

Permit Amendment Source Analysis & Technical Review

| | | | |
|------------------|---|---------------------------|---------------------------|
| Company | Foremark Performance Chemicals, Inc. | Permit Number | 43009 |
| City | La Porte | Project Number | 364017 |
| County | Harris | Regulated Entity Number | RN100897362 |
| Project Type | Amendment | Customer Reference Number | CN605379981 |
| Project Reviewer | Lou Malarcher, P.E. | Received Date | September 26, 2023 |
| Site Name | Foremark Performance Chemicals | | |

Project Overview

Foremark Performance Chemicals, Inc. (Foremark) owns and operates a formaldehyde (HCHO) and urea formaldehyde concentrate (UFC) manufacturing and monomethylamine (MMA) triazine and monoethanolamine (MEA) triazine manufacturing plant in La Porte, Harris County, Texas. Foremark submitted this amendment application to authorize construction and operation of a new system to unload anhydrous ammonia, converting anhydrous ammonia to aqueous fertilizer to be stored in storage tanks prior to being loaded for shipment via truck.

The site has three active New Source Review (NSR) authorizations from the TCEQ which are Permit No. 43009 and Permit by Rule (PBR) registrations 140707 and 172800. With this amendment, Foremark is requesting that PBR 172800 be incorporated by reference in Permit No. 43009. PBR 140707 and 12 unregistered PBR sources and activities are currently incorporated by reference in Permit No. 43009.

Planned maintenance, startup and shutdown (MSS) activities are authorized through Permit by Rule §106.263 when needed. As the only new equipment this project adds is fugitive equipment and an offloading activity for urea which will cease during MSS, no updates to the existing MSS authorizations are being requested.

Emission Summary

| Air Contaminant | Current Allowable Emission Rates (tpy) | Proposed Allowable Emission Rates (tpy) | Change in Allowable Emission Rates (tpy) | Project Changes at Major Sources (Baseline Actual to Allowable)* |
|-------------------|--|---|--|--|
| PM | 0.00 | 0.10 | 0.10 | N/A |
| PM ₁₀ | 0.00 | 0.10 | 0.10 | N/A |
| PM _{2.5} | 0.00 | 0.10 | 0.10 | N/A |
| VOC** | 17.41 | 18.23 | 0.82 | N/A |
| NO _x | 4.95 | 4.95 | 0.00 | N/A |
| CO | 52.73 | 52.73 | 0.00 | N/A |
| NH ₃ | 0.00 | 0.10 | 0.10 | N/A |

*The site is currently a minor source for all National Ambient Air Quality Standards (NAAQS) criteria pollutants. It will remain a minor source for all NAAQS with approval of this amendment.

**Total VOC includes HAPs.

Compliance History Evaluation - 30 TAC Chapter 60 Rules

| | |
|--|------------------|
| A compliance history report was reviewed on: | October 13, 2023 |
| Site rating & classification: | 0.00 / High |
| Company rating & classification: | 0.00 / High |
| Has the permit changed on the basis of the compliance history or rating? | No |

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Did the Regional Office have any comments? If so, explain. No

Public Notice Information

| Requirement | Date |
|--|------------|
| Legislator letters mailed | 10/17/2023 |
| Date 1 st notice published | 10/26/2023 |
| Publication Name: Bay Area Observer | |
| Pollutants: carbon monoxide, hazardous air pollutants, nitrogen oxides, organic compounds and particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less | |
| Date 1 st notice Alternate Language published | 10/26/2023 |
| Publication Name (Alternate Language): El Perico | |
| 1 st public notice tearsheet(s) received | 11/2/2023 |
| 1 st public notice affidavit(s) received | 11/2/2023 |
| 1 st public notice certification of sign posting/application availability received | 12/5/2023 |
| SB709 Notification mailed | 11/13/2023 |
| Date 2 nd notice published | 1/11/2024 |
| Publication Name: Bay Area Observer | |
| Pollutants: carbon monoxide, hazardous air pollutants, nitrogen oxides, organic compounds and particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less | |
| Date 2 nd notice published (Alternate Language) | 1/11/2024 |
| Publication Name (Alternate Language): El Perico | |
| 2 nd public notice tearsheet(s) received | 1/19/2024 |
| 2 nd public notice affidavit(s) received | 1/22/2024 |
| 2 nd public notice certification of sign posting/application availability received | 2/13/2024 |

Public Interest

| | |
|--|-----|
| Number of comments received | 0 |
| Number of meeting requests received | 0 |
| Number of hearing requests received | 0 |
| Date meeting held | N/A |
| Date response to comments filed with OCC | N/A |
| Date of SOAH hearing | N/A |

Federal Rules Applicability

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| Requirement | |
|---|-----------------------------|
| Subject to NSPS? | Yes |
| Subparts | A, Kb, VV, & RRR |
| Subject to NESHAP? | No |
| Subject to NESHAP (MACT) for source categories? | No |

Nonattainment review applicability:

The site is a minor source located in Harris County which is currently designated as severe nonattainment for the 2008 ozone standard. The total allowable emissions for VOC of 18.23 tpy and NO_x of 4.95 tpy are below the nonattainment major source threshold of 25 tpy. This site is therefore not an existing major source for either VOC or NO_x. Non-attainment review is therefore not applicable.

PSD review applicability:

The project allowable emissions for PSD major source applicability are 100 tpy of any criteria pollutant for a named source. The site is a chemical process plant (other than ethanol by fermentation) and is therefore a named source.

| Contaminant | Proposed Allowable (tpy) | PSD Threshold (tpy) | PSD Review Triggered |
|-------------------|--------------------------|---------------------|----------------------|
| PM | 0.10 | 100 | No |
| PM ₁₀ | 0.10 | 100 | No |
| PM _{2.5} | 0.10 | 100 | No |
| CO | 52.73 | 100 | No |
| VOC | 18.23 | 100 | No |
| NO _x | 4.95 | 100 | No |

Based on this analysis, PSD review is not applicable. Since PSD review is not applicable, greenhouse gas (GHG) PSD review is not applicable.

Title V Applicability - 30 TAC Chapter 122 Rules

| Requirement | |
|-------------|--|
|-------------|--|

Title V applicability:

The site does not currently have a Title V Operating permit and is not a major source as defined in 30 Texas Administrative Code (TAC) §122.10.

Periodic Monitoring (PM) applicability:

The site is not a major source as defined in 30 TAC §122.10. Therefore, Periodic Monitoring in 30 TAC Chapter 122 Subchapter G does not apply however the following monitoring requirements in NSR Permit No. 43009 apply to this amendment project:

Monthly recordkeeping and emission calculation will be required for product additives not previously specified which are received and stored in totes, drums, or sacks;
Fugitive components in VOC service are subject to 28RCT LDAR monitoring and components in contact with NH₃ are subject to 28AVO LDAR monitoring;
Monthly recordkeeping for handling of anhydrous ammonia will be required; and
Monthly recordkeeping of urea offloaded will be required.

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Compliance Assurance Monitoring (CAM) applicability:

The site is not a major source as defined in 30 TAC §122.10. Therefore, following 30 TAC §122.604(b) CAM does not apply to any emission units at the site.

Process Description

The facility manufactures formaldehyde and urea formaldehyde concentrate (UFC) from methanol feedstock that is piped in from offsite suppliers. Foremark manufacturers HCHO from atmospheric oxygen and methanol feedstock that is piped into the site from offsite suppliers. The HCHO manufacturing plant consists of four organic chemical manufacturing trains; each train includes two sets of reactors served by one absorber system and one catalytic converter which operates concurrently (a total of eight reactors in the four trains). All equipment at the site is designed to prevent or minimize fugitive emissions to the atmosphere and process vapors that are not recycled in the process are routed to the catalytic converters for emissions control. The product unloading area is monitored by remote camera from the main control room and loading and unloading activities are attended while loading / unloading is occurring. All transfers are served by vapor balance. After drawdown, the trailer or the railcar that delivers amines are isolated and protected at the rail spur on the site. Typically, a maximum of seven reactor units operate at a time while one system unit undergoes maintenance.

The HCHO process yield is 90 to 94% formaldehyde. Unconverted reactants (methanol and air), byproducts (water, carbon monoxide, and minor amounts of dimethyl ether and formic acid), and formaldehyde product exit the reactors. An absorber is used to quench the reacted gases with water or urea water yielding aqueous formaldehyde or urea formaldehyde concentrate (UFC). About 2/3 of the vapors from the top of the absorber are recycled back into the process. The remaining 1/3 of the process off-gases from each of the four absorber towers are routed to a catalytic converter for destruction of the VOCs. The four catalytic converter exhausts are manifolded together and vents through a common stack (EPN CAT). The catalytic converter units maintain a destruction efficiency of 99% for VOCs and do not require external fuel supplements. Startup of the catalytic converters is by electrical heat.

Project Scope

The purpose of this application is to:

- 1) Authorize emissions for anhydrous ammonia storage and fertilizer production facility at Foremark's La Porte site; and
- 2) Addition of an additive to the existing triazine product and either direct loading to a truck or temporary storage in an existing storage tank.

Foremark is seeking to authorize anhydrous ammonia handling and production of aqueous fertilizer (a "triazone" product). The project will involve the following process and equipment:

1. Offloading of anhydrous ammonia from dedicated trucks with a self-contained closed loop system.
2. An anhydrous ammonia storage tank with a design pressure of 300 psi and PSVs 10-15% below this point. Relief through the PSVs is not expected to occur. For routine maintenance, lines will be cleared to the extent possible with utility nitrogen; any remaining ammonia that cannot be cleared will be sent to a water scrubber before release to the atmosphere. Ammonia fugitives are calculated and assigned the new EPN FUGNH3. Foremark will incorporate AVO monitoring of ammonia equipment into its 6 times/day routine plant rounds, exceeding the minimum requirements for current BACT. MSS emissions have not been calculated as during maintenance activities, multiple lines will need to be cleared to perform work, and the fugitive components on these lines will effectively be out of service during maintenance.
3. Urea offloading pit where trucks will offload urea pellets into a below-ground pit. Simultaneously, water will be used to wet and then dissolve the urea pellets for use in the process. The below-ground handling, immediate wetting of the pellets, relatively large pit size, and the partial shelter for offloading acting as a windbreak will substantially limit the amount of particulate matter that may be emitted. Nevertheless, particulate emissions have been calculated for this activity and assigned a new EPN: URLOAD.
4. Addition of UFC and methanol (both through pipes new for this project), urea water, sodium hydroxide, and ammonia into a reactor. These emissions will be represented by EPN FUG1 for HCHO and methanol (MeOH)

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(both VOC emissions) up to the point of the reactor, EPN FUGNH3 up to the point of the reactor, and EPN FUGZO for the reactor and downstream components which contain the aqueous fertilizer.

5. Two storage tanks for handling finished aqueous fertilizer product. These tanks, associated piping, berms, and associated structures were previously authorized by non-registered PBR 106.301 Aqueous Fertilizer Storage (claimed August 17, 2022) and incorporated by reference during the previous amendment into the NSR Permit 43009 (issued August 4, 2023). These emissions will be sent through a new scrubber with water and dilute urea/UFC; Foremark is not claiming any removal efficiency for this scrubber at this time. Then, like all other plant vapors, the vapors will be sent to the plant vapor system to be treated with a 5-pack absorber column meeting BACT (greater than 98% control efficiency) and a catalytic oxidizer meeting BACT (greater than 98% control efficiency) – both in series achieving 99.96% control efficiency – before being released to EPN CAT. These emissions are calculated for this project. Fugitive emissions associated with these storage tanks and associated equipment are represented by EPN FUGZO.
6. Truck loading area for fertilizer loading. This loading will occur in a closed loop with the fertilizer storage, which itself will be upstream of the new scrubber. Therefore, the only emissions associated with this loading process will be fugitives, and these are included in EPN FUGZO.

The molecule for the fertilizer is large and the vapor pressure of the aqueous fertilizer mixture is lower than that of water, and the vapor pressure of the VOC portion is below 0.002 psi. Nevertheless, fugitive emissions have been estimated, conservatively so, and included in this application.

Foremark is seeking to authorize the addition of a glyoxal additive to a trailer intermediate triazine product or into a storage tank of triazine intermediate. Though the amount of glyoxal in the final product is expected to be small, Foremark is seeking to authorize this additive.

The glyoxal will be received in totes which will be stored fully closed in a protected location away from sunlight. The tote will be pumped into the bottom load line of a trailer with a hydraulic pump (bottom loading) with the truck connected to the vapor recovery line to the plant vent system. Alternatively, the tote will be pumped into an existing storage tank.

The tote pumping activity is expected to be less than 10 minutes in an hour. The portable pump will be flushed after use back into the system, primarily for safety reasons, but for the added benefit the glyoxal will not remain in the pump other than during pumping time. The portable pump will be attended full-time when in operation. The additive is intended to be used with existing Triazine blends; therefore, the storage tank would be an existing tank already used for Triazine. Though a tank cannot be used for two products simultaneously, tank working and breathing losses have been calculated for glyoxol/triazine product in addition to an existing Triazine tank working and breathing losses, all sent to the plant vent system, then to the absorber, catalytic oxidizer, and then to EPN CAT. Fugitive emissions are calculated and represented by the EPN FUGGL.

| Old SC# | New SC# | Change |
|---------|---------|--|
| 5 | 5 | Updated project reference for confidential Table 2 Material Balance. |
| 6 | 6 | Adding statement after 12-month rolling throughput (gallons) limit that additional additives as proposed in this application which may not be represented in the table can be added to the product as long as the throughput in gallons is maintained. |
| - | 8 | LDAR 28AVO will be added to the Special Conditions for components in contact with ammonia. Inspections, as proposed by the applicant, will be at least 6 times per day during routine plant rounds (separated by at least 2 hours between inspections), exceeding the minimum of one every 12 hours. |
| 8 | 9 | Added specification that startup and additional heating of the catalytic converters will be by electric heating only. |
| 9 | 10 | Added specification that 392 °F is for the minimum inlet temperature and 1202 °F is for the maximum outlet temperature. |
| 13 | 14 | Adding paragraph G showing when stack testing was last completed. |

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| - | 21 - 25 | Adding special conditions for anhydrous ammonia storage and handling as represented to minimize emissions. |
| - | 26 | Adding special condition for urea offloading and storage. |
| - | 27 | Adding special condition for addition of solid and liquid additives to products. |
| 19 | 28 | Chemical Flexibility to be updated to include EPN FUGGL and clarified conditions developed between the Chemical and Coatings Section. |
| 21 | 29 | Added PBR No. 172800 as a referenced PBR. |

Best Available Control Technology

| Source Name | EPN | Best Available Control Technology Description |
|--|--------|---|
| Tanks, reactors, process equipment | CAT | All storage tanks, reactors, and process equipment which may be modified by the additional chemicals proposed have the vents routed to the plant vent system and not directly to the atmosphere. The plant vent system goes through an absorber prior to a catalytic oxidizer before emitting to the atmosphere. The absorber scrubbing solution is monitored for pH to ensure formaldehyde is controlled. The catalytic converters are tested and temperature monitored to ensure a 98% control of VOC and 98% control of CO. Stack sampling on EPN CAT is completed every five years with the latest on 9/28/2023. The stack sampling showed CO emissions at 28% of the MAERT limit, NOX emissions at 11% of the MAERT limit, and total VOC as total hydrocarbon (THC) emissions at 69% of the MAERT limit. The existing stack testing schedule is therefore reasonable without modification due to potential additional vents being routed to EPN CAT with this project. Tier I BACT is satisfied. |
| Formaldehyde Process Equipment Fugitives | FUG1 | EPN FUG1 will be corrected to account for components previously represented however the associated emission rate on the MAERT was not updated. The modeling for this increase has been included with this review. The total uncontrolled VOC emissions from fugitive connections is less than 25 tpy (including EPNs FUG1 and FUG2). At greater than 10 tpy and less than 25 tpy of uncontrolled VOC emissions, LDAR 28M is Tier I BACT. The applicant has applied LDAR 28RCT monitoring which matches 28VHP except for a lower leak definition for pumps and compressors and is considered better than 28M. Therefore, better than Tier I BACT is satisfied. |
| Equipment Fugitives – additive | FUGGL | |
| Equipment Fugitives | FUGZO | |
| Equipment Fugitives | FUGNH3 | For fugitive components in ammonia service, LDAR 28AVO is considered Tier I BACT. 28AVO with at least 6 checks to be done daily is proposed and satisfies Tier I BACT. |

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| Urea offloading | URLOAD | <p>EPA Test Method 22 observation for visible emissions during urea offloading, simultaneous wetting of urea pellets during offloading to minimize particulate matter emissions, and monthly recordkeeping of throughput. The total represented particulate emissions are estimated at 0.03 lb/hr and 0.10 tpy without additional control based on the AP-42 drop loading calculations.</p> <p>As the urea pellets become sticky in higher humidity (above 70%) due to attracting moisture and historically, the humidity in the Houston area is above 70%, the potential for particulate emissions due to off loading of urea pellets is low.</p> <p>Therefore, the observation approach for visible emissions and off loading directly into a below ground storage pit providing a partial shelter and windbreak is accepted as satisfying BACT.</p> |
|-----------------|--------|--|

Permits Incorporation

| Permit by Rule (PBR) / Standard Permit / Permit Nos. | Description (include affected EPNs) | Action (Reference / Consolidate / Void) |
|--|-------------------------------------|---|
| 172800 | Specialty Scavenger Production | Reference |

Impacts Evaluation

Was modeling conducted? **Yes** Type of Modeling: **Screen3**

Is the site within 3,000 feet of any school? **No**

Additional site/land use information:

The Foremark plant is located at a site about 2,750 feet northwest of the intersection of Highways 225 and 146, north of the city of La Porte, Texas and immediately south of the La Porte Rail and Terminal chemical complex. The area surrounding the plant is industrial, near the Houston Ship Channel, with surrounding properties consisting of developed and undeveloped land. The nearest offsite receptor is an industrial site about 375 feet from the Foremark site, the nearest residential receptor is about 3,900 feet from the facility and the nearest school, Lomax Elementary School, is located 1.97 miles west-southwest of the site.

A health effects review following TCEQ Modeling and Effects Review Applicability (MERA), modeling for National Ambient Air Quality Standards (NAAQS), and applicable State Property Line standards was completed.

This project includes potential emission increases of formaldehyde, methanol, triazone, ammonia, urea (evaluated as particulate emissions), and glyoxal. Formaldehyde, methanol, triazone, and ammonia all dropped out of the MERA at step 2.

| Chemical | Short Term ESL ($\mu\text{g}/\text{m}^3$) | Long Term ESL ($\mu\text{g}/\text{m}^3$) | Short Term increase (lb/hr) | Long Term \geq 10% Short Term | De Minimis |
|--------------|---|--|-----------------------------|---------------------------------|------------|
| Formaldehyde | 15 | 3.3 | 0.006 | Yes | Yes |
| Methanol | 3900 | 2100 | 0.28 | Yes | Yes |
| Triazone | 70 | 7 | 0.04 | Yes | Yes |
| Ammonia | 180 | 92 | 0.04 | Yes | Yes |
| Glyoxal | 1 | 0.1 | 0.002 | Yes | No |

The sitewide GLC_{max} for Glyoxal was determined to be $0.5915 \mu\text{g}/\text{m}^3$. This is less than the ESL and therefore meets Step 7 for sitewide modeling.

For the particulate matter increase, a National Ambient Air Quality Standards (NAAQS) evaluation demonstrates the following for this project.

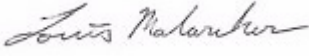

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| Pollutant | Averaging Time | SIL ($\mu\text{g}/\text{m}^3$) | Modeled ($\mu\text{g}/\text{m}^3$) | SIL Met? |
|-------------------|----------------|----------------------------------|--------------------------------------|----------|
| PM ₁₀ | 24-hour | 5 | 0.56 | Yes |
| PM ₁₀ | Annual | 1 | 0.11 | Yes |
| PM _{2.5} | 24-hour | 1.2 | 0.56 | Yes |
| PM _{2.5} | Annual | 0.2 | 0.11 | Yes |

No adverse health effects are expected to occur among the general public as a result of exposure to the emissions from the facilities authorized by this permit.

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|--|---------------------------|--|---------------------------|
|  Project Reviewer Lou Malarcher, P.E. | February 15, 2024 Date |  Team Leader Chirag Patel | February 21, 2024 Date |
|--|---------------------------|--|---------------------------|