

INTEROFFICE CORRESPONDENCE

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S. S. DUNN

DATE July 31, 1979
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PLAINTIFF'S EXHIBIT

MBL-212

INDUSTRIAL HYGIENE BASELINE EXPOSURE STUDY
MOBIL CHEMICAL COMPANY
CHEMICAL COATINGS DIVISION
SPECIALTY DIVISION
BEAUMONT, TEXAS
INDUSTRIAL HYGIENE SURVEY HRH-16-7/79

Attached is the Industrial Hygiene Report covering the industrial hygiene baseline exposure study which was completed during the 2nd Quarter, 1979 with the assistance of H. E. Coussou, BCSP Safety Supervisor. The purpose of the study was to determine representative employee exposure to various potentially hazardous chemical and physical environmental factors associated with BCSP operations.

A total of fifty-two (52) exposure measurements for gases, vapors, and particulates were conducted at the Acrylic, Catalyst, SHF, and 1259 units. This involved the collection of a series of area, source, and employee breathing-zone air samples. In addition, several wipe samples for nickel nitrate content were collected in the Catalyst area to determine the possibility of nickel contamination outside of the solution preparation area.

Overall, the findings of the study are favorable. None of the measurements exceeded the respective OSHA permissible exposure limits (PEL's). The attached report contains the results of the monitoring as well as recommendations regarding improvements. The data developed from the exposure measurements is necessary to establish compliance with existing permissible exposure limits and should be retained in the BCSP OSHA file. This information will further be helpful in setting priorities for additional exposure monitoring and determining the impact of new regulations as they are developed.

Thanks again for your cooperation and assistance. If you have any questions, I can be contacted in Houston on Extension #5756.

B.A. Larson

B. A. Larson
Industrial Hygienist

BAL:jrt
Attachment

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I. INTRODUCTION

An industrial hygiene survey was performed at the Beaumont Chemical Specialties Plant during the second quarter of 1979 to determine employee baseline exposure to various chemical materials and physical agents regulated by OSHA which result from plant operations. The study was conducted by B. A. Larson, Industrial Hygienist, Mobil Chemical Company, and H. E. Coussou, BCSP Safety Supervisor. The chemicals and environmental factors of concern in the study are listed by operating area/location as follows:

<u>Acrylics Unit</u>	<u>Catalyst Unit</u>	<u>SHF Unit</u>	<u>1259 Unit</u>	<u>Flare</u>
-Methyl Acrylate	-Nickel	-Boron Trifluoride	-Hydrogen Sulfide	-Hydrogen Sulfide
-Methyl Methacrylate	-Silica	-n-Propyl Alcohol	-Isopropyl Alcohol	-Nitrous Oxides
	-Noise		-Methyl Alcohol	-Sulphur Dioxide

In addition, carbon monoxide is present at the offsite catalyst warehouse and the drum storage area when there is heavy forklift activity.

A total of forty-five (45) exposure measurements were conducted to determine airborne concentrations of regulated materials. Of these, eight (8) were area samples placed to determine ambient concentrations of vapors released in the Acrylic and 1259 Units. Sixteen source samples for SO_2 , H_2S , and NO_x were collected at the Flare Area and another two (2) for Methyl Acrylate and Methyl Methacrylate were collected at the vent of Tank 503 in the Acrylics Area. Nineteen (19) employee breathing-zone samples were collected at the above areas to determine time-weighted average exposure levels. A summary of survey findings and recommendations by location is detailed below.

II. SUMMARY

A. Acrylics Unit

Five air samples were collected in the Acrylics Unit to determine airborne concentrations of Methyl Acrylate and Methyl Methacrylate under normal conditions of operation. The OSHA Permissible Exposure Limits (PELS) for these materials are 10 PPM and 100 PPM, respectively. Measurements, consisting of breathing-zone air samples collected over a full-shift of operation, were completed to determine representative time-weighted average personnel exposure by job description. Two samples were collected to determine the acrylics operator's exposure. An employee air sample was also collected during tank truck unloading.

An area sample was collected three feet above ground level at the pump adjacent to tank #201 to determine ambient concentrations of MA and MMA in the general plant environment. In addition, a source sample was collected at the vent of tank #503.

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II. SUMMARY (Continued)

Sample collection was performed by the charcoal tube method as specified by NIOSH. Sample analysis was conducted by an analytical laboratory accredited by the AIHA. Monitoring results are listed in Table 1.

1. Findings

-Personnel exposures to MA/MMA under normal operating conditions are well below the limits prescribed by OSHA (As detailed in Table 1).

-Background levels of MA/MMA do not exceed 1 PPM. The major sources of emissions are various pump seals, sampling points, and the #503 vent.

-As expected, relatively high concentrations of MA/MMA were measured at the #503 vent. Due to the remote location and dilution factors, however, there is minimal potential of employee exposure.

2. Recommendations

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done.

-Additional MA/MMA exposure monitoring should be conducted quarterly by the plant industrial hygiene monitor to better define employee/area exposure levels. The data developed from a regular monitoring program is also necessary to establish ongoing compliance with OSHA health regulations, determine exposure variations due to operational changes, and is helpful in identifying and minimizing conditions and work practices which contribute to exposure. Measurements to determine short-term exposure to ammonia during drum transfer should also be completed.

B. Catalyst Unit

Three breathing-zone air samples were collected in the Catalyst Unit to determine airborne concentrations of nickel and crystalline silica. These materials are components of two of the basic raw materials (nickel nitrate, silico aluminum) and are regulated by OSHA in their PEL listing (0.10 mg/M³-Nickel; 10 mg/M³ - Crystalline Silica). Catalyst operator exposure evaluations %SiO₂ + 2 were completed for manufacturing cycles involving calciner-drum filling operations, muller mixing, and routine shift duties.

A series of wipe samples was collected on the second floor of the Catalyst area to determine the extent, if any, of nickel nitrate contamination in areas adjacent to the nickel solution preparation mixer. Nickel is a respiratory irritant when inhaled and may cause dermatitis and skin sensitization following repeated contact at significant concentrations. Several bulk samples of catalyst were also collected to measure the content of crystalline silica.

Air samples for nickel and silica were collected with portable vacuum pumps and filter media according to standard sampling methods recommended by NIOSH. Wipe samples for nickel were obtained using cellulose filters according to the procedure outlined by OSHA in their Industrial Hygiene Field Operations Manual. All sample analysis was performed by an accredited industrial hygiene laboratory. A summary of the air sampling results and nickel and silica concentrations are listed in Tables 2 and 3.

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II. SUMMARY (Continued)

3. Catalyst Unit

Sound level data adapted from report E.H. 69-76 is shown in Table 4 for areas where noise levels exceed 90 dB(A). These include the catalyst blower, walkway and compressor area. Ordinarily, employees would not be required to work in these areas for extended periods, therefore, daily noise exposure would be expected to meet OSHA requirements.

1. Findings

-Operator exposure to airborne nickel is minimal. Our data indicates that full-shift exposure is a degree of magnitude below the present OSHA permissible exposure limit.

-Silica exposure is below the OSHA PEL during normal shift work. Exposure approaches the PEL, however, when the operator is assigned to the calciner area for an extended period. For example, we found that the operators exposure is 90% of the PEL when operating the calciner for seven hours, yet only 20% when operated for two hours.

-Surface nickel concentrations on the second floor outside of the nickel preparation mixer area are low. The levels measured on the second floor hand-rail are 10,000 times less than the amount found at the mixer opening.

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-Employee noise exposure may exceed OSHA limits at the calciner. Additional noise measurements should be completed.

2. Recommendations

-A high-efficiency vacuum cleaner should be provided to minimize dusting during catalyst cleanup.

-Additional air sampling should be performed to better define operator exposure to Silica during calciner operations. The use of respiratory protection should continue to be required. Local exhaust ventilation should be considered if our additional monitoring indicates an exposure problem.

* { -Operator exposure to noise should be established by performing a noise dosimetry study. Hearing protection should be required for mechanical work involving the blower or compressors and during calciner operations.

C. SHF Unit

The SHF process located in Building 2 is normally a closed system and very little opportunity exists for employee exposures during normal operations. OSHA regulated materials processed in this area include n-Propyl alcohol, n-Butyl alcohol and boron trifluoride (BF_3). The permissible exposure limits for these are 200 PPM, 100 PPM and 1 PPM, respectively.

Note { BF_3 is a visible white fume which is highly irritating to the eyes and respiratory passages. On contact with moisture or humid air, it rapidly decomposes to form fluoboric and boric acid (nonregulated). Because of the instability of BF_3 in air, there is no valid method for measuring employee exposure. (It is ironic that OSHA has adopted a level which cannot be enforced.)

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II. SUMMARY (Continued)
C. SHF Unit (Continued)

1. Findings

-An employee breathing-zone sample for n-Propyl alcohol was collected over a full shift to determine the time-weighted exposure level of J. Brawn, SHF operator. The analysis of the sample indicates a TWA exposure of less than 0.05 PPM.

-Exposure to BF_3 in the SHF process area is judged to be practically nil. No leaks, emissions, or odors were observed. Normal preventative maintenance should be adequate to control leaks/exposure.

2. Recommendations

-Further industrial hygiene testing should be performed to establish n-Butyl alcohol exposure levels.

D. 1259 Unit

Three air samples were collected at Building 2 in the 1259 area to determine airborne concentrations of Methanol and Isopropanol (PEL's 200 PPM, 400 PPM), as well as, n-Propyl alcohol which is present from the SHF process. A breathing-zone sample was collected to evaluate the time-weighted average exposure of the 1259 operator. Two area samples were also collected to determine ambient vapor concentrations on the first and second floors near process equipment (V-135, V-140). Samples were collected according to the NIOSH charcoal tube procedure. Sample analysis was performed by an accredited laboratory. Monitoring results are summarized in Table 5.

Hydrogen sulfide measurements were taken at several locations in the 1259 area where there is a potential for leaks. These include the knockout pot and the manway of the BOU solids tank.

1. Findings

-Operator exposure to Isopropanol was found to be less than 1 PPM as a time-weighted average. Methanol and n-Propanol concentrations were below the sensitivity of the analytical method.

-Ambient concentrations of Isopropanol ranged from 0.17 PPM to 0.76 PPM.

-Hydrogen sulfide concentrations at the knockout pot and BOU solids tank did not exceed 3.0 PPM.

E. Flare

A series of direct-reading measurements were taken at various locations in the vicinity of the BCSP flare to evaluate ambient concentrations of hydrogen sulfide, sulphur dioxide, and nitrous oxides. The purpose of these measurements

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II. SUMMARY (Continued)

E. Flare (Continued)

was to determine maximum concentrations resulting from flare emissions during 1259 adduct addition.

Sixteen air samples for these materials were collected at four areas west of the flare (downwind). At three locations, measurements were taken at ground level. The fourth sampling point located at the landing of the O/A propylene tank is approximately 20 feet above grade. Air samples for sulphur dioxide and nitrous oxides were collected using Drager length-of-stain tubes having minimum sensitivities of 0.1 PPM and 0.5 PPM, respectively. Hydrogen sulfide measurements were taken with a BioMarine direct-reading survey instrument having a sensitivity of 1.0 PPM. Each of the four sample locations are illustrated in Figure 1.

1. Findings

-No significant levels of H_2S , SO_2 , or NO_x were detected in any of the air samples. All measurements indicated concentrations below the limits of sensitivity for each of the measurement techniques.

F. Drum Storage Area & Offsite Catalyst Warehouse

Carbon monoxide measurements were performed at the drum storage area and the offsite catalyst warehouse to determine levels resulting from forklift traffic. The OSHA permissible exposure limit is 50 PPM. All windows and doors were open during the test.

In the drum loading area, a short-term breathing-zone sample was collected during drum stacking. At the offsite catalyst warehouse, both a breathing-zone and area sample were completed.

1. Findings

-Breathing-zone concentrations of CO were 15 PPM at the drum loading area and 35 PPM at the catalyst warehouse.

-CO concentrations at the exhaust of the forklifts ranged from 600 to 1,000 PPM.

2. Recommendations

-Additional CO measurements should be conducted during the winter months when natural ventilation is reduced.

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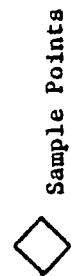
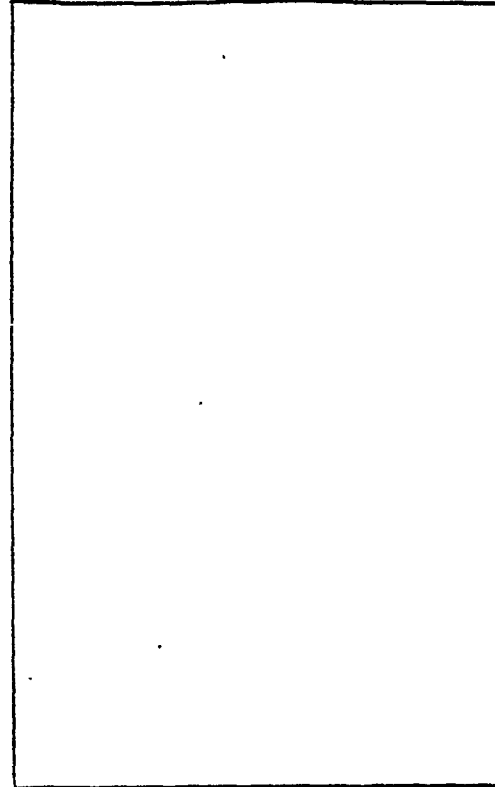
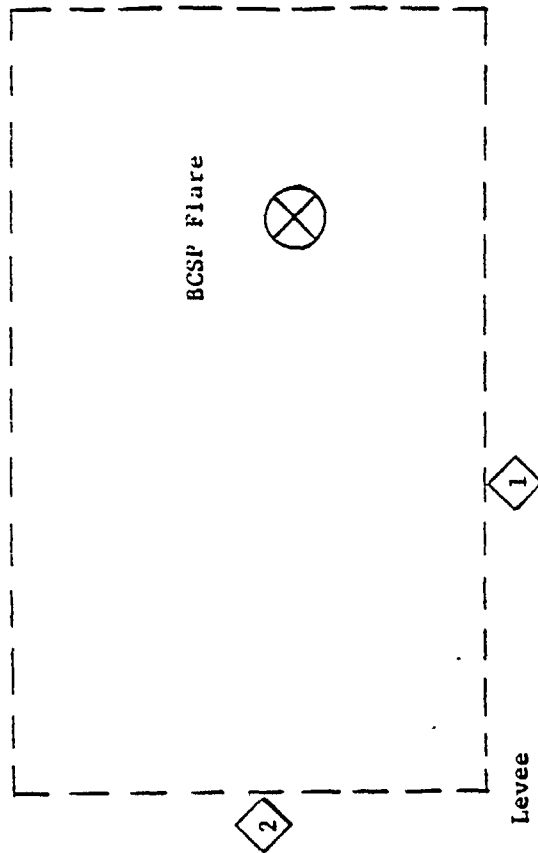
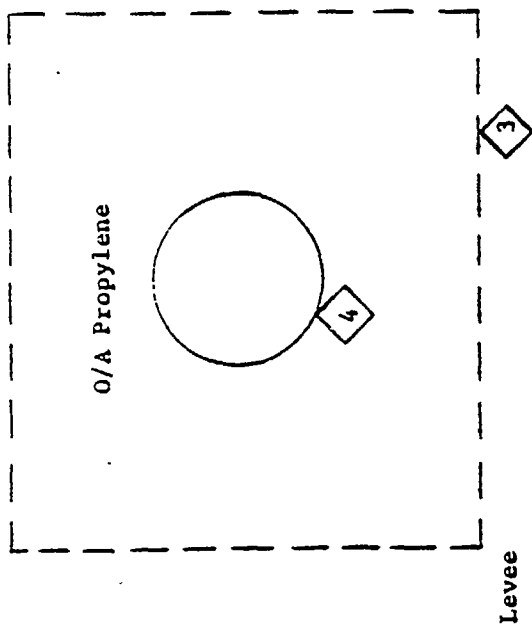


Figure 1 - Air Sampling Locations-BCSP Flare

BCSP Perimeter

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TABLE 1

AIRBORNE CONCENTRATIONS OF METHYL ACRYLATE & METHYL METHACRYLATE
ACRYLICS UNIT-BEAUMONT CHEMICAL SPECIALTIES PLANT

Sample No.	Employee/Area	Job Description/Location	Date	Material	Duration(Min)	Concentration(PPH)	TWA(PPH)	PEL(PPH)
BCSP-1		Acrylics Operator (Morning Sample)	5/1/79	Methyl Acrylate	197	0.02	See BCSP-5	10.0
				Methyl Methacrylate	197	0.02	See BCSP-5	100.0
BCSP-5		Acrylics Operator(Afternoon Sample)	5/1/79	Methyl Acrylate	160	10.0	3.82	10.0
				Methyl Methacrylate	160	5.9	2.26	100.0
BCSP-7		Operator-Tank Truck Unloading	5/3/79	Methyl Acrylate	240	1.8	1.03	10.0
				Methyl Methacrylate	240	1.3	0.74	100.0
BCSP-2	Tank No. 201	Area Sample - 3 Ft. Above Grade	5/1/79	Methyl Acrylate	295	0.17	-	10.0
				Methyl Methacrylate	295	0.28	-	100.0
BCSP-3	Tank No. 503	Source Sample - Vent Opening	5/1/79	Methyl Acrylate	341	240.0	-	10.0
				Methyl Methacrylate	341	340.0	-	100.0

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TABLE 2

AIRBORNE CONCENTRATIONS OF NICKEL & CRYSTALLINE SILICA
CATALYST UNIT-BEAUMONT CHEMICAL SPECIALTIES PLANT

<u>Sample No.</u>	<u>Employee</u>	<u>Job Description</u>	<u>Location</u>	<u>Date</u>	<u>Material</u>	<u>Duration (Min)</u>	<u>Conc. (mg/H³)</u>	<u>TWA (mg/H³)</u>	<u>PEL (mg/H³)</u>
CAT-1		Staff Operator " " " "	Calciner - Drum Fillout	5/1/79	Silica 14/5/107	460	0.69	0.69	0.77 ¹
CAT-2		Operator " " " "	Catalyst Unit	5/2/79	Silica	255	0.30	0.18	0.93 ²
CAT-3		Operator " " " "	Muller	3/1/79	Nickel 7/5/11	372	0.0013	0.0011	0.10

1 Based on 11.0% Silica Content

2 Based on 8.8% Silica Content

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TABLE 3

NICKEL & CRYSTALLINE SILICA CONTENT OF WIPE & BULK SAMPLES
CATALYST UNIT-BEAUMONT CHEMICAL SPECIALTIES PLANT (3/1/79)

<u>Sample No.</u>	<u>Location</u>	<u>Material</u>	<u>Content (mg/z)</u>	<u>Remarks</u>
Wipe No. 1	Top of nickel mixing tank-2nd floor	Nickel	30.3 mg	Equal to 17.3 mg/sq. inch
Wipe No. 2	Top of handrail - 2nd floor stairway	Nickel	0.0029 mg	Equal to 0.0016 mg/sq. inch
Bulk No. 1	2nd floor - floor surface near conveyor	Nickel Silica	<0.01 % 33.0 %	
Bulk No. 2	Top of east muller	Nickel Silica	<.01 % 6.0 %	

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TABLE 4
SOUND LEVEL MEASUREMENTS
CATALYST UNIT-BEAUMONT CHEMICAL SPECIALTIES PLANT*

<u>Measurement No.</u>	<u>Location</u>	<u>Noise Intensity dB(A)</u>	<u>Remarks</u>
1	Catalyst Blower	107	All readings taken three feet from source.
2	Center Of Walkway At Blower	92	
3	Air Compressors	90-92	

* From E. H. 69-76

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TABLE 5

AIRBORNE CONCENTRATIONS OF METHANOL, ISOPROPANOL & N-PROPANOL
1259 UNIT-BEAUMONT CHEMICAL SPECIALTIES PLANT

Sample No.	Employee/Area	Job Description/Location	Date	Material	Duration(Min)	Concentration(pph)	TWA(pph)	PEL(pph)
1259-1		Operator	3/1/79	Isopropanol	301	0.78	0.56	400.0
				Methanol	301	<0.01	<0.01	200.0
				N-Propanol	301	<0.05	<0.05	200.0
1259-2	V-135 Area	1st Floor	3/1/79	Isopropanol	354	0.76	-	400.0
				Methanol	354	<0.01	-	200.0
				N-Propanol	354	<0.05	-	200.0
1259-3	V-140 Area	2nd Floor	3/1/79	Isopropanol	341	0.17	-	400.0
				Methanol	341	<0.01	-	200.0
				N-Propanol	341	<0.05	-	200.0

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INTEROFFICE CORRESPONDENCE

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TO M. S. RIGGS

DATE April 16, 1979

CC E. R. Averill
 P. R. Chaney
 L. Levin
 W. D. Mitterlehner
 W. E. Sweeney

ASBESTOS CONCENTRATIONS RESULTING FROM
 O/A INSULATION DEMOLITION
 HRH-9-4/79
 MOBIL CHEMICAL COMPANY
 PETROCHEMICALS DIVISION
 February 10, 11, 12, 1979

INTRODUCTION

Six general area air samples were collected on February 10, 11, 12, 1979 during contract insulation removal at the O/A boiler preheater to determine the presence of asbestos fiber. All Rosendahl contract personnel working in this area were supplied with approved respirators and protective clothing.

SUMMARY

Asbestos concentrations are listed below by sample number, location, and date. The OSHA permissible exposure limit (PEL) for employee exposure is 2 fibers/cc.

<u>Sample No.</u>	<u>Date</u>	<u>Location/Operation</u>	<u>Total Fiber</u>	<u>Fibers/cc</u>
O/A-1	2/10/79	S. Side of Boiler - 20 Ft. Downwind	48,900	0.81
O/A-2	2/10/79	Near Boiler - Little Work In Progress	3,700	0.06
O/A-3	2/10/79	Near Boiler - Insulation Cleanup	25,600	0.42
O/A-4	2/10/79	Near Boiler - Insulation Cleanup	9,800	0.16
O/A-5	2/11/79	Near Boiler - Insulation Cleanup	96,500	1.6
O/A-6	2/12/79	S. Side of Preheater - After Cleanup	3,700	0.06

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Asbestos concentrations did not exceed 2.0 fibers/cc in any sample, however, this data may not be representative of personnel exposure at the breathing-zone.

RECOMMENDATION

In cooperation with Rosendahl, an additional series of employee breathing-zone samples should be collected at the time of the next scheduled removal operation. The results of this monitoring should be provided to Rosendahl as documentation of compliance with the exposure limit and initial monitoring required in the OSHA standard.

B. A. Larson

B. A. Larson
Industrial Hygienist

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