December 17, 2025

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Regional Permit Administrator
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Submitted via email to: Comments.Micron2025@dec.ny.gov

Re: Comments on Draft State Air Permit for Micron. Permit ID: 7-3124-00575/00004

Dear Department of Environmental Conservation,

On behalf of CHIPS Communities United (CCU) and the Center for Public Environmental Oversight (CPEO), we respectfully submit the following comments to the New York State Department of Environmental Conservation (NYSDEC) on the Draft State Air Permit for Micron, Permit ID: 7-3124-00575/00004.

CCU is a national coalition organizing for an equitable and sustainable semiconductor manufacturing industry. CCU includes labor, environmental, social justice, civil rights, and community organizations representing millions of workers and community members nationwide. Based in Silicon Valley, CPEO experts have been working to clean up the semiconductor industry since the 1970s.

Key recommendations are made in **bold** and in list form.

1) The draft air permit is premature

The public was informed on November 8th that construction and operation of Micron's memory chip factories would be delayed by two to three years. The start of construction of the first plant has been pushed back to the middle of 2026, with operations starting towards the end of 2030. Therefore, we see no need to rush to permit these facilities.

The air permit application was submitted in March 2025 by Trinity Consultants. They identified the following schedule as critical to receipt of final Title V Air Permit:

> March 2026: Micron [to] initiate installation of underground utilities for Fab 1 pending receipt of final Title V Air Permit.[1]

However, installation of underground utilities for Fab 1 has been pushed back to mid-2027[2], a delay of over a year. The first factory, Fab 1, is now slated to begin operating until the latter half of 2030, over two years delayed from the schedule provided in the March 2025 permit application, and in the draft EIS released on June 25, 2025.

Technologies to treat and monitor air pollutants – especially fluorinated gases – continue to improve, meaning the permit has the potential to be out-of-date by the time it goes into effect in 2030.

In addition, the Semiconductor Industry Association (SIA), which includes Micron as a member, continues to investigate the use of non-fluorinated compounds for heat transfer, etching and other applications. The substitution of other compounds would materially affect the air permit.

The technologies used to produce computer chips evolve at a rapid pace. As noted by Trinity Consultants on p. 2-1 of the March 2025 permit application:

> the nature of Micron's business requires rapidly-changing product mix, architecture, and functionality to meet customer needs. *The nature and rapid pace of constant technological change affects the type, number, and configuration of semiconductor process tools required to fabricate devices. The need for this flexibility extends to use of raw materials, process gases, etc.* The process categories and exhaust types planned for the fabs described in this application represent typical industry operations and are not expected to change substantially. However, the *specific operations, equipment, and materials to be used in each process category have the potential to change throughout the remainder of detailed design and operation of the fabs to keep pace with evolving technology*. Many materials that are commonly used in the industry will remain the same. However, evolution of technology may result in the requirement to use different materials and/or change the total quantity of materials projected to be used. Therefore, Micron cannot predict the exact identity and quantity of materials that will be used in the semiconductor manufacturing process operations in Fab 2 and recognizes that the projected material use inventory for Fab 1 may change prior to commencement of operation.[3] *(emphasis added)*

The delayed schedule for building and operating Fabs 1 and 2 makes it that much more likely that equipment and chemicals used in those factories will change.

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[1] Micron New York Semiconductor Manufacturing, LLC, Clay, NY PSD/NNSR Air Permit Application 2 for the Proposed Air Permit Project NON-CONFIDENTIAL VERSION. March 2025. Trinity Consultants. P. 1-11.
[2] FEIS, Table B-17, p. B-26
[3] Micron New York Semiconductor Manufacturing, LLC, Clay, NY PSD/NNSR Air Permit Application 2 for the Proposed Air Permit Project NON-CONFIDENTIAL VERSION. March 2025. Trinity Consultants. P. 2-1.

For all of these reasons, we urge DEC to **suspend the Title V Air Permit process until mid-2027**, which is still three years before the facility will go into operation. This will enable the Applicant to amend the permit application with updated process and chemical information, and for the Department to make revisions to the permit in keeping with those changes.

2) Extend the comment period and hold public information sessions

If DEC insists on proceeding with the permit process now, then at a very minimum the permit comment period should be extended well into 2026, accompanied by public information sessions.

The NYS Department of Environmental Conservation has an obligation to serve the public, and to meaningfully solicit public input on projects which materially affect the environment. The immense Micron project, with its many facets, demands such meaningful engagement. Yet the agency has failed to engage the public at all. A notice was posted in the ENB on November 5, 2025. No informational sessions were offered. Instead the public was given two on-line sessions on Dec, 9th and 10th, 2025, to make a statement. The only visible face during these sessions was that of the Administrative Law Judge, Craig Pettinger. The names of those in the audience were not shown. No substantive information was provided at the beginning of the hearing. This is the antithesis of public engagement.

DEC has set 5pm December 17, 2025, as the end of the comment period, only 42 days after it started. The permit is 347 pages long; the application is 824 pages. How do you expect the public to meaningfully interpret and comment on this material, much of which is highly technical? It is not reasonable to put this burden on the public, especially during the holiday season when folks are pre-occupied with family, end-of-year deadlines, and festivities.

If DEC insists on proceeding with the permit process now, to address these concerns, we request DEC to:

- At a very minimum, extend the permit comment period well into 2026.
- Engage with environmental and other interested groups in the community to explain what air monitoring is planned to obtain data at baseline, during construction, and during operations of Fab 1 and Fab 2.
- Make this data public and open to interpretation and discussion with the community.

3) Risk Management Plans (RMPs) for Hazardous Air Pollutants (HAPs)

Item 17.1[4] describes the regulations requiring Risk Management Plans for hazardous gases exceeding EPA/NY storage thresholds. We recommend that DEC require Micron to list all hazardous chemicals used on the Micron facility. As a matter of best safety practice, Micron should be required to write RMPs for hazardous substances based on lower storage/use thresholds. In particular, we recommend the application of California's thresholds for hazardous chemicals which are given at the following link: https://govt.westlaw.com/calregs/Document/IC187A010E14811EEA00AACD3D3AE5397?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default).

These include:

- Arsine, 100 lbs
- Ammonia, 500 lbs
- Hydrogen Chloride (gas), 500 lbs
- Hydrogen Fluoride (gas), 100 lbs
- Boron trichloride, 500 lbs

The RMPs should be made available to workers at Micron, and publicly available at local libraries and on-line.

In summary, we recommend DEC:

- Require Micron to list all hazardous chemicals used on the Micron facility.
- Require Micron to write RMPs for hazardous substances based on lower storage/use thresholds.
- Recommend DEC use the more protective limitations of California's thresholds for hazardous chemicals
- Make the RMPs available to workers at Micron, and to the public at local libraries and online.

4) Need for on-site environmental monitors

Item 32.2[5] suggests that environmental monitoring personnel might be required "where the compliance history or past practices of the regulated entity over the

[4] Draft State Air Permit for Micron. Permit ID: 7-3124-00575/00004, P. 19. Available at: https://assets.micron.com/adobe/assets/urn:aaid:aem:7bf1b396-b8b7-44f5-9b45-9a0d7e3b1d42/renditions/original/as/micron-ny-draft-atv-air-permit.pdf
[5] Ibid, p. 37.

past period of five years reveals an inability or unwillingness to comply with environmental laws and regulations…" There is no reason to wait for five years of non-compliance to consider using an environmental monitor.

Commissioner Policy 64[6] states that "It is the policy of the Department to require environmental monitoring only in those instances where circumstances warrant an added level of oversight." One of the triggers for monitoring is:

> …the regulated facility, site or regulated activity needs additional oversight due to exceptional circumstances relating to its size, throughput, material handled or location (such as proximity to human use or habitation, to drinking water supplies, to critical or sole source aquifers, to endangered species, to other sensitive receptors or to environmental justice areas) or relating to the nature of its operations.[7]

Certainly the Micron facility, covering a campus of over 1,000 acres, in close proximity to homes, and habitat with endangered bats and threatened birds, and which will be storing, handling and using hundreds of tons of hazardous chemicals per week, meets this definition. Thus the permit condition should be revised to **require environmental monitors—probably a team of them—to ensure compliance with the air pollution permit as well as other permits.**

5) Heat Transfer Fluids (HTFs)

We also want to highlight concerns related to heat transfer fluids (HTFs). Industry documents suggest that those used in chip production are all PFAS.[8] These chemicals are discussed throughout the FEIS and draft permit, and they deserve careful and transparent treatment because they contribute significantly to greenhouse gas emissions and raise broader PFAS-related concerns.

The FEIS shows that HTFs are a major source of greenhouse gas emissions from the proposed project. Tables 3.7-10 and 3.7-11 estimate HTF emissions at roughly 200,000 metric tons of CO_2-equivalent per year, using both 20-year and 100-year climate metrics. These emissions come from leaks and losses in chillers, transfer lines, valves, and other equipment used to keep manufacturing tools from overheating. At this scale, HTFs are not a minor issue — they are a meaningful part of the project's overall climate footprint.

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[6] New York State Department of Environmental Conservation (NYSDEC), *Commissioner Policy CP-64: Environmental Justice and Permitting* (2003), p. 1. Available at https://extapps.dec.ny.gov/docs/administration_pdf/cp64.pdf
[7] Ibid, p. 2.
[8] Semiconductor Industry Association (SIA), "PFAS-Containing Heat Transfer Fluids Used in Semiconductor Manufacturing." (July 26, 2023), prepared by the Semiconductor PFAS Consortium Heat Transfer and Thermal Test Fluid Working.

HTFs are fluorinated chemicals used to control equipment temperature. Research shows that these chemicals follow two primary pathways once released.[9] Some PFAS-based HTFs do not readily break down and persist in the upper atmosphere, where they function as powerful greenhouse gases with very high global warming potential (GWP). Other PFAS-based HTFs do break down in the atmosphere, but their degradation leads to the formation of trifluoroacetic acid (TFA), a highly persistent compound that is now widely found in water and other parts of the environment.[10] It is estimated that TFA "have the longest atmospheric lifetime of any of the greenhouse gases, up to 50,000 years," far longer than civilization has existed.[11] In other words, HTF emissions result either in direct long-term climate-warming impact or in the creation of a highly persistent and toxic environmental contaminant. These powerful greenhouse gases and their breakdown products can drive long-term climate impacts that are not fully reflected in short-term climate measures.[12] Even though HTFs are not classified as hazardous air pollutants, the climate and persistence concerns that result from the breakdown of these chemicals are dangerous and should be taken seriously in the permit.

Given the size of the projected emissions, robust monitoring of HTF losses is necessary. The FEIS and BACT analysis describe Micron's proposed approach, which includes tracking HTF use at the equipment level, alarms when losses are abnormal, and review of usage records. What is less clear is how this information will be used for regulatory oversight. The draft permit does not clearly explain how monitoring data will be reviewed by the Department, how often it will be reported, or whether the public will have access to this information. More clarity is needed so it is clear how monitoring will help identify problems and drive corrective action.

The permit relies heavily on emissions modeling based on projected use of HTFs, with actual emissions tracked later through recordkeeping and semiannual reports. If actual emissions exceed the modeled values, updated modeling is required. What remains unclear is how real-world emissions data will be used before exceedances occur. In particular, the permit does not explain whether emissions data collected during normal operations will be used to revisit assumptions, strengthen mitigation measures, or adjust permit conditions over time. We are asking for clarity on how

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[9] Accelsius, *PFAS White Paper* (Feb. 2024), https://accelsius.com/wp-content/uploads/PFAS-Whitepaper-Feb_2024.pdf.

[10] Arp, Hans Peter H; Gredelj, Andrea; Glüge, Juliane; Scheringer, Martin, and Ian T. Cousins. "The Global Threat from the Irreversible Accumulation of Trifluoroacetic Acid (TFA)." Environmental Science & Technology. 2024, 58, 19925-19935. Available at https://pubs.acs.org/doi/10.1021/acs.est.4c06189.

[11] Beu, L. S., and M. A. Gresham. 2024. "An Overview of Semiconductor Industry Efforts to Reduce PFAS Use and Emissions in Plasma Processes." *In SPIE Advanced Lithography + Patterning*, Vol. 12958. SPIE. https://doi.org/10.1117/12.3013226

[12] Arp, Hans Peter H; Gredelj, Andrea; Glüge, Juliane; Scheringer, Martin, and Ian T. Cousins. "The Global Threat from the Irreversible Accumulation of Trifluoroacetic Acid (TFA)." Environmental Science & Technology. 2024, 58, 19925-19935. Available at https://pubs.acs.org/doi/10.1021/acs.est.4c06189; *PFAS pollution linked to data centers and AI*, *The Guardian*, October 4, 2025, Available at: https://www.theguardian.com/environment/2025/oct/04/pfas-pollution-data-centers-ai

collected data will be used to inform ongoing oversight, not just to respond months after problems arise.

The permit also requires updated dispersion modeling within one year of permit issuance. However, the project is not expected to begin operating for many years, and current emissions estimates are based on assumptions drawn from other facilities. Modeling done shortly after permit issuance will therefore rely on estimates rather than real operating data. To make this modeling meaningful, updated dispersion modeling should also be required within one year after operations begin, with results made public. Another option would be to issue the permit closer to the start of operations, so that, if modeling is updated to incorporate real emissions data, it reflects actual operating conditions rather than projections.

The FEIS and BACT analysis explain that HTF losses are fugitive and cannot be captured with existing control technologies. For that reason, Micron's current approach focuses on system design, operation, maintenance, and reducing losses wherever possible. We support the development of enforceable emission limits for HTFs, but for now such limits are not proposed because there is no practical way to capture and control these systems. Until enforceable limits can be developed based on real operating data, it is especially important that the permit require a robust automated monitoring system, transparency, and best management and engineering practices to minimize losses.

The FEIS identifies a number of practical steps that can reduce HTF losses, including better system design, careful selection of fittings and connections, regular inspections, quick response to leaks, and ongoing efforts to reduce overall HTF use. These measures are currently the most effective tools available and should be clearly reflected in the air permit language.

Finally, the FEIS describes Micron's efforts to move toward lower-GWP HTF alternatives. Progress on substitution depends in part on review and approval by the U.S. Environmental Protection Agency under federal chemical laws. We support efforts to move quickly on evaluating safer alternatives so substitutions can happen as soon as possible. If EPA review takes too long, the New York State Department of Health should step in to evaluate these chemicals, so that delays do not stand in the way of reducing emissions and avoiding long-term harm.

To address these concerns, we ask that the permit:

- Clearly explain how HTF monitoring data will be reviewed by the Department and made available to the public.

- Clarify how emissions data collected during operations will be used to update modeling assumptions, mitigation measures, and permit conditions — not only after exceedances occur.
- Require updated dispersion modeling for HTFs within one year after operations begin, or issue the permit closer to the start of operations so modeling reflects real conditions.
- Ensure that HTF mitigation plans and any substantive updates are publicly available.
- Require strong best management and engineering practices to minimize HTF losses until enforceable emission limits can be developed.
- Support expedited evaluation of lower-GWP HTF alternatives, including review by the New York State Department of Health if EPA review is delayed.

6) CLCPA mitigation goals to be specified and greatly expanded

The proposed permit requires Micron to pay $2.5 million per fab to create a "mitigation fund." Micron has to develop a plan to choose mitigation projects, those mitigation projects have to generate "permanent, quantifiable GHG [greenhouse gas] reductions that is in addition to actions already required by law or regulation" and DEC has to approve the overall plan as well as the individual projects funded under it. There is no direct discussion of public participation in these projects.[13] Nor is there any discussion of how these projects will be implemented over the many years that will surely be required. The only further mention of mitigation is the 4MW of rooftop solar and the creation of 60 EV charging stations on site (out of 11,600 parking spaces).[14]

We request that, unlike with this air permit, the public be given ample opportunity to learn about and comment on the proposed Mitigation Plan(s).

There is no statement of a GHG reduction goal for the funded projects or any estimate of the amount of GHG emissions that will be mitigated. There is no statement of how much mitigation DEC thinks is required to make this project compatible with CLCPA goals. **The mitigation goals should hold Micron to mitigating a specific amount of CO2e emissions, regardless of cost, rather than setting mitigation spending.**

[13] Draft State Air Permit for Micron. Permit ID: 7-3124-00575/00004, Item, 5.1, p. 6. Available at: https://assets.micron.com/adobe/assets/urn:aaid:aem:7bf1b396-b8b7-44f5-9b45-9a0d7e3b1d42/renditions/original/as/micron-ny-draft-atv-air-permit.pdf

[14] Ibid, Item 163.2, p. 332.

A) Estimated GHG emissions are vastly underestimated.

Sierra Club, in its comments on the draft EIS, noted that the indirect GHG emissions are grossly underestimated. They wrote:

> "To calculate Scope 2 (indirect) GHG emissions, the DEIS states that Micron utilized the facility's estimated electricity consumption (15,673.83 GWh) and the applied GHG emission factors to this energy use "based on New York State electrical emission rate factors obtained from USEPA's Emissions and Generation Resource Integrated Database (eGRID)."[15] This approach is flawed. Calculating Scope 2 emissions for a new massive source of load based on eGRID emission rates—which represent the average emissions intensity of the local grid—misstates the emissions impact of adding the Micron facility. Instead, marginal emission rates must be utilized, and produce results that are multiple times higher than Micron estimates.
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> As EPA explains on the eGRID Power Profiler, the eGRID emission rates represent "average" emission rates for a subregion[16]—i.e., an emission rate that averages all sources of generation in the subregion that operate at any time. But the Micron facility will not be drawing *average* power from the grid. It is a massive *new* load and therefore will be drawing incremental (marginal) power. Consequently, the emission factor associated with serving the new electric load is that of the *marginal* unit, not that of the average unit, as the New York Public Service Commission recently affirmed.[17]
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> This distinction is critically important because the Upstate New York (NYUP) subregion has large amounts of hydropower (32.9% of fuel mix) and nuclear energy (32.3% of fuel mix),[18] which dramatically lowers the subregion's average emissions intensity. But nuclear and hydropower typically operate as baseload resources, dispatching before fossil (gas) units. Gas is routinely the marginal fuel in New York,[19] including when the marginal unit is located in Central New York (Zones B, C, and E), where the Micron facility would be located.[20]

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[15] DEIS, p. 3-203
[16] EPA Power Profiler, https://www.epa.gov/egrid/power-profiler#/
[17] *See* Order Granting Certificate of Public Convenience and Necessity and Providing for Lightened Regulation, N.Y. Pub. Serv. Comm'n Case No. 21-G-0576 (Nov. 18, 2022) at 36 (explaining that "the relevant emissions factor to apply to incremental loads on the New York electric system is the marginal (as opposed to average) emissions rate").
[18] EPA Power Profiler, https://www.epa.gov/egrid/power-profiler#/
[19] Potomac Economics, 2023 State of the Market Report for the New York ISO Markets (May 2024), at A-8 - A-9, available at https://www.potomaceconomics.com/wp-content/uploads/2024/05/NYISO-2023-SOM-Full-Report__5-13-2024-Final.pdf
[20] *Id.* at A-15, Fig. A-8.

DEIS Table 3.7-11 shows emissions from electricity usage of 2,273,587 metric tons of CO2e using a 100-year global warming potential (GWP).[21] Assuming this figure is based on electricity consumption of 15,673.73 GWh, the emissions correspond to an assumed emission rate of 290.1 lb/MWh.[22] Scope 2 GHG emissions based on marginal rather than average emission rates would be multiple times higher than the Micron's estimates. According to EPA's 2023 eGRID data, the "nonbaseload" (marginal) CO2e emission rate for the Upstate New York region (NYUP) is 911.8 lb/MWh.[23] Replacing Micron's 290.1 lb/MWh with the eGRID marginal emission rate increases projected CO2e Scope 2 emissions from 2,273,587 metric tons per year to 6,484,300 metric tons per year[24]—more than 4 million metric tons per year higher and nearly 3 times greater than Micron estimates."

These comments refer to the entire buildout of four chips fabrication plants, whereas the air permit pertains only to Fab 1 and Fab 2. Thus, the corrected CO2e Scope 2 emissions should be divided in half. So the Scope 2 emissions for Fabs 1 and 2 should be adjusted to 3,242,150 metric tons/yr. We will assume this is a 20-year GWP, to be conservative.

Using the direct emissions given in Permit F, Table 1-1 of the permit application, we estimate the operation of the first two Micron fabs will result in:

• Direct emissions	1,015,518 tons/yr of CO2e (20-year)
• Upstream emissions	3,242,150 tons/yr CO2e (20-year)
Total	4,257,668 metric tons/year CO2e.

This revised estimate sets an appropriate target for Micron to mitigate. Mitigation can take the form of building renewable energy systems, building very robust storage capacity, and planting forests. Micron could ultimately save money by reducing its utility bill.

B) Mitigation funds are not adequate

Published values of nature-based mitigation costs range from $7 to $24 per ton of CO2e.[25] Based on an average value $15.50/ton, we estimate the mitigation fund should be funded at approximately **$66 million.** It is worth pointing out that this represents 0.13 percent of the estimated project cost of $51 billion.

C) *Final Statement of Justification*

[21] 3-205, Tbl. 3.7-11.
[22] [2,273,587 metric tons CO2e * 2,204 lb/metric ton]/15,673,830 MWh = 319.7 lb/MWh.
[23] Data, T ab SRL, Col. DF, Row 17.
[24] [15,673,830 MWh * 911.8 lb/MWh] / [2,204 lb/metric ton] = 6,484,300 metric tons.
[25] Sylvera, "Carbon Offset Prices," accessed Dec.14, 2025, https://www.sylvera.com/blog/carbon-offset-price

DEC is required under DAR-21 to issue a Statement of Justification for GHG emissions that are not compatible with CLCPA GHG-reduction goals. Micron has submitted a CLCPA analysis (apparently dated October 30, 2025). DAR-21 says that DEC has to issue the statement of justification based on that CLCPA analysis before it issues a final permit. We request that DEC release the Statement of Justification publicly -- consistent with the emphasis on public participation in DEC's climate plans. And, ideally, DEC would state how much mitigation it thinks is required to make this project compatible with state goals.

In summary, we recommend that DEC:

1) Implement mitigation measures that effectively compensate for 4,257,668 metric tons/year CO2e emitted
2) Set aside a fund of approximately $66 million for this purpose
3) Issue a comprehensive Statement of Justification for GHG emissions, with full engagement with the community.

7) Identification of chemicals

The permit application and by extension, the permit, has redacted the names of numerous chemicals used in the chips manufacturing operation. These compounds are presumably tagged as "proprietary" by Micron and its suppliers. We note that many of these chemicals are commonly used throughout the industry. **We ask the NYS DEC to confirm that identification of these chemicals would actually impinge on Micron's ability to competitively produce memory chips.** Transparency should be the highest priority for the local community.

8) Monitoring of conventional and Hazardous Air Pollutants

The permit (Items 36, 37, 38) specify a confusing set of monitoring requirements with varying allowable concentrations of total HAPS (20 ppm, 14.22 ppm) and inorganic HAPs (0.42 ppm). **What is the basis for these concentration limits?**

Also, the permit appears to have very limited or vaguely specified requirements for monitoring stack emissions. The statement:

"Monitoring Frequency: AS REQUIRED - SEE PERMIT MONITORING DESCRIPTION"

appears again and again, with no reference to a page or section number. We have been unable to locate a Permit monitoring description elsewhere in the permit. **Please provide some clarity on the monitoring requirements for HAPs.**

Certain parameters, such as PM2.5 and NOx have a requirement for monthly monitoring. In general, we believe that **monthly monitoring is the absolute**

minimum for all air pollutants, especially hazardous pollutants like fluorides, acid gases, and hazardous organic compounds.

9) The treatment and monitoring of fluorinated process gases must be improved

The use and release of fluorinated process gases appears to be the largest source of GHGs from semiconductor production. The Micron Clay Final EIS estimates, using the GWP100 method, that the plant will emit 882,000 Metric tons CO_2e per year. What's more, some of these gases will persist in the atmosphere for tens of thousands of years.[26]

The semiconductor industry acknowledges the problem:

> The fluorinated greenhouse gases used in plasma processes are the most potent greenhouse gases measured. They absorb infrared (IR) at wavelengths that CO2 does not and they are potent - 1 kg of SF6 has the global warming impact of >25,000 kg of CO2. They also have the longest atmospheric lifetime of any of the greenhouse gases, up to 50,000 years. F-GHGs are anthropogenic and their concentrations in the atmosphere are increasing. Once released to the atmosphere, they will remain for longer than human civilization has existed.[27]

Micron's solution is to incinerate these gases at the point of use: "Thermal oxidation systems and RCTOs would combust natural gas, and byproducts of combustion would exhaust alongside other unreacted process GHG emissions."[28]

The problem with incineration is two-fold: it is not 100% effective; DRE values of 89% (CF_4) to 99% (3 F-gases) are shown in Table 6.17. These are generic values.

The other problem is that incineration produces toxic products of incomplete combustion, and hydrogen fluoride (HF), which is highly toxic and highly corrosive. This is discussed at length by Weitz et al (2024).[29] The authors conclude that

> Few studies have been conducted at full-scale operating facilities, and none to date have attempted to characterize possible fluorinated organic products of incomplete combustion (PICs). Further, the ability of existing air pollution control (APC) systems,

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[26] U.S. Environmental Protection Agency, *40 C.F.R. § 98, subpart A, table A-1* (Global Warming Potentials), Code of Federal Regulations, current edition, https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A/appendix-Table%20A-1%20to%20Subpart%20A%20of%20Part%2098

[27] Beu, L. S., and M. A. Gresham. 2024. "An Overview of Semiconductor Industry Efforts to Reduce PFAS Use and Emissions in Plasma Processes." *In SPIE Advanced Lithography + Patterning*, Vol. 12958. SPIE. https://doi.org/10.1117/12.3013226

[28] DEIS, p.3-188.

[29] Weitz, K. et al., *Review of per- and polyfluoroalkyl substance (PFAS) treatment in combustion-based thermal waste systems in the United States* (2024), *Science of the Total Environment*, 2024 Jul 1;932:172658. Available at https://www.sciencedirect.com/science/article/abs/pii/S0048969724028055

> designed primarily for particulate and acid gas control, to reduce PFAS air emissions has not been determined.[30]

They recommend "Further research is needed to examine the formation and measurement of PICs in full-scale treatment facilities."[31] This is why the Department of Defense moved away from incinerating PFAS firefighting foam. The PICs as they are called are not regulated. They are not even monitored. So we have the situation where toxic gases of unknown composition are being emitted into our community. What are the health effects?

We recommend that Micron's permit include monitoring of RCTO stack gases specifically for fluorinated compounds regularly to assess their effectiveness and to measure the concentrations of PICs. Table 6.15 in the permit application shows that the F-gases can be detected at levels ranging from 4 to 40 ppbv. We are aware of emerging technologies being developed which could be applied here.[32]

There are alternatives to incineration. For perfluorinated GHG, **Micron should be required to investigate and utilize one or more of the recently developed technologies for destroying the carbon-fluorine bond, as part of a treatment train that may be necessary to change the state or concentration of the emissions.** The U.S. Department of Defense has been funding and evaluating such technologies for years.[33]

10) Mass emission limits: future reductions

The permit proposes emissions limits in tons per year for various individual chemicals and categories of chemicals. If the limits are substantially higher than the actual amounts emitted, we would recommend that a mechanism be provided wherein permit limits are ratcheted down to levels that can reasonably be achieved.

The permit incorporates significant flexibility for Micron to be able to adjust its day-to-day operations, and its overall production line as it sees fit, without getting a new air permit. Thus, we **recommend that the permit be adjusted periodically to reduce emissions limits based on operational data.**

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[30] Weitz, K. et al., *Review of per- and polyfluoroalkyl substance (PFAS) treatment in combustion-based thermal waste systems in the United States* (2024), *Science of the Total Environment*, 2024 Jul 1;932:172658. Available at https://www.sciencedirect.com/science/article/abs/pii/S0048969724028055.
[31] Ibid.
[32] One example of this H. Hayes, C. Lutes, N. Watson, D. Benton, D. J. Hanigan, S. McCoy, C. Holton, K. E. Bronstein, B. Schumacher, J. Zimmerman, and A. Williams, "Laboratory development and validation of vapor phase PFAS methods for soil gas, sewer gas, and indoor air," *Environmental Science: Atmospheres*, vol. 5 (2025), pp. 94–109, Royal Society of Chemistry, https://doi.org/10.1039/D4EA00084F. Available at: https://pubs.rsc.org/en/content/articlelanding/2025/ea/d4ea00084f
[33] April Reese, "DOD-funded PFAS demo projects show promise for remediation and destruction," *Waste Dive*, December 1, 2025, https://www.wastedive.com/news/dod-pfas-destruction-disposal-demos-waste/805991/.

11) Comments on specific provisions in the proposed permit

a) *Remove arsine permit limit*

Item 166.2[34]: invokes Table 2 of Part 212-2.2 to set a mass emission limit of 10 lb/year for arsine. **Arsine is a deadly gas, and no numerical limit should be set for emissions.** Any release of arsine must be stringently avoided, and any accidental release reported immediately.

b) *Malfunctions*

The permit requires various kinds of record-keeping regarding malfunctions in production and abatement processes, but in most instances, these episodes are not immediately reportable. For example, on Page 82 regarding PM2.5, reports of "non-compliance" are due 30 days after the 12 month reporting period.

On Page 55 regarding emissions of "solid particulates," testing is required at "two representative locations" within 90 days of 90 percent fab production utilization. So if the facility never achieves 90 percent fab production utilization, no testing will be performed?

On page 62, NOx emissions are to be reported using a 12-month rolling average. Thus, in any one month, a huge release could go unreported as long as it does not push the 12-month total over the limit. This provides an additional reason why allowable emission limits should be set closer to the projected or actual emissions.

On page 65, if an RCTO malfunctions, the owner is to take '"corrective action." Records of these events must be maintained for 5 years and reports are to be submitted semi-annually. Shouldn't reporting be required more frequently, and immediately in cases where substantial amounts of emissions are released untreated?

On page 67, thermal oxidizers and acid gas scrubbers are to be operated under the EPA's Clean Air Act designation of LAER, Lowest Achievable Emission Rate. LAER sounds great but regulators should explain exactly what that means and how it would be applied in this facility.

Please provide additional clarity on how DEC monitoring and other procedures will ensure protection for fenceline communities from malfunctions when:

[34] Draft State Air Permit for Micron. Permit ID: 7-3124-00575/00004, Item 166.2, p.335. Available at: https://assets.micron.com/adobe/assets/urn:aaid:aem:7bf1b396-b8b7-44f5-9b45-9a0d7e3b1d42/renditions/original/as/micron-ny-draft-atv-air-permit.pdf

- Malfunctions are recorded but not immediately reportable, with non-compliance reported months later
- Emissions testing is contingent on reaching 90% production
- Emissions are reported using 12-month rolling averages
- Control device malfunctions are addressed through semiannual reporting
- LAER requirements are referenced without clear explanation of how they are implemented or verified

c) *Allowance for extra air pollution*

On Page 80, emission reduction credits have been purchased for NOx (411 tons) from Cogentrix of PA and VOCs (205 tons) from Amcor Flexibles North America, Norbord Industries, Bethlehem Steel Corp and Glens Falls Lehigh Portland Cement Co, all seemingly from outside of New York state. **Will New York state provide incentives with deadlines to have Micron reduce these emissions?**

d) *Application of BACT*

On Page 85, particulate matter emissions are to be addressed by the EPA designation of BACT - Best Available Control Technology. As I understand this, individual companies are allowed to define BACT using a variety of criteria including cost and "feasibility." Thus, the "Best" in BACT is not necessarily the best. In this instance, the permit says that for particulate matter, BACT is only "good combustion practices and maintenance procedures." No comments about equipment such as wet electrostatic precipitators or real processes/procedures are included. **The permit should be revised to require a more robust and transparent BACT analysis for particulate matter that prioritizes safety over cost.**

12) Monitoring of ambient air must be included to safeguard the public

Overall, the air permit is based on modeling, calculated emission factors, literature values for DREs, etc. A relatively small subset of the chemicals used at the facility are monitored. For the most part, it is assumed that the emission factors, chemical transformations, and air modeling are correct. But it is actual emissions of air pollutants and meteorological conditions that control the ultimate concentration of pollutants at the facility's fence line. These of course change hourly and daily. In comparison, the Oregon DEQ is requiring Intel to perform hourly monitoring near the fenceline, at Intel's expense.[35]

The bottom line: Actual concentrations of pollutants are the ultimate determinant of whether the air emissions pose a threat to local and regional communities.

[35] Oregon Department of Environmental Quality (ODEQ), *Title V Operating Permit Application for Intel Corporation, Aloha and Gordon Moore Park at Ronler Acres Campuses* (Standard ACDP Permit No. 34-2681), pp. 488-489 https://www.oregon.gov/deq/Programs/Documents/IntelTitleVAppl.pdf

We therefore propose that a robust air monitoring program be established for measuring NAAQS pollutants, HAPs, and key indicators of the facility's impact on areas that may be downwind of the plant. We propose that Micron establish a fund of $5 million to implement a robust air monitoring program, as outlined in Appendix A. It is important that this program is begun prior to the initiation of chips fab operations so that baseline pollutant conditions can be established.

Thank you for the opportunity to comment on this very important air permit which will affect air quality throughout central New York, and beyond.

Sincerely,

CHIPS Communities United and the Center for Public Environmental Oversight

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