

TCEQ Interoffice Memorandum

To: Brandon Marsh, P.E.
Chemical Section

Thru: Chad Dumas, Team Leader
Air Dispersion Modeling Team (ADMT)

From: Justin Cherry, P.E.
ADMT

Date: September 14, 2025

Subject: Air Quality Analysis Audit – Houston Refining LP (RN100218130)

1. Project Identification Information

Permit Application Number: 2167

New Source Review (NSR) Project Number: 381473

ADMT Project Number: 9925

County: Harris

Air Quality Analysis: Submitted by Trinity Consultants, August 2025, on behalf of Houston Refining LP. Additional information was provided September 2025.

2. Report Summary

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

A. Minor NSR and Air Toxics Analysis

Houston Refining LP provided a qualitative analysis of NO₂, CO, SO₂, PM₁₀, and PM_{2.5}. For these pollutants, the applicant analyzed the total project emissions change and found that the result is a net decrease in emissions. The applicant also evaluated the NO₂, CO, SO₂, PM₁₀, and PM_{2.5} source types and locations to determine where the emission increases and decreases occur. With the exception of EPNs 136-VCU and 136-LOAD, the proposed sources and sources to be removed are confined to the same general area. Since EPN 136-VCU is not near the other sources, ADMT evaluated the emissions of NO₂, CO, SO₂, PM₁₀, and PM_{2.5} for EPN 136-VCU utilizing the unit impact multipliers for this source noted in Table 1 below. The 8-hr and 24-hr unit impact multipliers were derived by multiplying the 1-hr maximum predicted concentration for EPN 136-VCU by 0.9 and 0.6, respectively. All predicted concentrations were below the applicable de minimis values. Please note that there are no NO₂, CO, SO₂, PM₁₀, and PM_{2.5} emissions associated with EPN 136-LOAD. Based on the applicant's demonstration and the supplemental demonstration by ADMT, it was concluded that the total project emissions change for NO₂, CO, SO₂, PM₁₀, and PM_{2.5} will not

TCEQ Interoffice Memorandum

cause or contribute to a condition of air pollution or a violation of the National Ambient Air Quality Standards or state property line standards, as applicable.

Table 1. Generic Modeling Results

Source ID	1-hr GLCmax ¹ (µg/m ³ per lb/hr)	Annual GLCmax (µg/m ³ per lb/hr)
TO	1.55	0.20
C022	3.83	0.35
C023	4.90	0.87
C031	3.53	0.23
C042	2.87	0.10
C101	3.79	0.23
C201	3.65	0.23
FUG [FUG1 – FUG2]	6.58	1.02
136VCU	6.65	0.59
136LOAD	26.09	6.16
134FUG	3.65	0.70
136FUG	3.12	0.49
138FUG	3.65	0.56
236FUG [F236_01 – F236_02]	2.80	0.45
634FUG [F634_01 – F634_02]	2.28	0.36
636FUG [F636_01 – F636_04]	2.29	0.41

The applicant did not report the generic modeling results for Model IDs C022, C023, C031, C101, and C201. The ADMT supplemented these results based on the modeling output file in Table 1 above.

¹ Ground level maximum concentration

TCEQ Interoffice Memorandum

Table 2. Minor NSR Project (Increases Only) Modeling Results for Health Effects

Pollutant	CAS# ²	Averaging Time	GLCmax (µg/m ³)	10% ESL ³ (µg/m ³)
benzene	71-43-2	1-hr	0.20	17
benzene	71-43-2	Annual	0.03	0.45
diesel fuel	68334-30-5	1-hr	25.80	100
ethylene	74-85-1	1-hr	0.11	140
ethylene	74-85-1	Annual	0.02	3.4
n-butane	106-97-8	1-hr	0.27	6600
1-butene	106-98-9	1-hr	0.27	1900
1-butene	106-98-9	Annual	0.04	160
n-pentane	109-66-0	1-hr	0.16	5900
1-pentene	109-67-1	1-hr	0.16	29
pyrolysis fuel oil (< 25% benzene)	69013-21-4	1-hr	13.29	25
paraffin oil	8012-95-1 (Vapor)	1-hr	1.20	100
petroleum distillates	8002-05-9	1-hr	15.38	350

3. Model Used and Modeling Techniques

AERMOD (Version 24142) was used in a refined screening mode.

A unitized emission rate of 1 lb/hr was used to predict a generic short-term and long-term impact for each source. 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 maximum predicted concentrations were compared to 10% of their respective ESLs [Step 3 of the Modeling and Effects Review Applicability (MERA) guidance]. All pollutants fell out of the MERA at Step 3.

² Chemical Abstract Service Number

³ Effects Screening Level

TCEQ Interoffice Memorandum

Please note that the 1 lb/hr unitized emission rate was evenly distributed between Model IDs FUG1 and FUG2, F236_01 and F236_02, F634_01 and F634_02, and F63_01 thru F636_04. The applicant used source groups (Source Group IDs FUG, 236FUG, 634FUG, and 636FUG, respectively) to combine the unit impacts for the MERA Step 3 calculations.

A. Land Use

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

The urban option was used in AERMOD to account for enhanced night-time dispersion due to heat island effects associated with the urban area and heat generated from nearby industrial sources. The population chosen was 2,300,000 people. The applicant followed EPA guidance from Section 5 of the AERMOD Implementation Guide.

B. Meteorological Data

Surface Station and ID: Houston, TX (Station #: 12918)
Upper Air Station and ID: Lake Charles, LA (Station #: 3937)
Meteorological Dataset: 2020
Profile Base Elevation: 14.3 meters

C. Receptor Grid

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

A single property line designation (SPLD) exists between Houston Refining LP, Channel Energy Center, L.P. (RN100213107), and Shell Pipeline Company LP (RN104860002). The single property line boundary was used in the modeling demonstration for the property line receptors, as well as all other parts of the Lyondell-Citgo Refining Company Ltd property.

D. Building Wake Effects (Downwash)

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

The applicant did not include tanks in the vicinity of Model ID 136VCU in the downwash analysis. The applicant provided test modeling that this discrepancy does not change overall conclusions.

TCEQ Interoffice Memorandum

4. Modeling Emissions Inventory

The modeled emission point and volume source parameters and rates were consistent with the modeling report. The source characterizations used to represent the sources were appropriate.

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.