



**Certified Mail - Return Receipt Requested**  
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Union Carbide Corporation  
A Subsidiary of The Dow Chemical Company  
P.O. Box 8004  
437 MacCorkle Avenue, SW  
South Charleston, WV 25303  
USA

April 8, 2016

Mr. William F. Durham, Director  
WV Department of Environmental Protection  
Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304

Dear Director Durham,

**Attention: Ms. Beverly McKeone**  
**NSR Permits Program Manager**

**Ms. Carrie McCumbers**  
**Title V Program Manager**

RE: Union Carbide Corporation (UCC) South Charleston Operations  
Middle Island Site Remediation - Facility ID# 039-00003  
45CSR13 Construction Permit

Enclosed are one hard copy and two CDs of a 45CSR13 application for the construction of a groundwater remediation system which utilizes a biofilter as a control device. Current intent is to provide the required Title V significant modification application as a part of the Title V renewal application due January 9, 2017.

A printed copy of the Class 1 Legal Advertisement to be published in a local newspaper is included with the application. When published, the affidavit of publication will be provided to your office.

A check in the amount of \$1,000 is enclosed for payment of application fees in accordance with 45CSR§13-4.4.

If there are any questions regarding the attached permit application, please call me at (304) 747-1354.

Sincerely yours,

Jay Fedczak  
WVO EH&S Environmental Specialist

Attachments

Union Carbide Corporation South Charleston Facility  
Middle Island Groundwater Containment System  
WVDAQ Regulation 13 Permit Application

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WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475  
[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

**APPLICATION FOR NSR PERMIT  
 AND  
 TITLE V PERMIT REVISION  
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):

- CONSTRUCTION     MODIFICATION     RELOCATION  
 CLASS I ADMINISTRATIVE UPDATE     TEMPORARY  
 CLASS II ADMINISTRATIVE UPDATE     AFTER-THE-FACT

PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT     MINOR MODIFICATION  
 SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

**FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.**

**Section I. General**

1. Name of applicant (as registered with the WV Secretary of State's Office): Union Carbide Corporation (UCC)		2. Federal Employer ID No. (FEIN): 13-142-1730	
3. Name of facility (if different from above): South Charleston		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: PO Box 8361 South Charleston, WV 25303		5B. Facility's present physical address: 437 MacCorkle Avenue SW South Charleston, Kanawha County, WV	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO - If YES, provide a copy of the Certificate of Incorporation/Organization/Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A. - If NO, provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: The Dow Chemical Company			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain:    UCC is a subsidiary of The Dow Chemical Company. UCC owns and operates the facility. - If NO, you are not eligible for a permit for this source.			

9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.):  Groundwater remediation equipment (groundwater containment system with groundwater extraction wells) with air pollution control device (biofilter reducing VOC through microbial degradation)	10. North American Industry Classification System (NAICS) code for the facility:  325199
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11A. DAQ Plant ID No. (for existing facilities only): 039 - 00003	11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R30-03900003-2012
--	--

**All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.**

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits**, please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From Charleston, travel I-64 West and take the Montrose Exit. Turn right towards the river and proceed straight through the traffic light across MacCorkle Avenue directly to the South Charleston Facility.

12.B. New site address (if applicable):

Not Applicable

12C. Nearest city or town:

South Charleston

12D. County:

Kanawha

12.E. UTM Northing (KM): 4,246.927

12F. UTM Easting (KM): 440.026

12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:

The Middle Island area Groundwater Containment System (GCS) consists of groundwater extraction wells that create groundwater capture zones and impart a reverse gradient inward towards the center of the island to provide groundwater plume containment. The extracted groundwater will be treated to reduce contaminant concentrations for discharge to the facility's process sewers. A biofilter will treat vapors generated as part of the groundwater pretreatment process. The biofilter will be the only point source of emissions from the groundwater containment system. The biofilter uses organic media to reduce VOC concentrations in the vapors by microbial degradation.

14A. Provide the date of anticipated installation or change: Late Summer 2016

- If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /

14B. Date of anticipated Start-Up if a permit is granted:

Late 2016

14C. Provide a **Schedule** of the planned **Installation of/Change to and Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved). Not applicable

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day: 24

Days Per Week: 7

Weeks Per Year: 52

16. Is demolition or physical renovation at an existing facility involved?  YES  NO

17. **Risk Management Plans**. If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see [www.epa.gov/ceppo](http://www.epa.gov/ceppo)), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion**. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (*if known*). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (*if known*). Provide this information as **Attachment D**.

## ***Section II. Additional attachments and supporting documents.***

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to **Plot Plan Guidance**).

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F**.

23. Provide a **Process Description** as **Attachment G**.

- Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

***All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.***

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H**.

- For chemical processes, provide a MSDS for each compound emitted to the air. Not Applicable

25. Fill out the **Emission Units Table** and provide it as **Attachment I**.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J**.

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K**.

28. Check all applicable Emissions Unit Data Sheets listed below:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Bulk Liquid Transfer Operations | <input type="checkbox"/> Haul Road Emissions     | <input type="checkbox"/> Quarry  |
| <input type="checkbox"/> Chemical Processes              | <input type="checkbox"/> Hot Mix Asphalt Plant   | <input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities |
| <input type="checkbox"/> Concrete Batch Plant            | <input type="checkbox"/> Incinerator             | <input type="checkbox"/> Storage Tanks   |
| <input type="checkbox"/> Grey Iron and Steel Foundry     | <input type="checkbox"/> Indirect Heat Exchanger |  |
- General Emission Unit, specify: Groundwater Remediation System

Fill out and provide the Emissions Unit Data Sheet(s) as Attachment L.

29. Check all applicable Air Pollution Control Device Sheets listed below:

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Absorption Systems | <input type="checkbox"/> Baghouse                   | <input type="checkbox"/> Flare                 |
| <input type="checkbox"/> Adsorption Systems | <input type="checkbox"/> Condenser                  | <input type="checkbox"/> Mechanical Collector  |
| <input type="checkbox"/> Afterburner        | <input type="checkbox"/> Electrostatic Precipitator | <input type="checkbox"/> Wet Collecting System |

Other Collectors, specify: Biofilter

Fill out and provide the Air Pollution Control Device Sheet(s) as Attachment M.

30. Provide all Supporting Emissions Calculations as Attachment N, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as Attachment O.

➤ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and *Example Legal Advertisement* for details). Please submit the **Affidavit of Publication** as Attachment P immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

YES  NO

➤ If YES, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "Precautionary Notice – Claims of Confidentiality" guidance found in the *General Instructions* as Attachment Q.

### Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable Authority Form below:

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Authority of Corporation or Other Business Entity | <input type="checkbox"/> Authority of Partnership         |
| <input type="checkbox"/> Authority of Governmental Agency                             | <input type="checkbox"/> Authority of Limited Partnership |

Submit completed and signed Authority Form as Attachment R.

*All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.*

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

#### **Certification of Truth, Accuracy, and Completeness**

I, the undersigned  Responsible Official /  Authorized Representative, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

**Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE  DATE: 4/8/2016  
*(Please use blue ink)* *(Please use blue ink)*

35B. Printed name of signee: Jon Putnam 35C. Title: WVO Responsible Care Leader

35D. E-mail: JPutnam@dow.com 36E. Phone: 304-747-1165 36F. FAX: 304-747-3147

36A. Printed name of contact person (if different from above): Jay Fedczak 36B. Title: EH&S Environmental Specialist

36C. E-mail: JPFedczak@dow.com 36D. Phone: 304-747-1354 36E. FAX: 304-747-3147

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate               | <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet            |
| <input checked="" type="checkbox"/> Attachment B: Map(s)                             | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s)                     |
| <input type="checkbox"/> Attachment C: Installation and Start Up Schedule            | <input checked="" type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s)            |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion              | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations                |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan                          | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s)   | <input checked="" type="checkbox"/> Attachment P: Public Notice                                    |
| <input checked="" type="checkbox"/> Attachment G: Process Description                | <input type="checkbox"/> Attachment Q: Business Confidential Claims                                |
| <input type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS)            | <input checked="" type="checkbox"/> Attachment R: Authority Forms                                  |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table               | <input type="checkbox"/> Attachment S: Title V Permit Revision Information                         |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee  |

*Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.*

**FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:**

- Forward 1 copy of the application to the Title V Permitting Group and:
- For Title V Administrative Amendments:
  - NSR permit writer should notify Title V permit writer of draft permit,
- For Title V Minor Modifications:
  - Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
  - NSR permit writer should notify Title V permit writer of draft permit.
- For Title V Significant Modifications processed in parallel with NSR Permit revision:
  - NSR permit writer should notify a Title V permit writer of draft permit,
  - Public notice should reference both 45CSR13 and Title V permits,
  - EPA has 45 day review period of a draft permit.

*All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.*

Attachment A  
Business Certificate

**WEST VIRGINIA  
STATE TAX DEPARTMENT  
BUSINESS REGISTRATION  
CERTIFICATE**

ISSUED TO:  
**UNION CARBIDE CORPORATION  
2030 DOW CTR  
MIDLAND, MI 48674-0001**

BUSINESS REGISTRATION ACCOUNT NUMBER: **1007-4220**

This certificate is issued on: **06/22/2010**

*This certificate is issued by  
the West Virginia State Tax Commissioner  
in accordance with W.Va. Code § 11-12.*

*The person or organization identified on this certificate is registered  
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.  
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

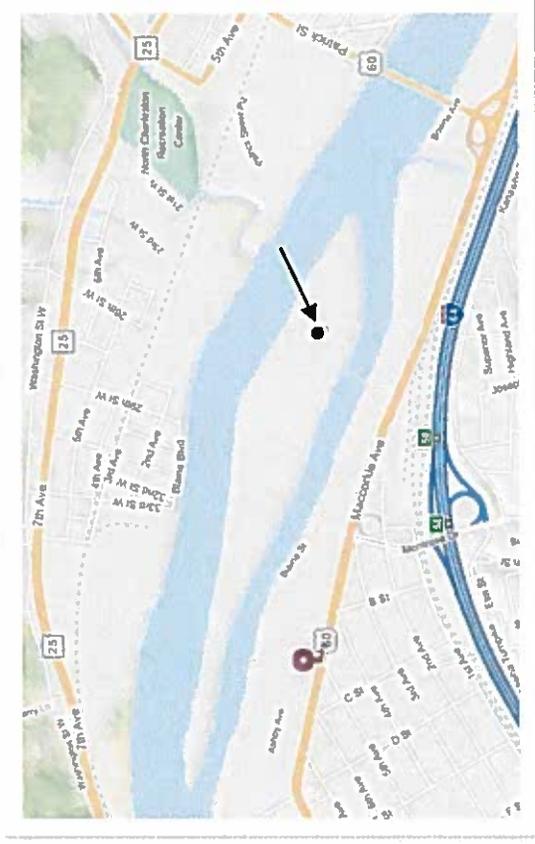
# Attachment B

Map(s)

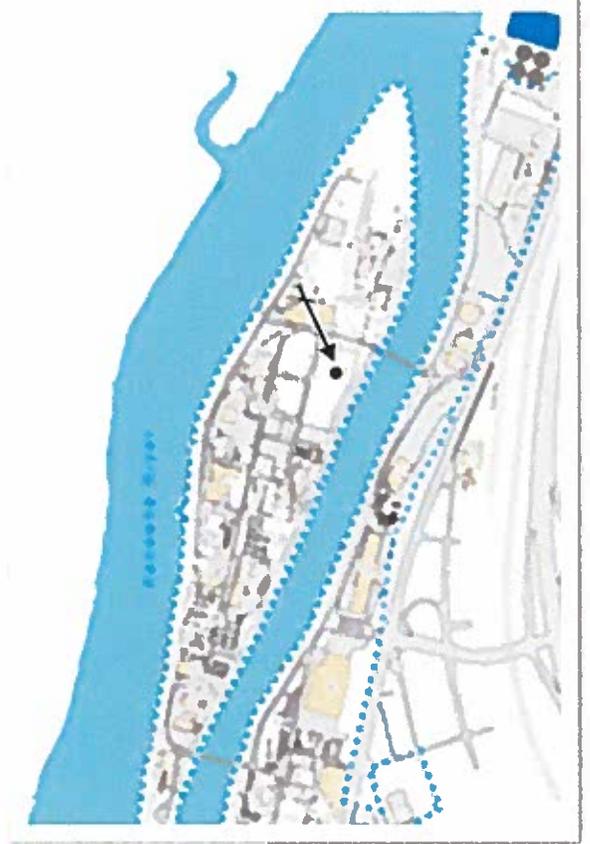
# Attachment B – Map Middle Island Groundwater Containment System

North  
↑

Vicinity Map



Site Location



## Attachment C

### Installation and Startup Schedule

Not applicable

Attachment D

Regulatory Discussion

Union Carbide Corporation – South Charleston Facility  
 WVDAQ Regulation 13 Permit Application – Middle Island Groundwater Containment System

**ATTACHMENT D – Regulatory Discussion**

**Purpose: Review of Rule Applicability.**

REGULATION	APPLICABLE (Yes or No)	COMMENTS
WVDAQ Regulation 2	No	Proposed activities do not involve combustion of fuel in indirect heat exchangers.
WVDAQ Regulation 4	Yes	Must prevent objectionable odors.
WVDAQ Regulation 6	No	Proposed activities do not involve incineration of refuse.
WVDAQ Regulation 7	No	Proposed operation is not a manufacturing process.
WVDAQ Regulation 10	No	Proposed operation will not result in sulfur oxide emission.
WVDAQ Regulation 13	Yes	Preconstruction permit required.
WVDAQ Regulation 14	No	PSD does not apply because uncontrolled emissions are less than applicability threshold amounts.
WVDAQ Regulation 16	No	Proposed operations do not include sources that are covered by NSPS.
WVDAQ Regulation 17	No	Does not apply because groundwater containment system and biofilter control will not result in fugitive particulate matter emissions.
WVDAQ Regulation 18	No	Requirements for Commercial and Solid Waste Incineration Units - process vent gas does not meet the definition of solid waste.
WVDAQ Regulation 19	No	Non-Attainment New Source Review does not apply because uncontrolled emissions are less than applicability threshold amounts and the source is located within an area of attainment for all pollutants.
WVDAQ Regulation 21	Yes	This unit is not engaged in the manufacture, mixing, storage, use, or application of volatile organic compounds, therefore it is not subject to this rule.
WVDAQ Regulation 22	Yes	Regulation 13 application fee applies. Provided with Regulation 13 permit application.
WVDAQ Regulation 25	No	Proposed installation does not require a permit per WVDEP Division of Water and Waste Management Regulations
WVDAQ Regulation 27	No	Per January 21, 2010, email from Steve Pursley of the WVDAQ, Regulation 27 does not apply to air sparging and treatment of contaminated vapor remediation activities. Rationale applies to groundwater extraction remediation activities as well (copy attached).
WVDAQ Regulation 29	Yes	Submittal of volatile organic compound emissions data. Data to be provided as part of site submittals as required by Agency rules.
WVDAQ Regulation 30	Yes	This qualifies as a significant modification to current air operating permit. Due to timing of the commencement of operation of this new source and the deadline of renewal permit application of this plant, the significant modification will be addressed in the renewal application.

Union Carbide Corporation – South Charleston Facility  
 WVDAQ Regulation 13 Permit Application – Middle Island Groundwater Containment System

**ATTACHMENT D – Regulatory Discussion**

40 CFR 64 (CAM)	No	CAM does not apply because this is not a modification to a large pollutant specific emission unit (PSEU).
WVDAQ Regulation 34		
(i) 40 CFR 61, Subpart V: Fugitive emissions of vinyl chloride and benzene	No	The remediation system is not comprised of equipment assembled to produce a volatile hazardous air pollutant (VHAP) covered by this rule or its derivatives as intermediates or final products, or equipment assembled to use a VHAP in the production of a product; as a result, it is not considered a "Process Unit".
(ii) 40 CFR 61, Subpart FF: Benzene Waste Operations	No	Benzene in wastes generated by remediation activities is not included in the total annual benzene quantity for that facility. Benzene Waste Operations NESHAP does not apply to UCC South Charleston Operations. 40 CFR 61.342(a)(3).
(iii) 40 CFR 63, Subpart GGGGG: Site Remediation	No	Exempt. Proposed activities are conducted under RCRA corrective action program. 40 CFR 63.7881(b)(3)

Note: See Section O of this Application, Monitoring/Recordkeeping/Reporting/Testing Plans, for proposed demonstration of compliance.

Union Carbide Corporation – South Charleston Facility  
WVDAQ Regulation 13 Permit Application – Middle Island Groundwater Containment System

**ATTACHMENT D – Regulatory Discussion**

WVDAQ Regulation 27 Non-applicability Determination

**From:** Pursley, Steven R [Steven.R.Pursley@wv.gov]  
**Sent:** Thursday, January 21, 2010 11:12 AM  
**To:** Sizemore, Freddie (FA)  
**Subject:** RE: UCC South Charleston Facility - Groundwater Remediation Project

Sorry, Freddie I thought I had already gotten back to you on that. The project would NOT be subject to Rule 27.

Steve

---

**From:** Sizemore, Freddie (FA) [mailto:sizemofa2@dow.com]  
**Sent:** Thursday, January 21, 2010 10:51 AM  
**To:** Pursley, Steven R  
**Subject:** RE: UCC South Charleston Facility - Groundwater Remediation Project

Steve.  
Any new information that you can share regarding R27 applicability?

Freddie  
747-3713

---

**From:** Pursley, Steven R [mailto:Steven.R.Pursley@wv.gov]  
**Sent:** Tuesday, December 29, 2009 2:23 PM  
**To:** Sizemore, Freddie (FA)  
**Subject:** RE: UCC South Charleston Facility - Groundwater Remediation Project

Freddie.  
I said I would get back to you this week regarding rule 27 applicability to SVE systems. Unfortunately, the only other examples of SVE permits I can find are for petrochemicals which are specifically exempt from rule 27. So I will need to wait until next week to talk to Bev (she's out this week).

Steve

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Union Carbide Corporation – South Charleston Facility  
WVDAQ Regulation 13 Permit Application – Middle Island Groundwater Containment System

**ATTACHMENT D – Regulatory Discussion**

**From:** Sizemore, Freddie (FA) [mailto:sizemofa2@dow.com]  
**Sent:** Wednesday, December 23, 2009 10:14 AM  
**To:** Pontiveros, Lucia S  
**Cc:** Pursley, Steven R; Amos, Joe (JA)  
**Subject:** UCC South Charleston Facility - Groundwater Remediation Project

Hi Lucy.

Joe and I met with Steve Pursley yesterday to discuss Regulation 13 permitting of a planned project to remove contaminants from groundwater at the South Charleston Facility. Basically the project involves sparging of groundwater and treating extracted vapor by air pollution control equipment. A Regulation 25 permit does not seem to be required for the following reasons. Please let me know if you concur.

DAQ Rule 25 and West Virginia Division of Water and Waste Management RCRA permits

- a.. No hazardous wastes are being generated because soil and groundwater are being addressed via in-situ air sparging and solvent vapor extraction (SVE).
- b.. Only waste stream generated will be unconfined soil vapor from SVE: which is not regulated by RCRA.
- c.. RCRA TSD permit is not required.

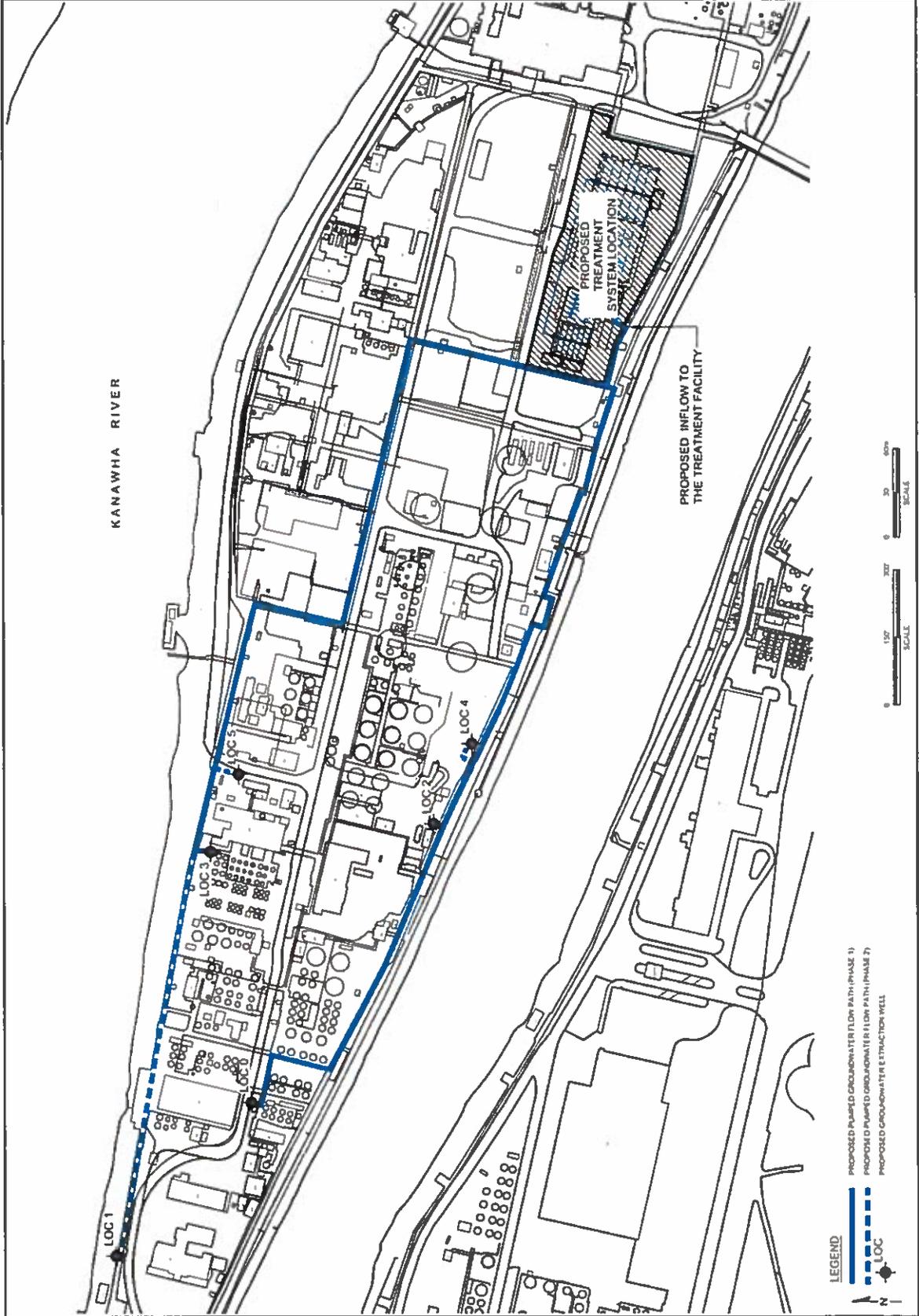
Thanks for the help. If additional information is needed let me know.

Freddie A. Sizemore  
UCC Regulatory Affairs Specialist  
304.747.3713

# Attachment E

## Plot Plan

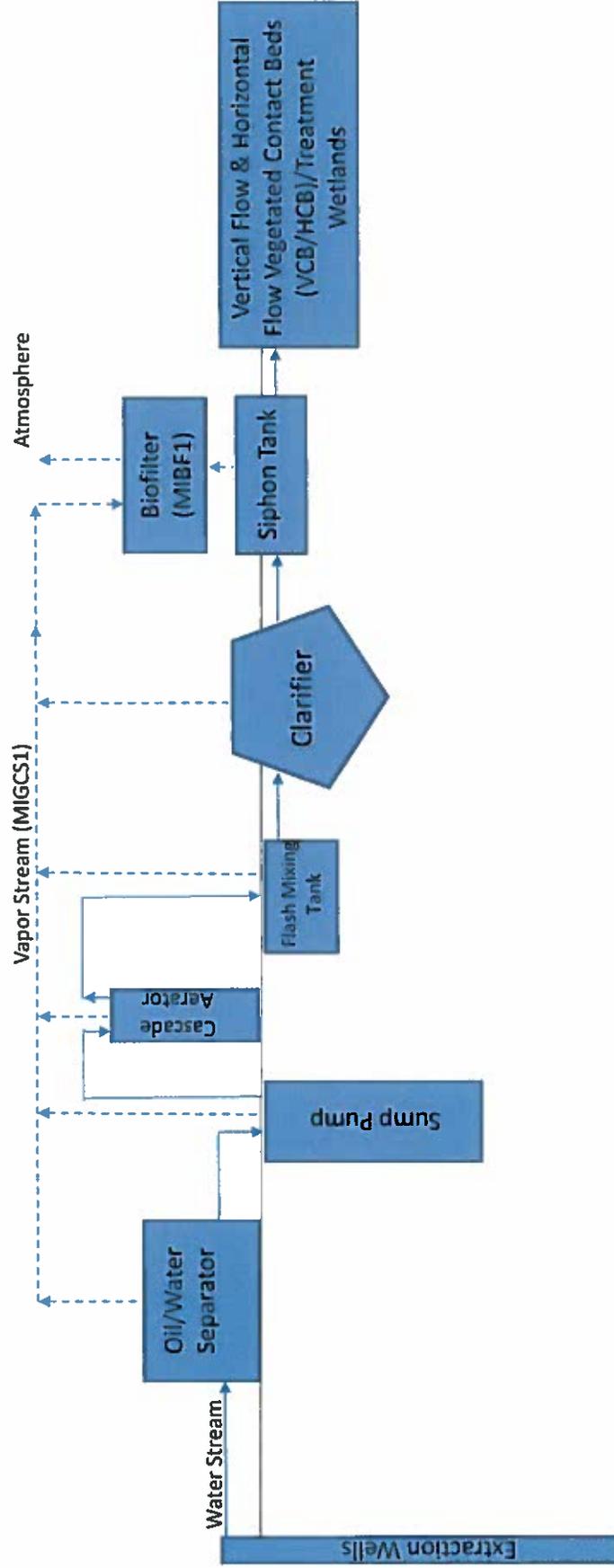
# ATTACHMENT E – PLOT PLAN MIDDLE ISLAND GROUNDWATER CONTAINMENT SYSTEM



## Attachment F

### Detailed Process Flow Diagram(s)

## Attachment F - Process Flow Diagram



Attachment G  
Process Description

**ATTACHMENT G**  
**PROCESS DESCRIPTION**

The Middle Island Groundwater Containment System (MIGCS) is proposed in this permit application as a new system that will be associated with the Middle Island Area (Refer to Attachments B and E for location). Groundwater from the area will be pulled to the surface through groundwater extraction wells that will impart a reverse gradient inward toward the center of the island to provide groundwater plume containment (Equipment Identification MIGCS). The extracted groundwater will be treated using vertical flow and horizontal flow vegetated contact beds (VCB/HCB)/treatment wetlands to reduce volatile organic compound (VOC) and hazardous air pollutant (HAP) concentrations prior to discharge to the facility's process sewers. No surface water will be exposed to the atmosphere in the wetland environment. Note: All HAPs emitted are VOC HAPs.

The full groundwater treatment train will include an oil/water separator, cascade aerator for iron removal, circular clarifier, and VCB/HCB/treatment wetland. Air emissions from the treatment train will be collected and routed to a biofilter for treatment (Refer to Attachment F for a process flow diagram). The biofilter will use organic media to reduce VOC/HAP concentrations in the vapors by microbial degradation. The biofilter will be the only point sources of air emissions from the MIGCS (Emission Control MIBF1/Emission Point MIGCS1).

Attachment H

Material Safety Data Sheets

Not Applicable

# Attachment I

## Emission Units Table



## Attachment J

### Emissions Points Data Summary Sheet

**Attachment J**  
**EMISSION POINTS DATA SUMMARY SHEET**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPs)*	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>4</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
MIGCS1	Upward Vertical Stack	MIGCS	Vent Gas	MIBF1	Biofilter Organic Media	C	8,760	Total HAPs Total VOCs	14.18 15.26	62.09 66.83	1.42 1.53	6.21 6.68	Gas	EE	-- -- --

\*HAP's - See Attachment N for full list of speciated HAP's and VOCs as well as concentrations.

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- <sup>1</sup> Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- <sup>2</sup> Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).
- <sup>3</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases (including CO<sub>2</sub> and methane), etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.
- <sup>4</sup> Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- <sup>5</sup> Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- <sup>6</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).
- <sup>7</sup> Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m<sup>3</sup>) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO<sub>2</sub>, use units of ppmv (See 45CSR10).



## Attachment K

### Fugitive Emissions Data Summary Sheet

**Attachment K**

**FUGITIVE EMISSIONS DATA SUMMARY SHEET**

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

Union Carbide Corporation – South Charleston Facility  
WVDAQ Regulation 13 Permit Application - Middle Island Groundwater Containment System

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS <sup>1</sup>	Maximum Potential Uncontrolled Emissions <sup>2</sup>		Maximum Potential Controlled Emissions <sup>3</sup>		Est. Method Used <sup>4</sup>
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	Not Applicable					
Unpaved Haul Roads	Not Applicable					
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	Not Applicable					
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	Not Applicable					
General Clean-up VOC Emissions	Not Applicable					
Other	Not Applicable					

<sup>1</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, etc. DO NOT LIST CO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

<sup>2</sup> Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>3</sup> Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>4</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

## Attachment L

### Emission Unit Data Sheet(s)

**Attachment L**  
**EMISSIONS UNIT DATA SHEET**  
**GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): MIGCS

<p>1. Name or type and model of proposed affected source:</p> <p>Groundwater Containment System - field constructed</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>A new groundwater containment system (MIGCS) will be installed to extract organic contaminants from groundwater. Total maximum water flow rate is 100 gallons per minute. Total maximum air flow rate will be 1000 scfm.</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Not applicable- products are not produced in this process.</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Not applicable</p>

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):		
(a) Type and amount in appropriate units of fuel(s) to be burned:		
Not applicable		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:		
Not applicable		
(c) Theoretical combustion air requirement (ACF/unit of fuel):		
Not applicable	@	°F and psia.
(d) Percent excess air: Not applicable		
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:		
Not applicable		
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:		
Not applicable		
(g) Proposed maximum design heat input: Not applicable × 10 <sup>6</sup> BTU/hr.		
7. Projected operating schedule:		
Hours/Day	24	Days/Week 7 Weeks/Year 52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	psia	
a. NO <sub>x</sub>	Not applicable	lb/hr	grains/ACF
b. SO <sub>2</sub>	Not applicable	lb/hr	grains/ACF
c. CO	Not applicable	lb/hr	grains/ACF
d. PM <sub>10</sub>	Not applicable	lb/hr	grains/ACF
e. Hydrocarbons	See Attachment N	lb/hr	grains/ACF
f. VOCs	See Attachment N	lb/hr	grains/ACF
g. Pb	Not applicable	lb/hr	grains/ACF
h. Specify other(s)		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing  
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

**MONITORING**

Not applicable

**RECORDKEEPING**

Not applicable

**REPORTING**

Not applicable

**TESTING**

Not applicable

**MONITORING.** PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

**RECORDKEEPING.** PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

**REPORTING.** PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

**TESTING.** PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Not applicable

## Attachment M

### Air Pollution Control Device Sheet(s)

**Attachment M**  
**Air Pollution Control Device Sheet**  
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): MIBF1

**Equipment Information**

1. Manufacturer: TBD Model No. TBD	2. Control Device Name: Middle Island GCS Biofilter Type: Biofilter
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency. See page 4 of Attachment M for example of system.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device. See page 4 of Attachment M for example of system.	
5. Provide a scale diagram of the control device showing internal construction. See page 4 of Attachment M for example of system.	
6. Submit a schematic and diagram with dimensions and flow rates. See page 4 of Attachment M for example of system.	
7. Guaranteed minimum collection efficiency for each pollutant collected:  Biofilter will reduce VOC/HAP emissions to less than 2 lb/hr	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume:            1000            SCFM	10. Capacity: Not applicable
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.  Not applicable	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment. See Attachment F for Process Flow Diagram	
13. Description of method of handling the collected material(s) for reuse or disposal.  Not Applicable	

**Gas Stream Characteristics**

14. Are halogenated organics present? Are particulates present? Are metals present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	<b>Maximum</b>	<b>Typical</b>	
Pressure (mmHg):	NA	NA	
Heat Content (BTU/scf):	NA	NA	
Oxygen Content (%):	NA	NA	
Moisture Content (%):	NA	NA	
Relative Humidity (%):	NA	NA	

16. Type of pollutant(s) controlled: <input type="checkbox"/> SO <sub>x</sub> <input type="checkbox"/> Odor				
<input type="checkbox"/> Particulate (type): <input checked="" type="checkbox"/> Other – VOC/HAPs				
17. Inlet gas velocity:                      84.9                      ft/sec	18. Pollutant specific gravity: N/A			
19. Gas flow into the collector: 900                      ACFM @ 40°F and standard PSIA	20. Gas stream temperature: Inlet:                      ambient°F Outlet:                      40                      °F			
21. Gas flow rate: <i>Outlet information provided</i> Design Maximum:                      1000                      ACFM Average Expected:                      900                      ACFM	22. Particulate Grain Loading in grains/scf: Inlet:                      Not Applicable Outlet:			
23. Emission rate of each pollutant (specify) into and out of collector: <i>See Attachment N</i>				
<b>Pollutant</b>	<b>IN Pollutant</b>	<b>Emission Capture Efficiency %</b>	<b>OUT Pollutant</b>	<b>Control Efficiency %</b>
	<b>lb/hr</b>	<b>grains/acf</b>	<b>lb/hr</b>	<b>grains/acf</b>
A				
B				
C				
D				
E				
24. Dimensions of stack:                      Height                      12                      ft.		Diameter                      0.5 ft.		
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.				

**Particulate Distribution**

26. Complete the table:	<b>Particle Size Distribution at Inlet to Collector</b>	<b>Fraction Efficiency of Collector</b>
<b>Particulate Size Range (microns)</b>	<b>Weight % for Size Range</b>	<b>Weight % for Size Range</b>
0 – 2	Not Applicable	
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):  
Not Applicable

28. Describe the collection material disposal system:  
Not Applicable

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet? Yes

**30. Proposed Monitoring, Recordkeeping, Reporting, and Testing**  
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:  
See Attachment O

RECORDKEEPING:  
See Attachment O

REPORTING:  
See Attachment O

TESTING:  
See Attachment O

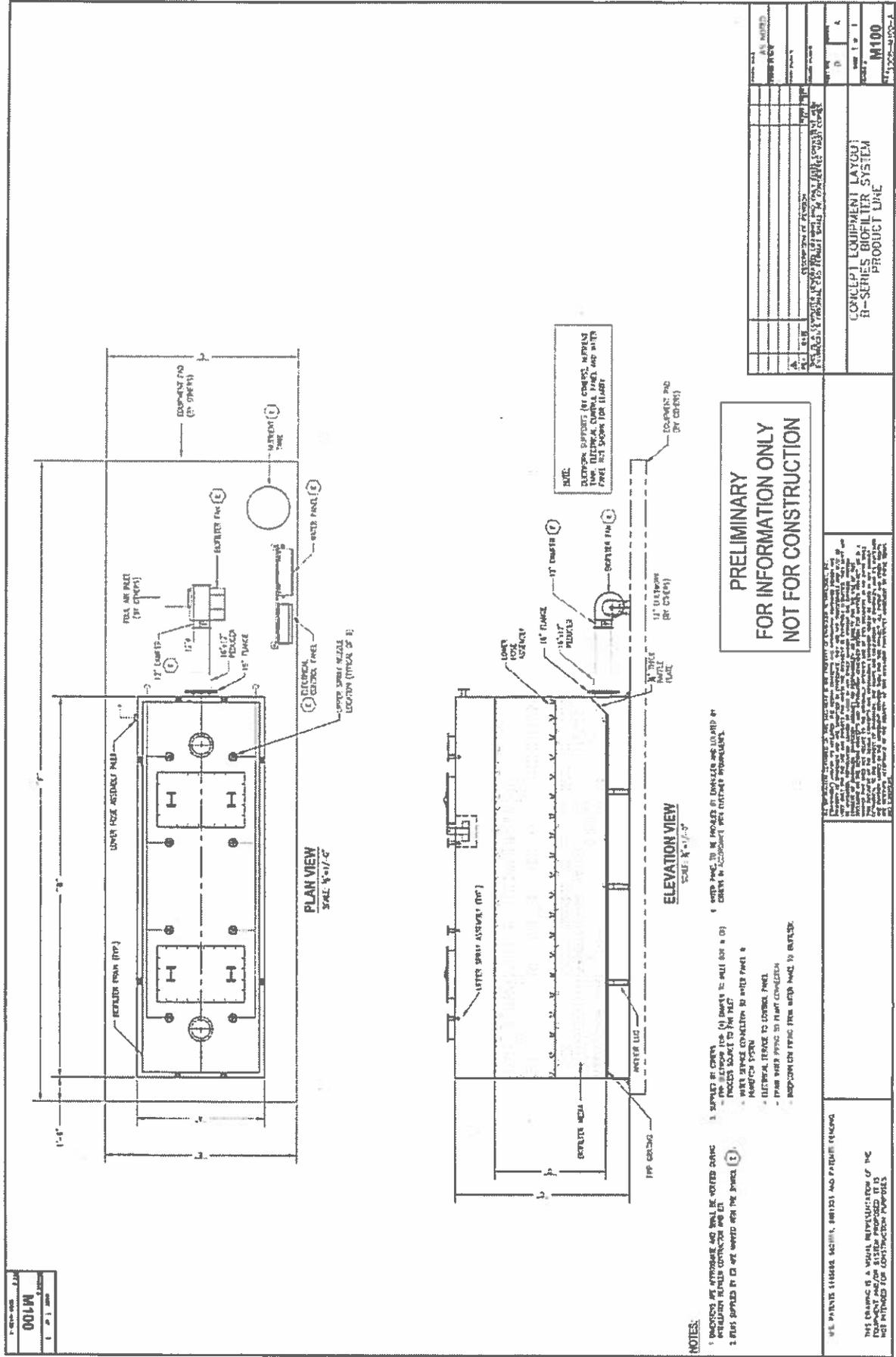
MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.  
RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.  
REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.  
TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.  
Biofilter will reduce VOC/HAP emissions to less than 2 lb/hr

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.  
Biofilter will reduce VOC/HAP emissions to less than 2 lb/hr

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.  
Not Applicable.

Union Carbide Corporation - South Charleston Facility  
Middle Island Groundwater Containment System Biofilter Example



**PRELIMINARY  
FOR INFORMATION ONLY  
NOT FOR CONSTRUCTION**

- NOTES:**
1. DIMENSIONS ARE APPROXIMATE AND SHALL BE CHECKED DURING INSTALLATION. REVISIONS TO THIS DRAWING SHALL BE MADE AS NECESSARY.
  2. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  3. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  4. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  5. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  6. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  7. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  8. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  9. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
  10. ALL DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.

PROJECT: MIDDLE ISLAND GROUNDWATER CONTAINMENT SYSTEM DRAWING NO.: M100-1000-4 DATE: 11/11/88 DRAWN BY: J. L. BROWN CHECKED BY: J. L. BROWN APPROVED BY: J. L. BROWN	
CONCEPT EQUIPMENT LAYOUT B-SERIES BIOFILTER SYSTEM PRODUCT LINE: M100	
THIS DRAWING IS A PRELIMINARY DESIGN AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.	

## Attachment N

### Supporting Emission Calculations

**ATTACHMENT N – Emissions Estimates**

Vapor emission estimates were based on analytical groundwater data representative of the containment area. Hourly and annual VOC and HAP emissions are based on maximum groundwater pollutant concentrations from groundwater samples collected within the full-scale remedy target treatment zone for the GCS area. As it is difficult to estimate emissions from each unit operations and unclear at which point in the process volatiles may be stripped from the groundwater, emissions were estimated by conservatively assuming that 99.99% of the mass of contaminants in the groundwater would be stripped to air and sent to the biofilter. Emissions from each stage of the groundwater treatment process are collected and routed to the biofilter; as a result, there are no anticipated fugitives from the process. Controlled emissions reflect a minimum reduction efficiency of 90 percent by the GCS biofilter.

The below table summarizes requested controlled emission rates. Detailed emission estimates are also attached.

<b>Chemical</b>	<b>Emission Rate (lbs/hour)</b>	<b>Emission Rate (TPY)</b>
1,2-Dichloroethane	0.01	0.04
Benzene	1.21	5.32
<b>Total HAPs</b>	<b>1.42</b>	<b>6.21</b>
<b>Total VOCs</b>	<b>1.53</b>	<b>6.68</b>

Table N-1

Summary of Emission Estimates, Biofilter

South Charleston Facility, Middle Island Groundwater Containment System, South Charleston, WV

Total by Regulatory Classification

	lb/hr	TPY
VOC	1.53	6.68
HAP	1.42	6.21
TAP	1.22	5.36
NRC	0.22	0.97

Chemical	Regulatory Classification	Uncontrolled		Controlled <sup>1</sup>	
		Emission Rate (lb/hr)	Emission Rate (tpy) <sup>2</sup>	Emission Rate (lb/hr)	Emission Rate (tpy) <sup>2</sup>
1,2-Dichloroethane	VOC/HAP/TAP	0.09	0.39	0.01	0.04
1,3-Dichlorobenzene	VOC	0.09	0.39	0.01	0.04
1,4-Dichlorobenzene	VOC/HAP	0.09	0.39	0.01	0.04
2-Butanone	VOC	0.89	3.90	0.09	0.39
Acetone	NRC	2.23	9.75	0.22	0.97
Benzene	VOC/HAP/TAP	12.14	53.17	1.21	5.32
Chlorobenzene	VOC/HAP	0.09	0.39	0.01	0.04
cis-1,2-Dichloroethylene	VOC	0.09	0.39	0.01	0.04
Ethylbenzene	VOC/HAP	0.17	0.75	0.02	0.08
Naphthalene	VOC/HAP	0.06	0.25	0.01	0.03
Styrene	VOC/HAP	0.10	0.45	0.01	0.05
Toluene	VOC/HAP	0.96	4.21	0.10	0.42
Xylenes, Total	VOC/HAP	0.46	2.01	0.05	0.20
<b>Total HAP</b>		<b>14.18</b>	<b>62.09</b>	<b>1.42</b>	<b>6.21</b>
<b>Total VOC</b>		<b>15.26</b>	<b>66.83</b>	<b>1.53</b>	<b>6.68</b>

1 - Biofilter provides a VOC/HAP control efficiency of 90%

2- Emission rates account for a 24 hour per day, 365 day per year operating schedule

3- NRC - Non-regulated contaminant

**Table N-2**  
**Summary of Vapor Emission Estimates - using Groundwater Concentrations**  
**South Charleston Facility, Middle Island Groundwater Containment System, South Charleston, WV**

Total Maximum Water Flow = 100 gpm  
 378.5 lpm

Constituent	Max. Weighted Conc. in Groundwater (mg/L)*	Loading Rate in Air to Biofilter (lb/hr)
1,2-Dichloroethane	1.78	0.09
1,3-Dichlorobenzene	1.78	0.09
1,4-Dichlorobenzene	1.78	0.09
2-Butanone	17.80	0.89
Acetone	44.49	2.23
Benzene	242.69	12.14
Chlorobenzene	1.78	0.09
cis-1,2-Dichloroethylene	1.78	0.09
Ethylbenzene	3.44	0.17
Naphthalene	1.16	0.06
Styrene	2.07	0.10
Toluene	19.21	0.96
Xylenes, Total	9.16	0.46
<b>**Total air emissions</b>		<b>17.48</b>

**Notes:**  
**Air Emission Rate (lb/hr) = pollutant GW conc. (mg/l) \* % that vaporizes (99.99%) \* water flow (lpm) \* g/1000 mg \* lb/454 g \* 60 min/hr**  
 \* Loading estimate are based on analytical groundwater data representative the containment area.  
 Green shading = 4 Max contributors: Benzene, Acetone, 2-butanone, toluene  
 \*\*Total air emissions includes emissions of other constituents which, alone are <0.01 lb/hr, but, combined account for 0.02 lb/hr.

## Attachment O

### Monitoring/Recordkeeping/Reporting/Testing Plans

## **ATTACHMENT O – Monitoring/Recordkeeping/Reporting/Testing Plans**

### **Proposed Demonstrations of Compliance**

A site specific monitoring plan will be maintained that includes the manufacturer's operations and maintenance (O&M) manual for procedures for operation, maintenance, calibrations and inspections. A copy of the plan will be maintained onsite.

The biofilter will be operated in accordance with manufacturer's instructions and good engineering practices.

### **Proposed Monitoring**

The Middle Island Biofilter (MIBF1) will be equipped with instrumentation that monitors effluent air temperature as a representation that the biofilter is able to achieve a minimum of 90% reduction of vent gas VOCs. Biofilter vendors have indicated that as long as the temperature is maintained at greater than 40 degrees F, the biofilter will achieve the specified minimum reduction efficiency. The effluent air stream temperature to MIBF1 will be monitored at least once per hour by a system internal to the biofilter. Temperature measurement devices will be checked for proper calibration in accordance with manufacturer's recommendation and/or good engineering practices.

### **Proposed Recordkeeping**

The following records will be maintained:

- Daily average effluent air temperature
- Completed maintenance and calibrations.
- Copy of the monitoring plan (i.e. Manufacturer's O&M Manual).
- Records of temperature monitor downtime and corrective actions taken. Such events could include loss of utilities, computer/equipment failures and malfunctions.
- Copy of the initial VOC stack test results.

### **Proposed Reporting**

On a semi-annual basis report events where the daily average biofilter effluent air stream temperature is operated at less than 40 degrees F when VOCs are present in the vent gas, or temperature monitor downtime events including corrective actions taken.

### **Proposed Testing**

Within 180 days of the time the Middle Island Groundwater Containment System (MIGCS1) and biofilter (MIBF1) begin operation, an initial stack test will be performed to confirm VOC emission rates to the atmosphere. Testing will be done using a photo ionization detector or other suitable detector or a sample may be collected and sent to a laboratory for analysis. At the time of the testing exhaust flow rates shall also be determined in order to calculate hourly VOC emissions.

### **Proposed On-Going Compliance Demonstration**

To determine compliance with the proposed mass emission rates for regulated air pollutants, the average daily effluent temperature will be at least 40°F when VOCs are present in the vent gas.

# Attachment P

## Legal Ad

Note: Original affidavit of publication will be submitted immediately upon receipt.

**AIR QUALITY PERMIT NOTICE**  
**Notice of Application**

Notice is given that Union Carbide Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit to install and operate a new groundwater containment system located at 437 MacCorkle Avenue SW, South Charleston, in Kanawha County, West Virginia. The latitude and longitude coordinates are: 38.36852, -81.68654

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: volatile organic compounds – 6.68 tons per year; hazardous air pollutants – 6.21 tons per year.

Startup of operation is planned to begin in late 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 11th day of April, 2016.

By: Union Carbide Corporation  
Jon Putnam  
WVO Responsible Care Leader  
P.O. Box 8361  
South Charleston, WV 25303

Attachment Q  
Business Confidentiality Claims

Not Applicable

Attachment R  
Authority Forms



February 22, 2016

**RE: DELEGATION OF AUTHORITY**

I delegate to the following individual the authority to sign and execute documents on behalf of Union Carbide Corporation (the "Company") in the areas identified below associated with West Virginia Operations.

Name: Jon W. Putnam  
Position: Responsible Care Leader  
Facilities: South Charleston Manufacturing Plant  
437 MacCorkle Avenue, SW, South Charleston, WV 25303  
South Charleston Technology Park  
3200/3300 Kanawha Turnpike, South Charleston, WV 25303  
Institute Manufacturing Site  
Route 25, Institute, WV 25112

To the fullest extent permitted by law, this delegation includes the authority to sign all reports and permit applications under regulations implementing federal, state, or local environmental, health and safety laws and regulations, and to provide, where appropriate, other relevant information requested by the Administrator of the U.S. EPA or other federal, state or local environmental, health and safety agencies. Any environmental, health and safety documents signed or executed by Jon W. Putnam shall have the same force and effect, and shall bind Union Carbide Corporation, as if done by me. Without limiting the generality of the foregoing, I am an authorized signatory for the Company as defined in 40 CFR 98.4, 40 CFR 122.22, 40 CFR 144.32, and 40 CFR 270.11, and a Responsible Official as defined in 40 CFR 70.2.

I explicitly stipulate that the individual named above is restricted to re-delegating any authority granted by this Delegation unless that delegation is executed in writing and the re-delegation is approved by the Law Department as meeting requirements of the environmental regulations referenced in the paragraph above.

This Delegation shall remain in effect until rescinded or modified by me or my successor, in writing, and shall expire on August 31, 2019. This Delegation supersedes and replaces any prior delegations.

02/23/16  
Date

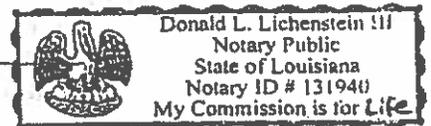
\_\_\_\_\_  
Jason P. Lankford  
Vice President

STATE OF LOUISIANA)  
  ) ss.  
PARISH OF ST. CHARLES        )

The foregoing instrument was acknowledged before me this 23<sup>rd</sup> day of February, 2016, by Jason P. Lankford, Vice President of Union Carbide Corporation, a New York corporation, on behalf of the corporation.

\_\_\_\_\_  
Notary Public

My commission expires \_\_\_\_\_  
DOW CONFIDENTIAL - Do not share without permission





Union Carbide Corporation  
A Subsidiary of The Dow Chemical Company  
P.O. Box 8004  
437 MacCorkie Avenue, SW  
South Charleston, WV 25303  
USA

### AUTHORITY OF CORPORATION

TO: The West Virginia Department of Environmental Protection,  
Division of Air Quality

DATE: March 1, 2016

ATTN: Mr. William F. Durham, Director

Corporation's Federal Employer I.D. Number 13-1421730

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business.

Further, the corporation entity certifies as follows:

- (1) Jon W. Putnam is the authorized representative and in that capacity may represent the interest of the corporation and may obligate and legally bind the corporation.
- (2) The corporation is authorized to do business in the State of West Virginia.
- (3) If the corporation changes its authorized representative, the corporation shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

Jason P. Lankford  
Vice President  
Union Carbide Corporation  
A Subsidiary of The Dow Chemical Company

## Application Fee