Message

From: Mues, Pascal [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0B2AB2E32A7049D78F063FA77D054524-PMUES]
Sent: 3/25/2020 11:26:36 PM
To: Goodwin, Cathleen@Waterboards [Cathleen.Goodwin@waterboards.ca.gov]
CC: Moore, Heaven@Waterboards [Heaven.Moore@Waterboards.ca.gov]
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Thank you for the context, Cathy. Either of the times you proposed for tomorrow would work for me, for now I'll block out 2-3 PM and you can tell me if we should delay to 3:45. Amelia has okayed that we stop CC'ing her while we're focusing on call logistics, and I'll loop her back in for any major discussions or follow-up.

If we still have 8-9 months' lead time before even the ROWD is submitted, then it is *definitely* appropriate to require the City to conduct more detailed modeling before submission. I can understand their desire to secure a dilution credit / mixing zone in as simple a manner as possible, but given my experience with the complexities of modeling other tidally influenced bay- and harbor systems, it's entirely appropriate for you to insist on a more rigorous analysis here, especially when the parameter of concern is Ammonia. Did I understand correctly that the discharge will still only be occurring on the favorable tide (beginning of outflow from the bay), or is that practice likely to change?

That said, I do think modeling is fundamentally a feasible approach to demonstrate the ability to comply with limits in this case. Depending on what existing data are available for the receiving water (e.g. background ammonia levels), they may need to do a bit of additional data collection, so we should favor giving them the direction they need to make that determination and get started as soon as we reasonably can.

I'd recommend particular attention to clearly communicating and managing expectations on both sides, as we do not want to direct the discharger to do additional work only to have to rule that it's inadequate upon submission.

Looking forward to our conversation tomorrow,
-Pascal

Pascal Mues, Environmental Engineer
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75 Hawthorne Street, San Francisco, CA 94105
Phone: (415)-972-3768 | mues.pascal@epa.gov

From: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Sent: Wednesday, March 25, 2020 3:56 PM
To: Mues, Pascal <Mues.Pascal@epa.gov>; Whitson, Amelia <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Hi Pascal:

I look forward to working with you on this.

The City's current NPDES permit, adopted in June 2016, had some significant changes over the prior permit. The City's discharge outfall is in Humboldt Bay near the opening to the Pacific Ocean. Historically, the discharge was characterized as on ocean discharge due to the location and modelling and dye studies that were conducted many years ago. The City has historically been allowed to discharge on the on-going tide on the assumption that the discharge was being carried out to the ocean. In 2014, per permit requirements, the City conducted a new modelling study that showed that under many conditions, the much of the discharge remains in Humboldt Bay. The 2016 permit recharacterized the discharge

as a discharge to an enclosed bay/estuary and the discharge was analyzed using California Toxics Rule water quality objectives rather than Ocean Plan WQOs. This resulted in more stringent effluent limitations for ammonia and loss of the mixing zone the City has under the Ocean Plan. The City is currently unable to comply with its ammonia effluent limitations. The current permit also requires the City to come into compliance with the Enclosed Bays and Estuaries Plan, which would require the City to make several changes to the plant to ensure that all discharges fully meet disinfected secondary requirements (historically blending has been allowed) and to demonstrate enhancement to the bay in order to get an exception to discharge to the Bay.

The technical memorandum proposing to use modelling to demonstrate compliance with ammonia effluent limitations was developed as they are working with the Regional Board staff to achieve compliance with current and future permit requirements. The current permit expires on July 31, 2021. The City's ROWD is due on December 1, 2020. Thus our response to this proposal will inform their approach to complying with ammonia effluent limitations. The City is hoping that they can demonstrate compliance through a modelling approach. I would say that we all have the better part of this calendar year to work through this.

I will send an email out to my team to see who is available tomorrow afternoon. It looks like several people might be available 2-3 or 3:45 to 4:45. Do these times work for you?

Cathy

From: Mues, Pascal <Mues.Pascal@epa.gov>
Sent: Wednesday, March 25, 2020 3:04 PM
To: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>; Amelia Whitson <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

EXTERNAL:

Cathy – Based on my read of the situation, I think there would not be much benefit to having you wait for me do a ground-up reanalysis when the limitations have more to do with the discharger's assumptions and limited input data. Also, unless the Eureka/Humboldt issue is elevated by both our management chains, I'm afraid my office probably can't spare the time and resources to do additional model runs in the near future - there are competing demands on me for modeling two major EPA permits within the next month.

In any case, your initial approach of requiring the discharger to justify their assumptions and/or do additional modeling themselves was the same one I would have taken before resorting to in-house model development. Are we still in the phase of reviewing the application package, or well into permit development? I'd like to understand how soon these issues are going up before the Board and thus how much lead time the discharger may still have to prepare and provide supplemental modeling.

Let's try to schedule a call sometime before the end of the week and talk through the basic issues. Any time between 1-6 PM, as stated in my previous E-mail. Do be aware that I am on a compressed schedule similar to Amelia, and therefore will not be working on Friday April 3rd.

-Pascal

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From: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Sent: Wednesday, March 25, 2020 2:40 PM
To: Mues, Pascal <Mues.Pascal@epa.gov>; Whitson, Amelia <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Hi Pascal:

I don't necessarily need to have input by the end of next week. If there is a benefit in you doing model runs of your own to inform our discussion and our comments, I'm all for it. I told Amelia that my goal would be to have comprehensive comments to send to the City within a month or so. Certainly, sooner if we have them. But, I'd like to take the time we need to go through this thoughtfully to ensure that we give the City a comprehensive set of comments that will guide them and Regional Board staff in this process.

Thanks
Cathy

From: Mues, Pascal <Mues.Pascal@epa.gov>
Sent: Wednesday, March 25, 2020 2:35 PM
To: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>; Amelia Whitson <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

EXTERNAL:

Cathy, good to be working with you. As I understand you are looking to prepare input by the end of next week, so we probably won't be doing any model runs of our own, but that aside I'm happy to walk through the technical issues with you and help refine what you should ask the discharger and/or their consultant to elaborate on. I've skimmed the consultant's report and their model outputs, and I don't think we need to budget more time for review there, unless there are other elements of the permit package I haven't seen yet that you think need to be taken into consideration.

I am generally available in the afternoons until at least 5 PM, potentially 6. We can try to set up a web-chat via Skype or, if that's infeasible, feel free to call me at my work number below. If you do decide to expand this discussion to other members of your team, please try to give me an hour's advance notice before we hold the bigger call so that we can make sure of the logistics.

Best of luck and health to everyone who is quite literally working through the current situation,
-Pascal

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From: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Sent: Wednesday, March 25, 2020 2:29 PM
To: Whitson, Amelia <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>; Mues, Pascal <Mues.Pascal@epa.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Amelia and Pascal:

Thank you so much. Yes, I would like to set up a time to discuss this further with Pascal. I'd like to see who else on my Regional Board team would like to participate in the conversation. Pascal, what is your availability for a call? Do you want to take more time to review the City's technical memorandum before we do so? I can let you know our availability soon (after I check in with a couple of Regional Board staff who might participate on the call).

Take Care,
Cathy

From: Whitson, Amelia <Whitson.Amelia@epa.gov>
Sent: Wednesday, March 25, 2020 2:18 PM
To: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>; Pascal Mues <Mues.Pascal@epa.gov>
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

EXTERNAL:

Hi Cathy,

Was so nice to talk with you earlier today. So glad to hear you and your family are safe and healthy! Hope the working-from-home continues to go smoothly.

Anyway, Pascal very kindly volunteered his time to help with your request. He's an incredible resource on this topic, and he's already very impressed with your review of the documents. He actually already had a chance to put together some initial responses on the documents you'd attached:

Following the same numbering scheme as Cathleen's comments in Attachment C:

- 1.a: We must evaluate how appropriate the Visual Plumes / UM3 model is for this discharge in the context of what modes of dilution the discharger is claiming to prove. In this case, they only seem to be seeking buoyant-plume mixing, aka "initial dilution", which UM3 can provide good results for <u>if carefully parametrized and staying aware of the model's limitations</u>.
  UM3 isn't sophisticated enough to take into account complex bottom shape or nearby shorelines of the kind we might expect in Humboldt Bay, much less tidal currents that change over time. The consultant's report does not demonstrate that they carefully considered and protected against those limitations of the model chosen, when they really should show their work.
  Because the discharger is only claiming initial, buoyant-plume dilution the results from UM3 / Visual Plumes are not *inherently* invalid. But, when EPA recently faced a similar discharge into a *less*-constrained bay (Pago Pago Harbor in American Samoa), we had to get the modeling re-done in CORMIX and found significant potential for boundary interactions that could reduce effective dilution.

- 1.a.i: A "sensitivity analysis" (i.e. submitting multiple model runs with variations in input parameters, including more than 2 flow rates) would be a normal best practice for modeling a discharge for the first time, and I would wholeheartedly support Cathleen's request here, even if the discharger complains about the additional time and cost.

- 1.b: The consultant's assumption of "zero background level" for Ammonia is probably the single biggest flaw in the analysis. Especially with a narrow-mouthed tidally-influenced system like Humboldt Bay, you would expect plume re-entrainment unless proven otherwise, and that can dramatically reduce effective dilution. Are there any "reference station" data, from this permit or other dischargers, that could be used to get a

background value? Also worth double-checking that consistent assumptions were used for the chemical transformation model.

- Skipping to 4.b: The "entrained ambient volume" only comes up in a general description in the report, so there is not a numeric value to report, but in practice yes this is based on how the algorithms in the model work.

- 4.c: UM3 does not produce 3-dimensional graphs of the effluent plume just because the base code of the model dates back to before computers were reasonably capable of rendering a 3-d graph like that. However, for information on "how far from the outfall the mini plumes blend together", see Attachment B to the consultant's report and look for the lines of the model where it says "merging".

Pascal also said he'd be happy to set up a phone call to discuss further with you. I'll leave it to the two of you to set up a time to talk, and no need to involve me (unless you'd like me to help facilitate in any way).

All the best,

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From: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Sent: Monday, March 23, 2020 3:56 PM
To: Whitson, Amelia <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Hi Amelia:

I hope you are well during the current COVID-19 emergency. Are USEPA staff working from home at this time?

I believe I spoke with you about the City of Eureka's proposal to use modelling to try to demonstrate that ammonia does not have the potential to exceed effluent limitations for ammonia. I just can't remember how much we discussed this. The City submitted the proposal in December 2019. I am just getting back to working on Eureka after working on getting the Santa Rosa permit out for public comment. I need to provide comments to the City on their proposal and whether such an approach is even an option.

Regional Board staff wish to request USEPA assistance in reviewing the City's proposal. Heaven Moore talked with someone from USEPA when she attended the NPDES Permit Writers' Training earlier this month. That person recommended that we contact Pascal Mues indicating that he has modelling background. Is it appropriate for me to contact Pascal directly to make this request? If not, how do you recommend that I request USEPA assistance for review of the City's technical memorandum? We are interested in providing the City with feedback soon. We want to be able to tell them whether this approach is an option for demonstrating that ammonia is not (or is) exceeding effluent limitations and, if so, identify the minimum requirements and appropriate assumptions to include in the evaluation to ensure a robust analysis. We also need guidance on appropriate modelling software.

I have attached the City's technical memorandum as well as a list of comments that I developed when I reviewed the technical memorandum.

I look forward to hearing from you.

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The governor of California has issued a statewide shelter in place order due to the COVID-19 emergency. The Water Boards are continuing day-to-day work protecting public health, safety, and the environment. However, most staff are working remotely and we continue to check email and voicemail regularly. Thank you and stay healthy and safe.