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By USPS First Class & Electronic Mail

Mr. J.D. Solomon, Chairman
Environmental Management Commission (EMC)
c/o NC DEQ
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Re: Formal Request for Emergency Rulemaking to Control to 1,4-Dioxane Pollution

Dear Chairman Solomon and Director Rogers:

I am submitting this formal request for emergency rulemaking to you on behalf of the Cape Fear Public Utility Authority (CFPUA), the regional water and wastewater service provider for the City of Wilmington and New Hanover County pursuant to 15A NCAC 02I .0501. Please also accept this letter as a request to present the petition in accordance with 15A NCAC 02I .0502.

More than 200,000 residents and businesses, and tens of thousands of commuters, travelers and visitors depend on CFPUA for safe, reliable drinking water every day. The Cape Fear River remains polluted with the likely carcinogenic compound known as 1,4-dioxane. On September 12, 2024, Chief Judge van der Vaart of the Office of Administrative Hearings issued a final order effectively barring the N.C. Department of Environmental Quality (NCDEQ) from regulating 1,4-dioxane due to NCDEQ's use of the narrative standard instead of a formal rule. Therefore, *CFPUA formally petitions the North Carolina Environmental Management Commission to immediately begin rulemaking to reduce 1,4-dioxane pollution in the Cape Fear River.*

The rule structure we suggest recognizes the successes of the cities of Reidsville, Greensboro, and Asheboro by establishing their performance as the minimum acceptable reduction target for all other 1,4 dioxane dischargers. To the extent that such rulemaking must extend beyond the Cape Fear River

basin to ensure the integrity of the rule before the courts, our request should be considered and implemented in that context; however, for the sake of expediency we would prefer to limit this rule to the Cape Fear River Basin at this time.

Basis for Request

The presence of 1,4-dioxane in the Cape Fear River, the source water for CFPUA's Sweeney Water Treatment Plant (WTP), is well-documented; the Sweeney WTP draws water near the mouth of the Cape Fear River, with numerous 1,4-dioxane dischargers upstream. The presence of 1,4 dioxane in CFPUA's finished water was first documented in UCMR-3 results from 2013. For the last five years, CFPUA has been monitoring 1,4-dioxane monthly, and has recently increased our frequency to once per week. Raw water concentrations of 0.19 to 6.3 µg/L have been observed, with effluent concentrations from below detection to 2.2 µg/L because of reductions accomplished by existing treatment processes. (Collaboratory, 2024, p. 31).

On October 10, 2023, S.L. 2023-137 (An Act to Provide Further Regulatory Relief to the Citizens of North Carolina) was enacted with multiple provisions relating to the assessment and evaluation of the impacts of 1,4-dioxane, including:

- Section 9(a) required DEQ to prepare a human health risk assessment of 1,4-dioxane in drinking water which was to be supported by peer-reviewed scientific studies. The Assessment report was due May 1, 2024, to the Joint Legislative Commission on Governmental Operations.
- Section 9(b) required the North Carolina Collaboratory (the Collaboratory) to evaluate technologies that are commercially available to remove 1,4-dioxane from wastewater, including the technical feasibility and limitations of each. The Collaboratory was to submit the report to the Joint Legislative Commission on Governmental Operations through NCDEQ by May 1, 2024.

The resulting documents from the NC Collaboratory (2024)[1] and NC DEQ (2024)[2], provide substantial support for our request.

NCDEQ's human health risk assessment (HHRA) for 1,4-dioxane identifies significant health risks associated with this chemical, emphasizing its classification as a likely human carcinogen by the U.S. Environmental Protection Agency (EPA), the International Agency for Research on Cancer (IARC), and the U.S. Department of Health and Human Services (DHHS). Animal studies demonstrate that 1,4-dioxane exposure is associated with cancer development in multiple organs, notably the liver, kidneys, and nasal cavities, which suggests similar potential risks for human populations. Based on these findings, the EPA established a cancer slope factor of 0.1 mg/kg-day for oral exposure, which is used to estimate cancer risk and forms the basis of regulatory guidance. (NCDEQ, 2024, pp. 3-5).

The NCDEQ report notes that North Carolina residents are at particularly high risk from 1,4-dioxane in drinking water, as average 1,4 dioxane concentrations in North Carolina are nearly twice the national average. Specifically, Unregulated Contaminant Monitoring Rule (UCMR3) data showed North Carolina

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[1] Gorzalski, A., Knappe, D., Rosenfeldt, E., & Rosen, D., [NC Collaboratory Report]. (2024, August 28). *Treatment Technologies & Implementation Costs to Comply with Proposed 1,4 Dioxane Limits, Final Report*. North Carolina Collaboratory. UNC-CH: Chapel Hill.

[2] North Carolina Department of Environmental Quality [NC-DEQ Report]. (2024, May 1). *1,4 Dioxane in Drinking Water Legislative Report: The Human Health Risk Assessment evaluating 1,4 Dioxane in North Carolina drinking water*, as directed by Session Law 2023-137; 9(a).

ranked third highest among all states for concentrations of 1,4-dioxane detected, with levels as high as 8.8 µg/L (or parts per billion) in certain areas. The report also finds that exposure in the Cape Fear River Basin is especially concerning, with some 1,4-dioxane discharges as high as 22,000 µg/L—well above the 0.35 µg/L level associated with a 1 in 1,000,000 cancer risk threshold. This data supports the urgent need for regulatory intervention to mitigate potential health impacts for the affected population. (NC DEQ, 2024, pp. 1-2, 6-7).

Finally, the NCDEQ report notes that long-term exposure to elevated levels of 1,4-dioxane is not only associated with cancer risks but has also been shown to cause non-cancerous effects, such as liver and kidney toxicity, based on chronic animal exposure studies. The report emphasizes that, due to the absence of a federal drinking water standard, North Carolina residents are currently less protected than populations in states that have enacted their own regulatory limits (e.g., New York's 1 µg/L standard for drinking water). Therefore, NCDEQ recommends establishing state-level 1,4-dioxane regulations to protect public health, referencing the cumulative scientific consensus on 1,4-dioxane's toxicity. (NC-DEQ, 2024, pp. 5, 16-17).

The Collaboratory's report on treatment technologies notes that implementing effective 1,4-dioxane treatment at the CFPUA Sweeney Water Treatment Plant could require advanced oxidation processes (AOP) with associated significant capital and operating costs. According to the Collaboratory, deploying a combination of ultra-violet (UV) disinfection and advanced oxidation processes (UV-AOP) to achieve a 95% reduction in 1,4-dioxane concentration could require an estimated $3.79 million in initial capital investment with additional annual operating costs of approximately $1.58 million ($1.60 per million gallons (MG) treated). These annual operational costs include electricity, hydrogen peroxide, and routine lamp replacement. (Collaboratory, 2024, pp. 52-94).

CFPUA commissioned its own cost estimate with Black & Veatch, an engineering firm with exceptional knowledge of the CFPUA Sweeney Water Treatment Plant as the primary architects and designers of the 2008-2012 modernization and the 2019-2022 Granular Activated Carbon (GAC) facility installed to remove Chemours' PFAS pollution. That familiarity with the Sweeney WTP offered our consultant more insight into specific design challenges. The cost estimate provided by Black & Veatch projected that the cost of *construction alone* would range from **$13.67 million to $23.91 million**.

These projected costs reflect the financial burden that CFPUA would face—today—if a 1-in-1,000,000 risk factor for 1,4-dioxane is deemed necessary for public health protection. Additionally, the costs emphasize the importance of upstream control strategies as an integral part of a cost-effective, sustainable approach for managing 1,4-dioxane contamination at municipal treatment facilities.

Significant reductions in 1,4-dioxane concentrations have been achieved by several North Carolina municipalities through *industrial source control efforts*. These efforts underscore the potential for non-treatment strategies, such as product substitution and waste diversion, to effectively limit 1,4-dioxane pollution in municipal wastewater discharges.

For example, the TZ Osborne Water Reclamation Facility in Greensboro achieved a reduction of over 97% in average effluent concentrations of 1,4-dioxane, lowering levels from 109 µg/L in 2018 to approximately 3.2 µg/L by 2023. This reduction was accomplished by identifying and collaborating with significant industrial users (SIUs) that were primary contributors to 1,4-dioxane discharge. One major SIU installed a dedicated treatment system, while another discontinued the use of high 1,4-dioxane-generating products. (Collaboratory, 2024, pp. 7-8).

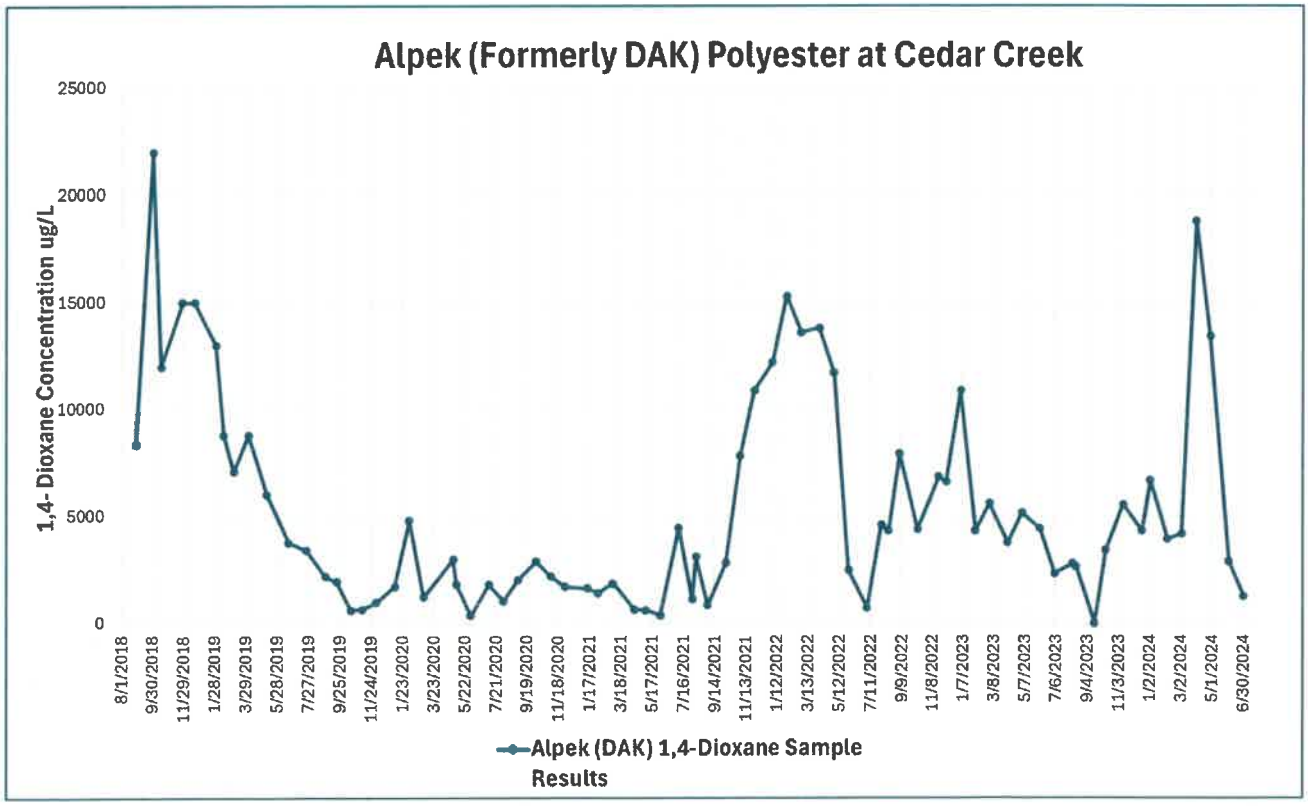
The Asheboro Wastewater Treatment Plant (WWTP) similarly reduced its average 1,4-dioxane effluent concentration by approximately 80%, from 334 µg/L in 2018 to 68 µg/L by 2023. These reductions were largely due to cooperation with an industrial facility involved in PET manufacturing, which installed a treatment system specifically to limit its 1,4-dioxane discharges. (Collaboratory, 2024, pp. 7-8).

Finally, the City of Reidsville's WWTP achieved a remarkable 99% reduction in 1,4-dioxane concentrations, dropping from 140 µg/L in 2018 to approximately 1.9 µg/L by 2023. This success was primarily due to source control measures, including product substitutions by a local plastics manufacturer and process waste divergence away from the sanitary sewer. The product substitutions reduced the company's 1,4-dioxane output by over 3000%. (Collaboratory, 2024, pp. 7-8).

These cases illustrate the ability of industrial source control strategies to mitigate 1,4-dioxane pollution effectively with substantially lower costs than implementing downstream treatment technologies at public drinking water plants.

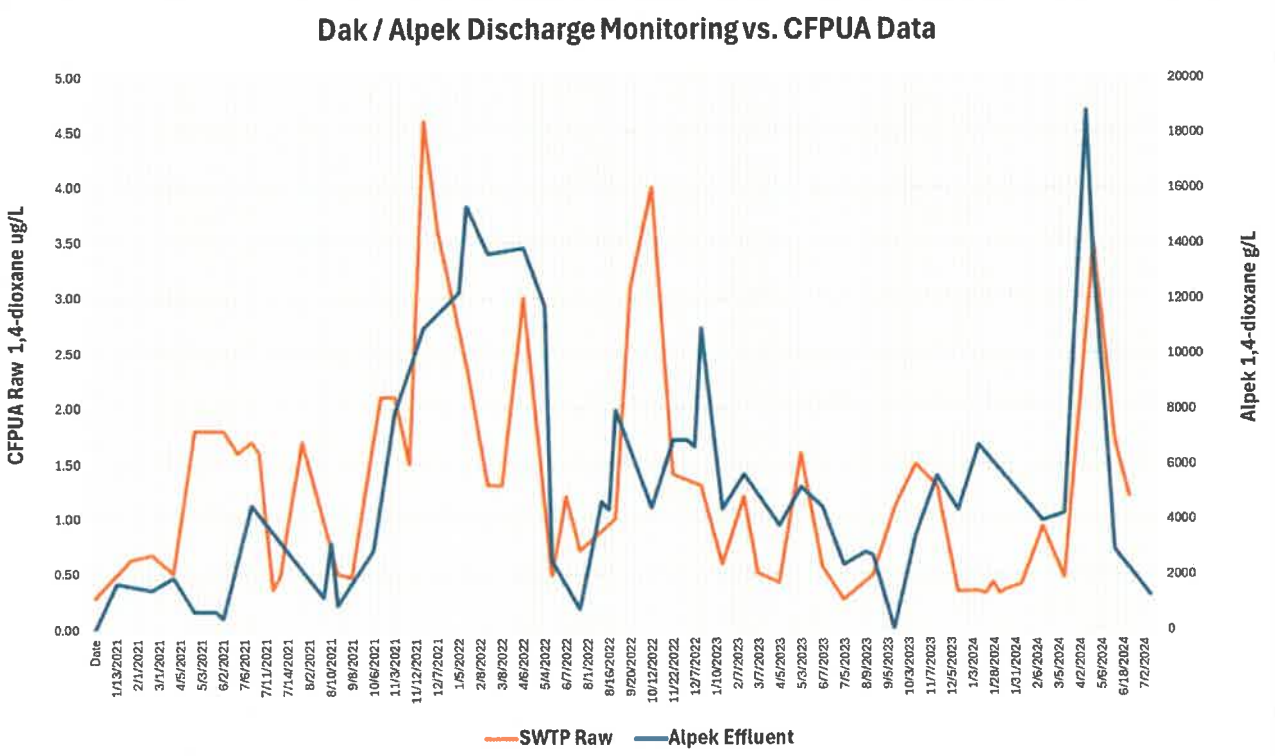
CFPUA is most concerned about 1,4 dioxane discharges from Alpek Polyester (formally DAK Americas) Cedar Creek industrial site, located just downstream of Fayetteville and approximately 60-miles upstream of our primary intake.

This industrial source has historically discharged 1,4 dioxane concentrations that have averaged 5,378 ppb from August 2018 through July 2024 with a high of 22,000 ppb as presented in the chart below.



CFPUA has evaluated the concentrations in our raw water taken from the Cape Fear River as it compares to the values reported by Alpek (DAK) between July 2021 and July 2024. This evaluation showed a strong

correlation between the discharges of this facility and the concentration of this pollutant in our raw water at the Sweeney WTP. The comparison is clearly reflected in the chart below. It is important to note that our treatment facilities can only remove 50-60% of the 1,4 dioxane we receive from upstream pollution sources, *at current in-stream concentrations*. This means our community is *more at risk* at times when there are higher concentrations of 1,4 dioxane discharged upstream of our source water intake. It is no secret that Alpek Polyester wishes to increase discharges. Downstream communities need to see this industry discharge less 1,4 dioxane, not more.



Requested Rule Structure

NCGS § 143-215.3(a)(1), "General Powers of the Commission," grants the EMC the authority to adopt rules to protect the environment, including water quality, by managing and regulating sources of pollution. The EMC is empowered to establish rules "as necessary to protect the public health and the environment."

NCGS § 150B-21.1A, "Emergency Rulemaking," provides the framework for emergency rulemaking by the EMC. It allows the EMC to adopt a temporary rule without prior notice or hearing if it finds that "a serious and unforeseen threat to the public health, safety, or welfare" exists, which includes environmental threats like contamination impacting drinking water. Additionally, this action is allowed as a result of the September 12, 2024, court order issued by the Office of Administrative Hearings.

We request the North Carolina Environmental Management Commission establish an emergency rule that establishes requirements for NPDES permit holders who discharge 1,4-dioxane above specified levels into state waters. Its purpose is to reduce 1,4-dioxane concentrations impacting downstream drinking water supplies to protect public health, in accordance with findings from the NC Department of

Environmental Quality (NC DEQ) Human Health Risk Assessment and the NC Collaboratory's Report on Treatment Technologies and Implementation Costs.

We offer the following generalized structure for consideration:

1. Definitions

For the purposes of the rule:

- **Direct Discharger**: Any individual or entity that intentionally stores, creates, manufactures, or uses 1,4 dioxane, and whose wastewater discharges 1,4 dioxane directly into any stream, navigable water, or other receiving body.
- **Downstream Drinking Water Intake:** A public water supply as defined by the Safe Drinking Water Act with surface water intake situated downstream from an NPDES discharge point.
- **Minimization Plan**: A structured plan developed by the NPDES holder and approved by the NC DEQ to reduce 1,4-dioxane concentrations in effluent discharges through source control, pretreatment, or other suitable reduction measures.
- **NPDES Holder**: Any individual or entity holding a National Pollutant Discharge Elimination System (NPDES) permit within North Carolina.
- **Passive Receiver**: A public water supply as defined by the Safe Drinking Water Act that removes contaminants from a source water for the purpose of potable water supply and returns effluent with those contaminants to waters of the United States via an approved NPDES permit and does not intentionally create, manufacture, or otherwise increase levels of 1,4 dioxane effluent as a part of its operational processes or treatment systems.

2. Scope of Rule

This rule would apply to any NPDES Holder who is a direct discharger with:

- A permitted average daily flow greater than 100,000 gallons per day and an effluent with a 1,4-dioxane concentration exceeding 35 µg/L; or
- Whose discharge, in combination with other sources, results in a 1,4-dioxane concentration above 0.35 µg/L at a Downstream Drinking Water Intake as determined by both grab and composite sampling.

3. Minimization Plan Requirements

a) Required Reduction Goal: NPDES permit holders meeting the criteria in Section 2 must achieve and maintain a minimum 80% reduction in 1,4-dioxane discharge concentration, calculated using historical baseline effluent monitoring data for five consecutive years. Expanded discharges must retain 80% achievement levels post expansion.

b) Minimization Plan Submission:
   - Eligible NPDES holders must submit a 1,4-dioxane Minimization Plan to the NC DEQ within 12 months of the effective date of the rule.
   - The Minimization Plan shall detail proposed strategies, measures, and a timeline to achieve the 80% reduction within five (5) years from the date of plan approval by NC DEQ.

c) Monitoring and Reporting:
   - NPDES holders must submit quarterly progress reports to NC DEQ, detailing reductions achieved, updated effluent concentrations, and any modifications to the Minimization Plan as needed to ensure compliance with the 80% reduction target.

- Compliance assessments will be based on quarterly average reductions compared to baseline levels, as verified by bi-weekly composite sampling and monitoring.

4. Compliance Determination
   a) Pre-Existing Reductions: Any NPDES holder that can demonstrate an 80% or greater reduction in 1,4-dioxane effluent concentrations, relative to its historical baseline data, shall be deemed compliant with the rule at the time of enactment. However, the NPDES permit holder shall be required to maintain the established reduction level of 80% or greater and remain subject to NC DEQ monitoring to ensure that said reduction continues to be maintained. Any subsequent increase in concentration shall render the NPDES permit holder non-compliant, even if the increased concentration meets the 80% minimum threshold.
   b) Five-Year Compliance Deadline: All required NPDES holders must achieve the 80% reduction target no later than five (5) years from the date of the initial Minimization Plan approval. Failure to meet this requirement may result in such enforcement actions by NC DEQ as authorized by law, including without limitation, suspension or termination of the NPDES permit and the assessment of civil penalties.

5. Exemptions
NPDES permit holders who are passive receivers or who discharge below the thresholds specified in Section 2 are exempt from the requirements of this rule, unless the NPDES permit holder thereafter becomes subject to the rule due to an increase of discharge volumes or 1,4-dioxane concentrations.

6. Justification and Basis
The rule is based on findings from the NC DEQ Human Health Risk Assessment and the NC Collaboratory's 1,4-Dioxane Treatment Technologies report, which highlight the health risks associated with 1,4-dioxane and recommend a reduction in effluent levels to protect public drinking water resources

Effect on Existing Rules or Orders

The proposed rule will have no effect on existing rules relating to 1,4 dioxane, as there are currently no numerical standards imposed relating to the presence of 1,4 dioxane. Although North Carolina has set in-stream target values (ITVs) for 1,4-dioxane in surface waters, these are unenforceable recommendations. The proposed rule would provide an enforceable mechanism for the reduction of 1,4 dioxane in water supplies. Furthermore, the September 12, 2024, Order from the Office of Administrative Hearings is presently pending a Petition for Judicial Review as filed by NCDEQ. The ultimate outcome of this case is unknown, and its current status leaves no means by which to otherwise control 1,4 dioxane discharges. Should the underlying decision be upheld, this rule would be in accordance with Chief Judge van der Vaart's decision, as a primary basis therefore was the absence of an explicit rule.

Conclusion

Much progress has been made on reducing 1,4 dioxane exposure for downstream potable water customers, and we thank NC DEQ, the EMC and our upstream neighbors for that work. Our proposed rule would reward and acknowledge those achievements, memorialize the gains, hold others to the same standard, and prevent any backsliding from the protections achieved.

Thank you for your service to the citizens of North Carolina. We know too well the demands of your time, the challenges you are facing and the difficult decisions you must make as an EMC member. North Carolina is a better place to live, work and play because of your sacrifices.

Respectfully submitted,

Kenneth Waldroup, PE
Executive Director

CC: NC EMC members
CFPUA Board
New Hanover County NCGA Delegation
Leadership, NCDEQ