

MOBIL OIL CORPORATION
WESTERN REGION MEDICAL DEPARTMENT
DALLAS, TEXAS

Hygiene and Toxicology

WR-15-71

April 15, 1971-June 4, 1971

Industrial Hygiene Report

Research and Development Laboratory
and Semi-Works, Mobil Chemical Company
Beaumont, Texas

Report by

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Approved by

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JRP

PLAINTIFF'S
EXHIBIT

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I. Introduction

Although Mobil Oil Corporation has been covered by safety and health regulations under the Walsh-Healey Act of 1969, there has been an added impetus to these regulations by the "Occupational Safety and Health Standards" which were published in the Federal Register on May 29, 1971. The standards will provide regulations for over 4,000,000 businesses and 57,000,000 employees. Although these regulations pertain to both safety and health, this survey will concern itself to the health aspects of the act, such as, noise, lighting, sanitation, ionizing radiation, toxic gases, dusts, vapors and mists, and ventilation.

In discussions with Department of Labor representatives who will enforce these regulations, it was disclosed that the priority of investigations will be given those plants which have poor safety records or have recently had catastrophic incidents, such as instances of death or severe injury to personnel, where bad fires have occurred, or where complaints have been filed. In as much as the R & D Laboratory is within the refinery property, the laboratory may be inspected at the same time as the refinery, even though the laboratory is a separate entity in the company organization.

II. Summary and Conclusions

Noise:

Noise is not a major problem at the laboratory or Semi-Works. As noted in Table 1, there is excessive noise in the area of the portable air compressors at the MTA Unit and on the south side of the MCA-600 Building in the area of Tank T-100. These should be no problem unless personnel are in these areas for periods of time in excess of those shown in Table 2. Employees should not be around the air compressors in excess of 2 hours per day and in the area of Tank T-100 in excess of 4 hours per day without ear protection. All other areas are considered as safe in that employees may work there for 8 hours a day without injury to their hearing.

Lighting:

The lighting intensities are pointed out in Table 3. There are a number of areas, particularly at the Semi-Works, where more lighting is needed. In such areas as gauge glasses, work benches, tank car and truck loading points (hatches), and for close detailed work, supplementary lights should be provided. Generally, it was found that there may be sufficient lighting in a room, but insufficient lighting where work is being performed. One of the most important places where more lighting is needed is around gauge glasses where liquid levels must be determined. In practically all instances, it is necessary to use flashlights to determine the liquid levels and, in our opinion, a flashlight would not be considered as a supplementary light. It is felt that the regulations mean that a supplementary light is a permanent fixture.

Sanitation:

The sanitary facilities throughout the R&D Laboratory and Semi-Works are considered as adequate with one exception, and the only problem would be keeping the facilities clean.

During the survey we found the facilities clean. The one exception is that the toilet room on the second floor of the analytical laboratory building is visible from the work room. In addition, there is no hot water available.

Ionizing Radiation:

There are a number of sources formerly used at the Semi-Works and now stored at the Foster Grant installation. These sources are tested as required by law and are well within the state regulations. Similarly, at the R&D Laboratory, where X-ray instruments are used, tests indicate that no excessive radiation is present. Film badges for personnel using these instruments have shown minimum thresholds below which the actual exposure can be measured.

Toxic Gases, Dusts, Vapors, and Mists:

The most persistent exposure to vapors is in the R&D Laboratory in the area of the Oxidation Column. Acetic acid vapors range up to twenty-five ppm in this area. The threshold limit value for acetic acid is ten ppm.

At the Semi-Works the greatest potential danger is from hydrogen sulfide which is produced in several processes. Spot checks have indicated very few instances where the concentration exceeds the TLV of ten ppm.

Of course, there is always the danger of excessive exposure to various chemicals at both locations due to human error. It is felt that the overall day-to-day safety program to minimize health hazards is well organized and should be continued.

Ventilation:

The face velocities of the various laboratory hoods in the R&D Laboratory and Semi-Works are shown in Table 4.

Generally, the face velocities of the laboratory hoods range from 5 to 140 feet per minute. The new Federal Regulations prescribe the required velocities depending on the potential hazard that exists. This is discussed later in this report.

III. Discussion

Noise:

Excessive noise is one of the most prevalent hazards in industry. In May, 1969, the Federal Government established noise level standards for employees who are covered by the Walsh-Healey Act. These regulations promulgated permissible noise exposure levels, above which an employer must furnish ear protection for the employees and designate these locations as high-noise areas. Table 5 shows the permissible noise exposure levels under this act.

The measurement is made on the so-called "A" scale, which corresponds roughly to the 500 to 2000 cycle per second sound range. These frequencies are the ones that most effect a person's hearing.

In the event of excessive noise exposure, audiograms indicate that a person first loses his hearing in the 4000 to 6000 cps range. If the exposure is extended, the person's hearing is effected in the lower frequencies. For this reason, people who are exposed to high noises should have annual audiograms made. Mobil has had a noise policy for several years, and it is now being changed to correlate with the Federal regulations.

IV. Recommendations

Noise:

Signs denoting "High Noise Area-Ear Protection Required," or words to that effect, must be placed in those areas where noises exceed 90 dBA as shown in Table 1. Ear muffs or plugs must be provided for workers who work in these areas longer than the periods designated in Table 2.

Lighting:

This is where a big problem exists. Specifically, supplementary lighting should be supplied behind or in the area of critical gauge glasses, at the loading points of tank cars, on work benches, and machines such as the large grinder and drill press at the laboratory. It is possible that desk lamps may be used on some desks rather than increase the overall room lighting. The entire library room in the R&D Laboratory is in need of better lighting.

It is also recommended that a sustained effort be maintained to replace burned out globes and to keep the lighting fixtures clean. This, it is felt, will greatly enhance the general lighting.

Sanitation:

Hot water should be supplied to the restroom on the second floor of the analytical laboratory building. In addition, as prescribed in the regulations, a screen of some sort should be placed in front of the door so that the interior of the restroom cannot be seen from the workroom.

Toxic gases, vapors, dusts, and mists:

A continued effort should be made to tighten up on all connections on the oxidation column in the R&D Laboratory to prevent the leakage of acetic acid.

It is felt that the overall program to inform personnel of the danger from chemicals is excellent, and the safety people are to be commended. This fine program should be continued.

Ventilation:

It is recommended that the face velocities of all laboratory hoods be a minimum of 100 feet per minute. This would meet the Federal regulations in all cases and would save the necessity of having to determine the proper ventilation rate for each chemical under the hoods.

TABLE 1

NOISE SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>DBA</u>
<u>Semi-Works:</u>	
<u>MTA Unit</u>	
Oxidation Area	80-88
Product Drum Filling Area	86-88
Around Portable Air Compressors	98-100
<u>MCA-600 Building</u>	
Between Building and Tank T-100	91-95
<u>R&D Laboratory</u>	
At Zeolite Control Panel for Oxidation Column	89
Back Slab Oxidation Area	80-87

All other areas less than 90 dBA.

Survey made using a General Radio Sound Survey Meter Model No. 1555A.

TABLE 2

PERMISSIBLE NOISE EXPOSURE LEVELS
WALSH-HEALEY ACT - 1969

<u>Duration - hours/day</u>	<u>Sound level, A-scale, dB</u>
8	90
6	92
4	95
3	97
2	100
1-1/4	102
1	105
1/2	110
1/4 or less	115

Personnel exposed to noise levels in excess of those shown must wear ear protection.

TABLE 2

LIGHTING SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Lighting Intensity Foot Candles</u>	<u>Mobil Engineering Council Lighting Guide</u>
<u>R&D Laboratory,</u>		
<u>Hi-Bay Area:</u>		
Room 111	70-75	70
Room 111 (Hood)	30	50
Room 113	50	70
Room 108	50-70	70
Storage Room	10	15
Storeroom in Rear of Building	15	15
LTD Unit, East Control Panel	100-125	50
Zeolite ZSM-5 Control Panel	150	50
Clean Room	75-150	70
Bench Scale Reactor "D"		
Control Panel	30	50
General Hy-Bay Area	15	50
Bench Scale Room	20-60	70
Restroom and Shower Room	60	20
Benzene Alkylation A & B		
Control Panel	110	50
Benzene Alkylation C		
Control Panel	110	50
Oxidation Control Room	25	50
Control Panel for Oxidation Room	5	50
Utility Room, Switch Gear Area	50	10
Back Slab Oxidation Area	5-10	5
Oxidation Blast Cell	20	5
Sample Desk in Hy-Bay Area	5	75
<u>Offices in Main Building</u>		
<u>Exclusive of Those Listed Below:</u>		
C. A. Duval Desk	80-110	75
Desk in Library	70	75
Table in Library	50	75
Between Book Shelves of Library	40	75
Room 201, Desk	5-20	70
	30-40	75
<u>Computer Room:</u>		
J. D. Stewart's Office	75	75
Spare Office	80	75
Systems Engineer's Desk	40	75
Key Punch Area	70	75
<u>Analytical Laboratory Building</u>		
<u>Lower Floor:</u>		
G. T. Burgess' Desk	60	75
P. T. Allen's Desk	75	75

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TABLE 3 (cont)

LIGHTING SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Lighting Intensity Foot Candles</u>	<u>Mobil Engineering Council Lighting Guide</u>
W. A. Embry's Desk	75	75
Laboratory Table Tops	50-60	70
Laboratory Hood	50	50
Atomic Absorption Room	30	70
Instrument Shop Table Top	40-70	70
Under Magnifier on Table	100	100
At Engraving Machine	20	70
<u>Upper Floor:</u>		
Analytical Lab Desk	100	75
At I.R. Instrument	90	70
Hood	200	50
Laboratory Table Tops	70-100	70
Polarograph Room Desk	75	75
Hood	50	50
Electrode Instrument	100	70
Oven Room (NW Corner of Lab)	40-50	70
Hood in Oven Room	100	50
Dohrman Room Table Tops	70-80	70
Hood in Dohrman Room	50	500
Balance Room Table Top	50-60	70
At Beckman DK-2A	80	70
At Balances	90	70
At Desk	75	75
Glass Blowing Room Table Top	65	70
Glass Blowing Room Hood	40	50
North Chromatograph Room Table Tops	90-100	70
Don Sherman's Desk	50	75
Chromatograph Shop Room	80	70
Restroom	40	20
X-ray Diffraction Room	75	70
X-ray Diffraction Room Desk	75	75
South Chromatograph Room Desk	90	75
At Chromatograph	95	70
<u>R&D Annex Building:</u>		
R. W. Williams' Office	80-100	75
Noel Galloway's Office	75-100	75
J. P. Frederick's Office	75-100	75
Feed Mixing Room	10-15	70
Distillation	100-110	70
Abcor Unit Room Desk	100	75

TABLE 2 (cont)

LIGHTING SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Lighting Intensity Foot Candles</u>	<u>Mobil Engineering Council Lighting Guide</u>
<u>Repair Shop Area:</u>		
Work Bench	30	50
Drill Press	40	50
Small Grinder (Supplemental light)	200	50
Large Grinder	30	50
Eating Area	25	20
<u>Semi-Works:</u>		
Offices and Portable Buildings	75-150	75
Drafting Room		
Desk on West Side of Room	90	75
Drafting Table, North Side	150-200	150
Drafting Table, South Side	110-130	150
<u>F.P.U. Building Area:</u>		
Offices	80-115	75
NTA Control Room Panel	80-100	50
Back of Control Panel	20	15
Hy-Bay Area (Storage)	5-10	10
"Front" Laboratory	70-90	70
Fume Hoods in "Front" Laboratory ⁽¹⁾	50	50
Chromatograph Laboratory	40-60	70
Desk in Above Laboratory	50	75
Second Floor of Hy-Bay Area	5-10	10
In Area of Proposed Catalyst Unit		
Ground Level	5-15	5
Second Floor	5-15	5

Lighting survey made at night in areas where workers normally work at night.
Other determinations made during daylight hours in areas where workers normally work day shift only.

(1) There are three fume hoods in the laboratory. There is 50 CP lighting intensity in the two lighted hoods. There are no light fixtures in the third hood.

TABLE 3 (cont)

LIGHTING SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Lighting Intensity Foot Candles</u>	<u>Mobil Engineering Council Lighting Guide</u>
<u>MTA Process Area:</u>		
Drum Loading Area	10	5
Reactor Area	1	5
Feed Prep Area	5	5
Tank Car Area	1	5
Tank Car Loading Point (2)	<1	30
Blending Area	1-20	5
2nd Landing MTA Unit	10-20	5
3rd Landing MTA Unit	5-15	5
Oxidation Area	5-10	5
<u>Polybutylene Process Area:</u>		
Desk in Control Room	75	75
Control Panel	50	50
Extruder Area	10-20	5
Process Area	5-10	5
Area Between Polybutylene Building and Feed Stock Tanks for MCA-600 Building Processes	<1	1
<u>MCA-600 Building Area:</u>		
Maintenance Operator's Desk	100	75
Process Operator's Desk	75	75
Switch Gear Area, South of Building	1-20	5
Material Feed Tank Area	1-20	5
General Purpose Still Area	5	5
Lower Floor Process Area	5	5
Control Panel, Lower Floor	20	30
Second Floor:		
Under Mercury Lights	10-30	5
Under Incandescent Lights	2-10	5
Switch Gear, North of Building	5	5
Area around Shriver Filter	3-7	5

(2) 30 CP needed at tank car loading point.

TABLE 3 (cont)

LIGHTING SURVEY - R&D LABORATORY AND SEMI-WORKS
MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Lighting Intensity Foot Candles</u>	<u>Mobil Engineering Council Lighting Guide</u>
Tank Car Loading Rack	1	5
At Tank Car Hatch	< 1	30
Product Storage Area	2-15	5
Switch Gear for Product Storage Pumps	10	5
Restroom and Locker Room	5-10	20
<u>Work Shop (West of FPU Building):</u>		
General Area	50-150	50
South Work Bench	200	50
North Work Bench	80	50

Lighting survey made at night in areas where workers normally work at night. Other determinations made during daylight hours in areas where employees normally work day shift only. Lighting survey made with G.E. Type 213 light meter.

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TABLE 4

VENTILATION SURVEY - HOOD VELOCITIES - R&D LABORATORY
AND SEMI-WORKS, MOBIL CHEMICAL COMPANY
Beaumont, Texas

April 15, 1971 to June 4, 1971

<u>Location</u>	<u>Face Velocities, feet per minute</u>
<u>R&D Laboratory:</u>	
Room 108	20
Room 109 (Walk-In Hood)	75
Room 109 Small Hood	20
Room 113	10
Clean Room	5-20
Room 111 (South Hood)	10
Room 111 (East Hood)	25
<u>Development Chemistry Lab. Room:</u>	
South Hood } Middle Hood } Balanced Hoods North Hood }	100 100 75
Atomic Absorption Lab	100
Perkin-Elmer A.A. Instrument	140
I. R. Room	100
Dohrman Room	50
Polarograph	60-80
Oven Room	40-50
Glass Blowing Room	10-20
<u>SemiWorks Laboratory:</u>	
GC Room	75
<u>Front Laboratory Room:</u>	
East	75
Middle	50
West	10-20

Face velocities determined with Alnor Velometer.

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