

SHELL OIL COMPANY

SHELL CHEMICAL COMPANY

DEER PARK MANUFACTURING COMPLEX

DATE MARCH 8, 1976

TO R. G. DILLARD

FROM MANAGER-SAFETY & INDUSTRIAL HYGIENE
DEER PARK MANUFACTURING COMPLEXSUBJECT INDUSTRIAL HYGIENE-
EXPOSURE MONITORING
PROGRAM

PLAINTIFF'S EXHIBIT

SH-994

Attached is the Industrial Hygiene Exposure Monitoring Plan developed by Jerry Ransdell for 21 chemicals of greatest concern within the complex.

This plan sets out a two-year, prioritized program for monitoring employee exposure to the selected chemicals. The plan assumes continued full-time involvement of two laboratory technicians and about one-half of the Industrial Hygienist's time. The priorities for chemical monitoring were established on the basis of guidelines from Manufacturing Safety & Health on toxicity, as well as local factors such as potential for exposure, and the number of employees exposed. The required monitoring programs for VCM and Benzene will, of course, be continued, as will the AC monitoring and periodic free silica monitoring.

This plan is currently in effect. It is a part of our overall "Health Standard" program outlined in an earlier document. Managers throughout the complex are encouraged to distribute copies of this plan to their appropriate personnel (extra copies available from Maxine Wallace - 56-247). Additionally, Jerry Ransdell is available to discuss this program at team meetings, or foreman meetings.

It is important that supervisors understand our Industrial Hygiene Programs, and we urge each manager to take positive steps to begin this educational process.



J. L. Rivard

Attachment
JLR:lg

cc: Messrs. R. L. Brunner, Chem. Mfg. & Dist. Mfg. Rep.
H. L. Kusnetz, Manager Safety and Health

LAM 000572

bc: Messrs. J. D. Beasley

H. J. Bettencourt

K. C. Braud

J. M. Braus

R. W. Bray

C. H. Brown

R. L. Bryan

H. R. Campbell

J. R. Cox

D. R. Deister

R. P. Frutiger

M. H. Grasley

L. W. Horstman

T. F. Hruska

W. V. Jacks

R. M. Kemball-Cook

D. H. Kievit

K. S. Leach

J. G. Massey

R. V. Mattern

D. H. McClintic

D. E. Miller -

C. M. Noble

J. D. Ransdell

F. G. Reitz

C. H. Rivers

D. O. Schissler

J. H. Tomfohrde DPMC-16278

H. G. Wilson

Acting Mgr. for Refinery Lab

SHELL OIL COMPANY

SHELL CHEMICAL COMPANY

DEER PARK MANUFACTURING COMPLEX

DATE MARCH 2, 1976

TO DEER PARK MANUFACTURING COMPLEX
MANAGER - SAFETY & INDUSTRIAL HYGIENEFROM INDUSTRIAL HYGIENIST
DEER PARK MANUFACTURING COMPLEXSUBJECT INDUSTRIAL HYGIENE - EXPOSURE
MONITORING PROGRAM

Monitoring the work environment is an essential portion of the industrial hygiene effort. Measurements of this type serve to define employee exposure and identify conditions which may be hazardous to health.

Personal (breathing zone) monitoring provides the measure of employee exposure which is comparable to the OSHA exposure limits. The results of such monitoring, not only ensure that employee exposures do not exceed safe exposure limits, but also provide the initial evaluation to comply with future health standards. This information may also be useful in any future epidemiological work.

The complexity of operation and the numerous process materials necessitate an organized plan for industrial hygiene surveillance with defined priorities and objectives. The plan in this memo outlines the criteria for selecting and prioritizing materials for industrial hygiene surveillance. This plan includes continuation of on-going personal sampling programs such as for vinyl chloride and benzene and introduces evaluation strategy for other significant materials.

Accomplishment of this plan will ensure that employee exposures do not pose a health risk, and will provide the initial measurement data necessary to comply with future health standards. Although no new periodic monitoring is scheduled in this plan, there is a possibility that periodic monitoring will be appropriate where exposures approach OSHA exposure limits. In terms of the standard language seen in the most recent proposed standards, the "action level" for periodic monitoring is one-half the exposure limit.

I. PRIORITY-SETTING CRITERIA

With the concurrence of Manufacturing Safety & Health, the determination of survey priorities is based on the following factors:

A. Material Toxicity

Toxicity is the inherent property of a material to do harm. Materials of greater toxicity are rated higher in priority.

LAM 000573

DPMC-16279

B. Promulgation of OSHA Standard

The likelihood of a proposed or finalized standard which details monitoring (initial exposure evaluation and periodic), medical surveillance, compliance methods, etc., is also considered in the establishment of priorities. The Standards Completion Project (SCP) could lead to standards for over 300 materials in the next few years. Materials appearing early on this list (e.g., MEK, MIBK, mesityl oxide, allyl chloride, epichlorohydrin, ethylene dichloride, phenyl glycidyl ether, hydrogen sulfide, butyl glycidyl ether, allyl alcohol, ethyl chloride, trichloropropane, acetone, and hexane) are rated higher in priority as well as materials for which OSHA is considering exposure limit revisions (e.g., free silica, asbestos, benzene).

C. Potential for Exposure

The true hazard of a material depends not only on the toxicity but on the potential for the material to escape into the working environment. This potential is determined by three factors: (1) the physical process (e.g., amount of material present, high temperature and pressure resulting in fugitive leaks, and process operations which are open to the atmosphere); (2) employee work practices (e.g., process sample collection and housekeeping); and (3) the materials's physical properties (e.g., volatility and density of vapor in air).

D. Number of Exposed Workers

As the number of exposed workers increases, more people are potentially affected so the survey priority of a material is adjusted upwards.

Since the prime consideration in this surveillance plan is to evaluate the risk to employee health, factors (A), (B), and (D) are given the strongest consideration.

II. INDUSTRIAL HYGIENE SURVEILLANCE PLAN

On the basis of factors presented in priority setting, twenty-one materials are identified for surveillance. This total includes materials for which monitoring is in progress as well as materials that have not been monitored. This plan, as summarized in table 1, calls for the continuation of vinyl chloride and benzene monitoring with gradual reductions in monitoring as exposure levels decrease or as exposure levels are confidently defined. Such reductions are anticipated at the end of 1976. The AC/ECH monitoring should continue through to completion with only minor monthly sampling to check improvements from AC abatement work. The survey scheduling of the other materials are discussed subsequently.

LAM 000574

The total manpower requirements for the surveillance plan consists of: (1) 28.5 man-days per month to continue the present vinyl chloride monitoring, the present benzene monitoring, the planned monthly allyl chloride monitoring, and the planned monthly free silica monitoring; and (2) 350-450 man-days to complete initial exposure evaluations for the other materials.

Completion of the initial exposure evaluations, while maintaining the periodic monitoring, will require two full-time laboratory technicians and approximately 50 percent of the industrial hygienist's time through 1977. Eighty to ninety percent of the monitoring would be in the Chemical Plant. Ten materials are in the Chemical Plant only and another nine materials are in both the Chemical Plant and Refinery with approximately eighty percent of the monitoring for such materials occurring in the Chemical Plant.

A. Priority Setting

The 21 materials are categorized into four groups to facilitate priority setting and survey planning: (1) carcinogens, mutagens, and teratogens (known or highly suspected); (2) chlorinated hydrocarbons; (3) ketones; (4) products of significant toxicity. Category (1) rates the highest priority in terms of the toxicity factor followed by groups (2) and (4). The potential for exposure is present with every material in each group. The exposure potential rating for groups (2) and (3) are about equal and generally higher than for materials in group 1. Group 4 materials vary in this respect with free silica rated highest followed by hydrogen sulfide. The remaining materials fall somewhere between group (3) and group (1). The number of exposed workers for each material is shown in the appendix with the number of job classifications scheduled for surveillance shown in table 1.

Priority based solely on the OSHA standard status is as follows. Vinyl chloride and asbestos rate highest because of existing standards. Because of impending proposed standards, group (3), benzene and free silica follow after vinyl chloride and asbestos. OSHA activities indicate glycidyl ethers, allyl alcohol, hexane and hydrogen sulfide would follow group (3) proposed standards. The next stage of standards development would include group (2) and ethylene dibromide with chlorine appearing near the end of the SCP list. No standards promulgation is foreseen for the aromatic amines in EPON Curing Agents for at least the next few years.

B. Monitoring Schedule

The vinyl chloride sampling results for 1975 indicate that eventually the frequency of monitoring can be reduced. Likewise, the 1975 results for benzene are low and a reduction in monitoring is likely. As the AC abatement program proceeds and exposures drop, so

LAM 000575

DPMC-16281

should the frequency of AC monitoring. The reduction in monitoring will probably not occur in 1976, but in 1977 it is foreseeable that VCM monitoring would be reduced from monthly to quarterly and benzene and AC monitoring would be reduced 75 and 50 percent, respectively. As these reductions occur, sampling for the remaining materials will increase. The projected sampling schedule is diagramed in figure 1 and summarized in table 1.

The order in which the materials are surveyed depends not only on the priority-setting criteria, but also on the manufacturing conditions (e.g., whether the material is being used or manufactured or shipped) and the availability of a sampling collection/analytical method. Because of this, there is a great deal of overlap between surveys as shown in figure 1.

C. Sampling Collection/Analytical Methods

Since the list of 21 materials consist of vapors and particulates, a variety of sampling/analytical methods will be used. The plastic bag/gas chromatographic analysis method used for VCM will apply to the chlorinated hydrocarbons, allyl alcohol, and the ketones. Therefore, all analytical work will be at Deer Park. Sample analysis for aromatic amines, polycyclic aromatics, asbestos, free silica, and glycidyl ethers is or can be arranged with the Industrial Hygiene Laboratory, Westhollow Research Center.

Table 1 shows the sampling procedures for each material and estimates of survey time. Initial exposure evaluation for each material will be determined by collecting a number of personal samples on different employees in the same job classification. The number of samples (usually 5-10) should be adequate enough to define the day-to-day variability of exposure. The sampling protocol (i.e., job classifications and number of samples) for each material is detailed in the appendix.

D. Manpower Requirements

On the basis that these monitoring reductions occur after 1976, the present staffing of two laboratory technicians and one industrial hygienist would complete the planned initial exposure evaluations while continuing the planned periodic monitoring by the end of 1977. Figure 1, which outlines the surveillance schedule, shows the workload for the two laboratory technicians. Not included in this figure is the industrial hygienist's time. Approximately 50% of his time over the next two years would be required to arrange sampling protocols, review and interpret results, and work with the laboratory technicians in the collection of samples. -

LAM 000576

The estimates of sample collection/analysis time are based on experience with vinyl chloride, benzene, and allyl chloride monitoring. In addition to sample collection and analysis, there is a certain amount of recordkeeping, report writing, equipment maintenance, etc., which usually consume as much time as the actual sample collection and analysis. Therefore, the total survey time is approximated by doubling the sampling/analytical time.

III. IMPLEMENTATION

This plan is designed to mesh with present survey work and can be implemented immediately. Additional manpower will be unnecessary.

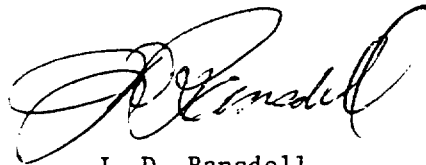
Prior to beginning surveys for each material, the industrial hygienist and/or the laboratory technician should present the survey plans at appropriate shift foreman's meetings. At that time, an explanation can be made of the intent of the survey and the sampling procedure.

The sample results will be reported as promptly as possible to each department concerned. Each department should be encouraged to present the survey plan to their hourly personnel and to discuss sampling results. If survey results indicate overexposure, engineering or administrative controls should be prepared and scheduled for implementation. These plans should be communicated in writing to Safety and Industrial Hygiene.

IV. SUMMARY

The priority-setting criteria and the industrial hygiene surveillance plan are intended to organize the approach to employee exposure evaluation.

Your comments are invited, and I request your concurrence to implement this plan.



J. D. Ransdell

JDR:lk

Attachments

cc - R. L. Bryan
F. G. Reitz

LAM 000577

TABLE I. INDUSTRIAL HYGIENE SURVEILLANCE PLAN

SAMPLING PROCEDURES			TIME REQUIREMENTS FOR SURVEY COMPLETION				SURVEY SCHEDULE	
Material	Sampling/ Analytical Method	Equipment Availability	No. of Job Classifications	No. of Samples	Sampling/ Anal. Time (Man-Days)	Time Allowed for Recordkeeping, Report Writing, Equip. Maint. (Man-Days)	Total Survey Time (Man-Days)	Start Finish
GROUP 1: Carcinogens/Mutagens/Teratogens (Known or Highly Suspected)								
Asbestos	Membrane filter collection/ microscopic fiber counting	Available	3	23-35 + 2/year	5-7	5-7	10-14	Feb/76 Dec/76
EPON® Curing Agents which contain aromatic or aliphatic amines		Sample collection and analysis pro- cedure would have to be developed by Ind. Hyg. Lab. at Westhollow	3	20-35	4-6	4-6	8-12	Mar/76 Dec/76
Ethylene Dibromide	Either bag or charcoal ad- sorption/GC analysis	Sample collection and analysis pro- cedures would have to be reviewed & tested	2	10-15	2-3	2-3	4-6	Apr/76 Jun/76
Polycyclic Aromatics	Silver membrane filter/GC-HRMS Analysis	Sample collection and analysis pro- cedure being developed by Ind. Hyg. Lab. at Westhollow	6	50-55	10	10	20	Apr/76 Jun/76
Vinyl Chloride	Alum. Polyester Bag/Anal. by GC-FID & micro- coulometer	Available	11	Completed: 10/mo -600 Planned: 60/month	10/mo	10/mo	20/mo	Continuing
GROUP 2: Chlorinated Hydrocarbons								
AC/ECH	Teflon Bag/Anal. by GC-FID and Microcoulometer	Available	24	Completed: 37 + 103 Planned: 110 + 8/mo	37 + 3/mo	37 + 3/mo	74 + 6/mo	In Progress
D-D	(Same as AC/ECH)	Available	5	25 (not incl. 8 3-5 from AC/ ECH sampling)	8	8	16	Apr/76 Dec/76
Ethyl Chloride	(Same as AC/ECH)	Available	5	25	8	8	16	Apr/76 Dec/76
Ethylene Dichloride	(Same as Vinyl Chloride)	Available	4	6-10 (not incl. 4/mo from VCH sampling)	2-3	2-3	4-6	Apr/76 Dec/76
Trichloro- propane	(Same as AC/ECH)	Available	3	15 (not incl. 5 from AC/ECH samp.)	5	5	10	Apr/76 Dec/76

LAM 000578

DPMC-16284

TABLE 1. INDUSTRIAL HYGIENE SURVEILLANCE PLAN

SAMPLING PROCEDURES			TIME REQUIREMENTS FOR SURVEY COMPLETION				SURVEY SCHEDULE	
Material	Sampling/ Analytical Method	Equipment Availability	No. of Job Classifications	No. of Samples	Sampling/ Anal. Time (Man-Days)	Time Allowed for Recordkeeping, Report Writing, Equip. Maint. (Man-Days)	Total Survey Time (Man-Days)	Start Finish
GROUP 3: Ketones								
Acetone	(Same as MIBK)	Available	16	70-85	18-21	18-21	36-42	Aug/77 Nov/77
Mesityl Oxide	(Same as MIBK)	Available	4	20	7	7	14	Jun/77 Jul/77
Methyl Isobutyl Ketone	Alum. Polyester Bag/Anal. by GC-FID	Available	19	110-170	37-57	37-57	74-114	Jan/77 Aug/77
Methyl Ethyl Ketone	(Same as MIBK)	Available	15	120-160	30-40	30-40	60-80	Jan/77 May/77
GROUP 4: Products of Significant Toxicity								
Allyl Alcohol	Teflon Bag/ Anal. by GC- FID	Available	5	30-35	7-9	7-9	14-18	Jul/76 Dec/76
Benzene	Charcoal Ad- sorption/GC- FID analysis	Available	6	5/mo	1/mo	1/mo	2/mo	Continuing
Chlorine	Drager Detector Tube	Available	4	25-50	2-3	2-3	4-6	Nov/77 Nov/77
Free Silica	PVC filter collection/ Gravimetric & X-ray analysis	Available	2	10 + 1/mo	2-3 + 0.25/mo	2-3 + 0.25/mo	4-6 + 0.5/mo	In Progress
Glycidyl Ethers (BGE, PGE, & EPON 812)	Charcoal Ad- sorption/GC- FID analysis	Collection and analytical method would have to be reviewed & tested	4	25-35	5-7	5-7	10-14	Jan/77 Dec/77
Hexane	Bag Collection charcoal tube ad- sorption/GC-FID analysis	To Be Determined						
Hydrogen Sulfide	Drager Detector tube	Available	-	As Needed	Variable	Variable	Variable	Variable

LAM 000579

YEAR: 1976

Material	Total Survey Time (Man-Days)	YEAR: 1976											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Vinyl Chloride	20/mo	20	20	20	20	20	20	20	20	20	20	20	20
Benzene	2/mo	2	2	2	2	2	2	2	2	2	2	2	2
AC/ECH	30 + 6/mo	19	19	19	6	6	6	6	6	6	6	6	6
Free Silica	4-6 + 3/mo	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-
D-D, EC, TCP, EDC	48	48											
Allyl Alcohol	14-18	14-18											
Polycyclic Aromatics	20	20											
Ethylene Dibromide	4-6	4-6											
EPON Curing Agents	8-12	8-12											
Amines	10-14	10-14											
Asbestos													

YEAR: 1977

Material	Total Survey Time (Man-Days)	YEAR: 1977											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Vinyl Chloride	10/mo (1)	10	10	10	10	10	10	10	10	10	10	10	10
Benzene	0.5/mo (2)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
AC/ECH	3/mo (3)	3	3	3	3	3	3	3	3	3	3	3	3
Glycidyl Ether	10-14	10-14											
Methyl Ethyl Ketone	60-80	60-80											
Methyl Isobutyl Ketone	74-114	74-114											
Mesityl Oxide	14	14											
Acetone	36-42	36-42											
Chlorine	4-6	4-6											

- (1) Assumes vinyl chloride monitoring is reduced to quarterly except for shutdowns.
 (2) Assumes benzene monitoring is reduced to quarterly.
 (3) Assumes 50% reduction in AC/ECH monitoring.

Condition: (a) Two full-time laboratory technicians and one industrial hygienist (part-time).
 (b) Vinyl chloride, benzene, and allyl chloride monitoring is reduced in 1977.

Total Survey Time:

Man-days Required		Year
484.5	-	1976
360	-	1977

LAM 000580

APPENDIX: SAMPLING PROTOCOL BY MATERIAL

Sample Collection/
Analysis Frequency
(Samples/Man-Day)

Material	Work Area	Job Title	No. of Workers	Sample Schedule		
				Long Term	Short Term	
Acetone	A Process	Ketone Furnace Oper.	4	5-10 (a)	5	
		A Distillation Oper.	4	10	5-10	
		B Distillation Oper.	4			
		A Gauger	4			
		M Plant Oper.	4	0	5	
	C Gauger	4	5 (b)	5		
	Maintenance	Variable	← 5-10 →			
	Major Resins	EPON-4 Oper. (2 jobs)	6	0	5	
		Shipping	TC Loader	2	5 (during loading)	
	TT Loader		1	5 (during loading)		
Drum Loader	1		5 (during loading)			
Marine Insp.	2		5 (during barge loading)			
Dispatching	Dockman	5	5 (during barge connect and disconnect)			
	Dockman's Helper					
QC Lab	QC Lab	Resins Lab Tech	7	5-10 (b)	5-10	
		GLC Lab Tech	11			
		Solvents Lab Tech	7			
Allyl Alcohol	A Process	AA Plt. Oper.	4	5-10	5	
		Maintenance	Variable	← 5 →		
	Shipping	TC Loader	2	5 (duration of loading)		
		TT Loader	1	5 (duration of loading)		
QC Lab	Shipping	Drum Loader	1	5 (duration of loading)		
To Be Determined						

LAM 000581

APPENDIX; SAMPLING PROTOCOL BY MATERIAL

2

<u>Material</u>	<u>Work Area</u>	<u>Job Title</u>	<u>No. of Workers</u>	<u>Sample Schedule</u>		<u>Sample Collection/ Analysis Frequency (Samples/Man-Day)</u>	
				<u>Long Term</u>	<u>Short Term</u>		
Allyl Chloride	QC Laboratory	Solvents Lab Tech	4		In progress	1	
		GLC Lab Tech	4		"		
	Shipping	TT Loader	1				
		TC Loader	2				
		Drum Loader	1				
		Evening Operator	1				
		Rockbox Shipping Oper.	1				
	G Dept.	G-100 Operator	48				3
		G-200 Operator					
		G-300 Operator					
		Propylene Prep. Oper.					
HTH Operator							
Utility Operator							
G-200 Frac. Oper.							
EC Operator							
	G-400 Operator	10					
	G-500 Operator						
	Shift Foreman						
	Maintenance						
	"C" Plt. Util. Oper.						
	"C" Plt. Shift Foreman						
	Maintenance						
	"B" Dist. Oper.						
	AA Plant Operator						
	Maintenance						
Specialties		40-50					
		4					
A Dept.		4					
		Variable					
		4.5					
		4.5					
		Variable					

LAM 000582

DPMC-16288

Sample Collection/
Analysis Frequency
(Samples/Man-Day)Sample Schedule
Long Term Short Term
← 20-30 →No. of
Workers
VariableJob
TitleWork
Area

Material

Asbestos

Process Area
Demolition/
Repopulation
CA
Refy. or Chemical
Garage
Refy. or Chemical
Carpenter Shop

Maintenance

Cell Renewal
Crew Member

Mechanic

Carpenter

2/yr

3-5 (during
brake servicing)

← 5 →

1

5

Benzene

OP-II HD

HD Oper.

4

1/mo

1/mo

EA Finishing Oper.

4

1/mo

1/mo

Aromatics East

BTX Oper.

4

4/yr

0

Refinery Lab

Lab Tech

4

0

4/yr

5

Dispatching

Dockman

5

0

5
(as barges load)

Chlorine

G Dept.

G-300 Oper.
(greatest exposure
of G operators
outside of CA
Plant)

4

0

5-10

CA Cell Rm. Oper.

CA Cell Renewal
CrewmanCA Cell Rm. Hourly
Foreman

4-7

0

20-40 (by
job task)

15

Brine Operator

Caustic Evap. Oper.

Caustic Finishing Oper.

Chlorine Unit Oper.

CA Shift Foreman

depend on other CA employee
results

D-D

G Dept.

Propyl. Prep Oper.

4

3-5 (c)

5

Utility Oper.

4

0

5

3

G-100 Oper.

4

0

5

Shipping

TC Loader

2

5 (during loading)

Drum Loader

1

5 (during loading)

Marine Insr

2

Infrequent barge loading

Dispatching

Dockman

5

Infrequent barge loading

LAM 000583

APPENDIX: SAMPLING PROTOCOL BY MATERIAL

4

<u>Material</u>	<u>Work Area</u>	<u>Job Title</u>	<u>No. of Workers</u>	<u>Sample Schedule</u>		<u>Sample Collection/ Analysis Frequency (Samples/Man-Day)</u>
				<u>Long Term</u>	<u>Short Term</u>	
Epichlorohydrin	Marine Dock	Dockman	6	In progress		1
		Dockman's Helper				
		Cargo Inspector				
		Solvents Lab Tech				
	QC Laboratory	Resins Lab Tech	4		"	
		TT Loader	4		"	
	Shipping	TC Loader	1			
		TC Loader	2			
		Drum Loader	1			
		Evening Operator	1			
	G Dept.	Shift Foreman	5			
		HTH Operator	4		"	
		G-300 Operator	4			
		Maintenance	Variable			3
BPA	Specialties	Utility Operator	4		"	
		Continuous Unit Oper.	4			
		Kettle Operators	4-5			
		Maintenance	Variable			
	BPA	2A Charge Operator	4		"	
		3A Charge Operator	4			
		EPON-4 Feed Rec. Oper.	4		"	
		EPON-4 Resin Train Oper.	4			
	Resins	3A Kettle Operator	4			
		2A Kettle Operator	4			
		Utility Operator	4			
		Maintenance	Variable			

LAM 000584

DPMC-16290

Material	Work Area	Job Title	No. of Workers	Sample Schedule		Sample Collection/Analysis Frequency (Samples/Man-Day)
				Long Term	Short Term	
EPON® Curing Agents (C-111, C-112, S-4, S-5, S-6, U & Y, and their amine components) that contain aromatic or aliphatic amines	Specialties	PDU Oper.	4	10-20	0	
		Maintenance	Variable	← 5 →		
	QC Lab	Resins Lab Tech.	7	0	5-10	5
Ethylene Dibromide	Refinery Lab	Motor Fuel Testing Lab Tech	4	← 5-10 →		5
		Antiknock Blending Operato.	4	← 5 →		
Ethyl Chloride	G Dept.	EC Rx Oper.	4	0	5	
		Propylene Prep	4	0	5 (collecting samples)	
		Utility Oper.	4	0	5 (collecting rundown samples)	3
		TC Loader	2	5 (during loading)		
Ethylene Dichloride	Shipping	TT Loader	1	5 (during loading)		
		EDC Rx Oper.	4	4/mo (d)	0	
	Shipping	Maintenance	Variable	6/mo (d)	0	
		Marine Insp.	2	3-5 (during gauging of barge)		4
Free Silica containing dusts	Dispatching	Dockman	5	3-5 (during barge connect & disconnect)		
		Dockman's Helper				
	Engineering Field	Sandblasting in yard	2	1/mo		
		Sandblasting in vessels	3	5		
Glycidyl Ethers (BCE, EPON 812 and PCE)	Power Plt. 2	PP #2 Oper.	4	5 (area samples downwind of Chemical Plt. sandblast yard)		4
		Contin. Un. Oper.		5-10	5-10	
	Shipping	Maintenance	Variable	← 5 →		
		Drum Loader	1	5 (for duration of loading)		5
	QC Lab	Resins Lab Tech	7	0	5	

LAM 000585

DPMC-16291

APPENDIX: SAMPLING PROTOCOL BY MATERIAL

5

Sample Collection/
Analysis Frequency
(Samples/Man-Day)

Sample Schedule
Long Term Short Term

No. of
Workers

Job
Title

Work
Area

Material

To Be Defined

As Needed

Hydrogen Sulfide

Mesityl Oxide A Process M Pit. Oper. 4 5-10 (b) 5 1

C Gauger 4 5-10 (b) 5

QC Lab GLC Lab Tech 11 10 (b) 5 3

Solvents Lab Tech 7 5

MEK A Process Ketone Furnace Oper. 4 5-10 5

S Distillation Oper. 4 5-10 5

C Gauger 4 5-10 (b) 5

Maintenance Variable 10-20 5

Filter Operator 8 5-10 5

TT/TC Loaders 5 5 (duration of loading) 5

Maintenance Variable 5-10 5

Dockman 5 0 5

Dockman's Helper 5

Shipping TT Loader 1 5 5

TC Loader 2 5 (duration of loading) 5

Drum Loader 1 5 0

Evening Oper. 1 0 0

Marine Insp. 2 0 5

Specialties EPONOL Oper. 4 5-10 5

Cont. Unit Oper. 4 5 (Production of 812) 5

QC Lab Resins Lab Tech 7 5-10 (b) 5-10

GLC Lab Tech 11

Solvents Lab Tech 7

LAM 000586

DPMC-16292

Material	Work Area	Job Title	No. of Workers	Sample Schedule		Sample Collection/Analysis Frequency (Samples/Man-Day)
				Long Term	Short Term	
MIBK	A Process	M Plt. Oper.	4	5-10	5	
		C Gauger	4	5-10	5	
		Maintenance	Variable	5-10 ₁		
	Major Resins	EPON-2 Oper.	24 (6-8 jobs)			
		EPON-3 Oper.				
		EPON-4 Oper.		10-20	10-20	
		Maintenance	Variable	5-10		
	Specialties	Cont. Unit Oper.	4	5-10	5-10	3
		Utility Oper.	4			
		Kettle Oper.	5	5	5	
		Maintenance	Variable	← 5 →		
Shipping		TC Loader	2	5 (during loading)		
		TT Loader	1	5 (during loading)		
		Drum Loader	1	5 (during loading)		
		Resins Lab Tech	7	10-15	10-15	
	QC Lab	GLC Lab Tech	11			
Polycyclic Aromatics	OP-II Pyr.	Solvents Lab Tech	7			
		Block 2 Fractionator Oper.	4.5	5	15	
		West Fractionator Oper.	4.5	Exposure should be less than the Block 2 Frac. Oper. so additional sampling will depend on interpretation of initial results.		
	Lube Dept.	TC/TT Loader	5	5 (during loading)		
		Tank Farm Oper.	4	0	5-10	
		LVI Unit Oper.	4	0	5	5
		Phenol Extraction Unit Oper.	4	0	5	
		Fractionator Oper.	4	0	5	
	CCU					
	Thermal Cracking					

LAM 000587

DPMC-16293

APPENDIX: SAMPLING PROTOCOL BY MATERIAL

8

Material	Work Area	Job Title	No. of Workers	Sample Schedule		Sample Collection/ Analysis Frequency (Samples/Man-Day)	
				Long Term	Short Term		
Trichloro- propane	G Dept.	G-300 Oper.	4	Depending on HTH Oper. results		.3	
		HTH Oper.	4	5 (c)	5		
	Shipping	TC Loader	2	5 (during loading)			1
		TT Loader	1	5 (during loading)			
Vinyl Chloride	G Dept. - VCM	Operators	23	In progress			
		Shift Foreman	6				
		Maintenance	Variable				
	Shipping - Site III	Operators	8	"			3
Foreman		4					
Maintenance		Variable					
QC Lab		Lab Technicians	4	"			

- (a) Samples included in MEK sample schedule.
 (b) Samples included in MIBK sample schedule.
 (c) Samples included in AC/ECH sample schedule.
 (d) Samples included in VCM sample schedule.

DPMC
 2-12-76
 JDR:lrc

LAM 000588

DPMC-16294

Industrial Hygiene
Monitoring Program
Deer Park Manufacturing Complex

<u>Substance</u>	<u>Sampling/Analytical Method</u>	<u>Equipment</u>	<u>Sample Type</u>
Asbestos	NIOSH method P & CAM 239	Bendix or MSA Pumps	Personal and Area
Vinyl Chloride Ethylene Dichloride Allyl Chloride Epichlorohydrin Dichloropropenes Dichloropropane Ethyl Chloride Trichloropropane Acetone Methyl Ethyl Ketone Methyl Isobutyl Ketone Mesityl Oxide Allyl Alcohol	Collection in plastic bags/ Analysis by GC with flame ionization detector and microcoulometer	SKC Pumps	Personal, Area and Source
Benzene Toluene Xylenes Cumene Butyl Glycidol Ether Phenyl Glycidol Ether Methyl Ethyl Ketone n-Butyl Alcohol Isopropyl Alcohol tone	NIOSH method S-311 NIOSH method S-343 NIOSH method S-318 NIOSH method S-23 NIOSH method S-81 NIOSH method S-74 NIOSH method S-3 NIOSH method S-66 NIOSH method S-65 NIOSH method S-1	Sipin, Bendix, MSA, or MDA Pumps	Personal and Area
Phenol	NIOSH method S-330	Bendix and MSA Pumps	Area
Polycyclic Aromatics	Filter collection/ Analysis by GC and high-resolution mass spectrometry	High Volume Sampler	Area, Source
Free Silica	NIOSH method S-317	MSA or Bendix Pumps	Personal and Area
Bisphenol-A	Filter collection/ Gravimetric analysis	Bendix Pumps	Personal and Area
Wood Dust	Filter collection/ Gravimetric analysis	Bendix and MSA Pumps	Personal and Area

LAM 000589

DPMC-16295

Industrial Hygiene
Monitoring Program
De Park Manufacturing Compl

2

<u>Substance</u>	<u>Sampling/Analytical Method</u>	<u>Equipment</u>	<u>Sample Type</u>
Acetone	Detector Tube	Either Drager, MSA, or Gastec	Area and Source
Ammonia			
Benzene			
Carbon Monoxide			
Hydrogen Sulfide			
Toluene			
Sulfur Dioxide			
Xylene			
Hydrocarbons			
Nickel Tetracarbonyl			
Alcohols			
Chlorine			
Mercaptans			
Mercury			
Methyl Ethyl Ketone			
Phenol			
Cumene			
C ne			
Isopropyl Ether			
Methyl Isobutyl Ketone			
Hydrogen Chloride	Explosimeter	MSA and J&W	Area and Source
Hydrazine			
Acetonitrile	Oxygen Meter	Edmont-Wilson and J&W	Area
Styrene			
Hydrocarbons	Ethyl Lead in air kit-colorimetric	Ethyl Lead Kit	Area
Oxygen			
Tetraethyl Lead			

LAM 000590

DPMC-16296

PROCEDURES SAMPLE DATA
COLLECTION 1975-80 720.1.1

LAM 000571

DPMC 16277.1