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ABSTRACT

This book details the process engineering work for P-3145. This is Phase II of the project entitled "Meet EDC Exposure Regulations". A new OSHA Rule 1910.1000 involving personnel exposure to chemicals used in Derivatives has been enacted. This rule requires engineering controls to prevent exposure to these chemicals by January 1, 1993. The four chemicals effected are EDC, Trichlor, Perchlor, and VDCM. Details concerning the regulation can be found in this manual (See Section III).

The process engineering work in Phase II was directed at the clearing of equipment for maintenance or opening for inspection. A team was formed with members from Process Engineering, Operations, Project Engineering, Environmental, and Human Resources. The group was instrumental in the creation, testing, and evaluation of different clearing concepts. The final clearing methods selected were; steaming, purging with hot nitrogen, and vacuum.

The engineering involved the modification of each piece of process equipment in Derivatives to allow one or all of the new clearing methods. A list of all effected equipment and their ratings was produced. This list is included in Appendix F "Equipment List". P&ID's for each unit were modified. New equipment was specified where necessary. The majority of the modifications are the installation of bleed valves, headers, valves, and diaphragm pumps. Nitrogen heaters, condensers, knock-out pots, revised catalyst pots, air blowers, and vacuum pumps are also included. Area monitors are also needed in all EDC areas of Derivatives.

P-3145 Project Scope

P-3145 was initiated to comply with new OSHA regulations requiring a reduction in personnel exposure to EDC vapors. The new exposure limits are 1 ppm TWA for 8 hours and 2 ppm STEL for 15 minutes. We are presently operating under a temporary provision which allows for the use of respiratory protection to meet the new exposure limits. However, engineering controls will need to be in place by December 31, 1992 to meet the new regulations without the use of respiratory protection. There are two related projects that deal with this regulation. P-2510 concerns personnel exposures at the B Shipping area. P-2609 concerns personnel exposures as a result of loading ships and barges. P-3145 concerns EDC exposures in the operating units in Derivatives.

As a result of two additional exposure regulation on VOC's and TSDF, which are similar to the EDC exposure regulations, it was decided to include VDCM and EC in this project. The regulations are subdivided into different categories. These categories include:

1. General
2. Pumps
3. Compressors
4. Pressure relief devices in gas service
5. Sampling
6. Open lines
7. Valves
8. Pressure relief devices in liquid service
9. Equipment clearing

This project was divided into two phases to comply with the new exposure regulations. Phase I (P-3097) deals with the pumps, compressors, pressure relief devices in gas service (low pressure storage tanks), small vessels vacuum clearing, and sampling. These items are easier to comply with since their scope is quite specific. The phase I ACT has been prepared and is in the approval process.

Phase II (P-3145) of the project deals primarily with process equipment clearing. Research, testing and development of new techniques to clear equipment of EDC and VOC vapors is required to fully comply with the new exposure regulations. Clearing procedures will be required for process equipment. Below is a partial listing of some of the equipment:

1. Distillation columns
2. Reboilers
3. Process tanks
4. Storage tanks
5. Process piping

6. Product dryers and filters
7. Heat exchangers
8. Tar buggies

In addition to clearing process equipment, other sources of personnel exposure that need to be addressed by the project are:

1. Vacuum trucks emissions
2. Process sumps and lift station emissions
3. WTU Classifier emissions

Vacuum truck usage has been essential within Derivatives for years. The project has approach the subject of vacuum truck emissions by attempting to eliminate the need for the vacuum truck in the process changes. Eliminating the usage of vacuum trucks will reduce emissions from the trucks as well as reduce PPG's costs. To further that end a survey was made of all the operating units to determine the actual usages of vacuum trucks. The goal is to eliminate each item on these lists. The lists are included in Appendix G "Vacuum Truck Usage Lists".

Exposure to emissions from process sumps and lift stations is being handled by P-3145. The sumps will be covered and the working losses from the sump will be directed to a carbon bed for purification.

Exposure to WTU Classifier emissions is being handled by P-3011. This project involves the replacement of the WTU Classifier system with a closed system.

Discussion of OSHA Rule 1910.1000

(From Industrial Hygiene, February 1991)

In January of 1989, the Occupational Safety and Health Administration (OSHA) published a Final Rule which lowered the Permissible Exposure Limit (PEL) for 212 regulated substances. PEL's were established for 164 substances that were not previously regulated by OSHA. Within the Derivatives area of the Lake Charles Complex, several chemicals were affected by this Final Rule. Among these are ethylene dichloride, perchloroethylene, vinylidene chloride and trichloroethylene. The previous exposure limits and the new PEL's are described in the chart below.

Chemical	Old OSHA PEL	New OSHA PEL	Old PPG Limit	New PPG Limit
Trichlor	100 ppm	50 ppm	50 ppm	50 ppm
EDC	50 ppm	1 ppm	5 ppm	1 ppm
VDCM	none	1 ppm	2.5 ppm	1 ppm
Perchlor	100 ppm	25 ppm	50 ppm	25 ppm

The Final Rule went into effect on March 1, 1989. The Rule required compliance with the PEL's through any method or combination of methods by September 1, 1989. Available compliance methods include engineering controls, respirators, work practices and administrative controls. Compliance must be achieved through the implementation of engineering controls alone by December 31, 1992. After this date, respirators may only be used to achieve compliance in emergencies, some maintenance activities, and where engineering controls are infeasible. OSHA's definition of feasibility typically does not incorporate economic considerations.

PROJECT APPROACH

A team was formed with members from Process and Project Engineering, Operations, Environmental and Human Resources. Several meetings of the team were held to generate ideas on potential clearing methods to be used. Next these methods were tested on different pieces of equipment. The team members were instrumental in choosing which pieces of equipment to test and making the equipment available for testing. The results of this phase of the project are included in Appendix B "Clearing Concepts and Testing".

The team also assembled a list of equipment within Derivatives that could be affected by the regulations. This list included the equipment description, SAC number, unit, pressure rating, vacuum rating and temperature rating. Over 950 individual pieces of equipment were identified. This list was used by the team to determine which clearing concepts were applicable to which piece of equipment. The final equipment list can be found in Appendix F "Equipment List".

The team also investigated questions such as to what limit the equipment should be cleared to and what should be used to check the progress of the clearing. It was decided that the goal of the team was to clear the equipment down to the exposure limit of the chemicals involved. Portable HNU-type meters which can be calibrated for EDC or other specific compounds would be the best choice for portable detectors. See Appendix D "Project Correspondence" and Appendix E "Team Meeting Minutes" for further details.

After the testing of clearing concepts was completed, the team then prepared a unit specific equipment list that included the preferred clearing method(s) for each piece of equipment in that unit. These lists were reviewed by the operations supervisors in each area for comments, changes and/or suggestions. Examples of these lists may be found in Appendix A "Unit Process Packages" under each unit's subsection. These lists were used by the process engineering team for its design.

For the most part, the process engineering phase involved the installation of valves, bleeds, and piping within each unit. A full set of P&ID's for each area were obtained. These drawings were marked by the process engineering team to show the addition of new equipment and some existing equipment not shown on the existing drawings. Logsheets detailing each revision are included in Appendix A in the unit's subsection. Also included in each unit's process package (Appendix A) are new equipment spec sheets. Also, a list of other items such as hoses, fixed-point monitoring stations, portable analyzers, etc. are included. The revised unit drawings were reviewed with an operations representative from that area.

Discussion of Drawings & New Equipment

The process engineering team assembled complete P&ID sets for each operating unit. These drawings were revised for each unit to reflect changes needed with the project. New equipment and piping was drawn with red pencil. In some instances, existing piping and equipment not shown on the existing drawings was drawn and indicated in blue. Each revision to each drawing was recorded on a logsheet for cross-reference. This was done to reduce the possibility of over-looking some of the smaller revisions due to the large number of revisions involved. These logsheets are included in each unit's subsection under Appendix A. The marked-up drawings are provided as part of the process package.

The following unit drawing sets were revised:

- ♦ VCM-II (56A)
- ♦ WTU (67A/68A/57G)
- ♦ TE-II (69A/20A/61A/66B)
- ♦ LP-EDC (60A)
- ♦ VDCM (61A)
- ♦ EC-HCL (64A/20A)

New process equipment was drawn on the revised drawings. The following system for giving the new equipment process numbers was used:

Dwg. Prefix - Equip. Type - No.

The following is an example of a new condenser at Waste Treatment:

67A - E - 104

The only exception to this system is that used for the VC-II area. Another number was added after the drawing prefix, which gives the Parsons drawing number. For example, a new pump at VC-II could have this number:

56A - 10 - P - 102

The new equipment spec sheets include this process number and the P&ID drawing number on which they may be found. Additional details may be found (if applicable) in Appendix C "Process Calculations".

Environmental Regulations

As mentioned in the Project Scope (See Section II), in addition to the OSHA Rule, there are some environmental regulations which are impacted by this project. Each will be discussed *briefly* below.

VOC Emissions - This regulates the emissions to the atmosphere of Volatile Organic Compounds (VOCs). A VOC is any organic chemical that is not on the exempted list. This regulations covers all the organics produced in Derivatives with the exception of methyl chloroform.

TSDF - This regulates the operation of Toxic Storage and Disposal Facilities. The Waste Recovery unit (Bottoms Plant) is considered a TSDF. Thus the emissions of chemicals handled in this area are regulated.

Air Toxics - This is a regulation proposed by the Louisiana DEQ. This regulation involves the emissions to the atmosphere for virtually every compound used or produced in Derivatives. Each compound is given a limit in lbs/year from all sources (relief devices, spills, fugitive emissions, clearing equipment, scrubbers, etc.). This regulation exceeds the requirements of the Clean Air Act.

Although OSHA Rule 1910.1000 is the main driving force behind the project it also greatly effects the level of compliance with the above environmental regulations.

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From: Ron Williams *RW*

Subject: OSHA Regulatory Summary

Please let me know if the attached is less than adequate for the regulatory summary requested at 2-18-91 EDC/VOC Exposure Team meeting.

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