

MEMORANDUM

TO: Amy S. Mann, P.E. *ASM*
THROUGH: Olayiwola I. Okesola, P.E. *O.O.*
FROM: Eric S. Rowland *ESR*
**SUBJECT: Croda Inc.
Atlas Point
Draft Permit: APC-2023/0041-CONSTRUCTION (NSPS) (FE)
Two (2) 650 hp Clarke Fire Pumps**

DATE: October 20, 2023

BACKGROUND INFORMATION

In an application dated December 19, 2022, Croda Inc. (Croda, the Company, or the Facility) requested a Construction Permit for the installation of two (2) 650 hp Clarke Fire Pumps. The fire pumps are associated with the construction of a new water tank for fire suppression use.

Croda Inc. manufactures chemical products and surfactants in various reactors, kettles, autoclaves, and other vessels. The Facility currently operates under a Title V permit, **Permit: APC-003/00058-Renewal (03) Revision (07)**, dated April 19, 2023, is a major source of Nitrogen Oxides (NO_x) and Carbon Dioxide (CO₂), and is a synthetic minor source of volatile organic compounds (VOCs) and Hazardous Air Pollutants (HAPs). In addition, the Facility was previously subject to a Plantwide Applicability Limit (PAL) for NO_x of 54 tons per year (TPY) via **Permit: APC-2012/0120-OPERATION(PAL)(FE)** issued June 25, 2012. This PAL permit was not renewed, and Croda has recently submitted a request (dated September 7, 2023, received September 11, 2023) to cancel the permit and reallocate the allowed emissions amongst the covered emission units. The emission units at the Atlas Point Facility are listed in Table 1.

Table 1: Atlas Point Emission Units

| Emission Unit (EU) # or Designation | Emission Unit Description |
|--|---|
| EU 108 | Boiler No. 5 – 84 MMBTU/hr heat input, fired on landfill gas, natural gas, and No. 2 fuel oil |
| EU 105 | Temporary Boiler – fired on natural gas and No. 2 fuel oil |
| EU 3 EU 4 | Blend Tank Area – two blend tanks, vented to the atmosphere |
| EU 13 | 3A and 4 Autoclave Hotwell – vented to atmosphere |
| EU 14 | 3A and 4 Autoclave Deodorizer Hotwell – vented to atmosphere |
| EU 15 | 4 Kettle Fume Spray Condenser – 22 scfm |
| EU 16 | 5 Autoclave Scrubber (Croll Reynolds) – 45 gpm, 14 scfm |
| EU 18 | 5 Autoclave Fume & Dust Scrubber (Croll Reynolds) – 15 gpm, 835 scfm |
| EU 19 | 5 Autoclave Deodorizer Hotwell – vented to atmosphere |
| EU 20 | 7 Kettle Spray Condenser – 105 gpm, 2100 scfm |
| EU 23 | EO/PO Storage Area Scrubber (Croll Reynolds) – 1 gpm, 100 scfm |
| EU 26 | 6 Autoclave Scrubber (Croll Reynolds)- 38 gpm, 106 scfm |
| EU 31 EU 32 | Unloading Station Tanks |

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| Emission Unit (EU) # or Designation | Emission Unit Description |
|--|---|
| EU 33 EU 34 EU 35 | |
| MP1EU 1 | Multipurpose Plant R-3100 Reactor Condenser (Yula) – 140 °F vent discharge |
| MP1EU 2 | Multipurpose Plant R-3200 Reactor Condenser Vent (Rubicon Industries) – 140 °F vent discharge |
| MP1EU 3 | Multipurpose Plant R-3300 Reactor Condenser Vent (Rubicon Industries) – 100 °F vent discharge |
| MP1EU 4 | Multipurpose Plant R-3400 Reactor Condenser Vent (Rubicon Industries) – 140 °F vent discharge |
| MP1INV 15 | Multipurpose Plant Solid Mix Tank – vented to atmosphere |
| MP1INV 18 MP1INV 19 MP1INV 20 | Multipurpose Plant Vacuum Pumps – vented to atmosphere |
| MP1EU 21 | Laminar Flow Booth – vented to atmosphere |
| 28-7000 28-7001 28-7002 28-7004 28-7010 28-7011 28-7013 28-7015 28-7016 18-7067 | Tank Farm |
| INV270 INV271 INV272 INV273 | No. 2 Fuel Oil Fired Emergency Generators – INV270: Main Guardhouse, INV271: Flammable Warehouse, INV272: IT Generator, & INV273: EO/PO |
| EU 106 EU 107 | Two 1100 KW landfill gas fired distributed generators |
| EU 504 | Ethanol Dehydration Furnace, 12.47 MMBTU/hr, fired on natural gas and landfill gas |
| EU 505 | Carbonate Regenerator, process CO ₂ recovery unit |
| CD 505 | Catalytic Combustion Unit, 0.81 MMBTU/hr, fired on natural gas |
| EU 506 | Ethylene Oxide Storage Tank, 30,000 gallons |
| EU 507 | Ethylene Oxide Storage Tank, 30,000 gallons |
| CD 506 | Scrubber, ethylene oxide emissions from storage tanks |
| EU 508 | Ethyl Chloride Chemical Addition Pot |
| T-1290 | Ethylene Purification Column (start-up and extended shutdown) |
| | 300 kW Emergency Generator, fired on No. 2 fuel oil |
| | Two (2) 350 HP Fire Pumps 1 & 2, one (1) existing 235 HP Fire Pump, all fired on No. 2 fuel oil |
| | Lab Hoods |
| D-1410A | Ethanol Storage Tank #1, vertical fixed roof, 50,000 gallons |

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| Emission Unit (EU) # or Designation | Emission Unit Description |
|--|--|
| D-1410B | Ethanol Storage Tank #2, vertical fixed roof, 50,000 gallons |
| F-1203 | Ethanol Blowdown Tank, vertical fixed roof, 10,000 gallons |
| G-336 | Anti-foam Tank |
| F-615 | Crude Ethylene Glycol Tank, 5,000 gallons |
| D-620A D-620B | Two (2) Glycol Product Receiver Tanks |
| D-630 | Heavy Glycol Tank |
| F-1261 | Propylene Glycol Tank, 200 gallons |
| F-1430 | Propylene Glycol Tank, 1,000 gallons |
| F-651 | MEG Product Storage Tank |
| | 2.108 MW Combined Heat and Power Distributed Generator |
| | 99.9 mmBtu LimitedTerm Boiler |

The facility is subject to the requirements of §112(r) of the 1990 Clean Air Act Amendments. The facility has registered in compliance with 7 DE Admin. Code 1201 "Accidental Release Prevention Regulation." Title VI requirements 40 CFR, Part 82, Subparts A, E, F, and G (labeling and recordkeeping for products using ozone-depleting substances) are applicable.

The fire pumps do not trigger major source status for NSR, PSD, or Air Toxics. The facility wide PTE is shown in Table 2.

Table 2: Facility Potential to Emit (PTE)¹

| Pollutant | Facility Wide PTE (tons/year) | Major Source Threshold (tons/year) |
|---|--|---|
| Nitrogen Oxides (NO _x) | 109.4 | 25 |
| Volatile Organic Compounds (VOCs) | 31.8 | 25 |
| Carbon Monoxide (CO) | 48.1 | 100 |
| Particulate Matter (PM) | 9.6 | 100 |
| Particulate Matter Less Than 10 Microns (PM ₁₀) | 9.6 | 100 |
| Particulate Matter Less Than 2.5 Microns (PM _{2.5}) | 9.6 | 25 |
| Sulfur Dioxide (SO ₂) | 20.7 | 100 |
| Lead | n/a | 10 |
| Carbon Dioxide Equivalent (CO _{2e}) | 115,153 | 100,000 |
| Other (EO) | 1.2 | 10 |
| Other (PO) | 0.6 | 10 |

¹ – Facility PTE based off of PTE table provided by Croda dated April 16, 2020.

The facility is a major source for NO_x and CO_{2e}. They have requested limits and are a synthetic minor source for VOC and HAPs. The permit will be advertised for 30 days and will be incorporated into the Title V permit.

The Company has not requested confidentiality.

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The Company is located within the Coastal Zone. The project has been evaluated by DNREC’s Division of Climate, Coastal and Energy, and found to fall under the category of “Uses Not Regulated”.

The Company is current with their annual fees and has paid appropriate construction application fees.

The property is zoned HI (Heavy Industry). The Company has brought this project to the attention of New Castle County’s (NCC) Department of Land Use in application number 2022-0298-S. NCC has determined that the project does not appear to be an expansion of the nonconforming use, and therefore does not require a Special Use Permit.

The Facility is located in a Limited English neighborhood. The legal notice will be translated to Spanish. The facility is located near an Equity Focus area. Enhanced outreach regarding the permitting action will be conducted by the Facility.

TECHNICAL INFORMATION

The fire pumps (2) are powered by 650 hp engines from Clarke, model C18H0-UFAD58. The engines are powered on No. 2 fuel oil.

Potential to Emit / Permitted Emissions

The potential to emit (PTE) was calculated based on the emissions factors provided to the Division of Air Quality (DAQ) in the application dated December 19, 2022, as well as from the Environmental Protection Agency’s (EPA) AP-42 Compilation of Air Emission Factors. The PTE was calculated for a period of 500 hours per year due to the emergency use of the equipment.

Table 3: Fire Pump Potential to Emit (PTE) for a Single Fire Pump

| Pollutant | Emission Factor | EF Units | EF Source | Emission Rate (lb/hr) | PTE (TPY) |
|------------------|------------------------|-----------------|------------------|------------------------------|------------------|
| NO _x | 2.63 | g/hp*hr | 1 | 3.769 | 0.942 |
| CO | 0.83 | g/hp*hr | 1 | 1.189 | 0.297 |
| PM (TPM or PT) | 0.085 | g/hp*hr | 1 | 0.122 | 0.030 |
| HC | 0.06 | g/hp*hr | 1 | 0.086 | 0.021 |
| SO ₂ | 1.21E-05 | lb/hp*hr | 2 | 0.008 | 0.002 |

Emission Factor (EF) Source

1 – Manufacturer Data

2 – AP-42, Table 3.4-1

The calculations in the application utilized an emission factor for SO₂ from Section 3.3.1 of AP-42 for Gasoline and Diesel Industrial Engines. Section 3.3.1 states, “The rated power of these engines covers a rather substantial range, up to 250 horsepower (hp) for gasoline engines and up to 600 hp for diesel engines. (Diesel engines greater than 600 hp are covered in Section 3.4, “Large Stationary Diesel and All Stationary Dual-fuel Engines”.)” Given that these fire pumps utilize a 650 hp diesel engine, the emission factor for SO₂ found in Section 3.4 was considered more suitable and is therefore shown in Table 3 above. Estimates using this emission factor from Table 3.4-1 show significantly lower SO₂ emissions than the emission factor from Table 3.3-1.

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Table 4 shows the modified requested permitted emissions values for a single fire pump and for both fire pumps together.

Table 4: Fire Pumps (2) Requested Permitted Emissions

| Pollutant | Permitted Emissions 1 Fire Pump (TPY) | Permitted Emissions Both Fire Pumps (TPY) |
|------------------|--|--|
| NO _x | 0.942 | 1.88 |
| CO | 0.30 | 0.59 |
| PM (TPM or PT) | 0.030 | 0.061 |
| PM ₁₀ | 0.030 | 0.061 |
| VOC | 0.02 | 0.04 |
| SO ₂ | 0.002 | 0.004 |

New Source Review (NSR) / Prevention of Significant Deterioration (PSD)

An NSR/PSD applicability determination was considered in the case of the 650 hp fire pumps and the addition of a 110 MMBtu/hr boiler. The information can be found in the memorandum for the 100 MMBtu/hr boiler, document esr23014.docx. Please note that these two permitting actions will be covered under the same legal notice and public hearing, and all documents will be shared concurrently.

Significant Impact Levels (SILs) & AERSCREEN Modeling

The effects of air contaminant emissions from the operation of the fire pumps (2) on the public health, safety, and welfare were assessed using Department criteria. The criteria assume no adverse effect when the Maximum Downwind Concentration (MDC) is less than the significant impact level (SIL) for each air contaminant emitted and over each applicable averaging period. For reference the SIL is “the level of ambient impact below which the EPA considers a source to have an insignificant effect on ambient air quality.” The current pollutant-specific SILs along with their respective averaging periods are summarized in Table 5 below.

Table 5: Significant Impact Levels for Pollutants of Interest

| Pollutant | Averaging Time | Source | Significant Impact Level (µg/m³) |
|-------------------|-----------------------|---------------|--|
| CO | 1-hour | 1 | 2,000 |
| | 8-hour | 1 | 500 |
| NO ₂ | 1-hour | 2 | 7.5 |
| | Annual | 1 | 1.0 |
| SO ₂ | 1-hour | 3 | 7.9 |
| | 3-hour | 1 | 25 |
| | 24-hour | 1 | 5 |
| | Annual | 1 | 1.0 |
| PM ₁₀ | 24-hour | 1 | 5.0 |
| | Annual | 1 | 1.0 |
| PM _{2.5} | 24-hour | 1 | 1.2 |

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|------------|--------|---|---------|
| | Annual | 1 | 0.3 |
| Air Toxics | 8-hour | 4 | TLV/100 |

1 – 40 CFR 51.165(b)(2)

2 – <https://www.epa.gov/sites/production/files/2015-07/documents/appwno2.pdf>

3 – <https://www.epa.gov/sites/default/files/2015-07/documents/appwso2.pdf>

4 – DNREC DAQ Internal Criteria

According to the EPA’s 2018 Guidance on SILs, the EPA believes there is a valid analytical and legal basis in most cases for the permitting authority to conclude that the proposed source will not cause or contribute to a violation of a National Ambient Air Quality Standard (NAAQS) only after a permit applicant has shown through air quality modeling that the projected air quality impact from a proposed source for a particular pollutant is not significant or meaningful. In order to show that the proposed source will not have a significant or meaningful impact on air quality, the Department has elected to use these SIL values as a compliance demonstration tool.

In the case where a pollutant-specific SIL was not available, threshold limit values (TLVs) for pollutants were obtained from the *2020 TLVs and BEIs* publication from the American Conference of Governmental Industrial Hygienists (ACGIH). When compared against TLVs, the MDC must be at a level no greater than 100 times less than the published TLV in order to demonstrate that public health and safety is protected.

According to the December 19, 1980 [letter](#) by EPA’s Administrator Douglas Costle to Senator Jennings Randolph:

"...the exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers."

The Division of Air Quality’s Model Application Guidance document includes the following interpretation:

"Based on this definition, if general public access is effectively precluded by a fence or other physical barriers, the facility is assumed to be controlled and public access effectively precluded, and the ambient air boundary can be set at where the fence line or other physical barriers are located."

(See also the December 2, 2019, [Revised Policy on Exclusions from "Ambient Air"](#) by Andrew Wheeler, EPA Administrator.)

In each case, the MDC of the air contaminant is 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 the 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 two (2) fire pumps were first treated as an individual point source, and then treated as a combined 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

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flow rate (in acfm), plume exit temperature (in °F), and the urban/rural land use options. The variables used are shown in the Table 6 below.

Table 6: AERSCREEN Point Source Variables for the Fire Pumps (2)

| Parameter | Single Fire Pump | Both Fire Pumps |
|---|------------------|-----------------|
| Emission Rate (lb/hr) ¹ | 1 | 1 |
| Stack Height (ft) | 16.7 | 16.7 |
| Stack Inner Diameter (in) ² | 8 | 11.3 |
| Stack Direction | Horizontal | Horizontal |
| Stack Cap | No | No |
| Plume Exit Temperature (°F) | 989 | 989 |
| Stack Air Flow Rate (ACFM) | 3,910 | 7,820 |
| Land Use | Rural | Rural |
| Population Estimate | n/a | n/a |
| Minimum Distance to Ambient (ft) ³ | 170 | 170 |
| MDC _{1-hr} (µg/m ³): | 21.53 | 16.71 |
| MDC _{3-hr} (µg/m ³): | 21.53 | 16.71 |
| MDC _{8-hr} (µg/m ³): | 19.38 | 15.04 |
| MDC _{24-hr} (µg/m ³): | 12.92 | 10.03 |
| MDC _{Annual} (µg/m ³): | 2.153 | 1.671 |

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

² – Both pumps operating together was modeled as a single point source with a stack inner diameter yielding an equal area to two (2) 8” diameter stacks.

³ – The worst case (closest) minimum distance to ambient of 170 ft (versus 188 ft) was used in all calculations.

In considering the fire pumps operating together as a single point source, an equivalent stack inner diameter was calculated which would have the same area as the two individual stacks combined.

Using the MDC values computed for 1 lb/hr, the MDC values for each pollutant were computed and compared to the applicable Significant Impact Level (SIL). For the purposes of modeling, all PM was assumed to be PM_{2.5} (and in turn, PM₁₀). The results for a single fire pump operating are shown in Table 7, and the results for both fire pumps operating are shown in Table 8.

Table 7: Comparison of Calculated MDC Values versus Significant Impact Levels For Operation of a Single Fire Pump

| Pollutant | Emission Rate (lb/hr) | Averaging Period | MDC (µg/m ³) ¹ | SIL (µg/m ³) | MDC<SIL? |
|-----------------|-----------------------|------------------|---------------------------------------|--------------------------|----------|
| CO | 1.189 | 1-hour | 25.60 | 2,000 | Yes |
| | | 8-hour | 23.04 | 500 | Yes |
| NO _x | 3.769 | 1-hour | 81.15 | 7.5 | No |
| | | Annual | 8.12 | 1 | No |
| SO ₂ | 0.008 | 1-Hour | 0.17 | 7.8 | Yes |
| | | 3-Hour | 0.17 | 25 | Yes |

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| Pollutant | Emission Rate (lb/hr) | Averaging Period | MDC ($\mu\text{g}/\text{m}^3$)¹ | SIL ($\mu\text{g}/\text{m}^3$) | MDC<SIL? |
|-------------------|------------------------------|-------------------------|--|--|--------------------|
| | | 24-Hour | 0.10 | 5 | Yes |
| | | Annual | 0.017 | 1 | Yes |
| PM ₁₀ | 0.122 | 24-Hour | 1.58 | 5 | Yes |
| PM _{2.5} | 0.122 | 24-Hour | 1.58 | 1.2 | No |
| | | Annual | 0.26 | 0.2 | No |

¹ – Sample Calculation: (MDC @ 1 lb/hr) * (Emission Rate)**Table 8: Comparison of Calculated MDC Values versus Significant Impact Levels For Operation of Both Fire Pumps**

| Pollutant | Emission Rate (lb/hr) | Averaging Period | MDC ($\mu\text{g}/\text{m}^3$)¹ | SIL ($\mu\text{g}/\text{m}^3$) | MDC<SIL? |
|-------------------|------------------------------|-------------------------|--|--|--------------------|
| CO | 2.378 | 1-hour | 39.74 | 2,000 | Yes |
| | | 8-hour | 35.77 | 500 | Yes |
| NO _x | 7.538 | 1-hour | 125.96 | 7.5 | No |
| | | Annual | 12.60 | 1 | No |
| SO ₂ | 0.016 | 1-Hour | 0.27 | 7.8 | Yes |
| | | 3-Hour | 0.27 | 25 | Yes |
| | | 24-Hour | 0.16 | 5 | Yes |
| | | Annual | 0.027 | 1 | Yes |
| PM ₁₀ | 0.244 | 24-Hour | 2.45 | 5 | Yes |
| PM _{2.5} | 0.244 | 24-Hour | 2.45 | 1.2 | No |
| | | Annual | 0.41 | 0.2 | No |

¹ – Sample Calculation: (MDC @ 1 lb/hr) * (Emission Rate)

As the calculated MDC values for CO, SO₂, and PM₁₀ are below the SILs in both cases, no further review is necessary. For NO_x and PM_{2.5} an assessment needs to be performed to ensure that the calculated MDCs, when added to background concentrations, will not exceed the NAAQS Standards. The results of these assessments are shown in Tables 9 and 10.

Table 9: Comparison of Calculated MDC & Background Values versus NAAQS Values For Operation of a Single Fire Pump

| Pollutant | Averaging Period | MDC ($\mu\text{g}/\text{m}^3$) | Background Concentration ($\mu\text{g}/\text{m}^3$) | MDC + Background ($\mu\text{g}/\text{m}^3$) | NAAQS ($\mu\text{g}/\text{m}^3$) | Total < NAAQS? |
|-------------------|-------------------------|--|---|---|--|--------------------------|
| NO _x | 1-hour | 81.15 | 66 | 147.15 | 188 | Yes |
| | Annual | 8.12 | 10.3 | 18.42 | 99.6 | Yes |
| PM _{2.5} | 24-Hour | 1.58 | 19.0 | 20.58 | 35 | Yes |
| | Annual | 0.26 | 7.8 | 8.06 | 12 | Yes |

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Table 10: Comparison of Calculated MDC & Background Values versus NAAQS Values For Operation of Both Fire Pumps

| Pollutant | Averaging Period | MDC (µg/m³) | Background Concentration (µg/m³) | MDC + Background (µg/m³) | NAAQS (µg/m³) | Total < NAAQS? |
|-------------------|-------------------------|-------------------------------|--|--|---------------------------------|--------------------------|
| NO _x | 1-hour | 125.96 | 66 | 191.96 | 188 | No |
| | Annual | 12.60 | 10.6 | 23.2 | 99.6 | Yes |
| PM _{2.5} | 24-Hour | 2.45 | 19.0 | 21.45 | 35 | Yes |
| | Annual | 0.41 | 7.8 | 8.21 | 12 | Yes |

The comparisons show that PM_{2.5} will be below the NAAQS level for both cases. However, NO_x values evaluated at the 1-hour averaging period will be below the NAAQS standard for a single fire pump operating, but above the NAAQS standard for both fire pumps operating together.

The EPA Memorandum by Tyler Fox (Leader, Air Quality Modeling Group) dated March 1, 2011 discusses this topic of intermittent operation. The memorandum discusses an alternate approach for the consideration of emissions based on an average hourly rate rather than a maximum hourly emission. It suggests the use of an Intermittent Emission Rate as follows:

$$\text{Intermittent Emission Rate} = \text{Emission Rate} * \frac{500}{8760}$$

While this memorandum provides clarification of modeling guidance for the 1-hour NO₂ NAAQS, there is no reason that this concept of an intermittent emission rate could not be more broadly applied as required.

In this case, the only failing value is the 1-hour NO_x value, and so that value will be re-evaluated utilizing an intermittent emission rate.

A modified, or intermittent MDC can be found as follows:

$$7.538 \frac{\text{lb NO}_x}{\text{hr}} * \frac{500}{8760} = 0.430 \frac{\text{lb NO}_x}{\text{hr}} * 16.71 \frac{\mu\text{g hr}}{\text{m}^3 \text{ lb}} = 7.19 \frac{\mu\text{g NO}_x}{\text{m}^3}$$

Table 11: Comparison of Calculated MDC & Background Values versus NAAQS Values For Operation of Both Fire Pumps

| Pollutant | Averaging Period | Intermittent MDC (µg/m³) | Background Concentration (µg/m³) | MDC + Background (µg/m³) | NAAQS (µg/m³) | Total < NAAQS? |
|------------------|-------------------------|--|--|--|---------------------------------|--------------------------|
| NO _x | 1-hour | 7.19 | 66 | 73 | 188 | Yes |

Lastly, as there are no Significant Impact Levels (SIL) established for Air Toxics, an evaluation was performed on Volatile Organic Compound (VOC) emissions. The VOC pollutant group does not have an assigned TLV, nor is there a single compound which was identified as a primary concern. In this case, the Department has historically used a value of 29 mg/m³ for analyzing modeling results for the VOC pollutant group. This is shown in Table 12.

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Table 12: TLV:MDC Evaluation of VOC Emissions

| Pollutant | TLV_{TWA} (mg/m³) | Emission Rate (lb/hr) | MDC_{8-hr} (µg/m³)¹ | TLV:MDC |
|-----------------------|---|--------------------------------------|--|----------------|
| VOC (1 fire pump) | 29 | 0.086 | 1.67 | 17,365 |
| VOC (Both fire pumps) | 29 | 0.172 | 2.59 | 11,197 |

¹ – Sample Calculation: (MDC_{8-hr} @ 1 lb/hr) * (Emission Rate)

When calculated via AERSCREEN at 170 feet from the equipment, criteria pollutants are shown to be below the SILs or NAAQs, as shown in Tables 7, 8, 9, 10, and 11. For air toxics, VOC emissions are shown in Table 12 to yield TLV:MDC ratios above the 100:1 requirement for the protection of public health, safety, and welfare.

REGULATORY REVIEW

- ✓ 7 DE Admin. Code 1102: Permits
- ✓ 7 DE Admin. Code 1104: Particulate Emissions from Fuel Burning Equipment
- ✓ 7 DE Admin. Code 1108: Sulfur Dioxide Emissions from Fuel Burning Equipment
- × 7 DE Admin. Code 1112: Control of Nitrogen Oxides Emissions
- ✓ 7 DE Admin. Code 1114: Visible Emissions
- ✓ 7 DE Admin. Code 1119: Control of Odorous Air Contaminants
- × 7 DE Admin. Code 1120: New Source Performance Standards
- × 7 DE Admin. Code 1124: Control of Volatile Organic Compound Emissions
- × 7 DE Admin. Code 1125: Requirements for Preconstruction Review
- × 7 DE Admin. Code 1130: Title V State Operating Permit Program
- × 7 DE Admin. Code 1138: Emission Standards for Hazardous Air Pollutants for Source Categories
- ✓ 40 CFR Part 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- ✓ 40 CFR Part 63 Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

7 DE Admin. Code 1102: Permits

7 DE Admin. Code 1102 Section 2.1 states, "...no person shall initiate construction, install, alter or initiate operation of any equipment or facility or air contaminant control device which will emit or prevent the emission of an air contaminant prior to receiving approval of his application from the Department..."

The equipment described in the application is not exempted in 2.2, and so 7 DE Admin. Code 1102 is applicable.

7 DE Admin. Code 1104: Particulate Emissions from Fuel Burning Equipment

7 DE Admin. Code 1104 Section 1.2 states, "The provisions of this Regulation shall not apply where the heat input capacity of the equipment is less than 1,000,000 BTU per hour."

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$$650 \text{ hp} * \frac{2509.625 \frac{\text{BTU}}{\text{hr}}}{\text{hp}} = 1,631,256 \frac{\text{BTU}}{\text{hr}}$$

As the BTU/hr of each fire pump is greater than 1,000,000, the provisions of this regulation apply.

7 DE Admin. Code 1104 Section 2.1 states, "No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum two-hour average, from any fuel burning equipment."

$$\frac{0.122 \frac{\text{lb}}{\text{hr}} \text{ PM}}{1,631,256 \frac{\text{BTU}}{\text{hr}} * \frac{1 \text{ mmBTU}}{1,000,000 \text{ BTU}}} = 0.075 \frac{\text{lb PM}}{\text{mmBTU}}$$

The fire pumps comply with the 0.3 pounds per million BTU heat input limit of Section 2.1.

7 DE Admin. Code 1108: Sulfur Dioxide Emissions from Fuel Burning Equipment

7 DE Admin. Code 1108 Section 2.3 states, "On and after July 1, 2016, no person shall offer for sale, sell, deliver, or purchase any fuel having a sulfur content greater than the limits specified in 2.3.1 through 2.3.3 of this regulation, when such fuel is intended for use in any fuel burning equipment in Delaware, and no person shall use any fuel having a sulfur content greater than the limits specified in 2.3.1 through 2.3.3 of this regulation in any fuel burning equipment in Delaware."

7 DE Admin. Code 1108 Section 2.3.1 states, "For a distillate fuel, except as provided for in 2.4 of this regulation, 15 ppm by weight;"

7 DE Admin Code 1108 Section 4.2 states, "Sulfur concentrations of residual fuels and distillate fuels shall be determined by the following method:

- 4.2.1 The standard ASTM method D2622-10 "Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry," or
- 4.2.2 Any alternative method specified in Title 40, Code of Federal Regulations, Part 80, Section 580 (July 2012 edition), or
- 4.2.3 Any alternative method approved by the Department and the EPA."

7 DE Admin Code 1108 Section 5.1 through 5.1.4.3 state, "Three (3) months after this revision of this regulation becomes effective, any person subject to 2.0 of this regulation, when selling or delivering any fuel oil to be used in Delaware (i.e., the transferor), shall provide to the person receiving the fuel oil (i.e., the transferee) an electronic or paper record that contains the following information:

- 5.1.1 Name, address and telephone number of the transferor.
- 5.1.2 Name, address and telephone number of the transferee, and the address where the fuel oil is delivered.
- 5.1.3 The volume of fuel being sold or delivered, and the date of sale or delivery.
- 5.1.4 The type of fuel, and the sulfur content of the fuel as a delivered product, determined pursuant to 4.3, 4.4, or 4.5 of this regulation, as applicable, and expressed as one of the following:

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5.1.4.1 The actual sulfur content in ppm or percent (%) by weight, or
5.1.4.2 A statement that certifies the sulfur content of the shipment is equal to or below the applicable limit specified in 2.0 of this regulation, or
5.1.4.3 Except for a sale or delivery to an ultimate consumer, a product code or product description that identifies the sulfur content of the shipment as equal to or below the applicable limit specified in 2.0 of this regulation, provided such code or description is standardized throughout the distribution system in which it is used, and each downstream party is given sufficient information to know its full meaning.”

7 DE Admin. Code 1108 Section 5.4 states, “For any transferee subject to requirements of a permit issued pursuant to 7 DE Admin. Code 1102, the records established pursuant to 5.1 of this regulation shall be maintained by the transferee for a minimum period of two (2) years from the date the record was generated.”

Sections 2.3 and 2.3.1 set limits on the sulfur content of the fuel oil used by the fire pumps, Section 4.2 defines the testing method to be used, while Section 5.4 requires recordkeeping of the information that Section 5.1 requires the seller or deliverer to provide to the Company. These requirements have been included in the permit.

7 DE Admin. Code 1112: Control of Nitrogen Oxides Emissions

7 DE Admin. Code 1112 Section 1.0 states, “Except, as provided in 4.0 of this regulation, the provisions of this regulation are applicable to major stationary sources of nitrogen oxides (NO_x).

While the Company is a major source of nitrogen oxides, Section 1.0 is referring to a major stationary source in terms of the described equipment. The fire pumps (2) are not major sources of nitrogen oxides, and therefore Regulation 1112 is not applicable.

7 DE Admin. Code 1114: Visible Emissions

7 DE Admin. Code 1114 Section 2.0 states, “No person shall cause or allow the emission of visible air contaminants or smoke from a stationary or mobile source, the shade or appearance of which is greater than 20% opacity for an aggregate of more than three minutes in any one hour or more than 15 minutes in any 24 hour period.” and is applicable to the described equipment.

This condition has been included in the permit.

7 DE Admin. Code 1119: Control of Odorous Air Contaminants

7 DE Admin. Code 1119 Section 2.0 states, “No person shall cause or allow the emission of an odorous air contaminant such as to cause a condition of air pollution.”

This condition has been included as a state enforceable condition of the permit.

7 DE Admin. Code 1120: New Source Performance Standards

The described equipment is not covered by any of the listed source types.

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7 DE Admin. Code 1124: Control of Volatile Organic Compound Emissions

7 DE Admin. Code 1124 is not applicable to the described equipment as it does not emit more than 15 pounds of volatile organic compounds (VOC) per day.

7 DE Admin. Code 1125: Requirements for Preconstruction Review

7 DE Admin. Code 1125 Section 2.1 states, "Applicability - The provisions of Section 2.0 of this regulation shall apply to any person responsible for any proposed new major stationary source or any proposed major modification." While the facility is a major source for NO_x, the described equipment (source) is not. A facility wide netting analysis was considered in the case of the 650 hp fire pumps and the addition of a 110 MMBtu/hr boiler. The information can be found in the memorandum for the 100 MMBtu/hr boiler, document esr23014.docx. Please note that these two permitting actions will be covered under the same legal notice and public hearing, and all documents will be shared concurrently.

Section 2 is not applicable to the described equipment or the facility as a result of its addition.

While the facility is a major source for NO_x, the described equipment does not meet the definition of a Major Stationary Source shown in 7 DE Admin. Code 1125 Section 3.1. A facility wide netting analysis was considered in the case of the 650 hp fire pumps and the addition of a 110 MMBtu/hr boiler. The information can be found in the memorandum for the 100 MMBtu/hr boiler, document esr23014.docx. Please note that these two permitting actions will be covered under the same legal notice and public hearing, and all documents will be shared concurrently.

Section 3 is not applicable to the described equipment or the facility as a result of its addition.

7 DE Admin. Code 1125 Section 4.4 states in part, "has a potential to emit of equal to or greater than five tons per year of volatile organic compounds (VOC's) or, nitrogen oxides (NO_x), or sulfur dioxide (SO₂) or sulfur trioxide (SO₃) or both [also termed sulfur oxides (SO_x)] or, fine particulate matter (PM_{2.5}), or, the potential to emit of equal to or greater than five tons per year, in the aggregate, of any of the hazardous air pollutants (HAP's) listed in Section 112(b) of the federal Clean Air Act."

The described equipment does not have the potential to emit greater than 5 tons per year of these compounds. Therefore, Section 4 is not applicable to the described equipment.

7 DE Admin. Code 1130: Title V State Operating Permit Program

7 DE Admin. Code 1130 Sections 3.1 through 3.1.5 state, "Covered Sources. Except as exempted from the requirement to obtain a permit under 3.2 of this regulation and elsewhere herein, the following sources are subject to the permitting requirements under this regulation:

3.1.1 Any major source;

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3.1.2 Any source, including an area source, subject to a standard, limitation, or other requirement under Section 111 (Standards of Performance for New Stationary Sources) of the Act;

3.1.3 Any source, including an area source, subject to a standard or other requirement under section 112 (National Emissions Standards for Hazardous Air Pollutants) of the Act, except that a source is not required to obtain a permit solely because it is subject to regulations or requirements under section 112(r) of the Act;

3.1.4 Any affected source; and

3.1.5 Any source that is subject to applicable requirements.”

The source (facility) is a major source and currently holds a Title V permit. The fire pumps do trigger Section 3.1.2, but are subsequently exempted by Section 3.2.1. The construction permit will be issued as a Federally Enforceable Regulation 1102 permit in accordance with 7 DE Admin. Code 1102 Section 12.4. Upon construction of the fire pumps, the terms will be incorporated into the Title V permit via the administrative amendment process in accordance with 7 DE Admin. Code 1130 Section 7.4.1.5.

7 DE Admin. Code 1138: Emission Standards for Hazardous Air Pollutants for Source Categories

The described equipment is not covered by any of the listed source categories.

40 CFR Part 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

§ 60.4200 Paragraph (a) states, “The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.”

§ 60.4200 Paragraph (a)(2) states, “Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:”

§ 60.4200 Paragraph (a)(2)(ii) states, “Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.”

§ 60.4200 Paragraph (a)(4) states, “The provisions of § 60.4208 of this subpart are applicable to all owners and operators of stationary CI ICE that commence construction after July 11, 2005.”

As the fire pumps are of new construction and their manufacture is after July 11, 2005 and July 1, 2006, the fire pumps are subject to this subpart.

§ 60.4205 Paragraph (c) states, “Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.”

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**Table 4 to Subpart IIII of Part 60
Emission Standards for Stationary Fire Pump Engines (Excerpt)**

| Maximum engine power | Model year(s) | NMHC + NO _x | CO | PM |
|-------------------------|---------------|------------------------|----|-------------|
| 450≤KW≤560 (600≤HP≤750) | 2009+ | 4.0 (3.0) | | 0.20 (0.15) |

§ 60.4206 states, "Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§ 60.4204 and 60.4205 over the entire life of the engine."

This condition has been included in the permit.

§ 60.4207 Paragraph (b) states, "Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 1090.305 for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted."

40 CFR 1090.305 states, "ULSD standards.

(a) Overview. Except as specified in § 1090.300(a), diesel fuel must meet the ULSD per-gallon standards of this section.

(b) Sulfur standard. Maximum sulfur content of 15 ppm.

(c) Cetane index or aromatic content. Diesel fuel must meet one of the following standards:

(1) Minimum cetane index of 40.

(2) Maximum aromatic content of 35 volume percent.

The requirements of § 60.4207 and 40 CFR 1090.305 have been included in the permit.

§ 60.4211 Paragraph (a) states, "If you are an owner or operator and must comply with the emission standards specified in this subpart, you must do all of the following, except as permitted under paragraph (g) of this section:

(1) Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;

(2) Change only those emission-related settings that are permitted by the manufacturer; and

(3) Meet the requirements of 40 CFR part 1068, as they apply to you."

§ 60.4211 Paragraph (c) states, "If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in § 60.4204(b) or § 60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in § 60.4205(c), you must comply by purchasing an engine certified to the emission standards in § 60.4204(b), or § 60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph (g) of this section."

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§ 60.4211 Paragraph (f) states, "If you own or operate an emergency stationary ICE, you must operate the emergency stationary ICE according to the requirements in paragraphs (f)(1) through (3) of this section. In order for the engine to be considered an emergency stationary ICE under this subpart, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (3), is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (3), the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines."

- (1) There is no time limit on the use of emergency stationary ICE in emergency situations.
- (2) You may operate your emergency stationary ICE for the purpose specified in paragraph (f)(2)(i) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (f)(3) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).
 - (i) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year."
- (3) Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in paragraph (f)(2) of this section. Except as provided in paragraph (f)(3)(i) of this section, the 50 hours per calendar year for nonemergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

§ 60.4211 Paragraph (g) states, "If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must demonstrate compliance as follows:

- (3) If you are an owner or operator of a stationary CI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer. You must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards."

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The applicable requirements of § 60.4211 as shown above have been included in the permit.

§ 60.4214 Paragraph (b) states, "If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time."

**Table 5 to Subpart IIII of Part 60
Labeling and Recordkeeping Requirements for New Stationary Emergency Engines
(Excerpt)**

| | |
|-----------------|---------------------|
| Engine power | Starting model year |
| KW≥130 (HP≥175) | 2011 |

The requirements of § 60.4214 have been included in the permit.

40 CFR Part 63 Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

§ 63.6585 states, "You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand."

§ 63.6585 Paragraph (a) states, "A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition."

§ 63.6585 Paragraph (c) states, "An area source of HAP emissions is a source that is not a major source."

The fire pumps (2) are subject to this subpart.

§ 63.6590 Paragraph (a) states, "Affected source. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand."

(2) New stationary RICE.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

§ 63.6590 Paragraph (c) states, "Stationary RICE subject to Regulations under 40 CFR Part 60. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for

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compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.”

(1) A new or reconstructed stationary RICE located at an area source;

The fire pumps (2) are affected sources in accordance with § 63.6590. However, no further requirements apply as long as the fire pumps (2) meet the requirements of 40 CFR Part 60 Subpart IIII.

RECOMMENDATIONS

It is recommended that the attached Draft Permit be advertised and sent to EPA and affected states pursuant to the requirements of 7 DE Admin. Code 1102 Section 12.4 on October 29, 2023.

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