NEW YORK STATE | Department of Environmental Conservation

KATHY HOCHUL
Governor

AMANDA LEFTON
Acting Commissioner

April 30, 2025

Scott Gatzemeier
Micron Technology Inc.
8000 S Federal Way
Boise, ID 83716

RE: Notice of Incomplete Application-Air Title V Permit Application
Micron New York Semiconductor Manufacturing, LLC.
Location: White Pine Commerce Park, T-Clay, Onondaga County
DEC ID: 7-3124-00575/00004

Dear Scott Gatzemeier,

The New York State Department of Environmental Conservation (DEC) reviewed the Micron Air Title V permit application submitted by Trinity Consultants, dated March 10, 2025. Based upon the initial review of the submitted information, DEC determined the application to be incomplete (6 NYCRR Part 621.6(e)), and the following items are required, unless DEC otherwise determines based on additional information that that such requirements are unnecessary.

To meet Micron's construction timeframes, the DEC requests that Trinity Consultants respond within **30-days**. DEC is available to discuss the identified requirements at Trinity Consultant's earliest convenience.

General Comments

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

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.
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.
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.
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.
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.
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.

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.
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.
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.
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).
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.

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.
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.
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.
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.
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.

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

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.

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.
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.

Appendix D: Operational Flexibility Protocol

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.

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.

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.
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).
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.
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. Pleaser revise this section to indicate that the results of any such modeling will be provided as part of the required advance notification.
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.
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.
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".

Appendix H – N: RACT/BACT/LAER Analyses

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.

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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.
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.
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.
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.
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.”
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.

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.
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.
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.
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.
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.

Appendix H

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.
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.
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.
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

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.
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.
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.

Appendix J

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

Appendix K

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.

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.
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.
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.
58. (Appendix K, Section 1.6.5, PDF Page 396) The applicant should indicate what the removal efficiency is for the mist eliminators
59. (Appendix K, Attachment 4, PDF Page 404) The BACT Economic Feasibility Evaluation is missing.

Appendix L

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.
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.
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.
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.
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.

Appendix M

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.
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.

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.
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.
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.
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.
71. (Appendix M, Section 1.3.2, PDF Page 535) Reference to CO is incorrect as this appendix is related to VOC.
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
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.
74. (Appendix M, Section 1.5.1, PDF Page 538) The reference to BACT should be replaced with LAER
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.
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.”
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.
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.
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.

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.

Appendix F: Emission Calculations

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.
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".
83. (Appendix F, Table 1-3) Tetrafluoromethane (CAS# 75-73-0): AGC is 330 µg/m3, not 300 µg/m3.
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.
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.
86. (Appendix F, Table 1-3) Carbon dioxide (CAS# 124-38-9) should have an environmental rating of "B*", not "D".
87. (Appendix F, Table 1-3) 4-methylpentan-2-ol (CAS# 108-11-2) does not have any ERP associated with it.
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.
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 "-".
90. (Appendix F, Table 1-3) Methacrylic acid (CAS# 79-41-4): In the "SGC" column, replace "Not in DAR-1" with "–".
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.
92. (Appendix F, Table 1-3) [redacted] In the "AGC" and "SGC" columns, replace "Not in DAR-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.
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
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.

95. (Appendix F, Table 1-4) Add [redacted] to 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.
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).
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.
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?
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.
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.
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.
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.

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.

Air Toxics

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.

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.

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.

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.

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.

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.
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.
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.

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.
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.
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. 1,2,4-trimethylbenzene (CAS# 95-63-6)
        ii. 1,3,5-trimethylbenzene (CAS# 108-67-8)

iii. Is there a more accurate CAS number for these TMBs or mixtures thereof?

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]
[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

75-46-7	Trifluoromethane
[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]	
1590-87-0	Disilane
[redacted]	
Triethylamine Group	
121-44-8	Triethylamine
[redacted]	
929-06-6	2-(2-aminoethoxy)ethanol
[redacted]	
107-21-1	Ethanediol
[redacted]	
Trimethylbenzene Group	
95-63-6	1,2,4-Trimethylbenzene
108-67-8	1,3,5-Trimethylbenzene

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.

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.

Appendix T: Stack Testing Plan

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.

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

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.

Air Quality Modeling Protocol

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.
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.
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.
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)
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.
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.
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.

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.
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.
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)
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.
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.

CLCPA

127. The CLCPA analysis for this project is currently being reviewed as part of the Environmental Impact Study required for SEQRA/NEPA compliance. Please see detailed comments provided on the draft CLCPA analysis for further information. Please provide a revised CLCPA analysis that addresses those comments. To the extent any information

that may be needed for this application is not included in that revised analysis, the Department will follow up with an additional request for information as needed.

If you have any technical questions, please contact DEC's Robert Jacobs, P.E., at 315-426-7420. If you have any questions on the administration of the permit application, please contact DEC's Kevin Balduzzi at 315-426-7493. Please be advised that the application will remain incomplete until DEC receives all the requested information.

Sincerely,

Kevin M. Balduzzi
Regional Permit Administrator
Division of Environmental Permits

ECC. Dereth Glance, DEC Region 7 Director
Thomas Berkman, DEC General Counsel and Deputy Commissioner
Robert Jacobs, P.E., DEC Region 7
Margaret LaFarr, P.E., DEC Division of Air Director
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