Trinity Consultants

MEMORANDUM

To: Kevin M. Balduzzi, NYSDEC

cc: Dereth Glance, NYSDEC, Robert Jacobs, P.E., NYSDEC; Margaret LaFarr, P.E., NYSDEC; Andy LoFaro, P.E., NYSDEC; Marissa Logan, NYSDEC; Jesse McMahon, Micron; Brittany Sanders, Micron; Kailin Schwan, Micron; Katie Birchenough, Micron, Steven C. Russo, Greenberg Traurig LLP; Michael G. Murphy, Beveridge & Diamond PC

From: Thomas M. Muscenti, P.E., Jacob Bugiera, Julia Ryan, John Ke, Sundar Sadashivam (Trinity Consultants)

Date: June 6, 2025

RE: Response to April 30, 2025, Notice of Incomplete Application

Micron New York Semiconductor Manufacturing, LLC (Micron) has applied for a Title V air permit with the New York State Department of Environmental Conservation (NYSDEC or Department) for its proposed semiconductor fab in Clay, New York ("Proposed Air Permit Project"). On behalf of Micron, Trinity Consultants (Trinity) submitted Micron's most recent air permit application ("Permit Application 2") on March 10, 2025.

The NYSDEC sent a Notice of Incomplete Application (NOIA) letter to Micron on April 30, 2025. This memorandum sets forth Micron's response to each comment. The full text of each comment is included below for reference, with the response provided *in italic font*. Micron, Trinity, and NYSDEC will meet on June 10, 2025, to discuss these responses.

Micron intends to submit an addendum to this memorandum, which will include attached revisions to relevant sections and appendices of Permit Application 2. This memorandum is provided without attachments at this time to facilitate discussion with the NYSDEC while updates are underway. A response to comments relating to the CLCPA analysis will be provided separately.

General Comments

NOIA Comment #1: The applicant has not submitted any documentation proposing language to be incorporated to the site's Air Title V permit. Although the Department often incorporates routine language into permits without explicit direction from the applicant, this application has utilized a number of permitting assumptions and equipment restrictions in its calculations. The Department cannot foreseeably write a permit consistent with the facility's application without the applicant providing explicit documentation of all the assumptions and limitations applied to equipment on site. The applicant needs to provide the Department with a summary of application assumptions and restrictions that will be implemented as permit

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restrictions. The Department anticipates that facility specific documentation would likely include facility wide caps, equipment limitations, and conditions ensuring engineering assumptions are confirmed.

Response: *Permit condition language will be proposed and provided in an Attachment to this memorandum, submitted under a separate cover letter.*

NOIA Comment #2: The applicant must confirm how many wastewater treatment plants will be at the facility. Several sections seem to indicate one, but the plot plan of Appendix P seems to indicate two.

Response: *The Proposed Air Permit Project includes two wastewater treatment plants (one for each Fab). The two wastewater treatment plants are denoted as "WWT1" and "WWT2" in Appendix P of Permit Application 2.*

NOIA Comment #3: (Section 3.3.10, PDF page 70) The applicant has proposed to exclude Hydrogen Fluoride (HF) from air quality modeling used to demonstrate compliance with the fluoride standard of 6 NYCRR Part 257-4. Section 257-4.1 indicates "[t]he term fluorides refers to a heterogeneous group of compounds formed from the highly reactive, nonmetallic gaseous element known as fluorine. For this Subpart, the term fluoride will include material that tests as fluoride." Accordingly, the Department has concluded that HF is an inorganic fluoride compound subject to the standard and must be included in air quality modeling used to demonstrate compliance with Subpart 257-4. Inhalation exposures to inorganic fluoride compounds, including hydrogen fluoride, lead to the critical effect of skeletal and dental fluorosis.

Response: *Micron provided additional documentation to NYSDEC regarding applicability of HF to Part 257-4 on April 14, 2025. Micron acknowledges NYSDEC's position and will include emissions of HF in its demonstration of compliance with the standards in Part 257-4.*

NOIA Comment #4: (Appendix A, PDF page 141) The Supporting Documentation and Attachments list provided is inclusive of documentation that has not been submitted with the application. The following documentation needs to be submitted for the Department to process the application: Air quality model results; Methods Used to Determine Compliance form; and use of emission reduction credits form.

Response: *The following documentation has not been submitted to NYSDEC as of the date of this memorandum:(1) the Methods Used to Determine Compliance form; (2) the Use of Emission Reduction Credits form; and (3) Air Quality Modeling Report. These forms will be provided in an attachment to this memorandum, under a separate cover letter. Air quality modeling results will be included in the forthcoming air dispersion modeling report which can only be submitted after NYSDEC has approved the air dispersion modeling protocol.*

NOIA Comment #5: (Modeling Protocol) The applicant must submit an approvable Modeling Results Report following the procedures of an approved Air Quality Modeling Protocol for the facility's Air Title V permit application to be considered complete. These modeling results must be utilized for compliance demonstrations inclusive of 6 NYCRR Part 212, Part 231, and Part 257.

Response: *Finalization and preparation of the air dispersion modeling report can only occur after NYSDEC reviews and approves Micron's Air Quality Modeling Protocol. While Micron submitted its Air Quality Modeling Protocol on March 21, 2025, NYSDEC has not yet approved the protocol.*

NOIA Comment #6: (Appendix E, PDF page 200) The applicant has introduced additional processes to the application that should be elaborated on. More specifically, the Department cannot verify what activities will be taking place in the HPM buildings. The process descriptions describe storage of materials only, while other sections of the application indicate material processing. The applicant should provide updated process descriptions indicating the processes taking place in the HPM buildings including any use of acid and ammonia exhausts unrelated to those utilized in the fabs and provide additional process flow diagrams as necessary.

Response: *Please refer to Permit Application 2, Section 1.4.4.3 (PDF Page 30) and Appendix F, Table 21-1 (PDF Page 247). The HPM buildings will include both material processing and storage. Specifically, as detailed in Section 1.4.4.3, the HPM buildings will house the spin-on dielectric waste neutralization process and several storage tanks as identified in Appendix F of Permit Application 2, Table 21-1 (PDF page 247). A process flow diagram for this spin-on dielectric waste neutralization process will be submitted as an Attachment to this memorandum, under a separate cover letter.*

NOIA Comment #7: (Section 2.1.7.1, PDF page 36) The applicant has indicated that Micron is developing and soliciting US EPA approval for alternative HTFs with lower global warming potentials. The Department continues to focus on HTFs due to the exceedingly high global warming potential of these chemicals. At the time of this application, it appears the applicant would like to claim credit for undergoing a change process, however, in the absence for documentation this process is irrelevant. The applicant should elaborate on the EPA approvals taking place and provide a compliance demonstration which may be incorporated to the permit memorializing this effort.

Response: *Application 2 does not claim credit for this commitment. Rather, in response to NYSDEC's concerns over HTFs, Micron expressed its commitment to evaluate potential options around HTFs. Micron's response included a discussion of its evaluation of potentially using alternative HTFs currently under review by the EPA as part of the Toxic Substance Control Act (TSCA) Pre-Manufacture Notification (PMN) process. Micron understands and acknowledges that EPA's review must be completed before the substances under review can be considered available for use in the United States by Micron or any other entity. As TSCA reviews progress, Micron will update its projections for HTF usage and will seek a modification to its Title V permit if/as needed, potentially seeking credit in the future if acceptable to NYSDEC.*

Regardless of this potential option currently under review, Micron has evaluated all currently available options as part of Application 2.

NOIA Comment #8: (Section 2.3.7, PDF page 46) The applicant has identified two onsite laboratories to support fab operations with testing and quality assurance. The applicant should be aware that these laboratories meet the exemption of 6 NYCRR Part 201-3.2(c)(40) and therefore are exempt from Part 212 regulation. The facility would, however, be considered an Air Title V facility due to emissions from exempt sources alone, and therefore emissions of criteria pollutants from these sources are not considered exempt pursuant 6 NYCRR 201-3.1 (c). Therefore, the laboratory operations will be permitted as a source and the applicable BACT/LAER assessments needs to be completed for each PSD or NSR contaminant.

Response: *Micron has elected to permit select sources that would otherwise be exempt, including emergency engines and cooling towers. While these sources were listed on the exempt activities form in Appendix B of Permit Application 2, Micron recognizes that this may have led to some confusion. Excluding emissions from these voluntarily permitted sources, all remaining exempt activity emissions are below major facility thresholds. All permitted sources have been evaluated in the BACT and LAER assessments included in Permit Application 2.*

NOIA Comment #9: The applicant should revise how the PEEC units are described in the application. EPA established PEECs as process equipment in a 1995 letter and Micron has further established these units as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork, therefore, these units are not considered control or a separate process source under 212. Incidental discussion of these units is expected in emission calculations due to the facility's non-routine emissions derivations, however, they should never be discussed as control or as BACT/LAER.

Response: *Section 1.4.2.1 of Permit Application 2 clearly asserts that PEECs are not control devices. Additionally, as outlined in Appendices H – N, emissions from PEECs are explicitly evaluated in each BACT and LAER analysis, since PEECs are part of the semiconductor manufacturing process.*

NOIA Comment #10: (Appendix E, PDF Page 203) The applicant has indicated on their process flow diagrams and elsewhere in the application that "the number of tools, PEECs, and POUs in each source is not fixed and will change regularly". This statement appears as a misunderstanding of the Department's permitting efforts. As a matter of clarification, no changes can be initiated unless the applicant follows the requirements of 6 NYCRR Part 201 and/or the facility's Operational Flexibility protocol. The Department has already acknowledged that groups of tools may be considered under a single source ID per § 200.1(f). However, for the purposes of ensuring specific POU controls can be attributed to a specific group of tools, a specific ID will need to be assigned to ensure the tested equipment continues to serve the same sources and ensure consistent monitoring and emissions verification conditions. The applicant has identified source IDs for plasma etch RCS units which are being utilized in the same process as the POUs therefore the applicant would be expected to follow this methodology for the POU units. The applicant should provide adequate source identification and association information to allow the Department to properly permit POU units.

Response: *Micron understands that the requirements of 6 NYCRR Part 201-6 must be met prior to initiating a modification. Micron will ensure that the frequent changes described in Appendix E to Permit Application 2 are not a "modification" as defined in §200.1(aq), are made in accordance with an approved Operational Flexibility Protocol (which, as proposed, includes such changes), and, where applicable, are made in accordance with the provisions of §201-6.6.*

If groups of tools may be considered under a single emission source ID per the definition in §200.1(f), which includes "any appurtenant exhaust system," then it would follow that groups of POUs should also be considered under a single emission source ID because the POUs are appurtenant air cleaning devices for each tool. Furthermore, the exhausts from the POUs are directed to collectively merged common headers (e.g. acid header, solvent header, ammonia header, etc.). Importantly, there is often a one-to-one relationship between POUs and tools, such that permitting POUs as individual control type sources would

defeat the purpose of grouping tools as collective process type sources. The Department has historically permitted the collections of POUs under single source IDs for other large fabs in New York State. As such, there is a strong technical and legal justification for this approach for Micron's permit.

NOIA Comment #11: (Section 3.2.2, PDF Page 52) The applicant has indicated that wastewater treatment operations are not subject to 40 CFR 63 Subpart BBBBB (Subpart BBBBB) but has indicated that the storage tanks attributed to this process are subject to Subpart BBBBB. The Department disagrees with this assessment. None of the equipment or emissions associated with the wastewater treatment operations are expected to be subject to Subpart BBBBB. The applicant should revise all acknowledgements of the wastewater tanks with the understanding that the tanks will likely be subject to Part 212, Part 229, or similar.

Response: *The definition of "storage tank" in 40 CFR 63.7195 includes tanks used for storing materials used in wastewater treatment. However, the definition specifically excludes "flow-through tanks where wastewater undergoes treatment (such as pH adjustment) before discharge, and are not used to accumulate wastewater." Critically, the US EPA clarified in promulgation of the final rule (68 FR 27918) that "it was always [US EPA's] intent to include all storage and wastewater tanks containing HAP in the affected source". Therefore, Micron continues to assert that Subpart BBBBB applies to these storage tanks.*

NOIA Comment #12: (Section 3.2.3, PDF Page 52) The applicant should provide additional documentation demonstrating compliance with Subpart BBBBB. The applicant has indicated they may comply with an emission concentration, or a percent reduction as described in the regulation. While this is correct, the Department has not been provided adequate documentation indicating these standards will be met for all sources subject to Subpart BBBBB. At the time of permit application 2, the Department can only confirm certain contaminants which do not appear to demonstrate compliance. For example, chlorine usage in the plasma etch process is 79,183 lbs/yr. There are no controls proposed and an expected emission of 79,183 lbs/yr. The applicant should provide a facility wide compliance demonstration clearly illustrating compliance with the emission standard of Subpart BBBBB.

Response: *The permit condition language will outline Micron's requirements to comply with Subpart BBBBB. Appendix F erroneously indicated that the PEECs would not reduce emissions of chlorine. Appendix F, Table 6-1 will be updated to reflect the expected management of chlorine in PEECs.*

Regardless, it should be noted that the requirements of 40 CFR 63.7184(c) do not apply to each individual inorganic HAP, but the collection of inorganic HAP emitted from a process vent, and there is an option to comply with a concentration standard as opposed to a percent control. 40 CFR 63.7186 outlines the compliance demonstration requirements, which includes performance testing. Micron has provided an analysis to indicate that it expects compliance will be demonstrated and will utilize performance testing to demonstrate compliance.

NOIA Comment #13: (Appendix F, PDF page 205) The applicant must provide a single facility wide emission summary which incorporates all criteria and non-criteria pollutants on a facility wide basis. This accounting should also incorporate otherwise exempt sources consistent with 6 NYCRR 201-3.1(c).

Response: *Appendix F, Table 1-1 to Permit Application 2 is a facility-wide emission summary which incorporates all criteria pollutants, including from otherwise exempt sources. This table will be revised in the Attachment to this memorandum, submitted under a separate cover letter, to include all contaminants emitted from the facility subject to New Source Review, consistent with 6 NYCRR 201-3.1. With these updates, Table 1-1 fulfills the requirement in §201-6.2(d)(3)(i) to include emissions of "regulated air pollutants" consistent with the definition in §200.1(bu). Appendix F, Table 1-3 to Permit Application 2 fulfills the requirement to provide an initial environmental rating, emission rate potential, and annual emissions from process emission sources subject to 6 NYCRR Part 212.*

NOIA Comment #14: (Appendix Q, PDF page 589) The emission unit matrix provided by the applicant does not accurately represent the structure that will need to be implemented at the facility. The emission unit matrix should be revised to include a "fugitive emissions" emission unit, POU devices (ES POU01 and similar) expected to be organized as individual sources, laboratory operations, and any other previously omitted sources.

Response: *A revised emission unit matrix will be included in the Attachment to this memorandum, submitted under a separate cover letter, which will include an emission unit for fugitive emissions. As noted in the response to Comment #10, Micron asserts that POUs should be permitted as collective sources, consistent with how tools will be permitted for this facility, and consistent with how POUs are permitted throughout New York State.*

NOIA Comment #15: (Appendix Q, PDF Page 589) The Department has acknowledged that process tools at the fab may be identified as a single emission source for the purposes of permitting. In previous conversations with Micron, DEC has requested a tracking system be developed and implemented to maintain documentation of the semiconductor process tools and any changes that are made. The applicant will be required to develop a plan for tracking process tools in each fab. This plan will be incorporated to the facility's permit.

Response: *Micron will propose monitoring of changes to process tools, PEECs, and POUs consistent with its Operational Flexibility protocol. Refer to the Attachment to this memorandum, submitted under a separate cover letter.*

NOIA Comment #16: (Section 2.3.6, PDF Page 46) The facility states that ion implant tools require the use of insulating gases such as sulfur hexafluoride. Table 28-1 in Appendix F does not differentiate the contribution of sulfur hexafluoride leaks from circuit breakers and ion implant tools. The leak rate for circuit breakers is assumed to be 0.5% per the manufacturer's guarantee but the leak rate of ion implant tools is not discussed. The facility should include the leak rate of ion implant tools and differentiate the individual emissions contributed by circuit breakers and ion implant tools.

Response: *Table 28-1 will be updated in the Attachment to this memorandum, submitted under a separate cover letter, to indicate projected SF6 leak rates from ion implant tools.*

NOIA Comment #17: (Appendix A, PDF Page 114) Due to limitations in DEC's Air Facility System (AFS) permitting software, individual processes (e.g., HA1) can only exist in one building. The process and source

associations for HPM1 and HPM2 buildings found in Appendix A need to be further divided into buildings HPM1-N, HPM1-S, HPM2-N, and HPM2-S. The current associated processes are HA1, HA2, HB1, HB2, HS1, and HS2 (PDF p. 183). The applicant should modify references to HPM1 and HPM2 buildings to HPM1-N, HPM1-S, HPM2-N, or HPM2-S in Tables A-1 and A-3.

Response: *Tables A-1 and A-3 will be revised accordingly in the Attachment to this memorandum, submitted under a separate cover letter.*

NOIA Comment #18: (Appendix A, PDF Page 114) The SCC used in the application for Processes HA1, HA2, CA1, CA2, HB1, HB2, HS1, HS2, WA1, WA2, WB1, WB2, WS1, and WS2 has been retired by the EPA. The applicant should be aware that DEC has changed the SCC to 40714697 and 40400121 where appropriate. Please confirm this change or provide an alternative SCC for these processes.

Response: *Micron acknowledges that the SCC for the listed processes will be updated as appropriate.*

NOIA Comment #19: (Appendix A, PDF Page 154) The exit temperature for the emission points of the cooling towers cannot be less than 0 deg F. Please confirm and adjust this value accordingly.

Response: *The emissions from the cooling tower will be at ambient temperature.*

New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

NOIA Comment #20: (Section 1.2.1.2.2, PDF page 19) The applicant has asserted that fabs 1 and 2 should be considered a separate project from fabs 3 and 4 with regards to PSD/NNSR. Micron points to EPA's project aggregation policy to conclude that the length of time between the commencement of construction of fabs 1 and 2 and fabs 3 and 4 is greater than the rebuttable presumption of three years. However, the applicant fails to take into consideration the following statement from EPA's 2006 project aggregation proposal "[c]hanges to a unit that are clearly sequenced or conducted in stages are, in many cases, considered a single project for major NSR applicability purposes" along with footnote 29 attached to that statement "[n]othing in this proposal is intended to amend our rules for applying BACT or LAER to phased construction projects" 71 FR 54247. Further, the applicant's CLCPA analysis document states that there would be a technical interconnection between the four fabs. Section 8.1.4 of the CLCPA analysis states "[a]ll fabs will further be linked to installations for heating and operations currently included in the Proposed Permit's Application 2." This would mean that Micron's claim that these are separate projects is refuted by the project aggregation policy "the appropriate basis for aggregation is whether there is a substantial technical or economic relationship" 83 FR 57326. All fab operations will share a common Standard Industrial Classification (SIC) code, be adjacent, and under common control by the applicant. Further, the applicant has pursued a combined EIS/SEQR process and permitting actions for all 4 fabs across numerous program areas. The Department has attempted to provide relief to the facility by allowing separate permitting efforts for the first two and second two fabs to accommodate anticipated changes to technology and emission sources asserted by the applicant over the period of construction. Accordingly, the facility's ATV permit will include a condition linking the permitting actions for all four fabs for the purposes of PSD/NNSR; however, while the four fabs will be considered a single phased project for PSD/NNSR, there will also be a corresponding permit condition that states permitting of fabs 3 and 4 will occur at a later date.

Response:

As a threshold matter, the purpose and scope of an environmental review is distinctly different from the purpose and scope of air permitting. Seven County Infrastructure Coalition et al v. Eagle County, Colorado, et al, 605 U. S. (2025), emphasizes that unlike the CAA, NEPA imposes no substantive environmental obligations or restrictions and that "NEPA is a purely procedural statute that, as relevant here, simply requires an agency to prepare an EIS—in essence, a report. . .to inform agency decision making." This is especially true here, where the full build out of the project spans over two decades, well beyond the term of a Title V permit. Therefore, the mere fact that the project's environmental review studies four fabs, is not indicative of the scope of the project's Title V permit.

Rather, Micron continues to assert that the Title V permit application for Fabs 1 and 2 should be evaluated as a separate project from potential Fabs 3 and 4. Micron's position is supported by EPA's 2009 rule finalizing the 2006 project aggregation proposal, which states:

> *We believe that if a previous physical or operational change has operated for a period of three or more years, permitting authorities may presume that a newly constructed change is not substantially related to the earlier change. When activities are undertaken three or more years apart, there is less of a basis that they have a substantial technical or economic relationship because the activities are typically part of entirely different planning and capital funding cycles. The fact that the earlier activities were constructed and operated independently for such a long a period of time tends to support a determination that the latter activities are technically and economically unrelated and independent from the other earlier constructed activities. Even if activities are related, once three years have passed, it is difficult to argue that they are* substantially *related and constitute a single project.*

Here, the timing of Fabs 3 and 4 is greater than the rebuttable presumption of three years. This timing gap is important as significant innovation and change in semiconductor technology and production during this time period. Fabs 3 and 4 are not "substantially related" to Fabs 1 and 2, based on the following:

- *The significant changes in technology support that Fabs 3 and 4 are not technically dependent on Fabs 1 and 2, and NYSDEC has acknowledged in its comment that changes will occur to technology and emissions sources for Fabs 3 and 4.*
- *The engineering design for the semiconductor manufacturing processes that will be used in Fabs 3 and 4 will be completed during a different planning period than Fabs 1 and 2.*
- *The capital funding cycle for Fabs 3 and 4 is separate than the Funding cycle for Fabs 1 and 2.*
- *The references in the CLCPA to Fabs 3 and 4 using heating and operations in the current application are for general HVAC and shipping operations, and are used to ensure a conservative CLCPA assessment. This "technical interconnection" is not related to the fab processes themselves, but ancillary operations. Any potential connection in ancillary operations does not constitute* ***substantial*** *technical or economic relatedness.*
- *Federal and State financial incentives have been separated for Fabs 1 and 2 and Fabs 3 and 4. Specifically, Micron's federal CHIPS Act funding contract covers Fab 1 and 2 only. Moreover, NYS Green CHIPS Act funding is specifically separated into two (2), ten-year phases to acknowledge the separation between the Fab 1 and 2 project and the Fab 3 and Fab 4 project (See Key Terms and Conditions for Development of the Micron Green Manufacturing Memory Chip Fab Campus in Clay, New York (Term Sheet), Section 3(10-11)).*

Based on the lack of substantial relatedness, Fabs 3 and 4 should be evaluated as a separate project. Micron acknowledges that all fab operations share a common SIC code, are adjacent, and under common control of the applicant. However, these criteria are for determining whether activities are part of the same stationary source, not whether distinct projects should be aggregated.

To address NYSDEC's concerns that Micron's Title V air permit will not include all stationary sources addressed in its NEPA/SEQR review, Micron will propose a permit condition acknowledging that if and when Micron chooses to pursue expansion, additional stationary sources will be appropriately permitted in accordance with 6 NYCRR Part 231.

NOIA Comment #21: (Section 4.2.2, PDF Page 75) Please revise the application to include Emission Reduction Credit (ERC) offset calculations and the source(s) of the ERCs that will be used for this project. It is not enough to state ERCs will be provided during the public comment period.

Response: *The appropriate ERC use forms will be included in the Attachment to this memorandum, provided under a separate cover letter.*

NOIA Comment #22: (Section 1.2.1.1.1, PDF Page 17) ATV application #2 included a request to separate construction emissions from the construction of the fab buildings of the ATV for the Micron campus. Separating the construction of the fabs from the ATV permit for the operation of the fabs is contrary to 201-1.1(a) which requires owners and operators of air contamination sources to obtain a comprehensive permit for both the **construction and operation** of such sources (emphasis added). Further, this would be contrary to how DEC has, in accordance with federal Clean Air Act Part 70, permitted every other major facility in the state. The facility must include applicable equipment and associated emissions from construction activities in their ATV permit application.

Response: *Micron is proposing a permitting approach that is consistent with NYSDEC's Title V permitting program. The full text of §201-1.1(a) reads: "The purpose of this is to require* ***owners and operators*** *of air contamination sources to obtain a permit or registration from the department for the construction and operation of such sources" (emphasis added). Micron has provided the Department with additional information, including RFP documentation, to demonstrate that it will neither own nor operate the stationary sources associated with Micron Campus construction (concrete batch plants, crushers, screeners, etc.). As there is no common control with respect to these operations, the owner and operator of those sources will obtain an air permit program authorization prior to constructing or operating those sources.*

Appendix D: Operational Flexibility Protocol

NOIA Comment A: The operational flexibility (op flex) provisions at 201-6.4(f) allow for certain changes made at Title V facilities to proceed without a permit modification provided sufficient detail is submitted by the applicant. However, such changes must be evaluated by the applicant pursuant to an op flex protocol established in the facility's permit and notification must be sent to DEC as described at 201-6.4(f)(2) and (3). Accordingly, it may be possible for Micron to make certain changes to POUs, process tools, or similar equipment pursuant to this provision, assuming sufficient detail is submitted to the Department as required by the op flex provisions. However, it is important to note that certain changes, such as those that would be considered a modification under Title I of the Act or that would cause the facility to exceed an emissions cap

or limitation in the permit, cannot proceed under the op flex protocol. This does not mean that the changes cannot proceed at all, only that a permit modification must be obtained first.
Notably, the requirements of 201-5.4(d) for facilities with air state facility permits and 201-6.4(f) for facilities with Title V facility permits are substantially different. Accordingly, it is not appropriate to compare permit conditions from air state facility permits to a proposed op flex protocol for this Title V permit application.

Response: *Micron understands that changes made under an OpFlex protocol must not be modifications under Title I of the Act and cannot cause an exceedance of existing emission limits.*

NOIA Comment #23: (Appendix D, PDF Page 193) The applicant has proposed an operational flexibility protocol (protocol) pursuant to 6 NCYRR 201-6.4(f)(2). Given the equipment changes anticipated at the facility, the Department asks the applicant to revisit Part 201-6.4(f)(2) and propose a process tool specific protocol with explicit language with the intention of facilitating changes to process tools as allowed by this regulation. The Department expects that this additional language would help streamline the applicant's process to implement changes to process tools and accordingly minimize Department comments when addressing those changes.

Response: *Section 201-6.4 indicates that an OpFlex protocol should "include provisions for evaluating potential changes for compliance," rather than requiring facilities to specifically list the types of changes it anticipates making at the time of permit issuance. Still, Micron understands the Department's request for additional understanding as to the types of changes Micron anticipates. Micron has provided additional documentation to the Department in a separate submittal to highlight how it plans to utilize its OpFlex protocol.*

NOIA Comment #24: (Appendix D, PDF page 193) Several portions of the proposed protocol discuss changes being made without notifying the Department. As discussed in 6 NYCRR 201-6.4(f)(2)(ii) and (3), the facility must notify the Department at least 15 days in advance of an anticipated change. Please revise the protocol to address this requirement throughout.

Response: *Micron agrees to specify that notifications will be submitted 15 days in advance when required as opposed to 7 days in advance.*

NOIA Comment #25: (Appendix D, Section 1.2 II A, PDF page 195) Please revise the protocol to include a statement that changes cannot be significant modifications as provided in 6NYCRR 201-6.6(d).

Response: *The OpFlex protocol will be amended as requested.*

NOIA Comment #26: (Appendix D, Section 1.2 II B.1.a, PDF Page 195) Please revise the protocol to discuss how it will be determined that future changes in equipment do not result in a reduced control efficiency and what documentation will be provided as part of the required advance notification.

Response: *The OpFlex protocol will be amended as requested.*

NOIA Comment #27: (Appendix D, Section 1.2 II D, PDF page 197) This section discusses changes that may require dispersion modeling to demonstrate compliance with applicable requirements. Please revise this section to indicate that the results of any such modeling will be provided as part of the required advance notification.

Response: *When notification is required, Micron will provide results of any air dispersion modeling conducted as part of the submittal to the Department. Despite whether notification is required, Micron will maintain records of air dispersion modeling results.*

NOIA Comment #28: (Appendix D, Section 1.2 II D, PDF page 197) A proposed change will not be allowed to proceed under op-flex when it will result in emissions of an unlisted contaminant. Please revise the protocol to indicate that such changes do not qualify for operational flexibility.

Response: *Sections 201-6 and DAR-1 do not prohibit changes involving contaminants not listed on DAR-1 from proceeding under OpFlex. DAR-1 establishes a de minimus AGC that Micron has proposed to use to evaluate unlisted contaminants under OpFlex. Micron has incorporated an extremely conservative approach to this issue in its OpFlex protocol. The ability to quickly implement changes involving unlisted contaminants will be critical to Micron's plans for leading-edge chip manufacturing in New York.*

NOIA Comment #29: (Appendix D, Section 1.2 II E. 3, PDF page 197) The statement "or be otherwise potentially significant under SEQRA (6 NYCRR Part 617)" should be removed. This is not a provision of 6 NYCRR 201-6.4 (f) and changes that are potentially significant under SEQR do not qualify for operational flexibility as they would be significant modifications to the permit.

Response: *Noted.*

NOIA Comment #30: (Appendix D, Section 1.2 II F.4, PDF page 198) Please revise the first sentence to say, "renewal or modification, whichever is first".

Response: *Noted.*

Appendix H - N: RACT/BACT/LAER Analyses

NOIA Comment B: The governing concern with the BACT and LAER analyses presented by the applicant is that it is not clearly stated how or why certain controls were chosen as BACT or LAER. These analyses are meant to be comprehensive top-down analyses as applied to the facility, rather than general research into current technologies applied in the industry. The requirements implemented by a BACT or LAER analysis may include but are not limited to emission limits, control efficiency requirements, specific control technologies, averaging plans, and fuel/raw material switching. While they may include general research into control technologies that have been applied in the industry, they are ultimately dependent on the technical feasibility of such controls for the emission sources in question rather than prevalence in the existing industry. The applicant generally fails to explain why controls applied to similar sources in other industries would be incompatible with this facility and seems to believe that BACT/LAER is specific to the industry instead of the correct interpretation that is it specific to the emission source being analyzed.

Regarding costs, DAR-20 describes the required elements of BACT and LAER analyses. If a potential control is eliminated from consideration due to economic infeasibility, the applicant must provide a cost analysis to DEC to substantiate their claim as discussed in DAR-20.

Response: *Please refer to Permit Application 2, Sections 5.2.2 and 5.2.3, which provide the comprehensive top-down approach for the analyses conducted. Additionally, each BACT/LAER Analysis presented in Appendices H through N includes a detailed analysis following the procedures outlined in Section 5 and consistent with the October 1990 New Source Review Workshop Manual, referenced in Comment #35 of this NOIA.*

The comment further states that Micron has failed to explain why controls applied to similar sources in other industries would be incompatible with its operations. Micron has provided additional details in its responses to the subsequent NYSDEC comments herein, that seek additional justification.

Lastly, this comment states that DAR-20 describes the required elements of BACT and LAER analyses. DAR-20 is the DEC Program Policy titled Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks. While this Policy includes information regarding economic and technical feasibility of controls, it is specific to New York RACT analyses and does not include any mention of applicability to federally required BACT or LAER analyses. Further, DAR-20 does not provide any guidance on conducting top-down analyses as the comment suggests. Relating to economic infeasibility, in any cases where Micron has eliminated a potential control due to cost, a cost feasibility analysis was conducted and provided as a part of Permit Application 2. The cost feasibility analysis discussed in Comment #59 will be included in the Attachment to this memorandum, submitted under a separate cover letter.

Application

NOIA Comment #31: (Appendix H – Appendix N) The applicant has not included all the components of DAR-20 as applicable to each analysis. A BACT or LAER analysis must be a top-down analysis that may include, but not be limited to, emission limits, control efficiency requirements, specific control technologies, averaging plans, and fuel/raw material switching. Specifically regarding LAER, some of these items are dismissed by the applicant as process changes, or not proven in the semiconductor industry, however, the application of LAER is dependent on technical feasibility not existing prevalence in the industry. Please revise the analysis to consider both the economic and technical feasibility of BACT and the technical feasibility of LAER.

Response: *DAR-20 is the DEC Program Policy titled Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks. While this Policy includes general information regarding economic and technical feasibility of controls, it is specific to New York RACT analyses and does not include any mention of applicability to federally required BACT or LAER analyses and does not provide any guidance on conducting top-down analyses.*

Micron believes it has completed an appropriate top-down analysis as outlined in Section 5 of the Permit Application 2; however, where specific additional information is requested in later comments, Micron has reviewed and provided an appropriate response.

NOIA Comment #32: (Appendix H – Appendix N) The applicant is required to assess BACT or LAER as applicable for every source of each applicable contaminant. At this time, it appears the applicant has not considered all technologies for each source or emission point. Specifically, regarding semiconductor process tools, the fab is expected to operate 5 different exhaust types and it does not appear that BACT and/or LAER will be implemented for each applicable contaminant and exhaust type or emission point. For example, the facility does not appear to consider VOC LAER on the Fab general exhaust or Fab ammonia exhaust. Please revise the BACT and LAER analyses to include all of the exhaust types and emission source types at the proposed facility.

Response: *Please refer to Section 6 of the Air Permit Application which summarizes the proposed BACT/LAER limits applicable by Emission Unit, Process, and Emission Source/Control. Each Exhaust Type emitting a pollutant is identified in the appropriate table with the corresponding BACT/LAER limit.*

NOIA Comment #33: The facility must expand Clearinghouse searches to include controls and permits beyond the approximately 10-year review windows provided in the application. The facility referenced "Semiconductor Industry: Wafer Fab Exhaust Management" in Appendix U, which appears to be dated material. If this reference is appropriate for application discussion, other control technology beyond 10 years ago may also be appropriate for the proposed facility.

Response: *Micron believes that the 10-year review window included is appropriate for the Air Permit Project as it would reflect the most up to date control technology and emissions limitations. BACT/LAER assessments conducted in the past 10 years would have reviewed the BACT/LAER assessments up to 20 years ago. If lower limits were included in an expanded review period, they would have been selected as a part of the subsequent BACT/LAER assessments and would be reflected in the 10-year review period. The document identified in the comment was used as a reference text for quantifying emissions. It focuses on general exhaust management strategies for the semiconductor industry and was not used as a determination of BACT/LAER for this project.*

NOIA Comment #34: (Section 1.4.3, PDF Page 28) The facility has proposed to use Regenerative Catalytic Systems (RCS) in place of Point of Use (POU) devices for certain acid exhaust applications. Some contaminants controlled may be subject to another governing regulation such as LAER. Therefore, although this change was proposed to minimize combustion emissions for the purposes of GHG BACT, the facility should conduct a side-by-side evaluation of the controls to demonstrate that the proposed RCS is meeting or exceeding the control efficiency of emissions that would otherwise be ducted through a POU.

Response: *For all pollutants Micron is proposing to route to the RCS rather than a POU control device, the control efficiency of the RCS is equivalent to that of the POU control devices. The destruction and removal efficiency (DRE) of the POU control devices and RCS is provided in Permit Application 2, Appendix F Tables 5-2 and 5-4.*

NOIA Comment #35: (Section 5.2.2.1, PDF Page 87) The applicant should research and include any control technologies that are available internationally in other fabs in addition to those found in the RBLC database. This is because the Top-Down Process as stated on page B.5 of the NSR Workshop Manual "includes technologies employed outside of the United States."

Response: *While not explicitly mentioned in the Air Permit Application, Micron reviewed control technologies implemented at its international operations as a part of the design process, including fabs located in Taiwan and Singapore. As a direct result of its international experience, Micron has proposed the implementation of the regenerative catalytic systems (RCS) as well as the wet scrubbing of NO_2. These technologies were not found in the RBLC database, US permit review, or California BACT review process. Micron did not identify any control technology implemented at its international operations which were not already addressed in the analyses submitted.*

By reviewing its own international network as a part of the design process and incorporating the technologies going beyond the current BACT/LAER identified through the RBLC database, Micron's analysis reflects a comprehensive top-down analysis.

NOIA Comment #36: (Section 5.2.3, PDF Page 88) The applicant has indicated there is an alternative to a top down BACT analysis by selecting controls that other agencies such as California have considered BACT This does not reflect how BACT reviews are conducted in New York State. While determinations from other states may inform DEC's determinations, it is never the case that a review from another state is given blanket approval or that it allows the applicant to avoid a top down BACT analysis for the proposed project.

Response: *Micron is not suggesting that a top-down analysis was not conducted for such cases where a California BACT determination was referenced. Rather, California's BACT for semiconductor processes was included and selected as BACT/LAER for several emission sources as it specified the most stringent controls and/or emission limitations identified through the complete top-down analysis.*

As demonstrated in Appendices H through N, even in cases where the BAAQMD BACT determination is ultimately selected in Step 4 or 5 as the proposed BACT or LAER, consideration was given to all technologies and limits identified in the RBLC and permit review process.

NOIA Comment #37: (Section 5.3.1, PDF Page 89) The definition of LAER under 200.1(ak) includes the following statement: "[t]he most stringent emission limitation achieved in practice, or which can reasonably be expected to occur in practice for a category of emission sources taking into consideration each air contaminant which must be controlled…" (emphasis added). Please revise the LAER analysis to address this statement when determining the technical feasibility of controls that have been used for a different source category but not in the semiconductor industry.

Response: *Appendices H and M for NO_X and VOC LAER will be revised to provide additional details on the technical infeasibility of controls that have been used for different source categories but not demonstrated in practice in the semiconductor industry.*

NOIA Comment #38: (Section 5.3.2, PDF Page 89) The applicant states "LAER does not consider economic, energy or other environmental factors unless the cost of control is so great that no similar source would be built and operated". Given the size of this project and the general principle that LAER can't be avoided due to cost, the applicant should provide a cost estimate and discussion for any specific control technology where the applicant is asserting that the cost is so great that no source would be built.

Response: *Section 5.3.2 provides general information about the top-down analysis procedures required for selecting LAER. Micron is not stating that there were any cases specific to this Project where cost was considered in making a LAER determination. As there are no such examples, Micron assumed no additional information is needed to address this comment.*

NOIA Comment #39: (Section 5.4.2, PDF Page 91) The explanation of the operation of the water bath vaporizers on page 5-11 would be consistent with DEC's definition of a boiler at 6 NCYRR 200.1(cm): "A device that combusts fossil fuel or wood and produces steam or heats water or any other heat transfer medium.". Therefore, the BACT and LAER reviews for the boilers and water bath vaporizers should be combined with the same control requirements and emission limits applied to each source.

Response: *The NYSDEC's definition of boiler is consistent with the federal definition of steam generating unit under NSPS Subpart Dc, 40 CFR 60.41c. While the water bath vaporizers do meet the definition of steam generating unit and NYSDEC's definition of boiler, water bath vaporizers are a different technology than a boiler and should be evaluated separately. The water bath vaporizers are comprised of a hot water tank with an inner tubular bundle for the conversion of cryogenic liquid nitrogen to gaseous nitrogen. The primary purpose of the water bath is to operate as a heat exchanger and maintain a temperature which allows the nitrogen to convert from cryogenic liquid nitrogen to gaseous nitrogen. Maintaining a consistent temperature during the endothermic reaction from liquid to gaseous nitrogen is inherently a different process than producing steam in a traditional boiler. As such, it would not be appropriate to broadly apply the same control and emission limit requirements to the two technologies.*

The federal definition of boiler under 40 CFR 51.123(cc) is "an enclosed fossil- or other-fuel-fired combustion device used to produce heat and to transfer heat to ***recirculating*** *water, steam, or other medium" (emphasis added). The vaporized nitrogen is used for process activities and is not recirculated. The water contained in the hot water bath is also not recirculating.*

Based on Micron's research and discussions with vendors, there are no water bath vaporizers available that are capable of meeting the same BACT/LAER emission standards for traditional boilers. Micron's position is further supported by the fact that there are distinct RBLC entries for water bath vaporizers with emission limits that differ from those for boilers, indicating that these units have historically been treated as separate sources from boilers in the context of BACT/LAER.

Therefore, for the purposes of this submission, the water bath vaporizers are being evaluated as separate sources and independent top-down analyses were performed for each source.

NOIA Comment #40: (Section 5.4.3, PDF Page 93) Footnote 73 equates BAAQMD BACT with LAER however, this is not true. While their version of BACT may be more stringent than others, it would still include a cost component unlike LAER. Additionally, these documents appear to be for minor NSR as the trigger is 10 lbs/day for a review which is significantly less than most major source BACT triggers.

Response: *Micron does not suggest that a top-down analysis was not conducted for such cases where a California BACT determination was referenced. Rather, the introduction to BAAQMD's BACT/T-BACT Workshop notes that many California air districts, including BAAQMD have BACT definitions that are much more stringent than BACT as defined in federal regulations, in some cases nearly aligning with federal LAER. Footnote 73 was intended to acknowledge this. Therefore, Micron included California's BACT for*

semiconductor processes as it specified the most stringent controls and emission limitations identified through the complete top-down approach. As demonstrated in Appendices H through M, even in cases where the BAAQMD BACT determination is ultimately selected in Step 4 or 5 as the proposed BACT or LAER, consideration was given to all technologies and limits identified in the RBLC and permit review process.

NOIA Comment #41: (Section 5.4.4, PDF Page 93) The applicant states that "Micron reviewed the air permits for a representative selection of semiconductor fabs that manufacture 300-mm wafers within the United States..." This would yield incomplete information. The applicant should consider all the fabs to determine potentially applicable control technologies, any issues with lower exhaust flow rates or emissions can be evaluated within the BACT/LAER analysis.

Response: *The technology used to manufacture 300-mm wafers is substantially different than that used in fabs manufacturing different wafer sizes. The 300-mm wafer size is the standard size manufactured in large, leading-edge semiconductor fabs worldwide such as Micron's proposed Fabs 1 and 2. As a result, the processes, and subsequent emissions from legacy 200-mm and 150-mmfabs would not be comparable to Micron's proposed operations, and their control technologies and emission factors would not be appropriate for a BACT and LAER determination for a 300-mm fabs. For example, the IPCC 2019 Refinement, which specifies process GHG emission factors utilized by Micron in Permit Application 2, includes distinct emission factors for 300-mm fabs and 200-mm fabs.*

Appendix H

NOIA Comment #42: (Appendix H, Table 1-1, PDF Page 292) Please provide additional justification as to why SCR for boilers under 50 MMBtu/hr would not be reasonably expected to occur in practice.

Response: *Appendix H will be updated to address this request.*

NOIA Comment #43: (Appendix H, Table 1-1, PDF Page 292) Based on the statement "LNBs and ULNBs are not generally manufactured and incorporated into PEECs in semiconductor manufacturing" they would be considered an available control technology. Please revise the BACT/LAER analysis to include these technologies.

Response: *Micron has conferred with vendors and reviewed available design information and has concluded that LNBs and ULNBs are not available for PEECs. As such, Micron has revised its statement in Appendix H to "LNBs and ULNBs are not manufactured and incorporated into PEECs in semiconductor manufacturing."*

NOIA Comment #44: (Appendix H, Section 1.2.4, Section 1.3.3, PDF Page 295, and PDF Page 296) When evaluating BACT for natural gas fired boilers and natural gas fired water bath vaporizers the applicant references utilizing "LNBs, ULNBs, and/or integrated FGR" but section 1.2.3 and section 1.3.3 state that these controls can be used in combination. Therefore, LAER should be based on combined usage.

Response: *LAER is not a specific control technology. LAER for NO_X was determined to be 9 ppmvd for boilers and 50 lb/MMscf for WBVs. These emission rates will be guaranteed by the manufacturer through*

the implementation of LNBs, ULNBs, and/or integrated FGR to meet the proposed limit. The final supplier has not been selected at this time; however, Micron will ensure that the purchased equipment meets the proposed LAER limitation.

NOIA Comment #45: (Appendix H, Section 1.2, Section 1.3.3, PDF Page 295, and PDF Page 296) The Department generally agrees that 9 ppm NOx can be considered LAER for the boilers and water bath vaporizers but the conversion to lb/hr appears to be incorrect. 9 ppm should be ~0.36 lb/hr not 1.45 lb/hr (Table 16-2 in Appendix F). Calculation in the Excel spreadsheet does not adhere to common conversion techniques. The following are accepted methods for converting ppm to lb/MMBtu:

$$lb/MMBtu = \frac{(ppm)(F)(MW)(P)\left(\frac{20.9}{20.9 - \%Oxygen}\right)}{(R)(460\deg R + std\,T\deg F)}$$

$$lb/MMBtu = \frac{(ppm)(F)(1020)(MW)}{(10^9)(385.5)} \times \frac{528\deg R}{460\deg R + std\,T\deg F} \times \frac{20.9}{20.9 - \%Oxygen}$$

F = fuel factor (8710 for natural gas)
R = ideal gas constant

Response: *Appendix F will be updated accordingly.*

NOIA Comment #46: (Appendix H, Section 1.4.4, PDF Page 297) The applicant has proposed utilizing Tier 4 emission standards for engines to demonstrate BACT. These standards will be used in conjunction with "good combustion and maintenance practices". The applicant further notes that additional control technologies may be utilized to meet these standards such as use of SCR, turbochargers, intercoolers and/or aftercoolers. As a matter of clarification, these technologies would need to be selected as LAER, not simply compliance with the standard and good combustion practices.

Response: *LAER is not a specific control technology. Tier 4 emissions standards were determined to be LAER for diesel-fired emergency engines. These emission rates will be guaranteed by the manufacturer and the controls utilized may include SCR, turbochargers, intercoolers, and/or aftercoolers. The final supplier has not been selected at this time and therefore, Micron cannot guarantee which technology the selected engines will incorporate; however, Micron will ensure that the purchased equipment meets the proposed LAER limit.*

NOIA Comment #47: (Appendix H, Section 1.5.1, PDF Page 298) The applicant indicates that the use of ULSD does not reduce NOx in Table 1-1, therefore this should not be listed as an available control technology. Further, ULSD is required by Subpart 225-1 and is not an additional control technology.

Response: *ULSD will be removed from the control technologies included under Section 1.5.1 of Appendix H.*

NOIA Comment #48: (Appendix H, Section 1.6.4, PDF Page 300) While there may be no precedent for wet scrubbing NOx limits, the inlet concentration and reduction efficiency (90% based on table 5-3 in Appendix F) should be used to establish a limit for LAER.

Response: *Appendix H will be updated accordingly.*

Appendix J

NOIA Comment #49: (Appendix J, Section 1.3.5, PDF Page 340) Similar to the NOx assessment, the water bath vaporizers should be considered boilers and meet the same BACT limit of 50 ppm.

Response: *Please refer to Micron's response to NOIA Comment #39. The water bath vaporizers are a separate technology from boilers and as such, have been evaluated separately for appropriate BACT and LAER limits.*

NOIA Comment #50: (Appendix J, Section 1.5.5, PDF Page 344) There is no reason to propose a limit of 500 hours per year for the emergency fire pump. Emergency engines are limited to 500 hours per year of operation by definition.

Response: *Micron agrees that emergency engines are limited by definition to 500 hours per year. The limit was included in Application 2 as a means of transparency to provide a comprehensive picture of limitations that will apply to the proposed units.*

NOIA Comment #51: (Appendix J, Section 1.6, PDF Page 345) Footnote 8 should be revised to remove the referenced BACT/LAER discussion for control devices.

Response: *Footnote 8 will be updated to clarify that POUs are not evaluated as a source subject to BACT/LAER as they are control devices.*

NOIA Comment #52: (Appendix J, Section 1.6.1, PDF Page 345) Table 6-1 of Appendix F states 99% control of CO from the plasma etch process category. As such, it should be considered in the BACT analysis and have a limit associated with it.

Response: *Appendix J will be updated accordingly.*

NOIA Comment #53: (Appendix J, Section 1.6.5, PDF Page 345) Both the RBLC and the BAAQMD BACT results contain numeric CO limits for semiconductor processes. These limits/technologies should be considered available and included in the analysis.

Response: *Micron has reviewed the BAAQMD BACT guidance for semiconductor processes and did not find the numeric CO limit referenced by the NYSDEC.*

With respect to the RBLC results, CO limits were included for the Regenerative Thermal Oxidizer and Combustor proposed as control for various processes at the SIO International Wisconsin, Inc. - Energy Plant. Based on a review of the current operating permit for the Facility, No. 25228533A-S01, the processes listed in the RBLC were never constructed. Further, based on the associated permit application, the numeric CO limits listed in the RBLC are applicable to the thermal oxidizers and combustors used to control emissions of VOC and not to the CO generated by the process itself.[1]

Appendix K

NOIA Comment #54: (Appendix K, Table 1-1, PDF Page 385) Several technologies were listed in Table 1-1 that are not included in the available technology summary section 1.1: cyclone, oxidation catalyst, ceramic filters, HEPA or ULPA filters, fiber bed filters, venturi scrubbers, and exhaust gas segregation. Please revise Section 1.1 to include a discussion of these control technologies.

Response: *Section 1.1 identifies available control technology that is discussed in the subsequent source-specific sections. However, Table 1-1 identifies control technologies that are not evaluated in the subsequent sections. These technologies are not considered to be available and therefore are not described in the prior section. Where additional details of technical infeasibility have been added and the control is discussed within the equipment-specific top-down analyses, the control description has been added to the available technology discussion in Section 1.1 of Permit Application 2, Appendix K.*

NOIA Comment #55: (Appendix K, Table 1-1, PDF Page 385) Nothing in the definition of BACT implies that if a control hasn't been used in a certain industry it should be automatically excluded. HEPA/ULPA filters, fiber bed filters, packed bed scrubbers, and exhaust gas segregation should be reviewed for BACT.

Response: *Appendix K has been revised to provide additional details on control devices not used in the semiconductor industry and the reasons they have been eliminated from consideration during the top-down process.*

NOIA Comment #56: (Appendix K, Section 1.2, PDF Page 387) RBLC has limits lower than 7.6 lb/MMscf (2 instances of 1.9 lb/MMscf [KY-0115, SC-0183] and 3 of the virtually identical 0.0019 lb/MMBtu [AR-0171, AR-0172, MD-0045]) which should be chosen as BACT unless control technology is not cost effective.

Response: *While the RBLC does include limits of 0.0019 lb/MMBtu for the Permit IDs identified, these limits are applied to filterable particulate matter whereas the 7.6 lb/MMscf limit is for PM_{10}. There are no RBLC limits for PM_{10} lower than 7.6 lb/MMscf. Attachment 1 to Appendix K will be revised to make this clarification.*

[1] The referenced permit materials can be found via the Wisconsin Department of Natural Resources Permit Seach Tool: https://apps.dnr.wi.gov/warp_ext/AM_PermitTrackingSearch.aspx

NOIA Comment #57: (Appendix K, Section 1.6.2, PDF Page 394) While the 99% efficiency BAAQMD lists may not be achievable, a control efficiency should still be associated with their use if selected as BACT. Calculations in Appendix F appear to use 82% as the removal efficiency.

Response: *Appendix K will be updated accordingly.*

NOIA Comment #58: (Appendix K, Section 1.6.5, PDF Page 396) The applicant should indicate what the removal efficiency is for the mist eliminators

Response: *A removal efficiency is not available for the proposed mist eliminators. The mist eliminators are integrated into the acid and ammonia scrubbers to prevent PM carryover from the operation of the wet scrubbers. Removal of submicron particles generated through process operations is not expected. The overall control efficiency proposed for the system is inclusive of any control to be provided by the mist eliminators.*

NOIA Comment #59: (Appendix K, Attachment 4, PDF Page 404) The BACT Economic Feasibility Evaluation is missing.

Response: *Micron will include the BACT Economic Feasibility Evaluation for IWS installation for the Acid and Ammonia Scrubbers in the Attachment to this memorandum, submitted under a separate cover letter.*

Appendix L

NOIA Comment #60: (Appendix L, Section 1.2.5, PDF Page 480) An emission limit will need to be applied to the boilers, 117 lb CO2e/MMBtu appears to be appropriate based on the RBLC.

Response: *Appendix L will be updated accordingly with the proposed GHG BACT limit for boilers.*

NOIA Comment #61: (Appendix L, Section 1.4.5, Section 1.5.5, PDF Page 484) An emission limit will need to be applied to the emergency engines, 163 lb CO2e/MMBtu appears to be appropriate based on the RBLC.

Response: *Appendix L will be updated accordingly with the proposed GHG BACT limit for emergency engines.*

NOIA Comment #62: (Appendix L, Section 1.6.5.1, PDF Page 489) The applicant discusses BACT with regards to the plasma etch and thin films process tools at length. To be clear, BACT for the RCS would be 75% reduction with a periodic testing requirement.

Response: *Micron acknowledges that stack testing would be appropriate to demonstrate compliance with proposed limits and will test according to a stack testing plan agreed upon with the NYSDEC.*

NOIA Comment #63: (Appendix L, Section 1.6.5.1, PDF Page 489) High-temperature thermal wet scrubbers that operates at 1000° C or more should be discussed for BACT for thin film process tools. It has been demonstrated to reduce nitrous oxide by 90% at an international semiconductor fab.

Response: *While an international fab has stated that a 90% reduction in nitrous oxide associated with thin film process tools has been achieved through the use of high-temperature thermal wet scrubbers, this control efficiency is not substantiated by a vendor guarantee. Appendix L has been updated accordingly to provide additional information on this potential control technology.*

NOIA Comment #64: (Appendix L, Section 1.7.5, PDF Page 491) The applicant indicates that they will "continue to evaluate" the use of low-GWP HTFs. This seems to indicate that after the permit is issued Micron will continue to look for ways to lower GHG emissions or alternatively it implies the BACT analysis remains incomplete. In the event that this is an ongoing evaluation, the applicant will be required to submit a plan for evaluation and implementation.

Response: *At the time of this Air Permit Application, there are no lower-GWP HTFs available on the market compatible with Micron's proposed operations. The use of good design and maintenance practices as outlined in Section 1.7.5 is the proposed BACT for the use of HTFs. The evaluation of process changes as they become available is part of Micron's corporate GHG reduction strategy.*

Appendix M

NOIA Comment #65: (Appendix M, PDF Page 527) The applicant has asserted various sources of VOC emissions are captured in the cleanroom and ducted to the outside atmosphere. The facility must evaluate VOC LAER for the general building exhaust.

Response: *Please refer to Section 6 and Appendix M of Permit Application 2. The general building exhaust is subject to the same proposed VOC LAER limits as all other stacks from the fab.*

NOIA Comment #66: (Appendix M, PDF Page 527) The applicant has evaluated HTF for GHG BACT but did not consider these compounds with regards to VOC LAER. HTFs, some of which are VOCs, are expected to be captured, conveyed, and emitted from permitted emission points.

Response: *Appendix M will be updated accordingly.*

NOIA Comment #67: (Appendix M, PDF Page 527) Nothing in Part 231 or the definition of LAER provides for an exemption of sources based on low level of emissions. Therefore, all storage tanks will need to be evaluated for LAER if they emit any amount of VOC.

Response: *Micron will achieve LAER as described for all permitted storage tanks emitting VOCs.*

NOIA Comment #68: (Appendix M, PDF Page 527) The applicant has identified two laboratories to support fab operations with testing and quality assurance. Although these sources qualify as exceptions under 6 NYCRR Part 212 due to the exemption in 6 NYCRR Part 201-3.2(c)(40), the facility is a new Air Title V facility subject to BACT/LAER, and therefore emissions of criteria pollutants from these sources are subject to NSR. Lab processes should be included for VOC LAER assessment.

Response: *Please refer to Micron's response to NOIA Comment #8. Micron acknowledges that conflicting information was presented in Permit Application 2. Although certain sources meet the criteria in 6 NYCRR 201-3.2 to be considered exempt from permitting and were listed on the exempt activities form Appendix B, Micron has proposed identifying them as permitted sources in Appendix A. Specifically, Micron is requesting more stringent operational limits for the emergency engines as part of the permit. Micron has revised Appendices A and B to delineate between sources for which it will apply an exemption in §201-3.2 and sources that will be included in its permit. With these updates, emissions from exempt sources at the facility do not exceed any major facility threshold. All sources proposed to be permitted are considered under BACT and LAER.*

NOIA Comment #69: (Appendix M, Table 1-1, PDF Page 530) Flares for storage tanks should be evaluated as LAER, as stated in the application flares have been demonstrated to control VOC emissions from storage tanks.

Response: *As currently proposed in Section 1.7.4 of Appendix M, LAER for storage tanks was determined to be an overall reduction of ≥95% through the use of good operating and maintenance practices, efficient tank design, and routing emissions to centralized control devices including the ammonia scrubber to control TMAH emissions and the RCTOs for all other tanks. While flares have been demonstrated in practice for storage tanks in other industries, there were no instances found through the RBLC search, California BACT review, or permit search of flares being used in practice in the semiconductor industry. Even if Micron were to consider this novel installation in lieu of the currently proposed control devices, the control efficiency expected from flares at the concentration of VOCs proposed is not expected to exceed 95%. Further, the combustion of auxiliary fuel needed to maintain flare operation would result in additional emissions of combustion pollutants, including VOCs.*

NOIA Comment #70: (Appendix M, Table 1-1, PDF Page 530) The applicant has been dismissive of common VOC controls implemented at wastewater treatment operations citing technologies not "being demonstrated" in the semiconductor industry. The wastewater plant should consider controls commonly implemented for wastewater treatment operations. Flares, steam strippers/condensers, and air strippers should be evaluated as LAER for the wastewater treatment plant. As stated in the application, these controls have been used to control emissions from wastewater treatment plants.

Response: *Appendix M will be updated accordingly.*

NOIA Comment #71: (Appendix M, Section 1.3.2, PDF Page 535) Reference to CO is incorrect as this appendix is related to VOC.

Response: *Typo noted, Appendix M will be updated accordingly.*

NOIA Comment #72: (Appendix M, Section 1.3.4, PDF Page 536) Water bath vaporizers should be subject to the same LAER limit as the boilers, 0.0017 lb/MMBtu

Response: *Please refer to Micron's response to NOIA Comment #39. The water bath vaporizers are a separate technology from boilers and as such, have been evaluated separately for appropriate BACT and LAER limits.*

NOIA Comment #73: (Appendix M, Section 1.4.1, Section 1.4.4, Section 1.5.1, Section 1.5.4) Use of ULSD in engines is not an acceptable control mechanism in New York State since Subpart 225-1 requires the use of that fuel for diesel engines.

Response: *Micron acknowledges that ULSD does not provide additional control beyond the base case as it is required by regulation.*

NOIA Comment #74: (Appendix M, Section 1.5.1, PDF Page 538) The reference to BACT should be replaced with LAER

Response: *Micron agrees that the reference to BACT in Section 1.5.1 of Appendix M should have been LAER. Appendix M will be updated accordingly.*

NOIA Comment #75: (Appendix M, Section 1.6.2.1, Section 1.7.2.1, PDF Page 541) The reasons given for fixed bed capture systems without regeneration do not meet the threshold of technical infeasibility for LAER. Please evaluate this control technology for LAER to see if it is more effective at reducing VOCs than what is proposed for LAER.

Response: *The justification for technical infeasibility outlined in Section 1.6.2.1 and Section 1.7.2.1 points to finite adsorption capacity, significant waste generation, and process downtime and maintenance requirements as reasons why fixed bed capture systems have not been demonstrated in practice as feasible within the semiconductor industry. Even if Micron were to consider this novel installation in the industry with the identified challenges, the technology provides an equivalent control efficiency to that of a capture system equipped with adsorption and recovery/regeneration (RCTO) which does not include the same challenges and was selected as LAER.*

NOIA Comment #76: (Appendix M, Section 1.6.2.2, PDF Page 541) The applicant indicates that they will "continue to evaluate" chemical substitution. This seems to indicate that after the permit is issued Micron will continue to look for ways to substitute chemicals or alternatively it implies the LAER analysis remains incomplete. Please clarify the meaning of "continue to evaluate."

Response: *At the time of the Air Permit Application, there are no lower-VOC material substitutions available compatible with Micron's proposed operations. By stating that Micron will continue to explore opportunities to utilize alternative processes and raw materials that result in lower VOC emissions, Micron is acknowledging that the semiconductor manufacturing industry is dynamic and chemical changes may occur in the future, but Micron will comply with and be bound by the LAER determination in the permit.*

NOIA Comment #77: (Appendix M, Section 1.6.4, PDF Page 542) The applicant is utilizing POUs to achieve desired emissions reductions as a part of LAER. These units should be incorporated in the VOC LAER evaluation.

Response: *Micron has incorporated the use of POUs into the VOC LAER evaluation. In Step 1 of the top-down analysis presented in Section 1.6 for Semiconductor Process Tools, PEECs, and Cleaning Operations, Micron identifies the use of tool-level thermal oxidation systems. As described in Section 2.2.2 of the Air Permit Application, tool-level thermal oxidation systems include POUs.*

NOIA Comment #78: (Appendix M, Section 1.6.4, Section 1.7.4, PDF Page 542) BAAQMD BACT takes cost into consideration and should not be automatically equated as LAER.

Response: *Micron does not intend to suggest that a top-down analysis was not conducted for such cases where a California BACT determination was referenced. Rather, Footnote 16 was intended to acknowledge that the introduction to BAAQMD's BACT/T-BACT Workshop notes that many California air districts, including BAAQMD have BACT definitions that are much more stringent than BACT as defined in federal regulations, in some cases nearly aligning with federal LAER. Therefore, Micron included California's BACT for semiconductor processes as it was the most stringent controls and emission limitations identified through the complete top-down approach. As demonstrated in Appendices H through M, even in cases where the BAAQMD BACT determination is ultimately selected in Step 4 or 5 as the proposed BACT or LAER, consideration was given to all technologies and limits identified in the RBLC and permit review process.*

NOIA Comment #79: (Appendix M, Section 1.6.4.2, PDF Page 544) Each emission source is required to meet the LAER emission limit so if multiple emission sources are tested at the same time averaging between them is not allowed. The exception to this would be the RCTOs as those sources have two emission points associated with them and the emissions need to be combined to determine compliance.

Response: *Micron acknowledges that stack testing may be required to demonstrate compliance with proposed limits and will test according to a stack testing plan agreed upon with the NYSDEC.*

NOIA Comment #80: (Appendix M, Section 1.7.4, PDF Page 546) Adsorption based VOC capture and control systems and thermal oxidation systems were stated to be a feasible control technology for VOC but not included as LAER. The analysis should be revised to include the technology that reduces emissions the most.

Response: *The Regenerative Thermal Oxidation System (RCTO) is an adsorption-based VOC capture and control system with thermal oxidation and is selected as LAER in Section 1.7.4 for VOC tanks in the FAB buildings. For tanks outside of those locations, other design considerations resulting in equivalent emission reductions are proposed.*

Appendix F: Emission Calculations

NOIA Comment #81: (Appendix F, Table 1-3) The applicant has presented the Emission Rate Potential (ERP) of each half of each fab as a total facility wide ERP. Similarly, the ERPs for the HPM buildings appear

to be on a "per building" basis which represents one quarter of expected emissions. The applicant should review all ERPs and confirm they are equal to or greater than the PTE and that they accurately represent the facility operations.

Response: *ERP is defined in §200.1(u) as "The maximum rate at which a specified air contaminant* ***from an emission source*** *would be emitted to the outdoor atmosphere in the absence of any control equipment" (emphasis added). Further, §212-2.1 restricts "emissions of air contaminants to the outdoor atmosphere from* ***any process emission source*** *or emission point" (emphasis added). Accordingly, Micron has presented the ERP for each process emission source subject to Part 212, consistent with the requirements of §212-1.5(a) through (c). There is no requirement to assess ERP on a facility-wide basis, therefore the ERP of a process emission source should not be directly compared to the PTE of a group of process emission sources. Further, ERP is presented on an hourly basis, while PTE is presented on an annual basis.*

NOIA Comment #82: (Appendix F, Table 1-3) Update with the following details about ozone (CAS# 10028-15-6). AGC = 0.24 µg/m3, SGC = 180 µg/m3, and an environmental rating of "INT-A".

Response: *The US EPA measured the annual average ambient concentration of ozone at its East Syracuse monitor (AQS ID: 36-067-1015) to be 54 µg/m3 in 2024. Micron requests clarification on how to demonstrate compliance with the standards listed in the comment given that local background data far exceeds the proposed AGC.*

NOIA Comment #83: (Appendix F, Table 1-3) Tetrafluoromethane (CAS# 75-73-0): AGC is 330 µg/m3, not 300 µg/m3.

Response: *Micron agrees and will update Appendix F accordingly.*

NOIA Comment #84: (Appendix F, Table 1-3) Hydrogen sulfide (CAS# 7783-06-4) has a State 1-hour standard of 14 µg/m3 (Part 257-5). This value needs to be in the "SGC" column.

Response: *Appendix F will be updated accordingly.*

NOIA Comment #85: (Appendix F, Table 1-3) For a separate project, the NYS DEC derived interim results for sodium hypochlorite (CAS# 7681-52-9) based on analogy to chlorine (CAS# 7782-50-5): AGC = 0.2 µg/m3, SGC = 116 µg/m3, and an environmental rating of "B". Please update the "AGC" and "SGC" columns accordingly.

Response: *Appendix F will be updated accordingly.*

NOIA Comment #86: (Appendix F, Table 1-3) Carbon dioxide (CAS# 124-38-9) should have an environmental rating of "B*", not "D".

Response: *DAR-1 Section V.C states that "No air contaminant should be initially assigned an ER of 'D' unless it is a simple asphyxiant," citing the National Institute of Health's Haz-Map database. The Haz-Map database defines carbon dioxide as a simple asphyxiant.[2] Therefore, an initial environmental rating of "D" is appropriate.*

NOIA Comment #87: (Appendix F, Table 1-3) 4-methylpentan-2-ol (CAS# 108-11-2) does not have any ERP associated with it.

Response: *Appendix F will be updated accordingly.*

NOIA Comment #88: (Appendix F, Table 1-3) Hexafluoroethane (CAS# 76-16-4) and Octafluorocyclobutane (CAS# 115-25-3): the AGC should be listed at 16,800 µg/m3 based on a recent submittal from NYSDOH.

Response: *In a May 5, 2025, letter to NYSDEC, Micron acknowledged acceptance of the AGC of 16,799 µg/m3 proposed by NYSDOH for hexafluoroethane (CAS#76-16-4) and octafluorocyclobutane (CAS# 115-25-3). Appendix F will be updated accordingly. This acceptance should not be construed as agreement with NYSDOH's rationale or approach for any other values or substances.*

NOIA Comment #89: (Appendix F, Table 1-3) [redacted] SafeBridge never derived guideline concentrations for this chemical because its annual emission rate is less than 100 lbs/yr. Please replace the "TBD" in the "AGC" and "SGC" columns with "-".

Response: *Appendix F will be updated accordingly.*

NOIA Comment #90: (Appendix F, Table 1-3) Methacrylic acid (CAS# 79-41-4): In the "SGC" column, replace "Not in DAR-1" with "–".

Response: *Appendix F will be updated accordingly.*

NOIA Comment #91: (Appendix F, Table 1-3) Tetrahydrofurfuryl alcohol (CAS# 97-99-4): In the "AGC" and "SGC" columns, replace "TBD" with "N/A". The NYS DEC approved SafeBridge's acute toxicity assessment for this chemical, so "INT-B*" can be replaced with "INT-B" in the "Env. Rating" column.

Response: *Appendix F will be updated accordingly.*

NOIA Comment #92: (Appendix F, Table 1-3) [redacted] In the "AGC" and "SGC" columns, replace "Not in DAR-

[2] https://haz-map.com/Agents/343?referer=Search&referer_data[s]=simple+asphyxiants&return_url=%2fSearch%3fdofilter%3d1%26f%255Btab%255D%3dtab1%26f%255Bs%255D%3dsimple%2basphyxiants.

1" with "N/A". The NYS DEC approved SafeBridge's acute toxicity assessment for this chemical, so "INT-C*" can be replaced with "INT-C" in the "Env. Rating" column.

Response: *Appendix F will be updated accordingly.*

NOIA Comment #93: (Appendix F, Table 1-4) Hexafluoroethane (CAS# 76-16-4) and Octafluorocyclobutane (CAS# 115-25-3): the AGC should be listed at 16,800 µg/m3 based on a recent submittal from NYSDOH

Response: *Please refer to Micron's response to Comment #88.*

NOIA Comment #94: (Appendix F, Table 1-4) Five analog groups need to be added. The chemicals in those analog groups where the combined emission rates exceed 100 lbs/yr will need to be modeled in aggregate and compared to the guideline concentration(s) of the chosen analog.

a. [redacted]
b. Triethylamine Group: Triethylamine (CAS# 121-44-8) and [redacted]
c. [redacted] and 2-(2-Aminoethoxy)ethanol (CAS# 929-06-6)
d. [redacted] Ethanediol (CAS# 107-21-1) and [redacted]
e. Trimethylbenzene Group: 1,2,4-Trimethylbenzene (CAS# 95-63-6) and 1,3,5-Trimethylbenzene (CAS# 108-67-8). Both chemicals have an AGC of 60 µg/m3. So, after modeling CAS #s 95-63-6 and 108-67-8 in aggregate, compare the model results to the 60 µg/m3 AGC.

Response: *Appendix F, Table 1-4 will be updated as suggested.*

NOIA Comment #95: (Appendix F, Table 1-4) Add [redacted] the [redacted]. Add 2-Methoxy-1-methylethyl acetate (CAS# 108-65-6), [redacted] and Propanol, 1(or 2)-ethoxy- (CAS# 52125-53-8) to the 1-Methoxy-2-propanol Group.

Response: *Appendix F, Table 1-4 will be updated as suggested.*

NOIA Comment #96: (Appendix F, Table 6-1) Add a column to Emission Chemical Classification in Table 6-1: Process Chemical Emissions Calculations for Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS).

Response: *The Emission Chemical Classification section of Table 6-1 groups contaminants into all classifications that are relevant to specific US EPA and NYSDEC air regulations. There are currently no US EPA or NYSDEC air regulations specific to PFAS that would require Micron to identify specific contaminants as PFAS.*

NOIA Comment #97: (Appendix F, Table 34-1) Table 34-1 (PDF pp. 269–270): SafeBridge's acute toxicity assessment for [redacted] has been approved by the NYS DEC.

Response: *Micron acknowledges this confirmation.*

NOIA Comment #98: (Appendix F, Table 34-1) The details on emissions of 1,3,5-Trimethylbenzene (108-67-8) are not readily found (273.31 lbs/yr). Is there a tab that represents the emissions from HPM solvent?

Response: *Micron will update Table 34-1 to combine the two isomers of trimethylbenzene. Table 1-3 will be updated to reflect this change.*

NOIA Comment #99: (Appendix F, Table 17-1) The applicant has requested to utilize a phased engine ramp down period for the 118 diesel engines on site. The applicant should clarify the desired operations plan since the ramp down plan indicated in Table 17-1 differs from those indicated elsewhere in the permit including in the NOIA Comment #13 response included in Appendix R.

Response: *Micron acknowledges the error in Table 17-1 and confirms that NOIA Comment #13 in Appendix R of Permit Application 2 is accurate: 38 engines will be limited to no more than 4 consecutive hours of operation in a 24-hr period, 34 engines will be limited to no more than 8 hours of operation in a 24-hr period, while the remaining 46 engines will have no limit on consecutive operation. Proposed permit conditions reflecting this will be included in the Attachment to this memo, submitted under a separate cover letter.*

NOIA Comment #100: (Appendix F, Table 26-1) The applicant stated in footnote #7 that transportation was modeled for liquid chemistries with total throughputs exceeding 150,000 gal/yr. The applicant should discuss why 150,000 gal/yr was chosen as the modeling cutoff point.

Response: *The 150,000 gal/yr threshold was intended to capture the majority of the volume of liquid chemistries delivered to or removed from the site to provide an analysis of roadway PM emissions. To address this comment, Micron will expand Table 26-1 to include all liquid chemistries.*

NOIA Comment #101: (Appendix F, Table 31-2) It appears that footnotes of Table 31-2 have been incorrectly assigned. More specifically it appears that footnotes 4 and 5 regarding Potential to Emit have been removed. The applicant should clarify the intent of these notes.

Response: *Micron agrees the footnotes to Table 31-2 were incorrectly assigned. The superscripts referring to footnotes 4 and 5 should be ignored. The superscripts referring to footnotes 6, 7, and 8 were intended to refer to footnotes 4, 5, and 6.*

NOIA Comment #102: (Appendix F, Table 30-3) Emissions Calcs Excel Sheet, Tab 30, Column J, Rows 51 and 54, it appears that an incorrect formula to calculate Annual Potential Emissions is used for nitrogen dioxide and carbon dioxide. The formula is looking to partition the annual potential emissions between exhaust types (95% VOCs via solvent exhaust and 5% via RCTO burner exhaust). Nitrogen dioxide and

carbon dioxide are identified as 100% emitted via the RCTO Burner Exhaust per footnote #2. The facility should revise the spreadsheet to remedy this error.

Response: *Micron agrees with this comment and will revise Table 30-3 accordingly.*

NOIA Comment #103: (Appendix F, Table 15-2) There appears to be a calculation error in Table 15-2. The lb/hr PTE and tpy PTE are equal when they are not expected to be.

Response: *In Table 15-2, the lb/hr and tpy emissions for the water bath vaporizers are equal due to the 2,000 hr/yr limit proposed for each unit.*

Air Toxics

NOIA Comment C: Part 212 requires the applicant to demonstrate to the satisfaction of the Department that non-criteria air pollutants will be emitted in a quantity that does not pose a threat to public health. This rule allows for several compliance options in which the applicant may demonstrate compliance with another rule and be considered compliant with Part 212 as well. Importantly, these methods are not "exemptions" from Part 212 as characterized by the applicant (see 6 NYCRR 212-1.5(e)).

There are several Part 212 requirements that the applicant is conflating: (1) hourly emission rate potential (ERP); (2) air dispersion modeling; (3) environmental ratings; and (4) T-BACT.

Response: *Micron acknowledges that meeting the criteria in §212-1.4 or §212-1.5(e) constitutes a sufficient demonstration of compliance with the requirements of Part 212, not an exemption from Part 212 applicability.*

NOIA Comment D: *ERP:* As discussed in Section V.A. of the DAR-1 guidance document, applicants proposing one or more emission sources that meet the definition of "process operation" at 212-1.2(b)(19) are required to provide the ERP of each contaminant designated as a High Toxicity Air Contaminant (HTAC) associated with each emission source regardless of the level of emissions. Applicants are also required to provide the hourly ERP of all contaminants not designated as HTACs with actual annual emissions greater than 100 pounds per year. Notably, this information is required regardless of other potentially applicable requirements (e.g. Lowest Achievable Emission Rate (LAER)) so that DEC can conduct a thorough review of the expected emissions from the proposed facility. Annual actual emissions for non-HTAC contaminants that are less than 100 pounds per year must meet the requirements of 212-1.5(g). In the case where guideline concentrations were developed using an analogy to another chemical with similar structure, ERP for all analogous chemicals with combined emissions greater than 100 pounds per year are required.

Response: *Micron intended to provide an ERP for all contaminants meeting the criteria described above from all relevant process emission sources. It appears that a small number of ERP values were inadvertently omitted from Table 1-3 of Appendix F to Permit Application 2. An updated version of Table 1-3 will be included in the Attachment to this memo, that will be submitted under separate cover.*

NOIA Comment E: *Air dispersion modeling:* Section V.A. of DAR-1 also indicates that applicants are required to provide all necessary analyses in support of the permit application, including but not limited to

air dispersion modeling. Notably, DEC is not requesting modeling of all contaminants. Rather, the applicant is being asked to model each contaminant which may be required to apply additional controls if an adjustment to the proposed environmental rating significantly changes compliance requirements under Part 212.

Response: *Micron will provide supplemental air dispersion modeling addressing this and other related comments in the forthcoming air dispersion modeling report.*

NOIA Comment F: *Environmental ratings:* Another item required by Section V.A. of DAR-1 is a listing of proposed environmental ratings for each contaminant. While DEC does consider these proposed ratings during its review of the application, it is important to note that a final rating is assigned by the DEC as discussed in Section V.C. of DAR-1. This final rating is assigned with consideration of several factors, including modeled concentrations of the pollutants that will be emitted, combined releases of pollutants with similar target health endpoints, and location of the source with respect to sensitive receptors. Further, DEC is tasked with establishing a final environmental rating per 6 NYCRR 212-1.3. This exercise of determining environmental ratings is separate from the compliance demonstration of satisfying the tables in 6 NYCRR Part 212-2.3. The environmental rating is then utilized in determining applicability of emission standards and determining the degree of air cleaning required.

In its initial environmental rating proposal, the applicant asserted that any VOC contaminants initially rated "B" and "C" should be allowed to demonstrate compliance with VOC RACT requirements using controls proposed as LAER. Since the facility is expected to be a Major facility for VOC, the Department agrees that any VOC contaminants with a final rating of "B" or "C" should demonstrate compliance with the provisions of VOC RACT established in 6 NYCRR Part 212-3 rather than the Allowable Emissions provisions of 6 NYCRR Part 212-2.

The Department is aware that adjustment of the environmental rating may result in changes to applicability and compliance demonstrations, therefore, applicants are encouraged to be inclusive of all process sources and contaminants until such a time that source or contaminant is eliminated from the Part 212 analysis based on an exception or applicable emission standard as indicated in 6 NYCRR Part 212-1.4 and 6 NYCRR Part 212-1.5 respectively.

Response: *Micron will provide air dispersion modeling for individual VOC assigned an initial environmental rating of "B" or "C" in the forthcoming air dispersion modeling report.*

NOIA Comment G: *T-BACT:* At the time of permit application 2, inadequate information has been provided with regards to completing a Part 212 analysis for several contaminants. In completing a full analysis, the applicant will be required to conduct a residual risk assessment for non-carcinogens expressed as a hazard index in conjunction with conducting any Toxics Best Available Control Technology (T-BACT) analysis. This assessment would likely incorporate additional data from contaminants which otherwise would not be applicable to Part 212.

Response: *DAR-1 Section V.F indicates that a T-BACT analysis is required when the degree of air cleaning prescribed by §212-2.3(b) cannot be met. Micron will conduct a T-BACT analysis, including a residual risk assessment as appropriate, for contaminants where compliance with §212-2.3(b) cannot otherwise be demonstrated.*

NOIA Comment #104: The facility has not submitted modeling in support of the process emissions assessment required by 6 NYCRR Part 212. Air quality modeling is one of multiple requirements for establishing the "final" environmental rating as indicated by 6 NYCRR Part 212-1.3, and therefore should be completed for all HTACs which exceed the mass emission limit of Table 2 in 6 NYCRR Part 212-2.2 for the respective contaminant, exceed 100 lb/yr for any other non-criteria air pollutants, or where a combined analogous group's emissions exceed 100 lb/yr.

Response: *Micron will provide air dispersion modeling for individual VOC assigned an initial environmental rating of "B" or "C" as requested above to facilitate determination of the final ER. Micron has proposed air dispersion modeling for other compounds meeting the criteria discussed in this comment in its air dispersion modeling protocol.*

NOIA Comment #105: (Section 3.3.4.14, PDF page 66) The applicant has indicated that nitrous oxide would require a percent reduction of 90% from the fab CVD exhaust. The application submitted a T-BACT analysis to demonstrate "that the 60% incidental removal provided by the PEECs is representative of best available control technology". PEECs have been established as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork. ERP is established after a PEEC unit, therefore, the facility is proposing no control other than good operating practices. The T-BACT analysis submitted should be revised acknowledging no control is the proposed level of BACT. Further, this T-BACT analysis should be revised to incorporate all applicable part 212 contaminants to a hazard index.

Response: *Micron agrees that, given that PEECs are not control devices, the proposed T-BACT for N2O involves no permitted control technology. Based on the initial ER for each contaminant subject to Part 212, T-BACT is not required for any other contaminants, as compliance with §212-2.3(b) or another provision of Part 212 can be demonstrated.*

NOIA Comment #106: (Appendix D, PDF Page 194) The applicant indicates that emission sources "for semiconductor manufacturing operations consist of the group of process tools and supporting equipment that are vented to a common header, and that the emission rate potential (and therefore degree of air cleaning required) for process tools connected to a common header will be determined at the exhaust of the header into the control devices or to the atmosphere if uncontrolled." ERP is defined at 200.1(u) as "The maximum rate at which a specified air contaminant from an emission source would be emitted to the outdoor atmosphere in **the absence** of any control equipment" (emphasis added). ERPs will need to be established prior to controls that will provide exhaust to the header such as POUs and RCS. Further, ERPs will likely need to be established for a variety of parameters requiring verification such as each source type ducting into a common header where emissions will be verified against the application's control or consumption assumptions. Therefore, ERP is expected to be established directly after fab tools, prior to control or intermingling emissions in a header.

Response: *Micron agrees that ERP is established in the absence of any control equipment, and calculated ERP accordingly in Permit Application 2. However, the Department has agreed in Comment #15 that the collection of process tools of a certain type should be permitted as one process emission source. Each fab will have just two exhaust systems in which all emissions from tools of a certain type in each half of each*

fab will be collected into one point before being distributed across several emission points in parallel. Therefore, consistent with the logic in §212-1.5 (a) and (b), Micron has calculated ERP to be the total pre-control emission rate from all equipment exhausting to one header. Micron did not intend to imply that POU or RCS control would be accounted for in the calculation of ERP by stating it would be determined "at the exhaust of the header". Further, control and monitoring provisions should be determined based on, in part, by the ERP of a process emission sources.

NOIA Comment #107: (Section 1.4.4.1, PDF page 29) The applicant has indicated that emissions will be produced from a biological treatment building in an anerobic digester. This digester is considered a process source and should be included in the 6 NYCRR Part 212 evaluation.

Response: *Please refer to Permit Application 2, Appendix F, Table 1-3. The biological treatment building is considered a process emission source in Permit Application 2. The ERP of contaminants emitted from this process is listed in the "Bio General" column of Table 1-3 of Appendix F.*

NOIA Comment #108: (Section 1.4.1.1, PDF Page 24) How is it known that the "metal ions not deposited on a wafer will coat the inside of the tool prior to the tool being opened to remove the wafer(s)"? Please provide verification to support this claim since it's explained that there will be no emissions from the PVD process. The applicant should provide supporting documentation for this assertion which would be anticipated to be inclusive of test results performed on this tool at other Micron facilities.

Response: *The physical vapor deposition (PVD) process involves the "sputtering", or physical deposition, of target metal ions onto a wafer surface in a thin layer in high vacuum using a pump. Sputtering utilizes bombarding a target metal material with ions, which causes atoms to be ejected from the target and deposited onto a substrate, forming a thin film coating. The metal is deposited and not emitted to any extent. Therefore, Micron is not aware of emissions testing performed on this type of tool in the semiconductor industry based on metals staying in chamber.*

NOIA Comment #109: (Section 2.1.4, PDF Page 33) The emission factors for some of the solvents used in these processes are assigned a seemingly universal emission factor of 0.2. The chemical, 1-methoxy-2-propanol (PGME), is given as an example, where 0.2 lb emitted/lb used or 20% of PGME is expected to make it to the RCTO.

a. It is understood from the explanation in this section that up to 20% of this VOC will evaporate in the process tool and must be controlled by the POU device. The solvent exhaust fraction is not understood. The non-evaporated fractions are assumed to be in the liquid phase, because of the role of some of these chemicals being used as solvents in the spin coating or as described 'Rinse Solvents'. By design these chemicals are used as thinning agents that when combined with the mechanical parameters programmed into the spin process direct the thickness of the resultant layer afforded by the rapid and uniform evaporation of select solvents. Are these evaporation events and related emission factors inherent to the chemicals used or process parameters?
b. Given PGME and trimethylbenzenes (TMB) are not incorporated into the deposited dielectric material (i.e. not polymerized in the photolithography processes) a large solvent fraction is expected whether recovered or in the vapor phase in process specific exhausts. Are these fractions collected as organic waste?

c. Why does Table 30-3 represent the emissions of trimethylbenzenes in two distinct isomeric forms (1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene) a bifurcation of the emissions for 1,2,4-trimethylbenzene reported in the process emissions summary Table 7-1?
   i. i. 1,2,4-trimethylbenzene (CAS# 95-63-6)
   ii. ii. 1,3,5-trimethylbenzene (CAS# 108-67-8)
   iii. iii. Is there a more accurate CAS number for these TMBs or mixtures thereof?

Response:

a. *The solvents used in the photolithography process are, as noted in the comment, applied to a spinning wafer to control the thickness of the solvent layer. The majority of the solvent used in these process tools is collected and drained and will either be managed as waste or treated in downstream wastewater treatment processes. The assumption that 20% of some of these solvents will evaporate into the exhaust system is conservative, as less than 20% of the photoresist stays on the wafer and the rinsing solvent immediately is drained from wafer to collection. More than 80% of each solvent used is expected to be managed as waste or treated as a constituent of wastewater. Lower emission factors are used for solvents with very low vapor pressures, such that the emission factors are related to both chemical properties and process mechanisms. Micron would like to clarify that POU devices are not used in conjunction with photolithography tools.*
b. *PGME and TMB are collected as organic waste.*
c. *Micron will revise Table 30-3 to combine the isomeric forms of trimethylbenzene.*

NOIA Comment #110: (Appendix F, Table 1-3) Air quality modeling is one of multiple requirements for establishing the "final" environmental rating as indicated by 6 NYCRR Part 212-1.3, and therefore should be completed for all HTACs which exceed the mass emission limit of Table 2 in 6 NYCRR Part 212-2.2 for the respective contaminant, exceed 100 lb/yr for any other non-criteria air pollutants, or where a combined analogous group's emissions exceed 100 lb/yr . This exercise of determining environmental ratings is separate from the compliance demonstration of satisfying the tables in 6 NYCRR Part 212-2.3. The environmental rating is then utilized in determining applicability of emission standards and determining the degree of air cleaning required. Given this facility's complex intermingling compliance options including T-BACT and LAER, the applicant must first model each contaminant which may be required to comply with 6 NYCRR Part 212 and which an adjustment to the environmental rating significantly changes compliance requirements. Compliance with or factor exceeding the applicable AGC and/or SGC will inform the Department's final environmental rating, and ultimately the compliance demonstration required.

The following contaminants should be modeled in assistance of determining a final environmental rating:

CAS #	Chemical Name
288-88-0	1,2,4-Triazole
[redacted]	[redacted]
872-50-4	1-Methyl-2-pyrrolidone
[redacted]	[redacted]
108-11-2	4-Methylpentan-2-ol
1344-28-1	Aluminum oxide
1303-86-2	Boron trioxide
7726-95-6	Bromine
108-94-1	Cyclohexanone
109-89-7	Diethylamine
97-64-3	Ethyl lactate

7782-41-4	Fluorine
[redacted]	[redacted]
999-97-3	Hexamethyldisilazane
10035-10-6	Hydrogen bromide
7722-84-1	Hydrogen peroxide
67-63-0	Isopropanol
79-41-4	Methacrylic Acid
123-86-4	n-Butyl acetate
7697-37-2	Nitric acid
7783-54-2	Nitrogen trifluoride
10024-97-2	Nitrous oxide
10028-15-6	Ozone
7664-38-2	Phosphoric acid
1314-56-3	Phosphorus pentoxide
7631-86-9	Silicon dioxide
64742-94-5	Solvent naphtha (petroleum), heavy arom.
7446-09-5	Sulfur dioxide
75-73-0	Tetrafluoromethane
[redacted]	[redacted]
75-59-2	Tetramethylammonium hydroxide
13463-67-7	Titanium dioxide
1314-35-8	Tungsten trioxide
1314-23-4	Zirconium oxide
7783-06-4	Hydrogen sulfide
[redacted]	[redacted]
	1-Methoxy-2-propanol Group
107-98-2	1-Methoxy-2-propanol
108-65-6	2-Methoxy-1-methylethyl acetate
[redacted]	[redacted]
52125-53-8	Propanol, 1(or 2)-ethoxy-
	Acetic Acid Group
64-19-7	Acetic Acid
[redacted]	[redacted]
	Ammonia Group
7664-41-7	Ammonia
74-86-2	Acetylene
[redacted]	[redacted]
687-47-8	Ethyl (S)-2-Hydroxypropionate
2110-78-3	Methyl 2-Hydroxy-2-Methylpropionate
[redacted]	[redacted]
	Difluoromethane Group
75-10-5	Difluoromethane
593-53-3	Fluoromethane
46-7	Trifluoromethane
	[redacted]

[redacted]	[redacted]
	Hexafluoroethane Group
76-16-4	Hexafluoroethane
115-25-3	Octafluorocyclobutane
	Sulfuric Acid Group
7664-93-9	Sulfuric acid
3144-16-9	2-Oxobornane-10-Sulphonic Acid
	Silane Group
7803-62-5	Silane
[redacted]	[redacted]
1590-87-0	Disilane
[redacted]	[redacted]
	Triethylamine Group
121-44-8	Triethylamine
[redacted]	[redacted]
[redacted]	[redacted]
929-06-6	2-(2-aminoethoxy)ethanol
[redacted]	[redacted]
107-21-1	Ethanediol
[redacted]	[redacted]
	Trimethylbenzene Group
95-63-6	1,2,4-Trimethylbenzene
108-67-8	1,3,5-Trimethylbenzene

Response: *Micron will perform air dispersion modeling for each of the compounds listed in the comment using the unit modeling approach discussed with and approved by the NYSDEC. An air dispersion modeling report will be prepared once the NYSDEC approves the air dispersion modeling protocol.*

NOIA Comment #111: The Department is aware of several contaminants which would not be expected to meet the emission reduction requirements of Table 3 or Table 4 of Part 212 or would be expected to meet the degree of air cleaning required but may still have off site air concentrations which are greater than the acceptable risk management range. These situations would normally trigger a T-BACT analysis. The Department recognizes that the application of VOC LAER will generally be accepted as T-BACT, however, the technology-based assessment of LAER does not necessarily consider the inhalation health risk otherwise evaluated under T-BACT. In support of this inhalation health risk assessment, please produce a Hazard Quotient (HQ) for each contaminant utilizing the modeling results of all the above contaminants and associated AGC/SGC value. These Hazard Quotients should be completed with duration specific values for both acute and long-term exposure. The applicant should be aware that emission reductions may be required when a Hazard Quotient or Hazard Index (HI) determines that the Residual Risk is unacceptable.

Response: *DAR-1 Section V.F indicates that a T-BACT analysis is required when the degree of air cleaning prescribed by §212-2.3(b) cannot be met. Following the Department's determination of final environmental ratings, Micron will reevaluate compliance with §212-2.3(b) and conduct a T-BACT analysis for contaminants where compliance with §212-2.3(b) cannot otherwise be demonstrated.*

NOIA Comment #112: (Appendix S, PDF Page 623) The applicant has identified PFAS compounds that will be utilized directly in the manufacturing of chips in addition to HTFs which are expected to be utilized as indirect fabrication support. Although HTFs are not expected to undergo a chemical, biological, or physical change, these compounds are expected to be captured, conveyed, and emitted from permitted emission points primarily via equipment leaks and ducting through general cleanroom exhaust. The applicant must quantify emissions that will be captured, conveyed, and emitted and demonstrate compliance with the applicable sections of 6 NYCRR Part 212. In the interest of expediency, the Department recommends conducting air quality modeling of these compounds from the building general exhaust for comparison with the applicable AGC/SGC, though further evaluation with regards to a other similar sources, T-BACT, or Hazard Index would be expected pending emissions estimates.

Response: *The closed-loop systems in which HTFs will be contained will not be "equipped with a vent" themselves. Therefore, these systems do not meet the definition of process operation in §212-1.2(b)(18). There will be no dedicated system to "capture" or "convey" HTFs before they are emitted, rather they will be passively emitted through the general exhaust along with cleanroom air. The general exhaust also does not qualify as a "vent" to which a process operation is equipped, as an exhaust and/or ventilation system "removes air contaminants from a process and transports them from their point of generation" per §200.1(z). The general exhaust will not remove air contaminants from any process and will not even be located near their point of generation.*

Appendix T: Stack Testing Plan

NOIA Comment H: It is commonplace to test for contaminants of concern or before and after control devices to determine compliance with applicable control efficiency requirements specified by regulation, which in this case will most likely be 40 CFR 63 BBBBB and 6 NYCRR 212. Emissions concentrations may be below detection limits at stack outlets, but most likely will not be below detection limits at the inlet sampling locations. There are test methods available to test for many of the key HAPs emitted from the facility, for example hydrogen fluoride (Method 26A). Micron must propose testing methods that will allow for determining emissions rates of speciated VOC HAPs to the extent practicable. These actual emissions rates will verify the accuracy of emissions calculations assumptions used in the application and emissions rates used as dispersion modeling inputs. Since Micron states its process is always evolving and tools and materials are expected to be changed out regularly, the site will need to test for HAP emissions initially and on a regular basis in addition to other contaminants as deemed acceptable to DEC.

Response: *40 CFR 63 Subpart BBBBB, as an alternative to percent reduction requirements, regulates concentrations of organic and inorganic HAP at stack outlets, not at any other point upstream. Micron acknowledges that stack testing to some extent is appropriate to validate the emission factors used in Permit Application 2 and has proposed a practicable plan of testing representative compounds from representative stacks for that purpose.*

NOIA Comment #113: (Appendix T, PDF page 626) The applicant has produced a stack test plan in response to a number of Department comments outlined in the NOIA and Technical Comments dated June 3, 2024, and July 19, 2024, respectively. The Department recognizes that this plan is not inclusive of the items which are expected in a test protocol, however, based on the current submission, the Department expects additional testing would need to take place beyond the testing already proposed. If the applicant would like to propose specific methodology for testing or further refine their stack test plan, a revision should be submitted, however, the department believes additional testing may be required for:

a. Contaminants required to meet percent reduction standards inclusive of inlet and outlet testing
b. Contaminants which will have a cap or limit applied
c. For each fab or section of fab which the Department does not deem representative of a previously tested section
d. Equipment which has not been granted a vendor guarantee for contaminant control
e. Confirming initial modeling assumptions or parameters

Response: *Micron has considered the Department's guidelines for when testing is expected and will propose a permit condition to expand on the testing plan proposed in Permit Application 2.*

NOIA Comment #114: (Appendix T, PDF page 626) The applicant is encouraged to ensure adequate sampling locations meeting the requirements of 40 CFR 60 Appendix A are installed during construction of the site.

Response: *Micron agrees with this comment.*

Air Quality Modeling Protocol

NOIA Comment #115: It has been noted that several comments which were raised in DEC's Air Title V Permit Application Technical Comments letter, dated July 19, 2024, have not been addressed in the revised Modeling Protocol. Previously unaddressed comments and all new comments must be addressed to DEC's satisfaction before final modeling protocol approval will be granted.

Response: *All NOIA Comments have been addressed below and will be incorporated into the modeling report.*

NOIA Comment #116: The facility has asserted that the exhaust from process tools will be routed to a common header then distributed from the header to multiple similar control devices along the length of the header. Each exhaust type will therefore have dozens of individual stacks at each Fab 1 and Fab 2. The organization of this ducting plan was clarified verbally by the applicant but remains unclear in the application and addendum documentation. The facility must submit an example schematic clearly illustrating this layout and provide a discussion on control equipment operation which clarifies how units in parallel and utilizing redundancy will be modeled to ensure a worst-case operations scenario is represented.

Response: *A process flow diagram will be provided with the modeling report.*

NOIA Comment #117: (Modeling Protocol, Figure 2-2, PDF Page 12) This figure should include the location of Micron facility in relation to the Rochester monitor and other facilities.

Response: *An updated figure including the location of the Micron facility in relation to the Rochester monitor and other facilities will be provided with the modeling report.*

NOIA Comment #118: (Modeling Protocol, Figure 2-4, PDF Page 14) This figure should mark the names and locations of 3 facilities proposed to be included in cumulative modeling demonstration (section 5.1.2.3 of the protocol)

Response: *An updated figure with the names and locations of the three facilities proposed to be included in the modeling demonstration will be provided with the modeling report.*

NOIA Comment #119: (Modeling Protocol, Section 5.1.1.2, PDF Page 35) Merged stacks: The applicant has proposed merging stacks for CVD and generator sources. The facility plot plan does not support that these stacks are within one stack diameter of each other. Please provide calculations/formulas and diagrams used to justify merged stack parameters for modeling purposes.

Response: *Calculations and formulas, as shown below for deriving the modeled parameters for merged plumes will be provided with the modeling report. The stack diameters in the facility plot plan are not drawn to scale and cannot provide the resolution to determine if the stacks are within one stack diameter of each other, such that the plumes can be merged for an air dispersion modeling demonstration. Micron has provided stack locations and diameters in the previously submitted modeling protocol that should provide enough supporting information that the stacks will be within one stack diameter of each other.*

For each group of merged plumes, the heights and exhaust temperatures of each individual stack in the group are identical, and therefore, the representative merged plume will have the same height and exhaust temperature. The equivalent stack diameter is calculated using the following formula:

$$D_{equiv} = 2 \times \sqrt{\frac{\sum Stack\ Area}{\pi}}$$

For each group of merged plumes, the exit velocities of each individual stack in the group are identical. The exit velocity of the merged plume is determined by dividing the combined airflow from the individual stacks by the cross-sectional area using the equivalent stack diameter. Although the merged plume will have a higher airflow compared to each individual stack, since each stack has the same airflow and the exit velocity is calculated using the cross-sectional area of the merged plume based on the equivalent diameter, the exit velocity of the merged plume will match the exit velocity of the individual stacks.

These formulas will be included in the modeling protocol.

NOIA Comment #120: (Modeling Protocol, Table 5-1, PDF Page 36) The applicant appears to summarize 838 individual emission sources and condense their stack parameter information into 28 source 'types'. The applicant should ensure that this is consistent with the application and is an accurate representation of what is present at the facility. For example, the emission point information for the engines provided in Appendix A, Table A-1 of the application show conflicting information than what is provided in Table 5-1 and Appendix D of the modeling protocol. In the application, the EPs 1U056-1U060 and 2U056-2U060 has a height of 27.5 ft, 1U061 and 1U062 and 2U061 and 2U062 has a height of 11.3 ft, and 1U063-1U065 and 2U063-2U065 has a height of 124 ft, whereas the stack height of all the engines in the modeling protocol is 21.03 m (69 ft). Similarly, indicate whether all grouped sources have identical stack parameters. For example, the applicant indicates engines housed in separate buildings on opposites sides of the campus will have identical stack elevation and heights.

Response: *In Appendix D of the modeling protocol, EPs 1U056-1U060 and 2U056-2U060 (F1GEN_49 – F1GEN_52, F2GEN_49 – F2GEN_52 in the modeling protocol) are described as Engine Exhaust Stacks in the HPM building. In Table 5-1, HPM Engine Exhaust Stacks are listed with a stack height of 8.38 m (27.5 ft).*

In Appendix D, EPs 1U061, 1U062, 2U061, and 2U062 (F1GEN_54, F1GEN_55, F2GEN_54, F2GEN_55 in the modeling protocol) are described as Engine Exhaust Stacks in the Gas Yard. In Table 5-1, Gas Yard Engine Exhaust Stacks are listed with a stack height of 3.45 m (11.3 ft).

In Appendix D, EPs 1U063 – 1U065 and 2U063 – 2U065 (F1GEN_56 – F1GEN_58, F2GEN_56 – F2GEN_58 in the modeling protocol) are described as Engine Exhaust Stacks in the Probe building. In Table 5-1, Probe Engine Exhaust Stacks are listed with a stack height of 37.80 m (124 ft.)

All sources that are part of a source type and building will have the same exact stack parameters. For example, all acid exhaust fan stacks that are located on the fab building will have the same stack parameters, regardless of at which fab the stacks are located.

NOIA Comment #121: (Modeling Protocol, Figure 4-4, PDF Page 30) The updated protocol states that Micron anticipates that all of the Micron Campus will be owned and controlled by Micron by the time of the operation of the Proposed Air Permit Project." Micron should clearly indicate on Figure 4-4 whether the property boundary shown represents the future anticipated boundary, or the current ambient boundary.

Response: *Figure 4-4 represents the future anticipated boundary of the Micron Campus.*

NOIA Comment #122: (Modeling Protocol, Section 4.6, PDF Page 32) Modeling Protocol section 4.6 should include a table or a list of all buildings/ structures at the facility, their corner locations, number of tiers and tier heights to be included in modeling. Adequate detail needs to be presented to allow the Department to clearly understand differences in building heights and any parameter expected to impact air quality modeling results.

Response: *Tables providing building information will be included in the modeling report.*

NOIA Comment #123: (Modeling Protocol, Section 5.2, Tables 5-3 through 5-6, PDF Page 41) Section 5.2 of the updated Air Dispersion Modeling Protocol presents modeled emission rates of NOx, PM10, PM2.5, and CO. It appears the emission rates presented in the updated Air Dispersion Modeling Protocol do not match the emission rates provided in the Application 2 submittal. This inconsistency should be corrected. The applicant should produce an additional section of Appendix F that details the derivation of these modeled emission rates for NYSDEC review.

Response: *Micron has compared emission rates in Section 5.2 and the emission rates provided in Application 2 and has identified one inconsistency where the modeled emission rate for CVD stacks was greater than the CVD emission rates listed in Application 2. This will be updated in the modeling report.*

NOIA Comment #124: (Modeling protocol Section 4.5.1 The applicant indicates that there are no sensitive receptors within 3 km of the Micron campus center. This is incorrect. The following sensitive receptors are located within 3 km of the Micron campus center and should be included as sensitive receptors in modeling:

a. The Cottages at Garden Grove: a skilled nursing home facility (borders eastside of Micron property)
b. Midstate Athletic Community Center: a youth sports complex (380 meters east)
c. Northern Onondaga Public Library with a garden onsite (820 meters east)
d. Cicero Senior Living Facility (850 meters east)
e. North Syracuse Central Schools (2,500 meters east)

Response: *These sensitive receptors will be included in the modeling demonstrations submitted with the modeling report.*

NOIA Comment #125: (Modeling Protocol, Section 5.1.1.1, PDF Page 34) The applicant quoted EPA's guidance document to justify modeling the 1-hour NO2 impacts from intermittent sources (emergency generators) based on an average hourly rate rather than the maximum hourly rate. A similar approach was proposed for the modeling of 24-hr PM10 and PM2.5 from the emergency generators. While the Department agrees this is sometimes an appropriate modeling methodology, DEC will need to review detailed information for each of the proposed emergency engines to make this determination. Currently there is not nearly enough information for the Department to confirm this is a representative proposal. The applicant must discuss the preferred methodology and receive Department approval prior to utilization in the final protocol.

Response: *As discussed with the NYSDEC on June 2, 2025, Micron will model maintenance and readiness testing operations for 1-hour NO_2. Since the modeling demonstration is meant to demonstrate the worst-case, but also realistic operating scenarios, and historically in the last five years, there has not been any blackouts that would have triggered an emergency situation that would require all emergency generators at the facility to operate at the same time, the NYSDEC has agreed that the 1-hour NO_2 should model the scenario that includes emissions from process operations and a subset of generators that would be operating due to maintenance and readiness testing. Micron will also provide a separate set of modeling files to demonstrate to a reasonable degree of confidence that the subset of generators selected for the final cumulative modeling demonstration represents the worst-case subset of all the generators at the facility that would operate in a 1-hour period for maintenance and readiness testing purposes.*

These modeling files will be included with the modeling report submission.

NOIA Comment #126: (Modeling Protocol, Section 5.3, PDF Page 49) The applicant should clearly state which model/software the applicant is proposing for their screening step. If Lakes Environmental Multi-Chem is proposed, DEC will accept it as a screening tool and a first step in the modeling process for Part 212 contaminants. NYSDEC will determine the pollutants which require a refined AERMOD analysis. The applicant must submit the final modeling results, report and electronic modeling files performed using the official EPA AERMOD version.

Response: *As discussed with the NYSDEC on June 2, 2025, Micron will proceed with the unitized emission rate modeling methodology using AERMOD to initially derive modeled concentrations for the Part 212 contaminants. This approach provides a conservatively high estimate of concentrations because it assumes*

that impacts from all modeled sources occur at the same time and location. If a contaminant's derived modeled concentration is greater than its respective AGC/SGC in this initial step, Micron will model that contaminant separately using pollutant-specific emission rates in AERMOD to demonstrate compliance.

In addition, the NYSDEC will provide a list of contaminants that will be modeled separately from the unitized emission rate modeling demonstration, using pollutant-specific emission rates in AERMOD. Micron will provide AERMOD input and output files for both the unitized emission rate modeling demonstration and the pollutant-specific emission rate modeling demonstrations, along with the Excel workbook that will be used to derive modeled concentrations from the unitized emission rate modeling methodology in the submittal with the modeling report.