Preliminary Determination Summary

INEOS OLIGOMERS USA LLC
Permit Numbers 136130 and N250M2

I. Applicant

INEOS Oligomers USA LLC (“INEOS”)
PO Box 2450
Alvin, TX 77512-2450

II. Project Location

INEOS Oligomers Chocolate Bayou
15916 FM Rd 2004
Brazoria County
Alvin, Texas 77511

III. Project Description

This project addresses the as-built corrections to the INEOS applications to construct a Linear Alpha Olefins (LAO) plant and a Poly Alpha Olefins (PAO) plant adjacent to the INEOS USA LLC steam cracker and polypropylene plant, located near Alvin, in Brazoria County.

Sources of emission covered by the permit include process vessels, piping components with fugitive emission potential; feed, intermediate and product storage; truck, railcar and barge loading operations; a cooling tower heat exchanger system, two hot oil heaters, a filter oven; an emergency generator. Process, storage and loading vents are directed to flare and thermal oxidizer controls and an emergency relief control system as appropriate. The application adjusted representations of operating parameters and throughputs of the equipment related to the air emission potential. The permit specifies operational requirements for control of the emissions and additionally specifies control requirements and work practice standards for all planned maintenance, startup, and shutdown (MSS) activities.

The original process construction authorizations were represented as major modifications at the site and the corrections will increase those significant potential emissions of NOx and VOC (ozone precursors). Lowest Achievable Emission Rate (LAER) will be applied for these pollutants, and emissions increases will be offset at a ratio of 1.3:1. This is the second modification of the Nonattainment Permit.

IV. Emissions

Air Contaminant	Proposed Allowable Emission Rates (tpy)
VOC	35.72
NO_x	24.98
SO_2	1.22
CO	97.94
$PM/PM_{10}/PM_{2.5}$	9.99 / 7.92 / 7.04
H_2S	0.01
H_2SO_4	0.01

NH_3	5.24
$Al(OH)_3$	0.99
NaOH	0.02

VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1
NOx - total oxides of nitrogen
SO2 - sulfur dioxide
CO - carbon monoxide
PM - total particulate matter, suspended in the atmosphere, including PM10 and PM2.5, as represented
PM_{10} - total particulate matter equal to or less than 10 microns in diameter, including PM2.5, as represented
$PM_{2.5}$ - particulate matter equal to or less than 2.5 microns in diameter
H_2S - hydrogen sulfide
H_2SO_4 - sulfuric acid
NH_3 - ammonia
$Al(OH)_3$ - aluminum hydroxide
NaOH - sodium hydroxide

All emissions are from the new facilities with the corrections as applied in this project. Therefore, the proposed allowable emission rates are the same as the project increases for purposes of Prevention of Significant Deterioration (PSD) and NNSR applicability. Total emission rates include both routine operation and MSS activities.

V. Federal Applicability

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

Pollutant	Project Emissions (tpy)	Major Mod Trigger (tpy)	NA Triggered Y/N	PSD Triggered Y/N
VOC	35.72	25 for NA 40 for PSD	Y	N
NO_x	24.98	25 for NA 40 for PSD	Y*	N
SO_2	1.22	40	NA	N
CO	97.94	100	NA	N
PM	9.99	25	NA	N
PM_{10}	7.92	15	NA	N
$PM_{2.5}$	7.04	10	NA	N
H_2SO_4	0.01	7	NA	N

H_2S	0.01	10	NA	N

* Company designation as follows:

The proposed project only involves the correction of the emission estimates and construction representations of new emissions units, so the actual-to-potential test is used to determine NNSR applicability. Baseline actual emissions of new units are assumed to be zero. The potential to emit of the new sources will be 35.72 tpy VOC and 24.98 tpy NOx (ozone precursors). These figures exceed the 5 tpy netting trigger for Brazoria County a severe ozone nonattainment area. Rather than performing project-wide or site-wide contemporaneous netting under Title 30, Texas Administrative Code (30 TAC) § 116.150(c), INEOS has elected to apply NNSR directly to the project, as provided for under 30 TAC § 116.12(20)(A).

The project is located at an existing major source (named source with potential to emit more than 100 tpy of any pollutant) and is located in an attainment area for all criteria pollutants except ozone. Project increases are less than the applicable significant emission rates as noted in the table above, so PSD review is not required. Since PSD review does not apply for emissions of traditional pollutants, PSD and BACT requirements for emissions of greenhouse gases do not apply.

VI. Control Technology Review

All proposed new or modified sources in this application are required to meet LAER for VOC and NOx, and state minor NSR BACT for other criteria pollutants. The applicant's LAER control proposals were evaluated by comparing the proposed emission rates to entries in the EPA's RACT/BACT/LAER Clearinghouse (RBLC), applicable NSPS, NESHAPs, and Texas and South Coast Air Quality Management District (SCAQMD) Reasonably Available Control Technology (RACT) requirements. This follows the approach applied and consistent with the previous initial and amendment projects for this permit (Project Nos. 242684, 253577 and 271115). New sources and changes to control determinations from the previous projects are as follows:

Corrected LAO normal process emissions and fugitive emissions connected to control are directed to the flare (EPN FLR-1) with a minimum of 98% DRE as noted below. This satisfies LAER for VOC.

Corrected PAO normal process emissions and fugitive emissions connected to control are directed to the thermal oxidizer (EPN THOx) with a 99.9% DRE as noted below. This satisfies LAER for VOC.

LAO and PAO Plant Equipment Leak Fugitives (EPNs FUG & FUG-2)
Component count calculation corrections were made. Control as previously represented was maintained. Leaks from piping components are minimized through use of the 28LAER leak detection and repair (LDAR) program. The permit requires quarterly instrument monitoring of accessible components using a leak definition of 500 ppmv. Directed maintenance on leaking components must be performed no later than 15 days after a leak is found. All pumps, compressors and agitators must be constructed with a shaft sealing system that prevents or detects emissions of VOC from the seal. 28LAER inspection and repair requirements are supplemented with additional physical inspection requirements for components in heavy liquid service. Piping in ammonia service (associated with the SCR system) must be monitored once per shift for leaks by audio, visual and/or olfactory means. This satisfies BACT for NH3 and LAER for VOC.

Fixed roof tanks (EPNs T-7813A, T-7813B,T-7857, T-7815A, T-7815B, T-7859, T-7819A, T-7819B, T-7821A, T-7821B, T-7582A, T-7582B, T-7722A, T-7722B, T-7584A, T-7584B, T-7586A, T-7586B, T-7724A, T-7724B, T-7726A, T-7726B, T-7728A, T-7728B, T-7729, T-7531, GASTK, DIESELTK, DIESELTK_2, T-7823, T-7951, T-7906, T-7962).
Calculation corrections were made. Control as previously represented was maintained. Except for the very small 250-gallon gasoline storage tank the stored materials have low vapor pressures (< 0.10 psia). The permit requires bottom or submerged fill, and that the tanks be painted white or unpainted aluminum. This satisfies LAER for the VOC storage tanks and BACT for the non-VOC storage tanks.

Internal floating roof tanks (Identified as T-7801, T-7802, T-7807A, T-7807B, T-7851, T-7809A, T-7809B, T-7853, T-7811A, T-7811B, T-7855, T-7712, T-7721, T-7532A and T-7533).
Control as previously represented was maintained. Uninsulated tank surfaces exposed to the sun are expected to be white or aluminum. The permit requires that all floating roof tanks have a mechanical shoe primary seal. All working and standing losses from these tanks will be captured and directed to the thermal oxidizer (EPN THOX) for control at 99.9% DRE as noted below. The floating roof and then thermal oxidizer control satisfies LAER.

Truck, railcar, and barge loading [EPNs L-1 (LAO Truck and Railcar Loading), L-2 (PAO Truck and Railcar Loading), BARGELOAD (LAO & PAO Barge loading) and LOADCAP (LAO & PAO Annual Barge, Railcar and Truck Loading Cap)
Calculation corrections were made. Control as previously represented was maintained. Truck, railcar, and barge loading of the low volatility (<0.01 psia) LAO and PAO products does not require control of the displaced vapors. The higher volatility (>0.10 psia) raw materials and products, hexene, 1-octene, 1-decene and $NaBF_4$ (10% Propanol), loading vapor displacement from trucks and railcars are controlled by the thermal oxidizer (EPN THOx) and barge loading is controlled by the Marine Vapor Combustion Unit (EPN MCVU), both with 99.9% VOC DRE as noted below. Vapor displacement loading and other losses are limited in all cases by bottom or submerged loading, visual inspection that all components are free of defects prior to hookup and required cessation of loading if liquid leaks are observed. Vapor leakage from the transport vessels is limited by requiring all trucks loaded to have passed vapor-tight testing every 12 months using the methods described in Title 40 Code of Federal Regulations Part 63 (40 CFR 63), Subpart R and railcars to have a current certification in accordance with U.S. Department of Transportation (DOT) pressure test requirements of 49 CFR §173.31. Barges required to control displacement vapors must be vacuum loaded. These loading procedures and control satisfies LAER for VOC.

Cooling Tower (EPN CT-1)
Calculation corrections were made. Control as previously represented was maintained. Leaks of process fluids into cooling water in the plant heat exchange system are limited through periodic monitoring of the strippable VOC content of the water in line returning water to the cooling tower (EPN CT 1). Monitored concentrations in excess of 50 ppbw (3.9 ppmv in stripping air) will trigger corrective action. Total dissolved solids (TDS) in the cooling water are limited to 5,000 ppmw. Particulate emissions from the cooling tower are limited through the use of drift eliminators with a guaranteed drift rate not to exceed 0.001%. This satisfies BACT for PM and LAER for VOC.

Hot oil heater (EPN HTR-1)
Minor calculation corrections for CO were made. Control as previously represented was maintained. The hot oil heater is a natural gas-fired thermal fluid heater which supplies process heat to heat exchangers and reboilers. It has a maximum firing rate of 261 MMBtu/hr (HHV basis). NOx emissions are limited to 0.014 lb/MMBtu (HHV basis) on a 1-hr block average, and 0.006 lb/MMBtu (HHV basis) on an annual average through the use of low-NOx burners and selective catalytic reduction (SCR). During periods of MSS (not to exceed 150 hours per year), the hourly NOx limit is 0.100 lb/MMBtu (HHV basis). The annual limit applies at all times.

Ammonia injection must be limited such that ammonia slip does not exceed 10 ppmv (corrected to 3% O2, dry basis) on a 1-hr block average. CO emissions are limited to 50 ppmv (corrected to 3% O2, dry basis) on a 1-hr block average basis. Particulate and VOC emissions are estimated using vendor factors that are below the AP-42 factors for good natural gas combustion. SO_2 emissions are minimized through the use of sweet natural gas containing no more than 0.2 grains total sulfur per 100 dry standard cubic feet. This satisfies BACT for CO, PM and SO2 and LAER for VOC and NOx.

Heater No. 2 (EPN HTR-2)
The small 17.9 MMBtu/hr heater was added to provides additional hot oil capacity. The burners are being upgraded to ultra-low NOx meet 0.01 lb/MMBtu. CO emissions are limited to 50 ppmv (corrected to 3% O2, dry basis) on a 1-hr block average basis. Particulate and VOC emissions are estimated using vendor factors that are below the AP-42 factors for good natural gas combustion. SO2 emissions are minimized using sweet natural gas containing no more than 0.2 grains total sulfur per 100 dry standard cubic feet. This satisfies BACT for CO, PM and SO2 and LAER for VOC and NOx.

Filter Oven (EPN OVEN-1)
The filter oven is a gas fired oven used to remove polymeric build-up from process filter baskets. Emissions of products of combustion are estimated using AP 42 (Chap. 1) factors for combustion of natural gas and fuel oil as a surrogate for combusted polymer, with a 99% destruction of the polymer. The oven is automated to insure a 1560^{o}F temperature for good polymer and natural gas combustion and satisfies LAER.

Marine Vapor Combustor Unit (EPN MVCU)
Calculation corrections were made for this control device. The thermal oxidizer must achieve a destruction/removal efficiency of not less than 99.9% for VOC. This is ensured by maintaining the combustion chamber temperature at no less than 1,764 °F (6-min averaging.) as established by initial stack testing. The permit limits collateral emissions of NOx to 0.06 lb/MMBtu (1-hr averaging). Emissions of CO and PM are limited through good combustion practices and are estimated using AP-42 Natural Gas combustion factors. Visible emissions for periods longer than 5 minutes are prohibited. This satisfies BACT for CO and PM, and LAER for VOC and NOx.

Reactor Emergency Relief system (EPN RER)
There was no change to this device. The reactor emergency relief system is an underground, partially enclosed combustion chamber intended to contain a release from a catastrophic failure of the chain displacement reactor due to over-pressuring. The permit requires that the reactor be designed to relieve to this system in the event of an emergency. Operations covered by the permit are limited to combustion of pilot and purge gas.

Thermal Oxidizer (EPN THOX)
Calculation corrections were made for this control device. The thermal oxidizer must achieve a destruction/removal efficiency of not less than 99.9% for VOC. This is ensured by maintaining the combustion chamber temperature at no less than 1,731 °F (6-min averaging.) as established by initial stack testing. The permit limits collateral emissions of NOx to 0.06 lb/MMBtu (1-hr averaging). Emissions of CO and PM are limited through good combustion practices and are estimated using vendor emission factors. Visible emissions for periods longer than 5 minutes are prohibited. This satisfies BACT for CO and PM, and LAER for VOC and NOx.

Flare (EPN FLR-1)
Calculation corrections were made for this control device. The flare system is a control device for MSS activities except equipment at the PAO plant that may contain water vapor from being routed through the BF3 scrubber cannot be routed to the flare for MSS. Instead, this equipment is routed to the thermal oxidizer for MSS activities. The flare is assumed to achieve 99% destruction

for compounds with three carbons or less, and 98% for all other VOC species. The permit requires that the flare meet the tip velocity and heating value requirements of 40 CFR § 60.18 at all times. Compliance is to be demonstrated through data collected by the required continuous VOC analyzer and total vent stream flow meter, to be installed immediately upstream of the flare. This satisfies LAER for VOC and NOx.

Diesel Generator (EPN DIESEL-1)
The emergency generator was revised to a much larger engine meeting EPA construction standards that should not exceed. 3.90 g NOx/hp-hr, 0.40 g CO/hp-hr, 0.08 g VOC/hp-hr and 0.03 g PM/hp-hr. Fuel is limited to ultra-low sulfur diesel (15 ppmw total sulfur) by permit condition. Use of gaseous fuel is not technically feasible due to the need to operate the engine during emergency situations (when pipeline access may be restricted). The engine is limited to 100 hours of non-emergency operation for the purposes of testing and maintenance (specific permissible non-emergency situations are defined at 40 CFR § 63.6640(f)), and must be equipped with a non-resettable runtime meter (or "hour meter"). SCAQMD Rule 1110.2 does not apply to emergency standby engines which are limited by permit condition to less than 200 hours per year.

Planned Maintenance, Startup, and Shutdown (MSS) representations and EPNs were revised. Emissions directly to the atmosphere or through control on portable vacuum trucks (carbon canister) are accounted in EPN MSS. Tank and equipment degassing are directed to the thermal oxidizer (EPN THOx) and the flare (EPN FLR-1) and must meet the same control standards as noted above. MSS emissions from the thermal oxidizer are accounted separately from normal emissions. MSS emissions from the flare have a high short term allowable for VOC, NOx and CO separate from the normal emission allowable, with annual MSS and normal emissions combined. Degassing of tanks and process equipment to control is required where VOC vapor pressures exceed 0.10 psia at 95°F or process temperature and vapor space must be below 10,000 ppmv as methane or <3% of the LEL with a minimum of 3 air changes before measurement unless liquids are flushed out with dodecene and then the vessel vapors are purged to control. Liquids must be removed to the extent practical prior to opening equipment. A 6 lb emission exception is allowed for equipment where there is no connection to control available. Forced ventilation with purge gas, fans, blowers, air movers may not be used on the equipment or vessel being cleared when it is open to the atmosphere. Vacuum trucks must equip with a duckbill or equivalent if the hose cannot be submerged and all use of vacuum pumps or blowers must limit emissions to 100 ppmv. Temporary tanks and vessels used in support of MSS activities must be bottom filled and be white or aluminum if they can have breathing losses, unless they are smaller than 450 gallons and do not have breathing losses. The sporadic use of aerosol spray cans is considered an inherently low emitting activity with the potential VOC accounted and confirmed annually. This satisfies LAER for VOC and NOx and BACT for CO, SO_2, and PM as noted above for the combustion control.

VII. Air Quality Analysis

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

A. Minor Source NSR and Air Toxics Review

Table 1. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (μg/m³)	De Minimis (μg/m³)

SO_2	1-hr	0.09	20.42
H_2S	1-hr	0.0002	2.16

Table 2. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	0.09	7.8
SO_2	3-hr	0.08	25
PM_{10}	24-hr	0.7	5
$PM_{2.5}$	24-hr	0.5	1.2
$PM_{2.5}$	Annual	0.03	0.2
NO_2	1-hr	5.1	7.5
NO_2	Annual	0.2	1
CO	1-hr	114	2000
CO	8-hr	102	500

The GLCmax are the maximum predicted concentrations associated with one year of meteorological data.

The justification for selecting the EPA's interim 1-hr NO_2 and 1-hr SO_2 De Minimis levels was 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 $PM_{2.5}$ 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 a $PM_{2.5}$ NAAQS based on the analyses documented in EPA guidance and policy memoranda[3].

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

[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

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 worst-case hypothetical source, the applicant estimated 24-hr and annual secondary $PM_{2.5}$ concentrations of 0.015 µg/m^3 and 0.0006 µg/m^3, respectively. When these estimates are added to the GLCmax listed in the table above, the results are less than the De Minimis levels.

Table 3. Generic Modeling Results

Source ID	1-hr GLCmax (µg/m^3 per lb/hr)	Annual GLCmax (µg/m^3 per tpy)
BG_LD	546.9	-
CT	4.42	0.06
DIES_TK	19.85	-
DIES_TK2	19.99	-
DIESEL1	13.97	-
FLR1	0.3	0.003
FLR1MSS	0.22	0.002
FUG	9.49	0.29
FUG_2	22.2	0.78
GASTK	19.75	-
HTR1	0.33	-
HTR2	1.86	-
L_1	11.48	-
L_2	9.85	-
MISCMSS	37.26	-
MVCU	2.93	0.02
OVEN1	3.24	0.06
PIPE_LAO	18.66	-

PIPE_PAO	33.78	-
T_7531	41.68	-
T_7532AM	42.3	1.06
T_7533M	52.46	-
T_7582A	38.11	-
T_7582B	41.63	-
T_7584A	70.85	-
T_7584B	73.4	-
T_7586A	81.49	-
T_7586B	90.24	-
T_7712M	35.65	-
T_7721M	38.62	-
T_7722A	40.18	-
T_7722B	40.14	-
T_7724A	54.78	-
T_7724B	54.8	-
T_7726A	61.29	-
T_7726B	63.09	-
T_7728A	74.14	-
T_7728B	75.16	-
T_7729	89.27	-
T_7801M	16.97	-
T_7802M	13.99	-

T_7807AM	20.71	-
T_7807BM	17.99	-
T_7809AM	22.74	-
T_7809BM	26.47	-
T_7811AM	21.97	-
T_7811BM	26.38	-
T_7813A	39.55	-
T_7813B	36.58	-
T_7815A	30.78	-
T_7815B	30.54	-
T_7819A	34.32	-
T_7819B	33.92	-
T_7821A	25.34	-
T_7821B	25.31	-
T_7823	25.28	-
T_7851M	24.1	-
T_7853M	20.06	-
T_7855M	20.16	-
T_7857	45.28	-
T_7859	40.03	-
T_7906	29.19	-
T_7962	14.71	-
THOX	1.49	0.01

THOXMSS	1.49	0.01
VAC_LAO	21.38	-
VAC_PAO	37.02	-

Table 4. Minor NSR Production Project-Related Modeling Results for Health Effects

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	10% ESL ($\mu g/m^3$)
1-hexene	592-41-6	1-hr	85.7	170
1-octene	111-66-0	1-hr	13	340

Table 5. Minor NSR MSS Project-Related Modeling Results for Health Effects

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	25% ESL ($\mu g/m^3$)
1-octene	111-66-0	1-hr	562	850

The project-related modeling results in Tables 4 and 5 represent all project increases since the most recent site-wide analysis.

Table 6. Minor NSR MSS Project-Related Modeling Results for Health Effects

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	ESL ($\mu g/m^3$)
1-hexene	592-41-6	1-hr	572	1700
distillates (petroleum), hydrotreated light	64742-47-8	1-hr	932	3500

The applicant did not properly report MERA Steps 4 and 5 in the EMEW; however, the ADMT supplemented the results in Tables 4, 5, and 6 above with the results reported in the supplemental MERA spreadsheet.

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

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	GLCmax Location	ESL ($\mu g/m^3$)
1-decene	872-05-9	1-hr	3041.3	N/A	5700
1-dodecene	112-41-4	1-hr	2765.1	N/A	5700
1-hexadecene	629-73-2	1-hr	615.8	N/A	5700

1-eicosene+	3452-07-1	1-hr	771.6	N/A	5700
sodium fluoborate	13755-29-8	1-hr	11.2	Central property line	17

Table 8. Minor NSR Site-wide Modeling Results for Health Effects in Agricultural Areas

Pollutant	CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	GLCmax Location	ESL ($\mu g/m^3$)
sodium fluoborate	13755-29-8	1-hr	2.02	115m NE	2.8 (For air permit reviews in agricultural areas)

The GLCmax locations for 1-decene, 1-dodecene, 1-hexadecene, and 1-eicosene+ could not be determined due to the method used in the generic modeling – individual source predictions added independent of time and space. The GLCmax and agricultural GLCmax locations for sodium fluoborate are listed in Tables 7 and 8 above, respectively. The locations are listed by their approximate distance and direction from the property line of the project site.

1. Model Used and Modeling Techniques

AERMOD (Version 21112) was used in a refined screening mode for the CO, PM_{10}, $PM_{2.5}$, and health effects analyses. AERMOD (Version 22112) was used in a refined screening mode for the H_2S, SO_2, and NO_2 analyses. Based on how the model was set up and run, using these different versions of the model will not affect the outcome of the analysis.

For the health effects analyses, unitized emission rates of 1 lb/hr and 1 tpy were used to predict a generic short-term and long-term impact for each source, respectively. The generic impact was multiplied by the proposed pollutant-specific emission rates to calculate a maximum predicted concentration for each source. The maximum predicted concentration for each source was summed to get a total predicted concentration for each pollutant. The total concentrations were compared to 10% of their corresponding ESLs at MERA Step 3. 1-decene; 1-dodecene; 1-hexadecene; 1-hexene; 1-octene; distillates (petroleum), hydrotreated light; 1-eicosene+; and sodium fluoborate were further evaluated at MERA Steps 4, 5, and 7. Pollutant-specific modeling was conducted for the site-wide sodium fluoborite analysis. All other pollutants met criteria of MERA Step 3.

In the generic modeling analysis, the applicant equally divided the generic rates for the cooling tower cells (EPN CT-1), the LAO plant fugitives (EPN FUG), and the PAO plant fugitives (EPN FUG-2). The applicant modeled each EPN as its own source group as follows:

- Source group CT - three sources (model IDS CT1_1, CT1_2, and CT1_3) were modeled for EPN CT-1 at 0.33 lb/hr each.
- Source group FUG - two sources (model IDs FUG_P and FUG_T) were modeled for EPN FUG at 0.5 lb/hr each.

- Source group FUG_2 - two sources (model IDs FUG_2P and FUG_2T) were modeled for EPN FUG-2 at 0.5 lb/hr each.

The resulting impact from each source group was used in the MERA analysis calculations.

The EMEW lists full conversion for the annual NO_2 NAAQS analysis; however, the applicant conducted the 1-hr and annual NO_2 NAAQS analyses using the ARM2 model option following EPA guidance.

A. Land Use

Medium roughness and elevated terrain were used in the modeling analysis. These selections are consistent with the AERSURFACE analysis, topographic map, DEMs, and aerial photography. The selection of medium roughness is reasonable.

The EMEW reports that low surface roughness was used; however, as noted above, the applicant used medium surface roughness, which is consistent with their analysis.

B. Meteorological Data

Surface Station and ID: Angleton, TX (Station #: 12976)
Upper Air Station and ID: Lake Charles, TX (Station #: 3937)
Meteorological Dataset: 2016
Profile Base Elevation: 7.3 meters

C. Receptor Grid

The grid modeled was sufficient in density and spatial coverage to capture representative maximum ground-level concentrations.

D. Building Wake Effects (Downwash)

Input data to Building Profile Input Program Prime (Version 04274) are consistent with the aerial photography, plot plan, and modeling report.

2. Modeling Emissions Inventory

The modeled emission point and volume source parameters and rates are generally consistent with the modeling report (see the discussion below on PM rates with the emergency engine). The source characterizations used to represent the sources are appropriate.

The computation of the effective stack diameters for the flares is consistent with TCEQ modeling guidance.

Emergency engines cannot be tested between the hours of 6 am and 12 pm in the Houston-Galveston-Brazoria (HGB) ozone nonattainment area (Title 30 of the Texas Administrative Code Chapter § 117.2030(c) or 117.310(f), as applicable). To account for this operational limitation, the modeled emission rates for EPN DIESEL-1 were multiplied by 0 during the hours of 6 am to 12 pm.

For the 1-hr NO_2 de Minimis analysis, emissions from the emergency engine (EPN DIESEL-1) and MSS activities from the thermal oxidizer (EPN THOx) were modeled with an annual average emission rate, consistent with EPA guidance for evaluating intermittent emissions. Emissions from the emergency engine and MSS activities from the thermal oxidizer were represented to occur for no more than 100 hours per year.

The emergency engine was also modeled with 24-hr average emission rates for the 24-hr PM_{10} and $PM_{2.5}$ analyses. The 24-hr emission rates were based on one hour of operation in an 18-hour period due to the limitation noted above. The applicant inadvertently modeled double the average rate; however, this is conservative and will not change overall results.

According to the applicant, five types of MSS activities can occur for the elevated flare (EPN FLR-1): LAO startup, LAO shutdown, PAO startup, PAO miscellaneous equipment de-pressuring, and LAO miscellaneous equipment de-pressuring. For the 1-hr NO_2 de Minimis analysis, an annual average emission rate was calculated for the LAO miscellaneous equipment de-pressuring emission rate, consistent with EPA guidance for evaluating intermittent emissions. LAO miscellaneous equipment de-pressuring emissions were represented to occur for no more than 100 hours per year. This annual average emission rate was added with the maximum rate of the other four MSS rates (LAO startup), and this total was modeled as a single source (model ID FLR1MSS).

Except as noted above, maximum allowable hourly emission rates were used for the short-term averaging time analyses, and annual average emission rates were used for the annual averaging time analyses.

VIII. Offsets

The project is located in the Houston-Galveston-Brazoria Severe Ozone Nonattainment Area. The permit requires that INEOS offset project increases of VOC and NOx at a ratio of 1.3 to 1. The permit requires that all offset requirements be satisfied through participation in the TCEQ Emissions Banking and Trading (EBT) programs, as specified by Rule (30 TAC Chapter 101, Subchapter H). VOC offsets must be supplied through use of VOC Emission Reduction Credits (ERCs, 30 TAC Chapter 101, Subchapter H, Division 1). NOx offsets must be supplied through use of NOx ERCs, and optionally through use and surrender of Mass Emissions Cap and Trade (MECT) allowances for sources subject to the MECT program (30 TAC Chapter 101, Subchapter H, Division 3).

The permit holder shall use 47.9 tpy of VOC emission reduction credits (ERCs) and 33.0 tpy of NOx ERCs and Mass Emission Cap and Trade (MECT) allowances to offset the 35.62 tpy VOC and 24.93 tpy NOx project emission increase for the facilities authorized by this permit. The Emissions Banking and Trading program confirmed EBT Project numbers, ERC Certificate numbers and MECT Allowances and the available credits to be used are available and the permit lists the credits used.

IX. Alternative Site Analysis and Compliance Certification

Alternative sites were considered in the original applications where INEOS submitted an analysis demonstrating that the use of alternative sites, sizes, and/or production processes would outweigh any environmental benefits accruing from location in an attainment area. Infrastructure requirements, including access to pipeline-born ethylene of suitable quality, severely limit the number of feasible sites within the states.

X. Conclusion

The applicant has demonstrated that the project meets all applicable rules, regulations and requirements of the Texas and Federal Clean Air Acts. The permit is recommended for issuance.