Preliminary Determination Summary

Permit Numbers 156571, PSDTX1564, and GHGPSDTX195

I. Applicant

Motiva Chemicals LLC
500 Dallas Street
Houston, Texas 77002-4800

II. Project Location

4241 Savannah Avenue
Port Arthur, Texas 77640
Jefferson County

III. Project Description

Motiva Chemicals LLC (Motiva) a new polyethylene production plant (Polyethylene Manufacturing Complex) in Port Arthur, Jefferson County, Texas. They polyethylene plant will produce both linear low density polyethylene (LLDPE) and high density polyethylene (HDPE). The complex will also include the following utilities and logistical operations: boilers for plant steam needs, a wastewater treatment plant, and truck and railcar loading racks for transfer of liquids. Maintenance, startup, and shutdown (MSS) emissions will be authorized under this permit.

The complex will be a new, major stationary source under Prevention of Significant Deterioration (PSD) regulations, and is subject to PSD permitting requirements, including Best Available Control Technology (BACT) requirements for emissions of greenhouse gases (GHG). Since the polyethylene plant will be located in an area that is in attainment for each National Ambient Air Quality Standard (NAAQS), Nonattainment New Source Review (NNSR) does not apply.

IV. Emissions

Air Contaminant	Proposed Allowable Emission Rates (tpy)
VOC	1,867.88
NO_x	275.19
SO_2	122.93
CO	964.62
$PM/PM_{10}/PM_{2.5}$	86.30/84.48/58.21

H_2SO_4	2.12
NH_3	22.57
CO2	1,088,909.01
CH4	121.74
N2O	11.21
CO2 Equivalents (CO2e)	1,095,294.94

CO2e - carbon dioxide equivalents based on global warming potentials of CH4 = 25, N2O = 298, SF6=22,800.

V. Federal Applicability

The following chart illustrates the annual project emissions for each pollutant and whether this pollutant triggers PSD or Nonattainment (NA) review.

Pollutant	Project Emissions (tpy)	Major Mod Trigger (tpy)	NA Triggered Y/N	PSD Triggered Y/N
VOC	1,867.88	25 for NA 40 for PSD	N/A	Y
NO_x	275.19	25 for NA 40 for PSD	N/A	Y
SO_2	122.93	40	N/A	Y
CO	964.62	100	N/A	Y
PM	86.30	25	N/A	Y
PM_{10}	84.48	15	N/A	Y
$PM_{2.5}$	58.21	10	N/A	Y
H_2SO_4	2.12	7	N/A	N

The proposed project triggers PSD review for non-GHG NSR regulated pollutants. As shown in the table below, because the project increase is more than 75,000 tpy of CO2e, PSD review is triggered for GHG emissions.

Pollutant	Project Emissions (tpy)	Major Source or Major Mod Trigger Level (tpy)	PSD Triggered Y/N
CO2e	1,095,294.94	75,000	Y

VI. Control Technology Review

Control technology is consistent with PSD BACT for PSD pollutants (VOC, NO_X, CO, PM, PM_{10}, $PM_{2.5}$, SO_2, and GHG) and state minor NSR BACT for H_2SO_4. A control technology review was conducted for all pollutants. The controls described in this section were determined to satisfy BACT requirements based on a review of recently issued permits from Texas and other states, and consideration of the RACT/BACT/LAER Clearinghouse (RBLC) data provided by the applicant. A more detailed description of the control technology review is included in the permit file.

Source Name	EPN	Best Available Control Technology Description
LLDPE Boiler 1	633BLR001	The boilers will be fired with natural gas and/or process gas. Emissions of NO_X are minimized through the use of low NO_X burners and SCR. The permit limits NO_X emissions to 0.015 lb/MMBtu fuel fired (HHV basis) on a 1-hr average and 0.010 lb/MMBtu fuel fired on an annual average. Ammonia slip from the SCR is limited to 10 ppmvd (3% O_2 basis) on a 24-hr average. Emissions of CO are limited to 100 ppmvd (3% O_2 basis) on a 1-hr average. SO_2 emissions are limited through use of low-sulfur fuel gas. Emissions of particulate and VOC are limited through good combustion practices and the use of gaseous fuel, and are estimated using AP-42 emission factors for natural gas combustion. GHGs from the boilers will be limited through energy efficient design, low carbon fuels, and good combustion practices.
LLDPE Boiler 2	633BLR002	
HDPE Boiler 1	635BLR001	
HDPE Boiler 2	635BLR002	
LLDPE Polymer Cooling Tower	633CTW001X	Process-to-water heat exchangers can generate emissions of VOC due to leaks in the heat exchanger, which are emitted at the cooling tower. **The cooling tower is non-contact design.** The permit requires weekly sampling of cooling water for strippable VOC. Corrective action must be taken if total strippable hydrocarbon content of the cooling water exceeds

Source Name	EPN	Best Available Control Technology Description
HDPE Polymer Cooling Tower	634CTW001	0.08 ppmw equivalent, and delay of repair procedures cannot be used if the strippable hydrocarbon content exceeds 0.8 ppmw. Dissolved solids in the cooling water may also result in particulate emissions at the cooling tower. The permit requires that particulate emissions be minimized through the drift eliminators which are designed to limit total liquid drift to no greater than 0.001%. Drift eliminators must be inspected regularly and must be repaired or replaced when defects are discovered.
XXBH001X Bag House	XXBH001X	Baghouses and cartridge filters are used to control dust emissions from catalyst handling, compounding, and polyethylene handling operations. All particulate control devices must reduce the outlet grain loading of their exhaust to 0.005 gr/dscf or less. Baghouses and filters must be continuously monitored for pressure drop, and maintenance or filter replacement must be performed if the measured pressure drop is outside of the manufacturer's recommendations. A permit alteration must be obtained prior to the start of operation to specify pressure drop or other parametric monitoring thresholds for the particulate control devices. Residual VOC in the resin will be emitted from process vents in the pellet handling section of the plant. The LLDPE process must be degassed to such an extent that total VOC emissions from the extruded pellets does not exceed 50 lb per million pounds of PE produced. Compliance must be determined by taking samples of the resin at the first uncontrolled vent and at the final product loading station. The residual VOC of a sample (in units of ppmw) is determined using headspace analysis, and the total emission rate per unit production is determined as the difference between the two samples. The permit requires that an alteration be obtained prior to start of operation so that an approved sampling protocol can be attached to the permit.
Loading Station #1 Bag House	XXBH002X	
XXBH003X Bag House	XXBH003X	
LLDPE Hopper Car Loading Filter Vent	HOPLOAD1	
LLDPE Truck Trans Loading Filter Vent 1	XXWS011L	
LLDPE Truck Trans Loading Filter Vent 2	XXWS012L	
LLDPE Truck Trans Loading Filter Vent 3	XXWS013	
LLDPE Truck Trans Loading Filter Vent 4	XXWS014	
LLDPE Truck Loadout Silo Vent 1	XXBH006	
LLDPE Truck Loadout Silo Vent 2	XXBH007	
LLDPE Truck Loadout Silo Vent 3	XXBH008	
LLDPE Truck Loadout Silo Vent 4	XXBH009	
XXBH004X Bag House	XXBH004X	Baghouses and cartridge filters are used to control dust emissions from catalyst handling, compounding, and polyethylene handling operations. All particulate control devices must reduce the outlet grain loading of their

Source Name	EPN	Best Available Control Technology Description
XXBH005X Bag House	XXBH005X	exhaust to 0.005 gr/dscf or less. Baghouses and filters must be continuously monitored for pressure drop, and maintenance or filter replacement must be performed if the measured pressure drop is outside of the manufacturer's recommendations. A permit alteration must be obtained prior to the start of operation to specify pressure drop or other parametric monitoring thresholds for the particulate control devices. Residual VOC in the resin will be emitted from process vents in the pellet handling section of the plant. The HDPE process must be degassed to such an extent that total VOC emissions from the extruded pellets does not exceed 80 lb per million pounds of PE produced. Compliance must be determined by taking samples of the resin at the first uncontrolled vent and at the final product loading station. The residual VOC of a sample (in units of ppmw) is determined using headspace analysis, and the total emission rate per unit production is determined as the difference between the two samples. The permit requires that an alteration be obtained prior to start of operation so that an approved sampling protocol can be attached to the permit.
HDPE Hopper Car Loading Filter Vent	HOPLOAD2	
Truck Loading Filter Vent 1	XXWS011	
Truck Loading Filter Vent 2	XXWS012	
1-Hexene Feed Tank	633TK007	The 1-hexene feed tank will be an internal floating roof tank with a mechanical shoe primary seal and rim mounted secondary seal. The tank will be painted white and designed as drain dry.
Diesel Tank	TK-DIESEL1	The fixed roof diesel tanks are less than 25,000 gallons. The tanks will be painted white and equipped with submerge fill mechanisms.
Diesel Tank	TK-DIESEL2	
Diesel Tank	TK-DIESEL3	
Diesel Tank	TK-DIESEL4	
Diesel Tank	TK-DIESEL5	
Diesel Tank	TK-DIESEL6	
Aqueous Ammonia Tank/Scrubber	NH3SBR1	The Aqueous Ammonia Tank is a pressurized tank that will be designed so as not to generate emissions except during tank filling. Depressurization and filling emissions will be controlled by the aqueous ammonia scrubber. The Aqueous Ammonia Scrubber is proposed as a water scrubber that will achieve 99% removal efficiency during depressurization and filling of the aqueous ammonia tank.
Aqueous Ammonia Tank/Scrubber	NH3SBR2	
LLDPE HP Elevated Flare	629FLR001	The permit requires continuous monitoring for waste gas volumetric flow, waste gas composition, presence

Source Name	**EPN**	**Best Available Control Technology Description**
LLDPE LP Elevated Flare	629FLR002	of pilot flame, and visible emissions for each of the elevated flares. The flares must achieve a minimum destruction/removal efficiency (DRE) of 99% for hydrocarbons containing 3 carbon atoms or less, and 98% for all other compounds. This is to be achieved through compliance with operating requirements at 40 CFR § 60.18**.** GHGs from the flare will be limited through good process design, good flare design, best operational practices, and routing appropriate vents to fuel
HDPE HP Elevated Flare	629FLR001	
HDPE LP Elevated Flare	629FLR002	
Stabilizer Mixer Dust Collector	Z-491	Baghouses and cartridge filters are used to control dust emissions from catalyst handling, compounding, and polyethylene handling operations. All particulate control devices must reduce the outlet grain loading of their exhaust to 0.005 gr/dscf or less. Baghouses and filters must be continuously monitored for pressure drop, and maintenance or filter replacement must be performed if the measured pressure drop is outside of the manufacturer's recommendations. A permit alteration must be obtained prior to the start of operation to specify pressure drop or other parametric monitoring thresholds for the particulate control devices. Residual VOC in the resin will be emitted from process vents in the pellet handling section of the plant. The HDPE process must be degassed to such an extent that total VOC emissions from the extruded pellets does not exceed 80 lb per million pounds of PE produced. Compliance must be determined by taking samples of the resin at the first uncontrolled vent and at the final product loading station. The residual VOC of a sample (in units of ppmw) is determined using headspace analysis, and the total emission rate per unit production is determined as the difference between the two samples. The permit requires that an alteration be obtained prior to start of operation so that an approved sampling protocol can be attached to the permit.
Pellet Spin Drier Blower Vent	M-407	
Stabilizer Transfer Blower A through G	C-411	
Elutriator	629FIL9005	
Elutriator	629FIL9006	
Elutriator	629FIL9007	
Blending Silo	629S9001	
Blending Silo	629S9002	
Blending Silo	629S9003	
Blending Silo	629S9004	
LLDPE Plant Thermal Oxidizer #1	629FLR003	Thermal oxidizers must achieve 99.9% destruction efficiency. This is to be demonstrated through initial stack sampling and by maintaining the firebox temperature at or above the temperature demonstrated during the stack test (6-minute average) during subsequent operations. Prior to the initial stack test, the firebox temperature must be maintained at or above 1400°F. Collateral NO_X emissions are limited to 0.035 lb/MMBtu, based on the higher heating value of
LLDPE Plant Thermal Oxidizer #2	629FLR004	
HDPE Plant Thermal Oxidizer #1	636HTR001	

Source Name	EPN	Best Available Control Technology Description
HDPE Plant Thermal Oxidizer #2	636HTR002	the waste gas. GHGs from the thermal oxidizer will be limited through good thermal oxidizer design and best operational practices.
Oligomer and Low Polymer TT/RC Loading	636HTR001 LOADING	Oligomer and Low Polymer are loaded in both tank trucks and railcars. All loading is submerged. Tank trucks and railcars must be certified as vapor tight. Displaced loading emissions from low polymer are required to be vented to a thermal oxidizer (EPN 636HTR001). Railcar loading will use hard-piped transfer lines and flanged connections.
U1 Pellet Dryer Vent	U1-Y-7010	Baghouses and cartridge filters are used to control dust emissions from catalyst handling, compounding, and polyethylene handling operations. All particulate control devices must reduce the outlet grain loading of their exhaust to 0.005 gr/dscf or less. Baghouses and filters must be continuously monitored for pressure drop, and maintenance or filter replacement must be performed if the measured pressure drop is outside of the manufacturer’s recommendations. A permit alteration must be obtained prior to the start of operation to specify pressure drop or other parametric monitoring thresholds for the particulate control devices. Residual VOC in the resin will be emitted from process vents in the pellet handling section of the plant. The LLDPE process must be degassed to such an extent that total VOC emissions from the extruded pellets does not exceed 50 lb per million pounds of PE produced. The Compliance must be determined by taking samples of the resin at the first uncontrolled vent and at the final product loading station. The residual VOC of a sample (in units of ppmw) is determined using headspace analysis, and the total emission rate per unit production is determined as the difference between the two samples. The permit requires that an alteration be obtained prior to start of operation so that an approved sampling protocol can be attached to the permit.
U1 Bag Station Dump Hopper Vent 1	U1-Y-6231	
U1 Bag Station Dump Hopper Vent 2	U1-Y-6232	
U1 Bag Station Dump Hopper Vent 3	U1-Y-6233	
U1 Bag Station Dump Hopper Vent 4	U1-Y-6234	
U1 Bag Station Dump Hopper Vent 5	U1-Y-6235	
U1 Talc Surge Bin Filter Vent	U1-Y-6251	
U1 Mixer Vent Filter Vent	U1-Y-6260	
U1 Catalyst Vent Filter	U1-C-4040	
U2 Pellet Dryer Vent	U2-Y-7010	
U2 Additive Surge Bin Filter Vent 1	U2-Y-6286	
U2 Additive Surge Bin Filter Vent 2	U2-Y-6287	
U2 Additive Surge Bin Filter Vent 3	U2-Y-6288	
U2 Additive Surge Bin Filter Vent 4	U2-Y-6289	
U2 Additive Surge Bin Filter Vent 5	U2-Y-6290	
U2 Talc Surge Bin Filter Vent	U2-Y-6251	

Source Name	**EPN**	**Best Available Control Technology Description**
U2 Mixer Vent Filter Vent	U2-Y-6260	
U2 Catalyst Vent Filter	U2-Y-4901	
U3 Pellet Dryer Vent	U3-Y-7310	
U3 Additive Surge Bin Filter Vent 1	U3-Y-6586	
U3 Additive Surge Bin Filter Vent 2	U3-Y-6587	
U3 Additive Surge Bin Filter Vent 3	U3-Y-6588	
U3 Additive Surge Bin Filter Vent 4	U3-Y-6589	
U3 Additive Surge Bin Filter Vent 5	U3-Y-6590	
U3 Talc Surge Bin Filter Vent	U3-Y-6551	
U3 Mixer Vent Filter Vent	U3-Y-6560	
U3 Catalyst Vent Filter	U3-Y-4902	
LLDPE OSBL Fugitives	OSBLFUG1	Fugitive emissions from piping components in VOC service will be monitored using the TCEQ 28VHP and 28CNTQ leak detection and repair (LDAR) programs. These LDAR programs require quarterly inspection of accessible valves, and pump, compressor and agitator seals in vapor and light liquid service using a portable hydrocarbon analyzer, with a leak definition of 500 ppmv VOC for valves, and 2000 ppmv VOC for pump, compressor and agitator seals. Flanges and other connectors must be monitored quarterly with a portable hydrocarbon analyzer, with a leak definition of 500 ppmv VOC. A first attempt must be made to repair leaks with 5 days, and repairs must be completed within 15 days. Ammonia will be used to supply SCR systems in the complex. Because NH_3 has a low odor threshold, the permit requires audio, visual and olfactory (AVO) checks for NH_3 leaks once per shift for piping in the SCR operating area in NH_3 service. Lines containing H_2S will also be monitored with the AVO program.
HDPE OSBL Fugitives	OSBLFUG2	
HDPE Fugitives	HDPEFUG	
LLDPE Fugitives	LLDPEFUG	
Wet Surface Air Cooler	637WSAC001	The Wet Surface Air Cooler will provide additional cooling water to the expanded wastewater treatment

Source Name	EPN	Best Available Control Technology Description
		plant. VOC emissions are not expected. The permit requires that particulate emissions be minimized through the drift eliminators which are designed to limit total liquid drift to no greater than 0.0005%. Drift eliminators must be inspected regularly and must be repaired or replaced when defects are discovered.
Wastewater Treatment Plant	WWTP	A new wastewater treatment plant (WWTP), separate from the refinery WWTP, will be authorized to serve the polyethylene units. The plant is comprised of a flash drum, sumps, equalization tanks, coagulation tank, flocculation tank, and dissolved air flotation (DAF) unit. All conveyances are closed. Emissions from the flash drum and sump are required to be controlled by the thermal oxidizer (EPN 636HTR001). Emissions from the equalization tank, the coagulation tank, flocculation tank, and Dissolved Air Floatation (DAF) unit, are required to be routed to the Air Stripper. Total VOC removal in the wastewater treatment plant is a minimum of 90%.
Emergency Generator 1	GEN1	The emergency generator is limited to those satisfying EPA Tier 4 (40 CFR § 1039.101) requirements, and emergency firewater pumps must satisfy EPA Tier 3 (40 CFR § 89.112) requirements. The engines will fire ultra-low sulfur diesel fuel, consisting of no more than 15 ppm sulfur by weight. The engines are limited to 100 hours per year of non-emergency operation and must have a non-resettable runtime meter. GHGs from the emergency engines will be limited through engine design and certification in accordance with CFR standards, limited operational hours, and proper operation and maintenance.
Emergency Generator 2	GEN2	
Emergency Generator 3	GEN3	
Emergency Generator 4	GEN4	
Firewater Pump 1	FWP1	
Firewater Pump 2	FWP2	
Process vents (controlled)	Various	Process vents will be routed to the flares, thermal oxidizers, or boilers.
Plant fuel gas	Various	Plant fuel gas is limited to 5 grains sulfur per 100 dscf.
MSS	Various	The permit specifies control requirements for vessel maintenance and cleaning activities. Process vessels must be degassed to an appropriate control device until the measured VOC concentration in the process vessel is verified to be less than 10,000 ppmv VOC or 10% of the LEL of a representative compound. Process vessels containing no more than 50 lb VOC for which a connection to a control device is not available may be opened to the atmosphere without any prior control. Catalyst handling is performed in a manner that minimizes particulate matter emissions.

<table>
<tr><th>Source Name</th><th>EPN</th><th>Best Available Control Technology Description</th></tr>
<tr><td></td><td></td><td>Degassing of process vessels may use the plant flare system or a temporary control device. Temporary control devices must meet the operational requirements specified in the permit.

A storage tank may not be opened to the atmosphere unless the tank has been degassed to control, and the residual VOC concentration in the tank is reduced to 1,200 ppmv or less. Once a tank is opened, measures must be taken to minimize emissions until all standing liquid is removed from the tank. For floating roof storage tanks storing liquids with a VOC vapor pressure of 0.5 psia or greater, the tank vapor space must be collected to a functioning closed vent system and control device any time the floating roof is landed on its supporting legs, except that control requirements are waived for up to 24 hours following emptying of the tank for inspection and maintenance.

Vacuum trucks must be equipped with a “duck bill” hose tip in order to minimize air entrainment into the truck’s storage tank. The exhaust of the vacuum truck must be directed to a control device if the liquid being collected has a VOC vapor pressure in excess of 0.5 psia.</td></tr>
<tr><td>Storage Tank (FIN TK701)</td><td rowspan="5">636FLR001/
636FLR002</td><td rowspan="6">The tanks are fixed roof tank that will be painted white and equipped with submerge fill mechanism. The tanks will vent to the control devices.</td></tr>
<tr><td>Storage Tank (FIN TK702)</td></tr>
<tr><td>Storage Tank (FIN D-763)</td></tr>
<tr><td>Storage Tank (FIN 633VES043)</td></tr>
<tr><td>Storage Tank (633VES043DX)</td></tr>
<tr><td>Storage Tank (FIN LPDRUM)</td><td>636HTR001</td></tr>
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VII. Air Quality Analysis

The air quality analysis (AQA) is acceptable, as supplemented by the ADMT, for all review types and pollutants. The results are summarized below.

A. De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results indicate that 24-hr and annual PM_{10}, 24-hr $PM_{2.5}$, 1-hr NO_2, and 8-hr CO exceed the respective de minimis concentrations and require a full impacts analysis. The De Minimis analysis modeling results for 1-hr, 3-hr, 24-hr, and annual SO_2, annual $PM_{2.5}$, annual NO_2, and 1-hr CO indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 and 1-hr SO_2 De Minimis levels is based on the assumptions underlying EPA's development of the 1-hr NO_2 and 1-hr SO_2 De Minimis levels. As explained in EPA guidance memoranda[1,2], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 and 1-hr SO_2 NAAQS.

The 24-hr $PM_{2.5}$ and ozone De Minimis levels are the EPA recommended De Minimis levels. The use of the EPA recommended De Minimis levels is sufficient to conclude that a proposed source will not cause or contribute to a violation of an ozone and 24-hr $PM_{2.5}$ NAAQS or 24-hr $PM_{2.5}$ PSD increments based on the analyses documented in EPA guidance and policy memoranda[3].

The applicant provided an evaluation of ambient $PM_{2.5}$ monitoring data, consistent with EPA guidance for $PM_{2.5}$[4], for using the annual $PM_{2.5}$ De Minimis level in the NAAQS analysis. If monitoring data show that the difference between the annual $PM_{2.5}$ NAAQS and the monitored annual $PM_{2.5}$ background concentrations in the area is greater than the annual $PM_{2.5}$ De Minimis level, then the proposed project with predicted impacts below the De Minimis level would not cause or contribute to a violation of the annual $PM_{2.5}$ NAAQS and does not require a full impacts analysis. See the discussion below in the air quality monitoring section for additional information on the evaluation of ambient $PM_{2.5}$ monitoring data.

The applicant also provided an evaluation of ambient $PM_{2.5}$ monitoring data for using the annual $PM_{2.5}$ De Minimis levels in the PSD Increment analysis. If the difference between the $PM_{2.5}$ increment and the change in ambient monitored $PM_{2.5}$ background concentrations in the area is greater than the $PM_{2.5}$ De Minimis level, then the use of the De Minimis levels are reasonable. See the discussion below in the Increment Analysis section for additional information on the evaluation of the ambient $PM_{2.5}$ monitoring data.

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[1] www.epa.gov/sites/production/files/2015-07/documents/appwso2.pdf

[2] www.tceq.texas.gov/assets/public/permitting/air/memos/guidance_1hr_no2naaqs.pdf

[3] www.tceq.texas.gov/permitting/air/modeling/epa-mod-guidance.html

[4] www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/guidance-for-pm25-modeling-52014.pdf

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (µg/m³)

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	4.8	7.8
SO_2	3-hr	7	25
SO_2	24-hr	3	5
SO_2	Annual	0.3	1
PM_{10}	24-hr	18	5
PM_{10}	Annual	2	1
$PM_{2.5}$	24-hr	3.1	1.2
$PM_{2.5}$	Annual	0.23	0.3
NO_2	1-hr	9.9	7.5
NO_2	Annual	0.8	1
CO	1-hr	1450	2000
CO	8-hr	1278	500

The 1-hr SO_2 and 1-hr NO_2 GLCmax are based on the highest five-year averages of the maximum predicted concentrations determined for each receptor. The GLCmax for all other pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

Intermittent guidance was relied on for the 1-hr SO_2 and 1-hr NO_2 PSD De Minimis analyses.

To evaluate secondary $PM_{2.5}$ impacts, the applicant provided an analysis based on a Tier 1 demonstration approach consistent with the EPA's Guideline on Air Quality Models (GAQM). Specifically, the applicant used a Tier 1 demonstration tool developed by the EPA referred to as Modeled Emission Rates for Precursors (MERPs). The basic idea behind the MERPs is to use technically credible air quality modeling to relate precursor emissions and peak secondary pollutants impacts from a source. Using data associated with the 1,000 tpy Harris County source, the applicant estimated 24-hr and annual secondary $PM_{2.5}$ concentrations of 0.135 µg/m³ and 0.006 µg/m³, respectively. When these estimates are added to the GLCmax listed in the table above, the results are less than the De Minimis levels for annual $PM_{2.5}$. Since the combined direct and secondary 24-hr $PM_{2.5}$ impacts are above the De minimis level, a full impacts analysis is required. Note that the EPA updated hypothetical source data added a 500 tpy H source, which would have been appropriate for the project emissions. Additionally, the applicant utilized the incorrect De minimis value when calculating the annual secondary $PM_{2.5}$ impact. The ADMT reviewed the proposed secondary contributions using the updated hypothetical source data and appropriate annual De minimis value and determined overall conclusions will not change.

Table 2. Modeling Results for Ozone PSD De Minimis Analysis in Parts per Billion (ppb)

Pollutant	Averaging Time	GLCmax (ppb)	De Minimis (ppb)
O_3	8-hr	0.96	1

The applicant performed an O_3 analysis as part of the PSD AQA. The applicant evaluated project emissions of O_3 precursor emissions (NO_x and VOC). For the project NO_x and VOC emissions, the applicant provided an analysis based on a Tier 1 demonstration approach consistent with the EPA's GAQM. Specifically, the applicant used a Tier 1 demonstration tool developed by the EPA referred to as MERPs. The basic idea behind the MERPs is to use technically credible air quality modeling to relate precursor emissions and peak secondary pollutants impacts from a source. Using data associated with the 500 tpy Harris County source, the applicant estimated an 8-hr O_3 concentration of 0.96 ppb. When the estimates of ozone concentrations from the project emissions are added together, the results are less than the De Minimis level. It should be noted the EPA updated hypothetical source data; however, using these updated data would not change the overall outcome of the analysis.

B. Air Quality Monitoring

The De Minimis analysis modeling results indicate that 24-hr PM_{10} and 8-hr CO exceed the respective monitoring significance level and require the gathering of ambient monitoring information.

The De Minimis analysis modeling results indicate that 24-hr SO_2 and annual NO_2 are below their respective monitoring significance level.

Table 3. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Significance ($\mu g/m^3$)
SO_2	24-hr	3	13
PM_{10}	24-hr	18	10

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Significance ($\mu g/m^3$)
NO_2	Annual	0.8	14
CO	8-hr	1278	575

The GLCmax for all pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant evaluated ambient PM_{10}, $PM_{2.5}$, and CO monitoring data to satisfy the requirements for the pre-application air quality analysis.

Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 481670004 at 2516 Texas Avenue, Texas City, Galveston County. The maximum high, second high monitored concentration from 2016-2018 was used for the 24-hr value (102 $\mu g/m^3$). This monitor is reasonable based on the applicant's land use comparison and quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site. The ambient background concentrations were also used in the NAAQS analysis.

Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482450021 located at 2200 Jefferson Dr., Port Arthur, Jefferson County. The applicant calculated a three-year average (2016-2018) of the 98th percentile of the annual distribution of the 24-hr concentrations for the 24-hr value (21.5 $\mu g/m^3$). The applicant calculated a three-year average (2016-2018) of the annual concentrations for the annual value (9 $\mu g/m^3$). This monitor is reasonable based on the applicant's land use comparison, quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site, and the proximity of the monitor to the project site (approximately five kilometers [km] to the northeast). The ambient background concentrations were also used in the NAAQS analysis.

Background concentrations for CO were obtained from the EPA AIRS monitor 482451035 located at 1800 N. 18th St., Nederland, Jefferson County. The maximum high, second high monitored concentration from 2016-2018 was used for the 1-hr value (1160 $\mu g/m^3$). The maximum high, second high monitored concentration from 2016-2018 was used for the 8-hr value (580 $\mu g/m^3$). The use of this monitor is reasonable based on the applicant's land use comparison and quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site. The ambient background concentrations were also used in the NAAQS analysis.

Since the project has a net emissions increase of 100 tons per year (tpy) or more of volatile organic compounds or nitrogen oxides, the applicant evaluated ambient O_3 monitoring data to satisfy requirements in 40 CFR 52.21 (i)(5)(i)(f).

Background concentrations for O_3 were obtained from the EPA AIRS monitor 482450011 located at 623 Ellias St., Port Arthur, Jefferson County. A three-year average (2016-2018) of the annual fourth highest daily maximum 8-hr concentrations was used in the analysis (66 ppb). The use of this monitor for a background concentration of ozone is reasonable based on the applicant's quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site and the proximity of the monitor to the project site (approximately 1.3 km to the west).

C. National Ambient Air Quality Standards (NAAQS) Analysis

The De Minimis analysis modeling results indicate that 24-hr PM_{10}, 24-hr $PM_{2.5}$, 1-hr NO_2, and 8-hr CO exceed the respective de minimis concentration and require a full impacts analysis. The full NAAQS modeling results indicate the total predicted concentrations will not result in an exceedance of the NAAQS.

Table 4. Total Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m³)	Background (µg/m³)	Total Conc. = [Background + GLCmax] (µg/m³)	Standard (µg/m³)
PM_{10}	24-hr	26	102	128	150
$PM_{2.5}$	24-hr	33	Note background discussion below	33	35
NO_2	1-hr	140	44	184	188
CO	8-hr	1262	580	1842	10000

The 24-hr PM_{10} GLCmax is the maximum high, sixth high (H6H) predicted concentration over five years of meteorological data. The 24-hr $PM_{2.5}$ GLCmax is the highest five-year average of the 98^{th} percentile of the annual distribution of predicted 24-hr concentrations determined for each receptor. The 1-hr NO_2 GLCmax is the highest five-year average of the 98^{th} percentile of the annual distribution of predicted daily maximum 1-hr concentrations determined for each receptor. The GLCmax for CO is the maximum high, second high predicted concentration across five years of meteorological data.

Intermittent guidance was relied on for the 1-hr NO_2 NAAQS analysis.

The applicant used a different monitor for the PM_{10} background concentration. The ADMT supplemented the monitor that was used for the pre-application analysis since it was more conservative.

As noted above, background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482450021 located at 2200 Jefferson Dr., Port Arthur, Jefferson County. For the 24-hr $PM_{2.5}$ NAAQS analysis, the applicant included $PM_{2.5}$ background concentrations in the modeling using the BACKGRND keyword. The applicant determined the 98^{th} percentile from the annual distribution of the maximum daily 24-hr concentrations using data from 2016-2018 on a seasonal basis, consistent with EPA guidance. These background values were then used in the model (as seasonal background scalars) to be combined with model predictions giving a total predicted concentration.

A background concentration for NO_2 was obtained from the EPA AIRS monitor 482451035 located at 1800 N. 18th St., Nederland, Jefferson County. The three-year average (2017-2019) of the 98^{th} percentile of the annual distribution of the daily maximum 1-hr concentrations was used for the 1-hr value. The use of this monitor is reasonable based on the applicant's land use comparison and quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site.

As stated above, the applicant performed an analysis on secondary $PM_{2.5}$ formation as part of the PSD AQA. The analysis included project emissions of $PM_{2.5}$ precursor emissions (NO_x and SO_2), as well as $PM_{2.5}$ precursor emissions from nearby off-property sources that are recently permitted or currently being reviewed. The analysis is based on a Tier 1 demonstration approach consistent with the EPA's GAQM. Specifically, the applicant used a Tier 1 demonstration tool developed by the EPA referred to as MERPs. For the project-related emissions, the applicant used data associated with the 1,000 tpy Harris County source and estimated a 24-hr secondary $PM_{2.5}$ concentration of 0.135 $\mu g/m^3$. For the off-property source emissions, the applicant also used data associated with the 1,000 tpy Harris County source and estimated a 24-hr secondary $PM_{2.5}$ concentration of 1.62 $\mu g/m^3$. When these estimates are added to the GLCmax listed in Table 4 above, the results are less than the NAAQS. Though the applicant provided an analysis to support using data from the Harris County source, the applicant did not support using the 1000 tpy NO_x source data. Using data associated with the 3000 tpy Harris County NO_x source would have been more appropriate given the total NO_x emissions considered in the analysis. However, using data from the 3000 tpy source will not significantly affect the overall results. Also, as noted above, the EPA updated hypothetical source data; however, using these updated data would not change the overall outcome of the analysis.

D. Increment Analysis

The De Minimis analysis modeling results indicate that 24-hr and annual PM_{10} and 24-hr $PM_{2.5}$ exceed the respective de minimis concentrations and require a PSD increment analysis.

Table 5. Results for PSD Increment Analysis

Pollutant	Averaging Time	GLCmax (µg/m^3)	Increment (µg/m^3)
PM_{10}	24-hr	27	30
PM_{10}	Annual	5	17
$PM_{2.5}$	24-hr	8.8	9

The GLCmax for the 24-hr PM_{10} and 24-hr $PM_{2.5}$ are the maximum high, second high (H2H) predicted concentrations across five years of meteorological data. For annual PM_{10}, the GLCmax is the highest annual predicted concentration associated with five years of meteorological data.

The GLCmax for 24-hr $PM_{2.5}$ reported in the table above represents the total predicted concentration associated with modeling the direct $PM_{2.5}$ emissions and the contributions associated with secondary $PM_{2.5}$ formation (discussed above in the NAAQS Analysis section).

Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482450021 located at 2200 Jefferson Dr., Port Arthur, Jefferson County. The applicant evaluated the difference in ambient concentrations for the time period between 2019 and the major source baseline date (2010). A comparison of the annual monitored concentrations for 2010 and 2019 show a change in ambient concentrations of -2.02 µg/m^3. When the changes in ambient concentrations are subtracted from the annual $PM_{2.5}$ increment (4 µg/m^3), the difference is greater than the annual $PM_{2.5}$ De Minimis level. This monitor is reasonable based on the applicant's land use comparison, quantitative review of emissions sources in the surrounding area of the monitor site relative to the project site, and the proximity of the monitor to the project site (approximately five km to the northeast).

E. Additional Impacts Analysis

The applicant performed an Additional Impacts Analysis as part of the PSD AQA. The applicant conducted a growth analysis and determined that population will not significantly increase as a result of the proposed project. The applicant conducted a soils and vegetation analysis and determined that all evaluated criteria pollutant concentrations are below their respective secondary NAAQS. The applicant meets the Class II visibility analysis requirement by complying with the opacity requirements of 30 TAC Chapter 111. The Additional Impacts Analyses are reasonable and possible adverse impacts from this project are not expected.

The ADMT evaluated predicted concentrations from the proposed project to determine if emissions could adversely affect a Class I area. The nearest Class I area, Breton Wilderness, is located approximately 480 km from the project site.

The H_2SO_4 24-hr maximum predicted concentration of 0.04 µg/m^{3}occurred approximately 20 meters from the southern property line. The H_2SO_4 24-hr maximum predicted concentration occurring at the edge of the receptor grid, approximately 22 km from the project sources, in the direction of the Breton Wilderness Class I area is 0.001 µg/m^3. The Breton Wilderness Class I area is an additional 458 km from the edge of the receptor grid. Therefore, emissions of H_2SO_4 from the project site are not expected to adversely affect the Breton Wilderness Class I area.

The predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, and SO_2 for all averaging times are all less than de minimis levels at a distance of approximately 12 km from the project sources in the direction the Breton Wilderness Class I area. The Breton Wilderness Class I area is an additional 468 km from the location where the predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, and SO_2 for all averaging times are less than de minimis. Therefore, emissions from the project are not expected to adversely affect the Breton Wilderness Class I area.

F. Minor Source NSR and Air Toxics Review

Table 6. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	5.33	16.34
H_2SO_4	1-hr	0.1	1
H_2SO_4	24-hr	0.04	0.3

Table 7. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant	CAS#	Averaging Time	GLCmax (µg/m^3)	GLCmax Location	ESL (µg/m^3)
ammonia	7664-41-7	1-hr	17	Property Line	180
1-butene	106-98-9	1-hr	1808	Property Line	19000
1-butene	106-98-9	Annual	11	Property Line	1600
diesel fuel	68334-30-5	1-hr	794	Property Line	1000
ethylene	74-85-1	1-hr	3284	Property Line	1400
ethylene	74-85-1	Annual	53	Property Line	34

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	GLCmax Location	ESL ($\mu g/m^3$)
hexane, mixed isomers	92112-69-1	1-hr	1928	Property Line	5600
hexane, mixed isomers	92112-69-1	Annual	38	Property Line	200
hexene, mixed isomers	25264-93-1	1-hr	422	Property Line	1700
isopentane	78-78-4	1-hr	1657	Property Line	59000
n-octane	111-65-9	1-hr	68	Property Line	5600
n-octane	111-65-9	Annual	1.29	Property Line	540
n-decane	124-18-5	1-hr	35	Property Line	1700
dodecane	112-40-3	1-hr	32	Property Line	3500
tetradecane	629-59-4	1-hr	15	Property Line	3500
hexadecane	544-76-3	1-hr	7	Property Line	3500
octadecane	593-45-3	1-hr	3	Property Line	3500

Table 8. Minor NSR Hours of Exceedance for Health Effects

Pollutant	Averaging Time	1 X ESL GLCmax	2 X ESL GLCmax
ethylene	1-hr	20	4

G. Greenhouse Gases

EPA has stated that unlike the criteria pollutants for which EPA has historically issued PSD permits, there is no National Ambient Air Quality Standard (NAAQS) for GHGs, including no PSD increment. The global climate-change inducing effects of GHG emissions, according to the “Endangerment and Cause or Contribute Finding”, are far-reaching and multi-dimensional (75 FR 66497). Climate change modeling and evaluations of risks and impacts are typically conducted for changes in emissions that are orders of magnitude larger than the emissions from individual projects that might be analyzed in PSD permit reviews. Quantifying the exact impacts attributable to a specific GHG source obtaining a permit in specific places and points would not be possible [EPA's PSD and Title V Permitting Guidance for GHGs at 48]. Thus, EPA has concluded in other GHG PSD permitting actions it would not be meaningful to evaluate impacts of GHG emissions on a local community in the context of a single permit.

The TCEQ has determined that an air quality analysis would provide no meaningful data and has not required the applicant to perform one. As stated in the preamble to TCEQ's adoption of the GHG PSD program, the impacts review for individual air contaminants will continue to be addressed, as applicable, in the state's traditional minor and major NSR permits program per 30 TAC Chapter 116.

VIII. Conclusion

As described above, the applicant has demonstrated that the project meets all applicable rules, regulations and requirements of the Texas and Federal Clean Air Acts. The Executive Director's preliminary determination is that the permits should be issued.