin θ = 0.0122 (in.); (<0.03125 in.)

P_A = 0.3555 (in.), P_B = 0.3420 (in.), D_t = .2565 (in.)

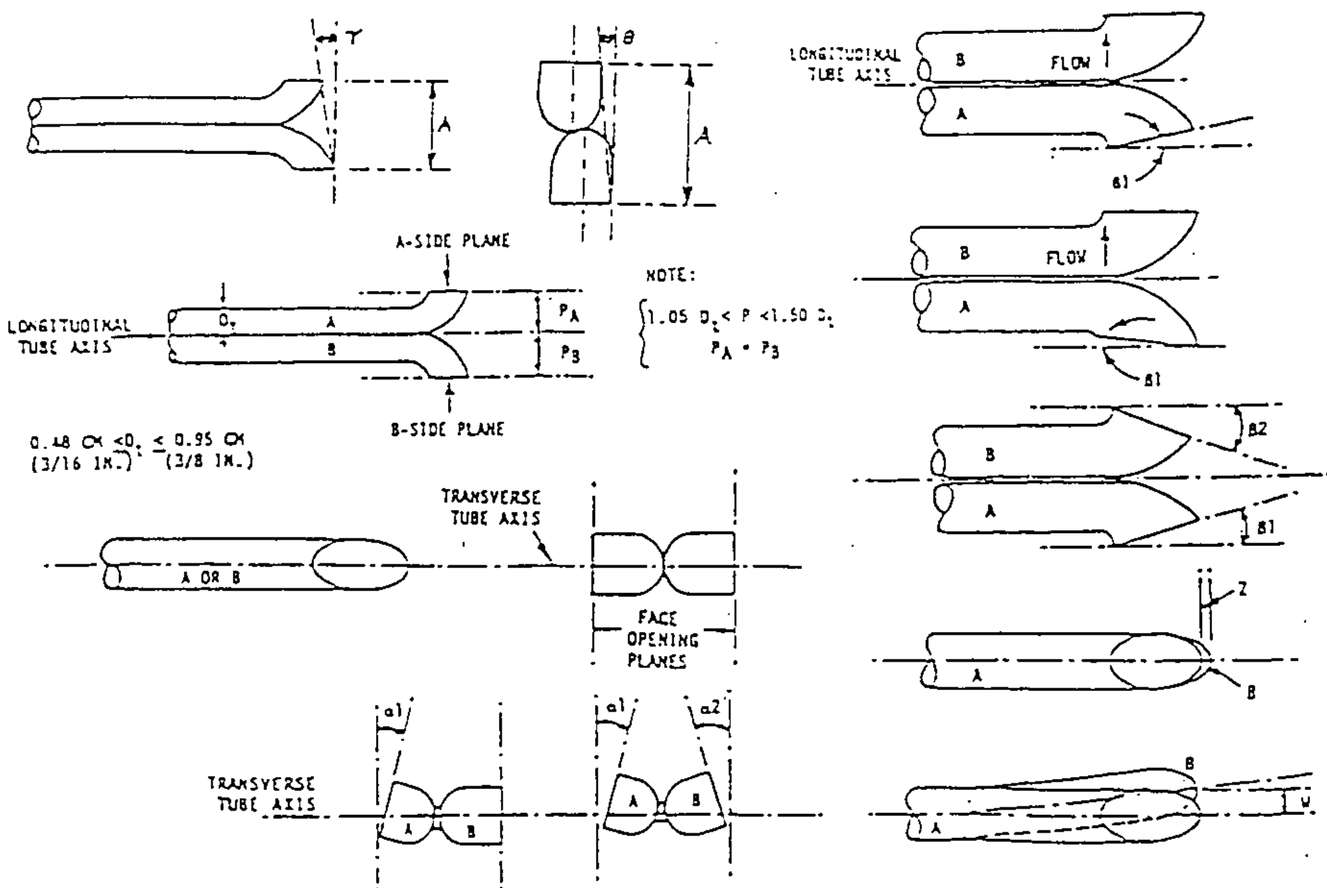
Comments: ______

______

______

Calibration required? ______ yes ✓ no

PITOT TUBE # P-15 DATE 11/16/93 NAME Edwards



TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 2 ° (<10°), α_2 = 0 ° (<10°)

β_1 = 2 ° (<5°), β_2 = 3 ° (<5°)

γ = 2 °, θ = 2 °, A = 0.7130 (in.)

z = A sin γ = 0.0288 (in.); (<0.125 in.)

w = A sin θ = 0.02488 (in.); (<0.03125 in.)

P_A = 0.3505 (in.), P_B = 0.3625 (in.), D_t = 0.2545 (in.)

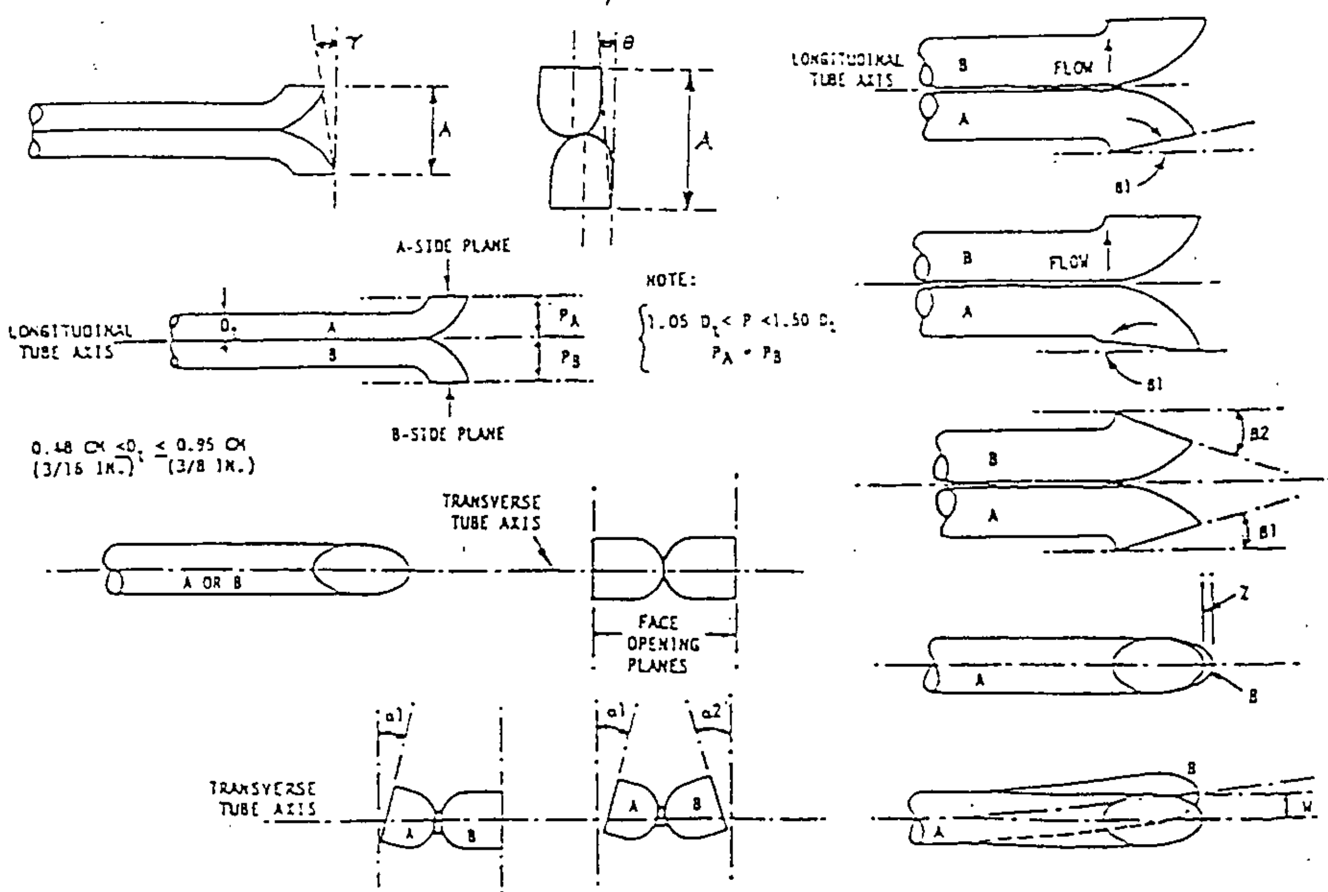
Comments: ______________________________

____

____

Calibration required? ______ yes ✓ no

PITOT TUBE # M-5 DATE 11/15/93 NAME Edwards



GOOSENECK THERMOCOUPLE CALIBRATION DATA FORM

Date 11/16/93 Job Number 4601-01-05-01

Ambient Temp. 70° F Barometer 29.41 in.Hg

Calibrator Edwards Reference Thermometer 4268K

Pyrometer No. Y-0815 Serial Number 14-990-5A

Calibration Method: Ambient Water Bath with ASTM Thermometer

Gooseneck T.C. No.	Leak Check & Check Valve Pass/No-Pass	Reference Thermometer Temperature F	Pyrometer Temperature F	Temperature Difference +/- 2 deg F
31	PASS	68°	67.8	0.2°
8	PASS	68	68.0	0.0
12	PASS	68°	67.4	0.6
9	PASS	68°	68.0	0.0
11	PASS	68°	68.0	0.0
35	PASS	68°	67.8	0.2
36	PASS	68°	67.8	0.2
39	PASS	68°	68.0	0.0
4	PASS	68°	68.0	0.0
2	PASS	68°	67.8	0.2
32	PASS	68°	66.8	1.2
30	PASS Leak Check Failed Check Valve	68°	67.2	0.8

Note: Gooseneck #30 repaired. Check valve failure has no adverse effect on testing train reliability.

STACK THERMOCOUPLE CALIBRATION DATA FORM

Job No. 4601-01-05-01

Date 11-16-93

Ambient Temp. 70° F

Calibrator Edwards

Avg. Stack Temp. 430° F

Stack Thermocouple No. 96-4

Barometer 29.41 in.Hg

Pyrometer No. Y0815

Reference Instrument: Heated Stainless Steel Core with Calibrated Pyrometers

Reference Instrument Temperature F	Pyrometer Temperature F	Temperature Difference F	Temperature Difference % *
126.8	126.2	0.6	0.4732%
201.0	199.6	1.4	0.6965%
311.6	313.8	2.2	0.7060%
398.6	403.2	4.6	1.1540%

$$* \left[\frac{(\text{ref.temp., F} + 460) - (\text{pyro.temp., F} + 460)}{(\text{ref.temp., F} + 460)} \right] * 100 \leq 1.5\%$$

STACK THERMOCOUPLE CALIBRATION DATA FORM

Job No. 4601-01-05-01

Date 11-16-93

Ambient Temp. 70° F

Calibrator Edwards

Avg. Stack Temp. 430° F

Stack Thermocouple No. 96-7

Barometer ~~Y-0815~~ 29.41 in.Hg

Pyrometer No. Y0815

Reference Instrument: Heated Stainless Steel Core with Calibrated Pyrometers

Reference Instrument Temperature F	Pyrometer Temperature F	Temperature Difference F	Temperature Difference % *
129.2°	129.6°	0.4°	0.3095%
~~129.2~~	~~130.0~~	~~0.8~~	
206.2	207.8	1.6	0.7759%
311.8	313.6	1.8	0.5773%
398.4	402.4	4.0	1.0040%

$$* \left[\frac{(\text{ref.temp., F} + 460) - (\text{pyro.temp., F} + 460)}{(\text{ref.temp., F} + 460)} \right] * 100 \leq 1.5\%$$

STACK THERMOCOUPLE CALIBRATION DATA FORM

Job No. 4601-01-05-01

Date 11-16-93

Ambient Temp. 70 F

Calibrator Edwards

Avg. Stack Temp. 430° F

Stack Thermocouple No. 96-6A

Barometer 29.41 in.Hg

Pyrometer No. Y0815

Reference Instrument: Heated Stainless Steel Core with Calibrated Pyrometers

Reference Instrument Temperature F	Pyrometer Temperature F	Temperature Difference F	Temperature Difference % *
129.2	130.0	0.8	0.6192%
200.0	200.8	0.8	0.4000%
306.4	308.8	2.4	0.7833 %
392.6	395.2	2.6	0.6623%

$$* \left[\frac{(\text{ref.temp., F} + 460) - (\text{pyro.temp., F} + 460)}{(\text{ref.temp., F} + 460)}\right] * 100 \leq 1.5\%$$

STACK THERMOCOUPLE CALIBRATION DATA FORM

Job No. 4601-01-05-01

Stack Thermocouple No. 96-2

Date 11/16/93

Barometer 29.41 in.Hg

Ambient Temp. 70 F

Pyrometer No. Y0815

Calibrator Edwards

Reference Instrument: Heated Stainless Steel Core with Calibrated Pyrometers

Avg. Stack Temp. 430° F

Reference Instrument Temperature F	Pyrometer Temperature F	Temperature Difference F	Temperature Difference % *
128.4	128.8	0.4°	0.3115%
206.2	207.4	1.2°	0.5820%
308.8	309.4	0.6	0.1943%
398.6	400.8	2.2°	0.5519%

$$* \left[\frac{(\text{ref.temp., F} + 460) - (\text{pyro.temp., F} + 460)}{(\text{ref.temp., F} + 460)}\right] * 100 \leq 1.5\%$$

QA / QC Audit Report

– To Be Completed –

Appendix E
Sample Calculations
to Be Completed