

Statement of Basis of the Federal Operating Permit

The Dow Chemical Company

Site/Area Name: Hydrocarbon & Energy (2)

Physical location: 2301 Brazosport Blvd.

Nearest City: Freeport

County: Brazoria

Permit Number: O2213

Project Type: Minor Revision

Standard Industrial Classification (SIC) Code: 2869

SIC Name: Industrial Organic Chemicals,

This Statement of Basis sets forth the legal and factual basis for the draft changes to the permit conditions resulting from the minor/significant revision/reopening project in accordance with 30 TAC §122.201(a)(4). The applicant has submitted an application for a minor permit revision per §§ 122.215-217. This document may include the following information:

- A description of the facility/Area Process Description;
- A description of the revision project;
- A basis for applying permit shields;
- A list of the federal regulatory applicability determinations;
- A table listing the determination of applicable requirements;
- A list of the New Source Review Requirements;
- The rationale for periodic monitoring methods selected;
- The rationale for compliance assurance methods selected;
- A compliance status; and
- A list of available unit attribute forms.

Prepared on: October 30, 2007

OPERATING PERMIT BASIS OF DETERMINATION

DESCRIPTION OF REVISION/REOPENING PROJECT

Following updates are made to the permit during this revision:

- (1) Special Terms and Condition (A01E) for MACT EEEE referencing Chapter 113 was added.
- (2) Special Terms and Condition (A88A,B,D,E,F,H,I,L,N,O,Q) for MACT GGGGG site wide requirement was added.

PERMIT AREA PROCESS DESCRIPTION

The application area consists of several processes. These are as follows:

Olefin Production Unit (LHC-7): The products from this processes are ethylene, propylene, and a C4+ stream. The first section is the cracking section. Process heaters are used to convert the plant feed (a mixture of ethane and propane) into olefins. The next section is the compression/chilling section which takes the olefin stream from the cracking section and compresses it. The refrigeration system converts the olefin stream into a liquid stream. The distillation section takes the liquid stream from the chilling section and separates out the different desired products.

The LHC-8 plant converts cracking feed-stocks into ethylene, propylene, C4 compounds, pyrolysis gasoline, fuel oil and off-gas (primarily hydrogen and methane). The process consists of a thermal cracking step, followed by compression, drying, distillation and purification. The primary cracking feed-stocks are liquefied petroleum gases (LPG), natural gas liquids, petroleum naphtha and condensate. Other cracking feed-stocks may include various petroleum derived hydrocarbons in the C5-C10 carbon number range. Pyrolysis gasoline produced by the cracking process consists primarily of a mixture of paraffins, olefins, diolefins, cyclic and aromatic compounds. The pyrolysis gasoline is sent to the marine loading docks after temporary storage in the south tank farm.

Production of Styrene: Ethylbenzene will react in the presence of iron oxide catalyst to produce styrene. Since the reaction is endothermic in nature, heat is supplied by superheated steam. The final product at styrene 1 is called crude styrene. Crude styrene is composed of styrene, ethylbenzene, toluene, benzene and styrene tars. The vent gas produced is mixed with fuel gas and burned in the superheating furnaces. Styrene 1 currently operates as a single unit. In Styrene 2 Ethylbenzene and steam are superheated and fed to reactor system where crude styrene is produced by the high temperature catalytic dehydrogenation of ethylbenzene. The crude styrene is condensed and then separated. This crude styrene along with the crude styrene from Styrene 1 are separated in a series of distillation columns. The light hydrocarbons are removed in the first column. The ethylbenzene is removed in the second column and recycled back to the reactor system. Finished styrene is removed in the third column and styrene heavies are removed in the fourth column. The finished styrene is transferred from Styrene 2 storage tanks to Styrene distribution storage tanks.

Styrene Distribution receives crude styrene from Styrene 1 and finished Styrene 2. Styrene at plant A is stored in storage tanks and then loaded into ships and barges.

EBA Process: The basic raw materials for the reactions are benzene and ethylene. Benzene is supplied via marine vessels is off-loaded into a benzene storage tank. Ethylene is supplied by an internal distribution system. The catalyst for the reaction is continuously produced and stored in process vessels. The catalyst is pumped from storage to main ethyl-benzene reactor. Benzene,

ethylene and catalyst enter the reactor section. The effluent from the main reactor is transferred to a second reactor for further ethylbenzene yield. The crude ethylbenzene is separated from the catalyst in a liquid-liquid separator. The crude ethylbenzene and excess catalyst complex is transferred to the wash system for neutralization. The wash system consists of four process vessels and distribution feed tank. The distillation section of the plant consists of a benzene recovery tower, ethylbenzene purification tower and a polyethylbenzene recovery tower. The polyethylbenzene recovery tower is driven by a direct-fired heater (reboiler), that also combusts process vents. The poly ethylbenzene is further reacted to improve ethylbenzene yield in the second reactor. The heavy oil is sold for blending in the fuel oil market. Product ethylbenzene is transferred to internal customers or loaded onto marine vessels for outside sales. Byproduct, diethylbenzene is produced by further distilling the polyethylbenzene. It is stored and loaded into tank cars for distribution.

The vents from most of the process are scrubbed, then compressed and combusted in the process heater or flare. All process water is stored and stream-stripped prior to transfer to the Texas Operation Wastewater Treatment Plant.

ATTAINMENT STATUS/MAJOR SOURCE POLLUTANTS

The area ozone nonattainment classification for Brazoria County is Moderate.

The table below specifies the pollutants for which the site is a major source:

Major Pollutants	VOC, PM, NOX, HAPS, CO
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The permit contains terms and conditions that specify the area-wide applicable requirements and a table of applicable requirements for specific emission units in the application area. The "application area" consists of the emission units and that portion of the site included in the application and this permit. When there is only one area for the site, then the application information and permit will include the site.

Additional FOPs: O1388, O2202, O2203, O2204, O2205, O2206, O2207, O2208, O2209, O2210, O2211, O2212, O2214, O2215, O2216, O2217, O2218, O2219, O2220, O2221, O2311, O2313, O2697

FEDERAL REGULATORY APPLICABILITY DETERMINATIONS

The following chart summarizes the applicability of the principal air pollution regulatory programs to the permit area:

Regulatory Program	Applicability (Yes/No)
Prevention of Significant Deterioration (PSD)	No
Nonattainment New Source Review (NNSR)	No
State NSR	Yes
40 CFR Part 60 - New Source Performance Standards	Yes
40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPs)	Yes
40 CFR Part 63 - NESHAPs for Source	Yes

Categories	
Title IV (Acid Rain) of the Clean Air Act (CAA)	No
Title V (Federal Operating Permits) of the CAA	Yes
Title VI (Stratospheric Ozone Protection) of the CAA	Yes

INSIGNIFICANT ACTIVITIES

In general, units not meeting the criteria for inclusion on either Form OP-SUM or Form OPREQ1 are not required to be addressed in the operating permit application. Examples of these types of units include, but are not limited to, the following:

1. Office activities such as photocopying, blueprint copying, and photographic processes.
2. Sanitary sewage collection and treatment facilities other than those used to incinerate wastewater treatment plant sludge. Stacks or vents for sanitary sewer plumbing traps are also included.
3. Food preparation facilities including, but not limited to, restaurants and cafeterias used for preparing food or beverages primarily for consumption on the premises.
4. Outdoor barbecue pits, campfires, and fireplaces.
5. Laundry dryers, extractors, and tumblers processing bedding, clothing, or other fabric items generated primarily at the premises. This does not include emissions from drycleaning systems using perchloroethylene or petroleum solvents.
6. Facilities storing only dry, sweet natural gas, including natural gas pressure regulator vents.
7. Any air separation or other industrial gas production, storage, or packaging facility. Industrial gases, for purposes of this list, include only oxygen, nitrogen, helium, neon, argon, krypton, and xenon.
8. Storage and handling of sealed portable containers, cylinders, or sealed drums.
9. Vehicle exhaust from maintenance or repair shops.
10. Storage and use of non-VOC products or equipment for maintaining motor vehicles operated at the site (including but not limited to, antifreeze and fuel additives).
11. Air contaminant detectors and recorders, combustion controllers and shut-off devices, product analyzers, laboratory analyzers, continuous emissions monitors, other analyzers and monitors, and emissions associated with sampling activities. Exception to this category includes sampling activities that are deemed fugitive emissions and under a regulatory leak detection and repair program.
12. Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical analysis, including but not limited to, assorted vacuum producing devices and laboratory fume hoods.
13. Steam vents, steam leaks, and steam safety relief valves, provided the steam (or boiler feedwater) has not contacted other materials or fluids containing regulated air pollutants other than boiler water treatment chemicals.
14. Storage of water that has not contacted other materials or fluids containing regulated air pollutants other than boiler water treatment chemicals.
15. Well cellars.
16. Fire or emergency response equipment and training, including but not limited to, use of fire control equipment including equipment testing and training, and open burning of materials or fuels associated with firefighting training.
17. Crucible or pot furnaces with a brim full capacity of less than 450 cubic inches of any molten

metal.

18. Equipment used exclusively for the melting or application of wax.
19. All closed tumblers used for the cleaning or deburring of metal products without abrasive blasting, and all open tumblers with a batch capacity of 1,000 lbs. or less.
20. Shell core and shell mold manufacturing machines.
21. Sand or investment molds with a capacity of 100 lbs. or less used for the casting of metals;
22. Equipment used for inspection of metal products.
23. Equipment used exclusively for rolling, forging, pressing, drawing, spinning, or extruding either hot or cold metals by some mechanical means.
24. Instrument systems utilizing air, natural gas, nitrogen, oxygen, carbon dioxide, helium, neon, argon, krypton, and xenon.
25. Battery recharging areas.
26. Brazing, soldering, or welding equipment.

NEW SOURCE REVIEW REQUIREMENTS

Below is a list of the New Source Review (NSR) permits for the permitted area. These NSR permits are incorporated by reference into the operating permit and are enforceable under it. These permits can be found in the main TCEQ file room, located on the first floor of Building E, 12100 Park 35 Circle, Austin, Texas. The Office of Public Assistance (OPA) may be contacted at 1-800-687-4040 for help with any question.

Additionally, the site contains emission units that are permitted by rule under the requirements of 30 TAC Chapter 106, Permits by Rule. The following table specifies the permits by rule that apply to the site. All current permits by rule are contained in Chapter 106. Outdated 30 TAC Chapter 106 permits by rule may be viewed at the following website:

www.tceq.state.tx.us/permitting/air/permitbyrule/historical_rules/old106list/index106.html. Outdated Standard Exemption lists may be viewed at the following website:

www.tceq.state.tx.us/permitting/air/permitbyrule/historical_rules/oldselist/se_index.html

Title 30 TAC Chapter 116 Permits, Special Permits, and Other Authorizations (Other Than Permits By Rule, PSD Permits, or NA Permits) for the Application Area.	
Authorization No.: 17480	Authorization No.: 18950
Authorization No.: 20432	Authorization No.: 21596
Authorization No.: 4370	Authorization No.: 75090
Authorization No.: C-18606	Authorization No.: R-17479
Authorization No.: R-2689	Authorization No.: T-18020
Permits By Rule (30 TAC Chapter 106) for the Application Area	
Number: 008	Version No./Date: 05/04/1994
Number: 008	Version No./Date: 04/05/1995
Number: 008	Version No./Date: 10/04/1995
Number: 051	Version No./Date: 06/18/1992
Number: 083	Version No./Date: 10/04/1995
Number: 086	Version No./Date: 08/11/1989
Number: 103	Version No./Date: 05/04/1994
Number: 106.452	Version No./Date: 09/04/2000
Number: 106.454	Version No./Date: 11/01/2001
Number: 106.472	Version No./Date: 03/14/1997

Number: 106.475	Version No./Date: 03/14/1997
Number: 106.478	Version No./Date: 03/14/1997

EMISSION UNITS AND EMISSION POINTS

In air permitting terminology, any source capable of generating emissions (for example, an engine or a sandblasting area) is called an Emission Unit. For purposes of Title V, emission units are specifically listed in the operating permit when they have applicable requirements other than New Source Review (NSR), or when they are listed in the permit shield table.

The actual physical location where the emissions enter the atmosphere (for example, an engine stack or a sand-

blasting yard) is called an emission point. For New Source Review preconstruction permitting purposes, every emission unit has an associated emission point. Emission limits are listed in an NSR permit, associated with an emission point. This list of emission points and emission limits per pollutant is commonly referred to as the "Maximum Allowable Emission Rate Table", or "MAERT" for short. Specifically, the MAERT lists the Emission Point Number (EPN) that identifies the emission point, followed immediately by the Source Name, identifying the emission unit that is the source of those emissions on this table.

Thus, by reference, an emission unit in a Title V operating permit is linked by reference number to an NSR authorization, and its related emission point.