TCEQ Interoffice Memorandum

To: Industrial Permits Team
Wastewater Permitting Section

From: Katie Cunningham, Water Quality Assessment Team
Water Quality Assessment Section

Date: August 10, 2021

Subject: Port of Corpus Christi Authority of Nueces County
Wastewater Permit No. WQ0005253000
Critical Conditions Recommendation Memo

This memo supersedes the memo written by Katie Cunningham, dated June 10, 2020. Following the TCEQ Commissioners' decision to remand this permit application to the State Office of Administrative Hearings, the applicant submitted revised information pertaining to the discharge via Outfall 001, including a new diffuser design and outfall location.

The following information applies to **Outfall 001**.

Discharge from Outfall 001 will be via diffuser directly into the Corpus Christi Ship Channel (part of Corpus Christi Bay, Segment No. 2481). The proposed daily average permitted flowrate is 95.6 million gallons per day (MGD) of water treatment wastes from the reverse osmosis treatment process from a seawater desalination facility. A mixing analysis of the discharge from Outfall 001 was conducted using the CORMIX 11.0GTD (Version 11.0.1.0) modeling software. Additional details of this analysis are included in the report titled, *Mixing Analysis for the Port of Corpus Christi Authority of Nueces County*, dated August 10, 2021.

Outfall 001 will consist of a submerged multi-port diffuser, located approximately 229 feet from the shoreline and oriented approximately parallel to the bank. At the permitted flowrate of 95.6 MGD, the diffuser will consist of 20 ports, each with a diameter of 7 inches and oriented 30 degrees upwards towards the water surface. The port height above the channel bottom is 26 feet, and the depth of the water body where the ports discharge is approximately 90 feet.

The 20-port diffuser configuration corresponds to discharge at the permitted flowrate of 95.6 MGD. The applicant's submittal explains that if the effluent flowrate decreases by more than 10%, the diffuser ports can be blocked, or smaller diameter ports can be used to maintain the same port exit velocity (~8.2 m/s). According to the submittal, when this port exit velocity is maintained, the diffuser can achieve the same effluent dilutions at lower effluent flowrates. While the specifics of the diffuser design at lower flowrates are not evaluated in this review, the permittee is required to maintain the diffuser such that the maximum percentage of effluent (or less) is still achieved, regardless of the discharge flowrate. **The CORMIX model notes that a discharge velocity less than 2.5 m/s may be recommended to avoid possible adverse conditions for sensitive fish populations. However, this issue is outside the scope of the critical conditions/diffuser review.**

The TexTox menu number is **5** for a bay, estuary, wide tidal water body, or narrow tidal water body with no upstream flow.

This discharge is to the Corpus Christi Ship Channel (part of Corpus Christi Bay, Segment No. 2481).

Segment No.	2481
Effluent Flow for Aquatic Life (MGD)	95.6 (Proposed)
% Effluent for Chronic Aquatic Life (Mixing Zone)	8.9
% Effluent for Acute Aquatic Life (ZID)	14.6
Oyster Waters?	Yes
Effluent Flow for Human Health (MGD)	95.6 (Proposed)
% Effluent for Human Health	5.4

Human Health criteria apply for Fish Only.

The chronic aquatic life mixing zone is defined as a 553-foot by 227-foot rectangle centered on the diffuser with the longer edge extending along the diffuser barrel. This area is approximately equal to the area of a 200-foot radius circle. Chronic toxic criteria apply at the edge of the chronic aquatic life mixing zone.

The ZID is defined as a 184-foot by 43-foot rectangle centered on the diffuser with the longer edge extending along the diffuser barrel. This area is approximately equal to the area of a 50-foot radius circle.

The human health mixing zone is defined as a volume within a 1,053-foot by 477-foot rectangle centered on the diffuser with the longer edge along the diffuser barrel. This area is approximately equal to the area of a 400-foot radius circle.

It is recommended that the following language be included in the Other Requirements section of the issued permit:

The permittee shall maintain the diffuser at Outfall 001 to achieve a maximum of 14.6 percent effluent at the edge of the ZID. The ZID is defined as a 184-foot by 43-foot rectangle centered on the diffuser barrel with the longer edge extending along the diffuser barrel. This area is approximately equal to the area of a 50-foot radius circle.

OUTFALL LOCATION

Outfall Number	Latitude	Longitude
001	27.844412 N	97.063602 W