SOAH DOCKET NO. 582-24-22552
TCEQ DOCKET NO. 2023-1591-MWD

APPLICATION OF CORIX	**§**	**BEFORE THE STATE OFFICE**
UTILITIES (TEXAS) INC.	**§**	
FOR TPDES PERMIT NO.	**§**	**OF**
WQ0013977001	**§**	
	§	**ADMINISTRATIVE HEARINGS**

EXHIBIT ES-213

Toxicological Evaluation of Corix Application to Amend
TPDES Permit No. WQ0013977001
December 19, 2024

Dr. Jordan Crago
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The applicant, Corix Utilities (Texas) Inc., has requested a major amendment to the current domestic wastewater permit, No. WQ0013977001, which would increase the average daily flow from no greater than 0.05 million gallons per day (MGD), to 0.25 MGD during an Interim Phase, so named "Interim Phase II", followed by an increase to 0.51 MGD in the Final Phase for which the domestic wastewater permit will ultimately operate under.

The permit is for the McKinney Roughs Wastewater Treatment Facility MBR system activated sludge process plant operated in conventional mode. This treatment facility currently employs a bar screen, an aeration basin, a final clarifier, a sludge digester, a sludge holding tank, and a UV disinfection channel. The proposed change to the treatment plant will include a primary fine screen, two equalization tanks, two anoxic tanks, two aeration basins, two aeriated MBR tanks, two secondary fine screens, a sludge holding tank, and a UV disinfection system. Sludge generated from the treatment facility will be disposed of at a TCEQ-authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge.

The treated effluent is discharged to an unnamed tributary, thence to the Colorado River Below Lady Bird Lake/Town Lake in Segment No. 1428 of the Colorado River Basin. The unclassified receiving water use is minimal aquatic life use for the unnamed tributary. The designated uses for Segment No. 1428 are primary contact recreation, public water supply, and exceptional aquatic life use.

In accordance with 30 Texas Administrative Code § 307.5 and TCEQ's Procedures to Implement the Texas Surface Water Quality Standards (June 2010), an antidegradation review of the receiving waters was performed. In a preliminary Tier 1 antidegradation review, the Executive Director has preliminarily determined that existing water quality uses will not be impaired by this permit action. As detailed below, I have concerns that the discharge has not been shown to be protective of all existing water quality uses.

In a preliminary Tier 2 review, the Executive Director has determined that no significant degradation of water quality is expected in Colorado River Below Lady Bird Lake/Town Lake, which has been identified as having exceptional aquatic life use. Existing uses will be maintained and protected. The preliminary determination can be reexamined and may be modified if new information is received. As detailed below, I have concerns that it has not been shown that the discharge will not result in harmful impacts on water quality.

Upon review of the documents provided in the permitting process it is of my opinion that there are three areas of concern;

- **Applicant has identified that this Bastrop county provides critical habitat to the Houston toad.** Further review has identified the state threatened species including blue sucker (Cycleptus elongatus) as well as several mussel species of concern. The water flow due to outflows from Lady Bird Lake will contribute to an increased presence of anthropogenic contaminants in the section of the Colorado River receiving the Corix discharge. This increase is not expected to account for acute mortality, but it is reasonable to expect chronic toxicity, in particular as it relates to sensitive stages such as during egg-larval development and metamorphosis.

- **Per- and polyfluoroalkyl substances (PFAS) concentrations should be considered in the evaluation of the impacts of the increased Corix discharge.** Both perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) have been added to the US Environmental Protection Agency National Recommended Water Quality Criteria - Aquatic Life Criteria in 2024. Given the fact that the main route of PFAS input is through both domestic and industrial wastewater effluent discharge, it would be important to determine the baseline concentrations currently found within the effluent discharge, and in the Colorado River both upstream and downstream of the unnamed tributary. This in turn, would provide concentrations to base predicted PFAS concentrations at the completion of the Final phase of the proposed project.

- **PFAS persistence in the water column would potentially create a burden to the City of Bastrop**. The permit holder has identified that the town of Bastrop's drinking water is downstream of discharge point into the Colorado River. Given the general acceptance of the low degree of PFAS degradation through the wastewater treatment process and persistence in the water column, this would potentially create a burden to the City of Bastrop in reducing PFAS concentration to below current guidelines of 4 parts-per-trillion for PFOA and PFAS. Please note the specific guidelines for implementation of this:

  "The final rule requires:
  - Public water systems must monitor for these PFAS and have three years to complete initial monitoring (by 2027), followed by ongoing compliance monitoring. Water systems must also provide the public with information on the levels of these PFAS in their drinking water beginning in 2027.
  - Public water systems have five years (by 2029) to implement solutions that reduce these PFAS if monitoring shows that drinking water levels exceed these Maximum Contaminant Level (MCLs).
  - Beginning in five years (2029), public water systems that have PFAS in drinking water which violates one or more of these MCLs must take action to reduce levels of these PFAS in their drinking water and must provide notification to the public of the violation."

(EPA Final PFAS National Primary Drinking Water Regulation, 2024)

PFOA and PFOS Ecotoxicology Data

Vertebrates

Amphibians

The current US EPA National Recommended Aquatic Life Criteria (NRALC) for PFAS was published in 2024. Of the two PFAS compounds, PFOS is considered more toxic to aquatic organisms and therefore acceptable concentrations are lower for PFOS than PFOA. PFOS freshwater chronic values (parts per billion (ppb)) 0.25 in water, 0.028 mg/kg Wet Weight in Invertebrate Whole-Body Tissue, 0.087 mg/kg Wet Weight in Fish Muscle Tissue. PFOA values are 100 ppb in water, 1.18 mg/kg Wet Weight in Invertebrate Whole-Body Tissue, 0.133 mg/kg Wet Weight in Fish Muscle Tissue.

Both PFOS and PFOA do not readily degrade in the water column. Both compounds exist at water:sediment and water:air interfaces. Therefore, they can be readily available to both sediment-bound organisms, such as invertebrate larvae (ex. *Chironomid spp.*) and mussels, as well as free swimming organisms (fish and amphibians). Most ecotoxicology work on this compounds has relied on relatively few aquatic species.

Specifically, there are a total of *3* studies that have examined the effect of chronic exposure to PFOS or PFOA in amphibia that have met the criteria of inclusion in the US EPA ECOTOX Knowledgebase (Hoover et al. 2017, Flynn et al. 2021, Degitz et al. 2024). All studies employed one North American frog species and one commonly used in developmental toxicity assessment (*Rana pipiens and Xenupus laevis*). In all three studies, larval development was impaired. Specifically, delays occurred in PFOS water concentrations at 0.06 ppb, which is below NRALC concentrations (0.25 ppb). Given the paucity of amphibia data for either PFOA or PFAS, and that delays in development occur at concentrations below NRALC levels, it has not been shown that the increased discharge will not have negative impacts upon the Houston Toad.

Invertebrates

Freshwater Mussels

There are currently no studies that have examined the effect of chronic exposure to PFOS or PFOA in freshwater mussels that have met the criteria of inclusion in the US EPA ECOTOX Knowledgebase. Given the lack of any information that meets the standards of

EPA for inclusion in risk assessment analysis it is unknown what effects PFOS or PFOA have on freshwater mussels. Therefore, I am unable to assess potential effects on freshwater mussels listed as "of concern" in Texas.

Sediment dwelling invertebrates (Chironomide spp.)

Chironomids (Mayflies) are a common invertebrate species in aquatic ecotoxicity testing due to well identified stages of development and endpoint measurements. Specifically, larvae develop in the sediment, feeding on surrounding detritus. Growth of larvae can be measured as well as metamorphosis, commonly called 'emergence'. There are several studies that have employed Chironomid species assessments in this manner. In all cases, PFOA is less acutely and chronically toxic to Chironomid larvae. That said, in a number of cases, chironomid, are sensitive to PFOS, with survival, growth, and emergence—were significantly affected. All studies demonstrate the chronic toxicity of PFOS to ecologically important invertebrate species, that may affect food web assemblages. These impacts have not been addressed in the evaluation of the permitted discharges impact upon the environment and aquatic life.

Conclusions

Given the potential for PFAS to enter the Colorado River through the McKinney Roughs Wastewater Treatment Facility, and the inclusion of PFOA and PFOS in both NRALC and EPA Drinking water standards, it is critical to determine a) current PFAS levels within the effluent at the McKinney Roughs Wastewater Treatment Facility and b) the share of PFAS in the Colorado River that is, and will be, from this discharge.