

CONOCO

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** **
** SAFETY **
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INTEROFFICE COMMUNICATION

To: John Mangelinkx

From: Tim Myers

Date: November 30, 1987

Subject: Benzene Samples Needed On Refinery Streams

As per the new **Benzene Standard**, "It is recommended that streams be sampled to determine those which may contain **>0.1% benzene** and that locations be placed under the standard accordingly." John, I need your help in identifying these streams.

Attached you will find a list of the refinery's stream that may contain benzene as identified by the Refinery Lab. Please have these streams test for benzene. Our goal is to have a **Written Compliance Program by December 10, 1987**. The results of your testing would be beneficial in the writing of this program and are needed by December 8, 1987. 18th?

John, I realize that this is a very short noticed and that we may not be able to get all the results before the writing of the Compliance Program. I ask that you do what you can.

Please get in touch with me if I have left off any streams that may contain benzene > 0.1% that we may need to test. I thank you for your help.

Tim Myers

Tim Myers
Safety Supervisor

cc: SJB DDF

SAL 000008896

RFP
#3

Unit: X COKER
Sample: X COKER GASOLINE
Per Cent Benzene:

Area: # 1 COKER
Unit: ANODE COKER
Sample: REG COKE GASOLINE
Per Cent Benzene:

Area: # 1 COKER
Unit: F COKER
Sample: F COKER GASOLINE
Per Cent Benzene:

Area: # 1 COKER
Unit: SP COKER
Sample: SP COKER GASOLINE
Per Cent Benzene:

Area: # 2 Coker
Unit: # 6 HDS
Sample: # 6 HDS Stripper OH Liquid
Per Cent Benzene:

Area: SOUR CRUDE
Unit: # 6 HDS UNIT
Sample: # 6 HDS ST OH LQ
Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER CHARGE
Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REF STB OH LIQ
Per Cent Benzene:

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: MOLEX GASOLINE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 85 FCC/CP
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 38 LSR
Per Cent Benzene:

SAL 000008897

Area: DOCKS
Unit: DOCKS
Sample: GASOLINE STARTING
Per Cent Benzene:

Area: DOCKS
Unit: DOCKS
Sample: GASOLINE FINISHED
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE B GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE C GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE D GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE E GRADE
Per Cent Benzene:

Area: # 3 DTU
Unit: # 4 HDS
Sample: # 4 HDS Stripper OH Liquid
Per Cent Benzene:

Dupont Aromatic Slop

Vista Aromatic Slop

SAL 000008898

CONOCO INC.

PONCA CITY, OKLAHOMA

REFINING TECHNICAL SERVICES LABORATORY

Plt.: 10

File: 662.1

Date: 10/6/64

LABORATORY NO.: J-21-83

CHARGE: 10 49

SUBJECT: Quality of Products - Typical Base Gasolines and Gasoline Streams
Summer 1983 - Lake Charles RefineryTABLE I
BASE GASOLINESComposition, Normal Range

<u>Stock</u>	<u>Regular</u>	<u>Unleaded</u>	<u>Super Unleaded</u>
<u>Composition, Vol. %</u>			
Denuded C.H.	5-10	0-5	0-5
1st. St. Run	5-10	0-5	0-5
Coker Gasoline	0-5	0-5	0-5
FCC Gasoline	40-55	30-40	15-25
No. 2 Reformate	15-25	35-45	10-15
No. 3 Reformate	0-5	5-10	25-35
Cat Poly	0-5	0-5	0-5
Alkylate	0-5	0-5	25-35
Butane	0-5	5-10	5-10

Typical Inspections

Gravity, °API	58.5	56.0	58.5
Distillation, ° F, 760 mm			
1PB	95	91	91
10% Evaporated	118	114	116
50% Evaporated	211	220	222
90% Evaporated	354	339	328
End Point	434	434	427
Recovery, Vol. %	97	97	96
Roid Vapor Pressure, psi	11.0	11.0	11.2
Temperature for V/L of 20, °C.	129	129	129
Existent ASTM Gum, mg./100 mls.	2	1	1
Aromatics, Vol. %	31	38	30
Olefins, Vol. %	24	12	7
Total Sulfur, Wt. %	0.07	0.04	0.02
Benzene, Vol. %	1.5	2.2	2.4
<u>Research Octanes</u>			
Clear	90.8	92.5	96.0
0.25 gm./gal. TEL	92.7		
0.5 gm./gal. TEL	93.5		
1.0 gm./gal. TEL	95.9		
<u>Motor Octanes</u>			
Clear	80.1	82.1	86.0
0.25 gm./gal. TEL	81.4		
0.5 gm./gal. TEL	81.7		
1.0 gm./gal. TEL	84.4		

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TABLE 11
TYPICAL BASE GASOLINE STREAMS
LAKE CHARLES REFINERY - SUMMER 1983

Formula City Sample No.:	1610	1603	1604	1608
Lake Charles Sample No.:	720	719	720	724
Stock:	FOC Gasoline	No. 2 L.L. St. Run Gasoline	No. 3 L.L. St. Run Gasoline	Denuded Casinghead
Gravity, °API	53.6	64.0	69.8	78.6
<u>Distillation, D 86, °F, 760 mm</u>				
1BP	100	122	119	96
5% Evaporated	117	156	134	105
10% Evaporated	129	165	141	109
20% Evaporated	149	176	149	114
30% Evaporated	171	185	156	118
40% Evaporated	231	205	167	131
50% Evaporated	300	222	178	153
60% Evaporated	383	245	197	221
75% Evaporated	407	255	205	249
End Point	444	276	221	304
Recovery, Vol. %	98	98	98	97
Raid Vapor pressure, psi	7.7	5.0	7.7	11.1
Sulfur, Wt. %	0.11	<0.01	<0.01	<0.01
Aromatics, Vol. %	33	8	6	3
Paraffins, Vol. %	34	41	41	1
Existent ASTM Gum, mg./100 mls.	2	1	1	1
Benzene, Vol. %	0.7	1.7	3.5	1.5
<u>Research Octanes</u>				
Clear	93.2	83.6	70.3	74.0
0.25 gms./gal. TEL	94.3	86.8	73.4	77.1
0.5 gms./gal. TEL	95.9	89.2	76.5	80.0
1.5 gms./gal. TEL	97.7	96.0	84.0	87.3
<u>Motor Octanes</u>				
Clear	80.3	63.1	68.4	72.0
0.25 gms./gal. TEL	81.5	66.6	71.3	75.6
0.5 gms./gal. TEL	82.2	69.6	74.5	79.1
1.5 gms./gal. TEL	84.0	78.3	81.6	85.6

SAL 000008900

TABLE 11 (Continued)
TYPICAL BASE GASOLINE STREAMS
LAKE CHARLES REFINERY - SUMMER 1981

Poncha City Sample No.:	1607	1605	1606
Lake Charles Stock No.:	723	721	725
Stock:	Cat Poly Gasoline	Alkylate	Coker Gasoline
Gravity, °API	62.8	71.2	61.9
<u>Distillation, D-86, °F, 760 mm</u>			
1BP	97	79	124
5% Evaporated	---	107	134
10% Evaporated	161	136	153
20% Evaporated	230	180	185
30% Evaporated	249	207	205
40% Evaporated	274	221	233
50% Evaporated	296	230	264
60% Evaporated	342	269	296
75% Evaporated	376	341	312
End Point	424	429	362
Recovery, Vol. %	94	97	97
Raid Vapor Pressure, psi	10.3	9.4	10.3
Sulfur, Wt. %	<0.01	<0.01	0.24
Aromatics, Vol. %	<1	<1	8
Olefins, Vol. %	97	1	43
Existent ASIM Gum, mg./100 mls.	13	2	2
Recovery, Vol. %	>0.1	>0.1	0.1
<u>Research Octanes</u>			
Clear	95.3	96.0	72.0
0.25 gms./gal. TEL	96.7	98.2	73.7
0.5 gms./gal. TEL	97.5	100.3	74.7
1.0 gms./gal. TEL	99.4	103.5	78.8
<u>Motor Octanes</u>			
Clear	82.6	92.0	65.1
0.25 gms./gal. TEL	83.5	95.0	66.0
0.5 gms./gal. TEL	84.0	97.6	67.2
1.0 gms./gal. TEL	85.4	100.7	71.0

10/6/83

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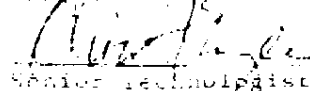
TABLE II (Continued)

TYPICAL BASE GASOLINE STREAMS

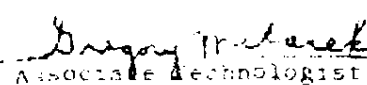
LAKE CHARLES REFINERY - SUMMER 1983

Pomona City Sample No.:	1611	1609	1751
Lake Charles Sample No.:	727	725	858
Stock	No. 2	No. 2	No. 3
	Reformer	Reformer	Reformer
	Charge		
Gravity, NAPI	57.5	49.1	44.4
Distillation, D 86, °F, 760 mm			
IBP	129	115	101
5% Evaporated	181	148	125
10% Evaporated	208	163	146
20% Evaporated	225	184	178
30% Evaporated	234	201	203
50% Evaporated	259	240	246
70% Evaporated	283	278	281
90% Evaporated	312	321	325
95% Evaporated	321	338	344
End Point	339	388	404
Recovery, Vol.%	97	98	98
Road Vapor Pressure, psi	8.7	5.5	7.9
Sulfur, Wt.%	<0.01	<0.01	<0.01
Aromatic, Vol.%	11	49	63
Olefins, Vol.%	1	1	1
Existent ASTM gum, mg./100 ml.	<1	2	1
Benzene, Vol.%	1.0	3.8	6.0
Research Octanes			
Clear	53.8	94.7	100.9
0.25 gms./gal. TEL	56.4	96.3	102.0
0.5 gms./gal. TEL	59.4	97.7	102.8
1.5 gms./gal. TEL	68.7	100.0	104.3
Motor Octanes			
Clear	53.4	85.2	89.0
0.25 gms./gal. TEL	56.3	86.6	89.6
0.5 gms./gal. TEL	60.8	88.0	90.2
1.5 gms./gal. TEL	71.4	90.5	92.2

Approved:



Senior Technologist

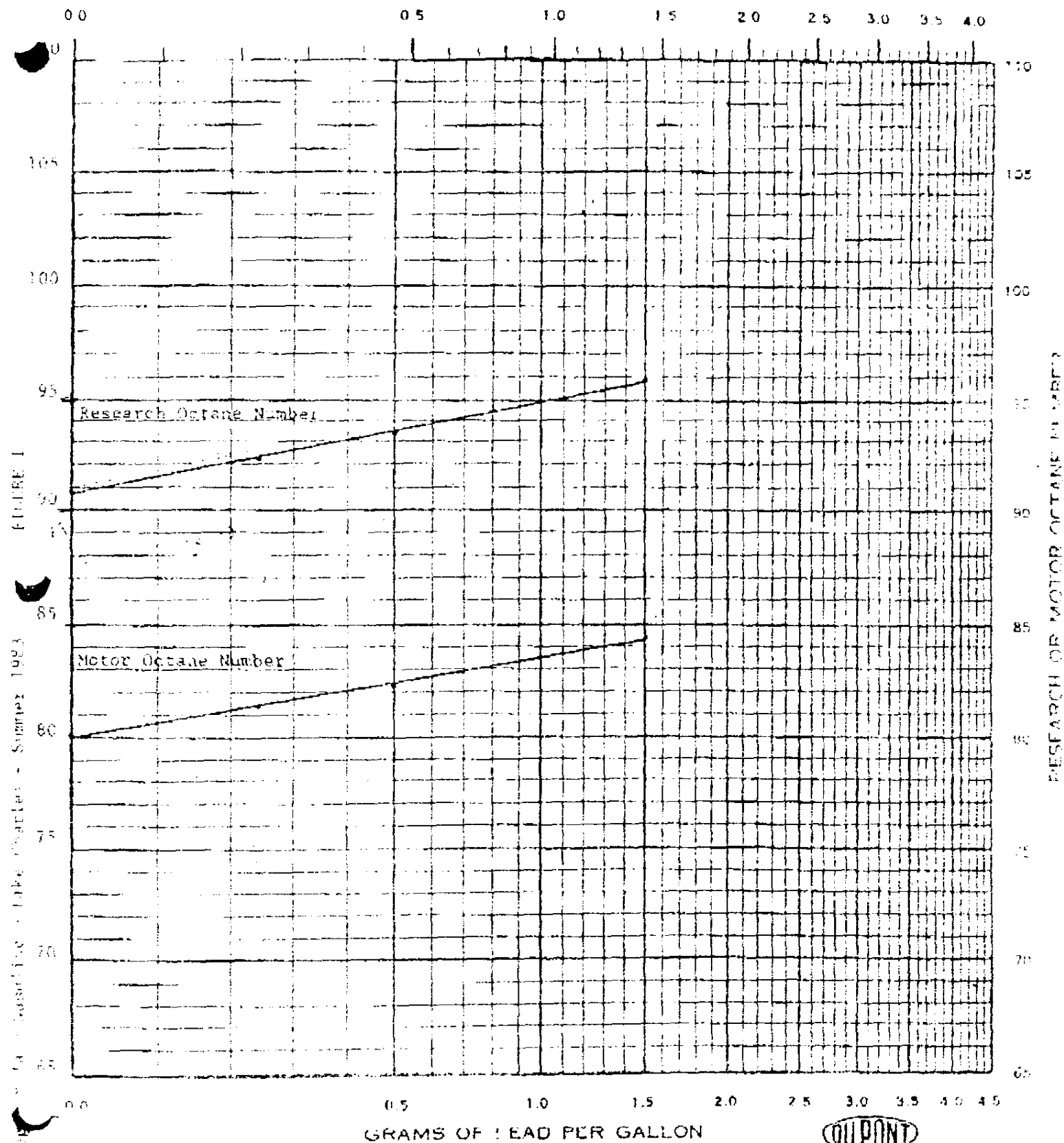


Associate Technologist

SAL 00008902

TEL MOTOR ANTIKNOCK SUSCEPTIBILITY CHART

TETRAETHYL LEAD, MILLILITERS PER GALLON



SAL 000008903

CONOCO INC.

PONCA CITY, OKLAHOMA
TECHNICAL SERVICES LABORATORY

Plt.: LC

File: 662.1
924

Date: 9-11-85

LABORATORY NO.: I-32-85

CHARGE: TSL

SUBJECT: Summary of Benzene Content of Finished Gasoline and In-Plant
Streams - 1977 to 1985 - Lake Charles Refinery

CONCLUSION:

None of the Lake Charles Refinery finished gasolines or in-plant streams analyzed by this laboratory contain as much as 10.0 wt. % benzene. Therefore, the control provisions of EPA regulation 40 CFR 61, Subpart J, do not apply.

DISCUSSION:

A June 6, 1984, promulgated regulation from EPA mandates controls on benzene fugitive emissions at petroleum refineries. A key definition in the regulation is: "In benzene service means that a piece of equipment either contains or contacts a fluid that is at least 10 percent benzene by weight as determined according to the provisions of §61.245(d)." Unless fluids produced or used in the refinery contain at least 10 wt.% benzene, the controls in the regulation do not apply.

At P. L. Youngblood's request of 9-6-85, the results of previous laboratory studies of benzene in Lake Charles Refinery streams are summarized in this report. Five major studies on this topic were made from 1977 through 1985. Benzene content of all the streams measured in them was lower than 10 wt.%. Additional analyses have been done by the Lake Charles Refinery Laboratory.

Attachment II is a laboratory crosscheck comparing benzene concentrations determined using gas chromatography and infra-red analytical methods. The benzene results included in this report were obtained using both methods at different times. The method described in the regulation at §61.245(d) is gas chromatography.

ANALYTICAL DATA:

Attachment I.

REFERENCE:

1. Verbal request from P. L. Youngblood to R. S. Jones, dated 9-6-85.
2. Several laboratory reports dated in 1977, 1983, and 1985.

Approved:

Robert S. Jones
Senior Technologist

jd

cc: PWT-FMC-EW-PLY-RSJ-TGW-GM-F
All: 2

SAL 000008904

ATTACHMENT I
BENZENE CONTENT OF LAKE CHARLES REFINERY
FINISHED GASOLINES AND IN-PLANT STREAMS

<u>Stream Description</u>	<u>Sample Date</u>	<u>Benzene Wt. %</u>
<u>Finished Gasolines</u>		
Regular Gasoline	8/83	1.8
Unleaded Gasoline	8/83	2.6
Super Unleaded Gasoline	8/83	2.8
Regular Gasoline	5/77	1.3
Premium Gasoline	5/77	1.2
Unleaded Gasoline	5/77	1.3
Unleaded Gasoline	3/77	1.8
Regular Gasoline	3/77	1.2
Premium Gasoline	3/77	1.3
<u>In-Plant Streams</u>		
Naphtha Cutterstock	5/85	0.7
Naphtha Cutterstock	4/85	0.7
Naphtha Cutterstock	4/85	0.4
Naphtha Cutterstock	4/85	0.5
Field PBC	1/85	1.3
Denuded Casinghead	1/85	2.4
No. 2 CTU LSR	1/85	3.9
No. 3 CTU LSR	1/85	2.8
W-10 OH	1/85	2.4
W-10 Btms	1/85	3.0
FCC Gasoline	8/83	0.8
No. 2 Lt. St. Run Gasoline	8/83	2.1
No. 3 Lt. St. Run Gasoline	8/83	4.4
Denuded Casinghead	8/83	2.0
Cat Poly Gasoline	8/83	0.1
Alkylate	8/83	0.1
Coker Gasoline	8/83	0.1
No. 2 Reformer Charge	8/83	1.2
No. 2 Reformate (95 RON)	8/83	4.3
No. 3 Reformate (101 RON)	8/83	6.6
No. 2 CTU Lt. Straight Run	11/77	2.2
No. 2 CTU Naphtha	11/77	0.2
Thermal Gasoline	11/77	3.8
Coker Gasoline	11/77	0.3
Coker Gasoline	5/77	0.2
Thermal Gasoline	5/77	0.4
TCC Gasoline	5/77	0.6
No. 1 Lt. Straight Run	5/77	2.3
No. 2 Lt. Straight Run	5/77	2.0
Denuded Casinghead	5/77	1.3
No. 1 Reformate	5/77	1.1
No. 2 Reformate	5/77	1.1
Primary Tower OH	5/77	3.4

CONOCO

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ACHIEVING ** SAFETY ** EXCELLENCE
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INTEROFFICE COMMUNICATION

To: All Supervisors

From: Tim Myers

Date: January 07, 1988

Subject: Lab Results Of The Refinery's Streams That Have
Been Tested For Benzene Content

Attached you will find a list of the refinery's streams that have been tested for Benzene content. The samples dated 12-14-87, were taken after the HAD from Tank 27 had been injected into the # 3 CTU's crude charge for over a week. The total Benzene content of # 3 CTU's crude charge was 0.3% .

We are monitoring a represented number of the job tasks where an employee is exposed to a stream with a Benzene concentration of $> 0.1\%$. A list should be develop by the Operating Department of all equipment that is in service of these streams, or any like streams that would contain $> 0.1\%$ Benzene.

Please contact the Safety Department, in advance, as equipment in service of these streams is brought down for repair. This will help us in setting up the personnel monitoring required by the new Benzene Standard.

Many of the employees have already received the results of the monitoring that they took part in. Additional results will be made available as we receive it.

Please contact your area Safety Supervisor or the Safety Department with any questions concerning Benzene Exposure.

Tim Myers

Tim Myers
Safety Supervisor

SAL 000008906

BENZENE RESULTS OF REFINERY'S STREAMS

UNIT	SAMPLE	FIRST RESULT	SECOND RESULT
# 1 HDS UNIT	# 1 HDS EFFLUENT	0.18% (01-31-86)	
# 2 COKER	# 2 COKER GASOLINE	0.43% (01-28-86)	0.19% (12-14-87)
# 2 CRU & HDS	# 2 HDS CHARGE	1.16% (01-31-86)	0.90% (12-14-87)
	# 2 REF. REFORMAT	2.71% (01-31-86)	3.76% (12-14-87)
# 2 CRUDE UNIT	# 2 LSR GASOLINE	1.95% (01-31-86)	5.49% (12-14-87)
	# 2 NAPHTHA	0.18% (01-31-86)	0.21% (12-14-87)
# 3 CRU & HDS	# 3 HDS CHARGE	1.16% (01-31-86)	1.01% (12-14-87)
	# 3 REF STR OH LIQ	<0.01% (12-14-87)	
	# 3 REFORMER CHARGE	1.17% (12-14-87)	
	# 3 REFORMER REFORMAT	2.71% (01-31-86)	5.20% (12-14-87)
# 3 CTU	# 3 HOD	<0.01% (02-04-86)	0.03% (12-14-87)
	CHARGE (W/ 500 BPD HAD)	0.3% (12-14-87)	
	Desalted Water	<0.01% (12-14-87)	
# 3 CTU & VAC	# 3 LSR GASOLINE	2.79% (02-04-86)	5.28% (12-14-87)
	# 3 NAPHTHA	0.41% (01-31-86)	0.41% (12-14-87)
# 4 HDS	# 4 HDS Strip. OH LQ	0.19% (12-14-87)	
# 4 Mod	# 4 Frac. Btms.	<0.01% (12-14-87)	
	# 4 Frac. HOD	<0.01% (12-14-87)	
	# 4 Frac. Naphtha	0.07% (12-14-87)	
	# 4 Frac. OH Liquid	2.76% (12-14-87)	
# 6 HDS	# 6 HDS Strip. OH LQ	0.12% (12-14-87)	
ALKYLATION UNIT	TOTAL ALKYLATE	< 0.01% (02-02-86)	
CASINGHEAD	PBC DENUDED CASINGHEAD	1.29% (02-03-86)	2.83% (12-14-87)
CAT POLY UNIT	CAT POLY GASOLINE	< 0.01% (01-28-86)	
FCC PRODUCT FRACT	FCC GASOLINE	1.21% (01-28-86)	0.93% (12-14-87)
	LV% FCC GASOLINE	1.21% (01-28-86)	
GRF	GRF GASOLINE	0.39% (01-28-86)	0.45% (12-14-87)
LITE GASO. SPLITTER	PRIM TWR BTMS	<0.01% (01-31-86)	
	PRIM TWR OH GASOLINE	0.32% (01-31-86)	1.41% (12-14-87)
TANK FARM	TK. 38 LSR	1.30% (12-14-87)	
	TK. 85 FCC/CP	0.87% (12-14-87)	
THERMAL CRACKER	THERMAL GASOLINE	0.25% (02-04-86)	1.66% (12-14-87)
	W-10 GASOLINE	3.15% (02-04-86)	3.78% (12-14-87)
	W-10 NAPHTHA	2.29% (02-04-86)	4.62% (12-14-87)

SAL 000008907

Unit:

Sample:

Per Cent Benzene:

Identify Streams
7 0.1% Benzene

Area: # 1 COKER

Unit: X COKER

Sample: X COKER GASOLINE

Per Cent Benzene:

Area: # 1 COKER

Unit: ANODE COKER

Sample: REG COKE GASOLINE

Per Cent Benzene:

Area: # 1 COKER

Unit: P COKER

Sample: P COKER GASOLINE

Per Cent Benzene:

Area: # 1 COKER

Unit: SP COKER

Sample: SP COKER GASOLINE

Per Cent Benzene:

Area: # 2 Coker

Unit: # 6 HDS

Sample: # 6 HDS Stripper OH Liquid

Per Cent Benzene:

Area: # 2 COKER

Unit: GRP

Sample: GRP GASOLINE

Per Cent Benzene: 0.39 (01-28-86)

Area: # 2 COKER

Unit: # 2 COKER

Sample: # 2 COKER GASOLINE

Per Cent Benzene: 0.43% (01-28-86)

Area: # 3 CTU

Unit: # 4 HDS

Sample: # 4 HDS Stripper OH Liquid

Per Cent Benzene:

~~Area: # 3 CTU~~

~~Unit: # 3 CTU~~

~~Sample: # 3 HDS~~

~~Per Cent Benzene: 0.01 (02-04-86)~~

SAL 000008908

Area: # 3 CTU

Unit: # 3 CTU & VAC

Sample: # 3 LSR GASOLINE

Per Cent Benzene: 2.79% (02-04-86)

Unit: # 3 CTU & VAC
Sample: # 3 NAPHTHA
Per Cent Benzene: 0.41% (01-31-86)

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 HDS CHARGE
Per Cent Benzene: 1.16% (01-31-86)

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER CHARGE
Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER REFORMAT
Per Cent Benzene: 2.71% (01-31-86)

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REF STR OH LIQ
Per Cent Benzene:

Area: DOCKS
Unit: DOCKS
Sample: GASOLINE STARTING
Per Cent Benzene:

Area: DOCKS
Unit: DOCKS
Sample: GASOLINE FINISHED
Per Cent Benzene:

Area: DOCKS
Unit: DOCKS
Sample: SYN CON STARTING
Per Cent Benzene:

Area: DOCKS
Unit: DOCKS
Sample: SYN CON FINISHED
Per Cent Benzene:

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 NAPHTHA
Per Cent Benzene: 0.18% (01-31-86)

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 LSR GASOLINE
Per Cent Benzene: 1.95% (01-31-86)

AMBIGUOUS
SAME AS
FINISHED
GASOLINE TANKS
> 0.1%

SAL 000008909

Unit: FCC PRODUCT FRACT
Sample: FCC GASOLINE
Per Cent Benzene: 1.21% (01-28-86)

Area: FCC
Unit: FCC PRODUCT FRACT
Sample: LV% FCC GASOLINE
Per Cent Benzene: 1.21% (01-28-86)

~~Area: FCC
Unit: CAT POLY UNIT
Sample: CAT POLY GASOLINE
Per Cent Benzene: < 0.01% (01-28-86)~~

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 HDS CHARGE
Per Cent Benzene: 1.16 (01-31-86)

Area: REFORMER
Unit: # 1 HDS UNIT
Sample: # 1 HDS EFFLUENT
Per Cent Benzene: 0.18 (01-31-86)

WHEN ~~IN~~ IN
KEROSENE SERVICE < 0.1 %

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: MOLEX GASOLINE
Per Cent Benzene:

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 REF. REFORMATE
Per Cent Benzene: 2.71% (01-31-86)

Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR OH GASOLINE
Per Cent Benzene: 0.32% (01-31-86)

~~Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR BTMS
Per Cent Benzene: < 0.01% (01-31-86)~~

Area: SOUR CRUDE
Unit: # 6 HDS UNIT
Sample: # 6 HDS ST OH LQ
Per Cent Benzene:

SAL 000008910

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 79 REFORMAT
Per Cent Benzene:

SAME AS
REFORMER
REFORMATE

Unit: TANK FARM
Sample: TK. 33 REFORMAT
Per Cent Benzene:

*SAME AS REFORMER
REFINATE*

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 85 FCC/CP
Per Cent Benzene:

~~Area: TANK FARM
Unit: TANK FARM
Sample: TK. 88/99 ALKY
Per Cent Benzene:~~

3

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 38 LSR
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE B GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE C GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE D GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: GASOLINE E GRADE
Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: RETAIN GASOLINE
Per Cent Benzene:

?

*NOT A STREAM
OR PRODUCT*

Area: THERMAL
Unit: CASINGHEAD
Sample: FBC DENUDED CASINGHEAD
Per Cent Benzene: 1.29 (02-03-86)

SAL 000008911

Area: THERMAL
Unit: THERMAL CRACKER
Sample: THERMAL GASOLINE
Per Cent Benzene: 0.25% (02-04-86)

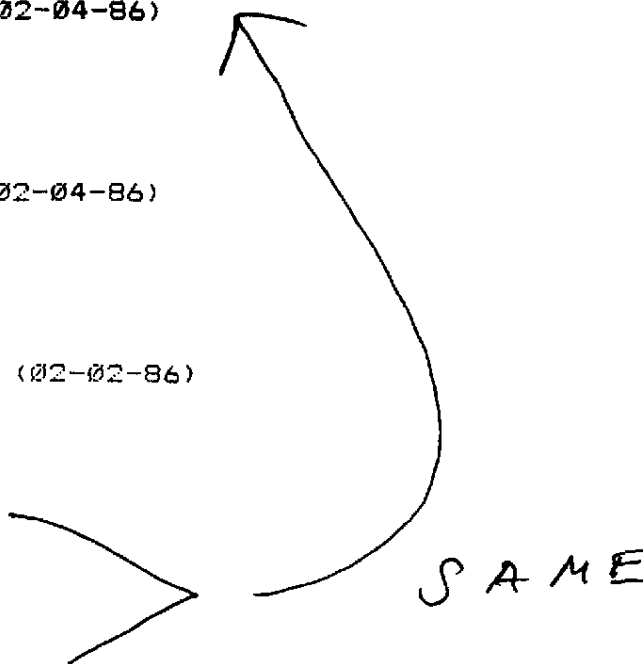
Unit: THERMAL CRACKER
Sample: W-10 GASOLINE
Per Cent Benzene: 3.15% (02-04-86)

Area: THERMAL
Unit: THERMAL CRACKER
Sample: W-10 NAPHTHA
Per Cent Benzene: 2.29% (02-04-86)

~~Area: THERMAL
Unit: ALKYLATION UNIT
Sample: TOTAL ALKYLATE
Per Cent Benzene: < 0.01% (02-02-86)~~

Area: THERMAL
Unit: GASOLINE TREATING
Sample: D-318 GASOLINE
Per Cent Benzene:

Area: THERMAL
Unit: GASOLINE TREATING
Sample: T-51 GASOLINE
Per Cent Benzene:



CONOCO

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**
** SAFETY **
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ACHIEVING INTEROFFICE COMMUNICATION EXCELLENCE

To: All Supervisors

From: Tim Myers

Date: January 06, 1988

Subject: Lab Results Of The Refinery's Streams That Have
Been Tested For Benzene Content

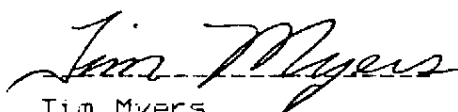
Attached you will find a list of the refinery's streams that have been tested for Benzene content. The samples dated 12-14-87, were taken after the HAD from Tank 27 had been injected into the # 3 CTU's crude charge for over a week.

We are monitoring a represented number of the job tasks where an employee is exposed to a stream with a Benzene concentration of $> 0.1\%$. . . A list should be develop by the Operating Department of all equipment that is in service of these streams, or any like streams that would contain $> 0.1\%$ Benzene.

Please contact the Safety Department, in advance, as equipment in service of these streams is brought down for repair. This will help us in setting up the personnel monitoring required by the new Benzene Standard.

Many of the employees have already received the results of the monitoring that they took part in. Additional results will be made available as we receive it.

Please contact your area Safety Supervisor or the Safety Department with any questions concerning Benzene Exposure.



Tim Myers
Safety Supervisor

cc: File

SAL 000008913

Area: # 2 COKER
Unit: # 2 COKER
Sample: # 2 COKER GASOLINE
(1) Per Cent Benzene: 0.43% (01-28-86)
(2) Per Cent Benzene: 0.19% (12-14-87)

Area: # 2 COKER
Unit: GRP
Sample: GRP GASOLINE
(1) Per Cent Benzene: 0.39% (01-28-86)
(2) Per Cent Benzene: 0.45% (12-14-87)

Area: # 2 Coker
Unit: # 6 HDS
Sample: # 6 HDS Stripper OH Liquid
(1) Per Cent Benzene: 0.12% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 Ctu
Unit: # 4 Mod
Sample: # 4 Frac. Naphtha
(1) Per Cent Benzene: 0.07% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. OH Liquid
(1) Per Cent Benzene: 2.76% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. HOD
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. Btms.
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CTU
Sample: Desalted Water
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER REFORMAT
(1) Per Cent Benzene: 2.71% (01-31-86)
(2) Per Cent Benzene: 5.20% (12-14-87)

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER CHARGE
(1) Per Cent Benzene: 1.17% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 HDS CHARGE
(1) Per Cent Benzene: 1.16% (01-31-86)

SAL 000008914

Area: # 3 CTU
Unit: # 3 CTU & VAC
Sample: # 3 NAPHTHA
(1) Per Cent Benzene: 0.41% (01-31-86)
(2) Per Cent Benzene: 0.41% (12-14-87)

Area: # 3 CTU
Unit: # 3 CTU & VAC
Sample: # 3 LSR GASOLINE
(1) Per Cent Benzene: 2.79% (02-04-86)
(2) Per Cent Benzene: 5.28% (12-14-87)

Area: # 3 CTU
Unit: # 3 CTU
Sample: # 3 HOD
(1) Per Cent Benzene: <0.01% (02-04-86)
(2) Per Cent Benzene: 0.03% (12-14-87)

Area: # 3 CTU
Unit: # 4 HDS
Sample: # 4 HDS Stripper OH Liquid
(1) Per Cent Benzene: 0.19% (12-14-87)
(2) Per Cent Benzene:

Area: FCC
Unit: CAT POLY UNIT
Sample: CAT POLY GASOLINE
(1) Per Cent Benzene: < 0.01% (01-28-86)
(2) Per Cent Benzene:

Area: FCC
Unit: FCC PRODUCT FRACT
Sample: LV% FCC GASOLINE
(1) Per Cent Benzene: 1.21% (01-28-86)
(2) Per Cent Benzene:

Area: FCC
Unit: FCC PRODUCT FRACT
Sample: FCC GASOLINE
(1) Per Cent Benzene: 1.21% (01-28-86)
(2) Per Cent Benzene: 0.93% (12-14-87)

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 LSR GASOLINE
(1) Per Cent Benzene: 1.95% (01-31-86)
(2) Per Cent Benzene: 5.49% (12-14-87)

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 NAPHTHA
(1) Per Cent Benzene: 0.18% (01-31-86)
(2) Per Cent Benzene: 0.21% (12-14-87)

Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR BTMS
(1) Per Cent Benzene: <0.01% (01-31-86)
(2) Per Cent Benzene:

Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR OH GASOLINE
(1) Per Cent Benzene: 0.12% (01-31-86)

SAL 000008915

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 REF. REFORMATE
(1) Per Cent Benzene: 2.71% (01-31-86)
(2) Per Cent Benzene: 3.76% (12-14-87)

Area: REFORMER
Unit: # 1 HDS UNIT
Sample: # 1 HDS EFFLUENT
(1) Per Cent Benzene: 0.18% (01-31-86)
(2) Per Cent Benzene:

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 HDS CHARGE
(1) Per Cent Benzene: 1.16% (01-31-86)
(2) Per Cent Benzene: 0.90% (12-14-87)

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 38 LSR
(1) Per Cent Benzene: 1.30% (12-14-87)
(2) Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 85 FCC/CP
(1) Per Cent Benzene: 0.87% (12-14-87)
(2) Per Cent Benzene:

Area: THERMAL
Unit: ALKYLATION UNIT
Sample: TOTAL ALKYLATE
(1) Per Cent Benzene: < 0.01% (02-02-86)
(2) Per Cent Benzene:

Area: THERMAL
Unit: THERMAL CRACKER
Sample: W-10 NAPHTHA
(1) Per Cent Benzene: 2.29% (02-04-86)
(2) Per Cent Benzene: 4.62% (12-14-87)

Area: THERMAL
Unit: THERMAL CRACKER
Sample: W-10 GASOLINE
(1) Per Cent Benzene: 3.15% (02-04-86)
(2) Per Cent Benzene: 3.78% (12-14-87)

Area: THERMAL
Unit: THERMAL CRACKER
Sample: THERMAL GASOLINE
(1) Per Cent Benzene: 0.25% (02-04-86)
(2) Per Cent Benzene: 1.66% (12-14-87)

Area: THERMAL
Unit: CASINGHEAD
Sample: PBC DENUDED CASINGHEAD
(1) Per Cent Benzene: 1.29% (02-03-86)
(2) Per Cent Benzene: 2.83% (12-14-87)

SAL 000008916

00M

CONOCO

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INTEROFFICE COMMUNICATION

To: All Supervisors

From: Tim Myers

Date: January 06, 1988

Subject: Lab Results Of The Refinery's Streams That Have
Been Tested For Benzene Content

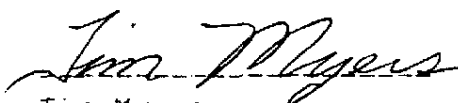
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Please contact the Safety Department, in advance, as equipment in service of these streams is brought down for repair. This will help us in setting up the personnel monitoring required by the new Benzene Standard.

Many of the employees have already received the results of the monitoring that they took part in. Additional results will be made available as we receive it.

Please contact your area Safety Supervisor or the Safety Department with any questions concerning Benzene Exposure.


Tim Myers
Safety Supervisor

cc: File

SAL 000008917

Area: # 2 COKER
Unit: # 2 COKER
Sample: # 2 COKER GASOLOINE
(1) Per Cent Benzene: 0.43% (01-28-86)
(2) Per Cent Benzene: 0.19% (12-14-87)

Area: # 2 COKER
Unit: GRP
Sample: GRP GASOLINE
(1) Per Cent Benzene: 0.39% (01-28-86)
(2) Per Cent Benzene: 0.45% (12-14-87)

Area: # 2 Coker
Unit: # 6 HDS
Sample: # 6 HDS Stripper OH Liquid
(1) Per Cent Benzene: 0.12% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 Ctu
Unit: # 4 Mod
Sample: # 4 Frac. Naphtha
(1) Per Cent Benzene: 0.07% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. OH Liquid
(1) Per Cent Benzene: 2.76% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. HOD
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 4 Mod
Sample: # 4 Frac. Btms.
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CTU
Sample: Desalted Water
(1) Per Cent Benzene: <0.01% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER REFORMAT
(1) Per Cent Benzene: 2.71% (01-31-86)
(2) Per Cent Benzene: 5.20% (12-14-87)

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 REFORMER CHARGE
(1) Per Cent Benzene: 1.17% (12-14-87)
(2) Per Cent Benzene:

Area: # 3 CTU
Unit: # 3 CRU & HDS
Sample: # 3 HDS CHARGE
(1) Per Cent Benzene: 1.16% (01-31-86)

SAL 000008918

Area: # 3 CTU
Unit: # 3 CTU & VAC
Sample: # 3 NAPHTHA
(1) Per Cent Benzene: 0.41% (01-31-86)
(2) Per Cent Benzene: 0.41% (12-14-87)

Area: # 3 CTU
Unit: # 3 CTU & VAC
Sample: # 3 LSR GASOLINE
(1) Per Cent Benzene: 2.79% (02-04-86)
(2) Per Cent Benzene: 5.28% (12-14-87)

Area: # 3 CTU
Unit: # 3 CTU
Sample: # 3 HOD
(1) Per Cent Benzene: <0.01% (02-04-86)
(2) Per Cent Benzene: 0.03% (12-14-87)

Area: # 3 CTU
Unit: # 4 HDS
Sample: # 4 HDS Stripper OH Liquid
(1) Per Cent Benzene: 0.19% (12-14-87)
(2) Per Cent Benzene:

Area: FCC
Unit: CAT POLY UNIT
Sample: CAT POLY GASOLINE
(1) Per Cent Benzene: < 0.01% (01-28-86)
(2) Per Cent Benzene:

Area: FCC
Unit: FCC PRODUCT FRACT
Sample: LV% FCC GASOLINE
(1) Per Cent Benzene: 1.21% (01-28-86)
(2) Per Cent Benzene:

Area: FCC
Unit: FCC PRODUCT FRACT
Sample: FCC GASOLINE
(1) Per Cent Benzene: 1.21% (01-28-86)
(2) Per Cent Benzene: 0.93% (12-14-87)

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 LSR GASOLINE
(1) Per Cent Benzene: 1.95% (01-31-86)
(2) Per Cent Benzene: 5.49% (12-14-87)

Area: FCC
Unit: # 2 CRUDE UNIT
Sample: # 2 NAPHTHA
(1) Per Cent Benzene: 0.18% (01-31-86)
(2) Per Cent Benzene: 0.21% (12-14-87)

Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR BTMS
(1) Per Cent Benzene: <0.01% (01-31-86)
(2) Per Cent Benzene:

Area: REFORMER
Unit: LITE GASOLINE SPLITTER
Sample: PRIM TWR OH GASOLINE
(1) Per Cent Benzene: 0.32% (01-31-86)

SAL 000008919

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 REF. REFORMATE
(1) Per Cent Benzene: 2.71% (01-31-86)
(2) Per Cent Benzene: 3.76% (12-14-87)

Area: REFORMER
Unit: # 1 HDS UNIT
Sample: # 1 HDS EFFLUENT
(1) Per Cent Benzene: 0.18% (01-31-86)
(2) Per Cent Benzene:

Area: REFORMER
Unit: # 2 CRU & HDS
Sample: # 2 HDS CHARGE
(1) Per Cent Benzene: 1.16% (01-31-86)
(2) Per Cent Benzene: 0.90% (12-14-87)

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 38 LSR
(1) Per Cent Benzene: 1.30% (12-14-87)
(2) Per Cent Benzene:

Area: TANK FARM
Unit: TANK FARM
Sample: TK. 85 FCC/CP
(1) Per Cent Benzene: 0.87% (12-14-87)
(2) Per Cent Benzene:

Area: THERMAL
Unit: ALKYLATION UNIT
Sample: TOTAL ALKYLATE
(1) Per Cent Benzene: < 0.01% (02-02-86)
(2) Per Cent Benzene:

Area: THERMAL
Unit: THERMAL CRACKER
Sample: W-10 NAPHTHA
(1) Per Cent Benzene: 2.29% (02-04-86)
(2) Per Cent Benzene: 4.62% (12-14-87)

Area: THERMAL
Unit: THERMAL CRACKER
Sample: W-10 GASOLINE
(1) Per Cent Benzene: 3.15% (02-04-86)
(2) Per Cent Benzene: 3.78% (12-14-87)

Area: THERMAL
Unit: THERMAL CRACKER
Sample: THERMAL GASOLINE
(1) Per Cent Benzene: 0.25% (02-04-86)
(2) Per Cent Benzene: 1.66% (12-14-87)

Area: THERMAL
Unit: CASINGHEAD
Sample: FBC DENUDED CASINGHEAD
(1) Per Cent Benzene: 1.29% (02-03-86)
(2) Per Cent Benzene: 2.83% (12-14-87)

31/O&LH/TLE → FILE 220.01

CONOCO INC.
PONCA CITY, OKLAHOMA
TECHNICAL SERVICES LABORATORY

Plt.: LC

File: 010.0

Date: 2/9/88

LABORATORY NO.: B-34-88
CHARGE: TSL - LC
SUBJECT: Benzene Analysis - Lake Charles Refinery

DATA:

Sample:	No. 3 CTU Crude Charge	No. 3 CTU Stabilized OH Liquid
Sample Date:	12/16/87	12/16/87
LC Sample No.:	2311-87	1212-87
PC Sample No.:	<u>1506</u>	<u>1507</u>
Benzene, LV%	0.35	<0.1

REFERENCE:

Verbal request from Tim Myers.

Approved:

W. D. Senbelle
Senior Technologist

b1

cc: (DRU-PFM)-ESJ-TM-JI-TGW-F

Craig Wilson
Associate Technologist

SAL 000008921

Benzene Analysis Method at Lake Charles

Varian Model 2700 Chromatograph

Column: TCEP 20' x 1/8"

Detector: Filaments (TCD)

Column: #90-1 Prepared in Ponca City Technical Services Laboratory

Samples and standards were syringe injected, the sample area is ratioed to standard area counts

This method was used at the Lake Charles refinery from approximately 1986(7) to 1990. Prior to that time samples were sent off site for analysis.

SAL 000008922

Varian 2700

Column: TC2P 20' x 1/8"

Detector: Filaments (TCD)

Col. # 90-1 Ponca City Tech.

Syringe Injected Samples and Standards.

Sample area ratioed to standard area counts

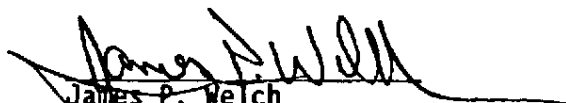


Interoffice Communication

TO: Quincy L. Hider
FROM: James P. Welch
DATE: February 20, 1990
SUBJECT: BENZENE ANALYSIS USING THE VARIAN

Listed below is a short summary for the operation of the Benzene Analyzer.

- 1) Put on safety equipment located next to the instrument.
- 2) Prepare the integrator: adjust the SP4270 LEVEL using the FINE BALANCE ADJUST KNOB located on the front panel bottom right hand corner.
- 3) Turn off the vacuum to the analyzer, located on the east side of the instrument.
- 4) With the sample in a volumetric flask, place the injection tube below the level of the sample liquid. The injection tube is located above the vacuum inlet.
- 5) Open the vacuum line and let the sample purge through the instrument for about one minute.
- 6) Turn off the vacuum to the instrument. Leave the flask below the injection tube to catch any sample drops.
- 7) Turn the sample injection valve from PURGE to INJECT. Simultaneously push INJECT A on the SP4270. If the integrator reports NO DATA, CHANNEL A, you have double injected. Push INJECT A again.
- 8) Turn inject valve back to purge, open vacuum line, remove the sample.
- 9) The benzene peak should come off at 3.3 minutes.
- 10) Let the analysis run for about 20 minutes, then push INJECT A to get a report of sample peaks.
- 11) Use the Benzene Concentration vs. Counts graph to approximate the Benzene concentration. Remember to divide analysis counts by 10 to put it on the same scale as the graph.
- 12) Select two standards to bracket the Benzene Concentration. Use the results from the standards to interpolate the actual sample concentration.
- 13) Log the results in the computer. Unit 63, Code 1, Test 194.


James P. Welch
Analytical Chemist

cc: RHC/JAB/FILE CHEMISTS
A: BENZENE. JPW

EXAMPLE CALCULATION - BENZENE

Determine the Sample's peak area from the peak area table.

Sample Area = 18729

From the graph generated with standards, approximate the samples concentration. Select TWO standards to bracket the sample concentration.

Select the 10% and 15% standards.

Inject both standards and find the slope between the two points.

$$M = \frac{\text{Counts at 15\%} - \text{Counts at 10\%}}{15\% - 10\%}$$

$$M = \frac{22692 - 15264}{15 - 10} = 1486 \text{ counts}$$

Divide sample area by slope to determine Benzene concentration.

$$\text{Sample concentration} = \frac{18729}{1486} = 12.6 \%$$

Log results into the computer and Benzene Book.

CONTINENTAL OIL COMPANY
PONCA CITY, OKLAHOMA
REFINING TECHNICAL SERVICES LABORATORY

Plt.: LC
File: 662.1
924
Date: 1-4-78

LABORATORY NO.: A-11-78
CHARGE: LC 49
SUBJECT: Analysis of 155-200°F TBP Cut Point Gasolines for Benzene
Manufacturing - Lake Charles Refinery

DISCUSSION:

Samples of No. 2 CTU Straight Run, No. 2 CTU Naphtha, Thermal Gasoline, and Coker Gasoline were fractionated using a TBP still. Component analysis, distillation and octane data were obtained on the original and each fraction. Note: On some of the samples there were insufficient sample to perform all the tests requested.

Flow rates and crude composition have also been included for 11-21-77. These were provided by J. J. Mangelinkx in his letter to K. C. Hunt dated 11-23-77.

ANALYTICAL NOTES:

An eight plate T.B.P. still was used for fractionation of the samples. The overhead receiver was packed in dry ice and a dry ice acetone trap was used to condense the light overhead vapors. Indications are that the losses incurred were from the light ends of the samples.

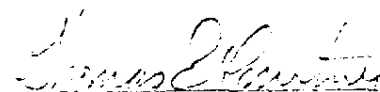
REFERENCE:

Letter to K. C. Hunt from J. W. Bredthauer dated 11-18-77 and letters to K. C. Hunt from J. J. Mangelinkx dated 11-21-77 and 11-23-77.

DATA:

Attached

Approved:


James E. Hunt
Senior Technologist

cc

cc: LWC, MEO, (GAC-CPL -CWH-JFW-KCH-F


Associate Technologist

SAL 000008926

No. 2 CTU Straight Run (Original)
Sample Date,

PC 1643, LC 1409-77
11-21-77

API Gravity @ 60°F

67.7

Distillation ASTM-D86°F

IBP	102
5% Recovered	135
10% Recovered	144
20% Recovered	158
30% Recovered	171
40% Recovered	183
50% Recovered	194
60% Recovered	204
70% Recovered	215
80% Recovered	226
90% Recovered	244
95% Recovered	260
EP	276
% Rec.	98
% Res.	1
RVP	6.8

Research Octane,
Clear

65.3

Research Octane,
3.17 gm pb/gal.

85.5

T.B.P. Distillation

Liquid Volume %

IBP to 155°F	32.8
155°F to 200°F	28.3
200°F to E.P.	37.6
Loss	1.3
Total	100.0

T.B.P. Cuts, °F

IBP-155

155-200

200-E.P.

API Gravity @ 60°F

83.5

63.3

57.2

Distillation, ASTM-D86, °F

IBP	83	167	217
5% Recovered	97	177	224
10% Recovered	100	178	225
20% Recovered	104	179	228
30% Recovered	109	182	230
40% Recovered	114	183	232
50% Recovered	119	185	234
60% Recovered	125	188	238
70% Recovered	132	192	242
80% Recovered	140	195	248
90% Recovered	149	200	257
95% Recovered	157	204	265
EP	162	217	284
% Rec.	98	99	99
% Res.	1	1	1
RVP	14.3	6.8	2.8

Research Octane,
Clear

74.9

65.4

54.7

Research Octane,
3.17 gm PB/gal

92.4

85.0

77.1

SAL 000008927

LABORATORY NO: A-11-78

January 4, 1978

Attachment, Page two

No. 2 CTM Naphta (Original)

Sample Date

PC 1644, LC 1410-77

11-21-77

API Gravity @ 60°F

53.0

Distillation ASTM-D36°F

IBP

210

5% Recovered

262

10% Recovered

270

20% Recovered

278

30% Recovered

284

40% Recovered

292

50% Recovered

297

60% Recovered

306

70% Recovered

313

80% Recovered

322

90% Recovered

336

95% Recovered

348

EP

365

8 Rec.

99

1 Res.

1

RVP

2.1

Research Octane,

Clear

42.7

Research Octane,

3.17 gm pb/gal.

66.7

T.B.P. Distillation

Liquid Volume, %

IBP to 155°F

2.0

155°F to 200°F

3.1

200°F to EP

94.9

Loss

0

Total

100.0

T.B.P. Cuts, °F

IBP-155

155-200

200-EP

API Gravity @ 60°F

80.8

61.7

52.1

Distillation, ASTM D-86

IBP

87

172

257

5% Recovered

106

188

278

10% Recovered

112

189

280

20% Recovered

121

191

285

30% Recovered

128

192

289

40% Recovered

134

194

295

50% Recovered

140

196

300

60% Recovered

146

198

306

70% Recovered

151

201

313

80% Recovered

155

204

322

90% Recovered

161

208

336

95% Recovered

211

343

EP

173

217

365

8 Rec.

95

99

99

1 Res.

1

1

1

RVP

0.0

Research Octane,

Clear

49.9

Research Octane

3.17 gm pb/gal.

65.3

SAL 000008928

LABORATORY NO.: A-11-78
 January 4, 1978
 Attachment, Page three
 Thermal Gasoline (Original)
 Sample Date

API Gravity @ 60°F

Distillation ASTM-D86°F

IBP
 5% Recovered
 10% Recovered
 20% Recovered
 30% Recovered
 40% Recovered
 50% Recovered
 60% Recovered
 70% Recovered
 80% Recovered
 90% Recovered
 95% Recovered
 EP
 % Rec.
 % Res.
 RVP

Research Octane

Clear

Research Octane

3.17 pb/gal.

T.B.P. Distillation

IBP to 155°F
 155°F to 200°F
 200°F to EP
 Loss
 Total

T.B.P. Cuts, °F

API Gravity @ 60°F

Distillation, ASTM-D86, °F

IBP
 5% Recovered
 10% Recovered
 20% Recovered
 30% Recovered
 40% Recovered
 50% Recovered
 60% Recovered
 70% Recovered
 80% Recovered
 90% Recovered
 95% Recovered
 EP
 % Rec.
 % Res.
 RVP

Research Octane,

Clear

Research Octane

3.17 pb/gal.

PC 1645, LC 1411-77
11-21-77

58.9

116
 155
 166
 181
 195
 210
 225
 241
 257
 274
 292
 314
 341
 98
 1
 3.2

Liquid Volume %

26.5
 16.0
 57.5

 100.0

IBP-155

155-200

200-EP

75.4

61.3

51.4

100
 118
 121
 125
 129
 132
 136
 140
 146
 151
 156
 159
 170
 97
 1
 10.6

171
 179
 180
 182
 184
 186
 188
 191
 195
 199
 204
 208
 220
 99
 1
 2.1

230
 245
 247
 251
 256
 260
 266
 274
 282
 293
 309
 326
 357
 90
 1
 0.0

83.2

38.5

66.1

94.7

84.0

1124/1
 59.6

117
 158
 170
 182
 199
 212
 225
 238
 258
 265
 284
 300
 325
 99
 1
 72.1
 87.1

SAL 000008929

LABORATORY NO.: 4-11-78 (Supplement)
 February 3, 1978
 Attachment, Page 1

Sample
 Sample Date
 API Gravity 3.6098

Coker Gasoline (Original)
 1-24-78

42.7

Distillation ASTM D-86°F

13P	118
5% Recovered	210
10% Recovered	236
20% Recovered	266
30% Recovered	290
40% Recovered	311
50% Recovered	328
60% Recovered	350
70% Recovered	368
80% Recovered	385
90% Recovered	400
95% Recovered	411
EP	432
Rec.	99
Res.	1

T.B.P. Out, °F	13P-155	155-200
Research Octane		
Clear	94.1	75.3
Research Octane		
3.17 gm pb/gal.	92.4	88.6

SAL 000008930

LABORATORY NO.: A-11-78

January 4, 1978

Attachment, Page four

Coker Gasoline (Original)

Sample Date

API Gravity @ 60°F

Distillation ASTM-D86°F

IBP

5% Recovered

10% Recovered

20% Recovered

30% Recovered

40% Recovered

50% Recovered

60% Recovered

70% Recovered

80% Recovered

90% Recovered

95% Recovered

EP

% Rec.

% Res.

RVP

Research Octane

Clear

Research Octane

3.17 gm pb/gal.

T.B.P. Distillation

122 to 155°F

155°F to 200°F

200°F to EP

Loss

Total

T.B.P. Cuts, °F

API Gravity @ 60°F

Distillation, ASTM-D86, °F

IBP

5% Recovered

10% Recovered

20% Recovered

30% Recovered

40% Recovered

50% Recovered

60% Recovered

70% Recovered

80% Recovered

90% Recovered

95% Recovered

EP

% Rec.

% Res.

RVP

Research Octane

Clear

Research Octane

3.17 gm pb/gal.

PC 1646, LC 1412-77

11-21-77

42.2

121

275

245

372

293

320

342

381

379

385

413

425

413

39

0.1

0.1

71.7

84.4

Liquid Volume

6.3

5.1

97.7

0.1

109.2

IBP-155

155-200

200-EP

78.5

62.9

37.3

81

94

107

119

127

133

139

145

150

155

161

175

175

94

1

170

174

177

177

198

190

195

195

207

205

209

212

213

35

1

2.1

251

279

280

306

321

341

358

365

390

405

420

428

445

99

1

0.5

71.6

84.3

LABORATORY NO.: A-11-76
 January 4, 1978
 Attachment, Page five

FLOW RATES

11/21/77

LC 1409	#2 LSP	8332 Bbls./Day
LC 1410	#2 NAP	6582 Bbls./Day
LC 1411	Thermal Gasoline	1347 Bbls./Day
LC 1412	Coker Gasoline	803 Bbls./Day

CRUDE COMPOSITION

11/21/77

#2 CTU

	<u>BBLS./DAY</u>	<u>VOL. %</u>
West Cameron 66	1297	3.0
Vermillion-CATC 120	357	1.5
Raymark	---	---
Morgan City - Kerr	643	1.0
Amelia	803	1.3
Abbeville	393	0.6
Johnson Bayou	423	0.7
Big Lake	72	0.1
Burns Terminal	1665	2.6
Grand Isle GML Mix	393	0.6
Iberia	4232	6.8
Paradise La Fitte	2900	4.6
Sahara Blend	6591	10.5
S. Louisiana Light	---	---
Louisiana Mix	20235	32.4
Es Sider	20355	33.4
Black Bayou	139	0.3
Boston Bayou	---	---
Bancher	397	0.6
Patterson Cond.	5	0.0
Total	62871	100.0

SAL 000008932

LABORATORY NO: A-11-73
January 4, 1978
Attachment, Page six

Sample:
LC No.:
PC No.:
Sample Date:

No. 2 CTU Straight Run
1409-77
1643
11/21/77

	<u>Original</u>	<u>1BP-155°F Cut</u>	<u>155-200°F Cut</u>	<u>200°F-EP</u>
<u>Paraffins, LVI</u>				
Ethane	trace	trace	---	---
Propane	trace	trace	---	---
Isobutane	0.4	1.1	---	---
Normal Butane	2.3	7.2	---	---
Isopentane	7.4	20.3	0.03	0.03
Normal Pentane	7.9	22.0	0.11	0.03
1,4-Dimethylbutane	0.58	1.92	0.10	---
2,3-Dimethylbutane	1.18	3.12	0.55	---
2-Methylpentane	5.01	10.85	3.46	0.02
3-Methylpentane	3.41	7.15	3.06	0.02
Normal Hexane	7.02	11.89	9.31	0.08
2,2-Dimethylpentane	0.29	0.21	0.92	0.03
2,4-Dimethylpentane	0.58	0.43	1.86	0.07
3,3-Dimethylpentane	0.16	0.05	0.57	0.06
2,3-Dimethylpentane	0.88	0.05	2.49	0.49
2,2,3-Trimethylbutane	0.08	0.06	0.27	0.04
2-Methylhexane	2.98	0.13	7.86	1.32
3-Methylhexane	3.20	0.07	8.09	2.46
3-Ethylpentane	0.15	0.02	0.61	0.12
Normal Heptane	6.98	0.04	12.50	9.19
C ₈ Isoparaffins (total)	6.8	---	0.81	17.84
Normal Octane	5.1	---	---	12.7
C ₉ Paraffins (total)	3.6	---	---	8.9
C ₁₀ Paraffins (total)	0.1	---	---	0.3
C ₁₁ Paraffins (total)	---	---	---	trace
C ₁₂ Paraffins (total)	---	---	---	---
Total Paraffins	66.6	86.6	52.6	54.2
<u>Naphthenes, LVI</u>				
Cyclopentane	0.7	2.17	0.07	---
Methylcyclopentane	3.19	5.72	6.41	0.77
Cyclohexane	3.11	2.43	9.11	0.62
1,1-Dimethylcyclopentane	0.62	0.05	2.29	0.37
1-o-3-Dimethylcyclopentane	0.85	0.04	3.04	0.52
1-t-3-Dimethylcyclopentane	0.69	0.03	2.64	0.48
1-t-2-Dimethylcyclopentane	1.48	0.04	4.78	1.10
1-o-2-Dimethylcyclopentane	0.13	---	0.26	0.17
Methylcyclohexane	7.33	0.02	12.14	11.20
C ₈ Naphthenes (total)	6.4	---	0.38	13.73
C ₉ Naphthenes (total)	1.6	---	---	4.0
C ₁₀ Naphthenes (total)	trace	---	---	1.3
C ₁₁ Naphthenes (total)	---	---	---	trace
C ₁₂ Naphthenes (total)	---	---	---	---
Total Naphthenes	16.1	10.5	41.1	33.6
<u>Aromatics, LVI</u>				
Benzene	1.6	2.9	0.9	0.7
Toluene	0.4	---	3.3	6.4
C ₈ Aromatics (total)	0.9	---	---	5.4
C ₉ Aromatics (total)	0.1	---	---	0.3
C ₁₀ Aromatics (total)	---	---	---	---
C ₁₁ Aromatics (total)	---	---	---	---
C ₁₂ Aromatics (total)	---	---	---	---
Total Aromatics	7.3	2.9	5.3	12.2

SAL 000008933

Sample:

No. 2 CTU Naphtha

LC No.:

1410-77

PC No.:

1644

Sample Date:

11/21/77

Paraffins, LV

	Original	ISP-155°F Cut	155°-200° Cut	200°F-E
Ethane	----	----	----	----
Propane	0.1	1.0	----	----
Isobutane	0.1	2.3	0.03	----
Normal Butane	0.2	6.5	0.07	----
Isopentane	0.3	12.0	0.11	----
Normal Pentane	0.4	14.6	0.11	----
2,2-Dimethylbutane	0.03	1.79	0.03	----
2,3-Dimethylbutane	0.05	3.71	0.11	----
2-Methylpentane	0.33	13.02	1.29	----
3-Methylpentane	0.20	9.21	1.44	----
Normal Hexane	0.66	15.93	6.78	0.0
2,2-Dimethylpentane	0.03	0.31	0.92	0.0
2,4-Dimethylpentane	0.06	0.63	1.84	0.0
3,3-Dimethylpentane	0.03	0.09	0.64	----
2,3-Dimethylpentane	0.09	0.08	2.77	0.0
2,2,3-Trimethylbutane	0.02	0.08	0.29	----
2-Methylhexane	0.38	0.23	3.60	0.1
3-Methylhexane	0.43	0.13	3.97	0.1
3-Ethylpentane	0.05	0.02	0.68	0.0
Normal Heptane	1.54	0.07	13.54	1.1
C ₈ Isoparaffins (total)	1.9	----	1.58	2
Normal Octane	6.3	----	----	6
C ₉ Paraffins (total)	20.2	----	----	21
C ₁₀ Paraffins (total)	15.8	----	----	16
C ₁₁ Paraffins (total)	3.4	----	----	3
C ₁₂ Paraffins (total)	0.7	----	----	0
Total Paraffins	53.3	81.7	49.8	52

Naphthenes, LV

Cyclopentane	0.03	2.01	0.03	----
Methylcyclopentane	0.32	8.14	5.72	.05 0
Cyclohexane	0.36	3.40	9.89	.08 0
1,1-Dimethylcyclopentane	0.08	0.08	2.55	.04 0
1-c-3-Dimethylcyclopentane	0.12	0.06	3.44	.04 0
1-t-3-Dimethylcyclopentane	0.11	0.04	3.01	.07 0
1-t-2-Dimethylcyclopentane	0.17	0.09	5.45	.06 0
1-c-2-Dimethylcyclopentane	0.07	----	0.29	.01 0
Methylcyclohexane	2.24	0.08	13.52	.06 0
C ₈ Naphthenes (total)	6.6	----	0.50	2.1
C ₉ Naphthenes (total)	10.5	----	----	11.1
C ₁₀ Naphthenes (total)	5.5	----	----	5.7
C ₁₁ Naphthenes (total)	4.1	----	----	4.3
C ₁₂ Naphthenes (total)	2.1	----	----	2.1
Total Naphthenes	32.3	13.9	44.2	32.4

Aromatics, LV

SAL 000008934

Benzene	0.2	4.4	2.4	TR
Toluene	1.1	----	3.4	1.0
C ₈ Aromatics (total)	6.2	----	----	6.7
C ₉ Aromatics (total)	5.2	----	----	5.1
C ₁₀ Aromatics (total)	1.4	----	----	1.6
C ₁₁ Aromatics (total)	0.3	----	----	0.3
Total Aromatics	14.4	4.4	5.8	15.2

LABORATORY NO.: A-11-78

January 4, 1978

Attachment, Page eight

Sample:

Thermal Gasoline

LC No.:

1411-77

PC No.:

1645

Sample Date:

11/21/77

Paraffins, LV%OriginalISP-155°F Cut155°-200°F Cut200°F-End

Ethane	----	----	----	----
Propane	----	----	----	----
Isobutane	trace	0.1	----	----
Normal Butane	0.4	1.5	----	----
Isopentane	1.0	3.8	0.01	----
Normal Pentane	4.1	15.2	0.08	----
2,2-Dimethylbutane	0.01	0.04	trace	----
2,3-Dimethylbutane	0.11	0.50	0.04	----
2-Methylpentane	2.15	8.38	1.16	0.02
3-Methylpentane	1.24	4.79	0.81	0.02
Normal Hexane	7.49	25.99	8.01	0.10
2,2-Dimethylpentane	0.05	0.10	0.09	trace
2,4-Dimethylpentane	0.10	0.21	0.17	0.01
3,3-Dimethylpentane	0.01	----	0.03	0.01
2,3-Dimethylpentane	0.11	0.03	0.46	0.04
2,2,3-Trimethylbutane	trace	----	0.01	----
2-Methylhexane	1.27	0.20	3.95	0.33
3-Methylhexane	1.37	0.13	3.93	0.43
3-Ethylpentane	0.05	0.01	0.09	0.02
Normal Heptane	6.24	0.22	17.83	6.22
C ₈ Isoparaffins (total)	2.4	----	1.03	3.7
Normal Octane	5.0	----	----	3.5
C ₉ Paraffins (total)	6.0	----	----	10.1
C ₁₀ Paraffins (total)	2.4	----	----	3.9
C ₁₁ Paraffins (total)	0.5	----	----	0.8
C ₁₂ Paraffins (total)	0.1	----	----	0.2
Total Paraffins	42.1	61.2	37.8	34.4

Naphthenes, LV%

Cyclopentane	0.42	2.10	0.08	----
Methylcyclopentane	2.40	3.06	3.11	0.05
Cyclohexane	0.52	0.97	1.41	0.04
1,1-Dimethylcyclopentane	0.11	0.03	0.43	0.03
1-c-3-Dimethylcyclopentane	0.45	0.03	1.58	0.11
1-t-3-Dimethylcyclopentane	0.34	0.03	1.39	0.09
1-t-2-Dimethylcyclopentane	0.64	0.04	1.81	0.18
1-c-2-Dimethylcyclopentane	0.23	0.01	0.36	0.15
Methylcyclohexane	1.10	0.03	2.12	1.25
C ₇ Naphthenes (total)	3.1	----	0.3	5.1
C ₈ Naphthenes (total)	2.2	----	----	2.3
C ₉ Naphthenes (total)	0.9	----	----	1.6
C ₁₀ Naphthenes (total)	0.2	----	----	0.4
C ₁₁ Naphthenes (total)	trace	----	----	0.2
Total Naphthenes	11.3	11.3	12.3	14.5

Aromatics, LV%

SAL 000008935

Benzene	3.2	6.4	8.4	0.3
Toluene	3.1	----	2.5	4.7
C ₈ Aromatics (total)	5.5	----	----	9.3
C ₉ Aromatics (total)	3.0	----	----	5.4
C ₁₀ Aromatics (total)	0.6	----	----	1.3
C ₁₁ Aromatics (total)	0.3	----	----	0.6
C ₁₂ Aromatics (total)	----	----	----	----
Total Aromatics	15.7	6.4	10.9	21.3

LABORATORY NO.: A-11-73
January 4, 1978
Attachment, Page nine

Sample:
LC No.:
PC No.:
Sample Date:

Thermal Gasoline (Continued)

1411-77

1645

11/21/77

Olefins, wt

	<u>Original</u>	<u>1BP-155°F Cut</u>	<u>155 -200°F Cut</u>	<u>200°F-EP bt</u>
Butylenes (total)	0.3	0.7	----	----
Amylenes (total)	3.4	12.4	----	----
C- & Heavier (total)	<u>26.2</u>	<u>18.0</u>	<u>38.4</u>	<u>31.6</u>
Total Olefins	29.9	21.1	38.4	37.6

SAL 000008936

LABORATORY NO.: A-11-78
 January 4, 1978
 Attachment, Page ten

Sample: Coker Gasoline
 LG No.: 1412-77
 PG No.: 1646
 Sample Date: 11/21/77

Paraffins, LV	Original	IBP-155°F Cut	155°F-200°F Cut	200°F-E
Ethane	trace	0.6	----	----
Propane	0.4	3.2	----	----
Isobutane	0.1	1.3	----	----
Normal Butane	0.5	6.4	----	----
Isopentane	0.4	4.2	0.03	----
Normal Pentane	1.0	12.3	0.26	----
1,2-Dimethylbutane	0.01	0.03	0.01	----
2,3-Dimethylbutane	0.05	0.60	0.09	----
2-Methylpentane	0.38	5.91	1.27	0.1
3-Methylpentane	0.14	3.12	0.70	0.1
Normal Hexane	1.37	16.67	6.71	0.1
1,2-Dimethylpentane	1.01	0.10	0.11	tr
2,4-Dimethylpentane	0.03	0.21	0.22	tr
2,5-Dimethylpentane	trace	0.01	0.03	----
2,3-Dimethylpentane	0.03	0.02	0.61	0.1
2,4,5-Trimethylpentane	----	----	0.01	----
3-Methylhexane	0.26	0.15	4.13	0.1
3-Methylheptane	0.33	0.10	4.62	0.1
3-Ethylpentane	0.02	----	0.14	0.1
Normal Heptane	2.37	0.08	18.93	1.1
C ₈ Isoparaffins (total)	1.5	----	1.53	1.1
Normal Octane	2.6	----	----	3.1
C ₉ Paraffins (total)	4.5	----	----	5.1
C ₁₀ Paraffins (total)	4.8	----	----	5.1
C ₁₁ Paraffins (total)	4.3	----	----	4.1
C ₁₂ Plus Paraffins (total)	3.7	----	----	4.1
Total Paraffins	28.3	55.0	39.4	26.1

Napthenes, LV				
Cyclopentane	0.10	1.08	0.35	----
Methylcyclopentane	0.94	8.20	4.91	0.1
Cyclohexane	0.11	0.65	1.56	0.1
1,1-Dimethylcyclopentane	0.03	0.02	0.56	0.1
1,2-3-Dimethylcyclopentane	0.18	0.06	2.44	0.1
1,2-3-Dimethylcyclopentane	0.14	0.04	1.97	0.1
1,2-2-Dimethylcyclopentane	0.16	0.04	2.35	0.1
1,2-1-Dimethylcyclopentane	0.14	0.01	0.64	0.1
Methylcyclohexane	0.50	----	2.32	0.1
C ₈ Napthenes (total)	1.7	----	0.5	----
C ₉ Napthenes (total)	1.8	----	----	----
C ₁₀ Napthenes (total)	1.7	----	----	----
C ₁₁ Napthenes (total)	2.9	----	----	----
C ₁₂ Plus Napthenes (total)	2.3	----	----	----
Total Napthenes	11.7	17.7	17.6	12.1

Aromatics, LV				
Benzene	0.3	2.9	2.6	tr
Toluene	3.6	----	5.9	3.1
C ₈ Aromatics (total)	6.4	----	----	6.1
C ₉ Aromatics (total)	6.0	----	----	5.1
C ₁₀ Aromatics (total)	5.3	----	----	5.1
C ₁₁ Aromatics (total)	12.0	----	----	20.1
C ₁₂ Plus Aromatics (total)	0.9	----	----	1.1
Total Aromatics	38.5	30.3	18.5	44.5

SAL 000008937

LABORATORY NO.: A-11-78
January 4, 1978
Attachment, Page eleven

Sample:
LC No.:
PC No.:
Sample Date:

Coker Gasoline (Continued)
1412-77
1646
11/21/77

<u>Olefins, LV</u>	<u>Original</u>	<u>IBP-155°F Cut</u>	<u>155°-200°F Cut</u>	<u>200°F-EP btms</u>
Propylene	0.1	0.7	----	----
Butylenes (total)	0.4	3.3	----	----
Amylenes (total)	0.8	9.0	----	----
C6 & heavier (total)	16.7	19.0	34.5	17.5
Total Olefins	18.0	32.0	34.5	17.5

SAL 000008938

CONOCO INC.
PONCA CITY, OKLAHOMA
REFINING TECHNICAL SERVICES LABORATORY

Plt.: LC
 File: 662.1
 Date: 10/6/83

LABORATORY NO.: J-23-83
 CHARGE: LC 49
 SUBJECT: Quality of Products - Typical Base Gasolines and Gasoline Streams -
 Summer 1983 - Lake Charles Refinery

TABLE I
BASE GASOLINES

Composition, Normal Range

<u>Stock</u>	<u>Regular</u>	<u>Unleaded</u>	<u>Super Unleaded</u>
<u>Composition, Vol.%</u>			
Denuded C.H.	5-10	0-5	-----
Lt. St. Run	5-10	0-5	-----
Coker Gasoline	0-5	0-5	0-5
FCC Gasoline	40-55	30-40	15-25
No.2 Reformate	15-25	35-45	10-15
No.3 Reformate	0-5	5-10	25-35
Cat Poly	0-5	0-5	0-5
Alkylate	-----	0-5	25-35
Butane	0-5	5-10	5-10

Typical Inspections

Gravity, °API	58.5	56.0	58.5
Distillation, ° F, 760 mm			
IPB	95	91	92
10% Evaporated	118	114	116
50% Evaporated	211	220	222
90% Evaporated	354	339	328
End Point	434	434	427
Recovery, Vol.%	97	97	96
Reid Vapor Pressure, psi	11.0	11.0	11.2
Temperature for V/L of 20, calc.	129	129	129
Existent ASTM Gum, mg./100 mls.	2	1	2
Aromatics, Vol.%	31	38	30
Olefins, Vol.%	24	12	7
Total Sulfur, Wt.%	0.07	0.04	0.02
Benzene, Vol.%	1.5	2.2	2.4

Research Octanes

Clear	90.8	92.5	96.0
0.25 gms./gal. TEL	92.2		
0.5 gms./gal. TEL	93.5		
1.5 gms./gal. TEL	95.9		

SAL 000008939

Motor Octanes

Clear	80.1	82.1	86.0
0.25 gms./gal. TEL	81.4		
0.5 gms./gal. TEL	82.3		
1.5 gms./gal. TEL	84.4		



Interoffice Communication

To Mike Johnston
From M. W. Clayton
Date February 4, 1986
Subject BENZENE ANALYSIS OF REFINERY STREAMS - WESTLAKE REFINERY

A survey of the benzene concentrations of the major light end refinery streams was performed. The following results were obtained.

<u>UNIT</u>	<u>STREAM</u>	<u>DATE</u>	<u>BENZENE (LVZ)</u>
No. 3 CTU	Light Str. Run	2-4-86	2.79
No. 3 CTU	Naphtha	1-31-86	0.41
No. 3 CTU	HOD	2-4-86	<0.01
No. 3 Reformer	HDS Charge	1-31-86	1.16
No. 3 Reformer	Reformate	1-28-86	2.71
No. 2 Reformer	Prim. Twr. Ovhd.	1-31-86	0.32
No. 2 Reformer	Prim. Twr. Btms.	1-31-86	<0.01
No. 2 HDS Reformer	Charge & 2 HDS Charge	1-31-86	1.16
No. 1 HDS	Effluent - LVZ	1-31-86	0.18
No. 2 Reformer	Reformate	1-31-86	2.71
No. 2 Coker	Gasoline	1-28-86	0.43
GRP	Gasoline	1-28-86	0.39
No. 1 Coker	Gasoline	2-4-86	0.84
Alky	Total Alkylate	2-2-86	<0.01
PBC	Denuded Casinghead	2-3-86	1.29
Thermal	W-10 Gasoline	2-4-86	3.15
Thermal	W-10 Naphtha	2-4-86	2.29
Thermal	Gasoline	2-4-86	0.25
No. 2 CTU	Lt. Str. Run	1-31-86	1.95
No. 2 CTU	Naphtha	1-31-86	0.18
FCC	Gasoline	1-28-86	1.21
Cat Poly	Gasoline	1-28-86	<0.01

M. W. Clayton

M. W. Clayton
Analytical Chemist
Lake Charles Refinery

eh

cc: JJM/JCK/JI/File
WORK: MWC-2-4-86

SAL 000008940

TABLE II
TYPICAL BASE GASOLINE STREAMS
LAKE CHARLES REFINERY - SUMMER 1983

Ponca City Sample No.:	1610	1603	1604	1608
Lake Charles Sample No.:	726	719	720	724
Stock:	FCC Gasoline	No.2 Lt. St. Run Gasoline	No.3 Lt. St. Run Gasoline	Denuded Casinghead
Gravity, °API	53.6	64.0	69.8	78.6
<u>Distillation, D-86, °F, 760 mm</u>				
IBP	100	122	119	96
5% Evaporated	117	156	134	105
10% Evaporated	129	165	141	109
20% Evaporated	149	176	149	114
30% Evaporated	171	185	156	118
50% Evaporated	231	205	167	131
70% Evaporated	300	222	178	163
90% Evaporated	383	245	197	221
95% Evaporated	407	255	205	249
End Point	444	276	221	304
Recovery, Vol.%	98	98	98	97
Reid Vapor pressure, psi	7.7	5.0	7.7	11.1
Sulfur, Wt.%	0.11	<0.01	<0.01	<0.01
Aromatics, Vol.%	33	8	6	3
Olefins, Vol.%	34	<1	<1	1
Existent ASTM Gum, mg./100 mls.	2	1	1	1
Benzene, Vol.%	0.7	1.7	3.5	1.5
<u>Research Octanes</u>				
Clear	93.2	63.6	70.3	74.0
0.25 gms./gal. TEL	94.3	66.8	73.4	77.1
0.5 gms./gal. TEL	95.9	69.2	76.4	80.0
1.5 gms./gal. TEL	97.7	78.0	84.0	87.3
<u>Motor Octanes</u>				
Clear	80.3	63.1	68.4	72.0
0.25 gms./gal. TEL	81.5	66.6	71.3	75.6
0.5 gms./gal. TEL	82.2	69.6	74.5	79.1
1.5 gms./gal. TEL	84.0	78.3	81.6	85.6

SAL 000008941

TABLE II (Continued)
TYPICAL BASE GASOLINE STREAMS
LAKE CHARLES REFINERY - SUMMER 1983

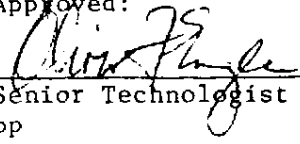
Ponca City Sample No.:	1607	1605	1606
Lake Charles Stock No.:	723	721	722
Stock:	Cat Poly Gasoline	Alkylate	Coker Gasoline
Gravity, °API	62.8	71.2	61.9
<u>Distillation, D-86, °F, 760 mm</u>			
IBP	97	79	124
5% Evaporated	---	107	134
10% Evaporated	162	136	153
20% Evaporated	230	180	185
30% Evaporated	249	207	205
50% Evaporated	274	221	233
70% Evaporated	296	230	264
90% Evaporated	342	269	296
95% Evaporated	376	341	312
End Point	424	429	362
Recovery, Vol.%	94	97	97
Reid Vapor Pressure, psi	10.3	9.4	10.3
Sulfur, Wt.%	<0.01	<0.01	0.24
Aromatics, Vol.%	<1	<1	8
Olefins, Vol.%	97	1	45
Existent ASTM Gum, mg./100 mls.	13	2	2
Benzene, Vol.%	<0.1	<0.1	0.1
<u>Research Octanes</u>			
Clear	95.3	96.0	72.0
0.25 gms./gal. TEL	96.7	98.2	73.2
0.5 gms./gal. TEL	97.5	100.3	74.2
1.5 gms./gal. TEL	99.4	103.5	78.8
<u>Motor Octanes</u>			
Clear	82.6	92.0	65.1
0.25 gms./gal. TEL	83.5	95.0	66.0
0.5 gms./gal. TEL	84.0	97.6	67.2
1.5 gms./gal. TEL	85.4	100.2	71.0

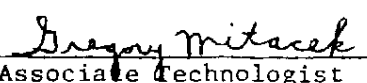
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TABLE II (Continued)
TYPICAL BASE GASOLINE STREAMS
LAKE CHARLES REFINERY - SUMMER 1983

Ponca City Sample No.:	1611	1609	1781
Lake Charles Sample No.:	727	725	858
Stock	No. 2 Reformer Charge	No. 2 Reformate	No. 3 Reformate
Gravity, °API	57.5	49.1	44.4
Distillation, D-86, °F, 760 mm			
IBP	129	115	101
5% Evaporated	181	148	125
10% Evaporated	208	163	146
20% Evaporated	225	184	178
30% Evaporated	234	201	203
50% Evaporated	259	240	246
70% Evaporated	283	278	281
90% Evaporated	312	321	325
95% Evaporated	321	338	344
End Point	339	388	404
Recovery, Vol.%	97	98	98
Reid Vapor Pressure, psi	8.2	5.5	7.9
Sulfur, Wt.%	<0.01	<0.01	<0.01
Aromatics, Vol.%	11	49	63
Olefins, Vol.%	1	1	1
Existent ASTM Gum, mg./100 mls.	<1	2	1
Benzene, Vol.%	1.0	3.8	6.0
Research Octanes			
Clear	53.8	94.7	100.9
0.25 gms./gal. TEL	56.4	96.3	102.0
0.5 gms./gal. TEL	59.4	97.7	102.8
1.5 gms./gal. TEL	68.7	100.0	104.3
Motor Octanes			
Clear	53.4	85.2	89.0
0.25 gms./gal. TEL	56.3	86.6	89.6
0.5 gms./gal. TEL	60.8	88.0	90.2
1.5 gms./gal. TEL	71.4	90.5	92.2

Approved:


Senior Technologist
bp


Associate Technologist

SAL 000008943

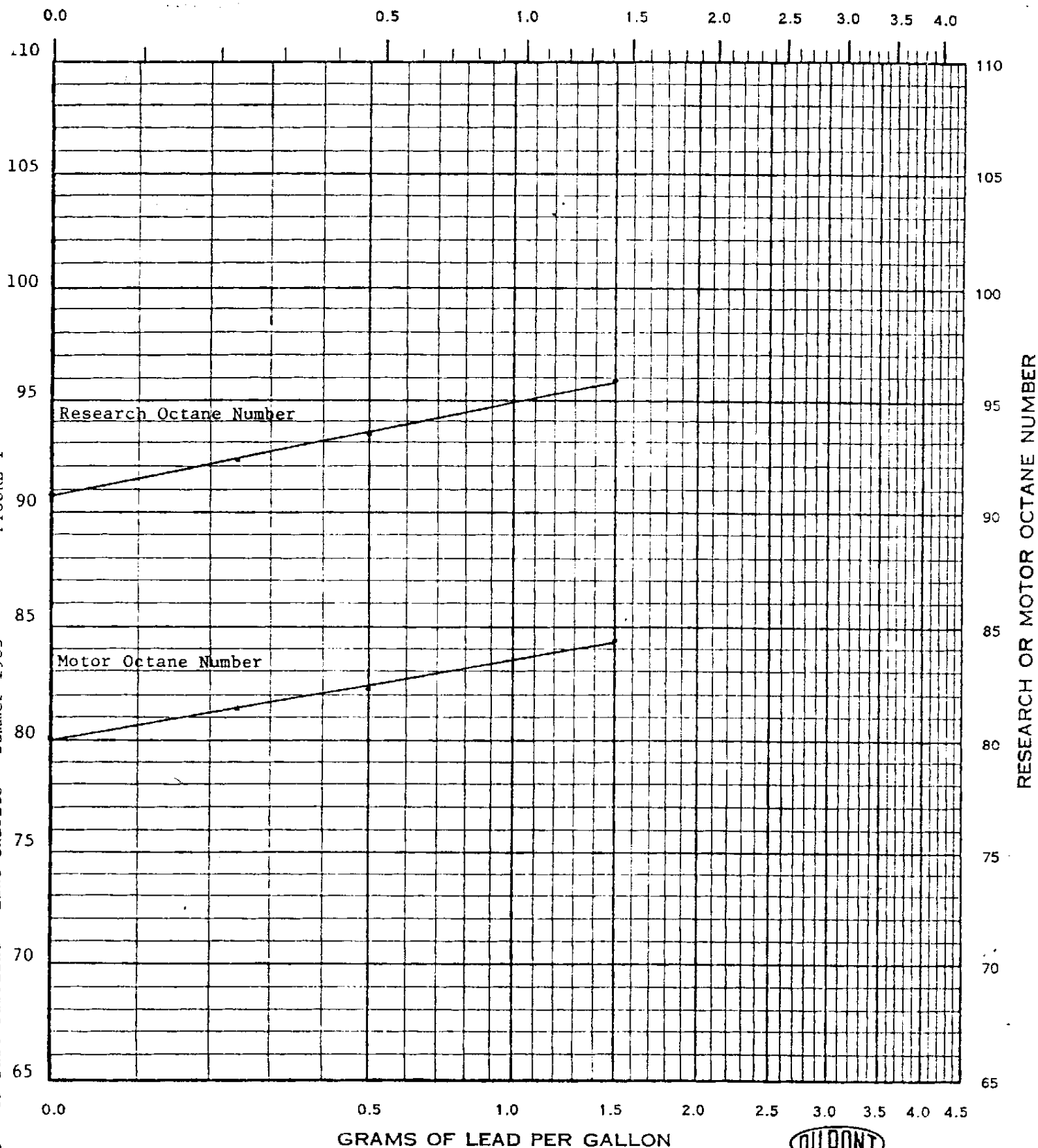
10/6/83

TEL MOTOR ANTIKNOCK SUSCEPTIBILITY CHART

TETRAETHYL LEAD, MILLILITERS PER GALLON

FIGURE 1

Re ar Base Gasoline - Lake Charles - Summer 1983



GRAMS OF LEAD PER GALLON



PETROLEUM CHEMICALS DIVISION
E. I. DU PONT DE NEMOURS & CO. (INC.)
WILMINGTON 98, DELAWARE

SAL 000008944

JW
~~EX~~

CONOCO INC.
PONCA CITY, OKLAHOMA
REFINING TECHNICAL SERVICES LABORATORY

Plt.: LC
File: 662.1
Date: 2/8/85

LABORATORY NO.: B-38-85
CHARGE: LC 49
SUBJECT: Analysis of Light Straight Run Gasoline Samples - Lake Charles Refinery

DISCUSSION:

Six samples of light straight run gasoline material were received for complete compositional analysis. Additionally, the samples were analyzed for fluoride, chloride, bromide and basic/total nitrogen. This work was done to provide data for evaluating a C₅-C₆ isomerization process for the Lake Charles Refinery.

DATA:

Attached

REFERENCE:

Letter to K. C. Hunt from P. A. Nelson dated 1/24/85.

W. G. Genbelle
Associate Technologist

Approved:

J. E. Condit
Senior Technologist

bp

cc: (PWL-PFM)-JWL-JM-PAN-HGG-CDC-JRU-DCG-KCH-F

SAL 000008945

2/8/85

Page 1 Att.

Sample:	Field PBC	Denuded Casinghead	No. 2 CTU LSR
Sample Date:	1/23/85	1/23/85	1/23/85
LC Sample No.:	71A-85	71B-85	71C-85
PC Sample No.:	1796	1797	1798

Compositional Analysis, LVZPARAFFINS, LVZ

Methane	---	---	---
Ethane	0.1	---	---
Propane	0.4	---	---
Isobutane	29.1	Trace	Trace
Normal Butane	27.4	1.2	0.2
Isopentane	12.2	27.3	4.2
Normal Pentane	8.2	20.6	5.4
2,2 Dimethylbutane	0.6	1.7	0.6
2,3 Dimethylbutane	0.7	1.6	1.3
2-Methylpentane	2.9	7.4	5.7
3-Methylpentane	1.6	4.0	4.2
Normal Hexane	3.0	7.9	8.5
2,2 Dimethylpentane	0.3	0.5	0.9
2,4 Dimethylpentane	0.3	0.6	1.0
3,3 Dimethylpentane	0.1	0.2	0.3
2-Methylhexane	0.8	1.7	4.1
2,3 Dimethylpentane	0.2	0.4	1.1
3-Methylhexane	0.7	1.7	4.2
3-Ethylpentane	0.1	0.1	0.4
Normal Heptane	1.2	3.0	9.3
C8 Paraffins, total	1.4	2.2	9.0
C9 Paraffins, total	0.6	0.8	0.6
C10 Paraffins, total	0.1	0.2	---
Paraffins, Total	92.0	83.1	61.0

NAPHTHENES, LVZ

Cyclopentane	0.4	1.0	0.6
Methylcyclopentane	1.0	2.7	3.3
Cyclohexane	1.3	2.8	5.1
1,1 Dimethylcyclopentane	0.2	0.4	0.9
1-c-3 Dimethylcyclopentane	0.2	0.4	1.0
1-t-3 Dimethylcyclopentane	0.1	0.3	0.8
1-t-2 Dimethylcyclopentane	0.2	0.7	1.6
1-c-2 Dimethylcyclopentane	Trace	0.1	0.3
Methylcyclohexane	1.5	2.6	10.2
Ethylcyclopentane	0.1	0.2	0.5
C8 Naphthenes, total	0.7	1.2	4.3
C9 Naphthenes, total	0.2	0.3	0.1
C10 Naphthenes, total	0.1	Trace	---
Naphthenes, Total	6.0	12.7	28.7

AROMATICS, LVZ

Benzene	0.9	1.8	3.2
Toluene	0.7	1.2	6.5
C8 Aromatics, total	0.3	0.5	0.6
C9 Aromatics, total	0.1	0.1	---
Aromatics, Total	2.0	3.6	10.3

OLEFINS, LVZ

C4 Olefins, total	---	---	---
C5 Olefins, total	---	0.2	---
C6+ Olefins, total	---	0.4	---
Olefins, Total	---	0.6	---

TOTAL	100.0	100.0	100.0
-------	-------	-------	-------

SAL 000008946

Sample:	No. 3 CTU	W-10	W-10
	LSR	OH	Stms
Sample Date:	1/23/85	1/23/85	1/23/85
LC Sample No.:	71D-85	71E-85	71F-85
PC Sample No.:	1799	1800	1801

Compositional Analysis, LVZ

PARAFFINS, LVZ

Methane	—	Trace	—
Ethane	—	0.2	—
Propane	0.1	1.5	—
Isobutane	0.8	2.7	—
Normal Butane	3.6	9.9	—
Isopentane	4.8	21.6	Trace
Normal Pentane	7.9	29.5	0.2
2,2 Dimethylbutane	0.3	1.5	0.3
2,3 Dimethylbutane	1.0	1.9	0.9
2- Methylpentane	6.2	8.7	4.9
3- Methylpentane	4.4	5.2	4.0
Normal Hexane	12.8	8.4	10.8
2,2 Dimethylpentane	0.8	0.18	1.0
2,4 Dimethylpentane	0.8	0.17	1.1
3,3 Dimethylpentane	0.3	0.03	0.4
2-Methylhexane	4.0	0.08	5.2
2,3 Dimethylpentane	1.2	0.03	1.4
3-Methylhexane	4.8	0.06	5.8
3-Ethylpentane	0.4	—	0.3
Normal Heptane	10.3	0.05	13.0
C8 Paraffins, total	4.4	—	8.7
C9 Paraffins, total	0.3	—	0.5
C10 Paraffins, total	—	—	Trace
Paraffins, Total	69.2	91.7	58.5

NAPHTHENES, LVZ

Cyclopentane	0.8	1.7	0.3
Methylcyclopentane	4.1	2.3	4.0
Cyclohexane	4.1	0.9	3.5
1,1 Dimethylcyclopentane	1.0	0.02	1.2
1-c-3 Dimethylcyclopentane	1.2	—	1.3
1-t-3 Dimethylcyclopentane	0.9	0.02	1.2
1-t-2 Dimethylcyclopentane	1.8	0.03	2.3
1-c-2 Dimethylcyclopentane	0.1	—	0.2
Methylcyclohexane	4.8	0.03	9.4
Ethylcyclopentane	0.7	—	0.8
C8 Naphthenes, total	2.5	—	4.5
C9 Naphthenes, total	0.1	—	0.2
C10 Naphthenes, total	—	—	Trace
Naphthenes, Total	22.1	3.0	30.9

AROMATICS, LVZ

Benzene	2.2	1.7	2.5
Toluene	3.0	Trace	3.4
C8 Aromatics, total	0.2	—	0.5
C9 Aromatics, total	—	—	—
Aromatics, Total	5.4	1.7	8.4

OLEFINS, LVZ

C4 Olefins, total	Trace	0.2	—
C5 Olefins, total	0.2	0.3	—
C6 Olefins, total	3.1	1.0	2.2
Olefins, Total	3.3	1.3	2.2

Hydrogen Sulfide, LVZ

	—	0.1	—
TOTAL	100.0	100.0	100.0

SAL 000008947

LABORATORY NO.: B-38-85
2/8/85
Page 3 Att.

Sample:	Field PBC	Denuded Casinghead	No. 2 CTU LSR	No. 3 CTU LSR	W-10 OH	W-10 Bottoms
Sample Date:	1/23/85	1/23/85	1/23/85	1/23/85	1/23/85	1/23/85
LC Sample No.:	71A-85	71B-85	71C-85	71D-85	71E-85	71F-85
PC Sample No.:	<u>1796</u>	<u>1797</u>	<u>1798</u>	<u>1799</u>	<u>1800</u>	<u>1801</u>
Fluoride, ppmw	<1	<1	<1	<1	<1	<1
Chloride, ppmw	2	8	6	9	5	5
Bromide, ppmw	<1	<1	<1	<1	<1	<1
Nitrogen, Total, ppmw	1.0	1.0	0.7	1.5	1.0	1.0
Nitrogen, Basic, ppmw	<0.5	<0.5	<0.5	1.0	<0.5	<0.5

SAL 000008948



Interoffice Communication

To: Harry Jouett, SS# 437-24-6914
From: John LeMaire
Date: October 29, 1982
Subject: RESULTS OF PERSONAL MONITORING

On 8/30/82, you took part in the hygiene monitoring program here in the Refinery. The purpose of our program is to define or locate work areas where employees may be subject to a harmful exposure. Once the areas are defined, engineering controls may have to be designed and installed to control and reduce the exposure. It may be necessary for employees to use some type protective equipment (ear plugs, respirators, clothing, etc.) until the controls are installed.

The results of the personal monitoring you took part in are outlined below.

Monitoring Data

Date: 8/30/83

Job Classification: Lab octane tester

Work Performed: testing leaded gasoline samples

Suspected Hazard(s): total alkanes, benzene, toluene

Threshold Limit Value (TLV)

The time-weighted average concentrations for a normal eight-hour work day or forty hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

NIOSH TLV 350 mg/m³/ppm - Total Alkanes, OSHA Benzene 10 ppm,
ACGIH Toluene 100 ppm.

The results of the analysis of your sample was 65.31 mg/m³/ppm - Total Alkanes, 0.022 ppm Benzene, 10.49 ppm Toluene, which is less than the TLV.

Thank you for your cooperation in this program to improve our employees' working conditions.

John LeMaire
John LeMaire
Safety Supervisor
Lake Charles Refinery

ar

cc: 



Interoffice Communication

To: Edna Baldwin, SS# 262-94-4968
From: John LeMaire
Date: October 28, 1982
Subject: RESULTS OF PERSONAL MONITORING

On 8/30/82, you took part in the hygiene monitoring program here in the Refinery. The purpose of our program is to define or locate work areas where employees may be subject to a harmful exposure. Once the areas are defined, engineering controls may have to be designed and installed to control and reduce the exposure. It may be necessary for employees to use some type protective equipment (ear plugs, respirators, clothing, etc.) until the controls are installed.

The results of the personal monitoring you took part in are outlined below.

Monitoring Data

Date: 8/30/82
Job Classification: Lab 2nd Tester
Work Performed: Sample tester
Suspected Hazard(s): Total alkanes, benzene, toluene

Threshold Limit Value (TLV)

The time-weighted average concentrations for a normal eight-hour work day or forty hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

NIOSH TLV 350 mg/m³/ppm - Total Alkanes, OSHA Benzene 10 ppm,
ACGIH Toluene 100 ppm.

The results of the analysis of your sample was 86.03 mg/m³/ppm - Total Alkanes, 0.022 ppm Benzene, 15.69 ppm Toluene, which is less than the TLV.

Thank you for your cooperation in this program to improve our employees' working conditions.


John LeMaire
Safety Supervisor
Lake Charles Refinery

ar

cc: 

SAL 000008950



Interoffice Communication

To: Kelly Ledet, SSE 436-90-8761
From: John LeMaire
Date: October 29, 1982
Subject: RESULTS OF PERSONAL MONITORING

On 8/30/83, you took part in the hygiene monitoring program here in the Refinery. The purpose of our program is to define or locate work areas where employees may be subject to a harmful exposure. Once the areas are defined, engineering controls may have to be designed and installed to control and reduce the exposure. It may be necessary for employees to use some type protective equipment (ear plugs, respirators, clothing, etc.) until the controls are installed.

The results of the personal monitoring you took part in are outlined below.

Monitoring Data

Date: 8/30/83

Job Classification: Lab Distillation Tester

Work Performed: Sample Tester

Suspected Hazard(s): Total alkanes, benzene, toluene

Threshold Limit Value (TLV)

The time-weighted average concentrations for a normal eight-hour work day or forty hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect:

NIOSH TLV 350 mg/m³/ppm - Total Alkanes, OSHA Benzene 10 ppm,
ACGIH Toluene 100 ppm.

The results of the analysis of your sample was 268.54 mg/m³/ppm - Total Alkanes, 4.49 ppm Benzene, 18.09 ppm Toluene, which is less than the TLV.

Thank you for your cooperation in this program to improve our employees' working conditions.

John LeMaire
John LeMaire
Safety Supervisor
Lake Charles Refinery

ar

cc: BJM

SAL 000008951