

SOAH DOCKET NO. 582-20-1895

TCEQ DOCKET NO. 2019-1156-IWD

IN THE MATTER OF THE § BEFORE THE STATE OFFICE
APPLICATION OF PORT OF §
CORPUS CHRISTI AUTHORITY OF § OF
NUECES COUNTY FOR TPDES §
PERMIT NO. WQ0005253000 § ADMINISTRATIVE HEARINGS

WRITTEN PREHEARING STATEMENT
OF JAMES KING, TAMMY KING, SAM STEVES AND EDWARD STEVES

I. SUMMARY

The Port has done it again.

- It has failed to obtain the information it told the Commission it would obtain, such as information on the eddy that created the hole;
- It has failed to perform proper CORMIX modeling; and
- It cannot meet the recommendations for permit limits by the Texas Parks and Wildlife Department and General Land Office, or any permit limits for salinity levels needed to avoid adverse impacts to the marine species;

And, the Port is now, on the eve of hearing, proposing to move the discharge point again; move it to a location where no party performed their modeling and evaluation; move it to a location it has not identified; and apparently move it to be about halfway back to its original location.

The Port cannot meet its burden of proof on the any of the six referred issues.

II. SALINITY STANDARDS AND TPWD AND GLO RECOMMENDATIONS

In the two agencies' 2017 joint report on desalination¹ and in TPWD's separate comments on the Port's application,² the agencies recommended a permit limit on the increase in salinity levels at the boundary of the mixing zone. They recommended the lesser of 2 parts per thousand (ppt) or 5 percent. These are the two agencies charged with protecting the coastal environments. Their recommendation is

¹ PAC-17.

² PAC-37.

for discharges to the Gulf and to the ship channel. Their recommendations have been ignored. The ED has not proposed any salinity limits in the permit.³ The ED it has no numerical standards of its own on which to base a salinity limit, and it refuses to accept the recommendation of its sister agencies who were directed by the Legislature to evaluate the impacts of discharges from desalination facilities.

As Dr. Schlenk's testimony explains, most international standards use such a 2 ppt limit on the increase in salinity to protect marine species.⁴ This limit is also shown by the work of Dr. Nielsen to be a level above which redfish larvae on the Texas coast begin to be adversely affected.⁵ And even the Port's expert, Dr. Nathan Knott, has supported the use of the 2 ppt standard for desalination discharges.⁶

And these agencies' recommendation would have been met if the Port had a diffuser that could meet the targets the Port set in its initial application for the percentages of effluent remaining at the mixing zone boundary of "2.5% for the ZID, 1.5% for the aquatic life mixing zone (ALMZ), and 1.0% for the human health mixing zone (HHMZ)." The 2 ppt limit would have been met if the Port's had a diffuser that could have met the looser limits in both the ED's original draft permit or the ED's 2020 revision. The original diffuser could not; nor can the redesigned diffuser, as will be shown below.

PAC's modeling expert showed the percentages of effluent at the boundaries of the three mixing zones were up to 70%, 50%, and 35% for that original diffuser. They were so high because worse mixing occurs with faster tidal currents, not slower ones, as the Port and ED had assumed. Now, PAC's experts have shown that, with proper CORMIX modeling, the new diffuser will again result in very poor mixing, with the percentages of effluent as high as 55%, 41%, and 24% at the boundaries of the three mixing zones. That is because Port moved its discharge to an even worse location. And the resulting changes in

³ The ED's position is that the agency has to treat all applications for industrial discharge permits the same. (ED-SG-1, page 6, lines 4-7) Since most other industrial permits do not have salinity limits, this one does not need one either. But those other applications do not discharge high concentrations of brine as the chemical of concern and for which there are no numeric standards.

⁴ PAC-50R p. 14, l. 9.

⁵ PAC-48R p. 10, ll. 6-7, and PAC-50R p. 15, l. 27 – p. 16, l. 2.

⁶ PAC-54R and PAC-50R p. 27, ll. 1 – 19.

salinity at the three mixing zone boundaries will also be much higher than the 2 ppt recommendation for the permit limit, as much as 6 ppt at the boundary as far out as the HHMZ boundary. Salinity levels, well over 6 ppt throughout the three mixing zones, are much too great for early life stages of fish.

And even if the CORMIX modeling performed by the Port and the ED correctly predicted the changes in the levels of salinity at the relevant mixing zone boundaries, which they do not, the figures would still be too high to comply with the recommendations of TPWD and GLO. Ms. Cunningham's modeling shows worse case conditions of a 2.5 ppt and 7% increase in salinity at the ALMZ boundary. The ED's modeling also shows that the salinity concentrations in the channel will be well above 40 ppt, in all three mixing zones, as high as 44.7 ppt at the ZID boundary.

As a result, the Port now argues that any limits on the changes in salinity that result from the discharge should be much higher than the international standard, much higher than the level that TPWD and GLO recommended and much higher than the local testing has confirmed is necessary to protect aquatic life in the Corpus Christi Bay System.

III. THE EDDY AND OTHER SITE-SPECIFIC CONDITIONS

The data collected by the Port for its amended application raise more questions than they answer. What happened to the eddy? What created the hole and when? Is the hole getting deeper or filling in? Is the location for the outfall on the side of the hole eroding? How do the sides of the cove, in which the discharge was moved, affect the mixing?

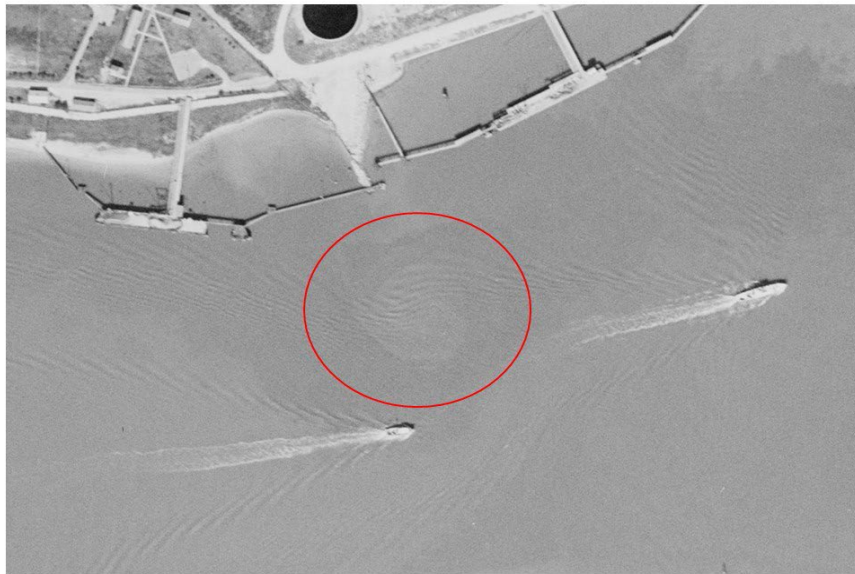
The Port advised TCEQ that there is an eddy that created the 90-foot hole when the Port first identified that hole in the spring of 2019. The Port produced no information on the eddy, no information on its size, its location, or its strength.

At the Commissioners' agenda meeting, Counsel for the Port stated:

Because there was a localized eddy that changes the bathymetry at that exact location. And they-in our view, and I-we think our expert testimony provided this in the record that that eddy and that localized increase in depth enhances the mixing, and makes, makes existing modeling more conservative. The ALJs disagreed, and they wanted more specific data. That's the type of

data that we think we can provide that will show that being deeper, having more current enhances the mixing and provides more protection for marine life and the environment.⁷

Now the Port argues there is no eddy and that the hole was not created by an eddy. The Port says this even as Dr. Tischler's June 24 2021 memo in the amended application references the eddy created "hole."⁸ The Port now refers to the hole as a "depression." So, Dr. Tischler put quotes around "hole," but not around the term "eddy created." As of the date the amended application was filed in June, the Port still believed the hole had created by an eddy. And with good cause. For example, such a large eddy appears to sit right over the hole in historic photos, such as the one below. This one is part of a 1956 aerial photograph,⁹ and the eddy in the circle can be seen clearly by enlarging the picture.



Dr. Austin's testimony shows that the data collected by the Port last June reflects significant evidence of non-uniform flow conditions near the discharge that could be the result of an eddy.¹⁰ And Dr. Socolofsky, clearly the most qualified and reliable expert on flow conditions along the Texas coast, has identified evidence of eddies near the discharge site on satellite images.¹¹ There is still significant

⁷ Exhibit PAC-53R, page 47.

⁸ Exhibit APP LT-5-R pdf page 3, referenced on AR Tab I, page 248.

⁹ Exhibit PAC-53R BW-17.

¹⁰ Exhibit PAC-44R, page 23, line 22 – page 25, line 4.

¹¹ Exhibit PAC-51R SS-4.

evidence of eddies to support the position of the staff of the Port in the original hearing. The Port did not do the work needed to evaluate them or prove that they do not exist in the area of the discharge.

Why? The presence of an eddy presents one of the problematic site-specific conditions that precludes the CORMIX model from predicting the mixing at the boundaries of the mixing zones.

The Port's original application indicated a channel bottom of about 63 feet deep. It did not identify the 90-foot hole or the eddy, despite the Port's corporate representative, the Port's environmental officer, saying that it was common knowledge that there was an eddy at or near the location of the outfall that created the hole.¹² Only when asked about the hole by the ED did the Port admit that there is an eddy, and claimed it was common knowledge! Now, the Port does not merely say that its found no evidence of an eddy. It claims that its evidence proves there is no significant eddy.

However, the earlier testimony of both a witness for the ED and one for the Port conflicts with the Ports creative argument that the eddy improves mixing. These two experts make it clear that an eddy can capture the effluent and recirculate it.¹³ And that recirculation can clearly happen in the mixing zones, i.e. over the hole. Still, instead of conceding that the eddy creates a problem for it, the Port's experts now argues that there is no significant eddy, just small centimeter size eddies.

¹² Exhibit PAC-17, page 12, line 9 – page 13, line 17. A fuller description of the Port's position on the eddy is available from testimony for the Port in Exhibits PAC-23, PAC-17, page 12, line 9 – page 13, line 7, and PAC-18, page 33, line 4 – page 35, line 25.

¹³ James Michalk, testifying for the ED explained:

Q Are you familiar with eddies?

A. I am familiar. I'm somewhat familiar with eddies.

Q. Have you been caught in one in a kayak, by any chance?

A. Yeah, I think I have.

Q. Okay. So what happens in an eddy?

A. It can keep bringing you back around.

Exhibit PAC 15, Excerpts from the deposition, page 19 lines 10 – 25

Dr. Jordan Furnans for the Port agreed:

Q. If there is an eddy, it takes whatever's in the water, swirls it around and around in a circle, correct?

A. Not necessarily a circle, but, yes, it swirls it around and around. . . .

Q. The point being whatever is in that eddy gets caught in that eddy for some period of duration?

A. Yes.

Tr. Vol 3 page 158 line 16 – page 159 -19

And the Port does so without explaining why the eddy was common knowledge to the Ports own personnel, who believed that the eddy created the hole. It does not explain why its experts accepted the eddy as fact originally without any data on the eddy, The Port does not explain why its experts repeatedly testified that the eddy would enhance greater mixing in the hole below the 63-foot bottom depth it used for its CORMIX modeling. And now the Port reverses its position without doing the site-specific analysis that is needed to support their new opinion. It has less than four days of data, all in the same week. And it has owned the submerged land at the discharge for many years.

But, the Port's failure to characterize the eddy is not its only problem. There is a clear conflict in the bathymetry presented in different parts of the application and in the Port's expert testimony. Attachment 2 below shows the bathymetry presented by Dr. Tischler in his Figure 1 of the "Updated Application" and in Figure 4 of the Parsons' Technical Memo. The contours are about 30 feet different from each , as are the locations of the discharge. PAC showed this problem months ago, yet the Port has not amended its application to identify which set of contours it is relying upon.

And, in its response to a specific request for clarification from the ED on the depth below the discharge, the Port misrepresented the data it had. The Port responded that the discharge can be assumed to discharge at an area over the 90-foot hole.¹⁴ That area is 70 feet farther out into the channel, close to where the original discharge was proposed. And the discharge is actually on, if not buried in, the side of the side of the hole, the bank coming down from Harbor Island, at a 65-foot depth.

The assertion that the discharge is over the 90-foot (now 95-foot) bottom of the hole could only be accurate if the discharge is moved again back toward the original location. And the Port's own CORMIX modeling shows the plume only goes a few feet toward the middle of the channel before turning to flow parallel to the channel over depths that never get to 90 feet and rarely to 65 feet.

¹⁴ The Port's July 28 Response to the ED's Requests for Clarification, page 1.

IV. IMPROPER MODELING

Once again, the modeling done by the Port for the application and by the ED for the Draft Permit is not in accordance with the CORMIX User's Manual. For the first application, both the Port and ED made two big mistakes. First, they looked in the wrong direction for the mixing conditions at the ZID boundary. They both looked at the X-axis, and not the Y-axis. PAC's experts showed them they were wrong. The ED acknowledged the mistake it and the Port made. The ED then simply revised its draft permit to change the limit from less than 2% of the effluent at the boundary to more than 18% - allowing 9 times the concentration of the high salinity effluent at the ZID boundary.

But the Port and the ED also incorrectly assumed that the worst modeling was at low channel velocities. Again, PAC's experts had to show them their errors. PAC's experts proved that the figure at the ZID boundary would be as high as 70% of the effluent, not 18.4%.

Now, in their modeling for the new location, the Port and ED again make two major errors. First, contrary to clear direction in the CORMIX User's Manual, they improperly schematize the channel. They assume that there is no bank or side of the hole within 200 feet of the location of the discharge. Yet, the discharge is at that the bank, the side of the hole. See Attachment 1. Thus, their modeling completely ignores the interaction of the dense sinking plume with the bank and side of the hole. And the CORMIX model shows such interaction with the bank will greatly reduce the mixing.

But the Port and the ED make an even greater error. They ignore the fact that the discharge is in a cove and the effluent plume is blocked by the sides of the cove for most of the time for incoming and outgoing tides. They do not acknowledge or attempt to analyze what the CORMIX model tells them, that the path of the plume would have to go underground to get to the boundaries of the mixing zones. The plumes going in or out with fast currents run into the side of the cove almost immediately, and will be diverted from the straight-line path the CORMIX model assumes.

The CORMIX model shows that the faster tidal currents turn the plume from flowing across the channel to parallel with the channel within a few feet of the discharge for most tidal conditions. That was shown by Mr. Trungale in the initial hearing, and it has been shown here by the ED's modeling.

Because of the placement of the discharge in a cove, the CORMIX model cannot predict where the plume will go once it contacts the bank or sides of the cove. It cannot predict how it will mix once contact is made. And the interactions occur before the plume gets to the boundaries of any of the mixing zones. Attachments 1 and 3 show this problem with the sides of the cove.

Once this was pointed out by PAC's experts, the Port and the ED have taken the position that they can simply ignore that unpleasant fact and accept the model predictions as if the plume could go straight to the boundaries of the mixing zones. The plume cannot, and the Port and ED cannot rely upon the predicted mixing. As Mr. Michalk has noted in testimony in the last hearing, there are simply some places where the model cannot provide reliable results.¹⁵ The cove is clearly one of those places.

Moreover, as PAC's experts also will explain using the CORMIX model predictions, once the plume interacts with the side of the cove, the bank down from Harbor Island, to the left and right of the discharge location, the mixing is much worse. The ED's and Port's modeling shows better mixing because they schematize the channel using assumptions that discharge is at least 200 feet from the bank. They contend this is reasonable because the **shoreline**, where the water meets the shore of Harbor Island at the surface of the channel, is more than 200 feet from the discharge. But the 20 discharge ports are on, if not buried in, the bank.

Even if PAC's experts should assume the discharge location is in the water and 10 or 15 feet out from where the application says it is, the model still shows that the plume will still interact with the bank and the sides of the cove going with the incoming or outgoing tides.

¹⁵ PAC 15, Excerpts from the deposition, page 19 lines 23 – 25

The CORMIX User's Manual makes Protestants' position clear in a number of ways. For example, it provides drawings for the proper approach for determining the distance from the bank or shore to the location of the discharge, the "DISTB." Two examples copied from the Manual are shown on Attachment 4. In both figures, the schematization puts the vertical wall at the bank near the discharge not at the bank where at the water surface. As Dr. Socolofsky explains, the proper schematization assures that boundary interactions can be identified and evaluated, here resulting in up to the 55% figure.

The Port's problem is its new location, where sinking effluent, a negatively buoyant concentrated brine, does not rise above the bank or the sides of the cove. The plumes do not go over the side of the hole. The effluent is initially trapped in the hole for most tidal conditions. The plume contacts the bank and the sides of the cove almost immediately.

V. MOVING THE DISCHARGE LOCATION AGAIN

Thus, the only real option is for the Port to argue it can move the discharge location. The Port claims it can do this, saying that TCEQ rules give it the flexibility to move the discharge location once the permit is issued.

In effect, the Port claims the ED, the Judges and the Commission can simply ignore all of the modeling and evaluation work done by PAC's experts with the location of the discharge identified in the amended application. The Port claims it does not even have to say where the new diffuser location will be. According to Dr. Tischler, that is a decision for the Port to make, once the permit is issued.

The Port's position cannot be allowed. This issue was raised for the original application, when it was clear that the location of the discharge show by the latitude and longitude was not the same as what was shown on some of the figures in the application. In her deposition, the Port's Corporate Representative said that the location the Port intended is at the latitude and longitude in the application.¹⁶

¹⁶ Ms. Garza stated: The latitude and longitude in the application is what the Port is relying on." Exhibit PAC-18, p. 31 of 44, ll. 13-14.

In its June 2021 amended application, the Port moved the location about 70 feet north of its prior location. The Port provided the new latitude and longitude for the new location. Protestants objected, knowing that they would have to start over with their modeling and analysis.

The ED has now added the latitude and longitude figures in its draft permit, as it did for the prior draft permit. And all parties have had to redo their modeling and analysis using that specific location.

The Port was on clear notice that it needed to get the site-specific facts right for its “do over.”¹⁷ And the discharge location is THE key basis for conducting the mixing analysis that is then used for environmental impacts evaluation. The application forms requires the specific latitude and longitude figures and TCEQ rules require an applicant to swear to the accuracy of such information.

PAC and other Protestants will have wasted their time and money modeling the diffuser design at the specific location identified in the amended application if the Port gets away with the new move at this late date. And Protestants already were required to waste their resources on expert modeling and evaluation in the first proceeding. Moreover, allowing such actions by applicants would set a terrible precedent for public participation in future water discharge permit proceedings.

The TCEQ public participation process, which EPA only approved after 25 years of debate with Texas, cannot work if the discharge location can be a moving target.

VI. CONCLUSION

It is important to remember that in the first hearing, Dr. Tischler testified, “Under the condition of high flow rates, the modeling would suggest that they [the Port] couldn’t meet it [the 18.4% limit].” Tr. Vol. 3, at 264:20-265:3. In effect, the Port admitted it knew all along that its diffuser design in the original application could not meet the standards in the draft permit. Yet, it did not withdraw its application without prejudice and file one with a location or diffuser design that could be authorized.

¹⁷ The Commission remanded this case for additional evidence on (among other things) “Whether the **Application, and representations contained therein**, are complete and accurate.”

Instead, Dr. Tischler presented a new diffuser design, which the Port unveiled just before the hearing. The Port claimed that it could meet the 18.4% permit limits at the ZID boundary with the new diffuser and, therefore, had met its burden of proof. It did not matter, the Port claimed, that the new diffuser was not the subject of the discovery or any other party’s modeling. It did not matter the Port claimed, that the Port’s new design could not meet the % of effluents that the ED’s modeling showed for the other boundaries, as shown in Table 1.

Table 1: Comparison of “critical conditions” for CORMIX modeling for the Original Application

Boundary	Modeling by ED for		Modeling by Port for		Modeling by PAC for
	The 2019 Draft Permit	The 2020 Rev. Draft Permit	The 2019 Application	The new/2020 Diffuser Design	The 2019 Application
ZID:	1.95	18.4	1.75-2.06	14.8	Up to 70
ALMZ	1.34	1.34	0.45-0.86	9.79	Up to 50
HHMZ	1.20	1.20	0.53-0.73	6.79	Up to 35

Now, Dr. Socolofsky and Mr. Osting have shown that the proper CORMIX modeling for the new location and diffuser design results in up to 55% of the effluent remaining at the ZID boundary. Table 2 provides the same comparisons for the new diffuser and the new discharge location.

Table 2: Comparison of “critical conditions” for CORMIX modeling for the Amended Application

Boundary	Modeling by ED	Modeling by Port	Modeling by PAC
	For 2021 Draft Permit	In 2021 Application	For 2021 Application
ZID:	14.6%	10.7%	up to 55.0%
ALMZ	8.9%	4.9%	up to 41.4%
HHMZ	5.4%	3.4%	up to 24.5%

So, the Port is scrambling again; trying for a last minute Hail Mary.

The only proper option for the Port, other than accepting denial of the permit, is to withdraw its application “without prejudice.” It would be subject to the TCEQ rule on payment of the Protestants’ costs of their experts¹⁸ as it should have been in the first proceeding.

The Port can then file a new application. It will need to take the time required – months, not days – to obtain the data needed to characterize any new discharge location it chooses. It needs to do that only

¹⁸ 20 T.A.C. § 80.25

after it chooses a location for which the CORMIX model can be used to accurately predict the mixing performance of the diffuser. Then, the issue of impacts on marine species can be addressed, as proposed by TPWD and GLO or otherwise, but with adequate data and reliable predictions of mixing by the diffuser.

Respectfully submitted,
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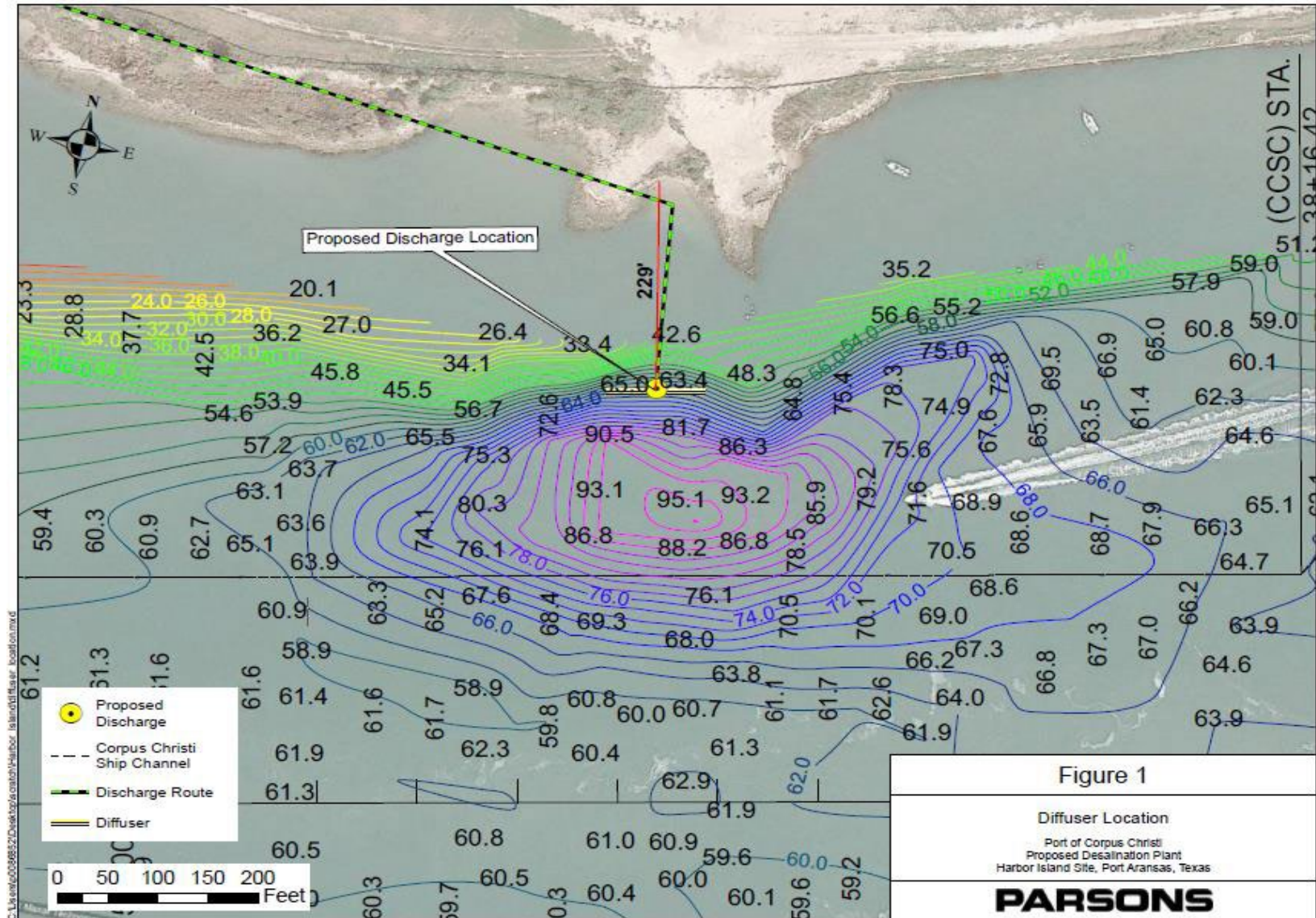
ATTORNEYS FOR PROTESTANTS

CERTIFICATE OF SERVICE

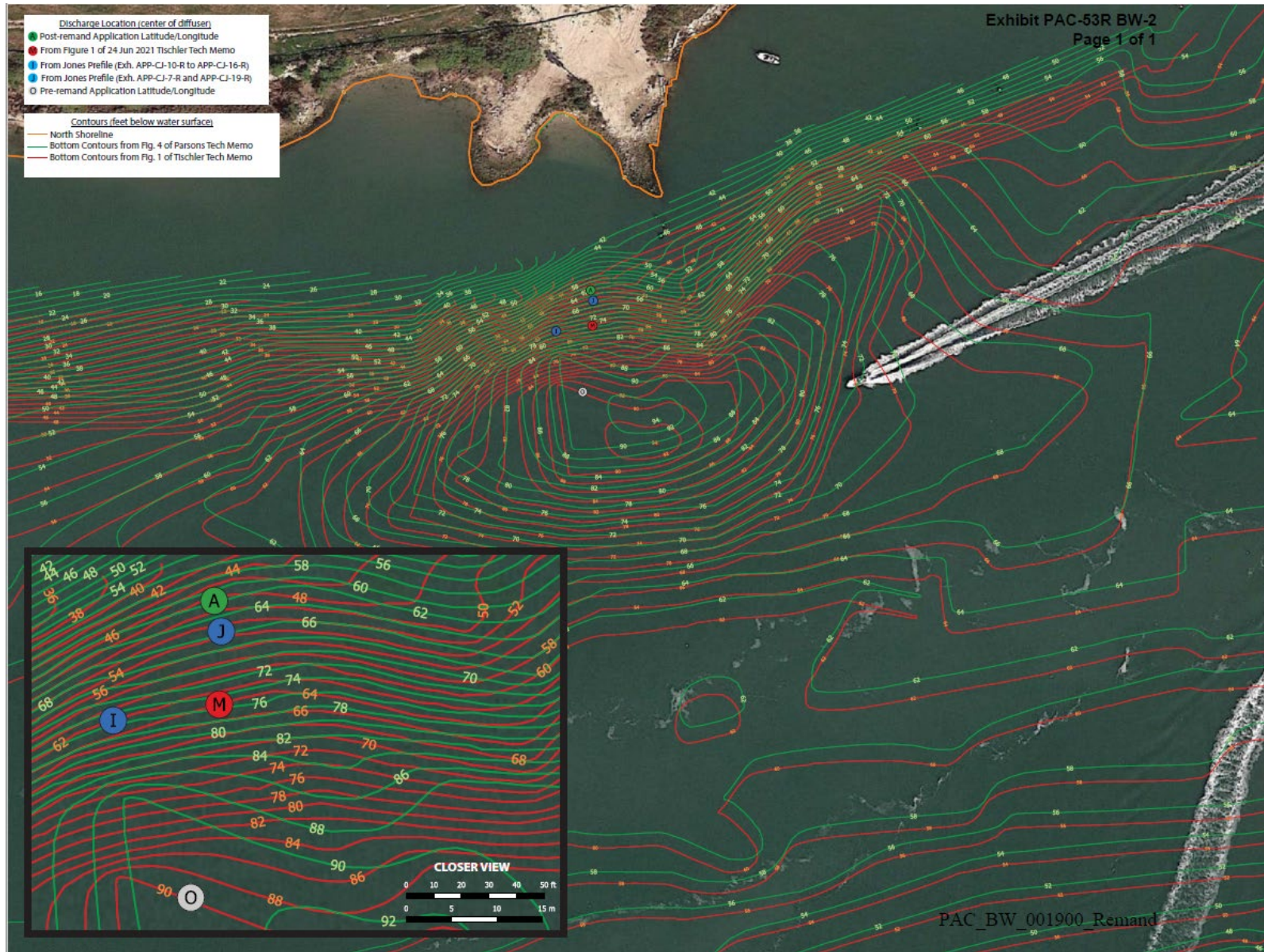
I hereby certify that, on March 9, 2022, a true and correct copy of the foregoing document has been served on the below parties to this case.

/s/ Richard Lowerre
Richard Lowerre

Attachment 1: Figure 1 from the Port's Updated Application AR Tab I Page 254

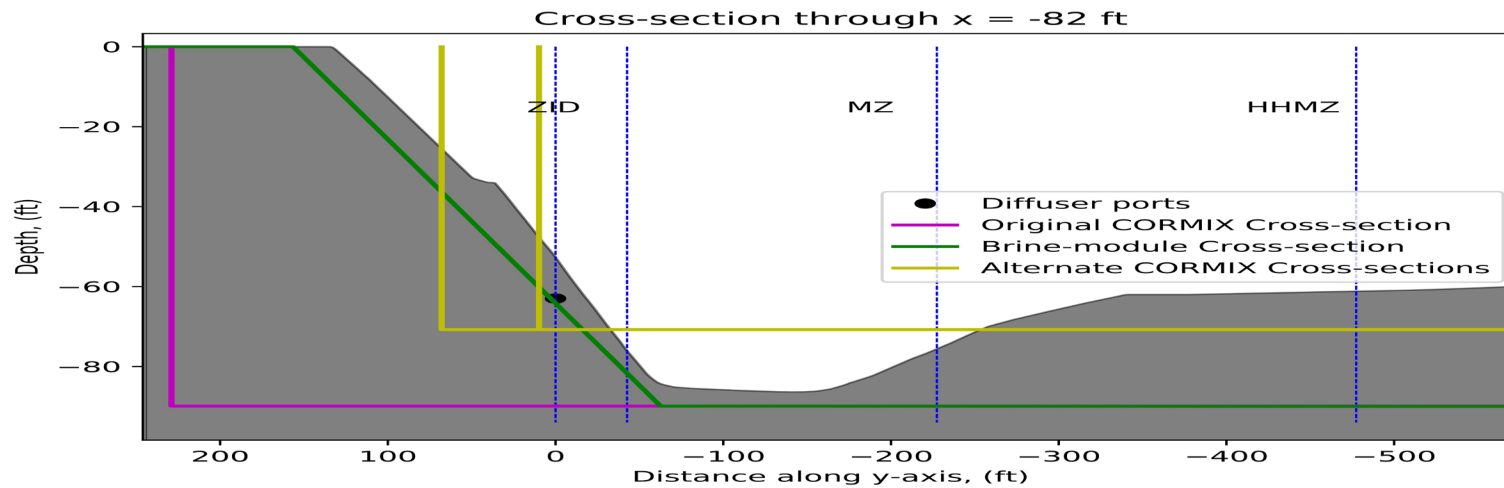
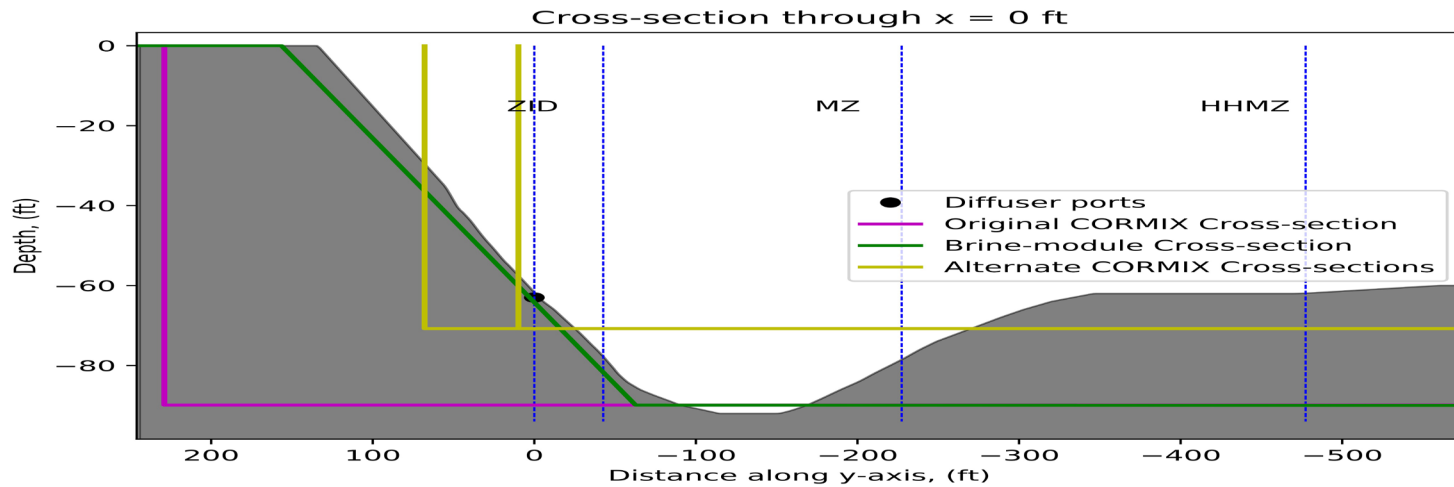


Attachment 2: PAC-53R BW-2: Comparison of the different outfall locations and bathymetry in the Port's application and testimony



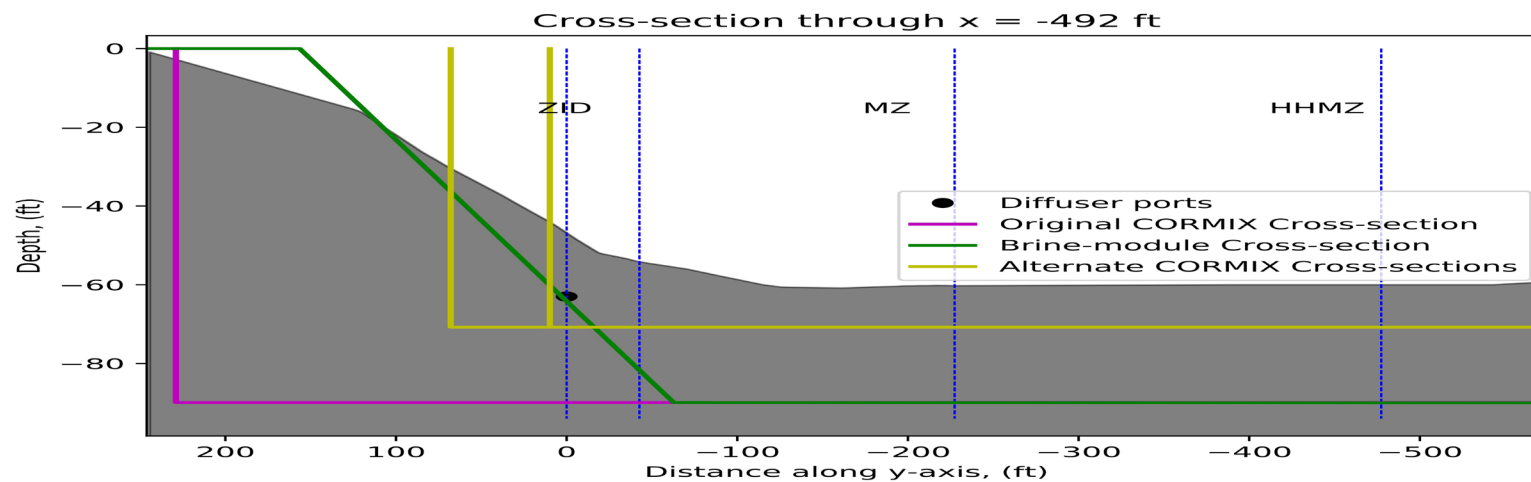
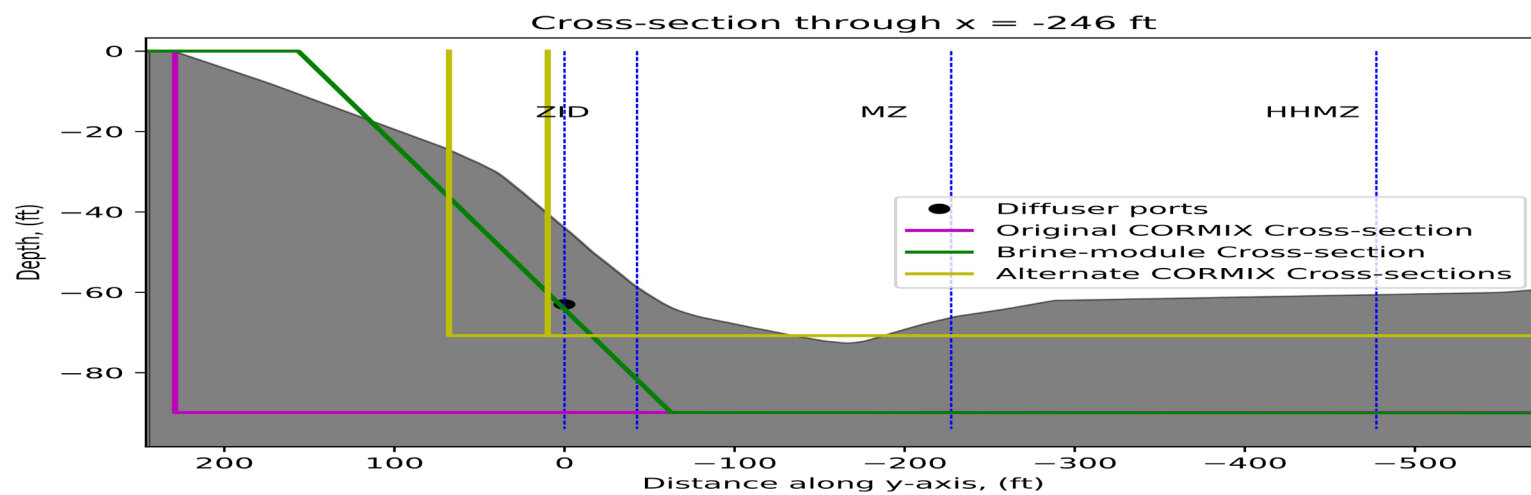
Attachment 3. Showing Cross Section at the Discharge and 82 Feet Downstream. From PAC 51-R SS-6 pp. 9 & 10

Note. The second figure shows the side of the hole at 82 feet down stream of the discharge, which is within the ZID which is 92 feet downstream of the discharge . The side of the hole there is approximately 10 to 20 feet further out into the channel that it is at the discharge .

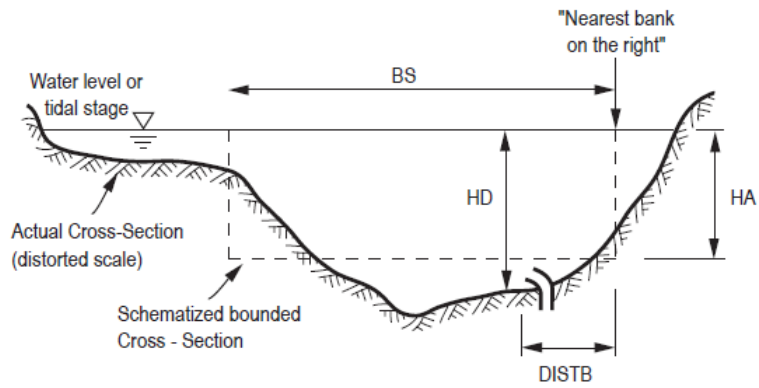


Attachment 3 Continued

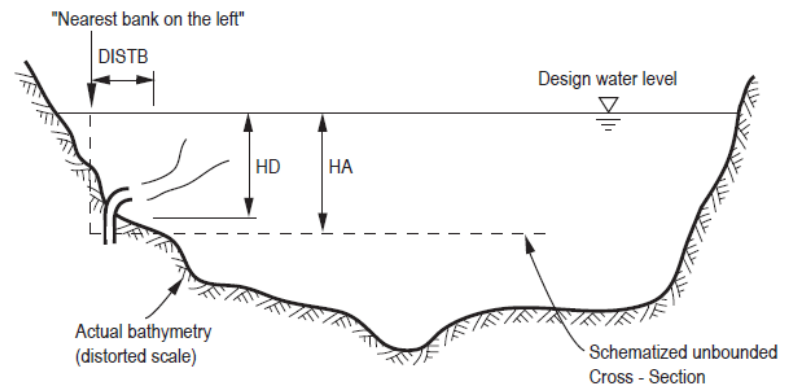
Note. The next two figures show how far the side of the hole project into the channel blocking the direction of the plume as predicted by the CORMIX model near the boundary of the aquatic life and human health mixing zones.



Attachment 4. Figure 4.4 from Exhibit ED-KC-3, page 44



a) Example: Bounded Cross - Section Looking Downstream (River or Estuary)



b) Example: Unbounded Cross - Section Looking Downstream (Small Buoyant Jet Discharge Into Large Lake or Reservoir)