



Shell Oil Company • Shell Chemical Company
Interoffice Memorandum

PLAINTIFF'S EXHIBIT

SH-1201

DECEMBER 9, 1982

FROM: SENIOR INDUSTRIAL HYGIENIST
DEER PARK MANUFACTURING COMPLEX

TO: ALL MANAGERS

SUBJECT: DPMC EXPOSURE GUIDELINES AND MINIMUM RESPIRATOR USE REQUIREMENTS

Attached for your future reference is a guideline outlining the minimum respiratory protection to be used for selected chemical substances. Also included is information pertaining to the current permissible exposure limit, known primary toxicity effects, reported odor threshold, and protective clothing requirements, etc. The introductory page included offers additional information on this subject.

It is recommended that current protective equipment and clothing procedures be reviewed for consistency with these guidelines. It is suggested that this document be retained with the departmental material safety data sheet book.

Please let me know if there are any questions or comments concerning this guideline.

It is anticipated that this guideline will be updated on an annual basis. Any suggested additions (or corrections) to this listing should be identified for the Industrial Hygiene group.

A handwritten signature in cursive script that reads "Phil Snyder".

P. J. Snyder

PJS/mh

cc: PJS Chron

~~LOD Date 11/1/82~~

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DPMC-16083

How To Complete The Industrial Hygiene Sampling Form (0-2801)

Refer to the attached form which shows the fields keyed by number to the following descriptions. An * indicates parameters that will be entered into the computer.

- * 1. NAME OF THE EMPLOYEE SAMPLED. For a personal sample, enter the name of the employee. The Industrial Hygiene Information System will interface with both the Medical Information System and the Shell Personnel Payroll System (SPPS). The employee name listed on the medical file is identical to that on the SPPS file. When a name is entered into the Industrial Hygiene Information System from a sampling form, the name with the individual's social security number will be checked by the computer against the medical file and corrected, if necessary, to read the individual's proper name. Additionally, because the information system will trace an employee's work history with the company via the payroll system, exposure data for an individual must be entered with the correct SPPS/medical name. Avoid the use of nicknames; be consistent with the use of "Sr. and "Jr."; and when using initials, provide first and middle initials.
- * 2. SOCIAL SECURITY NUMBER. For a personal sample, enter the employee's social security number.
- * 3. SHELL EMPLOYEE NUMBER. For a personal sample, enter the individual's complete six-digit employee number.
- * 4. JOB EXPOSURE PROFILE (JEP). Enter the unique JEP code for the job classification that is being sampled. Data, in general, will be analyzed by job classification rather than by individuals.

The JEP is a nine (9) character code; the first four reflect the location (or location/unit) and the last five represent the job code. Uniquely defined, this code will represent the work activities and potential exposures for a job classification. If assistance is needed to define a JEP, contact HS&E-Industrial Hygiene Services. A JEP must be defined in the JEP System before it can be used on exposure sampling forms.
- 5. JOB TITLE (OPTIONAL). Enter the commonly used title of the job being monitored.
- * 6. EMPLOYEE'S COMPANY. Enter employee's company (e.g., Shell Oil, Shell Chemical, Shell Development, etc.). If contractor, enter the name of the contract company (e.g., Brown & Root, Wiese, Mimi, etc.).
- * 7. LOCATION. Enter E020 on all areas and personnel samples.
- * 8. AREA/UNIT. Description of the location in which the sample was collected. (Up to 25 characters). The area or unit name which is recorded must be selected from the area name table. Additions to this table may be made as required.
- * 9. OPERATING CONDITION/OPERATION. The entry must be a two digit code. The code used must be in the operating condition/operation table. New codes can be developed by HS & E where this is appropriate.

For long term samples, eg. 4 hours or more, enter an appropriate operating condition code, for example, Normal (01) Shutdown/Turnaround (05) and Startup (02). Standardize the codes used so as to record data in the same manner under similar conditions.

For short term, ceiling or peak samples, enter an appropriate code which will describe the activity monitored. NOTE: Codes 01-08 cannot be used for "Personal Peak" samples. An operation code is to be selected which best describes the activity monitored.

- * 10. SAMPLE TYPE. Check the box indicating the type of sample collected. Generally, a ceiling or short term sample collected but in the unit would be an AREA sample; source samples do not represent the breathing zone air and may be collected at leaking equipment; GRAB samples are to be considered as "OTHER".
- * 11. SAMPLE COLLECTOR. Check only one box indicating the type of sample collector used.
- 12. POSSIBLE INTERFERENCES/INSTRUCTION. Briefly enter interfering contaminants or special instructions to the laboratory. List those contaminants which may be present as interferences but for which analytical results are not required.
- 13. BAROMETER. Enter the barometric pressure with units of inches mercury as indicated on the form.
- 14. TEMPERATURE. Enter the temperature (or temperature range for a long-term sample) in degrees Fahrenheit as indicated on the form.
- 15. WIND. Enter the range of wind speed in miles per hr. as indicated on the form. Also indicate the prevailing wind direction.
- 16. HUMIDITY. Enter the percent relative humidity as indicated on the form.
- * 17. ANALYSIS REQUIRED: CODE. Enter the code number(s) for the contaminant(s) that you want the laboratory to analyze for. A list of frequently sampled chemicals and physical agents with their code numbers is included in this manual under "Contaminant Code List". If a code number has not previously been assigned for a specific contaminant or group of contaminants (metal fumes, hydrocarbons, etc.), contact Industrial Hygiene Services. The six-digit code must appear on the sample form because the computer will use this number to identify a contaminant due to variations in chemical names used throughout Shell.

Analysis for up to eight contaminants may be requested on one form. If it is necessary for more than eight contaminants to be analyzed, a second sampling form must be attached to the original sampling form, listing the additional contaminants. The key entry operators will be able to enter the additional contaminants as a continuation of the first form. The industrial hygienist need only list the contaminant codes, names, and results on the additional form.

If multiple contaminants are entered, any comment code (see No. 48) entered will apply to all of them unless clarified by a long-hand entry in the comment section.

- * 18. ANALYSIS REQUIRED: NAME. Enter the full name of the contaminant, if ten letters or less, or the common abbreviation. If there is not a common abbreviation, enter a reasonable abbreviation (see attached

contaminant code list). If you feel there may be some confusion, the full name should be recorded in the comment section for at least one of the batches of samples being submitted.

- *19. LESS THAN/GREATER THAN SIGN. If a sample result is reported as less than (<) or greater than (>) by the laboratory, fill in the box with the appropriate sign (not an asterisk).
- *20. RESULT. The results of the analysis should be entered by the location on the front of the form after it is returned from the laboratory.
- *21. UNIT. The location should check the unit in which the results are reported. If a special reporting unit is used, check box 9 and fill in the unit. Multiple results requiring different units should be submitted on separate IH sampling forms.
- *22. DATE SAMPLED. Enter the date the sample was collected using the format 01/01/82, including the leading zeros and slashes. If separate samples for a TWA are collected over midnight, the date of all the samples must be the same, otherwise, the computer will not be able to match up the samples. Use the date of the earliest start time on every sample in the group. The comment section can be used to record the actual date of the later samples.
- *23. SHIFT. Enter the number of the shift during which the sample was collected. For a normal eight hour day, the first shift would be midnight to eight. The second 8 a.m. to 4 p.m. and the third 4 p.m. to midnight. For locations with non-standard work shifts, the first shift would be the first one initiated on a given day. For example, the first shift could be 7 a.m. to 7 p.m., the second, 7 p.m. to 7 a.m., etc. For information purposes, the specific hours of the shift may be long hand entered to the right of box three, however, only the codes of 1, 2 or 3 will actually be entered into the system.
- *24. SAMPLE NUMBER. Assign a local number to identify the sample. Space is allowed for up to a twenty (20) character alpha/numeric entry. It is recommended that a consistent numbering system be developed at each location, which will prevent duplication of sample numbers within the location.
- 25. DESCRIPTION OF COLLECTOR. Describe the collection device in terms of its manufacturer, the charcoal lot number, type of filter, etc.
- 26. SAMPLED BY. Enter the name and phone number of the person conducting the monitoring.
- 27. RETURN RESULTS TO. Enter the initial and last name of the individual and his/her office address.
- *28. START TIME. Enter the start time of the sample in the designated box. Use 24-hour clock, i.e., 1:00 p.m. equals 1300, 8:00 p.m. equals 2000, etc.
- 29. OVERALL LOG AND DESCRIPTION OF EMPLOYEE'S WORK. A brief, but descriptive account of the tasks performed during the sample period should be entered in this section.

30. SKETCH AREA. This space should be used to sketch the work area, if necessary, and/or to make additional notes for location use.
31. INSTRUMENT TYPE AND MODEL NUMBER. Enter the manufacturer name and the model number of the sampling device.
32. SERIAL NUMBER. Enter the serial number of the instrument used for sampling.
33. CALIBRATED BY. Enter the name of the individual who calibrated the instrument used for sampling.
34. DATE. Enter the date of calibration.
35. REFERENCE/METHOD. Describe the method used for equipment calibration; e.g., soap bubble meter.
36. VOLUME PER COUNT. For sampling devices with a stroke counter, enter the volume per count obtained from the calibration data.
37. FLOW RATE. Enter the volume of air pumped per unit time and record the units, e.g., cc/min, Lpm, etc.
- *38. SAMPLING TIME. Enter the total sampling time in minutes.
39. SAMPLE VOLUME. Enter the total sample volume in liters.
40. COUNTER READING. For devices with a stroke counter, enter the initial and final readings on the counter. The net count is the difference between the two.

NOTE: Items 38, 41-45 are used by the computer to calculate the Time Weighted Average (TWA).
- *41. LENGTH OF SHIFT. Enter in minutes the total length of the shift worked by the individual.
- *42. SAMPLE REPRESENTATIVE OF POTENTIAL EXPOSURE. If the sample is representative of the potential exposure the individual received over the entire day, enter "yes". Generally, at least 420 minutes of sampling time is required for an 8-hour shift, 540 minutes for a 10-hour shift and 660 minutes for a 720 minute shift.

If the exposure was unusual, non-representative of the entire shift, or if the sample represented only a limited portion of the shift, enter "no". A "no" response requires additional information (see No. 43-45).

A "yes" entry for a sample will advise the computer to view it as a TWA, with no additional samples to be included or calculations made.
- *43. NUMBER OF ADDITIONAL SAMPLES (Total number - 1). If several samples are collected throughout the day to represent the shift, the number of additional samples (if they are to be included in a TWA calculation) should be entered. The computer will be capable of associating these multiple samples and calculating a TWA value.

The number that you enter is not the total number, but the total number minus one. This number must be entered on each form that is a part of the set.

When a TWA is to be calculated from multiple samples, the following items must remain consistent throughout the set of samples:

- | | |
|---------------------------|---------------------|
| a. Employee name | g. Sample type |
| b. Social Security Number | h. Sample collector |
| c. Job Exposure Profile | i. Unit of measure |
| d. Employee's company | j. Date sampled |
| e. Location | k. Shift |
| f. Area/unit | l. Length of shift |

Variations will be ignored by the system and the information from the sample with the earliest start time will be recorded on the TWA.

- * 44. NO EXPOSURE. If it can be determined that an employee received no exposure during a period in which he/she was not wearing a sampling device, that time (in min.) is entered here. If "zero exposure" time is included, it must be documented in the work task section (see #29), otherwise we assume that the measured TWA is valid for the entire work shift. Note: Clothing or shoe contamination may contribute to exposure while an employee is in a Control Room.
- *45. TWA CANNOT BE CALCULATED. If a time-weighted average cannot be calculated due to insufficient sample time, non-representative sample, etc., this box is checked.
- *46. WAS A RESPIRATOR WORN. If a respirator was worn during the sampling period to control exposure, the "yes" box should be checked. A respirator may be worn for only a very short period (i.e., 10-15 minutes), but if it is when peak exposure occurs, it is controlling exposure. (For example, when collecting a process sample or filling a drum.) This information should be documented in the work task section (see No. 29).

If a respirator was not worn to control exposure and for non-personal samples (i.e., area, source, etc.), check the "no" box.

- *47. SIGNIFICANT SKIN CONTACT. Check the "yes" box if significant skin contact occurs. If not, check the "no" box. Skin contact should be considered significant if it increases the overall exposure of the individual to the contaminant. Professional judgement is required in making this decision.

- *48. COMMENTS. Boxes are provided to enter up to 9 codes (2 digits each) for frequently used comments (attached). Space is also provided for longhand entries that are not covered by a code. Such comments must be brief and clearly written. Five blocks of 39 characters each are available for such entries.

The computer will be able to sort on coded comments, but not on the longhand comments. However, these will be stored and can be retrieved for output reports.

*49. DATA CLASSIFICATION. Well documented, valid and representative industrial hygiene data are vital to Shell and more specifically to the future use of the Health Surveillance System. Data classification procedures are needed to ensure industrial hygiene sampling results accurately represent actual contaminant levels and exposure conditions in the workplace. The Industrial Hygiene Sampling Form (O-2801) provides the means for data recording and classification. This form represents Shell's legal source document. Exposure monitoring data collected today will be used for future epidemiology studies as well as for evaluating employee exposure to chemical and physical agents. To identify and document the quality of the data, industrial hygiene sampling forms should be reviewed and assigned an appropriate data classification code.

The initial data classification can be done by the person who conducts the sampling. However, responsibility for final data classification is assigned as follows:

- HS&E-Industrial Hygiene Services for surveys conducted by that department's personnel.
- HS&E - Industrial Hygiene Services for locations conducting their own surveys without direct supervision of ABIH certified personnel.
- A location's ABIH certified personnel (Certified Industrial Hygienist, Industrial Hygienist in Training, Certified Industrial Hygiene Technologist) for surveys conducted by the location/contract staff.

This responsibility includes:

- Establishing written procedures defining the location's classification mechanism and review process. A copy should be sent to Industrial Hygiene Services, HS&E, and the appropriate functional health and safety organization for review and concurrence to assure continuity throughout Shell.
- Communication of the procedure to personnel conducting the industrial hygiene monitoring.
- Approving all sampling forms by dating and signing.

It is recognized that professional judgement will be exercised in the execution of these responsibilities. Therefore, the procedures may vary from location to location to fit particular circumstances.

CLASSIFICATION CRITERIA

The assignment of this code requires a consideration of several technical variables which may affect or otherwise bias the monitoring result. For any one measurement, single or multiple factors may be relevant. These variables include those which are obvious, such as the proper selection and use of a sampling device, and those which may be more ambiguous. This latter category may include weather influences, pump performance, worker tampering and chemical interferences. The assignment of a data classification code on

each sampling form presumes that each of these variables has been taken into consideration. The future use of exposure data on file as documentation of employee exposure is dependent on the accurate and proper classification of this data.

Data Classification Codes to be used are: 01 (Valid), 02 (Probably Valid), and 03 (Invalid). All samples should be assigned one of these three codes and entered into the record.

These are defined as follows:

- 01 Valid. The measurement is representative of work exposure without reservation. Sample was collected, shipped, and analyzed properly. Sample arrived at laboratory in good condition. Accepted analytical method used.
- 02 Probably Valid. The sample probably represents actual exposure conditions, but some doubt exists due to possible problems with sample collection (calibration, weather interferences, contamination etc.), equipment (tampering, breakage), or analysis (breakthrough, sample loss during analysis).
- 03 Invalid. The sample does not represent actual exposure conditions due to problems with sample collection, shipment, or analysis.

The classification will depend on the careful assessment of the following:

- Qualifications of the person(s) collecting the samples.
- The use of an acceptable sampling/analytical method.
- The use of proper calibration procedures.
- Conditions or occurrences reducing sampling accuracy.
- Conditions or occurrences reducing analytical accuracy.

Qualifications of The Person(s) Collecting The Samples

Personnel collecting industrial hygiene samples should possess adequate knowledge of required procedures and sampling techniques for the type of samples they are collecting. This knowledge may be obtained by attending short-courses on industrial hygiene monitoring, formal education in industrial hygiene, or by on-the-job training by ABIH certified personnel.

The Use of An Acceptable Sampling/Analytical Method

A monitoring method, which has been validated or generally accepted for the anticipated use conditions should be selected. Guidelines for monitoring, including sampling rates and collection devices (tubes, filters,

etc.) are available from the Industrial Hygiene Laboratory, Westhollow Research Center. The use of a sampling method not yet qualified by the Westhollow Laboratory requires that a comment code of 45 be entered.

The Use of Proper Calibration Procedures

The calibration procedure used for each measurement must establish that the monitoring method achieved an acceptable level of performance. For air sampling equipment, this usually involves calibrating the pump to check for a continuous sampling rate. Noise dosimeters and other "sensing" types of monitoring equipment usually require a calibration and/or battery check before and after each use. Calibration problems which may affect the determination of an appropriate classification code include:

- Final pump calibration is 1.0 Lpm instead of 2.0 Lpm as expected - a validity code of 03 would be indicated. (A 100% difference in initial and final pump calibration warrants an invalid code. However, it is not clear what smaller amount of variation should be considered acceptable. This question will be addressed in the future by the appropriate head office and field personnel.)
- Using a dosimeter for eight hours but forgetting to calibrate before use - warrants a 02 or 03 classification depending on knowledge of circumstances.
- Sampling pump stops during sampling period for an unknown amount of time - warrants a 02 or 03 classification depending on knowledge of circumstances.

Conditions or Occurrences Reducing Sampling Accuracy

There are conditions and occurrences which may interfere with sample collection. Such conditions and occurrences must be considered and evaluated as necessary for their effect. Typical examples are as follows

- Employee removes sampler for part of the sampling period - would reduce the classification code to 02 or 03, depending on time, etc.
- Sampling collector (charcoal tube, filter, passive dosimeter) is worn under clothing (slicker, suit, coats, etc.) during part or all of the period of exposure - would reduce the classification code to 02 or 03.
- Visible liquid contamination of sample by rain, product or water sprays or mists, etc. - would reduce the classification code to 03.
- The microphone of a noise dosimeter is removed from the dosimeter for an unknown amount of time - would reduce the classification code to 02 or 03.

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- Sampling collectors worn improperly by employee (at waist level, etc.) - would reduce the classification code to 02 or 03.

Conditions or Occurrences Reducing Analytical Accuracy

There are conditions and occurrences which reduce accuracy during sample shipment, storage, and analysis. Such conditions or occurrences will usually be identified by the lab. The lab is in the best position to evaluate and report such conditions. The laboratory should note on the sample form any findings plus their significance. Typical examples are as follows:

- Improper shipping conditions such as failure to refrigerate when specified - would reduce the classification code to 02 or 03.
- Charcoal tube caps are not in place when received at the lab - would reduce classification code to 02 or 03 depending on the volatility of the substance.
- Apparent contamination of air sample with a bulk sample --would reduce the classification code to 02 or 03.
- Excessive sample breakthrough occurs when the sample value obtained for the backup section of the charcoal (or other absorbent) tube exceeds 25% of that found on the front section. If this occurs the sample should be given a 02 classification. The result should be reported as ">" and comment code 31 should be added to the form.

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NORTH

<u>AREA NAME</u>	<u>JEP CODE</u>	<u>ENTRY TO BE MADE</u>
Complex	910400	-
DPMC North	910422	-
DPMC South	910434	-
<u>Operations East</u>	910464	-
Catalytic Reforming	910426	Cat Reforming
Catalytic Cracking	910425	Cat Cracker
Gas Recovery	910427	Gas Recovery
Aromatics West	910424	Arom West
Aromatics East	910423	Arom East
Hydrocracking	910428	Hydrocracking
<u>Operations West</u>	910416	-
Distilling	910419	Distilling
Thermal Cracking	910420	Therm Crack
Solvents and Treating	910418	Sol-Treat
Alkylation	910417	Alkylation
Dispatching Tank Farm	910496	Dispatching
Dispatching Docks	910488	Docks
<u>Operations Lube/Phenol-Acetone</u>	910430	-
Phenol A	910431	Phenol A
Phenol B	910404	Phenol B
Lube A	910432	Lube A
Lube B	910433	Lube B
Lube C	910459	Lube C

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NORTH

<u>AREA NAME</u>	<u>JEP CODE</u>	<u>ENTRY TO BE MADE</u>
<u>Utilities</u>	-	-
Utilities - CPS	910478	Utilities CPS -
Utilities - Distribution	910479	Utilities Distribution
Utilities North	910437	Utilities North
<u>Lab North/Analytical</u>	910409	Lab North/Analytical
Wet Chemistry	910480	Wet Chemistry
GC Section	910481	GC Section
Phenol Section	910482	Phenol Section
<u>Lab North/Operations</u>	910483	Lab North Operations
Main Lab	910401	Main Lab
GLC Room	910412	GLC Room
Catalyst Room	910413	Catalyst Room
Shipping Room	910414	Shipping
Motor Lab	910411	Motor Lab
Stockroom	910415	Stockroom
Bottlewasher Room	910410	Bottlewasher Room
Lab Courtyard	910402	Courtyard
Sample Carrier Room	910403	Carrier Room
<u>Maintenance North</u>	910469	Maint. North
Paint Shop	910494	Paint Shop
Carpenter Shop	910495	Carpenter Shop
Instrument Shop	910484	Instrument Shop
Garage	910489	Garage
Main Shop	910487	Main Shop -
<u>Environmental Operations Complex</u>	910456	Environ. Complex
Environmental Operations North	910457	Environ. North

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SOUTH

<u>AREA NAME</u>	<u>JEP CODE</u>	<u>ENTRY TO BE MADE</u>
Complex	910400	-
DPMC North	910422	- -
DPMC South	910434	-
<u>Intermediates and Solvents</u>	910466	-
G Department	910461	G
AC/D-D 100-200	-	G 100-200
ECH 300-400	-	G 300-400
CA	910439	CA
Vinyl Chloride	910440	VCM
Oxy 150 Section	-	VCM-150
EDC 100 Section	-	VCM-100
VCM 200 Section	-	VCM-200
HCIN Area	910441	HCIN
C Department	910447	C
A Department	910448	A
BA/SR Department	910442	BA-SR
Gerbitol Area	910443	Gerbitol
<u>Olefins</u>	910449	
OP II Light Olefins	910472	L0
Treating	-	L0-Treating
Isoprene	-	L0-Isoprene
OP II Pyrolysis	910474	PY
OP II/III Butadiene	910405	BD
OP II/III Hydrotreating	910407	HT -
OP III Light Olefins	910473	L03
OP III Pyrolysis	910475	PY3

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SOUTH

<u>AREA NAME</u>	<u>JEP CODE</u>	<u>ENTRY TO BE MADE</u>
<u>Utilities South</u>	910447	Utilities South
<u>Resin Operations</u>	910463	- -
Liquid Resins (ERU-5)	910436	Liquids
Solid Resins	910429	Solids
Epon II	910498	Solids-EP2D
Warehouse	-	
Epon VI	910497	Solids-EP6
Warehouse	-	
Bisphenol A(1,2,3)	910435	BPA
Resin Solutions	910460	Solutions
Speciality Resins	910446	Specialities
Continuous Unit	-	Specialities-Continuous
ECH Finishing	-	Specialities-Finishing
EPON I	-	Specialities-Epon I
Utilities	910499	
Distribution O.I.S.	910445	-
West Rack	910492	Distribution-West Rack
Site III	910491	Distribution-Site III
Denaturing Plant	910493	DP Plant
LRDF	910408	
Non-Shell Chemical Exposures	910486	Offsite

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SOUTH

<u>AREA NAME</u>	<u>JEP CODE</u>	<u>ENTRY TO BE MADE</u>
<u>Lab South</u>	910454	Lab South
Stockroom	910453	Stockroom -
Instrument Lab	910467	Instrument Lab
Solvents Lab	910462	Solvents Lab
Intermediates Lab	910465	Intermediates Lab
Olefins Lab	910451	Olefins Lab
Resins Lab	910450	Resin Lab
Environmental Lab	910452	Environmental Lab
Process Chemical Lab	910468	-
Instrument Repair Shop-Maint.So.	910455	-
<u>Maintenance South</u>	910470	Maintenance South
E Area	910485	E Area
CWT South	910471	CWT South
<u>Environmental Operations Complex</u>	910456	Enviornmental - Complex
Environmental Operations South	910444	Environmental South
<u>Other</u>		
Non-Operating Area - DPMC South		DPMC South
Non-Operating Area - DPMC North		DPMC North

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DPMC-16098

OPERATING CONDITION/OPERATION CODESOPERATING CONDITION (01-15) (30 CHARACTER DESCRIPTION)

01 Normal
02 Startup
03 Upset
04 Spill/Leak
05 Shutdown/Turnaround
06 Maintenance
07 Disassembling equipment
08 Other

OPERATION (16-60) (30 CHARACTER DESCRIPTION)

16	Entering vessel	29	Checking gauges
17	Collecting sample	30	Decontam. pump/other equipment
18	Filling drum	31	Gauging tank
19	Filling tank car	32	Making/Brking. transfr. line conn.
20	Filling tank truck	33	Adjusting valves or blinds
21	Removing insulation	34	Containing leak or spill
22	Sandblasting	35	Other mechanical work
23	Breaking into a line	36	Other operating tasks
24	Analyzing QC sample		
25	Unloading		
26	Changing filters		
27	Pouring		
28	Tank inspection		

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DPMC-16099

COMMENT CODESCOMMENTS (0-75) (75 CHARACTER DESCRIPTION)

- 01 Not actual exposure. Respirator worn.
- 02 Sample invalid. Pump malfunctioned.
- 03 Monitoring in parallel with OSHA.
- 04 Local ventilation system in work area.
- 05 Major engineering changes made.
- 06 Levels skewed to right. Looking at problem areas. Not random samples.
- 07 Sample result of employee complaint.
- 08 Random sample.
- 09 Worst case situation.
- 10 Initial based determination per OSHA requirements.
- 11 Periodic monitoring required by OSHA regulation.
- 12 Work practices apparently not normal.
- 13 Pump did not run entire sampling period. Pump failure.
- 14 Pump may not have run entire sampling period.
- 15 No record of pump calibration. Flow rate and volume cannot be checked.
- 16 Starting and stopping flow rates not given.
- 17 Incorrect flow rate used.
- 18 Lab found sample damaged.
- 19 Lab found loose material on sample filter.
- 20 Sample lost in analysis. Equipment malfunction.
- 21 Interferences with analysis prevent quantification of specific contaminant.
- 22 Sample stored too long before analysis.
- 23 Lab found sample contaminated.
- 24 Sample stored incorrectly.
- 25 Sample shipped incorrectly.
- 26 Sample volume too small. Insufficient to permit analysis.
- 27 Sample tubes arrived at lab without end sealing caps.
- 28 Sample not received in lab. Lost in shipment.
- 29 Sample appears to have been tampered with.
- 30 Openings in end of charcoal tube too small.
- 31 Extremely high breakthrough found in lab analysis.
- 32 Contaminants in sample collector inconsistent with what was expected.
- 33 Sample not under observation throughout sample period.
- 34 No blank submitted with sample.
- 35 Incorrect sample collector used.
- 36 Developmental sample collector or analytical technique. Result uncertain.
- 37 Data collected prior to implementation of JEP's at location.
- 38 Unit of measurement for noise dosimetry = % PEL.
- 39 Dosimeter Set at 85 dBA threshold.
- 40 Dosimeter Set at 87 dBA threshold.
- 41 Dosimeter Set at 90 dBA threshold.

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- 42 115 dBA peak level exceeded. Noise of sufficient intensity to produce reading present during sample period.
- 43 Same day duplicate sample.
- 44 Weather conditions may have effected results.
- 45 Method not validated by Shell IH Lab-WRC.
- 46 Sample not analyzed. Collector contaminated during sampling.
- 47 Sample invalid. Dosimeter malfunctioned.
- 48 Dosimeter would not recalibrate.
- 49 Dosimeter was not cleared prior to use.
- 50 Welding in enclosed area in pipe rack.
- 51 115 dBA peak level exceeded. Reading suspect. No apparent noise of sufficient intensity to produce reading.

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DPMC-16101

I.H. SAMPLING FORM - ANALYSIS REQUIRED CODE-ASSIGNMENT LISTCHEMICAL COMPOUNDS

ACETIC ACID		900,632
ACETONE		900,501
ACETONITRILE	MCN	900,603
ACROLEIN		900,502
ALDICARB		900,503
ALDRIN		900,668
ALLYL ALCOHOL	AA	900,504
ALLYL CHLORIDE	AC	900,505
ALLYL GLYCIDYL ETHER	AGE	900,506
AMMONIA		900,507
ANDRIN		900,669
ANILINE		900,663
ASBESTOS		900,508
ATRAZINE		900,509
AZODRIN		900,510
BENZENE		900,511
BIDRIN		900,512
BLADEx		900,513
BROMOFORM		900,514
BUTADIENE		900,628
BUTANOL		900,515
BUTYL GLYCIDYL ETHER	BGE	900,516
BUTYL OXITOL GLYCOL ETHER	BOGE	900,636
CARBON DIOXIDE	CO2	900,517
CARBON DISULFIDE	CS2	900,518
CARBON MONOXIDE	CO	900,519
CARBON TETRACHLORIDE	CARBON TET	900,520
CHLOROBENZENE (MONO)		900,650
CHLOROFORM		900,521
CIODRIN		900,522
CRESOL (PARA)	P-CRESOL	900,589
CRESYL GLYCIDYL ETHER	CGE	900,523
CUMENE		900,524
CYANURIC CHLORIDE	CYC	900,525
CYCLOHEXANE	CYCLOHEX	900,526
DD SOIL FUMIGANT	DD	900,527
DIACETONE ALCOHOL	DAA	900,528
DIAZINON		900,529
DIBROM		900,530
DIBROMOCHLOROPROPANE	DBCP	900,586
DIBROMO METHANE	DBM	900,573
DICHLOROBENZENE	DCB	900,531
DICYCLOPENTADIENE	DCPD	900,634
DIELDRIN		900,670
DIETHYL GLYCOL	DEG	900,638

DIISOBUTYLENE	DIB	900,621
DIMETHYL DISULFIDE	DMDS	900,572
DIMETHYL METHYL PHOSPHONATE	DMMP	900,532
DIMETHYL PHOSPHONATE	DMP	900,533
DIOXANE		-900,581
DIETHANOL AMINE	DHEA	900,646
DIETHYL AMINE	DEA	900,645
EPICHLOROHYDRIN	ECH	900,534
ETHANOL PENTOXONE		900,597
2-ETHOXYETHANOL		900,656
ETHYL ACETATE	ET ACETATE	900,535
ETHYL ALCOHOL	ETOH	900,536
ETHYL AMINE	ET AMINE	900,582
ETHYL AMYL KETONE	EAK	900,622
ETHYL BENZENE	ETBZ	900,537
ETHYL BENZOATE		900,651
ETHYLENE DIAMINE	EDA	900,623
ETHYLENE DIBROMIDE	EDB	900,538
ETHYLENE DICHLORIDE	EDC	900,539
ETHYLENE GLYCOL	EG	900,639
ETHYLENE OXIDE	EO	900,540
FERROUS OXIDE	FEO	900,643
FORMALDEHYDE	FORM	900,576
GAMMA GLYCIDIOXY PROPYL TRIMETHOXY SILANE	G-GPTS	900,667
GLACIAL ACRYLIC ACID	GAA	900,664
HEPTANE		900,541
HEXACHLOROCYCLOPENTADIENE	HCCPD	900,671
HEXANE		900,542
N-HEXANE		900,653
HEXYLENE GLYCOL	HEXG	900,637
HYDRAZINE	N2H4	900,644
HYDROGEN CHLORIDE	HCL	900,649
HYDROGEN CYANIDE	HCN	900,585
HYDROGEN FLOURIDE	HF	900,543
HYDROGEN SULFIDE	H2S	900,544
IONOL		900,545
IONOL HEAVY ENDS		900,600
IONOL LIGHT ENDS		900,599
ISOPENTANE		900,652
ISOPROPYL ALCOHOL	IPA	900,546
ISOPROPYL AMINE	IP AMINE	900,583
ISOPROPYL ETHER	IPE	900,630
MESITYL OXIDE	MO	900,624
2-METHOXY ETHANOL		900,658
METHYL ALCOHOL	MEOH	900,547
METHYL BUTYL KETONE	MBK	900,548

METHYL CHLORIDE	MECL	900,549
METHYL ETHYL KETONE	MEK	900,550
METHYL ISOBUTYL CARBINOL	MIBC	900,631
METHYL ISOBUTYL KETONE	MIBK	900,551
METHYL ISOCYANATE	MIC	-900,625
METHYL MERCAPTAN		900,665
METHYL OXITOL	MEOX	900,642
METHYL TERTIARY BUTYL ETHER	MTBE	900,650
METHYL THIOACETALDOXIME	MSAO	900,606
METHYLENE BIS(4 PHENYL) ISOCYANATE	MDI	900,659
METHYLENE CHLORIDE	MECL2	900,584
MONO ETHANOLAMINE		900,662
MONOBUTYL CRESOL	MBC	900,601
MONOMETHYLAMINE	MMA	900,570
MONOMETHYLCHLOROACETOACETAMIDE	MMCAA	900,571
NICKEL CARBONYL	NI CARBO	900,552
NITRIC ACID	HNO3	900,610
NITROGEN DIOXIDE	NO2	900,553
N-NITROSODIBUTYLAMINE	NDBA	900,614
N-NITROSODIETHYLAMINE	NDEA	900,612
N-NITROSODIMETHYLAMINE	NDMA	900,611
N-NITROSODIPROPYLAMINE	NDPA	900,613
N-NITROSOMORPHOLINE	NMOR	900,617
N-NITROSOPIPERIDINE	NPIP	900,615
N-NITROSOPIRROLIDINE	NPYR	900,616
NONANE		900,607
NUDRIN		900,554
OCTANE		900,574
ORTHOCHLOROBENZOIC ACID	OCBA	900,587
ORTHODIMETHOXY BENZENE	ODMB	900,666
OXAZOLIDONE		900,604
OXITOL GLYCOL ETHER	OGE	900,635
OZONE		900,555
PENTANE		900,633
PENTOXONE		900,619
PENTOXONE HEAVY ENDS		900,595
PENTOXONE LIGHT ENDS		900,596
PHENOL		900,620
PHENYL GLYCIDYL ETHER	PGE	900,556
PHOSDRIN		900,557
PHOSGENE		900,640
PHOSPHINE		900,592
PYDRIN		900,558
RABON		900,559
RC-716		-900,593
RM-14		900,661
RM-17 + oxides	RM17 + ox	900,618

SECONDARY BUTYL ALCOHOL	SBA	900,647
SHOP LIGAND	SHOP LIG.	900,577
SILVER AMINO OXALATE SOLN		900,591
SILVER OXALATE		900,590
SODIUM CYANIDE		900,654
SODIUM HYDROXIDE	NAOH	900,641
STYRENE		900,560
SULFIODINE		900,605
SULFUR DIOXIDE	SO2	900,561
SULFUR TRIOXIDE	SO3	900,609
SULFURIC ACID	H2SO4	900,610
TERTIARY BUTYL ALCOHOL	TBA	900,626
TERTIARY BUTYL ALCOHOL-CONSTANT BOIL MIX		900,594
TERTIARY BUTYL BENZENE	TBB	900,602
TERTIARY BUTYL BENZOIC ACID (PARA)	P-TBBA	900,608
TERTIARY BUTYL TOLUENE	TBT	900,627
TETRA ETHYL LEAD	TEL	900,629
TETRAHYDROFURAN	THF	900,562
TITANIUM TRICHLORIDE	TT	900,575
TOLUENE		900,563
TOLUENE DIISOCYANATE	TDI	900,660
TRICHLOROBENZENE	TCB	900,578
TRICHLOROETHANE	TCETHANE	900,579
TRICHLOROETHYLENE	TCE	900,564
TRIETHYLAMINE	TEAM	900,648
TRIISOBUTYLENE		900,598
TRIMETHYL PHOSPHATE	TMPO	900,565
TRIMELLITIC ANHYDRIDE	TMA	900,657
TRIMETHYL PHOSPHITE	TMP	900,566
TRIPHENYL PHOSPHINE	TPP	900,580
VAPONA		900,567
VINYL CHLORIDE MONOMER	VCM	900,568
XYLENE		900,569

LAM 000393

DPMC-16105

ELEMENTS

ALUMINUM		900,401
ANTIMONY	SB	900,402
ARSENIC	AS	900,403
BARIUM		900,404
BERYLLIUM		900,405
BISMUTH		900,406
BORON		900,407
BROMINE	BR	900,408
CADMIUM	CD	900,409
CALCIUM	CA	900,410
CARBON	C	900,411
CHLORINE	CL	900,412
CHROMIUM (TOTAL)	CR TOT	900,413
CHROMIUM (HEXAVALENT)	CR HEX	900,414
COBALT		900,415
COPPER		900,416
CERIUM		900,449
GOLD		900,417
IODINE		900,418
IRIDIUM		900,419
IRON		900,420
LEAD (ORGANIC)	PB ORG	900,421
LEAD (INORGANIC)	PB INORG	900,422
LITHIUM		900,448
MAGNESIUM		900,423
MANGANESE		900,424
MERCURY		900,425
MOLYBDENUM (SOLUBLE)	MOLY SOL	900,426
MOLYBDENUM (INSOLUBLE)	MOLY INSOL	900,427
MOLYBDENUM (TOTAL)	MOLY TOT	900,447
NICKEL (SOLUBLE)	NI SOL	900,428
NICKEL (INSOLUBLE)	NI INSOL	900,429
NICKEL (TOTAL)	NI TOT	900,446
PHOSPHORUS		900,430
PLATINUM		900,431
POTASSIUM	K	900,432
SCANDIUM		900,433
SELENIUM		900,434
SILICON	SI	900,435

SILVER		900,436
SODIUM	NA	900,437
STRONTIUM		900,438
SULFUR	S	900,439
TIN	SN	900,440
TITANIUM		900,441
TUNGSTEN		900,442
VANADIUM	V	900,443
ZINC	ZN	900,444
ZIRCONIUM		900,445

LAM 000395

DPMC-16107

MISCELLANEOUS

ASPHALT FUMES	ASPLT FUM	900,801
BENZENE SOLUBLES	BZ SOL	-900,802
CATALYST DUST	CAT DUST	900,803
CHEMICAL WASTE		900,820
CHROMATE BASE PAINT		900,837
COAL DUST		900,822
CYCLOHEXANE SOLUBLES	CYCLO. SOL.	900,843
FIBERGLASS		900,827
FLUE GAS		900,831
FUEL GAS		900,840
GASOLINE		900,805
GREASES		900,825
KRATON PRODUCTS		900,823
LATEX PAINT		900,835
LEAD BASE PAINT		900,836
LEL		900,846
LUBE ADDITIVES		900,833
LUBE BASE STOCKS		900,832
LUBE OILS		900,811
MEDICAL SUPPLIES AND VACCINES		900,826
MERCAPTANS		900,830
MINERAL DUST	MIN DUST	900,810
NUISANCE DUST	NUSCE DUST	900,804
OIL BASE PAINT		900,834
OIL MIST		900,806
OPERATOR-LABORATORY REAGENTS		900,817
POLYBUTYLENE PELLETS		900,845
POLY NUCLEAR AROMATICS	PNAS	900,807
POLYPROPYLENE PELLETS		900,815
POLYPROPYLENE POWDER		900,814
POLYPROPYLENE VAPOR		900,816
POLYSTYRENE PRODUCTS		900,824
PREMIXED PREPOLYMERIZED CATALYST	PMPP	900,813
RECOVERED VOLATILES		900,828
SANITARY WASTE		900,819
SILICA		900,808
SILVER SLUDGE		900,818
SLOP OIL		900,812
SLUDGE		900,821
SOLDERING FUMES	SOLD FUM	900,842
SOUR WATER		900,839
STODDARD SOLVENT	STOD. SOL.	900,841
TOTAL HYDROCARBON	THC	900,844
USED MOTOR OIL		900,847
WATER BASE PAINT		900,838
WELDING FUMES	WELD FUM	900,809
WOOD DUST		900,829

LAM 000396

DPMC-16108

PHYSICAL AGENTS

NOISE		900,000
HEAT		900,001
COLD		900,002
ALPHA		900,003
BETA		900,003
GAMMA/X-RAY		900,005
INFRARED		900,006
ULTRAVIOLET	UV	900,007
MICROWAVES		900,008
VIBRATION		900,009
HIGH PRESSURE	HI PRESS	900,010
LOW PRESSURE	LO PRESS	900,011
LASER		900,012
ULTRASONIC		900,013

LAM 000397

DPMC-16109

SHELL DEER PARK MANUFACTURING COMPLEX EXPOSURE GUIDELINES

1

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC GUIDELINE		HEALTH DATA/COMMENTS
	PEL-TWA	PEL-CEILING	TLV-TWA	TLV-STEL	TWA	STEL	
Acetone	1,000.0	-	750.0	1,000.0	1,000.0	1,250.0	Mild E.N.T. irritant at conc. below 1,000; may be narcosis producing at higher concentrations.
Acetonitrile	40.0	-	40.0	60.0	40.0	60.0	Acute toxicity due to cyanide; odor detected at 40-50 ppm; possible respiratory tract effects.
Acrolein	0.1	-	0.1	0.3	0.1	0.3	Skin absorption possible. Vapors extremely irritating.
Allyl Alcohol	2.0	-	2.0	4.0	2.0	4.0	Skin absorption possible; marked eye, nose and throat irritant; mustard like odor detected .5 - 1.0.
Allyl Chloride	1.0	-	1.0	2.0	1.0	2.0	Unpleasant pungent odor. Odor detected at .47-3.0 ppm. Possible liver and kidney effects
Allyl Glycidyl Ether	-	10.00	5.0	10.0	5.0	10.0	Skin absorption possible.
Aluminum Metal Dust	15.0	-	10.0	20.0 $\frac{mg}{m^3}$	10.0	20.0	Considered as an inert or nuisance dust.
Ammonia	-	-	5.0	-	5.0	-	Welding fume.
	50.0	-	25.0	35.0	25.0	35.0	Odor detected 1 - 5 ppm; marked E.N.T. irritant.

DPMC-16110

LAM 000398

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Aniline	5.0	-	2.0	5.0	2.0	5.0	Skin absorption possible. Causes blood effects (methemoglobin). Odor threshold 1.0 ppm.
Asbestos	2.0	10.0	2.0	-f/cc	2.0	10.0	Human carcinogen.
Asphalt Fumes	-	-	5.0	10.0 $\frac{\text{mg}}{\text{m}^3}$	5.0	10.0	Respiratory, skin irritant.
Bisphenol A (BPA)	-	-	-	- $\frac{\text{mg}}{\text{m}^3}$	10.0 (total weight)	-	Considered a nuisance dust, possible skin sensitization, irritation.
Butyl Oxide	-	-	-	-	50.0	-	
Barium (soluble compounds)	0.5	-	0.5	- $\frac{\text{mg}}{\text{m}^3}$	0.5	-	
Benzene	10.0	25.0	10.0	25.0	-	10.0	Suspect human carcinogen odor threshold 4.68 ppm
Boron Trifluoride	-	1.0	-	1.0	-	1.0	Lung irritant, pneumonia producing.
1,3-Butadiene	1,000.0	-	1,000.0	1,250.0	1,000.0	1,250.0	Odor detected at .16 ppm, moderate irritant eye, nose, throat. Narcosis producing at high concentrations.

LAM 000399

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
n-Butyl Alcohol	100.0	-	-	50.0	50.0	100.0	Skin absorption possible. Odor threshold 10 ppm, reported affect on hearing.
sec-Butyl Alcohol	150.0	-	150.0	-	150.0	-	Some irritative and narcotic effects.
tert-Butyl Alcohol	100.0	-	100.0	150.0	100.0	150.0	Narcotic effect.
n-Butyl Glycidyl Ether (BGE)	50.0	-	25.0	-	25.0	-	Alleged reproductive carcinogenic and mutagenic effects. Irritant. Odor detected at .02 ppm. NIOSH recommends 4 ppm ceiling. Sensitization possible.
m-Butyl Ether (ethylene Glycol)	50.0	-	50.0	150.0	50.0	150.0	Butyl Oxitol. Skin absorption possible. Suspected of causing reproductive effects. Irritant, acute systemic effects.
Coal Tar Pitch Volatile (Benzene Soluble Fraction analyzed for specific PCAs)	0.2	-	-	- $\frac{\text{mg}}{\text{m}^3}$	0.2	-	PCA containing; respiratory and skin irritant; possible cancer association.
Cadmium Oxide Fume	0.1	0.3	-	.05 $\frac{\text{mg}}{\text{m}^3}$	0.1	-	Kidney, lung and possible long-term chronic effects.
Catalyst Dust	See Total Nuisance Dust				10	-	Catalyst Dust not otherwise classified.

DPMC-16112

LAM 000400

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Carbon Dioxide	5,000.0	-	5,000.0	15,000.0	5,000.0	15,000.0	Simple asphyxiant.
Carbon Monoxide	50.0	-	50.0	400.0	50.0	400.0	Chemical asphyxiation, possible heart effects. NIOSH recommends 35 ppm TWA.
Cellosolve Acetate	100.0	-	50.0	100.0	100.0	-	(2-Ethoxyethyl acetate). Skin absorption possible.
Chlorine	-	1.0	1.0	3.0	-	1.0	Eye, nose, and throat irritant; pulmonary irritation.
Chloroform	50(c)		10,	50.	10.0	50.0	Suspect cancer agent.
Chromium Fume (Metal and insoluble salts as CR)	1.0	-	0.5 CR III 0.05 CR VI	$\frac{\text{mg}}{\text{m}^3}$	0.5 CR III	-	Chronic lung hazard
Cobalt Fume (as Co)	0.10	-	0.05	$0.10 \frac{\text{mg}}{\text{m}^3}$	0.05 CR VI	0.10	Pulmonary effects possible.
Copper Fume (as Cu)	0.1	-	0.20	$\frac{\text{mg}}{\text{m}^3}$	0.10	-	Metal fever possible from fume, an irritant to the upper respiratory tract.
Dust (as Cu)	1.0	-	1.0	$\frac{\text{mg}}{\text{m}^3}$	1.0	-	Skin absorption possible. <u>Dermal irritant.</u> Toxicity similar to Phenol.
Cresol	5.0	-	5.0	-	5.0	-	Skin absorption possible. Narcotic and irritative effects possible.
Cumene	50.0	-	50.0	75.0	50.0	75.0	

DPMC-161113

LAM 000401

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Cyclohexane	300.0	-	300.0	375.0	300.0	375.0	Pungent odor which is detectable near 300 ppm.
1,3-Cyclopentadiene	75.0	-	75.0	150.0	75.0	150.0	Vapors irritating near 200 ppm.
Diacetone Alcohol	50.0	-	50.0	75.0	50.0	75.0	Vapors irritating near 100 ppm. Narcotic effects possible.
1,3-Dichloropropene (D-D soil fumigant) CHCL = CH-CH ₂ CL	-	-	1.0	10.0	1.0	3.0/ 1 HR.	Respiratory irritant, kidney and liver effects
Dicyclopentadiene (DPCD)	-	-	5.0	-	5.0	-	Disagreeable odor at 0.2 ppm but not irritating below 10 ppm. An irritant with possible chronic effects
Diethanolamine	-	-	-	-	-	-	
Diethylamine	25.0	-	10.0	25	25.0	-	Eye and upper respiratory tract irritant. Odor detected at .05 ppm.

DPMC-16114

LAM 000402

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Diethylenetriamine	-	-	1.0	-	1.0	-	Skin absorption possible.
Diglycidyl Ether	-	0.5	-	0.5	-	0.5	
Epichlorohydrin	5.0	-	2.0	5.0	1.0	3.0	Skin absorption possible Suspect human carcinogen
Ethanolamine	3.0	-	3.0	6.0	3.0	6.0	
Ethyl Alcohol	1,000.0	-	1,000.0	-	1,000.0	-	Narcotic effects.
Ethyl Benzene	100.0	-	100.0	125.0	100.0	125.0	
Ethyl Chloride	1,000.0	-	1,000.0	1,250.0	1,000.0	-	Narcotic effects.
Ethylenediamine	10.0	-	10.0	-	10.0	-	
Ethylene Dichloride	50.0	100.0	10.0	15.0	10.0	15.0	Toxic to liver, narcotic affects, suspect carcinogen
Ethylene Glycol m-Ethyl Ether	200.0	-	50.0	100.0	5.0	15.0	Ethyl Oxitol (2 ethoxyeth ol). Skin absorption possible. Suspect terato Acute systemic toxic eff
Gasoline (Bulk Handling)	-	-	300.0	500.0	-	-	Anesthetic effects, irritating to mucous membranes.
Hydroquinone	2.0	-	2.0	4.0	2.0	4.0	

DPMC-16115

LAM 000403

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
n-Heptane	500.0	-	400.0	500.0	500.0	-	Narcosis producing at high concentrations
n-Hexane	500.0	-	50.0	-	50.0	100.0	Polyneuropathy and narcosis effects
Hydrazine	1.0	-	0.1	-	0.1	-	Skin absorption possible, respiratory irritant, suspect cancer hazard
Hydrogen Chloride	-	5.0	-	5.0	-	5.0	Respiratory irritant
Hydrogen Sulfide	-	20.0	10.0	15.0	10.0	20.0	Marked irritant to eyes, lung; loss of smell, acute possibility fatal systemic effects.
Inorganic Lead Dust and Fume (As Pb)	.05	-	.15	.45 $\frac{\text{mg}}{\text{m}^3}$	.05	-	Kidney, blood, CNS effects
Iron Oxide (as Fe)	10.0	-	5.0	10.0 $\frac{\text{mg}}{\text{m}^3}$	5.0	10.0	Benign chronic lung hazard
Isobutyl Alcohol	100.0	-	50.0	75.0	100.0	-	
Isopropyl Alcohol	400.0	-	400.0	500.0	400.0	-	<u>Skin absorption possible</u>
Isopropyl Ether	500.0	-	250.0	310.0	250.0	310.0	
Magnesium Oxide Fume (as Mg)	15.0	-	10.0	- $\frac{\text{mg}}{\text{m}^3}$	10.0	-	
Manganese (as Mn) fume or dust	-	5.0	1.0	3.0 $\frac{\text{mg}}{\text{m}^3}$	1.0	3.0	
Mesityl Oxide	25.0	-	25.0	-	25.0	-	15 ppm TWA proposed by ACGIH

DPMC-16116

LAM 000404

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Methyl Ethyl Ketone	200.0	-	200.0	300.0	200.0	-	Irritant to eyes, nose, and throat. Narcosis producing at high concentrations.
Methyl Isobutyl Carbinol	25.0	-	25.0	40.0	25.0	40.0	<u>Skin absorption possible.</u>
Methyl Isobutyl Ketone	100.0	-	50.0	75.0	100.0	125.0	Irritant to eyes, nose and throat. Narcosis producing at high concentrations.
Methyl Mercaptan	-	10.0	0.5	-	-	10.0	<u>Skin absorption possible.</u>
Methyl Oxitol	25.0	-	25.0	35.0	25.0	35.0	<u>Skin absorption possible.</u>
Methylene Chloride	500.0	1,000.0	200.0	250.0	200.0	250.00	
Methacrylic Acid	-	-	20.0	-	20.0	-	Corrosive to skin and eyes, sensitization possible.
Naphthalene	10.0	-	10.0	15.0	10.0	15.0	
Nickel (insoluble) fume or dust	1.0	-	1.0	- $\frac{\text{mg}}{\text{m}^3}$	1.0	-	
Ozone	0.1	-	0.1	0.3	0.1	0.3	
Organic Lead	.075	-	TEL 0.1	0.3 $\frac{\text{mg}}{\text{m}^3}$	.075	-	<u>Skin absorption possible.</u>
			TML 0.15	0.5			

DPMC-16117

LAM 000405

SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
Pentane	1,000.0	-	600.0	750.0	600.0	750.0	Skin absorption possible. Odor Threshold .047 ppm 1 ppm TWA proposed by ACGIH
Phenol	5.0	-	5.0	10.0	5.0	10.0	
Phenyl Glycidyl Ether	10.0	-	10.0	15.0	10.0	15.0	
Styrene, Monomer	100.0	200.0	50.0	100.0	100.0	200.0	Odor Threshold .047-.1 ppm
Titanium	15.0	-	-	- $\frac{\text{mg}}{\text{m}^3}$	15.0		Skin absorption possible. Eye, nose, throat irritant. Odor Threshold 2.14 ppm Dust <1% Quartz
Toluene	200.0	300.0	100.0	150.0	100.0	150.0	
Total (Nuisance) Dust	15.0	-	10.0	- $\frac{\text{mg}}{\text{m}^3}$	10.0	-	
Total Welding Fume	15.0	-	5.0	- $\frac{\text{mg}}{\text{m}^3}$	5.0 inside hood 10.0 outside hood		ACGIH recommended standard for total welding fume based on measurement collected inside hood. 10 mg/m ³ adopted value based on nuisance dust limit.
Trichloroethylene	100.0	200.0	100.0	150.0	100.0	150.0	50 ppm TWA proposed by ACGIH

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SUBSTANCE	OSHA		1981 ACGIH		SHELL DPMC		HEALTH DATA/COMMENTS
	TWA	STEL	TWA	STEL	TWA	STEL	
1,2,3-Trichloropropane	50.0	-	50.0	75.0	50.0	75.0	
Vanadium Fume	-	0.1 (as V_2O_5)	-	0.05 $\frac{mg}{m^3}$ (as V)	0.05 (as V)	-	ACGIH recommends .05 as V_2O_5 .
Vinyl Chloride Monomer	1.0	5.0	5.0	10.0	1.0	5.0	Suspect human carcinogen.
Xylene	100.0	-	100.0	150.0	100.0	150.0	<u>Skin absorption possible.</u>
Zinc Oxide Fume	5.0	-	5.0	-	5.0	-	Metal fume fever from inhalation of fumes

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IT OPERATIONS
SAMPLING/MONITORING PROCEDURES
1988 720.1

LAM 000370

DPMC 16082.1