HEARING OFFICER'S REPORT

TO: The Honorable Shawn M. Garvin
Cabinet Secretary, Department of Natural Resources and Environmental Control

FROM: Lisa A. Vest
Regulatory Specialist, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Application of Croda, Inc., for modification of the existing federally enforceable 7 DE Admin. Code 1102 Construction Permit (APC-2016/0068-CONSTRUCTION [Amendment 4] [NSPS] [MACT] [VOC RACT] [MNSR] [FE]) for the 30,000 tons per year ("TPY") Ethylene Oxide ("EO") plant located at the Atlas Point facility, 315 Cherry Lane, New Castle, Delaware.

DATE: July 19, 2021

I. BACKGROUND AND PROCEDURAL HISTORY:

A virtual public hearing was held on Tuesday, June 29, 2021, at 6:00 p.m. via the State of Delaware Cisco WebEx Meeting Platform by the Department of Natural Resources and Environmental Control ("DNREC" or "Department") to receive comment on the application of Croda, Inc. ("Croda" or "Applicant") for modification of the existing federally enforceable 7 DE Admin. Code 1102 Construction Permit (APC-2016/0068-CONSTRUCTION [Amendment 4] [NSPS] [MACT] [VOC RACT] [MNSR] [FE]), hereinafter referred to as the "1102 Permit," of the 30,000 tons per year ("TPY") Ethylene Oxide ("EO") plant located at Croda's Atlas Point facility, 315 Cherry Lane, New Castle, Delaware ("Application"). The proposed modifications to Croda's existing 1102 Permit, in accordance with both the Application and recent Settlement Agreement of February 26, 2021, are subject to various state and federal regulatory requirements, including, but not limited to, Delaware's regulations concerning air quality, 7 DE Admin. Code 1100, specifically, Section 1102, *Permits,* and as provided for under Delaware law in 7 *Del.C.* Ch. 60.

The Applicant operates a multi-step continuous process to produce EO from ethanol. Ethanol is reacted with oxygen to form ethylene, which is in turn reacted to form EO. The EO is then purified, stored, and used on-site as a raw material in manufacturing surfactants that promote the mixing of oil and water-based ingredients in consumer products such as shaving cream and pharmaceuticals.

The design capacity of the Applicant's EO plant is 30,000 TPY of EO. Major emitting equipment at the plant includes an Ethanol Dehydration Furnace ("EDF"), a Catalytic Combustion Unit ("CCU") to control emissions from the carbonate regenerator, and two EO storage tanks. Side-streams include technical grade mono-ethylene glycol, polyglycols, and by-product carbon dioxide. Certain gas streams generated by the process, which contain organic constituents, are controlled by destruction in the EDF or CCU. Other sources of emissions include an ethyl chloride chemical addition pot, start-up/shutdown activities, storage tanks, an emergency generator, three fire pumps, and fugitive sources.

On September 17, 2020, Croda performed performance testing ("stack testing") of the T-330 Vent Scrubber ("Vent Scrubber") and F-610 Drying Colum Hotwell ("Hotwell") components of the EO plant as prescribed in Permit AQM-003/00058 (Renewal 3) (Revision 5). Testing was stopped midway through the planned tests due to concerns about results observed in the Hotwell and the EO plant was placed into a maintenance shutdown. Due to the shutdown, additional testing of the EDF and the CCU was not performed. The partial test results obtained showed violations of the emissions limits for both the Vent Scrubber and the Hotwell.

On December 30, 2020, Croda forwarded an amendment letter requesting proposed 1102 Permit modifications. This letter, received by the Department on January 4, 2021, enclosed a permit modification application for changes to the Vent Scrubber and the Hotwell, as described above. Both changes were intended to reduce emissions from the Applicant's facility by directing the vapor discharge stream to other process equipment at the EO plant.

On January 12, 2021, re-testing of the Vent Scrubber was performed (at a higher water flow rate than the September 2020 testing), achieving passing results. During the Department's discussion of the changes proposed in the Application at that time, Croda stated that vent gases would be flowed through (not diverted around) the Vent Scrubber. The Department maintained that it was necessary to maintain water flow through the Vent Scrubber at all times. Croda's Operations group questioned the need for this continuous water flow when the vent gases are being directed back into the process, however, the Safety, Health and Environmental group acknowledged the necessity for this provision.

On February 26, 2021, a Settlement Agreement was reached between the Department and Croda regarding exceedances during the September 2020 and January 2021 performance tests referenced above. The Settlement Agreement calls for certain changes to the Applicant's Title V Permit. Those changes are first being made to this underlying 1102 Permit and are set forth in detail in the Department's Technical Memorandum (May 24, 2021) from Joanna L. French, P.E., Engineer IV, and Eric S. Rowland, Engineer, both with the Department's Division of Air Quality (DNREC Exhibit 5).

The proposed modifications to Croda's existing permit, in accordance with both the Application and recent Settlement Agreement of February 26, 2021, will allow the following:

- For the T-330 Vent Scrubber, two operation scenarios will be allowed. The first scenario would be for normal operation, where vent gases would pass through the scrubber and then be directed back into the process. The second scenario would be for maintenance activities (while the EO plant would be off-line), such as purging of transfer lines and storage tanks. In the second scenario, vent gases would pass through the scrubber and exhaust to atmosphere.

- For the F-610 Drying Column Hotwell, the vapors/gases from this unit will be rerouted to B-1210 EDF for destruction. No emissions to atmosphere would occur.

- Emissions limits from the Vent Scrubber will remain unchanged, however, the percent Volatile Organic Compound ("VOC") reduction shall increase from 95% to 99%, and the scrubber shall be operated within parameters set by performance testing.

- Emissions from the EDF will be increased, not due to changes, but rather due to an error in the original permit, where average values were used instead of design (or worst case) values. The emissions changes are specified as follows: Carbon Monoxide ("CO") from 0.46 lb./hr. and 2.0 TPY to 1.0 lb./hr. and 4.5 TPY; Nitrogen Oxide ("NOx") from 0.33 lb./hr. and 1.4 TPY to 0.74 lb./hr. and 3.2 TPY; Sulfur Dioxide ("SO_2") from 0.014 TPY to 0.0073 lb./hr. and 0.29 TPY; VOC from 1.0 lb./hr. and 4.5 TPY to 1.3 lb./hr. and 5.7 TPY; and PM_{10} from 0.04 lb./hr/ and 0.18 TPY to 0.093 lb./hr. and 0.41 TPY.

It should be noted that the pending Application for the 1102 Permit, should it be approved by the Secretary, is for approving construction that will allow Croda to test the above scenarios to ensure long-term viability. The Applicant's emissions levels are not being addressed by the Department in this Application at this time. Upon Croda's completion of construction, the Department will incorporate the operating conditions and limits of the Applicant's 1102 Permit into the facility's existing Title V permit (Permit: AQM-003/00058) via an Administrative Amendment.

The Applicant's Permit Modification Application referenced above (dated December 30, 2020) was received by the Department on January 4, 2021. A revised Permit Modification Cover Letter (which provided additional information as requested by the Department's experts in the Division of Air Quality) was received on April 16, 2021. Accordingly, the Department published legal notices in the *Sunday News Journal* and the *Delaware State News* on May 30, 2021, advertising that a public hearing would be held, as referenced above. Thereafter, the Department held its virtual public hearing on June 29, 2021.

Department staff, representatives of Croda, and members of the public attended the June 29, 2021, public hearing. The hearing record ("Record") remained open for receipt of comment through July 14, 2021, however, no comments were received from the public regarding this permitting matter. Proper notice of the hearing was provided as required by law.

II. SUMMARY OF THE PUBLIC HEARING RECORD:

The Record consists of the following documents:

(1) The official verbatim Transcript of Proceedings from Wilcox & Fetzer, Ltd., generated from the public hearing of June 29, 2021;

(2) Eleven documents representing the Department's Exhibits concerning the Application, introduced by responsible Department staff at the aforementioned hearing, and marked accordingly by this Hearing Officer as "Dept. Exh. 1-11";

(3) Copy of the Applicant's PowerPoint presentation offered at the public hearing, marked accordingly by this Hearing Officer as "Applicant's Exh. 1."

The Department's persons primarily responsible for reviewing this application, Ms. French and Mr. Rowland, as referenced above, developed the Record with the relevant documents in the Department's files. As noted previously, no comments were received by the Department during the time period when the Record remained open to receive public comment.

The Department's experts in the Division of Air Quality believe that the finalized draft 1102 Permit addresses the technical and regulatory concerns of both the Department and the permittee, while fulfilling the Department's mission to protect the public health and the environment. It should be noted that no changes were made to the Draft Permit subsequent to the time it was originally made available for the public to review, per the Department's legal notice of May 30, 2021.

It should also be noted that the Department's Technical Memorandum of May 24, 2021, previously incorporated into the Record as "DNREC Exhibit 5," as noted above, is attached hereto as Appendix "A" and is expressly incorporated herein as such.

III. RECOMMENDED FINDINGS AND CONCLUSIONS:

Currently pending before the Department is the Application for modification of Croda's 1102 Permit, as set forth above. I find that the proposed removal of the Hotwell emission point, further definition of the operation(s) of the Vent Scrubber, and correction of the EDF emission limits for the Applicant's EO plant located at the Atlas Point facility at 315 Cherry Lane, New Castle, Delaware requires the Applicant to obtain modifications to the existing 1102 Permit, as noted above. I further find that the Applicant's proposed modifications are subject to various state and federal regulatory requirements, including, but not limited to, Delaware's regulations concerning air quality, 7 DE Admin. Code 1100, specifically, Section 1102, *Permits*, and as provided for under Delaware law in 7 *Del.C.* Ch. 60.

In reviewing the applicable statutes and regulations, as well as weighing public benefits of this project against potential detriments, the Department's experts in the Division of Air Quality have concluded that the pending Application complies with all applicable federal and state laws and regulations. Should this Application be approved, the 1102 Permit that would be issued by the Department would be reflective of the Application submitted, and would include operational, monitoring, and reporting requirements intended to protect public health and the environment.

The Record developed in this matter indicates that the Department's experts in the Division of Air Quality have considered all statutes and regulations that govern projects such as the Applicant's above proposed modifications and have recommended approval of the 1102 Permit necessary for the same. I find and conclude that the Applicant has adequately demonstrated compliance with all requirements of the statutes and regulations, and that the Record supports approval of the Application as submitted by Croda in this matter.

Further, I recommend the Secretary adopt the following findings and conclusions:

1. The Department has jurisdiction under 7 *Del. C.* Ch. 60 and Delaware's regulations concerning air quality, 7 DE Admin. Code 1100, specifically, Section 1102, *Permits*, and all other relevant statutory authority, to make a final determination on the Application submitted by Croda after holding a public hearing and considering all information contained in the Record generated in this matter;

2. The Department provided proper public notice of the Application submitted by Croda, and of the public hearing held on June 29, 2021, and held said hearing to consider any public comments that may be offered on the Application, in a manner required by the law and regulations;

3. The Department has carefully considered the factors required to be weighed in issuing the permit required by the Application, and finds that the Record supports approval of the same;

4. The Department shall issue to Croda a federally enforceable 7 DE Admin. Code 1102 construction permit (APC-2016/0068-CONSTRUCTION [Amendment 4] [NSPS] [MACT] [VOC RACT] [MNSR] [FE]) for modification of a 30,000 TPY EO plant located at Atlas Point, 315 Cherry Lane, New Castle, Delaware, consistent with the Record developed in this matter. Furthermore, said permit shall include all conditions as set forth in the Department's Draft Permit for Croda, to ensure that Delaware's environment and public health will be protected from harm;

5. The Department has an adequate Record for its decision, and no further public hearing is appropriate or necessary; and

6. The Department shall serve and publish its Order on its internet site.

/s/Lisa A. Vest
LISA A. VEST
Regulatory Specialist

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Attachment A: Technical Memorandum, Div. of Air Quality (05/24/2021)

MEMORANDUM

TO: Joanna L. French, P.E. JLF

FROM: Eric S. Rowland ESR

SUBJECT: **Croda, Inc.**
Atlas Point
Draft/Proposed Permit: APC-2016/0068-CONSTRUCTION (Amendment 4) (NSPS) (MACT) (VOC RACT) (MNSR) (FE)

DATE: May 24, 2021

BACKGROUND INFORMATION

Croda, Inc. (Croda or the Company) operates a multi-step continuous process to produce ethylene oxide from ethanol. Ethanol is reacted with oxygen to form ethylene, which is in turn reacted to form ethylene oxide. The ethylene oxide (EO) is purified, stored, and used on-site as a raw material in manufacturing certain products. The design capacity of the plant is 30,000 TPY of EO. Major emitting equipment include an ethanol dehydration furnace (EDF, 12.47 MMBTU/hr), a catalytic oxidizer (CCU, <1 MMBTU/hr) to control emissions from the carbonate regenerator and two EO storage tanks. Side-streams include technical grade mono-ethylene glycol, polyglycols, and by-product carbon dioxide. Certain gas streams generated by the process, which contain organic constituents, are controlled by destruction in the EDF or catalytic oxidizer. Other sources of emissions include an ethyl chloride chemical addition pot, start-up/shutdown activities, storage tanks, an emergency generator, three fire pumps, and fugitive sources.

On September 17, 2020, Croda performed performance testing (stack testing) of the T-330 Vent Scrubber and F-610 Drying Column Hotwell components of the Ethylene Oxide (EO) Plant as prescribed in Permit: AQM-003/00058 (Renewal 3) (Revision 5). Testing was stopped midway through the planned tests due to concerns about results observed in the hotwell, and the EO Plant was placed into a maintenance shut down. Due to this plant shutdown, additional testing of the B-1210 Ethanol Dehydration Furnace and the U-240 Catalytic Combustion Unit was not performed. The partial test results obtained showed violations of the emissions limits for the T-330 Vent Scrubber and F-610 Drying Column Hotwell.

An amendment letter for **Permit: APC-2016/0068-CONSTRUCTION (Amendment 4) (NSPS) (MACT) (VOC RACT) (MNSR) (FE)**, dated December 30, 2020, was received on January 4, 2021. This letter requests that the following changes be made:

- For the T-330 Vent Scrubber, two operating scenarios be allowed. The first scenario would be for normal operation where vent gases would pass through the scrubber and then be directed back into the process. The second scenario would be for maintenance activities (while the EO Plant was off-line) such as purging of transfer lines and storage tanks. In this second scenario, vent gases would pass through the scrubber and exhaust to atmosphere.
- For the F-610 Drying Column Hotwell, the vapors/gases from this unit will be re-routed to B-1210 Ethanol Dehydration Furnace for destruction. No emissions to atmosphere would occur.
- For the B-1210 Ethanol Dehydration Furnace, increases were requested for the emissions limits for CO, NO_X, SO_2, VOC, and PM_{10}. These increases are requested not due to a change, but due to an error in the original permit where average values were used instead of design (or worst case) values.

On January 12, 2021, re-testing of the T-330 Vent Scrubber was performed (at a higher water flow rate than the September 2020 testing). This testing achieved passing results. The changes proposed in the permit application have been discussed with Croda, and they state that vent gases will be flowed through

(not diverted around) the vent scrubber. As such, the Division feels it is necessary to maintain water flow through the scrubber at all times. Croda's Operations group has questioned the need for this continuous water flow when the vent gases are being directed back into the process, however the Safety, Health, and Environmental (SHE) group has acknowledged the necessity for this provision.

On February 26, 2021, a Settlement Agreement was reached between the Department and Croda regarding exceedances during the September 17, 2020 and January 13-14, 2021 performance tests (B-1210 Ethanol Dehydration Furnace and U-240 Catalytic Combustion Unit). This Settlement Agreement calls for certain changes to the Title V permit, which are first being made to this underlying Regulation 1102 construction permit.

The text of Condition 3.17 refers to the venting of the Ethylene Purification Tower, and is no longer accurate. This condition was not incorporated into Permit: AQM-003/00058 (Renewal 3) (Revision 5), as documented in the November 18, 2019 memo (which references a letter from March 5, 2018). It is being removed from this underlying Regulation 1102 permit at this time.

The changes to be made in this Amendment are shown in Table 1 below:

Table 1: Amendment 4 Changes to APC-2016/0068-CONSTRUCTION

Condition	Existing Wording	New Wording
Changes related to the F-610 Drying Column Hotwell made in accordance with Paragraph 14 of the Settlement Agreement and the Permit Application:		
3.24	The owner or operator shall maintain a TRE index value greater than 1.0 without use of VOC emission control devices for the hotwell.	Reserved.
4.14	For the purposes of demonstrating that the hotwell formaldehyde concentration is less than 500 ppmv:.	Reserved.
4.14.1	The process vent stream composition shall be determined by calculations based on material balances, process stoichiometry, or previous test results, provided that the results are still relevant to the current process vent stream conditions.	(deleted)
4.14.2	The owner or operator shall demonstrate that the concentration of TOC (including methane and ethane) measured by Method 25A is less than 250 ppmv with a VOC concentration of less than 500 ppmv to qualify for the low-concentration exclusion of 7 **DE Admin. Code** 1124 Section 48.1.2.4.	(deleted)
4.15	40 CFR 60 Subpart NNN §60.664(e) and (f) shall be used to determine the hotwell process vent stream TRE index value to show compliance with Condition 3.24.	Reserved.

Table 1: Amendment 4 Changes to APC-2016/0068-CONSTRUCTION

Condition	Existing Wording	New Wording
4.16	To comply with Condition 3.24, the owner or operator shall recalculate the TRE index value for the hotwell whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type, or catalyst type, or whenever there is replacement, removal, or addition of recovery equipment. The TRE index value shall be recalculated based on test data, or on best engineering estimates of the effects of the change to the recovery system.	Reserved.
4.5	Compliance with Conditions 2.1.1 (CO), 2.1.2 (NO_X), 2.1.4.1 (VOC), 2.1.4.2 (TOC), 2.1.5 (PM_{10}), 2.2.1 (CO), 2.2.2 (NO_X), 2.2.4 (VOC), and 2.2.5 (PM_{10}) shall be demonstrated by an initial stack test then subsequently once every 5 years thereafter. An initial performance test on the hotwell vent in accordance with 7 DE Admin. Code 1124, Section 48.4.9 shall be performed to demonstrate VOC emissions are less than 500 ppmv. Subsequent testing shall be conducted if a process change as described in Condition 4.6 is made. Testing shall be conducted while the unit is operated under the condition/conditions defined in a Department approved test protocol.	Compliance with Conditions 2.1.1 (CO), 2.1.2 (NO_X), 2.1.4.1 (VOC), 2.1.4.2 (TOC), 2.1.5 (PM_{10}), 2.2.1 (CO), 2.2.2 (NO_X), 2.2.4 (VOC), and 2.2.5 (PM_{10}) shall be demonstrated by an initial stack test then subsequently once every 5 years thereafter. Subsequent testing shall be conducted if a process change as described in Condition 4.6 is made. Testing shall be conducted while the unit is operated under the condition/conditions defined in a Department approved test protocol.
5.3.16	Records of the VOC concentration to be less than 500 ppmv at the hotwell. Records consist of an initial test unless a feedstock change requires additional testing.	Reserved.
5.3.17	Compliance with the hotwell maintaining a TRE index value greater than 1.0 without the use of VOC emission control devices shall keep the following records:	Reserved.
5.3.17.1	Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal or addition	(deleted)

Table 1: Amendment 4 Changes to APC-2016/0068-CONSTRUCTION

Condition	Existing Wording	New Wording
	of recovery equipment or a distillation unit;	
5.3.17.2	Any recalculation of the TRE index value performed pursuant to Condition 4.16; and	(deleted)
5.3.17.3	The results of any performance test performed pursuant to the methods and procedures required by §60.664(e).	(deleted)
Changes related to the T-330 Vent Scrubber made in accordance with Paragraph 16 of the Settlement Agreement:		
3.4	The 30,000 gallon ethylene oxide tanks' scrubber shall be designed and operated to reduce inlet VOC emissions by 95 percent or greater.	The 30,000 gallon ethylene oxide tanks' scrubber shall be designed and operated to reduce inlet VOC emissions by 99 percent or greater.
Changes related to the T-330 Vent Scrubber made in accordance with Paragraph 20 of the Settlement Agreement:		
2.3.1	Volatile Organic Compound (VOC) Emissions VOC emissions shall not exceed 0.58 tons per twelve (12) month rolling period.	Volatile Organic Compound (VOC) Emissions VOC emissions shall not exceed 0.024 tons/month and 0.29 tons per twelve (12) month rolling period.
Changes related to the T-330 Vent Scrubber made in accordance with Paragraph 24 of the Settlement Agreement:		
3.5.1	(new)	The closed vent system and scrubber parameters shall be set based on the last passing performance test. Parameters shall include, but are not limited to, scrubber water flow rate and vent gas flow rate.
3.5.2	(new)	The scrubber shall be in operation whenever any vent gas is present.
Changes related to the B-1210 Ethanol Dehydration Furnace made in accordance with Paragraph 28 of the Settlement Agreement and Permit Application:		
2.1.1	Carbon Monoxide (CO) Emissions CO emissions shall not exceed 0.46 pounds per hour and 2.0 tons per twelve (12) month rolling period.	Carbon Monoxide (CO) Emissions CO emissions shall not exceed 1.0 pounds per hour and 4.5 tons per twelve (12) month rolling period.
2.1.2	Nitrogen Oxides (NOx) Emissions NOx emissions shall not exceed 0.33 pounds per hour and 1.4 tons per twelve (12) month rolling period.	Nitrogen Oxides (NOx) Emissions NOx emissions shall not exceed 0.74 pounds per hour and 3.2 tons per twelve (12) month rolling period.
2.1.3	Sulfur Dioxide (SO2) Emissions SO2 emissions shall not exceed 0.014 tons per twelve (12) month rolling period.	Sulfur Dioxide (SO2) Emissions SO2 emissions shall not exceed 0.0073 pounds per hour and 0.29 tons per twelve (12) month rolling period.

Table 1: Amendment 4 Changes to APC-2016/0068-CONSTRUCTION

Condition	Existing Wording	New Wording
2.1.4.1	VOC emissions shall not exceed 1.0 pounds per hour and 4.5 tons per twelve (12) month rolling period.	VOC emissions shall not exceed 1.3 pounds per hour and 5.7 tons per twelve (12) month rolling period.
2.1.5	Particulate Matter (PM10) Emissions PM10 emissions shall not exceed 0.04 pounds per hour and 0.18 tons per twelve (12) month rolling period.	Particulate Matter (PM10) Emissions PM10 emissions shall not exceed 0.093 pounds per hour and 0.41 tons per twelve (12) month rolling period.
Changes related to the ethylene purification column made in accordance with the letter from March 5, 2018:		
3.17	The ethylene purification column shall vent to Boiler 5 during start-ups and extended shutdowns.	Reserved.

Technical Discussion

During the permit application process for the EO Plant, some supplementary information provided both "normal" emissions values and "design" emissions values. The construction permit, through amendment 3, has been based on the "normal" emissions values. These values do not take into account the conditions experienced at the end of the EO catalyst life. This error has been identified, and in order to correct it in this Amendment 4, an evaluation of AERSCREEN modeling is necessary for the increased limits.

AERSCREEN Modeling

The effects of air contaminant emissions from the operation of the B-1210 Ethanol Dehydration Furnace (EDF) on the public health, safety, and welfare were assessed using Department criteria. The criteria assume no adverse effect when the ratio of the Threshold Limit Value to the Maximum Downwind Concentration (TLV:MDC) is at least 100:1 at the nearest property line and beyond for each air contaminant released. The TLV of each air contaminant was obtained from the 2020 TLVs® and BEIs®, published by the American Conference of Governmental Industrial Hygienists (ACGIH). The MDC of each air contaminant was computed using AERSCREEN air dispersion modeling. AERSCREEN is EPA's recommended screening-level air quality model based on AERMOD.

AERSCREEN is an interactive command-prompt application that interfaces with MAKEMET for generating the meteorological matrix, but also interfaces with AERMAP and BPIPPRM to automate the processing of terrain and building information, and interfaces with AERMOD model utilizing the SCREEN option to perform the modeling runs. The AERSCREEN program also includes averaging time factors for worst-case 3-hr, 8-hr, 24-hr and annual averages.

In utilizing AERSCREEN, the EDF was treated as a point source. Point source variables in AERSCREEN are air contaminant emission rates (in lb/hr), stack height (in ft), stack inside diameter (in inches), stack gas exit velocity (in ft/s) or air flow rate (in acfm), plume exit temperature (in °F), and the urban/rural land use options. The variables used are shown in the Table 2 below.

Table 2: AERSCREEN Point Source Variables for the Ethanol Dehydration Furnace

Parameter	EDF
Emission Rate (lb/hr)[1]	1
Stack Height (ft)	85
Stack Inner Diameter (in)	47.04
Plume Exit Temperature (°F)	750
Stack Air Flow Rate (ACFM)	10207
Land Use	Rural
Minimum Distance to Ambient (ft)	140
$MDC_{8\text{-}hr}$ ($\mu g/m^3$):	2.312

[1] – AERSCREEN was run at an emission rate of 1 lb/hr, and this result used to compute a value for each contaminant

Using the $MDC_{8\text{-}hr}$ value computed for 1 lb/hr, the $MDC_{8\text{-}hr}$ for each pollutant and then the TLV:MDC ratio were computed and are shown in Table 3.

Table 3: Ethanol Dehydration Furnace TLV:MDC Evaluation

Pollutant	TLV_{TWA} (mg/m^3)	Emission Rate (lb/hr)	$MDC_{8\text{-}hr}$ ($\mu g/m^3$)[1]	TLV:MDC
CO	28.64	1.0	2.31	12,387
NO_X (as NO_2)	0.38	0.74	1.71	222
SO_2	0.66[2]	0.0073	0.017	39,105
VOC (as benzene)	1.6	1.3	3.01	532
PM_{10}	10	0.093	0.22	46,508

[1] – Sample Calculation: ($MDC_{8\text{-}hr}$ @ 1 lb/hr) * (Emission Rate)
[2] – The TLV value available for SO_2 is a Short Term Exposure Limit (STEL)

AERSCREEN predicts that the MDC for these pollutants will occur 128 feet from the stack of the EDC, with the distance to the nearest property line being 140 feet. The TLV:MDC ratios at this distance are greater than 100:1 criteria established by the Department. As such, public health, safety and welfare are presumed to not be adversely impacted by these emissions.

RECOMMENDATIONS

I recommend that the attached Draft/Proposed Permit be advertised on May 30, 2021, with notice of a Public Hearing (as per the Office of the Secretary's request) on June 29, 2021, the attached letter and Draft/Proposed Permit be sent to the facility, this technical memorandum and the Draft/Proposed Permit be emailed to the EPA, and Section A and Section B be emailed to the affected states.

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pc: Dover Title V File
Joanna L. French, P.E.
Eric S. Rowland