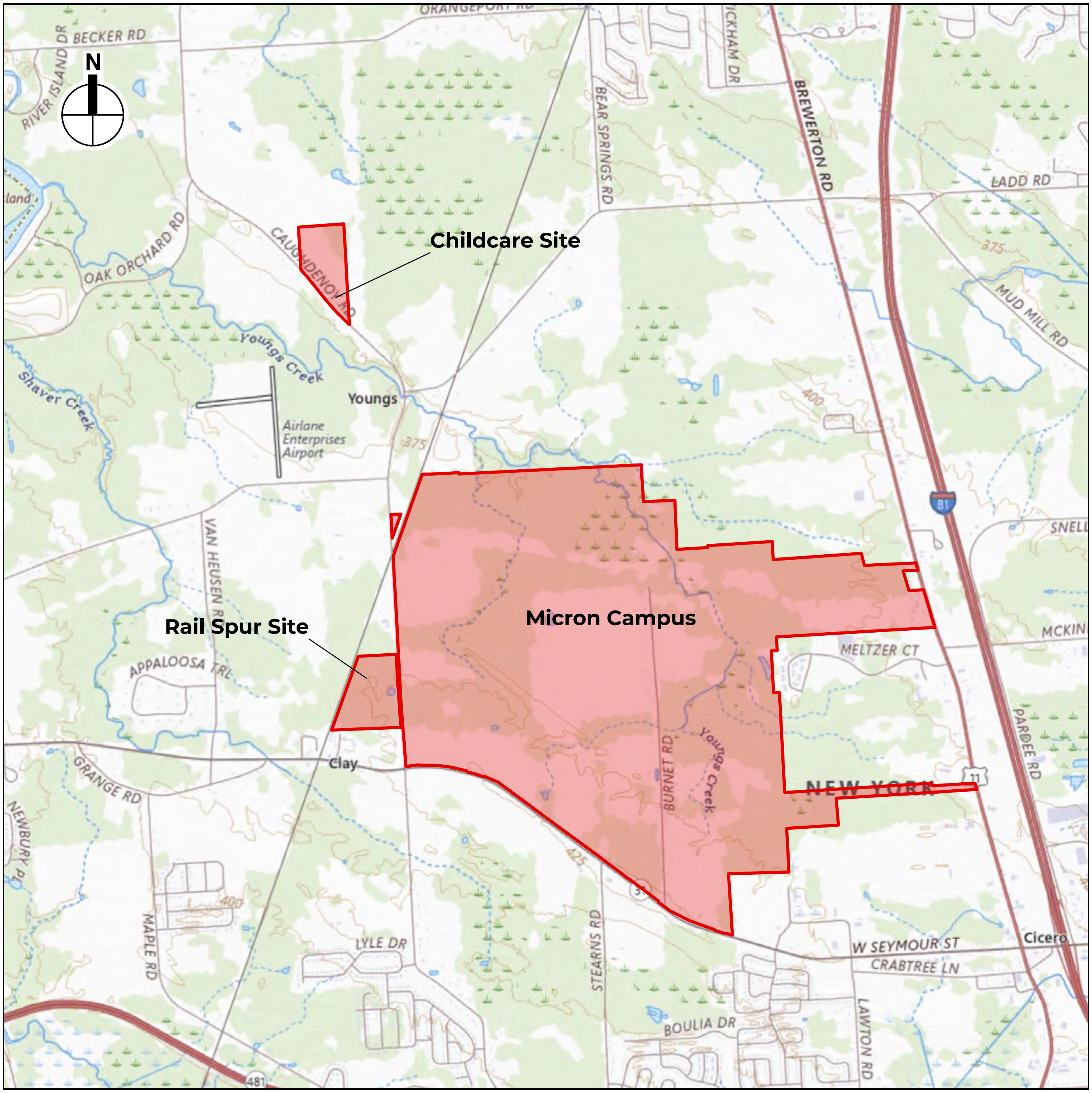
Disclaimer: Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. § 794d), as amended in 1998, requires that the information in federal documents be accessible to individuals with disabilities. CHIPS for America, U.S. Department of Commerce, has made every effort to ensure that the information in the Micron Semiconductor Manufacturing Project Draft Environmental Impact Statement is accessible; however, some Appendix elements may not be fully accessible. Individuals with disabilities are encouraged to contact David Frenkel, Environmental Division Director by phone at (240) 204-1960 or by email at david.frenkel@chips.gov for access to the information contained in this document.

APPENDIX H
HISTORIC AND CULTURAL RESOURCES

Appendix H-1
Area of Potential Effect (APE) Figures



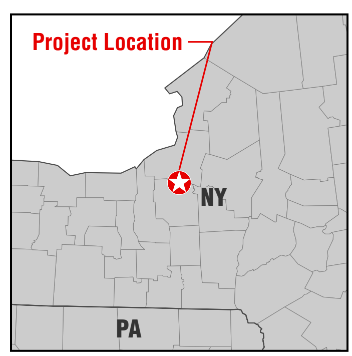
2.20.25

Data source: USGS The National Map. https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer

0 5,000 FEET

Area of Potential Effects

Approximate coordinates of Project Site:
76°9'20"W 43°11'52"N



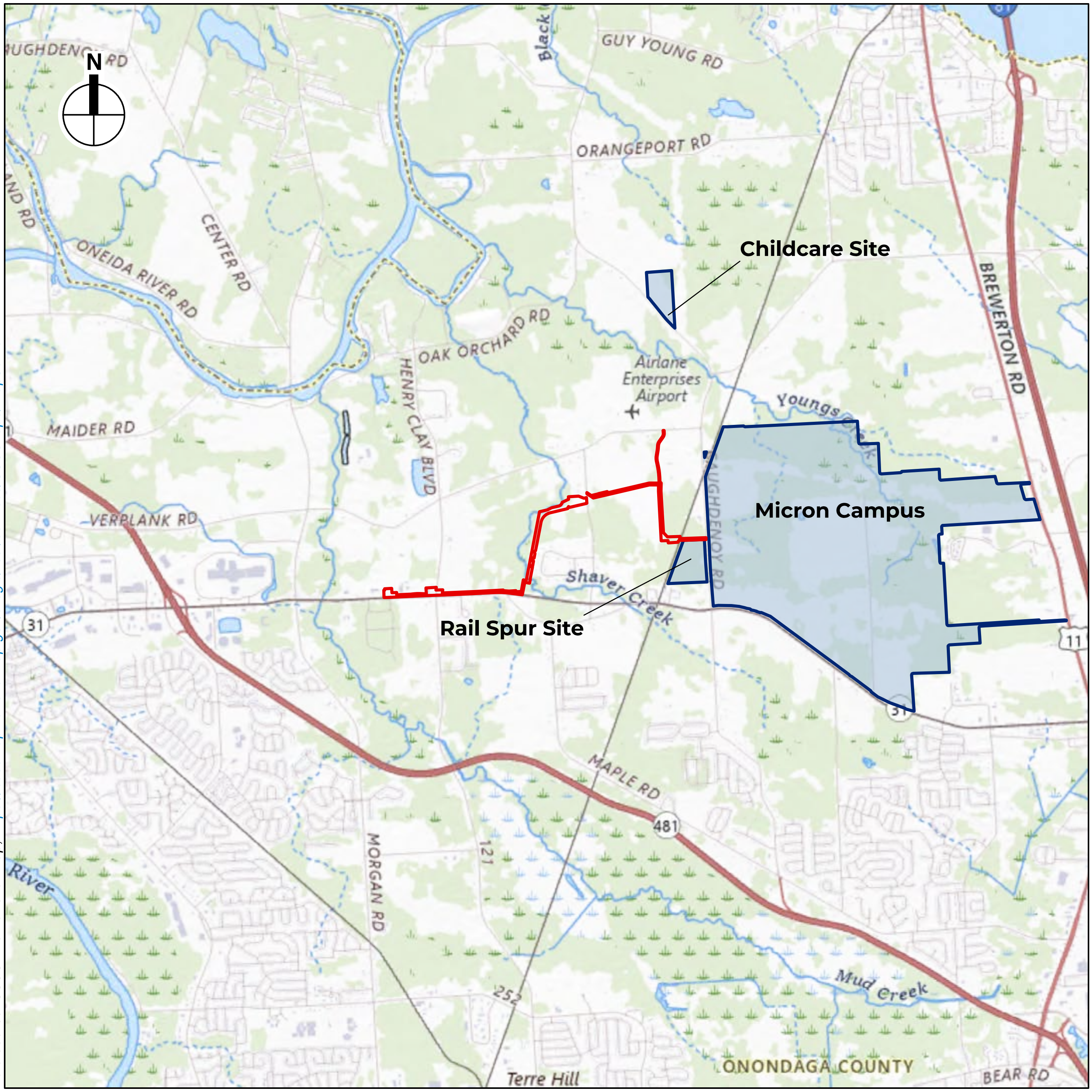
micron™

Micron Main Campus, Rail Spur Site, and Childcare Site APE

Figure 1

2.20.25

Data source: USGS The National Map, https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer

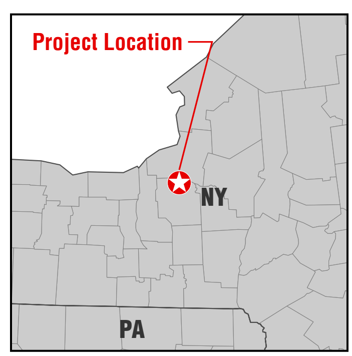


0 5,000 FEET

Natural Gas Line APE

Proposed Project
- Micron Campus
- Childcare Site
- Rail Spur Site

Approximate coordinates of Project Site:
76°11'11"W 43°11'28"N



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Natural Gas Line APE

Figure 2

2.24.25

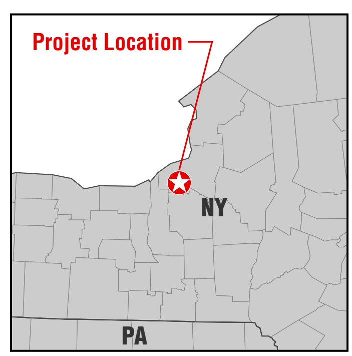
Data source: USGS The National Map. https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer

0 5 MILES

Water Supply APE

Proposed Project
- Micron Campus
- Childcare Site
- Rail Spur Site

NOTE: APE is located on the Brewerton, Baldwinsville, Fulton, and Hannibal quadrangles



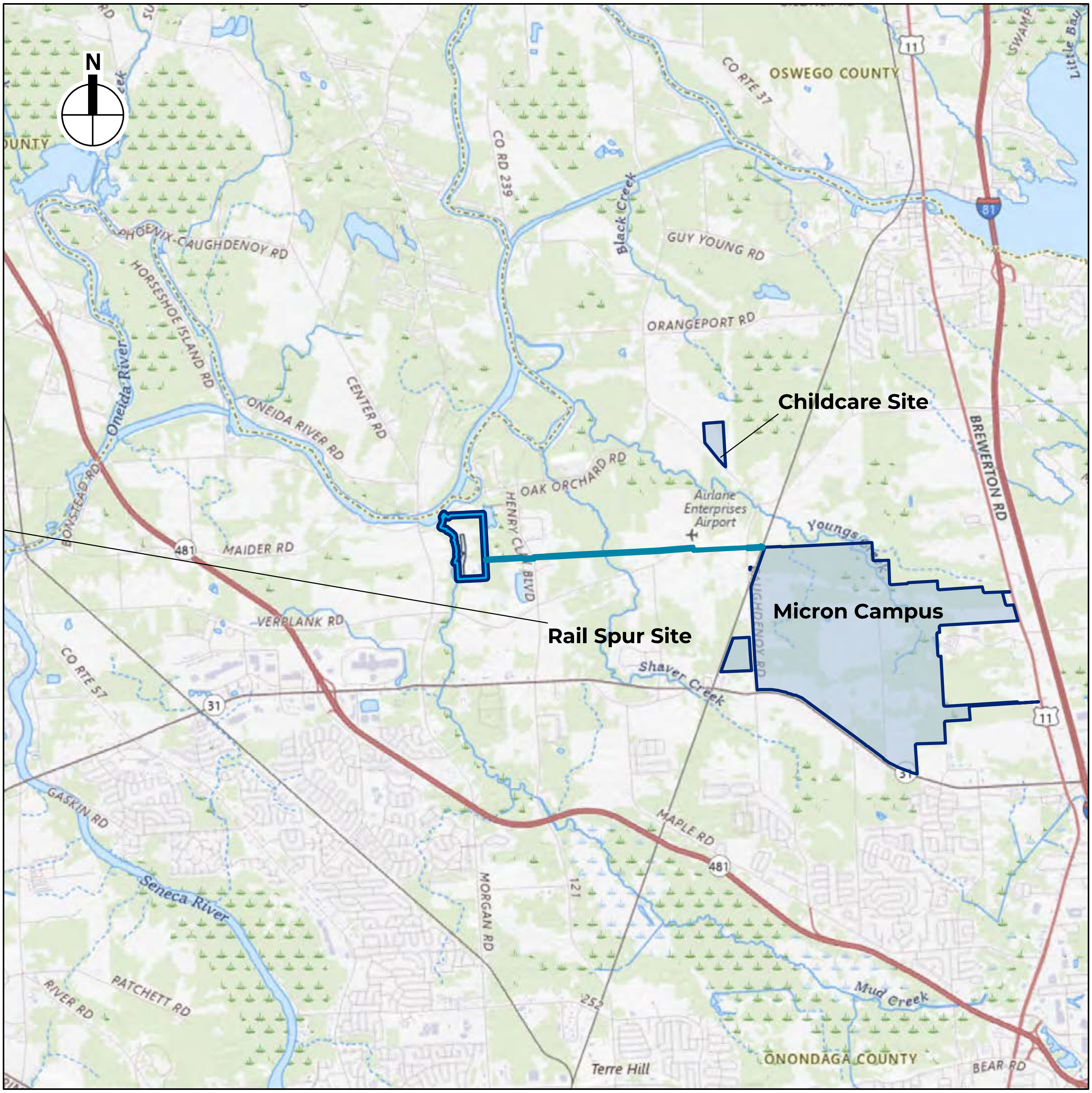
micron™

OCWA Water Supply APE

Figure 3

3.28.25

Data source: USGS The National Map. https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer



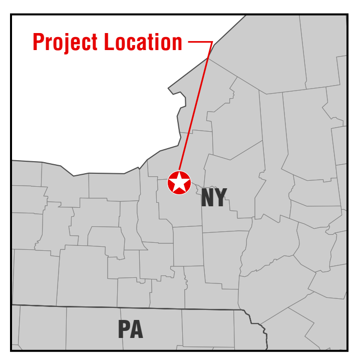
0 10,000 FEET

Oak Orchard Site

IWWTP at Oak Orchard APE

Industrial Wastewater APE

Proposed Project
- Micron Campus
- Childcare Site
- Rail Spur Site



Approximate coordinates of Project Site:
76°11'53"W 43°12'6"N

micron™

Wastewater Treatment Plant and Industrial Wastewater Conveyance APE

Figure 4

APPENDIX I
AIR QUALITY

Appendix I-1
Stationary Source Modeling Executive Summary: Micron Campus 4-Fab Scenario

I-1 Stationary Source Modeling Executive Summary – Micron Campus 4-Fab Scenario

I-1.1 Phase 1 (Fabs 1 and 2) DEC Permit Modeling Requirements

Based on the emissions totals associated with the Proposed Air Permit Project for Phase 1 (Fabs 1 and 2) as well as the regulatory requirements described in Section 3.4.1, atmospheric dispersion modeling was required to demonstrate that compounds emitted from the Proposed Air Permit Project do not exceed the NAAQS and Annual AGC and SGC within the study area for permit approval. Offsite concentrations within the modeling domain are not permitted to exceed the SGC. For AGC, the risk-management range can be employed, for facilities that are required to employ BACT.

As required by PSD for the proposed Micron Campus, modeling was performed for the criteria pollutants NO_2, CO, PM_{10}, and $PM_{2.5}$ to demonstrate compliance with the applicable NAAQS. As required by NNSR, no modeling demonstration for ozone was required as part of the permitting action and as such, VOC was not modeled in comparison to the Ozone NAAQS. SO_2 and lead were also not modeled to address PSD requirements as emissions increases were not anticipated to exceed the SER thresholds. SO_2 modeling was required to be completed by the 6 NYCRR Part 212 modeling demonstration described below. Lead emissions were not required to be modeled for Part 212 as there were no process emissions for lead from the Project.

NYSDEC dispersion modeling was also required for non-criteria air contaminants (such as fluorides and carbon tetrafluoride) as determined in accordance with the NYSDEC regulation 6 NYCRR Part 212 and 257 and to demonstrate that NYSDEC-developed New York Air Quality Guidelines, AGCs and SGCs, would not be exceeded. As required by PSD, modeled results are required to be evaluated on the averaging period that applies to each modeled air contaminant subject to a NAAQS (i.e., 1 hour and 8 hour for CO, 1 hour and annual for NO_2, 24 hour for PM_{10}, and annual and 24 hour for $PM_{2.5}$). As required by NYSDEC Part 212 and 257, modeled results are required to be evaluated on a 1-hour basis and annual basis for contaminants for which an SGC and an AGC (respectively) have been established by the NYSDEC. Permit modeling results have been submitted in Micron's Air Permit Application 2 package for the construction and operation of Fabs 1 and 2.

The aforementioned stationary source air quality modeling analysis was performed in accordance with (1) the USEPA user guides for the EPA Regulatory AERMOD Modeling System available from USEPA's Support Center for Regulatory Atmospheric Modeling website, (2) the USEPA's Guideline on Air Quality Models (40 CFR Part 51 - Appendix W), (3) DAR-10: NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis, and (4) DAR-1: Guidelines for the Evaluation and Control of Ambient Air Contaminants under 6NYCRR Part 212.

The study area for the DEC permit modeling was developed based on NYSDEC and EPA requirements and is consistent with the air resources study areas discussed in Section 3.4.2. The modeling includes evaluation of stack parameters, building configurations, local terrain and other factors that may affect the dispersion of air emissions from the facility.

I-1.2 4-Fab Modeling Scenario

As detailed in F-1.1, a regulatorily required modeling evaluation has been completed for Phase 1 (Fabs 1 and 2) air quality permitting of the proposed Micron Campus operations and has been submitted to the NYDEC for review. As required by the requisite hard look under NEPA and SEQR, a separate modeling evaluation has been completed for the full-scale operations of the proposed Micron Campus (Fabs 1-4). This modeling analysis utilized the same modeling requirements for NAAQS and NYSDEC regulation 6 NYCRR Part 212 and 257 compliance demonstrations as detailed in F-1.1. Although additional modeling and review will be required for subsequent regulatory permitting of Fabs 3 and 4, the modeling analysis summarized below ensures that, based on preliminary design information, the operation of the proposed Micron Campus (Fabs 1-4) will not cause or contribute to an exceedance of an ambient air quality standard.

The modeling analysis described below focuses on the operation of the proposed Micron Campus (Fabs 1-4) as these operations represent the maximum emissions generating scenario throughout the construction and operation phasing of the Proposed Project.

I-1.2.1 NAAQS Analysis

The NAAQS analysis included emissions from Fabs 1-4 along with significant sources of emissions in the surrounding area (as included in the regional source inventory, see “Nearby Sources” description below). These modeled impacts were added to appropriate background concentrations from representative ambient air monitors to define compliance with the NAAQS.

Background Concentrations

For NO_2 and CO, the analysis utilized background data from the Rochester Near-Road monitor (AQS Site ID 36-055-0015) from 2021 to 2023. This site is located approximately 70 miles (114 km) west of the proposed Micron Campus. The modeling demonstration also utilized seasonal, hour-of-day variable background data for 1-hour NO_2, which were derived from data available on EPA’s AirData website.

For PM_{10}, the analysis utilized background data from the Rochester monitor (AQS Site ID 36-055-1007) from 2021 to 2023. This site is located approximately 70 miles (114 km) west of the proposed Micron Campus and 0.5 km from the Rochester Near-Road monitor.

Both of the selected monitors are located in an urban environment, directly north of the junction between Interstates 490 and 590, which vary from the proposed Micron Campus in a manner such that these background concentrations are expected to provide conservatively high background concentrations in comparison to the rural nature of the area surrounding the Proposed Micron Campus.

Using data from 2021 to 2023, the analysis utilized the Syracuse monitor (AQS Site ID 36-067-1015) to establish the background for $PM_{2.5}$. The site is located approximately 11 miles (17 km) southeast of the proposed Micron Campus, in an urban area, at the junction of Interstates 690 and 481. Given the characteristics of the monitoring site, the background data for the monitor was expected to provide conservatively high background values. For the $PM_{2.5}$ background assessment, a further analysis was completed to identify if there were days in the timeframe that were eligible for removal from the background concentration as a result of natural or exceptional events. A more detailed description of the process used to ensure accuracy of the $PM_{2.5}$ background, is included in the Phase 1 modeling protocol submitted to the NYSDEC.

Secondary Formation

A Modeled Emission Rates for Precursors (MERPs) analysis to estimate single source $PM_{2.5}$ impact from NO_X and SO_2 emissions were included in the modeling analysis. Based on EPA's "MERPs View Qlik" website, the closest representative hypothetical source to the proposed Micron Campus is in Livingston County, NY. The result was added to the modeled direct $PM_{2.5}$ concentrations and used in the comparison to the applicable SILs and NAAQS.

6 NYCRR Part 212 and Part 257 – Non-Criteria Pollutant Modeling

Part 212 of 6 NYCRR applies to process emission sources and emission points associated with process operations. It requires that the off-site impacts from process operations be evaluated for emissions of air contaminants. Part 212 applies to several process emissions sources proposed as part of the proposed Micron Campus operations. Consistent with the applicability of Part 212 developed and submitted to NYDEC for Fab 1 and 2, the modeling analysis included with the DEIS for the Fab 1-4 analyses the same non-criteria air contaminants.

Part 212 and DAR-1 provide a guideline to determine which sources and compounds require air dispersion modeling to demonstrate that off-site impacts of air contaminants meet the requirements of Part 212. Table I-1 below summarizes the air contaminants that were analyzed for the Part 212 modeling demonstration.

Part 257 provides specific thresholds for Total Fluorides. However, DAR-1 converts these thresholds to "equivalent" 1-hour SGC and annual AGC standards to model against, which are listed in the table below.

Table I-1 Part 212 Modeled Contaminants

CAS #	Chemical Name	SGC (μg/m^3)	AGC (μg/m^3)
7726-95-6	Bromine	130.00	1.60
7782-41-4	Fluorine	5.30	0.067
10035-10-6	Hydrogen bromide[1]	680.00	0.1
7722-84-1	Hydrogen peroxide	-	3.30
7697-37-2	Nitric acid	86.00	12.30
7783-54-2	Nitrogen trifluoride	6.60	0.08
7446-09-5	Sulfur dioxide	196.00	80.00
75-73-0	Tetrafluoromethane	-	300.00
7783-06-4	Hydrogen sulfide	-	2.00

7664-41-7	Ammonia Group	2,400	500
75-10-5	Difluoromethane Group	-	50,600
76-16-4	Hexafluoroethane Group	-	50,400
-	Total Fluorides	5.30	0.067

1. Hydrogen bromide does not have a listed AGC in DAR-1. Per the modeling guidance, the de minimis AGC is 0.1 µg/m3.

Air Dispersion Modeling Methodology

Meteorological Data

The analysis utilized meteorological data from the meteorological tower at the Syracuse Hancock International Airport (KSYR) for the calendar years of 2019 to 2023. This monitoring location is approximately 10 km southeast of the proposed Micron Campus but represented the closest data collection site that could provide quality assured data for all necessary modeling parameters. AERMOD-ready data was made available from the NYSDEC for the modeling analysis.

The data set consisted of five years (2019-2023) of pre-processed meteorological data representing the winds, temperature, and atmospheric turbulence around the KSYR airport (WBAN No. 14771) Automated Surface Observing System (ASOS) monitoring station. Upper air data was collected from the National Weather Service (NWS) station in Buffalo, NY (WBAN No. 14733). The raw hourly surface data format was Integrated Surface Hourly Data (ISHD) and the upper air data format was Forecast Systems Laboratory (FSL). These were processed using the AERMET v23132 pre-processor. Although a new version of AERMET pre-processor has been released, based on NYSDEC guidance, the analysis continued to utilize pre-processed meteorology data provided by NYDEC.

Prior to providing the data, NYSDEC incorporated Adjust U* as a regulatory option for all the ASOS sites in New York. A base elevation of 125 meters was used for the meteorological tower in the modeling analysis.

Building Downwash

USEPA's guidelines require the evaluation of the potential for physical structures to affect the dispersion of emissions from stack sources, as the exhaust from stacks that are located within specified distance of buildings may be subject to "aerodynamic building downwash" under certain meteorological conditions. In accordance with recent AERMOD updates, an emission point is assumed to be subject to the effects of downwash at all release heights. Stacks located at a distance greater than 5L, where L is the lesser dimension of the nearest structure's height or width, are not subject to the wake effects of the structure.

Direction-specific equivalent building dimensions were used as input to the AERMOD model to simulate the impacts of downwash were calculated using the USEPA-sanctioned Building Profile Input Program (BPIP-PRIME), version 04274 and used in the AERMOD model.

Terrain

Receptor terrain elevations were input into the model were interpolated from 1/3 arc-second National Elevation Dataset (NED) data obtained from the U.S. Geological Survey (USGS) using AERMAP v24142.

Receptor Grids

Ground-level concentrations were calculated along the proposed Micron Campus boundary and also within a receptor grid outside the ambient air boundary. Since the primary receptor grid extended to 50 km, a nested Cartesian receptor grid was utilized based on DAR-10.

The boundary receptors were spaced 25 meters apart. The Cartesian receptor grid consisted of the following receptor spacing:

- 70 meter-spaced receptors from the boundary out to 1.0 kilometer from the proposed Micron Campus fenceline;
- 100 meter-spaced receptors from 1.0 to 2.5 kilometers;
- 250 meter-spaced receptors from 2.5 to 5 kilometers;
- 500 meter-spaced receptors from 5 to 10 kilometers; and
- 1000 meter-spaced receptors from 10 to 50 kilometers.

In the December 2019 memo from the EPA titled “Revised Policy on Exclusions from ‘Ambient Air’”, the ambient air policy is “…the atmosphere over land owned or controlled by the stationary source may be excluded from ambient air where the source employs measures, which may include physical barriers, that are effective in precluding access to the land by the general public”.

The proposed Micron Campus is planned for a greenfield site that currently consists of primarily residential and agricultural land. The property that constitutes the proposed Micron Campus would be made up of several parcels of land. All of the properties on the proposed Micron Campus have been acquired by the Onondaga County Industrial Development Agency (OCIDA) and the majority of the structures, including residences, were removed in late 2023. Micron anticipates that all of the proposed Micron Campus will be controlled by Micron by the time of the operation of the Proposed Project.

Regulatory NO_2 Model Selection

For NO_2 modeling, the USEPA approved Tier 2 Ambient Ratio Method 2 (ARM2) was utilized. USEPA Appendix W and subsequent guidance recommends a three-tier NO_2 modeling approach for the conversion of nitric oxide (NO) to NO_2. These tiers are regulatory options provided in AERMOD and each consider increasingly complex considerations of NO to NO_2 conversion chemistry.

- Tier 1 assumes total conversion of NO to NO_2;

- Tier 2 utilizes the ARM2 approach; and
- Tier 3 incorporates the Ozone Limiting Method (OLM), Plume Volume Molar Ratio Method (PVMRM), and Generic Reaction Set Method (GRSM) as regulatory options in AERMOD.

The analysis utilized default minimum and maximum ambient equilibrium ratios using the Tier-2 (ARM2) approach.

Emissions Sources and Rates

Source Emission Rates

Emission rates for the modeling analysis conservatively assumed potential to emit and continuous operation, with the exception of a few sources detailed below. Emission rate calculation methodologies and example calculations for each pollutant and relevant averaging period were included in the Air Permit Application 2 package under NYDEC review. As the Air Permit Application 2 package is only for Phase 1 (Fab 1 and 2) of the Proposed Project, Phase 2 (Fab 3 and 4) source parameters and emission rates were based on a duplication of Phase 1 emissions sources and source emission parameters.

Emergency Generators

24-Hour PM_{10} and $PM_{2.5}$

Micron is proposing a daily limit on generator use, which limits the number of hours that a certain number of generators will be operating at a given time. While the numbers provided below reflect only Phase 1, the same proportion of generators were assumed for the analysis for Phase 2. The proposed limits that were included are:

- 46 engines can operate for up to 24 hours
- 80 engines, inclusive of the 46 generators that can operate for up to 24 hours, can operate for up to 8 hours
- All remaining engines can operate for up to 4 hours

In order to maintain flexibility, Micron did not propose limiting specific generators, but rather the facility as a whole. To model the most conservative scenario, the analysis included modeling of the 46 closest generators to ambient receptors with the highest modeled impact in preliminary modeling as operating for 24 hours, the next closest 34 engines as operating for up to 8 hours, and the remainder of generators as operating for up to 4 hours.

1-Hour NO_2

As the 1-hour NO_2 NAAQS is a probabilistic standard, the EPA recommends to "model impacts from intermittent emissions based on an average hourly rate…[which] would account for potential worst-case meteorological conditions associated with emergency generator emissions by assuming continuous operation, while use of the average hourly emission represents a simple approach to account for the probability of the emergency generator actually operating for a given hour." In the Air Permit Application 2 package, Micron proposed a 100 hour per year operation limit on all generators; therefore, emissions for 1-hour NO_2 were input to the model annualizing the short-term emission rate based on operating 100 hours per year for each generator.

For the remainder of the NAAQS averaging periods and pollutants, the analysis modeled the emergency generators at short-term potential to emit emission rates.

Source Parameters

Merged Stacks

Generator and CVD stacks were modeled as merged stacks as the stacks are within 1 stack diameter of each other. In order to model these stacks, an equivalent diameter was calculated for each merged stack by determining the total cross-sectional area across the group of merged stacks. Generators were modeled as either groups of 2 or 3, while CVD stacks were modeled in groups of 2.

In the model, the total combined emissions from each group of stacks were modeled out of one equivalent stack. Stack height, temperature, and exit velocity reflected the shared parameters for each group of stacks.

Redundant Stacks

The proposed Micron Campus is designed such that there are redundant stacks. Only a certain number of units would be operating at a time, and thus, only a certain number of stacks would be operating at a time. Instead of dividing total facility emissions across all the stacks at the site, the analysis divided the total facility emissions across operational stacks, resulting in a higher emission rate per stack and modeling the redundant stacks with no emission rate. Redundant stacks were selected to provide the most conservative modeled impact based on proximity to the western fenceline, as that is where maximum off-site concentrations are expected to be located based on the meteorological data selected. Stacks that were further away from the fenceline were assumed to be redundant.

Nearby Sources

DAR-10 refers to 2011 NO_2 modeling guidance from EPA for how to determine emission source inventories for NAAQS modeling analyses. This guidance suggests that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within 10 kilometers of the project location. This distance is based on a rule of thumb that maximum concentrations typically occur a distance downwind that is approximately 10 times the source release height in relatively flat terrain and accounts for extra distance due to possible terrain influences.

EPA has published a final rule that revised Appendix W on November 20, 2024. As part of these revisions, the EPA also released a separate document, "Guidance on Developing Background Concentrations for Use in Modeling Demonstrations", published November 2024. The guidance recommends an initial qualitative analysis to determine how representative background data is of the source mix in the modeled demonstration area, as background monitors are not often co-located with the project source area. Understanding wind patterns, terrain features, and land use are also important in determining whether background data is representative and if nearby sources should be included in cumulative modeling demonstrations.

NYSDEC provided a list of Title V sources within 50 km of the proposed Micron Campus, air state facility permit sources within 25 km, and air facility registration permit sources within 5 km, all of which emitted NO_x, CO, PM_{10}, or $PM_{2.5}$. This list consisted of a total of 45 facilities and all Title V sources were greater than 10 km from the proposed Micron Campus.

A qualitative analysis was completed to initially eliminate nearby sources from the inventory. This involved comparing the density of sources near the selected background monitors compared to the density of sources near the proposed Micron Campus. As previously discussed, the proposed Micron Campus is located in a more rural area compared to the monitors in Rochester or Syracuse, and it is expected that the ambient background resulting from these monitoring locations is a conservative representation of background concentration.

The prevailing winds in the Syracuse area are mostly coming from the west, although there are prevailing winds from the east and south as well. To determine if a nearby source would be included in the cumulative modeling, Micron identified sources with the potential for overlapping plumes with the emissions from the Micron facility. Even though the background data would be expected to adequately represent emissions from these nearby sources, these sources were conservatively included in the cumulative analysis for all four pollutants.

- Paul de Lima Co. Inc.: Located 3 km east of the proposed Micron Campus
- Anheuser Busch Baldwinsville Brewery: Located 13 km west of the proposed Micron Campus
- Barrett Paving Materials Inc.: Located 10 km west of the proposed Micron Campus

All other sources listed in the regional inventory provided by the NYSDEC are either accounted for in the ambient background monitoring or are located further than 20 km from the site and their highest impacts would not be expected to affect the significant impact analysis.

Part 212 Modeling

The analysis utilized an initial unit modeling methodology to streamline the modeling for contaminants regulated under Part 212. As there are many toxic air contaminants that are subject to modeling, as shown in Table I-1, the analysis modeled all emission sources at 1 g/s and analyzed the High 1st High (H1H) modeled impact from every emission source. The maximum H1H modeled impact was then multiplied by the emission rate for each toxic air contaminant from each emission source in the model, and the products are summed together to calculate a worst-case modeled impact. This methodology utilized an extremely conservative assumption that all H1H modeled impacts occur at the same time and receptor.

For any toxic air contaminant where the worst-case modeled impact, based on this unit modeling methodology, was lower than the corresponding SGC or AGC, that toxic air contaminant was not modeled further using AERMOD. If the modeled impact exceeds the corresponding SGC and AGC, the contaminant was evaluated further. In this modeling demonstration, only fluoride

(F) exceeded its SGC and AGC when using the unit modeling methodology and this contaminant was evaluated further.

Modeling Results

Based on the modeling methodology described above and submitted as part of the Air Permit Application 2 Package, it has been confirmed that the ambient emission concentrations resulting from the maximum operation of Fab 1-4 on the proposed Micron Campus would remain below all applicable NAAQS and AGCs and SGCs. This demonstration represents the modeled impact from both Phase 1 and Phase 2 of the Proposed Project. Table I-2 provides the modeled impact of the NAAQS cumulative impact analysis and Table I-3 and Table I-4 provide the modeled impact of the Part 212 analysis.

Table I-2 NAAQS Results

Pollutant	Averaging Period	NAAQS Threshold ($\mu g/m^3$)	Total Modeled Impact[1] ($\mu g/m^3$)	Compliance Confirmed?
PM_{10}	24-hr	150	44.71	Yes
$PM_{2.5}$	24-hr	35	22.74	Yes
$PM_{2.5}$	Annual	9	7.29	Yes
NO_2	1-hr	188	185.92	Yes
NO_2	Annual	100	22.28	Yes
CO	1-hr	40,000	11,209	Yes
CO	8-hr	10,000	5,442	Yes
SO_2	1-hr	196	16.26	Yes

1. Total modeled impacts include background concentrations in results.

Table I-3 Part 212 and Part 257 Results – Short Term Impacts

CAS #	Chemical Name	Short-Term Modeled Impact ($\mu g/m^3$)	SGC ($\mu g/m^3$)	Compliance Confirmed?
7726-95-6	Bromine	35.99	130.00	Yes
7782-41-4[1]	Fluorine	2.46	5.30	Yes
10035-10-6	Hydrogen bromide	0.73	680.00	Yes
7722-84-1	Hydrogen peroxide	N/A	N/A	N/A
7697-37-2	Nitric acid	37.11	86.00	Yes
7783-54-2	Nitrogen trifluoride	4.52	6.60	Yes

7446-09-5[1]	Sulfur dioxide	16.26	196.00	Yes
75-73-0	Tetrafluoromethane	N/A	N/A	N/A
7783-06-4	Hydrogen sulfide	N/A	N/A	N/A
7664-41-7	Ammonia Group	425.34	2,400	Yes
75-10-5	Difluoromethane Group	N/A	N/A	N/A
76-16-4	Hexafluoroethane Group	N/A	N/A	N/A
Total Fluorides	-	2.63	5.30	Yes

1. Fluorine (CAS #7782-41-4) and sulfur dioxide (CAS #7746-09-5) modeled impacts reflect the modeled impact from modeling the contaminants individually, as opposed to the value derived from the unit modeling demonstration.

Table I-4 Part 212 and Part 257 Results – Annual Impacts

CAS #	Chemical Name	Long-Term Modeled Impact (μg/m^3)	AGC (μg/m^3)	Compliance Confirmed?
7726-95-6	Bromine	0.59	1.60	Yes
7782-41-4[1]	Fluorine	0.044	0.067	Yes
10035-10-6	Hydrogen bromide	0.01	0.1	Yes
7722-84-1	Hydrogen peroxide	0.39	3.30	Yes
7697-37-2	Nitric acid	0.61	12.30	Yes
7783-54-2	Nitrogen trifluoride	0.07	0.08	Yes
7446-09-5[1]	Sulfur dioxide	0.77	80.00	Yes
75-73-0	Tetrafluoromethane	2.98	300.00	Yes
7783-06-4	Hydrogen sulfide	0.02	2.00	Yes
7664-41-7	Ammonia Group	9.78	500	Yes
75-10-5	Difluoromethane Group	3.44E-03	50,600	Yes
76-16-4	Hexafluoroethane Group	0.02	50,400	Yes
Total Fluorides	-	0.048	0.067	Yes

1. Fluorine (CAS #7782-41-4) and sulfur dioxide (CAS #7746-09-5) modeled impacts reflect the modeled impact from modeling the contaminants individually, as opposed to the value derived from the unit modeling demonstration.

Appendix I-2
Mobile Source Methodology

I-2 Mobile Sources

The mobile source air quality analyses were performed in accordance with methodologies presented in the NYSDOT TEM, updated in March 2020 (NYSDOT 2020). The NYSDOT TEM guidance specifies use of the most recent available version of the Motor Vehicle Emission Simulator (MOVES4) emission factor model. The guidance also specifies the USEPA guidance *Using MOVES in Project-Level Carbon Monoxide Analyses* and *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* for project-level microscale/hot-spot analyses for NEPA and SEQRA (EPA 1992, 2021). In addition to the TEM guidance, the *Federal Highway Administration (FHWA) Updated Interim Guidance on Mobile Source Air Toxic (MSAT) Analysis in NEPA Documents* was used (FHWA 2023).

The mobile source air quality analyses conducted for the project included the following: a mesoscale (regional roadway network) emission analysis for criteria pollutants and MSAT; microscale (localized intersection) air quality analyses for CO and PM, and construction analyses.

I-2.1 MOVES4 Model

The USEPA's emission model, MOVES4, was used to estimate the mobile source emission factors and energy consumption for the analyses. MOVES4 provides great flexibility to capture the influence of time of day, car and bus/truck activity, vehicle speeds, and seasonal weather effects on emission rates from vehicles. MOVES4 calculates emission-related parameters, such as total mass emissions and vehicle activity (hours operated and miles traveled). From this output, emission rates (e.g., grams/vehicle-mile for moving vehicles or grams/vehicle-hour for idling vehicles) can be determined for a variety of spatio-temporal scales.

MOVES4 requires the use of site-specific input data for traffic volumes, vehicle types, fuel parameters, age distribution, and other input, as discussed below. By using site-specific data, the emission results reflect the traffic characteristics of the roadways affected by the project.

MOVES4 was used to estimate emission burdens of criteria pollutants, MSATs, GHG and energy consumption from the mesoscale roadway network. County-specific MOVES input data were developed by the NYSDEC. These county-specific data and project-specific link-by-link traffic data were used to develop project-specific input files to demonstrate the effects of the No Action and Preferred Alternatives for each scenario and year analyzed. Table I-5 and Table I-6 describe specific MOVES inputs.

Table I-5 MOVES Run Specification Options

MOVES Tab	Model Selections
Scale	County Scale Inventory Calculation type
Time Span	Hourly time aggregation including all months, days, and hours
Geographic Bounds	Onondaga County
Vehicles/Equipment	All on-road vehicle and fuel type combinations

MOVES Tab	Model Selections
Road Type	Urban restricted and urban unrestricted road types
Pollutants and Processes	Criteria pollutants, MSATs, CO_2e and energy consumption. Processes included running exhaust, evaporative permeation, evaporative fuel leaks, and crankcase running exhaust. Brake-wear and tire-wear emissions are included in the PM results
Manage Input Data Sets	New York State Low Emission Vehicle program input database provided by NYSDEC
Output	Generated by fuel type to differentiate diesel PM from PM produced by other fuel types

Table I-6 MOVES County Data Manager Inputs

County Data Manager Tab	Data Source
Age Distribution	NYSDEC
I/M Programs	NYSDEC
Ramp Fraction	NYSDEC
Source Type Population	Created from project traffic data
Fuel	NYSDEC
Meteorology Data	NYSDEC
Hoteling	NYSDEC
Vehicle Type Vehicle-Miles Travelled	Created from project traffic data
Average Speed Distribution	Created from project traffic data
Road Type Distribution	Created from project traffic data

MOVES4 on-road data inputs include specification of the geographic boundary of the Proposed Project, and Onondaga County specific data obtained from NYSDOT and NYSDEC (e.g., fuel characteristics, vehicle inspection and maintenance program, age distribution for each vehicle type [e.g., passenger car, heavy truck]) and meteorological data. Project-specific data inputs derived from the Proposed Project traffic study data included the volume of vehicles per hour and average speed on each road link in the Proposed Project air quality regional study area. For each road link, data for the length of the link were developed for input to MOVES4 on-road. The MOVES4 on-road algorithm accounts for seasonal (i.e., winter, spring, summer, fall) variation in meteorological conditions, time of day (i.e., morning peak, mid-day, evening peak and overnight), and variation in traffic volume which can affect the production of vehicle emissions in the regional study area. MOVES4 runs were performed for the No Action and Preferred Action Alternatives for each analysis year, with results summed to produce daily and annual emissions for development of the emission inventory.

The non-road module in MOVES4 was used to provide emission factors for non-road equipment used for construction of the Proposed Project. This module was run separately from the on-road module described above. Input data to MOVES4 non-road included year of analysis, fuel type, equipment sector (e.g., construction, industrial, commercial and nine other sectors), pollutant, and emission process (e.g., exhaust). MOVES4 non-road produces emission factors that are combined with construction activity information such as type and quantity of equipment, horsepower of the equipment, type of fuel used, and duration of use to develop a construction emission inventory for each year of construction. Estimates were produced for criteria pollutants and GHG emissions.

I-2.2 Microscale Analysis

The microscale analysis consists of evaluating changes to local ambient air pollutant concentrations caused by traffic generated from the Proposed Project. The NYSDOT TEM and USEPA guidance documents, *Using MOVES in Project-Level Carbon Monoxide Analyses* and *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*, prescribe procedures for conducting CO, PM_{10}, and $PM_{2.5}$ microscale air quality analyses. A microscale analysis consists of dispersion modeling of traffic-related air pollutant emissions for intersections and roadways determined to be of concern due to traffic volume changes or proximity of sensitive receptors. The microscale analysis was performed for the No Action and Preferred Action Alternatives.

The TEM states that the determination of whether a project requires an air quality analysis is based on the project's potential to significantly affect air quality. Although the PM_{10}/$PM_{2.5}$ USEPA hot-spot analysis guidance applies only to PM_{10}/$PM_{2.5}$ nonattainment or maintenance air quality areas, as per NYSDOT's TEM, the methodologies contained in the USEPA guidance are also used for NEPA and SEQRA purposes in both attainment and nonattainment areas.

I-2.2.1 CO Screening

NYSDOT TEM procedures for determining if a CO microscale analysis is necessary were followed. These procedures included evaluating specific criteria to determine the need for a detailed air quality analysis. The initial screening step was a LOS analysis taken from the Proposed Project’s traffic study. Intersections and roadways affected by the Proposed Project were assigned a letter designation of A through F to designate their LOS in the analysis years. Intersections with a LOS of A, B, or C were not subject to further analysis. Intersections with LOS D, E, or F were additionally screened by the volume threshold screening procedure.

The CO screening was conducted for over 70 intersections in the project area, following NYSDOT’s Transportation Environmental Manual (TEM) guidance. The intersection traffic used for the CO screening analysis was based on LOS and volume data from the traffic analysis (see Traffic section). Per the TEM guidance, those intersections with Build LOS of C or better pass the screening and require no further analysis. Those intersections with a Build LOS of D or worse under Build conditions, however, require further screening.

For those intersections that failed the initial screening, a volume threshold screening was conducted, and the results were compared to the thresholds in Table 3C of Section I-3 of the NYSDOT TEM Chapter 1.1. The emission factors applied within this screening are from USEPA’s MOVES4 model. CO emission factors were generated for all analysis years (2027, 2031 and 2041) for both idle and the average speed within the Project corridor, 30 mph. CO emission factors were generated for both idle and the average speed within the Project corridor, 30 mph. The resulting emission factors are shown in Table I-7.

Table I-7 CO Screening Emission Factors

Mode	2027	2031	2041
Idle (grams per hour)	6.5	5.0	3.7
30 mph (grams per mile)	2.3	1.9	1.2

Upon comparison to Table 3C in the TEM, when applying the above emission factors, intersections in the Project would pass the screening and require no further analysis if they have approach volumes of less than 4,000 at any approach.

As shown in the screening tables (attached to this appendix), none of the intersections have approach volumes close to 4,000 at any approach. As such, none of the intersections in the study area meet the criteria that would warrant a CO microscale analysis. The Project would not increase traffic volumes or change other existing conditions to such a degree as to jeopardize attainment of the NAAQS for CO.

I-2.2.2 PM Microscale Analysis Methodology

Introduction

Micron is proposing to lease and ultimately purchase the approximately 1,399-acre WPCP, located at 5171 Route 31, Clay, NY 13041, from OCIDA to construct a semiconductor manufacturing facility over a continuous, phased 16-year period. The Proposed Project consists of:

1) A manufacturing facility (referred to herein as the Micron Campus) to be constructed on the 1,377 acres (1,367 acres comprised of the WPCP, South Finger, and Burnet Road ROW, plus one acre on the northwest side of the Micron Campus), which will include four DRAM production fabs, ancillary support facilities, driveways, parking, and ingress and egress roads;

2) Construction of childcare, recreation, and healthcare centers and associated amenities at 9100 Caughdenoy Road, Clay, NY (referred to herein as the Childcare Site), NY;

3) Construction of a rail spur site on approximately 38 acres west of Caughdenoy Road (this property does not have an assigned address); and

4) Leasing of approximately 360,000-500,000 sq. ft of existing warehouse space in a to-be-determined location within 20 miles of the Micron Campus.

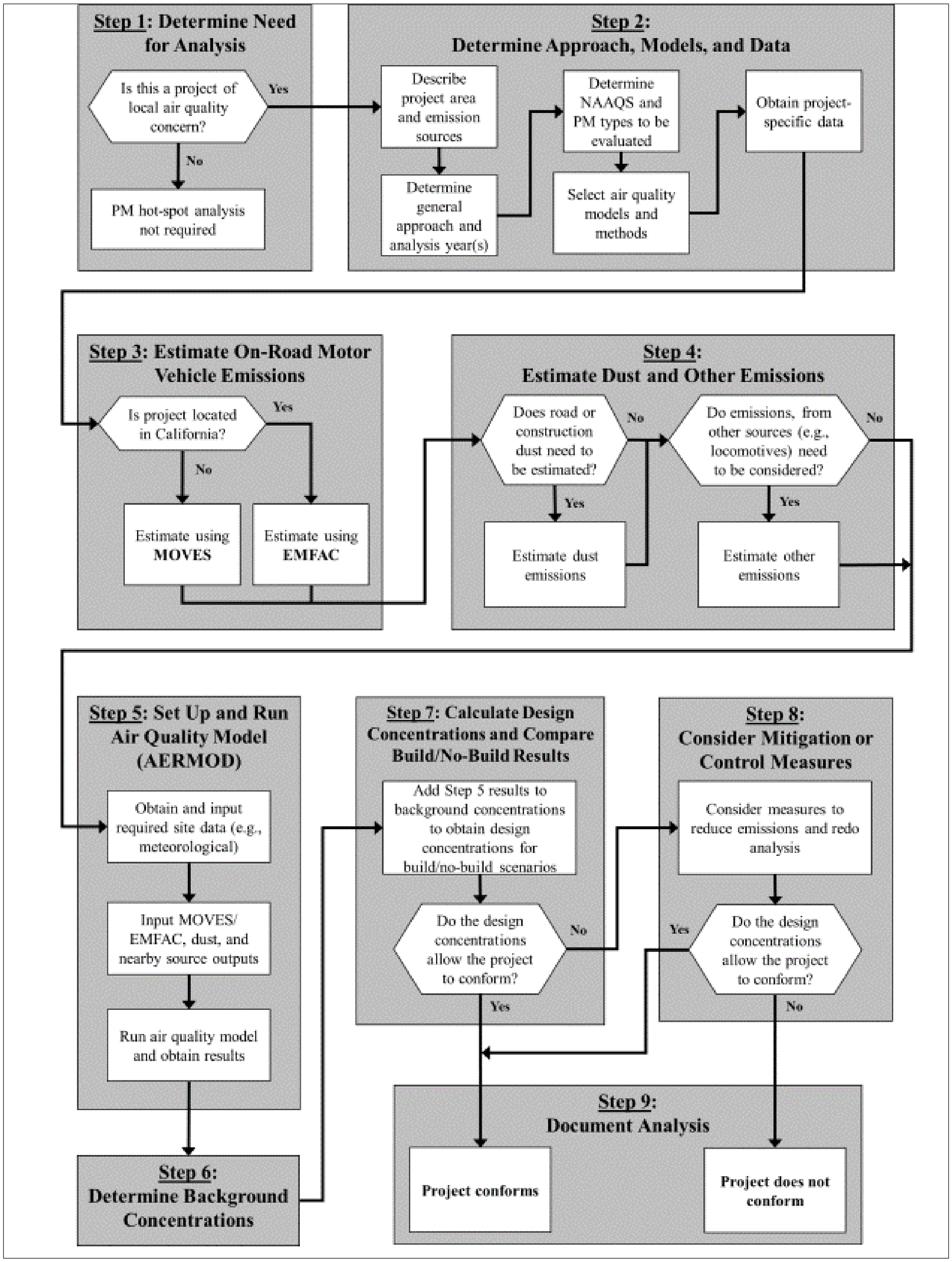
Separately, the Connected Actions would be required to support the Proposed Project. These include offsite utility infrastructure improvements and connections to the WPCP, as well as warehousing space required to support the Micron Campus.

PM Guidance

An effect of the Project includes employee and truck trips associated with operation of the four fabs. As such, a PM_{10} and $PM_{2.5}$ microscale (also known as hot-spot) analysis was undertaken to determine potential impacts from the traffic associated with Micron facility. This analysis was performed in accordance with the USEPA *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in* $PM_{2.5}$ *and* PM_{10} *Nonattainment and Maintenance Areas* (USEPA, 2021).

This **PM Hot-Spot Analysis Methodology** identifies the process for conducting a project-specific microscale analysis following USEPA's nine-step process as summarized in Exhibit 3-1 of that document, presented here in Figure I-1. This figure highlights the analysis procedures for transportation conformity. It should be noted that this analysis was performed for NEPA purposes; as such, there may be some differences (i.e. a No Action analysis was conducted for this project).

Figure I-1 Overview of a PM Hot-Spot Analysis



Source: USEPA, "PM Hot-spot Guidance: Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas" (EPA-420-B-21-037, October 2021, page 19) (USEPA, 2021).

All modeling procedures follow the applicable guidance in NYSDOT TEM. Three analysis sites were evaluated with a detailed PM microscale analysis.

Proposed Nine-Step PM Microscale Analysis

Step 1. Determine Need for a PM Microscale Analysis

A $PM_{2.5}$ and PM_{10} (PM) microscale/hotspot analysis was conducted for NEPA and SEQRA purposes to inform the decision-making process and was performed in a manner consistent with USEPA guidance for PM hotspot analyses.

Step 2. Determine Approach, Models and Data

a. <u>Approach</u>

Three locations have been selected for detailed analysis. The analysis site locations, in relation to the Micron chip plant, are shown in Figure I-2. Detailed link maps are shown in Figure I-3 through Figure I-5. Modeling was conducted for the traffic mitigation scenarios associated with the project.

Descriptions of the analysis locations, as well as the reasoning behind why they were selected, are presented below. More information on the screening (volumes, LOS, etc.) are contained within Appendix I-3.

1) **Site 1**: this site was selected for analysis in order to capture several major intersections surrounding the main north-south interstate, I-81. Besides including I-81 and associated truck traffic, the intersections at this location have some of the highest volumes of any in the area. Furthermore, the land uses around this site comprise various sensitive receptors, including multiple single-family homes, Cicero Elementary School, Cicero North Syracuse High School, and Cicero United Methodist Church. Modeling at this location was able to capture potential impacts from I-81 and the following six intersections:

    - US 11 & NY 31
    - NY 31 & I-81 SB Ramp
    - NY 31 & Pardee Road/I-81 NB Ramp
    - Parking Lot/Lakeshore Spur & NY 31
    - New Country Drive/Cicero Elementary School Parking Lot & NY 31
    - Cicero North Syracuse High School West Driveway & NY 31

    This site includes intersections with some of the highest volumes under AM peak conditions (it should be noted that the highest volumes are at NY 31 & I-481, which is a commercial area and does not have sensitive receptors). Furthermore, with the exception of the school driveways, these intersections have overall poor LOS, including LOS E and F at I-81 ramps.

2) **Site 2**: this site was selected for analysis due to the proximity to the Micron campus, as it is located at the south side of the proposed facility. This location includes many single-family homes along NY 31 as well as the below six intersections, many of which include driveways into the future Micron facility:

- NY 31 & Caughdenoy Road
- NY 31 & Access Road/Driveway 2
- NY 31 & Driveway 3
- NY 31 & Driveway 4
- NY 31 & Driveway 5
- NY 31 & Sterns Road

The intersections at this site are expected to carry a substantial number of Micron employees and deliveries to the nearby entrances. As such, this site includes intersections with some of the highest total volumes and the highest AM peak volumes, the highest truck volumes, and the highest truck increments (in both AM and PM).

3) **Site 3**: this site was selected based on community concern, as it includes the construction of a new interchange with the main east-west interstate, I-481. This site would also include the newly constructed Access Road, which would pass between two residential communities and provide direct access from I-481 to the Micron Campus. Furthermore, multiple single-family homes would be located directly adjacent to the new interchange. The modeling at this location was able to capture potential impacts from the following intersections:

- I-481 and EB ramps
- I-481 and WB ramps
- Access Road & Maple Road

b. <u>Analysis Years</u>

The analysis was conducted for the following years and scenarios:

- 2027 No Action & Preferred Action
- 2031 No Action & Preferred Action
- 2041 No Action, Preferred Action & Traffic Mitigation Scenarios A, B & C

Figure I-2 Analysis Locations

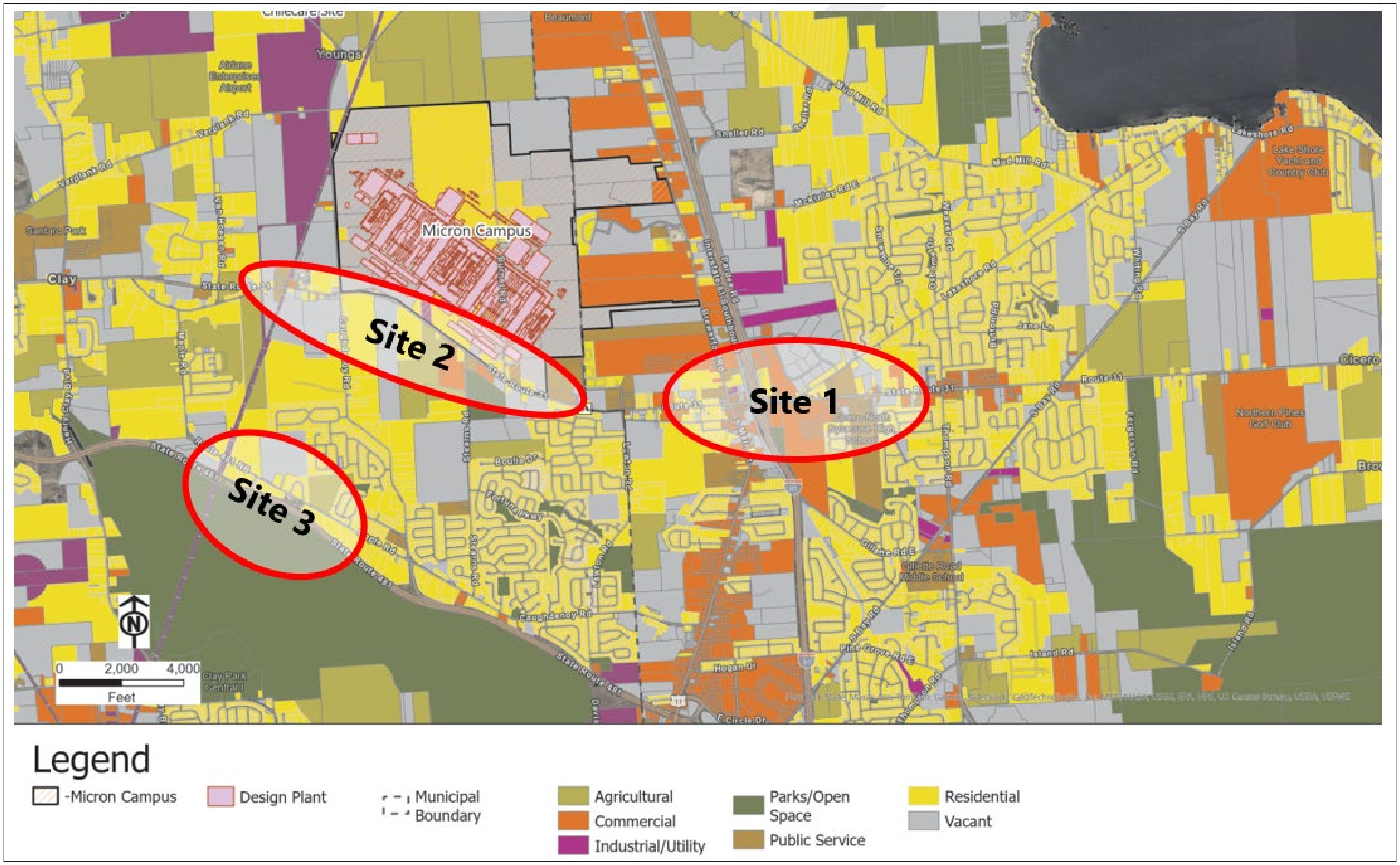
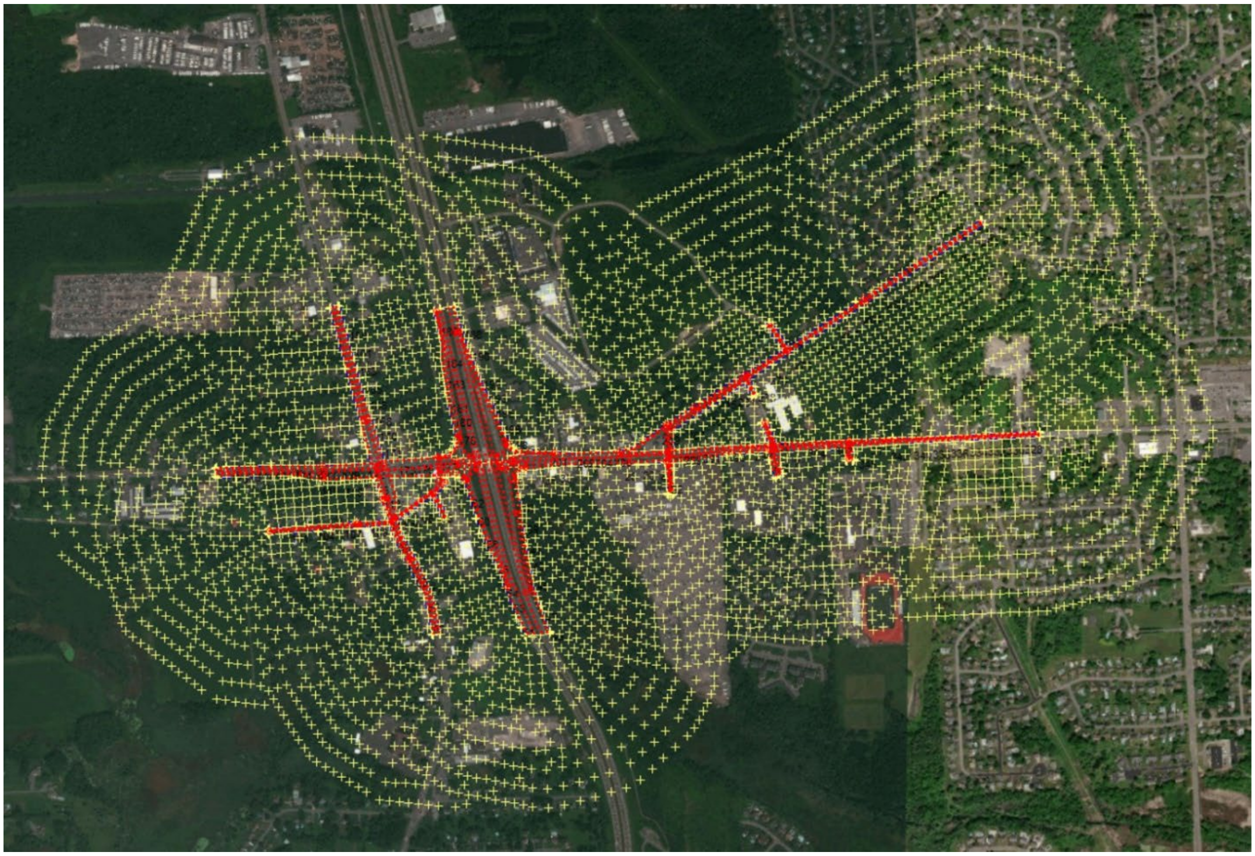
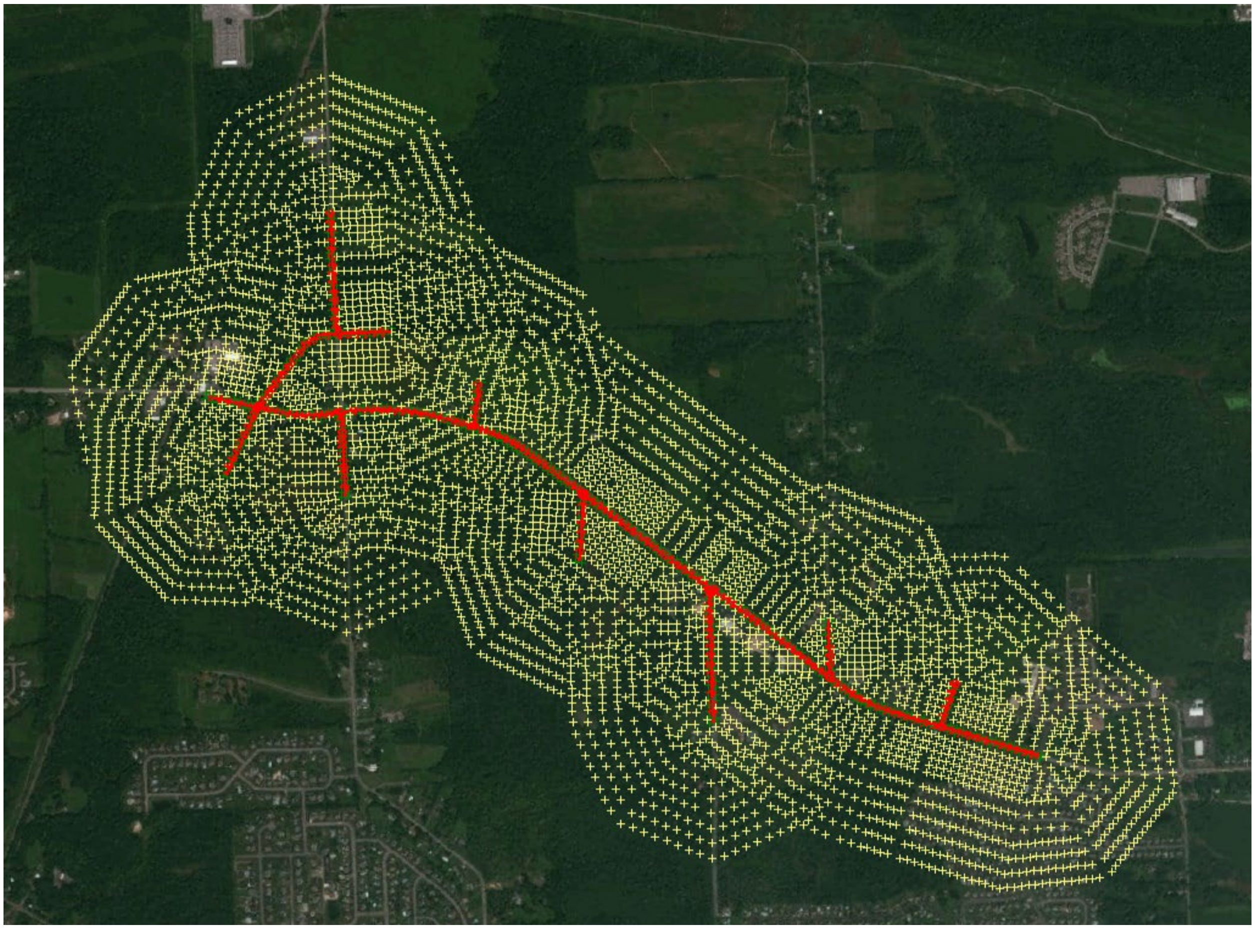


Figure I-3 Site 1



Note: Red lines indicate links modeled and yellow crosses represent receptor placement.

Figure I-4 Site 2



Note: Red lines indicate links modeled and yellow crosses represent receptor placement.

Figure I-5 Site 3

Note: Red lines indicate links modeled and yellow crosses represent receptor placement.

c. PM Emissions

The PM_{10} and $PM_{2.5}$ microscale analyses include only directly emitted PM_{10} and $PM_{2.5}$ emissions. $PM_{2.5}$ precursors are not considered in PM microscale analyses, since precursors take time at the regional level to form into secondary PM. Exhaust, brake wear, and tire wear emissions from on-road vehicles are included in the project's PM_{10} and $PM_{2.5}$ analyses. For these analyses, both running and crankcase running exhaust were considered because start exhaust is unlikely to occur on the roadways included in the model domain.

Re-entrained road dust was included in the PM_{10} analysis because the New York State Implementation Plan previously identified that such emissions contribute to PM_{10} concentrations. Road dust was not included in the $PM_{2.5}$ analysis.

d. Model

The analysis was performed using the EPA's MOVES4 emissions model, AP-42 and the AERMOD dispersion model (currently version 24142).

e. Data

The latest MOVES input parameters were obtained from NYSDOT and NYSDEC. Project-specific base traffic data, including volumes, average vehicle speeds, and facility type for each roadway section in the project area, was obtained from the project team. Vehicle volumes were obtained for AM, midday, PM, and overnight periods. The appropriate hourly meteorological data was obtained in the format required for use in AERMOD, as provided by NYSDEC. The meteorological data is representative of the terrain, climate, and topography of the study area. Surface meteorological data and upper air data from Syracuse Airport, NY was used.

Step 3. Estimate On-Road Vehicle Emissions

On-road vehicle emissions were estimated using MOVES. MOVES input parameters were provided by NYSDOT and NYSDEC. MOVES input relies on link-specific data. The PM emissions vary by time of day and time of year. Volume and speed data for each link was obtained from the traffic analysis being conducted for this project for AM, midday, PM, and overnight periods. For each intersection and analysis year, MOVES was run four (4) times (AM, PM, midday, and overnight) for one quarter. The month selected in MOVES coincides with the month with seasonal fuel that results in highest PM emissions. For every source, a set of four (4) emission factors in units of grams per mile were developed for use for each of the analysis years and for each pollutant. Based on the traffic analysis for the Proposed Project, the data was allocated into the time periods shown in Table I-8.

Table I-8 Proposed Traffic Analysis Time Period Combinations

Name	Description	From	To	# of Hours
Period 1	Overnight	6:00 PM	6:00 AM	12
Period 2	AM	6:00 AM	9:00 AM	3
Period 3	Midday	9:00 AM	3:00 PM	6
Period 4	PM	3:00 PM	6:00 PM	3

Step 4. Estimate Emissions from Road Dust, Construction and Additional Sources

Road dust emissions were included in the analysis, as described in step 2(b).

No additional sources of PM emissions were included. It is assumed that PM concentrations due to any other nearby emissions sources were included in the ambient monitor values used for background concentrations. In addition, the Proposed Project is not expected to result in changes to emissions from nearby sources.

Step 5. Select an Air Quality Model, Data Inputs and Receptors

a. Model

The USEPA's AERMOD air dispersion model, currently version 24142, was used to estimate concentrations of PM due to project operations. The model uses traffic data, emission factor data, and meteorological data to estimate concentrations of PM at a series of receptors. For each modeled alternative, the model setup includes a series of links, or roadway segments, for an approximately 1,000 feet segment of the highway. The analysis includes adjacent service roads and cross-streets, as presented in Step 2.

b. Data Inputs

Link-specific inputs include length, mixing zone width, volume, emission factor, initial vertical dimension and vertical dispersion coefficient, as well as release height above ground. The project team provided volume and speed data on the affected roadway links for the agreed-upon analysis years and scenarios. The vehicle mix, including the percentage of medium trucks, heavy trucks and buses, along with roadway grade (slope) on the affected roadway links was also obtained. Meteorological input files were obtained from NYSDEC. As recommended in EPA's "Guideline on Air Quality Models" (Appendix W to 40 CFR Part 51), five consecutive years (2019 to 2023) of the most recent and readily available meteorological data was used for the dispersion modeling analysis; meteorological data from Syracuse Airport was used. For each alternative, AERMOD was run for each of the five years of meteorological data.

c. Receptors

Receptors were placed to estimate the highest concentrations of PM_{10} and $PM_{2.5}$ to determine any possible violations of the NAAQS. Highest concentrations are expected to occur near the areas with the highest-volume roadways. Receptors were placed in a grid, as applicable. Pursuant to the NYSDOT's TEM and USEPA guidance, receptors were placed five meters (approximately 16 feet) from the source of emissions, with a grid of receptors spaced at 25 meters (approximately 82 feet) nearer to the main roadway sources and 50 meters (approximately 164 feet) farther from these sources. Receptors were placed up to 300 meters (approximately 1,000 feet) from the source of emissions (see Figure I-3 through Figure I-5).

Step 6. Determine Background Concentrations from Nearby and Other Sources

The same background concentrations used in the stationary source analyses (Section 0) were used for the PM microscale analyses. The background values were added to the AERMOD modeled design values for comparison to the NAAQS. These values are 14 ug/m^3 for 24-hour $PM_{2.5}$, 5.6 ug/m^3 for annual $PM_{2.5}$, and 33 ug/m^3 for PM_{10}.

Step 7. Calculate Design Concentrations

The model results (Step 5) were added to the background concentration(s) (Step 6) to calculate the design concentrations. The maximum design concentrations were calculated using the steps outlined in EPA's PM hot-spot guidance, which are consistent with the statistical form of the NAAQS. The design concentrations were evaluated to determine the project's potential impacts on PM_{10} and $PM_{2.5}$ concentrations in the project area.

Step 8. Consider Mitigation or Control Measures

If the project results in any violation of NAAQS, mitigation or control measures to reduce emissions in the study area may be considered by the project sponsors. Per NEPA and SEQRA, the consideration of mitigation is required for adverse effects. If such measures are considered, additional modeling will need to be completed, and new design values calculated to ensure that conformity and/or NEPA and SEQRA requirements are met. Mitigation measures may include the following:

a. Retrofitting, replacing vehicles/engines, and using cleaner fuels;
b. Reducing idling;
c. Redesigning the transportation project itself;
d. Controlling fugitive dust; and
e. Controlling other sources of emissions.

Step 9. Document the PM Hot-Spot Analysis

The PM microscale analysis and results are documented in the air quality section of the DEIS main body. Due to the large volume of input and output files created for this analysis, these files will be available electronically.

PM Hot-Spot Analysis Results

As shown in Table I-9 through Table I-11, there would be no exceedances of the NAAQS at any of the analyzed intersections; therefore, mobile source PM_{10} and $PM_{2.5}$ emissions associated with operation of the Preferred Action Alternative are not expected to have a significant adverse impact on local air quality.

Table I-9 Site 1 PM Design Concentrations (μg/m^3)

Year	Scenario	Background Concentration	Modeled Concentration	Design Concentration	NAAQS	Exceed NAAQS
	24-Hour $PM_{2.5}$					
2027	No Action	14	1.41	15	35	No
	Preferred Action		1.55	16		
2031	No Action		1.17	15		
	Preferred Action		1.49	15		
2041	No Action		0.91	15		
	Preferred Action		1.16	15		
	Traffic Mitigation Scenario A		0.71	15		
	Traffic Mitigation Scenario B		0.69	15		
	Traffic Mitigation Scenario C		0.69	15		
	Annual $PM_{2.5}$					
2027	No Action	5.6	0.59	6.2	9.0	No
	Preferred Action		0.65	6.3		
2031	No Action		0.48	6.1		
	Preferred Action		0.61	6.2		
2041	No Action		0.39	6.0		
	Preferred Action		0.50	6.1		
	Traffic Mitigation Scenario A		0.30	5.9		
	Traffic Mitigation Scenario B		0.30	5.9		
	Traffic Mitigation Scenario C		0.30	5.9		
	24-Hour PM_{10}					
2027	No Action	33	29.77	63	150	No
	Preferred Action		31.99	65		
2031	No Action		32.50	66		
	Preferred Action		38.23	71		
2041	No Action		33.76	67		
	Preferred Action		40.83	74		
	Traffic Mitigation Scenario A		26.43	59		
	Traffic Mitigation Scenario B		24.65	58		
	Traffic Mitigation Scenario C		24.64	58		

Note: Values may not add up due to rounding.

Table I-10 Site 2 PM Design Concentrations (μg/m^3)

Year	Scenario	Background Concentration	Modeled Concentration	Design Concentration	NAAQS	Exceed NAAQS
	24-Hour $PM_{2.5}$					
2027	No Action	14	0.44	14	35	No
	Preferred Action		0.47	14		
2031	No Action		0.48	14		
	Preferred Action		0.63	15		
2041	No Action		0.39	14		
	Preferred Action		0.59	15		
	Traffic Mitigation Scenario A		0.56	15		
	Traffic Mitigation Scenario B		0.45	14		
	Traffic Mitigation Scenario C		0.47	14		
	Annual $PM_{2.5}$					
2027	No Action	5.6	0.20	5.8	9.0	No
	Preferred Action		0.20	5.8		
2031	No Action		0.18	5.8		
	Preferred Action		0.24	5.8		
2041	No Action		0.15	5.7		
	Preferred Action		0.21	5.8		
	Traffic Mitigation Scenario A		0.21	5.8		
	Traffic Mitigation Scenario B		0.15	5.8		
	Traffic Mitigation Scenario C		0.18	5.8		
	24-Hour PM_{10}					
2027	No Action	33	13.92	47	150	No
	Preferred Action		14.67	48		
2031	No Action		18.35	51		
	Preferred Action		19.39	52		
2041	No Action		18.93	52		
	Preferred Action		20.42	54		
	Traffic Mitigation Scenario A		19.89	53		
	Traffic Mitigation Scenario B		18.81	52		
	Traffic Mitigation Scenario C		18.83	52		

Note: Values may not add up due to rounding.

Table I-11 Site 3 PM Design Concentrations (μg/m^3)

Year	Scenario	Background Concentration	Modeled Concentration	Design Concentration	NAAQS	Exceed NAAQS
	24-Hour $PM_{2.5}$					
2027	No Action	14	0.75	15	35	No
	Preferred Action		0.75	15		
2031	No Action		0.61	15		
	Preferred Action		0.63	15		
2041	No Action		0.40	14		
	Preferred Action		0.40	14		
	Traffic Mitigation Scenario A		0.40	14		
	Traffic Mitigation Scenario B		0.38	14		
	Traffic Mitigation Scenario C		0.37	14		
	Annual $PM_{2.5}$					
2027	No Action	5.6	0.26	5.9	9.0	No
	Preferred Action		0.26	5.9		
2031	No Action		0.22	5.8		
	Preferred Action		0.22	5.8		
2041	No Action		0.14	5.7		
	Preferred Action		0.14	5.7		
	Traffic Mitigation Scenario A		0.14	5.7		
	Traffic Mitigation Scenario B		0.12	5.7		
	Traffic Mitigation Scenario C		0.12	5.7		
	24-Hour PM_{10}					
2027	No Action	33	9.36	42	150	No
	Preferred Action		9.38	42		
2031	No Action		10.37	43		
	Preferred Action		10.60	44		
2041	No Action		11.02	44		
	Preferred Action		11.17	44		
	Traffic Mitigation Scenario A		11.09	44		
	Traffic Mitigation Scenario B		12.64	46		
	Traffic Mitigation Scenario C		11.94	45		

Note: Values may not add up due to rounding.

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Appendix I-3
CO & PM Screening Spreadsheets

2041 MICRON INTERSECTION SCREENING ANALYSIS

	Intersection Name	6:00 AM				7:00 AM				4:00 PM				5:00 PM				Any Approach over 4,000 vehicles?
		BD	A	B	C	BD	A	B	C	BD	A	B	C	BD	A	B	C	
1	NY 31 & NY 481 SB	Pass	NA	NA	NA	NA	NA	NA	NA	Pass	Pass	Pass	Pass	Fail	Fail	Fail	Fail	No/Pass
2	NY 31 & NY 481 NB	NA	NA	NA	NA	NA	NA	NA	NA	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	No/Pass
3	Marketfair Plaza & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
4	NY 31 & Great Northern Mall West	NA	NA	NA	NA	NA	NA	NA	NA	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	No/Pass
5	Parking Lot/Great Northern Mall East & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	Pass	Pass	Pass	Pass	Fail	Fail	NA	Pass	No/Pass
6	Morgan Road & NY 31	NA	NA	NA	NA	Fail	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	No/Pass
8	Grange Road W & NY 31	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
9	Van Hoesen Road & NY 31	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
10	Grange Road E & NY 31	NA	NA	NA	NA	Fail	Fail	NA	NA	Pass	NA	NA	NA	NA	Fail	NA	NA	No/Pass
11	Caughdenoy Road & NY 31	NA	NA	NA	NA	Fail	Fail	NA	NA	NA	Fail	NA	NA	Fail	Fail	Fail	NA	No/Pass
12	Stearns Road & NY 31	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
13	NY 31 & Micron Driveway 4	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	Fail	NA	NA	NA	No/Pass
14	Barcaldine Drive/Legionnaire Drive & NY 31	NA	NA	NA	NA	Fail	Fail	NA	NA	NA	NA	NA	NA	NA	Fail	Fail	Fail	No/Pass
15	Lawton Road/Legionnaire Drive & NY 31	NA	NA	NA	NA	Fail	Fail	NA	NA	Pass	NA	NA	NA	Fail	Fail	Fail	NA	No/Pass
16	US 11 & NY 31	Pass	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	Fail	Fail	Fail	Fail	No/Pass
17	NY 31 & I-81 SB Ramp	NA	NA	NA	NA	Fail	Fail	Fail	Fail	Pass	NA	NA	NA	Fail	NA	NA	NA	No/Pass
18	NY 31 & Pardee Road/I-81 NB Ramp	NA	NA	NA	NA	Fail	Fail	NA	NA	Pass	NA	NA	NA	Pass	NA	NA	NA	No/Pass
20	Parking Lot/Lakeshore Spur & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	No/Pass
21	New Country Drive/Cicero Elementary School Parking Lot & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
22	Cicero North Syracuse High School West Driveway & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	No/Pass
23	Thompson Road/Torchwood Lane & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	No/Pass
24	South Bay Road & NY 31	NA	NA	NA	NA	NA	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Fail	Fail	Fail	Fail	No/Pass
25	Henry Clay Boulevard & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
26	Caughdenoy Road & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Fail	NA	NA	NA	No/Pass
27	Caughdenoy Road & Mud Mill Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
28	Caughdenoy Road & Oak Orchard Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
29	US 11 & Mud Mill Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
31	Raymour & Flanigan/Wegmans East & NYS Route 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
32	Henry Clay Boulevard & Wetzel Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass

2041 MICRON INTERSECTION SCREENING ANALYSIS																	
	Intersection Name	6:00 AM				7:00 AM				4:00 PM				5:00 PM				Any Approach over 4,000 vehicles?
		BD	A	B	C	BD	A	B	C	BD	A	B	C	BD	A	B	C	
33	Allen Road & Bear Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
34	US 11 & Bear Road	NA	NA	NA	NA	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass	No/Pass
35	Bear Road & I-481 EB On/Off-Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
36	South Bay Road & Bear Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
37	I-481 WB On/Off-Ramp & Circle Drive E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
38	US 11 & Circle Drive W/Circle Drive E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	Pass	No/Pass
39	US 11 & Caughdenoy Road/Widewaters Commons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
40	NY 481 NB Off-Ramp & Maple Road & Caughdenoy Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
41	Maple Road & Grange Road W/Grange Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
43	US 11 & Crabtree Lane	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
44	Grange Road/Grange Road E & Van Hoesen Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
46	Parking Lot & Crabtree Lane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
47	Cicero North Syracuse High School East Driveway & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
49	NY 31 & Driveway	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	Fail	NA	NA	NA	No/Pass
50	McNamara Drive/Driveway & NY 31	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	NA	Fail	NA	NA	No/Pass
56	NY 31 & Weller Canning Road	NA	NA	NA	NA	Fail	NA	NA	NA	Pass	NA	NA	NA	NA	Fail	NA	NA	No/Pass
58	Caughdenoy Road & Micron Driveway 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
59	Caughdenoy Road & Access Road/Micron Driveway 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
60	NY 31 & Micron Driveway 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
62	NY 31 & Micron Driveway 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
63	US 11 & Micron Driveway 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
69	Morgan Road & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Fail	NA	NA	NA	No/Pass
70	Morgan Road & Great Northern Mall Driveway 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
71	Pardee Road & McKinley Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
72	Morgan Road & Great Northern Mall Driveway 2	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	Pass	NA	NA	NA	No/Pass
73	Great Northern Mall Driveway 3 & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
74	Great Northern Mall Driveway 4 & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
101	Caughdenoy Road & Micron Driveway X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
114	Verplank Rd & SB 481 Off-Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
117	Verplank Rd & NB 481 On-Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass

	2041 MICRON INTERSECTION SCREENING ANALYSIS																	
	Intersection Name	6:00 AM				7:00 AM				4:00 PM				5:00 PM				Any Approach over 4,000 vehicles?
		BD	A	B	C	BD	A	B	C	BD	A	B	C	BD	A	B	C	
132	Davidson & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
233	Oswego & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
258	Texas Roadhouse/Delta Sonic & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
260	US 11 & Chick_fil_A	NA	NA	NA	NA	NA	NA	NA	NA	Pass	NA	NA	NA	NA	NA	NA	NA	No/Pass
262	NY 31 & Carling Road	NA	NA	NA	NA	NA	Fail	NA	NA	Pass	Pass	Pass	Pass	Pass	NA	NA	NA	No/Pass
267	NY 31 & Dell Center Dr	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
275	Verplank Road & Proposed Access #1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
276	Lowes/Home Depot & NY 31	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pass	Pass	Pass	NA	Fail	NA	NA	No/Pass
280	NY 31 & Oswego Road	NA	NA	NA	NA	NA	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Fail	Fail	Fail	Fail	No/Pass
284	NY 31 & Proposed Access	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
287	Proposed Acess #2 & Verplank Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No/Pass
288	Soule Rd & Carling Rd & I-481 SB Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Fail	NA	NA	NA	Fail	No/Pass

		Volumes																			
		6:00 AM					7:00 AM					4:00 PM					5:00 PM				
	Intersection Name	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
1	NY 31 & NY 481 SB	2770	2740	2813	2781	2785	4033	4697	4828	4611	4618	7286	7405	7650	7549	7548	6594	7276	7472	7349	7353
2	NY 31 & NY 481 NB	2222	2283	2275	2263	2270	3556	4465	4420	4081	4120	7065	7183	7180	6953	6945	6436	7327	7282	7052	7041
3	Marketfair Plaza & NY 31	1970	2012	2006	1933	1936	3124	4007	3978	3526	3562	5717	5803	5860	5522	5514	5228	6053	6097	5623	5609
4	NY 31 & Great Northern Mall West	2154	2194	2189	2067	2073	3413	4233	4223	3736	3773	6056	6143	6227	5855	5867	5531	6228	6369	5825	5818
5	Parking Lot/Great Northern Mall East & NY 31	1916	1954	1958	1766	1777	3031	3736	3741	3234	3257	4940	5028	5099	4743	4773	4523	5075	5272	4631	4652
6	Morgan Road & NY 31	2299	2356	2349	2174	2178	3602	4806	4685	4259	4259	5113	5195	5403	5096	5106	4720	5590	5666	5156	5184
8	Grange Road W & NY 31	990	1039	1052	892	891	1516	2734	3033	2498	2481	2484	2571	2825	2508	2515	2284	2978	3509	2909	2903
9	Van Hoesen Road & NY 31	882	930	958	818	816	1370	2640	2951	2384	2381	2138	2217	2506	2385	2391	1995	2674	3238	2837	2833
10	Grange Road E & NY 31	881	932	977	805	802	1372	2688	3031	2388	2385	2170	2256	2553	2376	2386	2024	2723	3298	2852	2845
11	Caughdenoy Road & NY 31	977	1045	1096	833	833	1531	3839	4415	3165	3097	2252	2386	2670	2197	2167	2081	3853	4364	3363	3239
12	Stearns Road & NY 31	1342	990	1107	908	908	2059	4447	6056	4936	4868	2586	2766	2315	2125	2113	2418	4195	7530	5262	5272
13	NY 31 & Micron Driveway 4	799	893	1022	872	874	1228	3122	3526	2905	2873	1533	1667	2042	1972	1876	1400	2739	3713	2986	2966
14	Barcaldine Drive/Legionnaire Drive & NY 31	894	1017	1141	991	991	1364	3225	3801	3121	3076	1612	1773	2307	2233	2133	1475	2719	3630	3232	3209
15	Lawton Road/Legionnaire Drive & NY 31	1028	1152	1221	1071	1070	1577	3481	3930	3236	3172	2389	2553	2759	2706	2611	2185	3423	4068	3668	3658
16	US 11 & NY 31	1855	2021	1945	1800	1805	2947	5278	5468	4802	4796	4543	4771	4570	4506	4467	4153	5912	6101	5839	5833
17	NY 31 & I-81 SB Ramp	2278	2448	2357	2212	2209	3487	5674	5557	4835	4832	3982	4229	4065	4088	4052	3634	5283	5551	5193	5186
18	NY 31 & Pardee Road/I-81 NB Ramp	2085	2240	2062	2046	2041	3184	5210	4931	4416	4421	4337	4474	4132	4242	4220	3947	4208	4312	4390	4391
20	Parking Lot/Lakeshore Spur & NY 31	1260	1314	1573	1587	1587	1896	2138	2550	2563	2554	2469	2564	3161	3101	3110	2251	2584	3030	3127	3127
21	New Country Drive/Cicero Elementary School Parking Lot & NY 31	1221	1267	1372	1388	1385	1766	2000	2204	2217	2213	1906	1939	2371	2303	2301	1727	1814	2105	2163	2165
22	Cicero North Syracuse High School West Driveway & NY 31	1233	1273	1353	1369	1364	1825	2057	2155	2167	2161	2245	2259	2457	2395	2392	2047	2113	2197	2248	2252
23	Thompson Road/Torchwood Lane & NY 31	1015	1056	1129	1139	1139	1532	1786	1847	1840	1830	2541	2552	2677	2599	2596	2330	2375	2353	2400	2405
24	South Bay Road & NY 31	1178	1225	1231	1232	1236	1846	2120	2135	2122	2131	2772	2871	2945	2895	2944	2482	2856	2896	2912	2915
25	Henry Clay Boulevard & Verplank Road	207	211	206	202	204	378	667	513	377	381	779	808	662	629	644	645	947	795	641	642
26	Caughdenoy Road & Verplank Road	259	268	266	277	280	442	1087	857	775	778	709	765	711	727	735	609	1316	1152	970	973
27	Caughdenoy Road & Mud Mill Road	260	272	269	280	285	445	834	821	779	784	699	756	719	747	753	613	1100	1102	992	995
28	Caughdenoy Road & Oak Orchard Road	213	227	224	216	219	353	613	549	513	514	629	684	618	636	639	545	961	869	724	728
29	US 11 & Mud Mill Road	170	155	443	450	457	309	499	906	859	871	652	692	1204	1196	1201	569	809	1194	1178	1183
31	Raymour & Flanigan/Wegmans East & NYS Route 31	2290	2256	2341	2324	2326	3280	3773	3948	3872	3859	6208	6340	6649	6605	6608	5587	6114	6422	6446	6456
32	Henry Clay Boulevard & Wetzel Road	583	604	578	559	565	965	1311	1263	1244	1250	1568	1629	1633	1618	1623	1393	1663	1732	1660	1638
33	Allen Road & Bear Road	571	602	600	592	596	981	1125	1078	1063	1067	1591	1674	1790	1802	1807	1435	1576	1630	1663	1671
34	US 11 & Bear Road	1552	1610	1582	1485	1317	2459	2753	2632	2475	2185	3829	4002	4040	3963	3920	3443	4241	4033	3773	3756
35	Bear Road & I-481 EB On/Off-Ramp	1042	1055	1062	990	849	1456	1512	1471	1384	1169	1573	1638	1621	1592	1572	1456	1924	1724	1581	1612

		Volumes																			
	Intersection Name	6:00 AM					7:00 AM					4:00 PM					5:00 PM				
		NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
36	South Bay Road & Bear Road	672	704	681	680	699	1164	1250	1274	1272	1288	2029	2107	2148	2145	2146	1939	2044	2026	2011	2041
37	I-481 WB On/Off-Ramp & Circle Drive E	658	703	705	697	696	1052	1235	1301	1265	1271	2032	2127	2224	2194	2235	1856	2013	2079	2021	2037
38	US 11 & Circle Drive W/Circle Drive E	1396	1452	1406	1298	1121	2236	2553	2426	2238	1932	3782	3949	4070	3969	3970	3425	4188	4027	3625	3579
39	US 11 & Caughdenoy Road/Widewaters Commons	1192	1222	1140	1036	871	1922	2257	1932	1810	1630	3017	3097	3065	2915	2847	2803	3692	3330	2761	2695
40	NY 481 NB Off-Ramp & Maple Road & Caughdenoy Road	440	275	328	311	672	792	2536	1720	628	1321	1904	1960	931	797	1022	1570	2314	1021	773	1177
41	Maple Road & Grange Road W/Grange Road	178	179	183	133	139	238	223	245	217	205	503	506	476	227	232	419	487	508	217	218
43	US 11 & Crabtree Lane	795	822	775	768	773	1261	1608	1404	1370	1575	2631	2673	2450	2445	2406	2405	2563	2598	2440	2690
44	Grange Road/Grange Road E & Van Hoesen Road	43	44	62	30	32	56	95	121	55	56	114	110	123	58	59	97	106	114	64	66
46	Parking Lot & Crabtree Lane	6	6	26	26	26	2	16	21	21	23	16	17	30	30	31	15	15	34	34	34
47	Cicero North Syracuse High School East Driveway & NY 31	858	891	958	973	968	1240	1452	1514	1526	1514	2114	2117	2242	2182	2185	1921	1953	1976	2031	2034
49	NY 31 & Driveway	1097	1136	1150	992	990	1727	2694	2818	2486	2475	2710	2761	3112	2797	2813	2477	3178	3403	3040	3052
50	McNamara Drive/Driveway & NY 31	1225	1267	1288	1135	1137	1943	2926	3065	2741	2732	3001	3054	3412	3112	3132	2738	3446	3673	3327	3342
56	NY 31 & Weller Canning Road	911	961	1007	838	835	1426	2740	3085	2448	2445	2321	2408	2707	2544	2555	2165	2870	3440	3005	2998
58	Caughdenoy Road & Micron Driveway 1	0	138	137	148	149	0	820	623	553	554	0	312	351	388	389	0	969	860	651	654
59	Caughdenoy Road & Access Road/Micron Driveway 2	0	150	164	205	208	0	2902	2175	2150	2153	0	381	374	441	443	0	2892	2174	2052	2056
60	NY 31 & Micron Driveway 3	0	860	940	741	744	0	3325	3639	3297	3263	0	1556	1903	1717	1710	0	3215	3769	3238	3210
62	NY 31 & Micron Driveway 5	0	913	1037	886	889	0	3347	3852	3191	3154	0	1698	2216	2143	2047	0	2868	3768	3358	3336
63	US 11 & Micron Driveway 6	0	281	207	206	206	0	1240	1258	1318	1322	0	878	791	753	753	0	1426	1352	1379	1382
69	Morgan Road & Verplank Road	782	804	802	801	807	1239	1631	1487	1339	1336	2037	2088	1932	1904	1918	1814	2205	2037	1848	1846
70	Morgan Road & Great Northern Mall Driveway 1	780	800	798	800	806	1226	1514	1355	1283	1284	1740	1763	1779	1775	1774	1590	1792	1689	1648	1650
71	Pardee Road & McKinley Road	160	162	229	229	232	245	246	357	384	386	321	326	418	418	422	289	276	396	398	399
72	Morgan Road & Great Northern Mall Driveway 2	860	880	884	888	894	1353	1624	1447	1407	1406	1921	1926	2017	2017	2006	1771	1906	1805	1825	1830
73	Great Northern Mall Driveway 3 & Verplank Road	188	189	188	185	189	305	386	381	300	303	508	517	479	465	476	448	546	525	425	429
74	Great Northern Mall Driveway 4 & Verplank Road	210	212	212	207	212	340	416	416	333	336	576	585	545	528	532	506	605	584	486	484
101	Caughdenoy Road & Micron Driveway X	0	130	146	157	158	0	812	648	575	575	0	304	351	388	389	0	961	861	654	657
114	Verplank Rd & SB 481 Off-Ramp	113	113	211	205	206	187	270	441	360	381	319	320	327	323	328	287	295	303	297	303
117	Verplank Rd & NB 481 On-Ramp	278	160	284	279	281	461	638	620	452	457	680	689	362	370	373	602	719	415	327	333
132	Davidson & NY 31	1723	1800	1810	1804	1804	2463	3062	3124	3110	3094	4726	4887	4998	4991	4995	4231	4720	4816	4884	4889
233	Oswego & Verplank Road	454	475	479	479	481	812	858	857	861	867	975	1018	1009	1010	1013	873	934	924	928	930
258	Texas Roadhouse/Delta Sonic & NY 31	1806	1887	1901	1895	1897	2597	3224	3293	3277	3262	5008	5179	5281	5273	5280	4479	4991	5084	5153	5158
260	US 11 & Chick_fil_A	1122	1159	1113	1002	832	1802	2079	1895	1759	1545	3183	3287	3410	3286	3256	2953	3788	3543	3021	2954
262	NY 31 & Carling Road	2404	2477	2484	2465	2467	3350	4009	4065	3989	3975	6452	6588	6699	6648	6655	5836	6346	6446	6480	6485
267	NY 31 & Dell Center Dr	2033	2105	2114	2107	2110	2913	3523	3584	3565	3549	5712	5846	5986	5969	5974	5132	5633	5761	5821	5825
275	Verplank Road & Proposed Access #1	180	182	183	180	182	300	391	379	296	299	434	443	409	405	415	381	484	461	364	371

		Volumes																			
		6:00 AM					7:00 AM					4:00 PM					5:00 PM				
	Intersection Name	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
276	Lowes/Home Depot & NY 31	1968	2038	2047	2038	2044	2849	3457	3512	3497	3485	5787	5952	6050	6042	6048	5187	5711	5800	5869	5874
280	NY 31 & Oswego Road	2284	2402	2409	2410	2412	3564	4229	4255	4279	4280	5605	5861	5905	5906	5912	4981	5559	5593	5674	5681
284	NY 31 & Proposed Access	1620	1654	1629	1421	1421	2550	3184	3154	2658	2658	3777	3847	3856	3553	3575	3472	3981	4077	3418	3449
287	Proposed Acess #2 & Verplank Road	191	193	191	188	191	312	397	389	305	310	497	507	470	461	473	440	538	515	416	422
288	Soule Rd & Carling Rd & I-481 SB Ramp	905	1029	827	2713	820	950	1189	1153	1103	1105	1682	1713	1951	1931	1933	1584	1667	1890	1894	1894

		INTERSECTION SCREENING - DELTA VOLUMES															
		6:00 AM				7:00 AM				4:00 PM				5:00 PM			
	Intersection Name	BD	A	B	C	BD	A	B	C	BD	A	B	C	BD	A	B	C
1	NY 31 & NY 481 SB	-30	43	11	15	664	795	578	585	119	364	263	262	682	878	755	759
2	NY 31 & NY 481 NB	61	53	41	48	909	864	525	564	118	115	-112	-120	891	846	616	605
3	Marketfair Plaza & NY 31	42	36	-37	-34	883	854	402	438	86	143	-195	-203	825	869	395	381
4	NY 31 & Great Northern Mall West	40	35	-87	-81	820	810	323	360	87	171	-201	-189	697	838	294	287
5	Parking Lot/Great Northern Mall East & NY 31	38	42	-150	-139	705	710	203	226	88	159	-197	-167	552	749	108	129
6	Morgan Road & NY 31	57	50	-125	-121	1204	1083	657	657	82	290	-17	-7	870	946	436	464
8	Grange Road W & NY 31	49	62	-98	-99	1218	1517	982	965	87	341	24	31	694	1225	625	619
9	Van Hoesen Road & NY 31	48	76	-64	-66	1270	1581	1014	1011	79	368	247	253	679	1243	842	838
10	Grange Road E & NY 31	51	96	-76	-79	1316	1659	1016	1013	86	383	206	216	699	1274	828	821
11	Caughdenoy Road & NY 31	68	119	-144	-144	2308	2884	1634	1566	134	418	-55	-85	1772	2283	1282	1158
12	Stearns Road & NY 31	-352	-235	-434	-434	2388	3997	2877	2809	180	-271	-461	-473	1777	5112	2844	2854
13	NY 31 & Micron Driveway 4	94	223	73	75	1894	2298	1677	1645	134	509	439	343	1339	2313	1586	1566
14	Barcaldine Drive/Legionnaire Drive & NY 31	123	247	97	97	1861	2437	1757	1712	161	695	621	521	1244	2155	1757	1734
15	Lawton Road/Legionnaire Drive & NY 31	124	193	43	42	1904	2353	1659	1595	164	370	317	222	1238	1883	1483	1473
16	US 11 & NY 31	166	90	-55	-50	2331	2521	1855	1849	228	27	-37	-76	1759	1948	1686	1680
17	NY 31 & I-81 SB Ramp	170	79	-66	-69	2187	2070	1348	1345	247	83	106	70	1649	1917	1559	1552
18	NY 31 & Pardee Road/I-81 NB Ramp	155	-23	-39	-44	2026	1747	1232	1237	137	-205	-95	-117	261	365	443	444
20	Parking Lot/Lakeshore Spur & NY 31	54	313	327	327	242	654	667	658	95	692	632	641	333	779	876	876
21	New Country Drive/Cicero Elementary School Parking Lot & NY 31	46	151	167	164	234	438	451	447	33	465	397	395	87	378	436	438
22	Cicero North Syracuse High School West Driveway & NY 31	40	120	136	131	232	330	342	336	14	212	150	147	66	150	201	205
23	Thompson Road/Torchwood Lane & NY 31	41	114	124	124	254	315	308	298	11	136	58	55	45	23	70	75
24	South Bay Road & NY 31	47	53	54	58	274	289	276	285	99	173	123	172	374	414	430	433
25	Henry Clay Boulevard & Verplank Road	4	-1	-5	-3	289	135	-1	3	29	-117	-150	-135	302	150	-4	-3
26	Caughdenoy Road & Verplank Road	9	7	18	21	645	415	333	336	56	2	18	26	707	543	361	364
27	Caughdenoy Road & Mud Mill Road	12	9	20	25	389	376	334	339	57	20	48	54	487	489	379	382
28	Caughdenoy Road & Oak Orchard Road	14	11	3	6	260	196	160	161	55	-11	7	10	416	324	179	183
29	US 11 & Mud Mill Road	-15	273	280	287	190	597	550	562	40	552	544	549	240	625	609	614
31	Raymour & Flanigan/Wegmans East & NYS Route 31	-34	51	34	36	493	668	592	579	132	441	397	400	527	835	859	869
32	Henry Clay Boulevard & Wetzel Road	21	-5	-24	-18	346	298	279	285	61	65	50	55	270	339	267	245
33	Allen Road & Bear Road	31	29	21	25	144	97	82	86	83	199	211	216	141	195	228	236
34	US 11 & Bear Road	58	30	-67	-235	294	173	16	-274	173	211	134	91	798	590	330	313
35	Bear Road & I-481 EB On/Off-Ramp	13	20	-52	-193	56	15	-72	-287	65	48	19	-1	468	268	125	156
36	South Bay Road & Bear Road	32	9	8	27	86	110	108	124	78	119	116	117	105	87	72	102
37	I-481 WB On/Off-Ramp & Circle Drive E	45	47	39	38	183	249	213	219	95	192	162	203	157	223	165	181
38	US 11 & Circle Drive W/Circle Drive E	56	10	-98	-275	317	190	2	-304	167	288	187	188	763	602	200	154
39	US 11 & Caughdenoy Road/Widewaters Commons	30	-52	-156	-321	335	10	-112	-292	80	48	-102	-170	889	527	-42	-108

		INTERSECTION SCREENING - DELTA VOLUMES															
	Intersection Name	6:00 AM				7:00 AM				4:00 PM				5:00 PM			
		BD	A	B	C	BD	A	B	C	BD	A	B	C	BD	A	B	C
40	NY 481 NB Off-Ramp & Maple Road & Caughdenoy Road	-165	-112	-129	232	1744	928	-164	529	56	-973	-1107	-882	744	-549	-797	-393
41	Maple Road & Grange Road W/Grange Road	1	5	-45	-39	-15	7	-21	-33	3	-27	-276	-271	68	89	-202	-201
43	US 11 & Crabtree Lane	27	-20	-27	-22	347	143	109	314	42	-181	-186	-225	158	193	35	285
44	Grange Road/Grange Road E & Van Hoesen Road	1	19	-13	-11	39	65	-1	0	-4	9	-56	-55	9	17	-33	-31
46	Parking Lot & Crabtree Lane	0	20	20	20	14	19	19	21	1	14	14	15	0	19	19	19
47	Cicero North Syracuse High School East Driveway & NY 31	33	100	115	110	212	274	286	274	3	128	68	71	32	55	110	113
49	NY 31 & Driveway	39	53	-105	-107	967	1091	759	748	51	402	87	103	701	926	563	575
50	McNamara Drive/Driveway & NY 31	42	63	-90	-88	983	1122	798	789	53	411	111	131	708	935	589	604
56	NY 31 & Weller Canning Road	50	96	-73	-76	1314	1659	1022	1019	87	386	223	234	705	1275	840	833
58	Caughdenoy Road & Micron Driveway 1	138	137	148	149	820	623	553	554	312	351	388	389	969	860	651	654
59	Caughdenoy Road & Access Road/Micron Driveway 2	150	164	205	208	2902	2175	2150	2153	381	374	441	443	2892	2174	2052	2056
60	NY 31 & Micron Driveway 3	860	940	741	744	3325	3639	3297	3263	1556	1903	1717	1710	3215	3769	3238	3210
62	NY 31 & Micron Driveway 5	913	1037	886	889	3347	3852	3191	3154	1698	2216	2143	2047	2868	3768	3358	3336
63	US 11 & Micron Driveway 6	281	207	206	206	1240	1258	1318	1322	878	791	753	753	1426	1352	1379	1382
69	Morgan Road & Verplank Road	22	20	19	25	392	248	100	97	51	-105	-133	-119	391	223	34	32
70	Morgan Road & Great Northern Mall Driveway 1	20	18	20	26	288	129	57	58	23	39	35	34	202	99	58	60
71	Pardee Road & McKinley Road	2	69	69	72	1	112	139	141	5	97	97	101	-13	107	109	110
72	Morgan Road & Great Northern Mall Driveway 2	20	24	28	34	271	94	54	53	5	96	96	85	135	34	54	59
73	Great Northern Mall Driveway 3 & Verplank Road	1	0	-3	1	81	76	-5	-2	9	-29	-43	-32	98	77	-23	-19
74	Great Northern Mall Driveway 4 & Verplank Road	2	2	-3	2	76	76	-7	-4	9	-31	-48	-44	99	78	-20	-22
101	Caughdenoy Road & Micron Driveway X	130	146	157	158	812	648	575	575	304	351	388	389	961	861	654	657
114	Verplank Rd & SB 481 Off-Ramp	0	98	92	93	83	254	173	194	1	8	4	9	8	16	10	16
117	Verplank Rd & NB 481 On-Ramp	-118	6	1	3	177	159	-9	-4	9	-318	-310	-307	117	-187	-275	-269
132	Davidson & NY 31	77	87	81	81	599	661	647	631	161	272	265	269	489	585	653	658
233	Oswego & Verplank Road	21	25	25	27	46	45	49	55	43	34	35	38	61	51	55	57
258	Texas Roadhouse/Delta Sonic & NY 31	81	95	89	91	627	696	680	665	171	273	265	272	512	605	674	679
260	US 11 & Chick_fil_A	37	-9	-120	-290	277	93	-43	-257	104	227	103	73	835	590	68	1
262	NY 31 & Carling Road	73	80	61	63	659	715	639	625	136	247	196	203	510	610	644	649
267	NY 31 & Dell Center Dr	72	81	74	77	610	671	652	636	134	274	257	262	501	629	689	693
275	Verplank Road & Proposed Access #1	2	3	0	2	91	79	-4	-1	9	-25	-29	-19	103	80	-17	-10
276	Lowes/Home Depot & NY 31	70	79	70	76	608	663	648	636	165	263	255	261	524	613	682	687
280	NY 31 & Oswego Road	118	125	126	128	665	691	715	716	256	300	301	307	578	612	693	700
284	NY 31 & Proposed Access	34	9	-199	-199	634	604	108	108	70	79	-224	-202	509	605	-54	-23
287	Proposed Acess #2 & Verplank Road	2	0	-3	0	85	77	-7	-2	10	-27	-36	-24	98	75	-24	-18
288	Soule Rd & Carling Rd & I-481 SB Ramp	124	-78	1808	-85	239	203	153	155	31	269	249	251	83	306	310	310

		INTERSECTION SCREENING - LOS																			
	Intersection Name	6:00 AM					7:00 AM					4:00 PM					5:00 PM				
		NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
1	NY 31 & NY 481 SB	A	B	A	A	B	A	B	B	B	B	E	E	F	E	E	D	E	E	E	E
2	NY 31 & NY 481 NB	B	A	A	B	B	B	B	B	B	B	D	D	E	D	D	C	E	E	D	D
3	Marketfair Plaza & NY 31	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	NY 31 & Great Northern Mall West	B	C	C	B	B	B	B	C	B	B	F	F	E	D	E	F	F	F	E	E
5	Parking Lot/Great Northern Mall East & NY 31	B	C	B	B	B	C	C	C	C	C	D	F	D	D	D	C	F	D	C	D
6	Morgan Road & NY 31	C	C	C	C	C	C	D	D	D	D	E	F	E	D	E	E	F	F	E	D
8	Grange Road W & NY 31	A	A	A	A	A	B	F	A	A	A	D	E	B	A	A	D	-	B	A	B
9	Van Hoesen Road & NY 31	A	A	A	A	A	A	F	A	A	A	C	D	A	A	A	C	-	A	A	A
10	Grange Road E & NY 31	A	A	A	A	A	B	F	D	B	B	D	E	A	A	A	D	-	D	B	B
11	Caughdenoy Road & NY 31	A	B	B	A	A	A	D	E	B	B	C	C	D	C	C	B	F	E	D	B
12	Stearns Road & NY 31	A	A	A	A	A	B	F	A	B	B	E	E	B	B	A	D	-	C	A	B
13	NY 31 & Micron Driveway 4	A	B	A	A	A	A	F	A	A	B	A	F	A	A	A	A	F	B	B	B
14	Barcaldine Drive/Legionnaire Drive & NY 31	A	A	A	A	A	A	F	E	C	C	B	B	A	A	A	A	-	E	D	D
15	Lawton Road/Legionnaire Drive & NY 31	A	A	A	A	A	B	F	D	B	C	C	D	C	C	C	C	F	E	E	C
16	US 11 & NY 31	C	D	B	C	B	D	F	C	C	C	F	F	C	C	C	E	F	F	E	E
17	NY 31 & I-81 SB Ramp	B	C	B	B	B	D	F	F	E	E	D	E	B	C	C	C	F	B	B	B
18	NY 31 & Pardee Road/I-81 NB Ramp	C	C	B	B	B	D	F	D	C	C	F	F	B	C	C	F	F	C	C	C
20	Parking Lot/Lakeshore Spur & NY 31	A	A	B	B	B	A	B	C	C	C	D	E	E	E	E	C	F	D	D	D
21	New Country Drive/Cicero Elementary School Parking Lot & NY 31	A	A	A	A	A	A	B	B	B	B	A	B	B	B	B	A	B	B	B	B
22	Cicero North Syracuse High School West Driveway & NY 31	A	B	A	A	A	B	B	B	B	B	E	C	D	C	C	B	C	C	C	C
23	Thompson Road/Torchwood Lane & NY 31	0	A	A	A	A	0	B	A	A	A	0	0	C	C	C	C	E	B	B	B
24	South Bay Road & NY 31	B	B	C	C	C	C	C	D	D	D	C	D	D	D	D	C	E	E	E	E
25	Henry Clay Boulevard & Verplank Road	B	B	A	A	C	A	A	A	A	B	B	B	A	A	B	B	B	A	A	B
26	Caughdenoy Road & Verplank Road	A	A	A	A	A	A	C	A	A	B	A	A	A	A	A	A	D	A	A	A
27	Caughdenoy Road & Mud Mill Road	A	A	A	A	B	A	B	B	C	B	A	A	A	B	B	A	B	B	B	B
28	Caughdenoy Road & Oak Orchard Road	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A
29	US 11 & Mud Mill Road	B	B	A	A	A	A	A	A	A	A	A	A	B	B	B	A	A	B	B	B
31	Raymour & Flanigan/Wegmans East & NYS Route 31	B	A	B	B	B	B	B	A	B	A	C	C	C	C	C	C	C	C	C	B
32	Henry Clay Boulevard & Wetzel Road	B	B	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C
33	Allen Road & Bear Road	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B
34	US 11 & Bear Road	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	E	D	D	D
35	Bear Road & I-481 EB On/Off-Ramp	B	B	B	B	B	B	B	B	C	B	B	B	A	A	B	B	B	B	A	B

		INTERSECTION SCREENING - LOS																			
		6:00 AM					7:00 AM					4:00 PM					5:00 PM				
	Intersection Name	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
36	South Bay Road & Bear Road	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B
37	I-481 WB On/Off-Ramp & Circle Drive E	B	B	B	B	B	B	C	B	B	B	B	C	B	B	B	C	B	B	B	B
38	US 11 & Circle Drive W/Circle Drive E	A	B	A	B	C	A	B	B	A	C	C	C	C	C	E	C	C	C	B	D
39	US 11 & Caughdenoy Road/Widewaters Commons	C	B	C	B	B	C	C	C	C	B	C	C	C	C	C	C	C	C	C	C
40	NY 481 NB Off-Ramp & Maple Road & Caughdenoy Road	A	A	B	B	A	A	C	B	B	A	A	A	A	A	A	A	B	A	A	A
41	Maple Road & Grange Road W/Grange Road	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
43	US 11 & Crabtree Lane	A	A	A	A	A	A	A	A	A	A	D	D	A	A	A	C	C	C	A	C
44	Grange Road/Grange Road E & Van Hoesen Road	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
46	Parking Lot & Crabtree Lane	-	-	A	A	A	-	-	A	A	A	-	-	A	A	A	-	-	A	A	A
47	Cicero North Syracuse High School East Driveway & NY 31	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C	C	C
49	NY 31 & Driveway	-	A	A	A	A	-	F	B	B	B	-	E	A	A	A	-	F	C	B	B
50	McNamara Drive/Driveway & NY 31	A	A	B	B	A	D	F	B	B	B	F	F	B	B	B	E	-	D	B	B
56	NY 31 & Weller Canning Road	A	A	A	A	A	B	F	C	B	B	G	F	B	A	A	F	-	E	C	C
58	Caughdenoy Road & Micron Driveway 1	NF	A	A	A	A	NF	A	A	A	A	NF	A	A	A	A	NF	B	A	A	A
59	Caughdenoy Road & Access Road/Micron Driveway 2	NF	A	A	B	B	NF	F	B	B	C	NF	A	A	B	B	NF	F	C	C	C
60	NY 31 & Micron Driveway 3	NF	B	A	A	A	NF	F	B	B	D	NF	F	A	A	A	NF	F	C	B	C
62	NY 31 & Micron Driveway 5	NF	B	A	A	A	NF	F	E	C	C	NF	F	A	A	A	NF	F	B	C	C
63	US 11 & Micron Driveway 6	NF	A	A	A	A	NF	F	B	B	B	NF	B	A	A	A	NF	B	A	A	C
69	Morgan Road & Verplank Road	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	B	E	C	B	C
70	Morgan Road & Great Northern Mall Driveway 1	B	B	A	A	A	B	B	B	A	A	B	C	B	B	B	B	C	B	B	B
71	Pardee Road & McKinley Road	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
72	Morgan Road & Great Northern Mall Driveway 2	A	A	A	A	A	C	0	B	B	B	D	D	B	B	B	C	D	B	B	B
73	Great Northern Mall Driveway 3 & Verplank Road	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A
74	Great Northern Mall Driveway 4 & Verplank Road	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A
101	Caughdenoy Road & Micron Driveway X	NF	A	A	A	A	NF	0	A	A	A	NF	A	A	A	A	NF	B	A	A	A
114	Verplank Rd & SB 481 Off-Ramp	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A
117	Verplank Rd & NB 481 On-Ramp	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A
132	Davidson & NY 31	B	B	B	A	B	B	0	C	C	C	D	D	B	C	C	C	C	C	C	C
233	Oswego & Verplank Road	A	A	A	A	A	A	0	B	B	B	A	A	A	A	A	A	A	A	A	A
258	Texas Roadhouse/Delta Sonic & NY 31	C	B	B	A	B	B	0	C	C	C	B	B	B	B	C	B	C	B	B	B
260	US 11 & Chick_fil_A	A	A	A	A	A	A	0	A	B	A	D	E	C	C	C	A	B	B	B	B
262	NY 31 & Carling Road	B	B	B	B	B	B	0	D	C	C	E	F	D	D	D	D	F	C	C	C
267	NY 31 & Dell Center Dr	C	C	B	B	B	B	0	B	B	B	D	C	C	C	C	C	B	B	C	C
275	Verplank Road & Proposed Access #1	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A

		INTERSECTION SCREENING - LOS																			
	Intersection Name	6:00 AM					7:00 AM					4:00 PM					5:00 PM				
		NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C	NB	BD	A	B	C
276	Lowes/Home Depot & NY 31	A	A	B	B	B	B	0	B	B	B	C	C	D	D	D	C	C	D	C	C
280	NY 31 & Oswego Road	C	C	C	C	C	D	0	D	D	D	F	E	D	D	D	E	E	D	D	D
284	NY 31 & Proposed Access	A	A	A	A	A	A	0	A	A	A	B	B	A	A	A	A	C	A	A	A
287	Proposed Acess #2 & Verplank Road	A	A	A	A	A	A	0	A	A	A	A	A	A	A	A	A	A	A	A	A
288	Soule Rd & Carling Rd & I-481 SB Ramp	0	A	-	-	A	0	0	-	-	A	0	C	-	-	E	B	-	-	-	E

APPENDIX J
GREENHOUSE GAS EMISSIONS, CLIMATE CHANGE, AND CLIMATE RESILIENCY

Appendix J-1
Air Application 2 GHG BACT Analysis

J-1 Air Application 2 GHG BACT Analysis

As described in Chapter 3.6, GHG Emissions, Climate Change, and Climate Resiliency, included in this appendix are the GHG control measures and BMP's as proposed for Micron's GHG BACT analysis for its PSD permitting review in support of the submitted Air Permit Application 2 (Appendix L) to NYSDEC. Please note these measures are subject to change based on ongoing regulatory review of the application package by NYSDEC.

APPENDIX L. GHG BACT ANALYSIS

This appendix presents the best available control technology (BACT) determinations for the control of greenhouse gas (GHG) emissions from the emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management District (BAAQMD), and relevant semiconductor fab permits to identify appropriate control technologies and/or limits for GHG emission source categories. The analysis to determine BACT is described in Section 5.4 of the Micron Clay Air Permit Application. As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emission sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

This BACT evaluation addresses GHGs that may be emitted from the Proposed Air Permit Project (i.e., carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) from combustion and other GHGs, including fluorinated GHG (F-GHG) compounds and sulfur hexafluoride (SF_6)) as one category of GHG. This aligns with GHG as the New Source Review (NSR) contaminant that is subject to regulation for the Proposed Air Permit Project. Refer to Section 3.4.9.3 of the Micron Clay Air Permit Application narrative for additional details of this NSR determination. If there are differences between individual GHGs that affect emission control technology or the determination of BACT, they are noted throughout this appendix.

Emission sources include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine;
- Semiconductor process tools and thermal oxidation systems that emit GHGs;
- Use of heat transfer fluids (HTFs) that contain GHGs; and
- Use of Circuit Breakers that contain SF_6.

1.1 Available Technology Summary

The technologies identified to mitigate GHG emissions are described in the following subsections.

1.1.1 Good Design and Combustion Practices for Fuel-Fired Equipment

An efficient design in combustion devices significantly reduces GHG emissions by ensuring that a higher percentage of the fuel is converted into usable energy, thus reducing the total fuel required to achieve the purpose of the fuel-fired equipment and also reducing emissions of other non-GHG air contaminants. For this source category, good combustion practices are generally considered to be implementing the manufacturer’s recommendations, which may include a combination of the following:

- Optimizing the air-fuel ratio;

- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

The specific practices available for each source category are discussed in the subsequent sections.

1.1.2 Tool-Level Thermal Oxidation Systems

Thermal oxidation is used as a part of point-of-use (POU) control devices, which are used in conjunction with certain semiconductor process tools (e.g., plasma etch process tools) to mitigate emissions of fluorinated GHG by thermally treating exhaust streams from process tools that utilize F-GHG. These POU control devices also use wet scrubbing systems to control the resultant acid gases.

Thin films process tools often include process equipment exhaust conditioners (PEECs) as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork. Thin films PEECs may incidentally manage GHG emissions that are comingled with these hazardous materials.

1.1.3 Centralized Regenerative Catalytic Systems

The use of catalytic oxidation via centralized regenerative catalytic systems (RCS) may control emissions of F-GHGs by combining exhausts from several plasma etch process tools rather than operating tool-level thermal-based oxidation systems described in Section 1.1.2 of this analysis. This technology is an alternative to numerous individual POU control devices and would allow treatment of F-GHG process gases emitted from plasma etch process tools in a centralized control device.

1.1.4 Plasma-Based Oxidation

One potential alternative to a burn-wet style oxidation system is an electrically powered "plasma-wet" oxidation system. Instead of using natural gas combustion to oxidize exhaust, plasma-wet oxidation systems create a plasma environment in which these molecules in the exhaust can dissociate.

1.1.5 Process Chemical Substitution

Process chemical substitution in semiconductor manufacturing affects direct use of F-GHG and involves utilizing alternative materials or process chemicals that contain compounds with a lower global warming potential (GWP). To reduce carbon dioxide equivalent (CO_2e) emissions, both factors that determine CO_2e (i.e., mass of GHG and its GWP) must be evaluated. Process chemical substitution in semiconductor manufacturing is evaluated in two different manners in this analysis: (1) processes that have direct contact with semiconductor wafers (e.g., fluorinated process gases), and (2) processes that do not have direct contact with semiconductor wafers (e.g., chemical vapor deposition (CVD) chamber cleaning). Generally, there is more opportunity to evaluate alternatives where the materials do not have direct contact with semiconductor wafers due to the reduced potential impact on the semiconductor manufacturing process.

One example of chemical substitution in the semiconductor industry is through use of alternative substances. As mentioned above, certain fluorinated compounds that are F-GHG are used in the plasma etching processes which remove small quantities of silicon and/or other material as the wafer is etched. The selection of a fluorinated compound used for a particular substrate wafer and process step impacts the effectiveness of the etching process. The potential for emissions of CO_2e from this process is based on the fluorinated compound(s) selected, their GWP, the efficiency of converting the fluorinated compound(s) into F^- ion to etch the wafer and other byproduct F-GHGs. F-GHGs that are not converted to F^- ion within the process are exhausted from the process tool, through thermal oxidation systems to the atmosphere.

In addition, nitrogen trifluoride (NF_3) is utilized in CVD remote plasma clean technologies to replace less efficient CVD in-situ chamber cleaning or thermal cleaning technologies for thin film and diffusion tools. For additional description of this operation, refer to Section 1.4.1.1 of the Micron Clay Air Permit Application related to Thin Films/Diffusion. This can result in substantial reductions in the F-GHG emissions on a CO_2e basis.

1.1.6 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces GHG emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.7 Good Design and Operation Practices for HTFs

Several HTFs that are GHGs are used in transfer lines and equipment. Good design and operation practices related to the use of GHG-based HTFs include following manufacturer recommendations on the types of valves and fittings and transfer lines to use for connections between equipment. However, due to the nature of these transfer lines, there are no standardized practices as manufacturer recommendations only apply when interfacing with their equipment. Micron has developed a global program to monitor heat transfer fluid volumes at the equipment level for nontypical increases in usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas. Based on these data, Micron identifies areas of inefficient usage, evaluates ways to minimize potential emissions, and implements emissions minimizations measures. These efforts are beyond the manufacturer’s recommendations.

1.1.8 Manufacturing Process Optimization

Micron is proposing to install semiconductor process equipment, or process tools, as discussed within the Micron Clay Air Permit Application. Certain tools require F-GHG to achieve the intended process. For example, fluorine ions (F^-) are generated from the use of F-GHGs in the plasma/dry etching and cleaning processes which removes small quantities of silicon and/or other material from the semiconductor devices and by-products formed in the process equipment. Additional details are provided in Section 1.4 of the Micron Clay Air Permit Application.

This method to achieve BACT involves optimizing the operation of process tools and processes to utilize the GHGs efficiently while considering the complexity of semiconductor device manufacturing. Examples of these efforts may include optimizing process tool operating cycles and efficient utilization of process chemicals.

1.1.9 Carbon Capture and Storage

CCS is a set of technologies that can reduce GHG emissions to atmosphere through capturing CO_2 from emission sources, transporting it to a suitable location and sequestering it in subsurface formations.

An effective CCS system would require three elements:

- Separation technology for the CO_2 exhaust stream (i.e., "carbon capture" technology),
- Transportation of CO_2 to a storage site, and
- A viable location for long-term storage of CO_2.

These three elements work in series. Consequently, to execute a CCS program as BACT, all three elements must be feasible.

<u>CO_2 Capture</u>

CCS involves post-combustion capture of CO_2 from the emission units and sequestration of the CO_2 in some fashion. Carbon capture is typically accomplished with low pressure scrubbing of CO_2 from the exhaust stream with solvents (e.g., amines and ammonia), solid sorbents, or membranes. CO_2 must be compressed from near-atmospheric pressure in the stack to pipeline pressure (around 2,000 psia) prior to transportation to an appropriate sequestration site. CO_2 capture is likely feasible for sources emitting CO_2 in large amounts and high-purity CO_2 streams, such as fossil fuel-fired power plants, cement plants, and ammonia production facilities.

<u>CO_2 Transport</u>

CO_2 that has been captured and compressed is subsequently transported to a site designated for long-term geologic storage or use in enhanced oil recovery (EOR). Pipelines are expected to be the most economical and efficient method of transporting CO_2 for commercial purposes. Once constructed, pipelines reduce uncertainty associated with logistics, fuel costs, and reliance on other infrastructure that could increase the cost of CO_2 transportation. The history of transporting CO_2 via pipelines in the United States spans over 40 years.

As of 2019, there were approximately 32 liquid CO_2 pipeline operators under USDOT regulatory authority in the United States according to the Pipeline and Hazardous Materials Safety Administration (PHMSA). This distribution network consists of approximately 5,200 miles of pipe transporting supercritical fluid CO_2 and a significantly smaller amount (~60 miles) of gas CO_2 pipelines. A report delivered to Congress by the Council of Environmental Quality on CCS identifies priorities including the establishment of an interstate CO_2 pipeline network modeled by the Princeton Net-Zero America study covering portions of the Central States and Midwest regions, but there are no proposed routes in New York at the time of Air Permit Application 2.[1]

<u>CO_2 Storage</u>

CO_2 storage refers to the process of injecting CO_2 into subsurface formations for long-term sequestration. CO_2 storage is currently happening across the U.S. and around the world. To be considered suitable for

[1] Council on Environmental Quality Report to Congress on Carbon Capture, Utilization, and Sequestration (2021, June). Retrieved from https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf

sequestration, sites must have suitable geology. For stable storage of CO_2, sequestration reservoirs must be at least 2,500 feet below the ground surface and generally must have a porosity greater than 5% with adequate permeability to allow for flow between pores. Additionally, there must be a layer of impermeable rock above the sequestration reservoir, referred to as a "cap rock" to prevent migration and potential escape of CO_2.

1.1.10 Use of Different Medium in Circuit Breakers

SF_6 has been the preferred insulating medium in electrical switchgear since the 1950s due to its dielectric strength, arc quenching capability, and thermal stability. These characteristics allow for the use of small circuit breakers at high voltages; however, due to the high GWP of SF_6, researchers have been exploring lower GWP alternatives. Currently gas mixtures containing C4-FN (C4) or C5-FK (C5), Synthetic Air, or air and CO_2 are considered to be the most viable alternatives.

C4 and C5 are mixed with nitrogen (N_2), air and/or CO_2 to create a stable insulating medium. Synthetic air consists of a mixture of 20% oxygen and 80% nitrogen. Both alternatives have a lower GWP when compared to SF_6 and are generally considered feasible in low voltage applications; however, such technologies are not available in the US market for medium and high voltage applications. [2]

1.1.11 Guaranteed Low Leak Rate Circuit Breakers

The use of guaranteed low leak rate circuit breakers would reduce fugitive GHG emissions. For circuit breakers that use SF_6 gas for insulation, the leakage rate of present designs are less than 0.5%.

1.1.12 Leak Detection and Alarms for Circuit Breakers

The use of leak detection systems (including alarms) for circuit breakers minimizes GHG emissions by identifying such leaks and allowing the operator to promptly implement appropriate maintenance and repair.

1.1.13 Control Technologies Not Evaluated

Some control technologies have been omitted from the BACT evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1 and in the subsequent sections of this BACT evaluation.

[2] Moving Toward SF6-Free High Voltage Circuit Breakers

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuels or raw materials that would redefine the project are out of the scope of BACT evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.
Natural Gas-Fired Combustion Devices	Low NO_X Burners (LNBs) / Ultra-Low-NO_X Burners (ULNBs)	LNBs and ULNBs are primarily designed to minimize the formation of NO_X during the combustion process. In some cases, the addition of NO_X control systems may reduce combustion efficiency, resulting in an increase of fuel use and GHG emissions.[3]
Heat Transfer Fluids	POU Control Devices	Generally, fluorinated HTFs do not exhaust through process tools and, therefore, are not abated by POU control devices.

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The BACT analysis for GHG emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed natural gas-fired boilers:

- Good design and combustion practices
- Operating hour limitations; and
- CCS.

1.2.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, natural gas processing, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for

[3] AP-42 Vol. I, Chapter 1.4: Natural Gas Combustion, Section 1.4.3.

certain existing and new EGUs.[4] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serve generators capable of generating greater than 25 MW of electricity.

The boilers at the Proposed Air Permit Project operate intermittently to maintain precise temperature control for various stages of production, ensuring the efficient operation of machinery, and are not considered electric generating units. While the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for natural gas-fired boilers rated at less than 50 MMBtu/hr as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for natural gas-fired boilers of any size. Recovery and purification of CO_2 from boiler flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[5]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the natural gas-fired boilers and is not considered further in this analysis.

1.2.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.2.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.2.5 Step 5. Select BACT

Based on the analysis presented above, Micron proposes the use of efficient design and combustion practices as BACT for natural gas-fired boilers. Micron will comply the manufacturer's recommendations for good combustion and maintenance practices, which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 6,000 hours per year for each boiler.

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[4] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

[5] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

A BACT limit must not be higher than any other applicable state or federal regulation. The boilers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for GHG for natural gas-fired steam generating units.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The BACT analysis for GHG emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed natural gas-fired water bath vaporizers:

- Good design and combustion practices
- Operating hour limitations; and
- CCS.

1.3.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, natural gas processing and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs.[6] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves generators capable of generating greater than 25 MW of electricity.

The water bath vaporizers at the Proposed Air Permit Project operate intermittently to provide a reliable and efficient source of high-purity nitrogen gas. The water bath vaporizers provide the necessary supply of liquified gases to the fab when demand cannot be met by routing gas directly from an on-site air separations unit. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for natural gas-fired water bath vaporizers. The EPA's

[6] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

RBLC database does not include any CCS GHG BACT determinations for natural gas-fired water bath vaporizers of any size. Recovery and purification of CO_2 from water bath vaporizer flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[7]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the natural gas-fired water bath vaporizers and is not considered further in this analysis.

1.3.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.3.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.3.5 Step 5. Select BACT

Based on the analysis presented above, Micron proposes the use of efficient design and combustion practices as BACT for natural gas-fired vaporizers. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 8,000 hours per year for all water bath vaporizers combined, with no more than four units operating at a time.

A BACT limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The water bath vaporizers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for GHG for natural gas-fired steam generating units.

[7] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed diesel-fired emergency generators.

- Good design and combustion practices;
- Operating hour limitations; and
- CCS.

1.4.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs.[8] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves a generators capable of generating greater than 25 MW of electricity.

The emergency generator engines operate infrequently to support the fabs to safely shutdown in the event of loss of power and reduce process gases vented to the atmosphere. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for diesel-fired emergency generator engines as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for emergency generator engines of any size. Recovery and purification of CO_2 from emergency engine flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[9]

[8] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

[9] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the diesel-fired emergency generator engines and is not considered further in this analysis.

1.4.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.4.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.4.5 Step 5. Select BACT

Based on the analysis presented above, Micron proposes the use of efficient design and combustion practices as BACT for diesel-fired emergency generator engines. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Minimizing engine's idle time at startup;
- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 100 hours per year for each engine.

1.5 Diesel-Fired Emergency Fire Pump Engine

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

1.5.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed diesel-fired emergency fire pumps.

- Good design and combustion practices;
- Operating hour limitations; and
- CCS.

1.5.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs. The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves a generators capable of generating greater than 25 MW of electricity.

The emergency fire pump engine will operate infrequently to provide reliable power in the event of a power outage. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for diesel-fired emergency fire pump engines as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for emergency fire pump engines of any size. Recovery and purification of CO_2 from emergency engine flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the diesel-fired emergency fire pump engines and is not considered further in this analysis.

1.5.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.5.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.5.5 Step 5. Select BACT

Based on the analysis presented above, Micron proposes the use of efficient design and combustion practices as BACT for diesel-fired emergency fire pump engines. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Minimizing engine's idle time at startup;
- Optimizing the air-fuel ratio;
- Maintaining proper insulation;

- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools and PEECS

High-purity silicon wafers serve as the fundamental components for all semiconductor products that will be manufactured at the Proposed Air Permit Project, and wafers undergo numerous process steps in clean room environments to construct intricate semiconductor devices. During semiconductor fabrication and cleaning, several fluorinated process gases that are F-GHG are utilized. Fluorinated GHGs are used in semiconductor fabs because they are essential to the fabrication of modern semiconductors, provide uniquely effective process performance when etching, and are a reliable source of fluorine ion which is required for cleaning semiconductor process chambers. N_2O also is used as a process gas. Finally, a small amount of CO_2 and CH_4 are used as a process input material, but direct emissions of CO_2 and CH_4 from this use accounts for a minimal (<0.10% as 100-year CO_2e) impact on fab GHG emissions and not considered further in this evaluation.[10]

These high-purity gases are used in several different process steps:

- Dry etching and wafer cleaning process tools use plasma-generated fluorine ion with exposed wafer surface (e.g., dielectric, silicon, metals) or to remove residual material from wafer surfaces.
- Process chambers that are used for depositing thin films are cleaned periodically using fluorine ion that is generated in a chamber separate from the tool and then transferred into the tool to achieve the cleaning process. Hence, this is referred to as "remote cleaning."
- Additional process chambers are cleaned periodically using fluorine ions that are generated in the same process chamber. These processes are "in-situ cleaning," or "thermal cleaning."
- The thin film process tools and diffusion process tools use N_2O primarily for deposition.

Tool-level thermal oxidation systems that utilize natural gas are used to oxidize F-GHGs exhausted from the manufacturing processes. Due to natural gas combustion within these thermal oxidation systems, GHGs products of combustion are generated. Thin films PEECs are part are considered to be a part of the emission source and have therefore been considered as a part of the BACT analysis. POU control devices are not considered to be a part of the emission source, but rather are classified as control devices and are therefore excluded from this analysis.

1.6.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed semiconductor process tools and thermal oxidation systems:

- Good design and combustion practices for thermal oxidation systems;

[10] Refer to Appendix F of the permit application, Table 6-1 for CO_2 and CH_4 usage and Table 1-1 for total GHG emissions on a 100-year CO_2e basis.

- Centralized RCS;
- Process chemical substitution;
- Process optimization;
- Use of tool-level thermal oxidation systems;
- Process chemical substitution through use of NF_3 remote plasma cleaning; and
- CCS.

1.6.2 Step 2. Eliminate Technically Infeasible Options

In some cases, the control technologies listed in Step 1 are infeasible for use for the Proposed Air Permit Project. These instances have been discussed further in the following sections.

1.6.2.1 Infeasibility of Process Chemical Substitution

Process chemical substitution in semiconductor manufacturing requires careful consideration of the gases' performance, safety implications, and overall reduction potential in GHG emissions. The CVD chamber cleaning process has been identified as an opportunity for chemical substitution. For CVD chamber clean processes, NF_3 remote chamber cleaning has been demonstrated in practice to emit significantly less overall CO_2e emissions due to the process' high utilization and conversion rate as described in Section 1.1.4.

However, replacement of high-GWP gases with gases that present lower or no GWP in process tools that have direct contact with the wafers has not proven feasible due to the complexity of the wafer fabrication process, including in plasma etch process tools from which F-GHGs are emitted. Processing requirements for high-aspect ratio plasma etching continue to become more stringent, requiring both fluorine ion to etch and the right carbon-to-fluorine ratio to ensure successful etching results. While a significant amount of research has been conducted on alternative etchants and other raw materials, the chemicals that have been tested have not been found to be viable by Micron in the manufacturing environment due to excess polymerization, lack of etch selectivity, difficulties in delivering gases to the process chamber, and potentially increased employee exposure and safety risks. Therefore, process chemical substitution beyond what has already been demonstrated in practice on a commercial scale is considered technically infeasible.

1.6.2.2 Use of RCS With Metal Etch Process Tools

Metal etch tools, a subset of plasma etch tools that etch metal substrates, can generate metal oxide particulate matter in ductwork. The presence of metal oxide particulate in the exhaust would result in the fouling of the catalytic oxidation portion of an RCS unit. For this reason, the use of a centralized RCS is considered technically infeasible for the control of F-GHG from metal etch tools.

1.6.2.3 Plasma-Based Oxidation

GHG emissions are generated from combustion that occurs within thin films PEECs. Micron continues to explore alternatives to combustion-based thermal oxidation systems (i.e., "burn/wet" devices) to reduce the GHG emissions that are created through combustion. One potential alternative to a combustion-based thermal oxidation system is an electrically-powered "plasma/wet" oxidation system. Instead of using natural gas combustion to oxidize materials in the process exhaust, plasma/wet oxidation systems create a plasma environment in which materials can dissociate.

Micron is evaluating installing plasma-wet PEECs; however, the plasma technology is less proven for use in conjunction with the thin films tools exhausting to PEECs than it is with the plasma etch tools routing to POUs. One of the main compounds generated in thin films tools that PEECs are intended to manage is F_2. In a burn-wet style oxidation system, F_2 is efficiently converted into hydrogen fluoride (HF) in the burner, which is then removed in the second stage of the system. Fluorine gas itself is not effectively dissolved into water, so it must be managed in the burner in order to be removed from the exhaust to prevent safety issues. In a plasma-wet PEEC, there is a lack of free hydrogen ions in the plasma environment as compared to the combustion zone of a burn-wet PEEC. Therefore, F_2 is not as easily converted to HF, and can linger in the exhaust at the outlet of the system and be emitted.

For this reason, plasma-wet style PEECs are not considered a feasible alternative to burn-wet style PEECs at this time for the Proposed Air Permit Project.

1.6.2.4 Carbon Capture and Storage Technology

As discussed in Section 1.1.9, CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. While CO_2 is emitted from the semiconductor process tools and PEECs, the majority of GHG emissions on a CO_2e-basis are from N_2O, CF_4, and NF_3. CO_2 is expected to make up less than 2% of the CO_2e emissions emitted from the semiconductor process tools and PEECs. This is significantly lower than the CO_2 exhaust concentration expected from sources currently utilizing CCS. The membranes used in the CCS technology are very sensitive to chemicals and could potentially be fouled when used for these combustion exhausts.

Recovery and purification of CO_2 from the exhaust gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[11]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from semiconductor process tools and PPECs and is not considered further in this analysis.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all technically feasible identified control technologies to meet BACT control technology requirements. As a result, ranking the remaining control technologies is unnecessary.

1.6.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT

[11] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

control technology requirements. BACT-level control efficiency for one type of process tool (plasma etch) is achieved using the same control technology and implementing specific work practices. As a result, evaluating the most effective controls is unnecessary.

1.6.5 Step 5. Select BACT

The remaining technically feasible technologies include:

- Good design and combustion practices for tool-level thermal oxidation systems;
- Manufacturing process optimization;
- Use of tool-level thermal oxidation systems;
- Use of catalytic oxidation through a centralized RCS for the non-metal plasma etch process tools; and
- Process chemical substitution through use of NF_3 remote plasma cleaning.

1.6.5.1 Plasma Etch and Thin Films Process Tools

In the RBLC search results and other semiconductor permits reviewed as part of this BACT analysis, it was observed that GHG control requirements for semiconductor manufacturing processes commonly indicated that thermal oxidation-based devices have been utilized as a control technology to achieve BACT. As such, GHG BACT for metal etch and thin films process tools has currently been determined to be tool-level thermal oxidation systems that are used to oxidize GHG compounds. For non-metal plasma etch tools, GHG BACT has been determined to be the use of catalytic oxidation via centralized RCS.

In addition, one permit was identified in the RBLC search (RBLC ID WI-0287 and permit ID 18-JJW-036) in Attachment 1 to this GHG BACT analysis that indicated 75% control of GHG was achieved for plasma etch processes. In their 2019 Refinement to the 2006 the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (the "2019 Refinement"),[12] the IPPC established default emission factors and default destruction and removal efficiencies (DREs) for multiple process tools. The DREs that apply to the plasma etch process are listed in Table 6.17 of the 2019 Refinement. As illustrated on Appendix F to the Proposed Air Permit Project application, Table 4-1, plasma etch processes will emit compounds listed on IPCC's 2019 Refinement Table 6.17, including CF_4, CH_3F, C_2F_6 and other F-GHGs. As demonstrated in Table 6.16 of the 2019 Refinement, combustion is a suitable means to achieve the default DREs.[13] Table 6.17 of the same report illustrates that the default DREs for all GHG compounds listed and emitted from the process exceeds 75%. Methane is emitted from the plasma etch process but is not listed on Table 6.17. However, it is assumed that methane in the process tool exhaust will be combusted at an efficiency higher than 75% in a properly operating POU control device. Therefore, BACT for plasma etch processes is designated as following the work practice standards established by the IPPC in the 2019 Refinement. Following these work practices will confirm that the IPCC's 2019 Refinement Table 6.17 default DREs for emissions of GHG from plasma etch process tools will be met.

[12] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 6 – Electronics Industry Emissions.
[13] As described in Section 1.5.2.2 of this GHG BACT analysis, Micron may elect to employ centralized RCS system(s) to control GHG if the technology is demonstrated in practice in the future. The RCS technology would be considered "New Technology" in the context of Table 6.16 and, as such, the RCS would also be able to demonstrate compliance with the proposed BACT work practice standards if the conditions of Table 6.16 were met by Micron's vendors.

To demonstrate that the default DREs apply to a specific process, the 2019 Refinement articulates work practice standards that a facility must meet to confirm that the default DREs are met for POU control devices and the centralized RCS.

Micron is proposing the following work practice standards for POU control devices and the centralized RCS to demonstrate compliance with the default DREs for the plasma etch process:

- Obtain POU control device and RCS supplier DRE certification that states each can at a minimum meet default DREs or higher.
- Maintain a site maintenance plan that meets the POU control device and RCS supplier's installation, operation, and maintenance requirements.
- Track uptime of POU control devices and RCS when fab processes are running. DRE is assumed 0% (unless demonstrated otherwise) when these devices/systems are not running per site maintenance plan while process is running.
- Certify annually that each POU control device and RCS claiming default DRE followed the site maintenance plan.

In summary, Micron is proposing GHG BACT as the following for plasma etch and thin films process tools:

- Use of tool-level thermal oxidation systems that are used to oxidize F-GHGs.
- In addition, achieving BACT-level GHG destruction and removal efficiency for plasma etch will be achieved by meeting work practice standards listed above that align with 2019 IPPC work practice standards to meet the default DREs listed in the 2019 Refinement Table 6.17.

Micron will optimize the operation of semiconductor fab equipment and processes to utilize the GHG raw materials as efficiently as possible. This may include optimizing tool operating cycles and efficient utilization of process chemicals.

For cleaning CVD chambers between production cycles, NF_3 will replace the use of carbon-based F-GHGs except in limited cases where in-situ or thermal cleaning are technically required.

1.6.5.2 Thin Films PEECs

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with good combustion and maintenance practices as a work practice standard to achieve BACT for GHG generated through combustion of natural gas used to mitigate emissions from semiconductor process operations in lieu of a formal limit. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

1.7 Use of Heat Transfer Fluids

Fluorinated HTFs refer primarily to F-GHG-containing materials that are used to regulate the temperature of semiconductor process tools and are a necessary component of safe and effective manufacturing in the industry. HTFs serve as coolants in chillers, removing excess heat during manufacturing processes. Through all these processes, HTFs may emit the F-GHGs used fugitively inside the fab through leaking components in the transfer lines and equipment.

Note that these chillers use engineered HTFs, which transfer energy efficiently without undergoing a refrigerant phase change cycle, which distinguishes these HTFs from refrigerants regulated by 40 CFR 82.

The following sections address the BACT analysis for the proposed HTFs to be used at the Proposed Air Permit Project.

1.7.1 Step 1. Identify All Control Technologies

Good operating and maintenance practices have been identified as potential control technologies for reducing GHG emissions from the proposed HTFs. Good operation and maintenance practices for HTFs include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Chemical substitution to utilize HTFs that have a lower GWP is also a potential control technology. Micron is evaluating which alternative low-GWP HTFs are technically viable to meet the heat transfer needs of each desired application.

1.7.2 Step 2. Eliminate Technically Infeasible Options

The control technologies identified in Step 1 for the use of HTFs are technically feasible.

1.7.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered feasible and can be used in combination. As discussed in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.7.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered feasible and can be used in combination. As discussed in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.7.5 Step 5. Select BACT

Micron is proposing BACT for the proposed HTFs to be the use of good design and maintenance practices and will continue to evaluate the opportunity to use the low-GWP HTFs that are technically viable to meet the heat transfer needs of each desired application and will use the alternative low-GWP HTFs identified through this evaluation. Good operating and maintenance practices include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Due to the nature of the good operating and maintenance practices for the HTF distribution system, Micron is not proposing to meet an emission limit for operation of the systems that utilize HTFs.

1.8 Circuit Breakers

Micron plans to install circuit breakers rated at 38 kV and 420 kV at the Proposed Air Permit Project. SF_6 is the primary insulating medium used in electric switchgear; however, SF_6 is a GHG and as such a BACT analysis for the proposed circuit breakers has been completed. Note that Micron also intends to use air-insulated circuit breakers rated at 15kV and below which has been excluded from the BACT analysis.

1.8.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed circuit breakers.

- Use of a different medium in circuit breakers;
- Use of manufacturer-guaranteed low leak rate circuit breakers; and
- Leak detection systems (with alarms).

1.8.2 Step 2. Eliminate Technically Infeasible Options

For 38 kV circuit breakers, while alternative insulating mediums, including mixtures of air and CO_2, are available, there are significant operational safety, reliability, and maintenance constraints associated with their use. These circuit breakers have potential arc flash risk during operations and maintenance and testing activities, as well as fire and smoke risks when exposed to atmospheric conditions. These air insulated units are also subject to environmental factors such as dust, humidity, and liquid leaks and therefore, would require frequent shutdown maintenance and would not meet reliability requirement for the operations of the Proposed Air Permit Project. For these reasons, circuit breakers utilizing alternative insulating mediums are considered technically infeasible.

There are significant technical barriers in high-voltage applications, including the proposed 420 kV circuit breakers. When compared to SF_6, alternatives such as synthetic air provide limited dielectric strength, resulting in the need for a 25% larger equipment footprint and also possess maintenance risks as discussed above for the 38kV units. While C4 and C5 provide similar performance and equipment footprint as traditional SF_6 gas, they may be categorized as per-and polyfluoroalkyl substances (PFAS), depending on the definition used. Regulations restricting the use of intentionally-added PFAS have recently been proposed at the state and federal level, and further regulation is possible. Micron is also evaluating ways to minimize uses of PFAS. For these reasons, circuit breakers utilizing alternative insulating mediums are considered technically and environmentally infeasible.

In addition, non-SF_6 gas insulated switchgears are not available yet in the US market. Micron is working closely with Original Equipment Manufacturers to perform feasibility studies as soon as one becomes available.

The NYSDEC adopted 6 NYCRR Part 495, Sulfur Hexafluoride Standards and Reporting, in December 2024, which includes a program to phasedown the use of SF_6 in gas insulated equipment used by the electricity sector, an emissions limit for gas insulated equipment owners, limitations on the use of SF_6, and reporting requirements for certain users and suppliers of SF_6 and other fluorinated greenhouse gases. Part 495 proposes a periodic phase out plan for SF_6 gas insulated equipment starting January 1, 2028, for equipment rated equal to 38kV and continuing through January 1, 2033, for equipment rated above 245kV. The delayed phase out of high voltage equipment aligns with the conclusion that at the time of this Permit Application 2, alternative insulating mediums are not technically feasible. Micron will continue to evaluate SF_6 alternatives available in the future and will comply with the applicable phase out requirements.

1.8.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.8.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.8.5 Step 5. Select BACT

Based on the analysis presented above, for the circuit breakers rated at 38 kV and 420 kV, Micron proposes the use of manufacturer-guaranteed circuit breakers with SF_6 leak rates less than 0.5% and the use of leak detection systems (with alarms).

Attachment 1
RACT / BACT / LAER Clearinghouse Search Results

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	PACKAGE BOILER	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	34,189	T/YR
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	2 CALP LINE BOILERS	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	34,189	T/YR
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, PICKLE LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, ANNEALING PICKLE LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILERS SN-26 AND SN-27, GALVANIZING LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	121	LB/MMBTU
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Auxiliary Boiler (AB-3)	13.310	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	117	LB/MMBTU
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Auxiliary boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	9,521.5	TONS PER YEAR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.310	Carbon Dioxide Equivalent (CO2e)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	12,675	TONS/YR
MI-0420	DTE GAS COMPANY--MILFORD COMPRESSOR STATION	MI	185-15	06/03/2016	FGAUXBOILERS	13.310	Carbon Dioxide Equivalent (CO2e)	Use of pipeline quality natural gas and energy efficiency measures.	6,155	T/YR

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0426	DTE GAS COMPANY - MILFORD COMPRESSOR STATION	MI	185-15A	03/24/2017	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	13.310	Carbon Dioxide Equivalent (CO2e)	Use of pipeline quality natural gas and energy efficiency measures.	7,324	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion controls/natural gas combustion	4,008	T/YR
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion controls/natural gas combustion	4,456	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	use of natural gas, good combustion controls	4,502	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Natural gas as the sole fuel	7,845	T/YR
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and pipeline quality natural gas	2,817.6	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Startup boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and the use of natural gas	1,784	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.310	Carbon Dioxide	Good combustion practices and the use of natural gas	106,048	T/YR

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	03/05/2014	Auxiliary boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Clean fuels	117	LB CO2/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxiliary Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	44,107	TON
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practice to ensure complete combustion.	6,850	T/YR
WI-0266	GREEN BAY PACKAGING, INC. - SHIPPING CONTAINER DIVISION	WI	18-DMM-077	09/06/2018	Natural gas-fired boiler (Boiler B01)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices, use only natural gas, equip with Low NOx burners and flue gas recirculation	160	LBCO2E/1000 LB STEAM
WI-0303	GREEN BAY PACKAGING INC.- GB MILL DIV.	WI	20-DMM-055	07/14/2020	Natural Gas-Fired Boiler (B01)	13.310	Carbon Dioxide Equivalent (CO2e)	Only burn natural gas, good combustion practices, low NOx burner, and flue gas recirculation.	16,771	T/Y
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	02/28/2020	Temporary Boiler (B98A)	13.310	Carbon Dioxide Equivalent (CO2e)	Combust only pipeline quality natural gas.	118	LB CO2/MMBTU
WV-0031	MOCKINGBIRD HILL COMPRESSOR STATION	WV	R14-0033	06/14/2018	WH-1 - Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Limited to natural gas; and tune-up the boiler once every five years.	--	--
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	07/16/2014	Auxiliary Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	good combustion practices and energy efficiency	12,855	TONS

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	5/4/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.600	Carbon Dioxide Equivalent (CO2e)	Use of natural gas and efficient combustion technology through good combustion practices	15,965	TPY

Process IDs: ---
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Air Separation Plant Water Vaporizer	81.290	Carbon Dioxide Equivalent (CO2e)	Good operating practices	117	LB/MMBTU
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.900	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and implement design standards.	11,404	TON/YR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.600	Carbon Dioxide Equivalent (CO2e)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	15,032	TONS/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.310	Carbon Dioxide	Good combustion practices and the use of natural gas	28,200	T/YR
WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	05/05/2022	Water Bath Vaporizer	81.290	Carbon Dioxide Equivalent (CO2e)	PNG Good Combustion Practices	1,288	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	01/23/2015	Emergency Camp Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2,332	TONS/YEAR
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Black Start and Emergency Internal Combustion Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	2,781	TPY
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Carbon Dioxide	Good Combustion Practices	163	LB/MMBTU
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Methane	Good Combustion Practices	0.0061	LB/MMBTU
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Nitrous Oxide (N2O)	Good Combustion Practices	0.0013	LB/MMBTU
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	163	LB/MMBTU
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	164	LB/MMBTU
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	09/05/2014	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	432	TPY
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	225	TONS/YEAR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Emergency Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	508	TONS/YEAR
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	160	TONS/YEAR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	526.39	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	526.39	G/B-HP-H
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	1,044	TON/12 CONSEC. MONTH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Emergency generator EU-6006	17.110	Carbon Dioxide Equivalent (CO2e)	Tier II diesel engine	811	TONS
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	emergency generator EU 014a	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	1,044	TON/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Emergency Generator (CC-GEN1)	17.110	Carbon Dioxide Equivalent (CO2e)	Good engineering design and manufacturer's recommended operating and maintenance procedures.	163.6	LB/MMBTU
IN-0365	MAPLE CREEK ENERGY LLC	IN	T153-45909-00056	06/19/2023	Emergency generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	625	TONS PER YEAR
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (400 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	180	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (1000 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	389	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (2000 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	778	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Ammonia Plant Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	219	TONS
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-02 - North Water System Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-03 - South Water System Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-01 - Caster Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, 1264)	17.110	Carbon Dioxide Equivalent (CO2e)	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	56	TPY
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1; No. 2	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	77	TPY
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	05/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, 1202)	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	56	TPY

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	06/30/2016	Diesel Engines (Emergency)	17.110	Carbon Dioxide Equivalent (CO2e)	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Emergency Generator Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with NSPS Subpart IIII	84	TPY
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Generator 1	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	--	--
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 1	17.110	Carbon Dioxide Equivalent (CO2e)	Proper design and operation; energy efficiency measures	--	--
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 2	17.110	Carbon Dioxide Equivalent (CO2e)	Proper design and operation; energy efficiency measures	--	--
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	emergency generator engines (6 units)	17.110	Carbon Dioxide Equivalent (CO2e)	good combustion practices	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	Emergency Generator Engines (4 units)	17.110	Carbon Dioxide Equivalent (CO2e)	complying with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	--	--
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	09/21/2018	Large Emergency Engines (>50kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion of Practices and Good Operation and Maintenance Practices	1,481	T/YR
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Generator Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21	KG/MM BTU
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Use of good combustion practices and compliance with NSPS Subpart IIII	--	--
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Use of good combustion practices, compliance with NSPS Subpart IIII	--	--
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Emergency Engine/Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	162.85	LB/MMBTU

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0421	GRAYLING PARTICLEBOARD	MI	59-16	08/26/2016	Emergency Diesel Generator Engine (EUEMRGRICE in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	223	T/YR
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	928	T/YR
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE1 in FGRICE (Emergency diesel generator engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	209	T/YR
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE2 in FGRICE (Emergency Diesel Generator Engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	70	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices.	383	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices.	383	T/YR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Energy efficient design.	161	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD1--A 1500 HP diesel fueled emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and energy efficiency measures.	406	T/YR
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD2--A 6000 HP diesel fuel fired emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and energy efficiency measures.	1,590	T/YR
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	444	T/YR
MI-0447	LBWL--ERICKSON STATION	MI	74-18A	01/07/2021	EUEMGD--emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590	T/YR
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE1 in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion and Design Practices	590	T/YR
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE2 in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion and Design Practices	209	T/YR
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	383	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	383	T/YR
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.110	Carbon Dioxide Equivalent (CO2e)	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590	T/YR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency generator (P002)	17.110	Carbon Dioxide Equivalent (CO2e)	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	474	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	683	T/YR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	858	T/YR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Generator (P009)	17.110	Carbon Dioxide Equivalent (CO2e)	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	1,289	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	445	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	state of the art combustion design	445	T/YR
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	120	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Generator Engine (P001)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	116.8	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Fire Pump Engine (P002)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	40.1	T/YR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fired generator (P007)	17.110	Carbon Dioxide Equivalent (CO2e)	Equipment design and maintenance requirements	163.6	LB/MMBTU
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Diesel Generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design and proper maintenance and operation	109.2	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	200	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	80	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Emergency Generators (P005 and P006)	17.110	Carbon Dioxide Equivalent (CO2e)	Tier IV engine Good combustion practices	3,632	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.110	Carbon Dioxide	Good combustion practices and proper maintenance and operation	162.7	LB/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	2000 kW Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	81	TONS
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	09/01/2015	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	44	TPY
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	183	T/YR
TX-0766	GOLDEN PASS LNG EXPORT TERMINAL	TX	116055, PSDTX1386, GHGPSDTX100	09/11/2015	Emergency Engine Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Equipment specifications & work practices - Good combustion practices and limited operational hours	40	HR/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0872	CONDENSATE SPLITTER FACILITY	TX	118270 PSDTX1398M1 GHGPSDTX62	10/31/2019	Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Limiting duration and frequency of generator use to 100 hr/yr. Good combustion practices will be used to reduce VOC including maintaining proper air-to-fuel ratio.	--	--
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	EMERGENCY GENERATOR	17.110	Carbon Dioxide Equivalent (CO2e)	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	--	--
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices/Maintenance	163.6	LB/MMBTU
VA-0333	NORFOLK NAVAL SHIPYARD	VA	60326-36	12/09/2020	One (1) emergency engine generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2.543	LB
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	Diesel-Fired Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	The Use of Ultra-Low Sulfur Fuel and Good Combustion Practices	--	--
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices and The Use of Ultra-low Sulfur Fuel	--	--
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Generator (P07)	17.110	Carbon Dioxide Equivalent (CO2e)	Certified to at least meet EPA's criteria for Tier 2 reciprocating internal combustion engines and the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain generator according to the manufacturer's recommendations.	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2,416	LB/H
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Carbon Dioxide	Good Combustion Practices	163	LB/MMBTU
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Methane	Good Combustion Practices	0.0061	LB/MMBTU
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Nitrous Oxide (N2O)	Good Combustion Practices	0.0013	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Engines	17.210	Carbon Dioxide Equivalent (CO2e)	Good Operating Practices	164	LB/MMBTU
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1 & No. 2	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	77	TPY
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--

Process IDs: 99.011, 99.006
Other Search Criteria: ---
Process Description: Semiconductor Manufacturing
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID and Process Name

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	Carbon Dioxide Equivalent (CO2e)	Point-of-use (POU) devices that are specifically designed for fluorinated GHG and/or N_2O destruction, good combustion practices, and the use of natural gas	774,419	T/YR
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P12, P22, P18, P19, P28, P29 Organic Stripping Systems, Array/Color Filter and Cell Processes	99.006	Carbon Dioxide Equivalent (CO2e)	Regenerative Thermal Oxidizer	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P15 & P25 VOC System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Regenerative Thermal Oxidizer	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P13 & P23 Chemical Vapor Deposition System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Combustor, Baghouse and Wet Scrubber in series	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P14 & P24 Dry Etching System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Combustor and Wet Scrubber in series	75	%

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Circuit Breakers	99.999	Sulfur Hexafluoride	Limitation on leaks	0.5	% PER YEAR
FL-0355	FORT MYERS PLANT	FL	0710002-022-AC	09/10/2015	Circuit breakers	99.999	Sulfur Hexafluoride	Limitation on leak of SF6 from circuit breakers	0.5	PERCENT
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	Circuit breakers	99.999	Sulfur Hexafluoride	Leak prevention. Must have manufacturer-guaranteed leak rate no more than 0.5% per year. Must be equipped with leakage detection systems and alarms.	--	--
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Circuit breakers (two)	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Two Circuit Breakers	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Two Circuit Breakers	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
IA-0107	MARSHALLTOWN GENERATING STATION	IA	13-A-499-P	04/14/2014	circuit breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LOSS
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	% LEAK RATE
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LEAK RATE
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LEAK RATE
IN-0294	ST. JOSEPH ENERGY CENTER, LLC	IN	141-39839-00579	08/08/2018	Circuit Breakers SF6	99.999	Sulfur Hexafluoride	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Insulated circuit breaker	99.999	Carbon Dioxide Equivalent (CO2e)	Installation of modern, totally enclosed SF6 circuit breakers with density (leak detection) alarms and a guaranteed loss rate of < 0.5 % by weight per year.	6.9	TONS PER YEAR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure design with a low pressure detection system with an alarm to limit SF6 leak rate to 0.5 % per year.	85	T/YR
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	CIRCUIT BREAKERS	99.999	Carbon Dioxide Equivalent (CO2e)	GHG BACT FOR THE CIRCUIT BREAKERS SHALL BE INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	CIRCUIT BREAKERS	99.999	Carbon Dioxide Equivalent (CO2e)	GHG BACT FOR THE CIRCUIT BREAKERS SHALL BE INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Circuit breakers with SF6	99.999	Sulfur Hexafluoride	low pressure alarms and low pressure lockout system	6	LB/12MO
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Circuit breakers with SF6	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	79.8	TONS
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Circuit breakers	99.999	Sulfur Hexafluoride	State-of-the-art sealed enclosed-pressure circuit breakers with leak detection	1500	PPM
TX-0749	GOLDEN SPREAD ELECTRIC COOPERATIVE, ANTELOPE STATION	TX	PSD-TX-1358-GHG	06/02/2014	Fugitive Emissions from SF6 Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0753	GUADALUPE GENERATING STATION	TX	PSD-TX-1310-GHG	12/02/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0757	INDECK WHARTON ENERGY CENTER	TX	PSD-TX-1374-GHG	05/12/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0758	ECTOR COUNTY ENERGY CENTER	TX	GHGPSDTX1366	08/01/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	CIRCUIT BREAKERS (3)	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure type breaker and leak detector	19	T/YR
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	CIRCUIT BREAKERS (11)	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure type breaker and leak detection	1032	T/YR
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Circuit Breakers - 6	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed-pressure design with low-pressure detection system (with alarm).	--	--
VA-0332	CHICKAHOMINY POWER LLC	VA	52610-1	06/24/2019	Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed-pressure design with low-pressure detection system (with alarm).	--	--
WI-0299	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-151	08/20/2020	Sulfur Hexafluoride Containing Circuit Breakers and Transformers (F90)	99.999	Sulfur Hexafluoride	Not Specified	0.5	% LEAK RATE, BY WGHT
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Low-Side Generator Enclosed Pressure SF6 Circuit Breakers (F03)	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	0.5	% BY WEIGHT/YEAR
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	3/13/2023	CIRCUIT BREAKER FUGITIVES	15.210	Carbon Dioxide Equivalent (CO2e)	State-of-the-art circuit breakers that are gas-tight and require minimal SF6 are used. An AVO monitoring program is used to detect circuit breaker leaks.	--	--

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Limited Operation of 168 hr/yr.	37.2	TONS/YEAR
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fire Pump Diesel Internal Combustion Engines	17.21	Good Combustion Practices	216	TPY (COMBINED)
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Good combustion practices and limit operation to 500 hours per year per engine	163.6	LB/MMBTU
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Good Combustion Practices and Limited Use	164	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Good Operating Practices	164	LB/MMBTU
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Water Pumps	17.21	Good combustion practices	164	LB/MMBTU
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Emergency fire pump engine, 300 HP	17.21	Lowest-emitting available fuel	---	---
ID-0021	MAGNIDA	ID	P-2013.0030	04/21/2014	FIRE WATER PUMP ENGINE	17.21	Not Specified	22.6	LBS.

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Firewater Pump Engine	17.21	Not Specified	---	---
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Firewater Pump Engine	17.21	Not Specified	241	TONS/YEAR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Fire Water Pump Engine	17.21	Not Specified	92	TONS/YEAR
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Not Specified	25	TONS/YEAR
KS-0030	MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION	KS	C-13309	03/31/2016	Compression ignition RICE emergency fire pump	17.21	Not Specified	2.6	G/HP-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	10	TPY
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engines DFP-16-1 (EQT036)	17.21	Good Combustion Practices	13	T/YR
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engine DFP-16-2 (EQT037)	17.21	Good Combustion Practices	13	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Not Specified	---	---
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Good combustion practices	---	---
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	Not Specified	---	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	good combustion practices	---	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Good Combustion Practices	28	T/YR
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Good Combustion Practices	28	T/YR
LA-0370	WASHINGTON PARISH ENERGY CENTER	LA	PSD-LA-829(M-1)	04/27/2020	Emergency Fire Pump Engine (EQT0021, ENG-1)	17.21	Good combustion practices in order to comply with 40 CFR 60 Subpart IIII	9	TPY
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21	KG/MM BTU
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK39 - Emergency Diesel Fire Pump Engine (EQT0094)	17.21	Good Combustion Practices	12	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Fire Pump Engine	17.21	Not Specified	162.85	LB/MMBTU
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices	13.58	T/YR
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices.	55.6	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	Energy efficient design	86	T/YR
MI-0445	INDECK NILES, LLC	MI	75-16B	11/26/2019	EUFPENGINE (Emergency engine-diesel fire pump	17.21	Good combustion practices	13.58	T/YR
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Good combustion practices	85.6	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency Fire Pump Engine (P003)	17.21	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	75	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	Efficient design	41	T/YR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	Efficient design	90	T/YR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	123	T/YR
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	Efficient design	87	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	87	T/YR
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	good operating practices (proper maintenance and operation)	29	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fueled fire pump (P006)	17.21	Equipment design and maintenance requirements	163.6	LB/MMBTU
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Efficient design and proper maintenance and operation	18.67	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	good operating practices (proper maintenance and operation)	23	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Good combustion practices and proper maintenance and operation	162.7	LB/MMBTU
OK-0164	MIDWEST CITY AIR DEPOT	OK	2009-394-C(M-2)PSD	01/08/2015	Diesel-Fueled Fire Pump Engines	17.21	1. Good Combustion Practices. 2. Efficient Design.	44	TONS PER YEAR
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Fire pump engine	17.21	Not Specified	9	TON
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Not Specified	91.3	T/YR
TX-0753	GUADALUPE GENERATING STATION	TX	PSD-TX-1310-GHG	12/02/2014	Fire Water Pump Engine	17.21	Not Specified	15.71	TPY CO2E

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
TX-0757	INDECK WHARTON ENERGY CENTER	TX	PSD-TX-1374-GHG	05/12/2014	Firewater Pump Engine	17.21	Not Specified	5.34	TPY CO2E
TX-0758	ECTOR COUNTY ENERGY CENTER	TX	GHGPSDTX1366	08/01/2014	Firewater Pump Engine	17.21	Not Specified	5	TPY CO2E
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED WATER PUMP 376 bph (1)	17.21	Good Combustion Practices/Maintenance	104	T/YR
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	1040	T/YR
WI-0292	GREEN BAY PACKAGING INC. MILL DIVISION	WI	19-DMM-001	04/01/2019	P37 Diesel-Fired Emergency Fire Pump	17.21	Hours of Operation	200	HOURS
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Be certified by manufacturer to EPA's criteria for Tier 3 reciprocating internal combustion engines and to the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain according to the manufacturer's recommendations.	---	---
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Not Specified	309	LB/H
WY-0076	ROCK SPRINGS FERTILIZER COMPLEX	WY	MD-14824	07/01/2014	Fire Water Pump Engine	17.21	limited to 500 hours of operation per year	58	T/YR

Attachment 2
Semiconductor Permit Review Summary

Summary of Semiconductor Manufacturing Permits

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Fab Tool Processes	Intel Corp	AZ	P0009315	1/11/2016	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	CO2e		774,419 tons per rolling, 12-month period
Semiconductor Process Tool Emissions	Wafer Fabrication in Building B323 and B323A Collapse Chip Connection (C4) Plating Operation in B320 R&D and Post-Fab Activities	OnSemi	NY	3-1328-00025/01029	11/28/2023	GHG	All sources of per fluorinated gases (F-gases) are equipped with point-of-use (POU) abatement.	--