Attachment C
Regional Board Comments on Eureka ERWWTP November 25, 2019 Evaluation of Ammonia Toxicity Technical Memorandum
December 27, 2019

1. Overall concerns:
    a. The Visual Plumes model is typically used for flowing water. We are concerned that it might not adequately address the complex conditions in the Bay.
        i. Can a sensitivity analysis be done to show that the model appropriately reflects these complex conditions and to show that the appropriate data was used in the model?
        ii. Provide references to justify use of this model for use in bay waters.
    b. Assumed no ammonia in the receiving water. We are concerned that some ammonia may remain in the ambient water within the effluent dispersion zone. This ammonia could be what lingers from the City's discharge or from other sources. Regional Board staff also found information on the Internet documenting that Humboldt Bay contains nutrients (including ammonia and nitrate). The model should be run at higher ammonia concentrations and with receiving water ammonia.
    c. The model was run using an effluent ammonia concentration of 9.3 mg/L (based on a one-time sample collected this fall (to collect effluent data for the modelling effort). MEC = 18 mg/L. I've seen even higher total ammonia from trickling filter plants that are not nitrifying.
    d. The model was run for effluent flow rates of 6 mgd and 30 mgd. Does the model consider that the discharge is not continuous and occurs over two discharge periods each day (approximately 6 hours long)?
    e. Sampling should be done to validate the model. The current submittal lacks substantial sampling results to validate the model.
    f. We would need more information to be able to defend this approach before the Board and the public stakeholders.
2. Page 1.
    a. Explain "late summer/early fall receiving water conditions"
    b. Was effluent and receiving water monitored on the fall 2019 discharge day? Please provide the complete data set from the fall 2019 sampling.
3. Page 2.
    a. Section 2.2. We need a summary of all parameters used in the model and how those parameters impact the model.
4. Page 3.
    a. Was modelling based on conditions that would exist under future repaired outfall conditions? Per meeting - yes

b. Section 2.3. How was ambient entrained volume calculated? Is this based on an algorithm in the model?
c. Page 6. Does the model produce three dimensional graphs to understand the full dispersion of the plume (and how far from outfall before the mini plumes from each port blend together?)
d. Table 3-2.
    i. Chemical Model output. Why the NA in the last two columns for dilution of 1?
    ii. Are the pH and temperature of the mixture calculated using a mass balance?
    iii. Please provide the spreadsheet to allow RB staff to review all calculations in the table, particularly the calculations for unionized and total ammonia criteria. The values in the unionized criterion columns appear to less stringent then the values that result using the formulas in the U.S. EPA 1989 *Ambient Aquatic Life Water Quality Criteria for Ammonia (Salt Water).*
    iv. The values in the Total Ammonia Criterion column for temperatures of 15 degrees appear to be the values that correspond to 20 degrees C.
e. Page 3-3 Chemical Modeling Discussion
    i. The model should be run using at least a max ammonia of 18 mg/L. The graphs in Figures 3-1 and 3-2 should be revised based on comments above.