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June 12, 2018

Office of the Chief Clerk, MC-105
Texas Commission on Environmental Quality
PO Box 13087
Austin, TX 78711-3087

Re: TCEQ Industrial Wastewater Discharge NORI for Permit Number WQ0005254000

Dear Sir or Madam:

The Texas Parks and Wildlife Department (TPWD) appreciates the opportunity to provide comment on the application for the proposed Texas Pollutant Discharge Elimination System (TPDES) industrial wastewater discharge permit for Port of Corpus Christi Authority of Nueces County. (Permit No. WQ0005254000). TPWD is the agency with primary responsibility for protecting the state's fish and wildlife resources (Texas Parks and Wildlife Code §12.0011(a)) in addition to encouraging outdoor recreation on Texas water resources. With respect to this role, we are concerned about water quality for fish and wildlife. Additionally, we are charged with providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources (Texas Parks and Wildlife Code §12.0011(b)(3)). Please be aware that a written response to a TPWD recommendation for informational comment received by a state government agency may be required by state law. For further guidance, please see Texas Parks & Wildlife Code Section 12.0011.

In light of the statutory mandate, TPWD staff have reviewed the aforementioned TPDES permit application and offer our comments.

Based on the information provided in the permit application, there seems to be a discrepancy in the location of the outfall between the cited latitude/longitude in the first part of the application on page 9 (27.524566, -97.164738) and the one listed on page 6 of the Technical Report 1.0 found later in the application (27.87935, -97.27983). TPWD assume the location referenced in the Technical Report is the correct location. Attachment A to this letter contains a map (Figure 1) of the two locations listed in the permit application and Technical Report 1.0 and

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

TPWD would appreciate clarification from the applicant on this discrepancy.

Based on TPWD's review of the permit application, the proposed temperature range of the effluent may pose a concern to the La Quinta Channel fishery. As stated in the permit application Technical Report 1.0, page 9, a range of 14-32 °C is planned.

One point of clarification needed as well is the Technical Report table actually says °F, so we assume that is a mistake that should be corrected to °C.

TPWD is concerned that increased temperatures, especially in the winter months, could pose a problem for the spawning habitat, specifically for black drum, in La Quinta Channel by the release of warm water from Outfall 001. There is a popular black drum fishery in La Quinta Channel during the winter for "bull drum" (large sexually mature fish). This is mostly a catch and release fishery (these fish are usually oversized and cannot be legally harvested). Depending on the spatial extent of any potential water temperature increase in La Quinta Channel, this fishery, used by fishing guides and recreational anglers, might be impacted.

TPWD would like to see additional information regarding the results of the modeling analysis for water temperature from Outfall 001 in the area of the outfall.

With regards to the use of the CORMIX model in this application, TPWD has a series of questions and we would appreciate any clarification the permittee or TCEQ can provide. These questions are found in Attachment B to this letter.

Related to salinity concerns with the model, TPWD also has questions about the effects of this discharge on dissolved oxygen in the area of the discharge and beyond. TPWD would like clarification on how dissolved oxygen levels are modeled, especially as it relates to dissolved oxygen solubility in the presence of higher temperatures and higher salinities and whether this proposed location and volume of discharge could create a hypoxic zone.

TPWD recommends that the permittee and TCEQ consult with TPWD coastal fisheries staff knowledgeable of the potential impacts from this discharge related to temperature changes, salinity, and dissolved

oxygen within this section of the La Quinta Channel prior to finalizing the permit.

TPWD requests that these comments be considered during the technical review of the proposed permit application. We appreciate the opportunity to offer comment and look forward to working with TCEQ, the applicant, and other stakeholders on this matter. If you have questions or need more information, please contact me at anne.rogers@tpwd.texas.gov or (512) 389-8687. Thank you again for the opportunity to comment and for the opportunity to work collaboratively with you and your colleagues to conserve and protect Texas' valued aquatic resources.

Sincerely,

Anne R. Harrison

Anne Rogers Harrison
Water Quality Program Leader

ARH:ms

Attachment

cc: Ms. Cindy Loeffler
Mr. James Murphy
Mr. Alex Nunez
Mr. Brian Bartram

Attachment A.

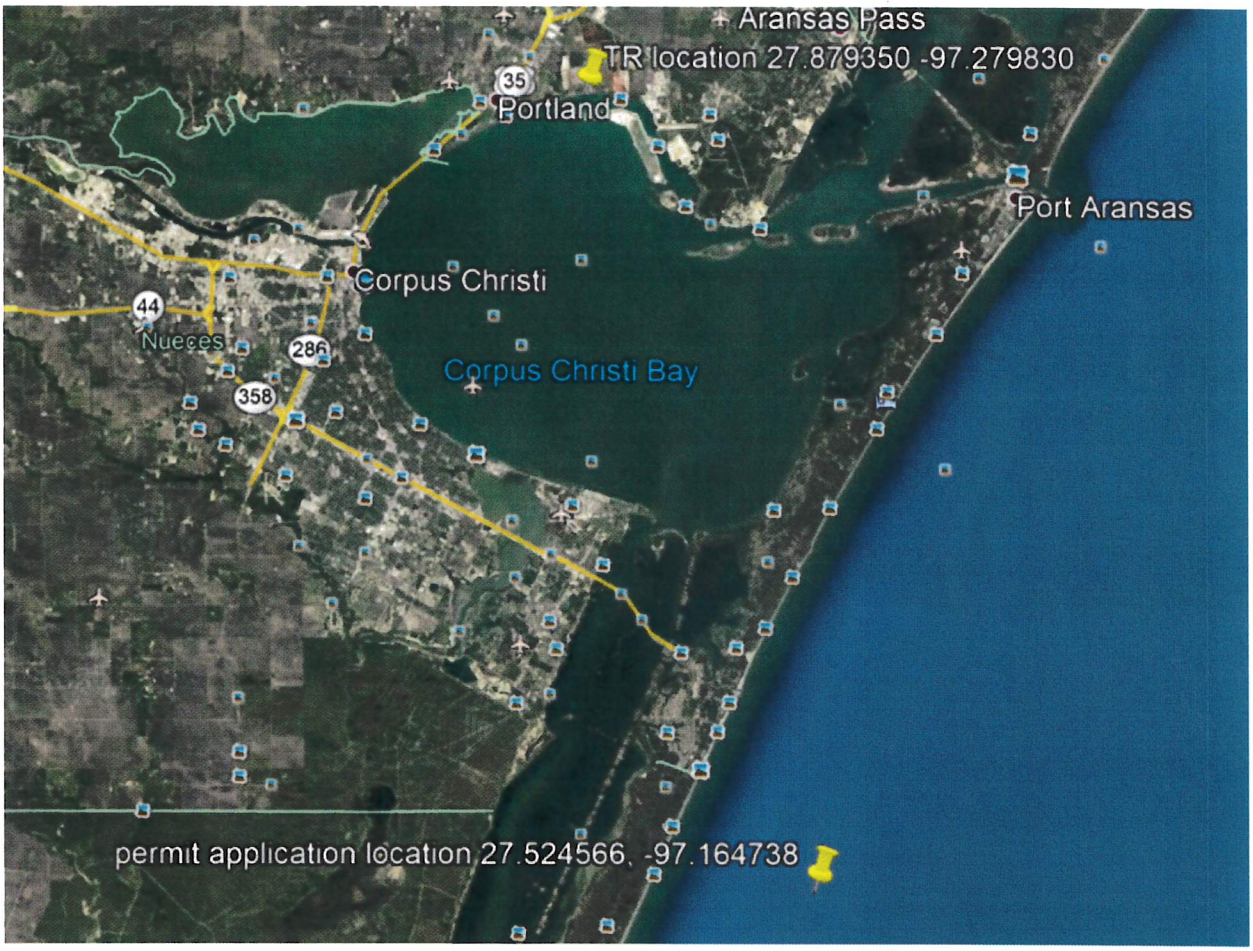

Figure 1. Location of Port of Corpus Christi Authority's desalination plant outfall per latitude/longitude in permit application and Technical Report 1.0.

Attachment B

The following is a series of questions on the use of the CORMIX model as it was used in the permit application, followed by documentation from the CORMIX website (italics), as well as quotations from the permit application. TPWD would appreciate clarification on these questions.

- What tidal information was used to drive the tidal mixing component of CORMIX? This is especially important to the buoyancy of the discharge in relation to boundary interactions to accurately predict mixing behavior.

  CORMIX needs some information on the ambient design conditions relative to any of the two slack tides.
  The rate reversal (time gradient of the tidal velocity) near these slack tides is of considerable importance for the concentration build-up in the transient discharge plume.

  Tidal reversals will reduce the effective dilution of a discharge by re-entraining the discharge plume remaining from the previous tidal cycle.

  CORMIX considers the reduction in initial dilution due re-entrainment of material remaining from the previous cycle. It does not consider unsteady build-up of material over several tidal cycles, it assumes a complete flushing of the historic plume in the near-field, will occur within a tidal cycle.

- Because salinity is considered a conservative constituent (not affected by biological processes), what data was used to formulate to ambient conditions in the near-field and far-field dilution zones? This applies to the depth integrated area of the channel, with respect to the multiport diffusers.

  Conservative Pollutant - The pollutant specified does not undergo any decay/growth process during mixing.

- From Page 10, Amec, Foster& Wheeler, Brine Discharge Mixing Analysis, Dec 2017

  "In considering the effect of stratification in these analyses, the salinity and temperature values at the top and bottom of the water column were paired. Given the available ambient data set from the TCEQ, the top depth

represents salinity at a depth of 0.3 meters. The bottom depths represent salinity at a depth of 3 meters. The average density differences between the top and bottom of the water column at these depths were calculated to be 0.06 kg/m3. Because the difference in density is less than 0.1 kg/m3, stratification does not need to be considered in the analysis in accordance with CORMIX guidance".

With the proposed depth of the diffusers set at 44 ft (13.4 meters), are these assumptions of 'no stratification' in the channel still valid?

- The effluent from the plant is estimated to be 1.63-1.88 X higher in salinity of the ambient receiving waters (66,000 – 77,460 mg/L TDS), and as such, will be negatively buoyant and likely sink (even with the multiport diffusers). Has the bottom topography of the receiving channel been surveyed, and is there sufficient lateral displacement (tidal movement) to negate a density flow in the far-field?

  Because these flows tend to have greater density than the surrounding ambient waters, they are negatively buoyant and will sink towards the bottom. After bottom boundary interaction (or stratified terminal layer formation) density current mixing is likely to occur.

  Density current flows can extend for large distances in the far-field before transition to passive ambient diffusion.

  Care should be exercised when simulating these flows within CORMIX.

  Although the system does recognize negatively buoyant flow classes (NV, NH, MNU) the system assumes a flat bottom topography.

  It is usually necessary to have access to cross-sectional diagrams of the water body. These should show the area normal to the ambient flow direction at the discharge site and at locations further downstream. These cross-sections should then be schematized into equivalent rectangular areas normal to the flow.

- If buoyancy-driven stratification of the effluent is likely, is hypoxia/anoxia in the bottom waters of the channel being investigated or proposed for monitoring?

  CORMIX does not have any user-adjustable parameters. However, it is suggested that you run a sensitivity analysis with representing a range of discharge (velocity, density) and/or environmental conditions (depth, velocity, density stratification) likely to occur at your site.

- From Page 7, Figure 4, Amec, Foster& Wheeler, Process Design Basis and Narrative, Dec 2017

  The straight lines on the salinity graph between 11/1985 to 11/1988, and from 11/1997 to 11/2001 likely represent data gaps and should not be shown as connected (implying a continuous record). Were these data gaps included in the formulation of the 'average salinity level' used for the analysis?

- Because CORMIX Flow Class designation had such a large effect on the design outcome (% Above Ambient, Tables 7-10, Amec, Foster& Wheeler, Brine Discharge Mixing Analysis, Dec 2017), far more documentation of the Flow Classes under consideration is needed (more so than just Figure A.7.a, as provided in Appendix 3).