



Illinois Environmental Protection Agency

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JB Pritzker, Governor

James Jennings, Acting Director

MEMORANDUM

Date: April 17, 2026
To: Pinto Veliyath, FESOP/State Permits/BOA
From: Amanda Williams and Zach Lythgoe, Modeling Unit, Permits/BOA
Subject: Road Production Materials LLC, ID 161025AFK, Permit Application 25100013

Brownfield Environmental Engineering (Brownfield), on behalf of Road Production Materials LLC (RPM), submitted a FESOP Construction and Operating Permit Application for a counterflow drum-mix asphalt plant. The proposed facility would be exclusively fueled with natural gas. The facility would be located at 16700 20th Avenue North in East Moline, Illinois. Centering coordinates for this facility are UTM Zone 16 coordinates 217608 meters (m) Easting and 4603958 meters (m) Northing.

As of the date of this application submittal, RPM's new facility would be located in an area of Environmental Justice (EJ) concern as identified using Illinois EPA EJ Start. The issued permit would allow increases in permitted emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM_{2.5} and PM₁₀), volatile organic molecules (VOMs), and hazardous air pollutants (HAPs). Consequently, Illinois Environmental Protection Agency (IEPA) requested RPM submit an air quality analysis as part of its permit application to ensure the project would not threaten or compromise existing National Ambient Air Quality Standards (NAAQS) for any pollutant with an increase in permitted emissions.

In response, RPM contracted GZA GeoEnvironmental, Inc. (GZA) to conduct a detailed air quality dispersion modeling analysis to assess the potential impact of the drum-mix asphalt plant on air quality from emissions of carbon monoxide (CO), particulate matter (PM_{2.5} and PM₁₀), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), volatile organic materials (VOM), and hazardous air pollutants (HAPs).

Modeling Unit Analysis

GZA submitted an air quality analysis summary for RPM along with modeling files to the Modeling Unit electronically on February 20th, 2026. The following main dot entries identify key aspects of the modeling methodology used in this analysis.

- GZA used AERMOD (version 24142). AERMOD is a federally approved regulatory model appropriate for use in an air quality analysis of this nature. The audit runs done by the Modeling Unit, also used this version.
- Modeling inputs utilized IEPA- and USEPA-recommended default regulatory options to simulate phenomena such as atmospheric stability, plume rise, and downwash. The model used five years of locally representative meteorology. The Modeling Unit obtained National Weather Service (NWS)



meteorological data files for the years 2020 through 2024 from the National Centers for Environmental Information (NCEI). This data came from the National Weather Service: surface data from Quad City International Airport in Rock Island County and upper air data from the National Weather Service in Davenport, IA. The data was processed using AERMET (version 24142).

- AERMOD’s terrain tool, AERMAP (version 24142), was used to find the elevations of receptors, sources, and buildings. It reads detailed elevation maps from the National Elevation Database (NED) provided by the United States Geological Survey (USGS). The area covered by the maps matched the study area, as recommended by USEPA. The site elevation at the Road Production Materials facility is about 175.8 meters above sea level.
- GZA utilized a Cartesian grid to distribute a total of 481 receptors, with receptors placed every 50 meters along the facility's property line. The following receptor grid densities in **Table 1** were applied:

**Table 1
Receptor Grid**

Discrete Cartesian Grid Format	
Spacing of Receptors	Range
50 m	Property Line out to 200 m.
100 m	200 m to 500 m.
250 m	500 m to 1500 m.

- GZA used USEPA’s Building Profile Input Program Building to account for downwash effects on plumes from the stacks at the facility.
- GZA selected the rural modeling option in their analysis. The Modeling Unit conducted an Auer’s Analysis as part of its review to characterize the area surrounding RPM and to determine whether the AERMOD rural option should be implemented. Results of the analysis showed that the surrounding area is approximately 87.6% rural and 12.4% urban. The Modeling Unit audit supports the rural modeling option used by GZA.
- The US EPA’s Appendix W¹, section 4.2.3.4 outlines the three tiers for modeling the conversion of NO_x to NO₂:
 - Tier 1: Assumes that all the NO_x emitted from the source’s emissions units is converted to NO₂.
 - Tier 2: Uses a representative atmospheric equilibrium default value, developed from conversion ratios based on monitored NO_x and NO₂ concentrations.
 - Tier 3: Allows for a detailed analysis using either the Ozone Limiting Method (OLM) or the Plume Volume Ratio Method (PVMRM) as regulatory screening options in AERMOD. These methods account for Ozone titration chemistry and the resulting NO₂ concentrations.

GZA applied a Tier 2 approach to model NO₂. GZA used the regulatory default Ambient Ratio Method (ARM2) option in AERMOD, which utilized Ambient NO₂/NO_x ratios ranging from 0.5 (lower limit) to 0.9 (upper limit).

¹ https://www.epa.gov/system/files/documents/2024-11/appendix_w-2024.pdf

Significant Impact Analysis

As part of its air quality analysis, GZA submitted a significant impact analysis to determine whether more detailed modeling would be required for any of the criteria pollutants identified SO₂, NO₂, CO, O₃ and particulates (PM_{2.5} and PM₁₀). Both GZA’s modeling analysis and the Modeling Unit’s audit found that impacts for Annual and Daily PM_{2.5}, Annual and Daily PM₁₀, and 1-hr NO₂ would be above their respective significant impact levels (SILs) and required further analysis.

Table 2
Significant Impact Modeling Results

Pollutant	Averaging Period	Facility Max Concentration (µg/m ³)	IEPA Max Concentration (µg/m ³)	Significant Impact Level (µg/m ³)
SO ₂	1-hour	7.75	7.25	7.8
	3-hour	N/A	7.28	25
	24-hour	N/A	1.67	5
	Annual	N/A	0.02	1
CO	8-hour	234.4	264.3	500
	1-hour	300.2	302.1	2000
PM _{2.5}	Annual	0.43	0.445 ⁽¹⁾	0.36
	24-hour	17.7	17.7 ⁽¹⁾	1.26
PM ₁₀	Annual	N/A	4.71	1
	24-hour	11.95	11.7	5
NO ₂	Annual	0.83	0.61	1
	1-hour	55.3	49.97	7.5

(1) The maximum modeled impact also included secondary PM_{2.5} impacts.

Secondary PM_{2.5} and Ozone Impacts

Secondary PM_{2.5}

Precursor emissions of NO_x, and SO₂, chemically react with the atmosphere to form secondary PM_{2.5}. For secondary PM_{2.5} emissions and for the ozone analysis, GZA followed the US EPA memorandum, *Clarification on the Development of Modeling Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM_{2.5} under the PSD Permitting Programs.*²

² US EPA (2024). Clarification on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM_{2.5} under the PSD Permitting Program https://www.epa.gov/sites/default/files/2020-09/documents/epa-454_r-19-003.pdf.

GZA utilized a hypothetical source located in Putnam County, Illinois as it produced the worst-case scenario estimates of secondary PM_{2.5} and O₃. The hypothetical source with a stack height of 10 m, and source emissions of 500 tpy was utilized in the modeling analysis. GZA’s analysis was based upon facility emissions of 2.52 tpy of NO_x, 0.26 tpy of SO₂, and 4.98 tpy of VOM.

The secondary PM_{2.5} results displayed in Table 3 summarized the MERPs calculations from RPM.

Table 3
MERPs Analysis for Secondary PM_{2.5}

Pollutant	Averaging Period	Concentration (µg/m ³)
PM _{2.5}	24-hour	0.000735
	Annual	0.0000394

Table 4
Tier I MERPs Analysis Results Ozone

Pollutant	Averaging Time	SIL (ppb)	Secondary Contribution (ppb)		Total Concentration (ppb)
			NO ₂	VOM	
Ozone	8-hour	1	0.00700	0.000712	0.00771

The total secondary PM_{2.5} concentrations were added to the primary PM_{2.5} impacts modeled with AERMOD for each respective averaging period for comparison to the PM_{2.5} SIL. These results shown in Table 2. The combined primary and secondary results for annual PM_{2.5} and for 24-hour PM_{2.5} were greater than their respective SILs. Therefore, further analysis against the NAAQS will be required for 24-hour and Annual PM_{2.5}.

Precursor emissions of NO_x and VOM chemically react with the atmosphere to form secondary ozone (O₃). The analysis estimated O₃ impacts to be below the 1.0 parts per billion (ppb) SIL, which shows that the emissions of NO₂ and VOM would not significantly impact the O₃ NAAQS.

Cumulative Impact Analysis

The results of the significant impact analysis show further analysis is required to evaluate the project’s impact against the Daily and Annual averaging periods for PM_{2.5}, PM₁₀, and 1-hour averaging period for NO₂ NAAQS. GZA developed a cumulative modeling analysis that incorporated background concentration from monitored concentrations and nearby emissions inventory sources.

GZA utilized representative background data collected from the Illinois EPA monitors located in Schiller Park, Illinois (AQS ID: 17-031-3103) for NO₂, and Northbrook, Illinois (AQS ID: 17-031-4201) for PM₁₀ and PM_{2.5}. These monitors were chosen based on the relative proximity to the RPM facility.

The modeled concentrations included impacts from the facility and nearby emissions inventory sources. The total concentrations are the summation of the modeled concentrations and background concentrations, and these impacts are compared to the respective NAAQS, as shown in **Table 5 and Table 6**.

**Table 5
Facility Cumulative Impact Analysis Results**

Pollutant	Averaging Period	Modeled Statistic	Modeled Impact	Background Concentration	Total Concentration	Standard
			($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
PM ₁₀	24-hour	Highest 6 th High Over 5 Years	59.4	82	141.4	150
PM _{2.5}	24-hour	5-Year Mean of the Annual 8 th High	11.95	21.97	33.92	35
	Annual	Maximum	0.60	7.39	7.99	12
NO ₂	1-hour	5-Year Mean of the Annual 8 th High	120.9	104.72	225.62	188.14

**Table 6
Modeling Unit Cumulative Impact Analysis Results**

Pollutant	Averaging Period	Modeled Statistic	Modeled Impact	Background Concentration	Total Concentration	Standard
			($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
PM ₁₀	24-hour	Highest 6 th High Over 5 Years	57.4	82	125.44	150
PM _{2.5}	24-hour	5-Year Mean of the Annual 8 th High	11.7	21.97	32.97	35
	Annual	Maximum	0.87	7.39	8.26	12
NO ₂	1-hour	5-Year Mean of the Annual 8 th High	120.9	104.72	225.62	188.14

The Modeling Unit audit supported the results presented in GZA’s analysis, that 24-hour PM₁₀, annual PM_{2.5}, and annual PM_{2.5} would be below the NAAQS, while 1-hour NO₂ concentrations would exceed the NAAQS standard.

GZA conducted an analysis to determine if the proposed RPM project would cause or contribute to any of the model-predicted exceedances. This analysis utilized AERMOD’s MAXDCONT tool and was performed for each receptor with a predicted NAAQS exceedance. For each modeled receptor, the MAXDCONT analyzed each level of impact (8th high, 9th high, 10th high, and so forth.) and terminated when the model found a concentration less than the NAAQS.

During its review, the Modeling Unit and GZA conducted modeling to assess the impact that the proposed project would have on the 1-hour NO₂ NAAQS. Tables 7 and 8 show the results of the modeling performed by the Modeling Unit and GZA for NO₂.

**Table 7
Facility NO₂ Cause and Contribute Analysis Modeling Results**

	Rank	Total Impact (µg/m³)	Total Concentration (µg/m³)	Project Contribution (µg/m³)	X-UTM Zone 16 (m, Easting)	Y-UTM Zone 16 (m, Northing)	NAAQS (µg/m³)	SIL (µg/m³)
Maximum Project Concentration	9th	92.4	197.12	1.67	718750	4602250	188.14	7.5
Maximum Project Contribution	12th	87.4	192.12	1.67	718750	4602500		

**Table 8
Modeling Unit NO₂ Cause and Contribute Analysis Modeling Results**

	Rank	Total Impact (µg/m³)	Total Concentration (µg/m³)	Project Contribution (µg/m³)	X-UTM Zone 16 (m, Easting)	Y-UTM Zone 16 (m, Northing)	NAAQS (µg/m³)	SIL (µg/m³)
Maximum Project Concentration	9 th	92.4	197.13	1.67	718750	4602500	188.14	7.5
Maximum Project Contribution	12 th	87.4	192.13	1.67	718750	4602500		

For all periods with predicted NAAQS exceedances, contribution from RPM would not exceed the SILs. Based on the modeling results, the Modeling Unit concluded that RPM would not cause or contribute to any of the modeled exceedances of the 1-hour NO₂. As such, no additional modeling was required for 1-hour NO₂.

Air Toxics Analysis

As part of the air quality analysis for RPM, the Modeling Unit requested the facility evaluate the impacts of toxic air pollutant emissions from the facility. GZA provided the Modeling Unit with emission calculations for potential HAP emissions from the facility. The Modeling Unit performed a screening analysis using the Air Emissions Risk Analysis (AERA) Guidance.³ It was determined from the use of the Minnesota Pollution Control Agency’s Risk Assessment Screening Spreadsheet (RASS) that RPM should conduct a dispersion modeling analysis for emissions of Arsenic and Ethylbenzene.

The Modeling Unit provided GZA with reference concentration levels for these pollutants from California’s Office of Environmental Health Hazard Assessment (OEHHA) and USEPA’s Integrated Risk Information System (IRIS). The results of GZA’s analysis are displayed in **Table 11** below. All modeled concentrations were below their respective reference concentrations.

³ Minnesota Pollution Control Agency. (2024) *Air Emissions Risk Analysis (AERA) Guidance*.

**Table 9
HAPs Modeling Results**

Pollutant	CAS Number	Averaging Period	Maximum Modeled Impact (µg/m³)	Threshold (µg/m³)	Reference
Arsenic	7440-38-2	1-hour	0.00019	0.015	OEHHA REL ⁽¹⁾
		8-hour	0.00016	0.015	OEHHA REL ⁽¹⁾
		Annual	0.00001	0.20	OEHHA REL ⁽¹⁾
Ethylbenzene	100-41-4	Annual	0.0090	1000	EPA IRIS ⁽²⁾

(1) OEHHA Reference Exposure Levels (REL) are established for pollutants based on exposure durations.

(2) IRIS Reference Concentrations for Inhalation Exposure (RFC) are established for pollutants based on exposure durations.

Summary

The Modeling Unit has reviewed the air quality analysis provided by GZA on behalf of RPM. The Modeling Unit audit of this analysis supports that RPM’s proposed operation would not exceed the NAAQS for any NO₂, PM_{2.5}, PM₁₀, CO or SO₂ averaging times. The audit also confirms that emissions of SO₂, VOMs, and NO₂ would not have significant impacts on PM_{2.5} and O₃ formation. The audit also shows the proposed emissions of HAPs should not exceed reference concentrations for the toxic pollutants of concern. This analysis was based on emissions calculations from the throughput of 150,000 tons per year of asphalt.

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