

Fact Sheet



*For Final Permitting Action Under 45CSR30 and
Title V of the Clean Air Act*

Permit Number: **R30-03900005-2006**
Title V Application Received: **October 7, 1996**
Plant Identification Number: **03900005**
Permittee: **Union Carbide Corporation**
Facility Name: **Institute Plant**
Business Unit: **EO Catalyst/Glycol Recovery (Group 1 of 5)**
Mailing Address: **P. O. Box 8361, South Charleston, WV 25303**

Physical Location: Institute, Kanawha County, West Virginia
UTM Coordinates: 432.00 km Easting • 4,284.31 km Northing • Zone 17
Directions: From I-64, take the Institute exit, turn right onto State Route 25. Plant is located about ½ mile west on Route 25.

Facility Description

Union Carbide Corporation has divided their Title V Application into the following five separate business units for which each will receive a Title V Permit:

Group	Process Units
1 of 5	EO Catalyst/Glycol Recovery
2 of 5	Acetone Derivatives/TONE [®] Polyol
3 of 5	Logistics
4 of 5	Glutaraldehyde
5 of 5	Water Soluble Polymers

Group 1 of 5 includes the EO Catalyst and Glycol Recovery Plants. The EO Catalyst Plant manufactures silver impregnated catalyst for use in production of Ethylene Oxide and Ethylene Glycol. The Glycol Recovery Plant processes byproduct ethylene glycol to remove water and other light boilers and refines it into a final product.

Emissions Summary

EO Catalyst/Glycol Recovery (Group 1 of 5) Emissions Summary [Tons per Year]		
Criteria Pollutants	Potential Emissions	2004 Actual Emissions
Carbon Monoxide (CO)	1.7	Negligible
Nitrogen Oxides (NO _x)	38.0	12.5
Particulate Matter (PM ₁₀)	6.3	0.01
Total Particulate Matter (TSP)	6.3	0.01
Sulfur Dioxide (SO ₂)	1.2	Negligible
Volatile Organic Compounds (VOC)	59.0	37.1

PM₁₀ is a component of TSP.

Hazardous Air Pollutants	Potential Emissions	2004 Actual Emissions
Acetaldehyde	0.10	0.06
Diantimony trioxide	0.01	0.00
Diethyl ether	0.01	0.00
Ethylene glycol	32.00	22.50
Ethylene oxide	0.60	0.31
Hydrogen chloride	0.10	0.00
Methanol	3.00	0.82

Some of the above HAPs may be counted as PM or VOCs.

Title V Program Applicability Basis

Due to the facility-wide potential to emit over 100 tons per year of criteria pollutants, over 10 tons per year of an individual HAP, and over 25 tons per year aggregate HAPs, Union Carbide Corporation's Institute Plant is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30.

Legal and Factual Basis for Permit Conditions

The State and Federally-enforceable conditions of the Title V Operating Permits are based upon the requirements of the State of West Virginia Operating Permit Rule 45CSR30 for the purposes of Title V of the Federal Clean Air Act and the underlying applicable requirements in other state and federal rules.

Group 1 of 5 has been found to be subject to the following applicable rules:

Federal and State:	45CSR2	Control of particulate matter from indirect heat exchangers.
	45CSR6	Open burning prohibited.
	45CSR7	Particulate matter and opacity limits for manufacturing sources.
	45CSR11	Standby plans for emergency episodes.
	45CSR13	Preconstruction permits for minor sources.

	WV Code § 22-5-4 (a) (14)	The Secretary can request any pertinent information such as annual emission inventory reporting.
	45CSR16	Emission Standards for New Stationary Sources Pursuant to 40 C.F.R. Part 60.
	45CSR30	Operating permit requirement.
	45CSR34	Emission Standards for Hazardous Air Pollutants Pursuant to 40 C.F.R. Part 63.
	40 C.F.R. Part 60, Subpart NNN	Standards of Performance for VOC Emissions from SOCOMI Distillation Operations.
	40 C.F.R. Part 61	Asbestos inspection and removal
	40 C.F.R. Part 63, Subparts F, G, H	Hazardous Organic NESHAP (HON)
	40 C.F.R. Part 63, Subpart FFFF	Miscellaneous Organic NESHAP (MON)
	40 C.F.R. Part 82, Subpart F	Ozone depleting substances
State Only:	45CSR4	No objectionable odors.
	45CSR§§21-37 and 40	Control of VOC Emissions
	45CSR27	Best Available Technology (BAT) for HAPs

Each State and Federally-enforceable condition of the draft Title V Operating Permit references the specific relevant requirements of 45CSR30 or the applicable requirement upon which it is based. Any condition of the draft Title V permit that is enforceable by the State but is not Federally-enforceable is identified in the draft Title V permit as such.

The Secretary's authority to require standards under 40 C.F.R. Part 60 (NSPS), 40 C.F.R. Part 61 (NESHAPs), and 40 C.F.R. Part 63 (NESHAPs MACT) is provided in West Virginia Code §§ 22-5-1 *et seq.*, 45CSR16, 45CSR15, 45CSR34 and 45CSR30.

Active Permits/Consent Orders for Group 1 of 5

Permit or Consent Order Number	Date of Issuance	Permit Determinations or Amendments That Affect the Permit (<i>if any</i>)
R13-1127	June 26, 1989	NA
R13-1215	April 24, 1990	NA
R13-1991B	May 23, 2003	PD04-066 (September 13, 2004)
CO-R21-97-41	October 20, 1997	June 14, 2006 letter from J. L. Blatt
CO-R27-99-14-A(92)	March 31, 1999	NA

Conditions from this facility's Rule 13 permit(s) governing construction-related specifications and timing requirements will not be included in the Title V Operating Permit but will remain independently enforceable under the applicable Rule 13 permit(s). All other conditions from this facility's Rule 13 permit(s) governing the source's operation and compliance have been incorporated into this Title V permit in accordance with the "General Requirement Comparison Table B," which may be downloaded from DAQ's website.

Determinations and Justifications

EO Catalyst Plant

R13-1991B Requirements

4.1.1 provides hourly and annual emission limits for emission points 070A, 070B, 070C, 070D, 070E, 070G, 070H, 070I, 070J, 070K, 070Q, 070R, 070S, 070T, 075C, 075D, 075E, 075G, 075K, and 075M. To demonstrate compliance with the emission limits for emission points 070A, 070B, 070C, 070D, 070E, and 070G which consist only of PM₁₀ emissions controlled by baghouses, the permittee is required by 4.4.2 to maintain and operate the baghouses in accordance with the proper operational guidelines to minimize emissions and to maintain accurate records of filter changes, maintenance activities, and malfunctions and other operational shutdowns. The permittee is also required to conduct testing upon request in accordance with 4.3.3 and 4.3.6. No additional monitoring, testing, recordkeeping, or reporting was added to demonstrate compliance with the PM₁₀ emission limits because the total allowable PM₁₀ emissions from all of these sources are only 2.3 lb/hr and 6.26 tpy.

In order to demonstrate compliance with the volatile organic compound emission limits from emission points 070H, 070I, 070J, 070K, 070Q, 070R, 075C, 075D, 075E, 075G, and 075M, the permittee is required by 4.3.4 to conduct emissions testing in accordance with 40 C.F.R. 60, Appendix A Methods 18 and/or 25A upon the request of the Director.

To determine compliance with the nitric acid emission limits for emission points 070Q, 070R, and 075K, 4.3.1 requires the permittee to conduct testing in accordance with 45CSR7A upon the request of the Director.

In addition to the monitoring, testing, and recordkeeping requirements specified above to determine compliance with the PM₁₀, VOC, and nitric acid emission limits set forth in 4.1.1, the permittee is also required by 4.4.4 to maintain records of data which will allow for the computation of the daily production rate and hours of operation. The daily production rate and hours of operation can be used to calculate an hourly throughput and hourly emission rates based on engineering calculations. To demonstrate compliance with the annual mass emission limits, the permittee is required by 4.1.2 to use engineering calculations and annual actual operating throughputs. Annual actual operating throughputs can be calculated using the records required to be maintained under 4.4.4.

To demonstrate compliance with the NO_x emission limits specified in 4.1.1 for emission point 070H, the permittee is required by 4.3.2 to conduct stack testing on a quarterly basis and to calculate hourly NO_x emissions according to the formula provided in 4.3.2. The results from the quarterly stack tests will then be used to develop a mathematical model relating reactor operating rate to NO_x emissions. This mathematical model will then be used to calculate monthly and annual emissions required under 4.4.3. Upon the request of the Director, the permittee may be required to also calculate NO_x emissions on a daily basis. If the emissions calculated from 4.4.3 exceeds 30 tons per year, the Director may require the permittee to conduct more frequent stack testing or install a continuous emissions monitoring device as specified under 4.3.5.

45CSR7 Requirements

Emission points 070A, 070B, 070C, 070D, 070E, 070G, 070S, 070T, and 070H are required by 4.1.3 (45CSR§7-3.1) to be maintained at or below twenty percent opacity. Monthly visible emission observations are required to be conducted in accordance with 4.2.1 in order to demonstrate compliance with this limit. Records of each visible emission check conducted and records of any Method 22 or 45CSR7A observations are required to be maintained in accordance with 4.4.1. R13-1991B, B.1 specified that 40 C.F.R. 60, Appendix A, Method 9 be used to determine visible emissions, but this requirement was changed because 45CSR7A is the required method of determining compliance with the opacity requirements specified under 45CSR7.

Emission points 070A, 070B, 070C, 070D, 070E, 070G, 070H, 070S, and 070T are subject to the hourly particulate matter emission limits of 45CSR§7-4.1. Since the hourly particulate matter emission limits of 45CSR§7-4.1 are less stringent than the hourly PM₁₀ emission limits for 070A, 070B, 070C, 070D, 070E, 070G, 070H, 070S, and 070T specified in 4.1.1, compliance with the emission limits from 4.1.1 shall demonstrate compliance with the less stringent hourly PM emission limits of 45CSR§7-4.1.

Emission points 070Q, 070R, and 075K emit nitric acid and are potentially subject to the requirements of 45CSR§7-4.2. Compliance with the hourly and annual nitric acid emission limits for 070Q, 070R, and 075K specified in 4.1.1 shall demonstrate that emissions of nitric acid are insignificant under 45CSR§7-10.6 and these emission points are not subject to the requirements of 45CSR§7-4.2. Emission point 075K has hourly nitric acid emissions greater than the 0.1 lbs/hr exemption limit, but nitric acid emissions from this source were determined by the Director, pursuant to 45CSR§7-10.6 and as specified in R13-1991B, B.13, to be “insignificant.”

4.1.7 (45CSR§7-5.1) requires emission sources to be equipped with a system which may include, but not be limited to, process equipment design, control equipment design, or operation and maintenance procedures, to minimize the emissions of fugitive particulate matter. Fugitive particulate matter emissions are controlled by proper operation and maintenance of baghouses. Bagoes must be operated and maintained in accordance with 4.4.2.

In order to demonstrate compliance with the requirements of 4.1.8 (45CSR§7-5.2), fugitive emissions from plant premises under the operating control of UCC are minimized through paving and/or gravel.

40 C.F.R. 63, Subpart FFFF (MON) Requirements

If it is determined that the EO Catalyst Plant is subject to the requirements of 40 C.F.R. 63, Subpart FFFF - “National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing,” the permittee must comply with all applicable requirements no later than May 10, 2008. In accordance with 40 C.F.R. §63.2520(d)(1), the permittee is required to submit a notification of compliance status report no later than 150 days after the compliance date of May 10, 2008, containing the information specified in 40 C.F.R. §63.2520(d)(2). Upon submittal of the notification of compliance status report required by 40 C.F.R. §63.2520(d)(1), the permittee must also submit a complete Title V application for a significant modification to the facility’s Title V Operating Permit to incorporate the requirements of 40 C.F.R. 63, Subpart FFFF.

45CSR21 Requirements

The permittee is subject to the state-enforceable only emission limitation requirements from 45CSR§21-40 and Consent Order CO-R21-97-41 provided in 4.1.11 and the state-enforceable only leak detection and repair (LDAR) requirements from 45CSR§21-37 and Consent Order CO-R21-97-41 provided in 4.1.12, 4.3.8, 4.4.6, and 4.5.1. The specific hourly, daily, and annual emission limits from Consent Order CO-R21-97-41 for the EO Catalyst Plant are provided in Appendix A, Attachment A of the permit.

45CSR2, 45CSR10, and 40 C.F.R. 63, Subpart DDDDD Requirements

Since the natural gas fired heater F-306 (emission point 070H) is indirect fired with a maximum design heat input of less than 10 MMBTU/hr, it is not subject to the requirements of 45CSR§§2-4 through 9, 45CSR10, and 40 C.F.R. 63, Subpart DDDDD as specified by 45CSR§2-11.1, 45CSR§10-10.1, and 40 C.F.R. §63.7506(c)(3).

The natural gas fired heater F-306 is subject to the ten percent opacity limit of 45CSR§2-3.1. Since 070H is a combined emission point for both the indirect heat exchanger (F-306) and 45CSR7 process source operations, and the burning of natural gas in the heater is not expected to result in any visible emissions, R13-1991B only required the permittee to demonstrate compliance with the twenty percent opacity limit of 45CSR§7-3.1 through monthly visible emission observations.

Glycol Recovery Plant

R13-1215 Requirements

5.1.1 and 5.1.2 provides hourly emission limits for emission points 085EE and 080TT, respectively. Emission point 085EE includes emission sources C320, T1401, T1402, T1403, T1404, T1405, T1406, T1408, T1491, T1492, T1493, and T1497. C320 discharges a Group 2 HON process wastewater stream subject to the recordkeeping requirements of 5.4.5. Tanks T1401, T1402, T1403, T1404, T1405, T1406, T1408, T1491, T1492, T1493, and T1497 are Group 2 HON storage tanks and are subject to the recordkeeping requirements of 5.4.3. Emission point 080TT is for the tank truck residue loading which is a Group 2 HON transfer operation subject to the recordkeeping requirements of 5.4.4. Since emission points 085EE and 080TT are subject to the recordkeeping requirements of 40 C.F.R. 63, Subpart H, no additional monitoring, testing, recordkeeping, or reporting requirements were added to demonstrate compliance with the hourly emission limits from 5.1.1 and 5.1.2 for emission points 085EE and 080TT.

R13-1127 Requirements

5.1.3 provides hourly and annual emission limits for emission points 085AA (Tank 1494), 085BB (Tank 1495), 085CC (Tank 1498), and 085DD (Tank 1499). These tanks are Group 2 HON storage tanks and are subject to the recordkeeping requirements of 5.4.3. Since these tanks are subject to the recordkeeping requirements of 40 C.F.R. 63, Subpart H, no additional monitoring, testing, recordkeeping, or reporting requirements were added to demonstrate compliance with the hourly and annual emission limits of 5.1.3.

40 C.F.R. 63, Subparts F, G, and H (HON) Requirements

Process Vents

V26805, V26802, and V2206 have a TRE index value greater than 4.0. Section 5.4.1 requires the permittee to maintain records of the measurements, engineering assessments, and calculations performed to determine the TRE index value of the vent stream, submitted as part of the Notification of Compliance Status report dated September 19, 1997. If there are any process changes or recalculation of the TRE index value, the permittee is required to maintain records in accordance with 5.4.2 and to submit reports as specified in 5.5.4 or 5.5.5. A report is not required if the conditions in 5.5.6 are met.

Storage Vessels

The following are Group 2 storage vessels: Tank 1005, Tank 1010, Tank 1401, Tank 1402, Tank 1403, Tank 1404, Tank 1405, Tank 1406, Tank 1408, Tank 1411, Tank 1413, Tank 1414, Tank 1415, Tank 1416, Tank 1418, Tank 1423, Tank 1424, Tank 1426, Tank 1427, Tank 1491, Tank 1492, Tank 1493, Tank 1494, Tank 1495, Tank 1496, Tank 1497, Tank 1498, Tank 1499, Tank 1601, Tank 1602, Tank 1615, Tank 1616, Tank 1617, Tank 1618, and Tank 1619. For each Group 2 storage vessel, the permittee is required by 5.4.3 to maintain records showing the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.

Transfer Operations

080TT is a Group 2 transfer operation. For this transfer operation, the permittee must record, update annually, and maintain the information specified in 5.4.4.

Process Wastewater

The following are Group 2 process wastewater streams and the permittee is required to maintain records in accordance with 5.4.5: GR-01 – Byproduct Run – Forecolumn/Refining Still Jet Condensate Collection Pot, GR-02 – Regular Run – Forecolumn/Refining Still Jet Condensate Collection Pot, GR-03 – Regular Run – Tails Collected from HON Column when less than 1,000 ppm HAP, GR-04 – Methanol Run – Forecolumn/Refining Still Jet Condensate Collection Pot, and GR-05 – Methanol Run – Tails collected from HON Column when less than 1,000 ppm HAP.

Heat Exchange System

Since the heat exchange system is a once-through heat exchange system subject to an NPDES permit that meets the requirements of 40 C.F.R. §§63.104(a)(4)(i) through (iv), 40 C.F.R. §63.104(a) does not require any additional monitoring, recordkeeping, or reporting to be conducted.

Maintenance Wastewater

For maintenance wastewaters containing organic HAP's listed in table 9 of 40 C.F.R. 63, Subpart G, the permittee is required to comply with the requirements of 5.1.8 and 5.4.6 by preparing a description of maintenance procedures and implementing them as part of the start-up, shutdown, and malfunction plan required under 40 C.F.R. §63.6(e)(3).

Equipment Leaks

Union Carbide Corporation's Institute Plant is subject to the equipment leak provisions of 40 C.F.R. 63, Subpart H – “National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks.” Equipment components in Group 1 of 5 are subject to 40 C.F.R. §§63.162 (Standards: General), 63.163 (Standards: Pumps in light liquid service), 63.166 (Standards: Sampling connection systems), 63.167 (Standards: Open-ended valves or lines), 63.168 (Standards: Valves in gas/vapor service and in light liquid service), 63.169 (Standards: Pumps, valves, connectors, and agitators in heavy liquid service; instrumentation systems; and pressure relief devices in liquid service), 63.170 (Standards: Surge control vessels and bottom receivers), 63.171 (Standards: Delay of repair), and 63.174 (Standards: Connectors in gas/vapor service and in light liquid service). Testing, recordkeeping, and reporting requirements to demonstrate compliance with the applicable leak standards specified in 5.1.9 are provided in 5.3.1 (40 C.F.R. §63.180 – Test methods and procedures), 5.4.7 (40 C.F.R. §63.181 – Recordkeeping requirements), and 5.5.7 (40 C.F.R. §63.182 – Reporting requirements).

40 C.F.R. 60, Subpart NNN Requirements

The Forecolumn and jets (Emission Source V26805) and the Refining Column and jets (Emission Source V26802) venting through emission point 080A are subject to the requirements of 40 C.F.R. 60, Subpart NNN. Based on the performance testing conducted on January 16, 1995, these sources have a TRE index value of 145. Since these sources have a total resource effectiveness of greater than 8.0, they were exempt from all provisions of Subpart NNN except for the emission standards of 40 C.F.R. §60.662, the applicable testing requirements of 40 C.F.R. §§60.664(d), (e), and (f), and the applicable reporting and recordkeeping requirements of 40 C.F.R. §§60.665 (h) and (l). These sources are complying with the applicable standards of 40 C.F.R. §60.662(c) which requires the permittee to maintain a TRE index value greater than 1.0 without the use of VOC emission control devices. To demonstrate ongoing compliance with the requirements of 40 C.F.R. §60.662(c) specified in 5.1.10, the permittee is required to maintain records in accordance with 5.4.8 and to submit semi-annual reports of any recalculation of the TRE index as specified in 5.5.8.

45CSR21 Requirements

The permittee is subject to the state-enforceable only emission limitation requirements from 45CSR§21-40 and Consent Order CO-R21-97-41 provided in 5.1.11 and the state-enforceable only leak detection and repair (LDAR) requirements from 45CSR§21-37 and Consent Order CO-R21-97-41 provided in 5.1.12, 5.3.3, 5.4.9, and 5.5.9. The specific hourly, daily, and annual emission limits from Consent Order CO-R21-97-41 for the Glycol Recovery Plant are provided in Appendix A, Attachment A of the permit.

45CSR27 Requirements

The permittee is subject to the state-enforceable only emission limitation requirements from 45CSR§27-3.1 and Consent Order CO-R27-99-14-A(92) for the Forecolumn and jets (Emission Source V26805) and the Refining Column and jets (Emission Source V26802) venting through emission point 080A and provided in 5.1.13 and the leak detection and repair (LDAR) requirements from 40 C.F.R. 63, Subpart H provided in 5.1.9. Since these emission sources are already subject to the requirements of 40 C.F.R. 63, Subpart G and 40 C.F.R. 60, Subpart NNN, no additional monitoring, testing, recordkeeping, or reporting was added to demonstrate compliance with the emission limits.

Non-Applicability Determinations

The following requirements have been determined not to be applicable to the subject facility due to the following:

- a. 40 C.F.R. 63, Subpart DDDDD – “National Emission Standards for Hazardous Air Pollutants: Industrial/Commercial/Institutional Boilers and Process Heaters.” The process heater (F-306) operated by the EO Catalyst Plant is a natural gas fired unit less than 10 MMBTU/hr and is therefore exempt.
- b. 40 C.F.R. 63, Subpart EEEE – “National Emission Standards for Hazardous Air Pollutants: Organic Liquid Distribution (Non-Gasoline).” Tank T-1004 is used to store an organic liquid containing HAPs, but is exempt from the control requirements because the liquid vapor pressure is less than 0.1 psia.

Request for Variances or Alternatives

None.

Insignificant Activities

Insignificant emission unit(s) and activities are identified in the Title V application.

Comment Period

Beginning Date: (Date of Notice Publication)
Ending Date: (Publication Date PLUS 30 Days)

All written comments should be addressed to the following individual and office:

Carrie McCumbers
Title V Permit Writer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304

Procedure for Requesting Public Hearing

During the public comment period, any interested person may submit written comments on the draft permit and may request a public hearing, if no public hearing has already been scheduled. A request for public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. The Secretary shall grant such a request for a hearing if he/she concludes that a public hearing is appropriate. Any public hearing shall be held in the general area in which the facility is located.

Point of Contact

Carrie McCumbers
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: 304/926-0499 ext. 1226 • Fax: 304/926-0478

Response to Comments (Statement of Basis)

UCC Requested Changes:

- 1) Changed the Emission Unit ID and Emission Point ID in the Emission Units Table 1.0 for Barge Loading from 1BL and LB1 to L1B and B1L based on an e-mail from UCC dated July 11, 2006 responding to Logistics (Group 3 of 5) Questions.
- 2) Removed Transfer Rack L5TC from the 40 C.F.R. 63, Subpart G (HON) requirements specified in 5.1.6 and 5.4.4 for Group 2 Transfer Operations because this emission source is no longer used for transferring materials subject to the HON requirements. This change was requested in a letter from UCC dated July 26, 2006.
- 3) Revised the naming of the Group 2 Process Wastewater Streams in Conditions 5.1.7 and 5.4.5 to be consistent with the current naming practices at UCC- Institute. This change was requested in a letter from UCC dated July 26, 2006.

Rose Nino of EPA, Region III notified me by e-mail dated July 12, 2006 that EPA had no comments on the Draft/Proposed Permit.