



returning to T.H. Waltrip

T.H.W.

Tech. Serv. Div.

JAN 21 1986

Interoffice Communication

To Distribution
From Ronald E. Thompson
Date January 15, 1986
Subject PROPOSED OSHA RULE ON BENZENE

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Attached is a summary on OSHA's benzene proposal that was prepared by API. Also attached is Mary Ann Chance's memorandum of December 26th on the same subject.

My primary concern relates to who in Conoco will be covered thereby triggering the initial monitoring requirements. The areas apparently excluded are:

1. Production
2. Distribution operations downstream of the truck racks at product terminals.
3. Truck racks with vapor recovery equipment (Larry Clynch advises that Conoco has 29).
4. Normal pipeline operations for both products and crude.

The areas apparently included are:

1. Truck racks without vapor recovery (Larry advises there are 6).
2. Refining operations where there are streams with in excess of 0.5% benzene.
3. Other areas where liquid mixtures with more than 0.5% benzene might be present or used. (barge operations, solvents, etc.)

The areas at question (at least to me) include:

1. Work operations around gasoline stored in floating roof tanks (does this constitute a sealed container?)
2. Work operations around crude tankage. Terry Waltrip advises that some crudes exceed 0.5% benzene and many exceed 0.1%. Since many crude tanks are cone roof, this could include a larger number of people (i.e. gaugers, deliverymen, etc.).

- (1) Urinary phenol.
- (2) If urinary phenol is ≥ 75 mg/l, CBC after 3 months.

4. Special exams

a. Criteria:

- (1) Hemoglobin < 14 grams percent for males or < 12 grams percent for females; and hematocrit < 38 for males or < 34 for females, and/or these indices show "a persistent downward trend" which "cannot be explained for other medical reasons".
- (2) Thrombocyte count $> 15\%$ below the most recent value or is $< 140,000/\text{mm}^3$.
- (3) Leukocyte count is $< 4,000/\text{mm}^3$ or there is an "abnormal" differential count.

b. Procedures:

- (1) If criteria are met, repeat CBC within 2 weeks.
- (2) If criteria persist, refer worker to a hematologist or internist, and worker is temporarily removed from workplace exposure.
- (3) After special exam, the physician must determine whether to allow the worker to return to exposure, in consultation with hematologist/internist.

E. Methods of Compliance [para. (f), (g)]

1. Engineering and work practice controls required except:

- a. Where the employer can establish they are not "feasible", "such as" maintenance, repair, vessel cleaning, or other operations where such controls "are infeasible because exposures are intermittent in nature and limited in duration".
- b. Where "benzene is present in a workplace" 30 days per year.

D. Medical Surveillance [para. (i)]

1. Timing

- a. Initial exams within 60 days of effective date.
- b. Previous exams within 6 months of the effective date of the final standard are grandfathered.
- c. Repeat exams every 6 months. ✓

2. Coverage

- a. Workers exposed >AL 30 or more days per year.
- b. Workers exposed >PEL 10 or more days per year.
- c. Worker formerly exposed to > ppm for 30 or more days in any prior year by current employer.
- d. For workers exposed to an "emergency" (an "unexpected significant release").

3. Elements

a. Initial exam:

- (1) Detailed occupational history.
- (2) Complete physical examination.
- (3) CBC and additional tests "as necessary in the opinion of the examining physician".
- (4) Pulmonary function test and chest x-ray for workers required to wear respirators > 30 days per year.

b. Repeat exams:

- (1) Brief history.
- (2) CBC and additional test "as necessary".
- (3) For respirator wearers, pulmonary function tests every 3 years and chest x-rays every 5 years.

c. Emergency exams:

2. Bulk terminals and plants that use vapor control (balance or recovery) systems. */
3. Intact containers and pipelines. */
4. Work operations where the only exposure is from liquids containing 0.5% (0.1% after 5 years) or less benzene by volume.
5. Oil and gas drilling, production and servicing.

C. Monitoring [para (e)]

1. Timing

- a. Initial monitoring within 60 days of effective date of final standard. **/
- b. Monitoring within 1 year prior to the publication date of final standard is grandfathered.

2. Scope

- a. For initial monitoring, at least 1 sample is required for each shift of each job classification in each work area.
- b. For repeat monitoring, single-shift monitoring permitted if employer shows other shifts are "equivalent".

3. Frequency

- a. Semiannually if exposures are > PEL.
- b. Annually if exposure are > AL but < PEL.
- c. None if exposures are < AL.
- d. Can reduce frequency (e.g., a to b, or b to c) based on two consecutive measurements at least 7 days apart.
- e. Redetermination required for any change that "may result in new or additional exposures" and after a spill has been cleaned up.

*/ The emergency and hazard communication provisions apply to bulk storage facilities and to containers/pipelines involving liquids with more than 0.1% benzene.

**/ The effective date is 90 days after publication of the final standard in the Federal Register.

4. OSHA concludes that this risk is significant, and that reducing the PEL to 1 ppm would achieve a significant risk reduction. OSHA adds that, "if it were feasible, OSHA would seek to reduce" the risk remaining under a 1 ppm standard (which OSHA estimates to be 5-16 deaths per 1,000 workers for a 45-year worklife); however, this is caveated by statements acknowledging that certain employer actions, such as holding average exposures below 0.5 ppm and implementation of medical surveillance provisions, will reduce the risk below the levels predicted by the risk assessment models [pp. 135-137].

C. Feasibility

1. OSHA concludes that a 1 ppm standard is technologically feasible [pp. 148-157], and suggests that a 0.5 ppm PEL may be feasible in refining, chemical, coke, and wholesale gasoline marketing industries [pp. 150, 153, 179].
2. OSHA also concludes that a 1 ppm PEL would produce no significant economic impacts [pp. 164-70].
3. OSHA estimates the annualized costs of the proposed standard to be \$29 million [p. 159], and that it will prevent 822 deaths over a 50 year period [pp. 144-148].

II. PROVISIONS

A. Exposure Limits and Triggers [para (c), (h)]

1. PEL: 1.0 ppm (8 hr. TWA).
2. No STEL is proposed, however comments will be considered on the merits of inclusion.
3. Action Level (AL): 0.5 ppm (8 hr. TWA).
4. Possible utilization of company data to help assess compliance with the standard if and when OSHA measurement indicates non-compliance.
5. Eye contact "prevention" and dermal contact "limits" are deleted although protective equipment provisions are included.

B. Scope: all workplaces involving "occupational exposures to benzene" except for the following [para (a)]:

1. Gasoline marketing downstream of bulk terminals and bulk plants.

SUMMARY OF OSHA'S
DECEMBER 2, 1985
BENZENE PROPOSAL

This outline summarizes the key factual findings contained in OSHA's benzene proposal and its major provisions.

I. FINDINGS

A. Health

1. Benzene has been shown to be associated with the following disorders in humans [pp. 23-24]:
 - a. myelogenous leukemia and its variants;
 - b. acute and chronic lymphatic leukemia;
 - c. multiple myeloma;
 - d. aplastic anemia and various cytopenias.
2. Benzene has been shown to produce non-lympho-hematopoietic cancer in animals; this risk has not been adequately evaluated in humans [p. 24]; OSHA refers to this risk as "suggestive" [pp. 24, 75].
3. Benzene causes chromosomal damage in humans below 10 ppm [pp. 25, 62 - 67].
4. Benzene causes hematotoxic and immune system effects in animals at around 10 ppm [pp. 77-79].
5. Benzene can be absorbed through the skin in significant amounts (e.g. equivalent to an 8-hour inhalation exposure of 1 ppm for a tire-builder) [pp. 80-83].

B. Risk Assessment

1. OSHA examines leukemia only, and says that the "total disease risk" may therefore be underestimated [pp. 85-86].
2. OSHA finds the linear dose-response model "most reasonable" based on chromosome and subchronic blood studies [p. 88].
3. OSHA's "preliminary preferred estimate" is 44 to 152 deaths per 1,000 workers exposed to 10 ppm for a 45-year working life (the White, Infante & Chu (1982) assessment) [p. 134].

assessment. However, as just discussed, OSHA expects the action level, industrial hygiene and medical surveillance provisions to reduce risk substantially below those predicted by the mathematical models, though the additional reduction cannot be quantified. OSHA preliminarily concludes that its proposed benzene standard will protect employees and that employers who fulfill the provisions of the standard will be taking reasonable steps to protect their employees from the hazards of benzene. Indeed many employers have already reduced exposures of employees to below those of the proposed standard." The second area is the cost and operation disruption that could potentially result from the myriad of individually small, but cumulatively significant monitoring, control, surveillance and compliance requirements included in the standard.

These two areas are the focus of ongoing efforts within API in developing our response to this proposed standard. We must try to bolster the agency's position in those areas where we believe they have acted reasonably as well as try to change those areas where they have not. Efforts will also be made to support the elimination of the STEL, and to support the use of company monitoring data in assessing compliance.

As a result of the changes made in this proposal from the last OSHA draft of February 1985, the overall impact of the proposed standard is less than previously expected. This assumes the STEL provision is not incorporated, and that the more flexible use of company data to determine average compliance with the PEL is incorporated into the standard. In general only relatively minor problems have been found with medical surveillance and ancillary provisions of the standard. Cost and operation disruption estimates stemming from control and compliance provisions of the standard are still being determined, but do not appear to be as high or as onerous as anticipated.

Attached is a more detailed description of the standard.

Benzene OSHA Standard Update

An occupational standard for benzene was proposed by OSHA on December 2, 1985. This proposal exhibits significant positive changes from earlier OSHA positions that reflect incorporation of industry concerns. Major provisions of the standard include:

- o A Permissible Exposure Limit (PEL) of 1 ppm 8 hour TWA.
- o An Action Level of 0.5 ppm 8 hour TWA. — ambient air
- o An assortment of monitoring, medical surveillance, and compliance provisions that, with minor exceptions, are compatible with industry interests.

Exempted from the standard are gasoline marketing establishments downstream of bulk terminals and plants, bulk terminals and plants that use vapor control systems, intact containers and pipelines, and work operations with exposures only from liquids containing 0.5% or less benzene by volume (0.1% after 5 years).

Potentially positive changes from the original draft proposal include:

- o Elimination of a Short Term Exposure Limit (STEL). However a STEL is still under consideration and comments on the merits of including an STEL in the standard have been requested by OSHA.
- o The possible utilization of company data to help assess compliance if and when OSHA monitoring indicates non-compliance. Options include requiring two separate OSHA measurements that indicate non-compliance with the PEL if adequate company monitoring data indicates compliance, or using the average of at least five 8 hour TWA company measurements to rebuke an exceedance measured by OSHA in the same work area. These provisions are not yet included in the proposed standard, but are entered into the preamble for comment and consideration.
- o Deletion of eye contact "prevention" and dermal contact "limits" from the standard. Protective equipment requirements are included however.

The OSHA proposal contains two areas that still require additional attention in developing API comments. First is the residual risk at 1 ppm which is characterized in the following passage: "Finally, OSHA preliminary concludes that the proposed standard is carrying out Congressional intent within the limits of feasibility and does not attempt to reduce insignificant risks. Under both the Congressional intent and the Supreme Court's guidance, OSHA would, if it were feasible, seek to reduce the level of risk estimated to remain at 1 ppm by the risk

3. Work operations around other liquids that might contain some amount of benzene (condensate, natural gasoline).

I am scheduled to attend a meeting of API's General Committee on Health and Environment on January 21, 1986. The API's response to the OSHA proposal is an agenda item. I will advise if anything new comes out of this meeting.



Ronald E. Thompson

RET/kk

Attachment

cc: J. R. Bender
W. D. Broddle
M. A. Chance
L. F. Clynch
E. L. DeWhitt
T. G. Waltrip

MEMO

February 27, 1978

SUBJECT: Benzene in Air, Compliance to Federal Regulation, Title 29, Part 1910, Section 1910.1028 Benzene, Technical Services Laboratory, Refining, Ponca City, Oklahoma

1. Initial Monitoring

All work areas within the Technical Services Laboratory have been monitored for employee exposure to benzene. No area exceeded or met the action level of 0.5 ppm benzene for an eight-hour time weighted average. For those areas where the airborne concentrations of benzene was suspected to be the highest for short periods of time, 15 minute samples were obtained. None of these measurements reached the ceiling limit of 5 ppm benzene for a 15 minute time weighted average.

All employees have been notified in writing of their individual exposure measurements. Specific locations and results are tabulated below:

1.1 X-ray Laboratory, November 3, 1977, 0.08 ppm benzene on an eight-hour time weighted average.

X-ray Laboratory, February 23, 1978, 0.83 ppm benzene for a 15 minute time weighted average, during the analyses of sulfur in gasolines.

1.2 North Analytical Laboratory, November 4, 1977, 0.12 ppm benzene on an eight-hour time weighted average.

North Analytical Laboratory, February 22, 1978, 1.44 ppm benzene for a 15 minute time weighted average, during the analyses of mercaptans in gasoline.

1.3 South Analytical Laboratory, November 8, 1977, 0.07 ppm benzene on an eight-hour time weighted average.

South Analytical Laboratory, February 24, 1978, 0.32 ppm benzene for a 15 minute time weighted average, during the blending of unleaded gasolines for lead determinations.

1.4 Gas Laboratory, November 2, 1977, 0.05 ppm benzene on an eight-hour time weighted average.

Gas Laboratory, February 22, 1978, 0.25 ppm for a 15 minute time weighted average, during the preparation of reformat for analysis.

2. Compliance Program

No written compliance program is required because all exposure measurements are below the action level. However, engineering control and work practices will be maintained to insure that no employee is exposed to benzene levels at or in excess of those minimums as set by the regulations. These controls and work practices are listed below:

2.1 Engineering controls:

All ventilating systems, exhaust hoods, sewer drains and vacuum systems will be maintained in good operational order. In any event, when any of the aforementioned is inoperable, a suitable sign noting that it is inoperable will be installed, measures will be taken to return it to operational condition as expedient as practical, and steps will be taken to insure that no increase in benzene exposure will result from this inoperation.

2.2 Work practices:

All work that requires handling of benzene will be done in an exhaust hood. In special cases where only small quantities of substances that contain small concentrations of benzene are handled and the ventilation system has proven by prior testing that exposure levels will not exceed the action level, will these substances be allowed to be handled outside a hooded area. These special cases are to be determined by the supervisor.

- All containers that contain benzene will be properly sealed and kept in a well-ventilated area.

All disposal of benzene will be done in an exhaust hood, either into the exhaust hood sink or into suitable containers for subsequent controlled disposal. In special cases where only small quantities of substances that contain small concentrations of benzene are to be disposed of and the ventilation system has proven by prior testing that exposure levels will not exceed the action level, will these substances be allowed to be disposed of into open sinks. These special cases are to be determined by the supervisor.

Gloves, aprons, face masks and other suitable protective equipment are to be used to prevent any skin and eye contact with substances that contain benzene.

MEMO Continued
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2.3 Medical surveillance:

No medical surveillance is required because all exposure measurements are below the action level.

2.4 Regulated areas:

There will be no regulated areas in the Technical Services Laboratories. The only areas where concentrated benzene may be used is in exhaust hoods. Any area where concentrated benzene is stored will be clearly marked with a sign noting 'Danger - Benzene' 'Cancer Hazard'.



Thomas E. Courtney
Senior Technologist
Technical Services, Laboratory, Refining

CONTINENTAL OIL COMPANY
PONCA CITY, OKLAHOMA
REFINING TECHNICAL SERVICES LABORATORY

Plt.: PC Gen.

File: 010.1
924

Date: 2-6-78

LABORATORY NO.: B-17-78

CHARGE: Gen. 49

SUBJECT: Analysis of Benzene in Air - All Refineries

DISCUSSION:

This report includes all data reported in Laboratory Report G-15-77 "Analysis of Benzene in Air - All Refineries" dated July 6, 1977, and all subsequent like data to date January 31, 1978.

All together there have been 511 samples analyzed. Summation per refinery is as follows, see attached data for details.

Billings Refinery - 22 samples, 0 exceeded TLV
Denver Refinery - 18 samples, 0 exceeded TLV
Humber Refinery - 30 samples, 7 exceeded TLV
Lake Charles Refinery - 96 samples, 1 exceeded TLV
Paramount Refinery - 73 samples, 16 exceeded TLV
Ponca City Refinery - 228 samples, 0 exceeded TLV
Wrenshall Refinery - 35 samples, 0 exceeded TLV
Technical Services Laboratory, 9 samples, 0 exceeded TLV

DATA:

Attached

REFERENCE:

Laboratory Report G-15-77, Analysis of Benzene in Air-All Refineries, dated 7-6-77.


Senior Technologist

bp

cc: D. A. Kuhn-ORB-KCH-TEC-F

SAL 000000991

BILLINGS REFINERY

15 Minute Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-6-77	Transport Truck Loading Rack	1.14

BILLINGS REFINERY

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-6-77	Combination Unit Gas Recovery Area	0.03
6-8-77	Combination Unit Crude and Vacuum Area	0.02
6-8-77	Condensate Unit- Sampling Area	0.03
6-9-77	Combination Unit-Sampling Area	0.03
6-9-77	Condensate Unit - Sampling Area	0.03
6-10-77	Condensate Unit Area	0.02
6-10-77	Combination Unit Reformer Desulfurizer Area	0.03
6-13-77	Train Loading Rack	0.07
6-13-77	Train Loading Rack	0.06
6-14-77	Pump Mechanic in Comb-Unit Gas Recovery Area	0.01
6-14-77	Slop Trap and Tank Farm	0.05
6-15-77	Tank Farm - Gauger	0.07
6-15-77	Pump Mechanic - All areas of the Plant	0.01
6-16-77	Pipefitter - All areas of Operating Units	0.01
6-16-77	Pipefitter - All areas of Operating Units	0.01
6-22-77	Instrument Man - All areas of Operating Units	0.02
6-22-77	Insulator - Carpenter - All areas of Operating Units	0.02
6-23-77	Electrician - All areas of Operating Units	0.02

BILLINGS REFINERY CONTROL LABORATORY 8 hour samples

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-3-77	Distillation and Gasoline Blending Counter	0.14
6-3-77	Distillation Counter	0.25
6-6-77	Knock Engine Room	0.06

HUMBER REFINERY

<u>Date</u>	<u>Location</u>	<u>8 Hour Sample</u>
		<u>Benzene, ppm</u>
10-21-77	Cooling Tower Area (P589)	0.13
10-21-77	Cooling Tower Area (P576)	3.84
10-21-77	Aromatics CR End Area (589)	1.68
10-21-77	Top of Fire Hose Rack in Front of T532 Area	0.45
10-21-77	Electrical Station in Front of T532 Area	0.72
10-26-77	Hot Oil Blowdown Pond Area	0.20
10-26-77	ADA Unit (AE Unit Shutdown)	0.82
10-27-77	HDA Unit (AE Unit Shutdown)	0.32
10-28-77	HDA Unit (AE Unit Shutdown)	0.95
10-28-77	Blowdown Pond	0.44
10-28-77	Main Control Laboratory (Benzene Testing)	2.27
11-21-77	HDA Unit Operator #1	0.08
11-21-77	AE Unit Operator #1	1.00
11-22-77	Control Laboratory (Benzene Testing)	2.92
11-22-77	HDA Unit Operator #2	0.29
11-22-77	AE Unit Operator #2	0.19
11-22-77	Control Laboratory (General Duties)	0.26
11-23-77	Control Laboratory (Benzene Testing)	1.10
11-23-77	Control Laboratory (General Duties)	1.01
11-23-77	HDA Operator #3	0.17
11-23-77	AEU Operator #3	0.43
11-24-77	Control Laboratory (Bottle Wash Room)	1.80
11-24-77	AEU Operator #4	0.23
11-25-77	Control Laboratory (Bottle Wash Room)	0.36
11-25-77	AEU Operator #5	0.18
11-25-77	HDA Operator #4	0.42
11-25-77	Control Laboratory (Gas Chrom. Lab.)	0.22
11-24-77	Control Laboratory (Benzene Testing)	0.63
11-28-77	AEU Operator #6	0.10
11-28-77	Reformer Operator #1	0.06

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LABORATORY NO.: B-17-78
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DENVER REFINERY

15 Minute Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-21-77	No. 2 Tester Work Area, Control Lab.	0.17
6-22-77	Pump House & Tank Farm Area	<0.01

8 Hour Sample

6-21-77	Loading Rack	0.18
6-22-77	Control Laboratory Area	<0.01
6-23-77	Pump House	0.02
6-28-77	Cat Poly Unit	0.01
7-5-77	Reformer Area	<0.01
7-6-77	FCC Unit Area	0.01
7-6-77	Crude Unit Area	<0.01
7-7-77	Boiler House Area	<0.01
7-19-77	Process Engineering Area	0.03
7-19-77	Control Laboratory Area	0.05
7-20-77	Office Bldg.	0.04
7-26-77	Instrumentman Area & Activities	0.02
8-1-77	Warehouse	0.02
8-16-77	Machine Shop Area	0.02
8-17-77	Insulator - Carpenter Area	0.01
8-25-77	Pump Mechanic	0.11

SAL 000000994

LAKE CHARLES REFINERY (Continued)

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
7-18-77	Product Fractionation (1st Controlman)	0.01
7-18-77	Product Fractionation (Operator)	<0.01
7-18-77	Product Fractionation (Foreman)	0.01
7-21-77	Loading Dock (Foreman)	0.03
7-21-77	Loading Dock (Operator)	0.02
7-21-77	Loading Dock (1st Loader)	0.03
7-28-77	Coker (Foreman)	<0.01
7-28-77	Coker (Outside Man)	0.02
8-1-77	Carpenter (1st)	0.01
8-1-77	Carpenter (Foreman)	<0.01
8-5-77	Electrician (1st)	0.01
8-5-77	Electrician (Foreman)	0.01
8-16-77	Instrumentman (1st)	0.01
8-16-77	Instrumentman (Foreman)	<0.01
8-19-77	Painter-Insulator (1st)	0.01
8-19-77	Machinist (Inside)	0.02
8-22-77	Pipefitter (1st)	0.01
8-22-77	Pipefitter (Foreman)	<0.01
8-26-77	Machinist (Outside)	0.03
8-26-77	Machinist (Outside)	0.02
8-30-77	Welder (1st)	<0.01
8-30-77	Welder (1st)	0.01
8-30-77	Welder (Foreman)	<0.01
9-1-77	Janitor	0.07
9-1-77	Tool Repairman	0.02
9-1-77	Utility Helper	0.03
9-6-77	Heavy Equip. Operator	0.01
9-6-77	Light Truck Operator	0.03
9-6-77	Heavy Truck Operator	0.01
9-8-77	Guard	0.03
9-8-77	Firemarshall	<0.01
9-8-77	Nurse	<0.01

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LAKE CHARLES REFINERY

15 Minute Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-29-77	No. 1 Reformer Area	0.07
6-29-77	No. 2 Reformer Area	0.01
6-29-77	No. 2 CTU Area	0.08
6-29-77	Product Fractionation Unit	0.06

LAKE CHARLES REFINERY

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-15-77	East Tank Farm and Pump House	0.10
6-15-77	Alkylation Unit Area	0.09
6-15-77	Thermo Unit Area	0.06
6-20-77	No. 2 Unit, Product Fractionation	0.03
6-20-77	No. 2 Crude Unit Area	0.19
6-23-77	No. 2 Reformer Area	0.01
6-23-77	Coker Unit Area	0.01
6-23-77	No. 1 Reformer Area	0.02
6-27-77	Tank Farm and Crude Area	0.02
6-27-77	Tank Farm and West Tank Farm	0.02
6-27-77	Tank Farm and Run Down Area	0.02
6-30-77	TCC Unit Area	0.03
6-30-77	TCC Unit Area	0.04
6-30-77	TCC Unit Area	0.03
7-5-77	Reformer (Foreman)	0.04
7-5-77	Reformer (Operator)	0.05
7-5-77	Reformer (Trap Man)	0.07
7-7-77	Pump House (Foreman)	0.01
7-7-77	Pump House (Operator)	0.01
7-7-77	Pump House (Blender)	0.03
7-11-77	Combination Unit (Foreman)	<0.01
7-11-77	Combination Unit (Operator)	0.01
7-11-77	Combination Unit (1st Controlman)	0.05
7-15-77	Power Plant (Treater)	0.02
7-15-77	Power Plant (Fireman)	0.02
7-15-77	Power Plant (Operator)	0.01

LAKE CHARLES REFINERY CONTROL LABORATORY(continued)

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-14-77	Gas Chromatograph Laboratory	0.14
6-14-77	Gravity Table	0.62
6-20-77	Knock Engine Laboratory	0.45
9-19-77	Senior Chemist	0.22
9-19-77	Assist. Chief Chemist	0.22
9-19-77	First Tester	0.41

LABORATORY NO.: B-17-78
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LAKE CHARLES REFINERY (Continued)

<u>Date</u>	<u>Location</u>	<u>8 Hour Sample</u> <u>Benzene, ppm</u>
9-12-77	Inspector	0.01
9-12-77	Inspector	0.03
9-12-77	Shift Foreman	0.02
9-15-77	Environmental Eng.	<0.01
9-15-77	Process Eng., TCC, #2 CTU, Cat Poly	<0.01
9-15-77	Process Eng., Reformer, Power Plt.	<0.01
9-21-77	Construction Foreman	1.38
9-21-77	Planner	<0.01
9-21-77	Planner	0.01
9-23-77	Zone Foreman	<0.01
9-23-77	Safety Supervisor	0.01
9-23-77	Fire Marshall	0.09
9-30-77	Planner	0.04
9-30-77	Senior Analyst	0.02
9-30-77	Training Supervisor	0.04
10-3-77	Mechanical Eng.	0.01
10-3-77	Contract Construction Foreman	0.02

LAKE CHARLES REFINERY CONTROL LABORATORY

<u>Date</u>	<u>Location</u>	<u>15 Minute Sample</u> <u>Benzene, ppm</u>
6-13-77	Gravity Table	1.02
6-13-77	Gas Chromatograph Laboratory	0.08
6-14-77	Chemist Work Area	0.52
6-29-77	Knock Engine Laboratory	0.01
6-30-77	Distillation Table	0.54
6-30-77	Chemist Wash Area	0.03
11-14-77	Filling Laboratory Truck With Gasoline	0.18

LAKE CHARLES REFINERY CONTROL LABORATORY

<u>Date</u>	<u>Location</u>	<u>8 Hour Sample</u> <u>Benzene, ppm</u>
6-13-77	Gravity Table	0.54
6-13-77	Gas Chromatograph Laboratory	0.06
6-13-77	Knock Engine Laboratory	0.30
6-14-77	Knock Engine Laboratory	0.24

PARAMOUNT REFINERY (Continued)

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
8-9-77	No. 1 CTU Operator	0.04
8-19-77	Research Laboratory	0.02
8-19-77	Research Laboratory	0.03
8-22-77	No. 1 and 2 CTU Operator	0.13
8-22-77	No. 1 and 2 CTU Operator	0.10
8-23-77	No. 1 and 2 CTU Operator	1.50
9-12-77	No. 2 CTU (Area for Lt. Naphtha Sampling)	0.53
9-15-77	Lt. Naphtha H ₂ O Drop Out	0.10
9-20-77	Vacuum Unit	0.15
9-20-77	No. 1 CTU (Area for Lt. Naphtha Sampling)	0.09
9-22-77	No. 1 CTU Operator	0.03
9-22-77	No. 2 CTU (Hvy Naphtha Sampling Area)	0.03
10-28-77	Control Laboratory (Lt. Oil Testing)	0.07 (4 hours)
10-28-77	Control Laboratory (Lt. Oil Testing)	0.33 (4 hours)
10-28-77	Control Laboratory (Lt. Oil Testing)	0.59 (4 hours)
10-31-77	Control Laboratory (Lt. Oil Testing)	0.12 (4 hours)
11-7-77	No. 1 & 2 CTU Operator	0.01
11-7-77	No. 1 & 2 CTU Operator	0.06
11-8-77	No. 1 & 2 CTU Operator	0.09
11-8-77	No. 1 & 2 CTU Operator	0.06
11-9-77	Reformer Operator	0.01
11-9-77	Reformer Operator	0.01
11-10-77	Pumper	0.02
11-10-77	Research Laboratory	0.01
11-17-77	Research Laboratory	0.02
12-20-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	0.84 (1 hour)
12-20-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	1.13 (1 hour)
1-16-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	14.7 (1.5 hours)
1-16-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	11.6 (1.5 hours)
1-17-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	6.1 (1 hr. & 10 min)
1-17-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	2.78 (1 hr. & 10 min)
1-17-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	13.3 (1.5 hours)
1-17-77	Naphtha Unloading (Bz., Tol. & Xyl. Unloading)	12.3 (1.5 hours)
1-18-77	Naphtha Unloading (100' away from activities)	2.60 (1 hr & 15 min)

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PARAMOUNT REFINERY

15 Minute Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
7-1-77	Reformer	0.04
7-1-77	Keystop Loading Rack	0.04
7-1-77	Control Laboratory	0.24
8-8-77	Gauge Hatch of TK 25003 (Lt. Naph. Storage Tk) Apparently sampled right in hatch opening ,	16.4 (Not applicab

PARAMOUNT REFINERY

8 Hour Sample

<u>Date</u>	<u>Location</u>	<u>Benzene, ppm</u>
6-22-77	Control Lab (Light Oil Tester)	0.47
6-23-77	Control Lab (Chemist)	0.21
6-28-77	Key Stop Loading Rack	0.02
6-28-77	Instrument Man	<0.01
6-29-77	Pump Shop	0.31
6-29-77	Air Blowing Plant	0.01
6-30-77	Crude Unit, Operator	0.07
6-30-77	Safety Office	0.01
7-1-77	Control Lab (Chemist)	0.57
7-6-77	Pumping Dept.	2.66
7-6-77	Reformer, Operator	0.15
7-7-77	Electricians	0.19
7-7-77	Pumping Dept.	0.19
7-8-77	Crude Unit, Operator	7.49
7-8-77	Welder	0.17
7-19-77	Reformer Trainee	0.03
7-19-77	Maint. Repairman	0.02
7-20-77	HDS Unit Operations Supt.	0.02
7-20-77	Pumping Dept. Supervisor	0.01
7-21-77	Pumper Trainee	0.01
7-21-77	Emulsion Operator	0.02
7-22-77	Reformer Operator	0.02
7-22-77	Crude Unit Operator	0.12
7-27-77	No. 1 and 2 CTU Operator	2.20
7-27-77	Pumper Operator	0.01
8-9-77	No. 1 CTU Operator	0.07