State of California

M e m o r a n d u m

Date: September 12, 2018

To: **Commissioners and ALJs**

From: John E. Forsythe - Energy Division
MPWSP CEQA/NEPA Team
CPUC Legal Division

File No: A.12-04-019 Cal-Am MPWSP FEIR/EIS

Subject: **Responses to Comments Received After Publication of MPWSP Final EIR/EIS**

Numerous comments have been raised in parties' briefs and separate comment letters directed to the CPUC following publication of the Final EIR/EIS in March 2018. Some of these have included additional studies, including the final report on airborne electromagnetic (AEM) data collected for MCWD[1] and a May 11, 2018 Technical Memorandum on the potential Pure Water Monterey System expansion.[2] None of these additional communications and studies raise any issues that cause us to believe there are new or more severe significant impacts beyond those identified in the Final EIR/EIS or that new mitigation measures or additional alternatives would be warranted. The vast majority of these comments already have been raised and responded to in the Final EIR/EIS.

Below is a summary of comments that appear to or claim to present new information, or otherwise merit a response, and responses to these comments.

Responsible Agency Consultation

The City of Marina is a responsible agency under CEQA because it will address project approvals other than those being acted on by the CPUC, notably a coastal development permit for the source water slant wells at the CEMEX site. CalAm has applied to the City of Marina for such permit. CEQA requires that the lead agency under CEQA, here the CPUC, prepare and circulate a Notice of Preparation concerning the subject of an EIR being prepared so that responsible agencies and others may provide written comments to the lead agency as to significant environmental issues and possible mitigation measures and alternatives that should be explored in the EIR. (CEQA Guidelines section 15082(b).) A responsible agency may request a meeting with the lead agency to assist the lead agency in determining the scope and content of the EIR. (CEQA Guidelines section 15082(c).) A responsible agency must respond to consultation by the lead agency, designate representatives to attend meetings requested by the lead agency about the EIR, and submit comments on the

1 Interpretation of Hydrostratigraphy and Water Quality from AEM Data Collected in the Northern Salinas Valley, CA, prepared for Marina Coast Water District. Ian Gottschalk, Rosemary Knight, Stanford University, Stanford, CA; Ted Asch, Jared Abraham, Jim Cannia, Aqua Geo Frameworks, Mitchell, NE. 15 March 2018.

2 Pure Water Monterey System Expansion Study Update for 7-mgd Capacity, Final Technical Memorandum, prepared for Monterey One Water. Craig Lichty and Todd Reynolds, Kennedy/Jenks Consultants. 11 May 2018.

EIR concerning project activities within the agency's area of expertise or that are required to be approved by the agency. (CEQA Guidelines Section 15096.)

The City of Marina claims that the CPUC has failed to properly consult with it throughout the 6-year process of the Final EIR/EIS being prepared. This is not correct. The CEQA/NEPA team has actively engaged with the City of Marina, exceeding the requirements of CEQA. In addition, the City became a party to the CPUC proceeding, so has had the opportunity to submit briefs on all of the issues, testimony addressing its interests and concerns, and comments on the Proposed Decision, and to participate in the oral argument held in front of the Administrative Law Judges and Commissioners on August 22, 2018.

A full chronology of communications between the City of Marina and the CPUC CEQA team beginning with the issuance of the 2012 Notice of Preparation is presented as Exhibit A.

Groundwater

Model Bias and "Data Tampering"

Overview

In the Water Plus[3] Opening Brief dated April 19, 2018, and in Water Plus comments on the Proposed Decision dated September 4, 2018, Dr. Ron Weitzman accuses the modeling consultants, HydroFocus and Geoscience, of data tampering. Dr. Weitzman's accusations stem primarily from his interpretation of a correlation of model errors (residuals) with model-calculated water levels in a single aquifer (the "180-Foot Aquifer"). The 180-Foot Aquifer is represented by model layer 4 in the North Marina Groundwater Model, v. 2016 (NMGWM^{2016} or North Marina model). Water Plus has provided no direct evidence to support the data tampering accusation. Rather, the evidence in the record (including but not limited to Final EIR/EIS Master Response 12: The North Marina Groundwater Model (v. 2016), and Final EIR/EIS Section 8.6.20) indicates that the data tampering accusations are false because:

1. Model runs by multiple independent entities (including Lawrence Berkeley National Laboratories, see EIR/EIS Appendix E1) produced identical results.
2. The information used to produce the graphs showing the correlation from which Water Plus infers data tampering include measured and model-calculated water levels. These water levels are easily accessed and can be viewed by anyone desiring to do so using Microsoft Excel. There is no intermediary program applied to the water levels prior to analysis and presentation other than Microsoft Excel.
3. There are logical, scientific, and straightforward explanations for the correlations.

This evidence is discussed in more detail below.

Model runs by multiple independent entities re-produced the same results

Three independent entities (i.e., Geoscience, HydroFocus, and Lawrence Berkeley National Laboratories or LBNL) produced the same output (model-calculated water levels), using different MODFLOW executables, confirming that the model-calculated water levels were not modified during the model run. As noted by LBNL in EIR/EIS Appendix E1 on page 2, "Based on this review, LBNL found its simulation results match those in Appendix E2 [Final NMGWM Report] of the DEIR. Some of the groundwater modeling outputs are

[3] Water Plus submitted comments on the Draft EIR/EIS under the organization name of Water Ratepayers Association of the Monterey Peninsula, or WRAMP.

reproduced exactly, while others show small differences that can be attributed to computer round-off and cancellation errors."

There is no computer program that "selectively" transfers data from MODFLOW output to an Excel spreadsheet

The data that correspond to the model scenarios reported in the January 2017 MPWSP Draft EIR/EIS continue to be publically available here: http://www.cpuc.ca.gov/Environment/info/esa/mpwsp/comms_n_docs.html. The step-by-step process by which those data are read directly into an Excel file is presented in Exhibit B. There is no intermediary program that would provide an opportunity for the data to be modified.

There are logical, scientific, and straightforward explanations for the correlations

The commenter's accusations of data tampering stem primarily from his interpretation of a correlation of model errors (residuals) with model-calculated water levels in a single aquifer (the "180-Foot Aquifer"). The correlation that is claimed to be evidence of data tampering is actually related to the availability of only poor quality model inputs, resulting in model bias. In this case, model bias means that the differences between the model-calculated water levels and the measured water levels – these differences are referred to as the model errors or "residuals" – are not consistent over the range of model-calculated water levels; the residuals (or errors) increase with increasing model-calculated water levels. Ideally, for a given model layer there should be both positive and negative residuals (model-calculated water levels fall equally and unpredictably higher and lower than measured water levels), and a plot showing the residual values on the y-axis and the model-calculated values on the x-axis should be approximately horizontal and scattered around zero for the entire range of model-calculated values. This would illustrate that the residuals are random and unpredictable, and there is little to no correlation. For example, the plot of Model Layer 8 for the 900-Foot Aquifer (this is described as the "Deeper Aquifers" in the Final EIR/EIS) shown below in Figure 1 does not show model bias. That is, the values of the residuals do not show a trend (correlation) as model-calculated water levels increase.

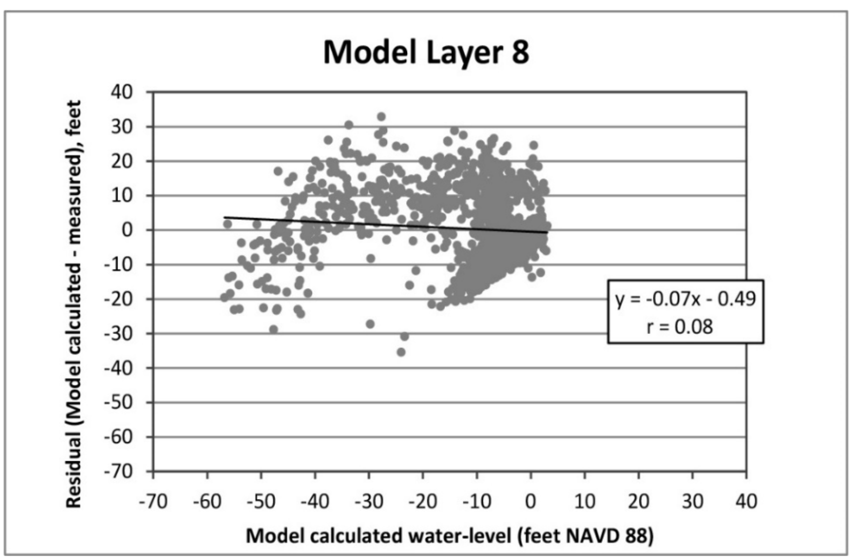

Figure 1. Relation of residuals and model calculated water levels for Model Layer 8 (900-Foot Aquifer), reproduced from Appendix E2 Figure 4.3b with trend line values expanded from one decimal place to two (the number of decimal places reported does not influence the conclusions).

In contrast, for Model Layer 4, which represents the 180-Foot Aquifer, residuals increase with increasing model-calculated water levels as shown in the graph in Figure 2 below. This means that there is a bias in the model for this layer – as model-calculated water levels increase, we can predict that residuals will also increase.

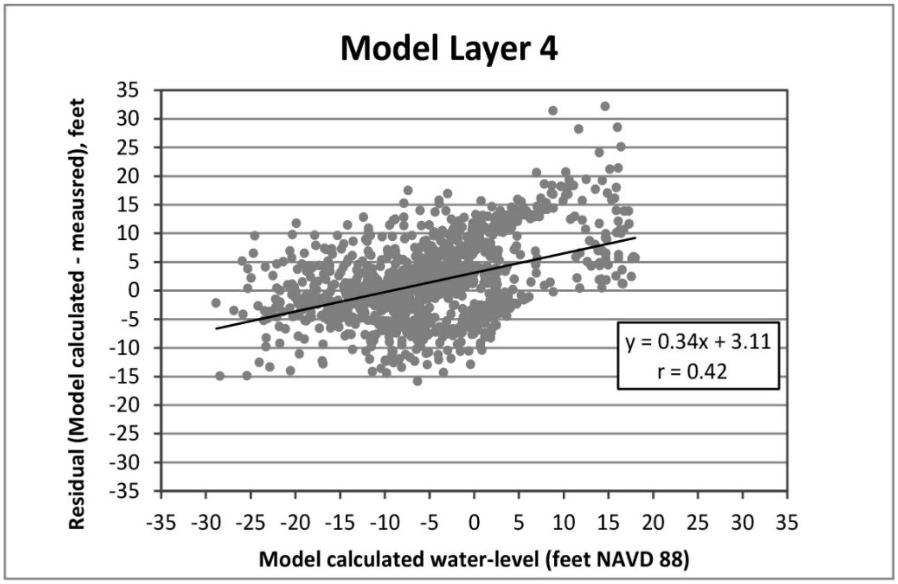

Figure 2. Relation of residuals and model calculated water levels for model layer 4 (180-Foot Aquifer), reproduced from Final EIR/EIS Appendix E2 Figure 4.3b with trend line values expanded from one decimal place to two (the number of decimal places reported does not influence the conclusions).

When HydroFocus evaluated the NMGWM prepared by Geoscience for the April 2015 Draft EIR, this bias was recognized as being the result of using NMGWM model inputs that were derived from data generated by the very coarse-grained, regional in nature, and outdated Salinas Valley Integrated Groundwater Surface Water Model (SVIGSM or Salinas Valley model), which is what was available as inputs for the NMGWM. As discussed in Final EIR/EIS Section 4.4.4.2, in Appendix E2, and in Master Response 12, the $NMGWM^{2016}$ was converted to superposition mode to isolate the change in conditions to those caused solely by the proposed project. In this conversion, initial water levels and background recharge and pumping were all set to zero throughout the model area. The superposition approach was employed to remove the bias of the poor-quality SVIGSM data, and reliably simulate the potential groundwater hydrologic effects attributable only to the proposed project. Superposition is a widely accepted approach to simulating the effects of groundwater extractions on water levels. It effectively isolates the hydrologic effects and obviates the need to consider the input problems associated with data from the SVIGSM.

Responses to Comments in Water Plus Opening Brief dated April 19, 2018

Comment

"2. Model corruption, not inadequacy. Both the second draft and the FEIR/EIS ("the two documents") identify data corruption as "Model Bias" meaning in this non-standard nomenclature that a non-zero correlation exists between predictions and errors."[4]

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[4] Throughout this response to Water Plus comments, the "second draft" is assumed to refer to the January 2017 Draft EIR/EIS.

Response

The use of graphs that show the regression relation between model residuals (the difference between model calculated or "predicted" water levels and measured or "observed" water levels) and model-calculated water levels is one standard practice for recognizing model bias. Bias in models results when the residuals do not conform to the assumptions of regression analysis as described in "Applied Regression Analysis" by Draper and Smith.[5] Draper and Smith (see page 60 of the third edition) provided guidance on how residuals should behave for model results. Specifically, the assumptions are that the errors are independent, have zero mean, have a constant variance, and follow a normal distribution. Similar assumptions are listed in "Statistical Methods in Water Resources" by Helsel and Hirsch,[6] (see page 225).

In Final EIR/EIS Appendix E2 Figure 4.3b for model layers 2, 6, and 8, the r value or correlation coefficient is close to 0.0. This means that the errors for different values of model-calculated water levels are independent of the values of the model-calculated water levels. Why is this important? If the errors are not independent, then the model tends to do a better job in (is "biased" toward) some places and times than in others. The model then fails to satisfy the criterion (as per Draper and Smith) of independent residuals, and the model is not entirely correct because it is biased. This was the case for the model results for Model Layer 4 where the correlation coefficient is 0.42 (see Figure 2 above). The superposition approach was employed to remove the bias of the poor-quality SVIGSM data, and reliably simulate the potential groundwater hydrologic effects attributable only to the proposed project. Superposition isolates the proposed project's hydrologic effects, effectively addressing the input problems associated with data from the SVIGSM.

Comment

"Citing Figures 4.3b and 4.3d in Appendix E2 of both the second draft and the FEIR/EIS, the two documents unaccountably provide different values for this non-zero correlation: the second draft, 0.4, and the FEIR/EIS (for the same correlation), 0.2 (p. 8.2-90)."

Response

The Final EIR/EIS text mistakenly reported the r^2 value (0.2), which is not the same as the r value (0.4). This has been corrected in the published Errata for Final EIR/EIS page 8.2-90. Note that the Final EIR/EIS Appendix E2 Figures 4.3b and 4.3d are correct, and both list 0.4 as the correlation coefficient (r value).

Comment

"This is not the only problem with the representation of this number in the two documents. The number actually should be negative rather than positive; HydroFocus mistakenly represented error as predicted value minus observed measurement (see Figure 4.3d in Appendix E2) though observed measurement is equal to predicted value plus error so that error is in fact equal to observed measurement minus predicted value."

Response

Indeed, Draper and Smith specify the residual calculation as equal to the measured value minus the modeled value. However, calculating the regression coefficient using residuals calculated as the

5 Draper, Norman R., and Harry Smith, 1998. Applied Regression Analysis, Third Edition, A Wiley Interscience Publication.
6 Helsel, D.R., and R.M. Hirsch, 1992. Statistical Methods in Water Resources, Elsevier Science Publishing Company.

modeled value minus the measured value only changes the sign, not the magnitude of the regression coefficient. Furthermore, the interpretation of the sign of the regression coefficient is determined by the practitioner's definition of the residual, which was clearly stated up-front as part of model evaluation. Therefore, the regression coefficient as determined by HydroFocus is an acceptable indicator of model bias and its definition had no influence on the interpretation of the bias.

Comment

"Common statistical practice is to represent correlations to two decimal places and, following this practice, the actual correlation between predictions and errors for the 180-foot aquifer is equal to -.45, as shown in Figure 2 of the Appendix."

Response

As shown in Figure 2 above, the correlation coefficient ("r") is 0.42 for Model Layer 4. The difference between 0.4 and 0.42 had no influence on the interpretation of the results.

Comment

"Both the second draft and the FEIR/EIS attribute the Model Bias to model inability to work properly when observed measurements rise or decline perhaps too steeply or for too long, as shown in Figure 4.3d of Appendix E2 (figure the same in the two documents)."

Response

This comment is an incorrect representation of the explanation for the model bias. Specifically, Final EIR/EIS Appendix E2 states on page 23 that the inability of the model to correctly simulate highs and lows in the groundwater levels is likely due to the timing and magnitude of specified pumping and recharge (model inputs). Because the timing and magnitude of the model inputs for pumping and recharge are the same for the North Marina and Salinas Valley models, and the inputs for the North Marina model for pumping and recharge came from the Salinas Valley Model, a logical conclusion is that the source of the bias is from the Salinas Valley model. As described above and in Master Response 12, the model bias has been addressed for purposes of the EIR/EIS analysis by converting to the superposition method.

Comment

"The data in this figure[7] represent the years 1979 to 1991, only the beginning portion of the analyzed data, which extend twenty more years to 2011. The correlation of -.45 applies to the entire data range, not to only the beginning twelve-year portion of it."

Response

The beginning portion of the data was used to illustrate the source of model bias and to calculate the correlation coefficient. As illustrated in Appendix E2 Figure 4.1a, this is the only portion of the data that can be used to estimate bias because it is the only portion where there are measured values for comparison with the modeled values.

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[7] Comment refers to Figure 4.3d of Appendix E2

Comment

"The model in question is called MODFLOW, developed by the U.S. Geological Survey. The model is not the problem. As shown in the following section (II.E.3), the problem is the selectively restricted data range used to explain the errant correlation."

Response

The range was selected because it was the only period for which there were both measured and modeled values. Both measured and modeled values are needed to calculate the residuals which are utilized to test for bias.

Comment

"*3. Zero correlation, not independence, between predictions and errors*. The FEIR/EIS claims (p. 8.2-89) that Model Bias occurs when model errors 'do not conform to the assumptions of regression analysis (the assumptions that the model errors are independent, have zero mean, have a constant variance and follow a normal distribution (Ward et al., 1987)).' This Ward et al. citation appears to be to a textbook used in a statistics course taken by at least one of the FEIR/EIS authors. It is not only old; it is also inaccurate."

Response

This was a mistake in the bibliography that has been corrected in the published Errata. The reference is not Ward et al. (1987) but Draper and Smith, "Applied Regression Analysis," Third Edition, published in 1998 by Wiley Interscience. This book's senior author is Professor Emeritus of Statistics at the University of Wisconsin, Madison, and is widely cited (32,274 citations according to Google Scholar). Coauthor Harry Smith is a former faculty member of the Mt. Sinai School of Medicine. The statements by Draper and Smith are consistent with other texts (e.g., Helsel and Hirsch, 1992, "Statistical Methods in Water Resources" published by Elsevier).

Comment

"Independence of model predictions and errors implies zero correlation between them, which itself is not an *assumption* but, as shown in Equation 5.2.41 on p. 68 of the statistics book by Dr. John Doherty underlying the MODFLOW model's estimation process, an *outcome* of the process, which produces, along with measurement estimates ("predictions") and other information, errors having the least possible variation (minimal error variance)."

Response

Doherty[8] stated that "for a calibrated model, residuals are normal to model outputs." This statement is in complete agreement with the need to achieve zero correlation of residuals versus model outputs. As stated above, it was impossible to improve the North Marina model calibration (and reduce the bias in Model Layer 4) because of the legacy inputs from the Salinas Valley model. While these inputs could have been adjusted to achieve better calibration, there is insufficient data with which to do this. Therefore, the superposition approach was adopted.

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8 Doherty, John, 2015. Calibration and Uncertainty Analysis for Complex Environmental Models. Watermark Numerical Computing, Brisbane, Australia.

Comment

"Zero correlation is neither an assumption nor a requirement of model estimation. Like predictions, it is one of the results. That means when zero correlation between predictions and errors fails to occur, manipulation of either the measurements or their predictions produced by the model *must* have occurred."

Response

Manipulation is not the reason zero correlation between predictions and errors fails to occur. The word "manipulation" is used only once in Doherty's book in the following text: "Geostatistical software which can generate realizations of complex, flow-determining geological features is freely available. However, …. manipulation of features which appear in these realizations in a calibration setting is difficult, if not impossible." Doherty does not state that the lack of zero correlation is the result of data or prediction manipulations. Dr. Weitzman proposes this as a reason for the non-zero correlation between residuals (errors) and model-calculated water levels. However, as has been stated and demonstrated in Master Response 12 in the Final EIR/EIS, there is ample evidence that manipulations have not occurred. As Draper and Smith (1998) point out, model incorrectness (not data or model manipulation) is indicated by non-zero correlation of residuals. Moreover, "incomplete or biased process representation, errors in the specification of initial and boundary conditions, as well as errors in the model parameters, can render the predictions of groundwater dynamics uncertain and biases."[9]

Doherty discussed bias in several places. On page 161, he states that "a defective model has the potential to incur bias in some of its management-critical predictions." Doherty further states that "No model is a perfect simulator of environmental processes at any study site. While this does not invalidate the use of models in environmental decision-making, it does mean that they should be used with caution. It also means that modelers should be aware of the repercussions of model defects so that, when called upon to make the many subjective decisions that modelling entails, these decisions can be as informed as possible." Moreover, Doherty states in Chapter 9 that: "Model defects arise from many sources. They may arise from approximations used in the model algorithm, in failure to provide enough parameters to represent system property heterogeneity, in erroneous definition of temporal and spatial boundary conditions, in the need for spatial and temporal discretization that supports numerical representation of partial differential equations, from improper definition of system stresses and source terms, and from many other sources."

In this case, the model defect was the inability of the North Marina model to adequately simulate water levels in the 180-Foot Aquifer due to deficient inputs from the Salinas Valley model. The precaution taken by HydroFocus to overcome this defect was to utilize the superposition approach and remove the source of the bias. The most likely sources of error in the superposition analysis using the NMGWM^{2016} arise from uncertainty associated with modeled boundary conditions including sea level rise, specified hydraulic conductivity values, and assumed project operations including pumping rates and relative contributions of groundwater in aquifers represented by Model Layer 2 and Model Layer 4 to total slant well pumping. We used the results from sensitivity model runs to delineate the potential range in drawdown contours and thus bracket the possible drawdown due to uncertainty in model input and assumptions. See Final EIR/EIS Appendix E2, Section 6.

[9] Rojas, Rodrigo, Luc Feyen, and Alain Dassargues, 2008. Conceptual model uncertainty in groundwater modeling: Combining generalized likelihood uncertainty estimation and Bayesian model averaging, Water Resources Research, 44, W12418, doi:10.1029/2008WR006908.

Comment

"Figures 2 and 3 in the Appendix are examples of non-zero (Figure 2) and zero (Figure 3) correlations between predictions and errors. Following Equation 5.2.41 in the Doherty book cited above, the text observes that a geometric interpretation of the equation is that "residuals (errors) are normal to model outputs," meaning that in a graph showing errors (vertical axis) as a function of predictions (horizontal axis) the error trend should be a straight line at right angles to the vertical axis."

Response

This is true for models where there is no bias and in complete agreement with the need to achieve zero correlation of residuals versus model outputs.

Comment

"That is the case in Figure 3, which does not reflect data corruption for the 900-foot aquifer, but not in Figure 2, which does, for the 180-Foot Aquifer (see the red trend line in each figure). Where and how the data corruption of model output for the 180-Foot Aquifer occurred are questions to which the FEIR/EIS, like the draft immediately preceding it, has tried but failed to provide answers that can withstand scrutiny. Figures 2 and 3 tell the story."

Response

The commentor erroneously assumes that lack of zero correlation is due to data corruption. There is no evidence for corruption of model output for the 180-Foot Aquifer. As explained above, there is bias introduced by errors in the specified monthly pumping and recharge rates. The following narrative and figures provide detail to explain why the correlation of residuals and modeled water levels exists.

Figure 3, below, shows model-calculated and measured water levels for a single well 02J01 located in Model Layer 4. In the early years on the graph represented by the first pop-out, the measured seasonal water level peaks occur sooner than the model-calculated peaks, resulting in a relatively large difference between model-calculated and measured values (large values of the calculated residual). In the later years on the graph represented by the second pop-out, the agreement between the timing of measured and model-calculated peaks improve and the differences between model-calculated and measured water levels decrease. As a result, the long-term trend in the differences between model-calculated and measured water levels shifts from relatively large values to relatively smaller values.

When these residuals are plotted on a graph with the residual values on the y-axis and the model-calculated water levels on the x-axis (Figure 4), the values plot on a general line showing an upward trend – meaning, negative values of model-calculated water levels are associated with relatively small residuals, and positive model-calculated water levels are associated with relatively large residuals.

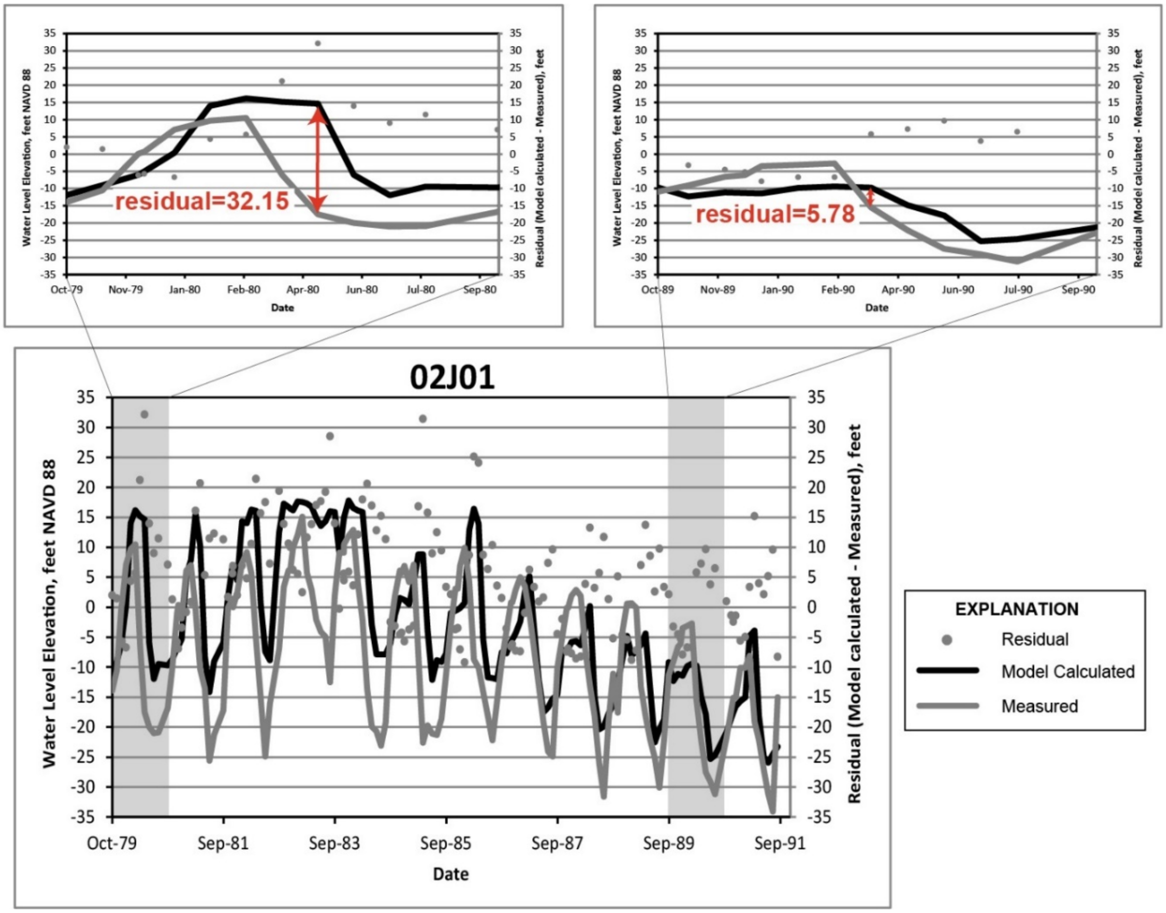

Figure 3. Model-calculated and measured water levels for a single well 02J01 located in Model Layer 4, reproduced from EIR/EIS Appendix E2 Figure 4.3d, with portions extracted to show detailed information.

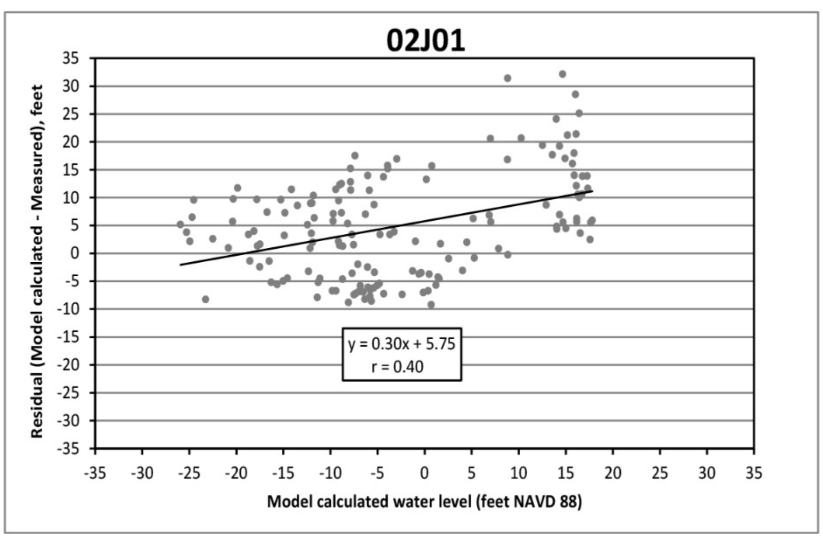

Figure 4. Residuals versus modeled calculated water levels for a single well 02J01 located in Model Layer 4, reproduced from EIR/EIS Appendix E2 Figure 4.3d with trend line values expanded from one decimal place to two (the number of decimal places reported does not influence the conclusions).

In contrast, the differences between Model Layer 8 model-calculated and measured water levels are generally random, as indicated by their scatter, and independent, as indicated by the slope being very close to zero. Figure 5 shows model-calculated and measured water levels for a single well 19Q03 located in Model Layer 8. There is better agreement between model-calculated and measured seasonal water level peaks throughout the simulation period. Moreover, there is no trend when the residuals are plotted on a graph (Figure 6) where the residual value is on the y-axis and the model-calculated water level values are on the x-axis (the values generally plot on a horizontal line).

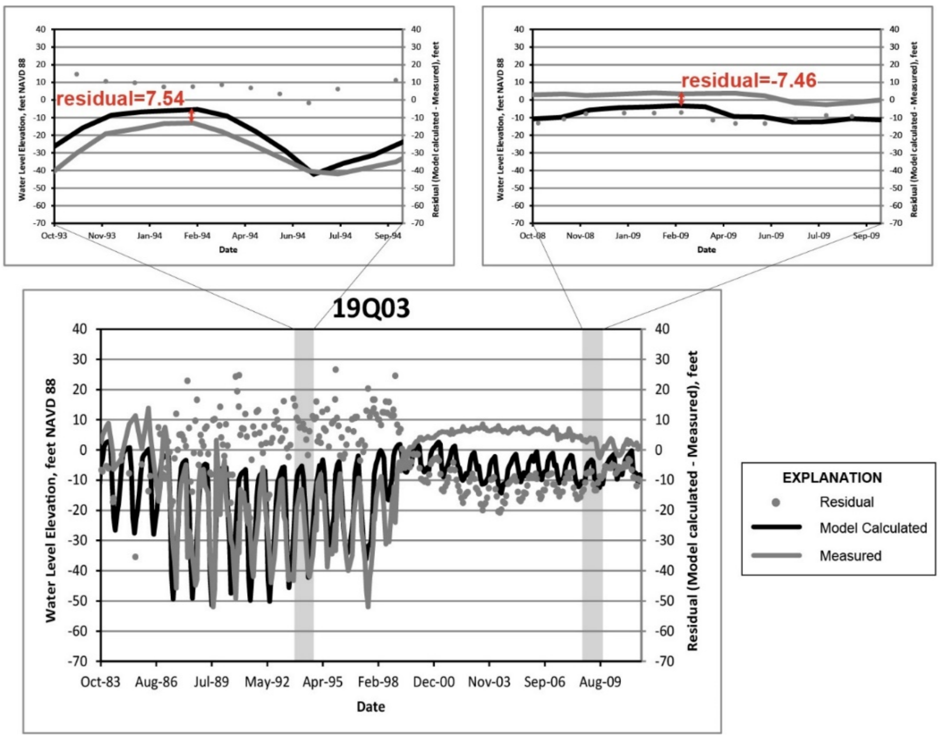

Figure 5. Model-calculated and measured water levels for a single well 19Q03 located in Model Layer 8.

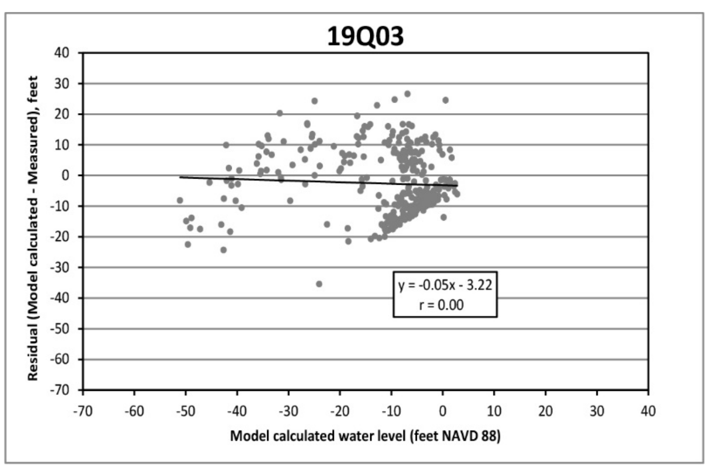

Figure 6. Residuals versus modeled calculated water levels for a single well 19Q03 located in Model Layer 8.

These figures confirm that the model bias identified in Appendix E2 is limited to Model Layer 4 and show that it is caused by the timing and magnitude of shift between seasonal peaks. The model-calculated seasonal peaks are the result of model inputs – not data tampering. Specifically, the timing and magnitude of pumping and recharge specified in the model for extraction wells in Model Layers 4 and 8 were originally derived from the SVIGSM. Using the NMGWM in a superposition mode for the EIR/EIS analysis eliminated the model bias caused by the poor quality SVIGSM-generated data.

Comment

"The U-shaped relationship in Figure 3 for the 900-foot aquifer shows that zero correlation can exist between predictions and errors even when they are not independent of each other: In this case, as one goes up the other first goes down and then goes up (like the letter U). When predictions, tagging observed water elevations, are relatively low, as they are in the later years of data collection, a plot of errors against predictions for those years of 900-foot aquifer data would look very much like the one for the 180-foot aquifer in Figure 4.3d of Appendix E2 of the FEIR/EIS even though for the complete 900-foot aquifer data set zero correlation exists between predictions and errors. (The error trend would be downward rather than upward, as it is in Figure 4.3d, because HydroFocus determined error incorrectly, as shown earlier.) If HydroFocus had used such a plot for the 900-foot aquifer to explain non-zero correlation, it would have explained something that did not exist. The non-zero correlation for the entire 180-foot aquifer data set is evidence of the corruption of output data, nothing else. A good place to look for the source of that corruption is the computer program that selectively transferred the MODFLOW output to a Microsoft Excel spreadsheet, which HydroFocus and the other consultants used to analyze the results."

Response

The step-by-step process by which the publicly available MODFLOW output file is read directly into an Excel file is presented in Exhibit B. There is no intermediate program that transferred the MODFLOW output to an Excel spreadsheet.

Comment

"*4. Net, not full, effect of pumping isolated by MODFLOW model*. As noted earlier, recognizing that something was wrong with the output of the MODFLOW model, HydroFocus modified the model to produce what it identified as a superposition model. The modification consisted of setting all water elevations on the boundary enclosing the zone under study (North Marina or CEMEX) and all square blocks within the zone equal to zero (p. 8.2-93). The result was a model that isolated the impact of test-well pumping on water elevation within each block within the zone, while eliminating the possible nuisance influences of regional pumping and recharge on water elevation. The theory underlying this modification is that a MODFLOW model containing these regional influences run with and without the influence of test-well pumping would produce a difference in results showing the same isolated impact of test-well pumping that a superposition model would (p. 8.2-94). Because a model like MODFLOW isolates solely the portion of an influence that is uncorrelated with other influences accounted for by the model, the only condition under which the superposition theory would be correct is that none of the regional influences on water elevations within the zone is correlated with test-well pumping.

That condition is not likely to exist. It would not exist, for example, if regional pumping were related to test-well pumping, a relationship that would occur if regional pumping increased seawater intrusion within the zone. The resulting increased density of the water drawn by the test well would reduce its impact on water elevations within the zone so that the greater the influence of regional pumping the smaller would be the influence of test well pumping. The superposition model rests on a shaky theoretical foundation. That is unfortunate because “the Lead Agencies and their CEQA/NEPA experts relied on HydroFocus’ superposition modeling report (Appendix E2) in their evaluation of the project (p. 8.2-30).”

Response

The superposition approach simulates solely the effects of slant-well pumping. As correctly stated by the commenter, the result was a model that isolated the impact of test-well pumping on water elevation within each block within the zone, regardless of the influences of regional pumping and recharge on water elevation.

Comment

“An example of the serious consequences of this reliance is that, in a review of the second draft, the consulting firm GeoHydros, which, instead of superposition, used the difference between unmodified MODFLOW model runs (one with and one without test well pumping) to isolate the net impact of test-well pumping on water elevations, “reported that 756 AFY of the water removed by the slant wells would come from upward flow into the overlying 180-Foot and Dune Sand Aquifers from the 400-Foot and deeper aquifers . . . [producing] harm to the deeper aquifers. 8.2-95). Obtaining a contrary result using superposition, HydroFocus discounted that conclusion (*Ibid*) which, in view of superposition’s shortcomings, is likely true.”

Response

HydroFocus responded to the GeoHydros comments (comment MCWD-GH-21 in Final EIR/EIS Section 8.5.2 on page 8.5-751) by explaining that the water budget results reported by HydroFocus are calculated directly from the method of superposition, whereas the GeoHydros results are calculated by subtracting two (with and without project pumping) model runs. If correctly implemented, the results from the two approaches must be identical, as HydroFocus showed using an example problem in Attachment 1 to Appendix E-2. However, the analysis employed by GeoHydros was shown to be flawed. Furthermore, either approach provides the change in water budget components and those changes must be applied to the real-world groundwater conditions. When appropriately interpreted relative to field-measured conditions, the budget changes indicate that slant well pumping is expected to reduce outflow from the 180-Foot Aquifer to the 400-Foot Aquifer, likely providing a water quality benefit to the deep aquifers.

Final EIR/EIS Master Response 12, The North Marina Groundwater Model (v. 2016), provides more detail.

Responses to Water Plus comments on the Proposed Decision dated September 4, 2018

For all comments related to the perceived conflict of interest with Geoscience, see Final EIR/EIS Master Response 5, The Role of the Hydrogeologic Working Group and its Relationship to the EIR/EIS, Section 8.2.5.6. No new information is raised in these comments regarding the relationship of Geoscience to this project.

Comment

“Important to note now is that Dr. John Doherty, who wrote the text underlying the parameter-estimation portion (PEST) of MODFLOW, confirmed in a 19 February 2015 personal email message to me that, along with the estimates, the model produces—does not simply assume—zero correlation between them and their residuals."

Response

The commenter has not provided a copy of this email message, so the CEQA/NEPA team cannot review it. However, MODFLOW itself does not perform statistical analysis, and PEST is not a "portion" of MODFLOW. Moreover, PEST was not used to calibrate the NMGWM^{2016} (nor is it mentioned in the modeling report).

Comment

"Because both the two new CPUC consultants confirmed my far-from-zero correlation between predictions and errors, they concluded that MODFLOW, as applied in the NMGWM or in the CM, was at fault. That was the reason for the replacement of those two models by the Superposition Model."

Response

In fact, as explained previously, HydroFocus (and LBNL, independently) confirmed that the correlation between predictions and errors was the result of inputs from the SVIGSM, not the "fault" of MODFLOW. No direct evidence has been presented by Water Plus to support the data tampering accusation. In fact, the available evidence indicates that the data tampering accusations are false as explained above in responses to the Water Plus Opening Brief dated April 19, 2018. Further, Water Plus continues to erroneously interpret the use of superposition to mean that a new model was developed. Superposition does not replace the NMGWM^{2016}; rather, it is a method of analysis that uses the NMGWM^{2016}, as explained in detail in Final EIR/EIS Master Response 12, Section 8.2.12.3.

Comment

"The consultant who made that replacement assumed that neither model met the assumption of independence between model predictions and errors. What the consultant did not realize is that, regardless of whether that assumption of independence is met, MODFLOW in any of its applications that produces estimates also produces a zero correlation between them and their errors in the process of optimizing the estimation."

Response

Statistical calculations were not conducted using MODFLOW. Furthermore, no process of "optimizing the estimation" was employed, as explained above in responses to the Water Plus Opening Brief dated April 19, 2018.

Seawater Intrusion

Comments by Water Plus on the Proposed Decision (dated September 4, 2018) state on page 12, "The test well began with 74 percent seawater and ended with 93 percent. That result indicates the project would increase seawater intrusion into Salinas Valley groundwater, contrary to the intent of the Agency Act." Additionally, letters from Margaret Ann Coppernoll and Ag Land Trust suggest that CalAm is either currently (via the test slant well) or would be (via Project wells) intentionally exacerbating seawater intrusion in the SVGB in order to support the process of obtaining water rights. This claim is unsubstantiated, and the CEQA/NEPA team's work and responses to comments and reports (e.g., Final EIR/EIS Master Responses 8 and 11) show that the test slant well has not, and the Project wells would not, exacerbate existing, ongoing seawater intrusion into the SVGB. As described in Final EIR/EIS Section 4.4.5.2 on page 4.4-101, pumping over the life of the project would change the local groundwater quality of the inland areas close to the slant wells and within the groundwater capture zone from the current brackish-to-saline quality to a higher salinity. The increase in salinity within this small area would occur because the slant wells would draw in the brackish water that is currently in the aquifer formation and seawater would flow in to replace it. This effect would only occur within the capture zone near the coast at the CEMEX site; areas outside of the capture zone would not be affected. Thus, assertions by Water Plus, Coppernoll, and Ag Land Trust that the project would exacerbate seawater intrusion elsewhere in the SVGB (i.e., outside of the capture zone) are not supported by the evidence.

AEM and Hydrogeology

In addition to and within the context of the Final AEM Report released in April 2018, EKI, Hopkins Groundwater Consultants Inc. (HGC), and Jacobson James and Associates (JJA) commented on the groundwater analysis in the Final EIR/EIS and the work completed by the Hydrogeologic Working Group (HWG) (appended to MCWD comments on Final EIR/EIS). Aqua Geo Frameworks (AGF) also commented (appended to City of Marina comments on Final EIR/EIS). Further, the HWG submitted comments to the CPUC and MBNMS on April 19, 2018, responding to the Final AEM Report and reports and technical memos by HGC, AGF, EKI, GeoHydros, and JJA.

Comments submitted by AGF focused on the HWG's interpretation of the Stanford AEM study results, specifically, the methodology used by HWG to correlate the AEM results with actual groundwater quality. HWG's correlation was presented in Final EIR/EIS Appendix E3 and was discussed in Section 4.4.1.4 and Master Response 8.2.9. AGF comments do not change the discussion or conclusions presented in the EIR/EIS.

Generally speaking, the comments provided by EKI, HGC, and JJA claim that the Final EIR/EIS:

- does not analyze how a change (e.g., a reduction, or reversal) in the inland groundwater gradient would alter the projected capture zone nor how the capture zone could increase seawater intrusion;
- does not adequately address how the project would impact efforts under the Sustainable Groundwater Management Act (SGMA);
- does not incorporate, and in some cases dismisses, the findings of Dr. Knight's AEM study, especially in the representation of hydrogeologic conditions of the Dune Sands Aquifer and 180-Foot Aquifer at the coast;
- underplays and misrepresents the unique recharge conditions in the North Marina Subarea and dismisses the presence of a freshwater lens inland of the CEMEX site; and
- misrepresents the definition of brackish water and does not acknowledge the beneficial uses of groundwater with TDS of 3,000 mg/L or less.

The CEQA/NEPA team has previously encountered and commented on most of these issues and claims, none of which present new information that would change our working understanding of the hydrogeologic setting or the conclusions of the impact analyses presented in the Groundwater Resources section of the Final EIR/EIS. The following subsections provide additional clarification and respond to the issues raised in these comments. However, it is important to note that the comments and responses presented here do not provide any new information that would change the environmental setting or impact analyses or conclusions of the Final EIR/EIS.

Inland Gradient and Groundwater Capture Zones

Reduced or Reversed Groundwater Gradients

Based on comments received on the January 2017 Draft EIR/EIS, the March 2018 Final EIR/EIS includes an enhanced discussion and accompanying graphics showing the extent of the groundwater capture zone that would be created in the Dune Sand Aquifer and the 180-Foot/180-Foot Equivalent (FTE) Aquifer by pumping source water from MPWSP slant wells; see EIR/EIS Sections 4.4.4.2 and 4.4.5.2, and Master Response 8.2.8. Comments received on the Final EIR/EIS from EKI, HGC, and JJA address the groundwater zone of capture and claim that the Final EIR/EIS is deficient because the analysis does not address the configuration of the MPWSP slant well capture zone if the inland groundwater gradient were reduced or reversed in the future.

The relationship between the inland groundwater gradient and seawater intrusion is discussed in detail in the Final EIR/EIS Section 4.4.1.3. In summary, before human development of the Salinas Valley, groundwater flowed at a certain gradient toward, and was discharged into, the Monterey Bay (landward to seaward gradient). Extensive groundwater pumping beginning in the mid-20th century throughout the Salinas Valley resulted in a regional decline in the inland groundwater levels, causing the landward to seaward flow gradient to reverse, and become the seaward to landward (inland) flow gradient that currently exists; see Final EIR/EIS Figure 4.4-5, which shows the existing groundwater depression east of Salinas in the 180-Foot Aquifer. The existing inland gradient allows ocean water to mix with the fresh water inland of the coast, causing the seawater intrusion that is present today in the SVGB. As is appropriate under CEQA and NEPA, the existing environmental conditions are those against which the project's environmental impacts are measured, as opposed to hypothetical, speculative future conditions.

The inland gradient and the presence of the ocean would control the extent of the capture zone projected to be created by the MPWSP pumping. The ocean is a constant-head recharge boundary; in other words, the ocean is an area from where the aquifers are consistently replenished. Most of the water drawn into the slant wells would come from the ocean. The comments on the Final EIR/EIS assert that if the current inland groundwater gradient were reduced (got flatter) or reversed (started flowing toward the ocean) in the future, the project would begin to draw fresh water from areas inland of the coast. However, the analyses presented in the comments misrepresent the conditions because they disregard or understate the presence and influence of the ocean, a substantial recharge boundary, and overestimate the extent that groundwater would be captured from inland sources.

The effects of a flatter groundwater gradient on coastal pumping are demonstrated in EIR/EIS Appendix E2, as well as in a study completed by HydroMetrics for MCWD in 2008.[10] Groundwater modeling conducted for the EIR/EIS found that the size of the capture zone would increase with a flatter inland gradient (see Appendix E2, Figure 5.7). HydroMetrics demonstrated that with no seaward or landward gradient, the capture zone from two vertical groundwater supply wells, drilled into the 180-Foot Aquifer 800 feet inland, would become wider along the coast in order to capture the same amount of flow, rather than drawing groundwater from inland aquifers. This is because the flow gradient from the ocean is steeper and the travel distance and time for ocean water to reach the wells is shorter than it is for inland groundwater to reach the wells. The conditions examined under the HydroMetrics study can also be considered a worst-case condition in comparison to the proposed project because the MPWSP wells would be slanted beneath the coastline (rather than 800 feet inland as evaluated by HydroMetrics for MCWD in 2008) where the gradient would be even

10 HydroMetrics, LLC. Preliminary Modeling Results for the MCWD Desalination Intake. Draft Technical Memorandum to Martin Feeney. July 23, 2008.

steeper and the travel distance and travel time from the ocean to the slant wells would be even shorter than modeled by HydroMetrics.

Similarly, the comments overstate the conditions under which the gradient would reverse and begin to flow seaward. Again, the effects of the ocean as a recharge boundary are either disregarded or understated by certain commenters, leading to a misleading projection of the capture zone extent and an overestimated potential for the wells to draw groundwater from inland sources. Considering the findings of the HydroMetrics study, under a reversed gradient, some inland water could be drawn into the MPWSP slant wells, but the volume of inland water arriving at the slant wells would be far less and take more time than it would for the higher volume of seawater to reach the slant wells. Most of the water entering the slant wells would still come from the ocean if the gradient were seaward rather than landward as it is today. Indeed, as noted by the SWRCB in its July 2013 Final Analysis of the MPWSP (EIR/EIS Appendix B2), "The extraction wells are not predicted to draw water equally from seaward and landward areas. In a system that has no gradient of flow, extraction wells would draw water equally from seaward and landward directions, but this is not true in the proposed MPWSP area because there is a significant gradient of groundwater flow from the seaward areas toward the inland pumping depressions. In the long-term, the situation may be altered and the source of the water drawn from the extraction well system would need to be reevaluated under the following conditions: (1) if pumping of water from inland areas is reduced to the point that the groundwater system is in equilibrium, and (2) the pumping depressions are reduced such that there is no longer a landward gradient." (at Section 5.3 on page 24).

What is important to consider here is that there is very little likelihood, and it would be total speculation to believe, that the existing groundwater gradient in the Dune Sand and 180-Foot Aquifers could be reversed within the life of the project. As discussed below, even under the requirements of the SGMA, achieving groundwater elevations in the SVGB necessary to reverse (or even flatten) the existing inland gradient would require concerted basin-wide efforts to reduce pumping and increase recharge inland of the coast. See Response to Comment Marina-JJ&A-6 at Final EIR/EIS page 8.5-634.

Inducing Seawater Intrusion

Seawater is currently mixing with groundwater at the coast and flowing landward from the ocean through the Dune Sand Aquifer and 180-Foot/180-FTE Aquifer because of the existing landward gradient, discussed above. Comments assert that the capture zone created by the MPWSP would induce seawater intrusion in areas outside the groundwater capture zone. While the pumping influence of the proposed MPWSP slant wells within the limits of the capture zone would capture and draw in the saline and brackish groundwater (this is illustrated in Final EIR/EIS Figure 4.4-13b), groundwater flow on the periphery of the capture zone, while not being drawn into the wells, would be directed around the exterior of the capture zone and would continue to flow inland. Groundwater flowing outside the influence of the slant well capture zone would continue to flow inland as it does currently. The capture zone created by the slant well pumping would not induce additional seawater intrusion adjacent to and beyond the limits of the capture zone. The slant wells would in fact capture saline water that would otherwise flow inland as seawater intrusion and would, therefore, assist in impeding seawater intrusion along the coastline at CEMEX (site of the proposed slant wells).

Seawater Intrusion and "Chloride Islands" in the 400-Foot Aquifer

Comments assert that the Final EIR/EIS is deficient because it fails to fully acknowledge the presence of isolated areas of elevated chloride concentrations in the 400-Foot Aquifer east of the seawater intrusion front. These areas (aka "chloride islands") were identified through the seawater intrusion monitoring and mapping conducted by the Monterey County Water Resources Agency (MCWRA). As discussed in EIR/EIS Section 4.4.1.4, the MCWRA has been monitoring seawater intrusion in the 180-Foot and 400-Foot Aquifers since 1947 by measuring chloride concentrations in several participating groundwater wells. EIR/EIS Figures 4.4-10 and 4.4-11 show the extent of seawater intrusion based on the 2013 monitoring data. The latest seawater intrusion maps released on April 11, 2018, after the publication of the Final EIR/EIS, show seawater intrusion monitoring data for 2015 and 2017 (see Figures 1 and 2, attached).[11] These data show a slight advance of the seawater intrusion front (where information was available) in the 180-Foot Aquifer. The data for the 400-Foot Aquifer show an advance of seawater intrusion along the northern, central, and southern portion of the intrusion front, and show three isolated areas of elevated chloride concentrations (chloride islands) east of the front. The presence of these chloride islands documents the occurrence of inter-aquifer seawater intrusion. Inter-aquifer seawater intrusion occurs when seawater-intruded groundwater migrates vertically between aquifers. This can be caused in several ways: thin or discontinuous aquitards (clay layers); well screens that cross multiple aquifer units (multi-aquifer wells); improperly constructed or abandoned wells; wells in poor condition; or vertical hydraulic gradients where groundwater levels are deeper in the underlying aquifer, either due to the naturally occurring hydraulic heads in the aquifer or pumping-induced groundwater level differentials.[12] Varying combinations of these conditions are present at many locations throughout the 180/400-Foot Aquifer Subbasin, as evidenced by vertically migrating groundwater.[13] EIR/EIS Section 4.4.1.2 describes the 180/400-Foot Aquitard unit (the clay layer between the 180-Foot and 400-Foot aquifers) as generally 50 to 100 feet thick, although it can be as much as 200 to 250 feet thick, and can be absent in some areas. The EIR/EIS also states that, at the CEMEX site, the 180/400-Foot Aquitard is about 220 feet deep and is 10 to 70 feet thick. The Stanford AEM study produced imagery that could be interpreted as inland gaps in the 180/400-Foot Aquitard that result in inter-aquifer intrusion between the 180-Foot Aquifer and 400-Foot Aquifer.

The inter-aquifer seawater intrusion and the chloride islands that currently exist are too far inland to have an effect on, or to be affected by, the MPWSP slant well pumping. As described in the EIR/EIS Impact 4.4-3 and shown graphically in EIR/EIS Figures 4.4-15 and 4.4-16, the chloride islands are 2 to 3 miles from the farthest extent of the slant well pumping influence. However, the impact analysis and accompanying figures also show that delivering the MPWSP return water to the CCSD and/or the CSIP area in lieu of groundwater pumping would contribute to groundwater recovery in the 400-Foot Aquifer, thereby helping to retard the inland advance (and vertical migration) of seawater intrusion. The MPWSP could, therefore, have a beneficial effect on the aquifer by reducing seawater intrusion.

MPWSP Effects on Sustainable Groundwater Management Act (SGMA)

Comments assert that the Final EIR/EIS fails to consider that future groundwater projects and those proposed as part of SGMA could restore groundwater levels in the SVGB and ultimately raise groundwater levels enough to flatten or reverse the inland groundwater gradient. It would realistically require decades of groundwater management to flatten the groundwater gradient, much less reverse it, and expectations that groundwater projects would be successful in affecting the inland gradient within the life of the MPWSP would be overly optimistic. There are no reasonably foreseeable cumulative projects proposed to reduce or reverse the current landward gradients in the Dune Sands and 180-Foot aquifers at this time, and while projects under the SGMA may improve the sustainability of the SVGB -- such as a basin-wide reduction in pumping, and/or increased recharge necessary to fill the groundwater depression on the east side of Salinas,

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[11] MCWRA seawater intrusion maps showing the seawater intrusion front and the chloride islands from 2015 monitoring data were released August 18, 2017.

[12] Monterey County Water Resources Agency (MCWRA). *Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin*, Special Reports Series 17-01, October 2017.

[13] Ibid.

and/or projects that may involve increasing protective groundwater elevations along the coast (much like CSIP) or include extraction systems to capture incoming seawater intrusion along the coast at CEMEX (much like the proposed MPWSP) -- such actions or projects are too speculative to assume and opine about in the EIR/EIS.

Final Stanford AEM Study

The final report of the Stanford AEM study, titled, "Interpretation of Hydrostratigraphy and Water Quality from AEM Data Collected in the Northern Salinas Valley, CA" (prepared by Ian Gottschalk and Rosemary Knight of Stanford University) was released on March 15, 2018, just two weeks prior to the release of the Final EIR/EIS. Review of the final Stanford AEM study did not bring to light any new information or findings that would change the conclusions in the Final EIR/EIS. As concluded in the Final EIR/EIS, the Stanford AEM study shows a distribution of groundwater quality that is generally consistent with that developed in the HWG hydrogeologic investigations and generally consistent with the MCWRA seawater intrusion mapping for the 180-Foot and 400-Foot Aquifers.

The organization, presentation of data, and discussion of findings in the final report of the Stanford AEM study, however, does not appear to be on par with the technical rigor displayed in the previous peer-reviewed academic works relating to Electric Resistivity Tomography (ERT) prepared through Stanford University.[14,15] The March 2018 final report does not contain many of the elements that would be expected in a published academic manuscript or a scientific technical report. These elements include an abstract; description of study area; description of an accepted hydrogeologic conceptual model; details of data acquisition, processing, and inversion; a thorough discussion of results and conclusions; and necessary appendices containing outside data sources, including exploratory logs, geophysical logs, and water quality results. The lack of adherence to standard protocols for the presentation, data analysis, and technical peer review calls into question whether the report can be used as a reliable, unbiased technical source.

Definition of Drinking Water

One overriding difficulty with interpreting and applying the findings of the Stanford AEM study is that it considers drinking water as having a Total Dissolved Solids (TDS) concentration ranging between 0 and 1,000 milligrams per liter (mg/L) and considers groundwater between 0 and 3,000 mg/L as a "source of drinking water." This is misleading and skews the conclusions of the study, undermining its utility. The California Code of Regulations (CCR) title 22 recommends 500 mg/L TDS as a Secondary Maximum Contaminant Level ("Consumer Acceptance Contaminant Levels Ranges") with 1,000 TDS as the upper limit for drinking water. In most cases, groundwater exceeding 500 mg/L TDS must undergo some treatment before it is used for a domestic or municipal drinking water supply.

Another key component of drinking water standards (not discussed and factored into the AEM Study) is chloride concentrations. As discussed in EIR/EIS Section 4.4.1.4, the MCWRA uses chloride rather than TDS to track the advance of seawater intrusion in the 180-Foot and 400-Foot aquifer groundwater. The MCWRA's seawater intrusion program monitors select wells and biennially produces maps of the inland advance of the intrusion front. The MCWRA defines the seawater intrusion front as the inland extent at which the concentration of chloride in groundwater is at least 500 mg/L. A chloride concentration of 500 mg/L

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14 Pidlisecky, A., T. Moran, B. Hanson, and R. Knight, 2016. Electrical Resistivity Imaging of Seawater Intrusion into the Monterrey Bay Aquifer System. Groundwater Vol. 54, No. 2, March-April, pages 255-261.

15 Goebel, Meredith, Adam Pidlisecky, and Rosemary Knight, 2017. Resistivity Imaging Reveals Complex Pattern of Saltwater Intrusion along Monterey Coast, Journal of Hydrology, accepted manuscript February 22.

represents a level that is twice the National Secondary Drinking Water Regulation (250 mg/L) and that exceeds the concentration for water considered to be of “Class III - injurious or unsatisfactory” quality for agricultural irrigation (350 mg/L).[16] The recommended California Secondary Maximum Contaminant Level under CCR Title 22, which is California’s regulatory limit for chloride based on the National Secondary Drinking Water Regulation, is 250 mg/L with an upper limit of 500 mg/L. This means that groundwater within the seawater intrusion line (since it contains chloride in concentrations greater than 500 mg/L) could not be drinking water under state or federal standards.

The Stanford AEM study report further confuses its findings regarding the distribution of water quality by not clearly defining what is meant by “freshwater,” a term used throughout the report. The AEM report considers “drinking water” and “sources of drinking water” (discussed above) but the term “freshwater” is not defined by a TDS concentration. By doing this, “freshwater” could be misconstrued to mean drinking water that is readily available as a potable supply without treatment. Fresh water, as defined in EIR/EIS Sections 4.4.1.4 and Master Response 8.2.2, is groundwater that is below 500 mg/L TDS based on the recommended Secondary Maximum Contaminant Level set forth by CCR Title 22. Groundwater monitoring has clearly shown that groundwater in the MPWSP area may well be a “source of drinking water,” but it cannot become a readily available potable supply without treatment. Monitoring of the 24 MPWSP monitoring wells between February 2015 and June 2015 found only one isolated instance of groundwater in the Dune Sand, 180-Foot, or 400-Foot aquifer below 500 mg/L TDS (366 mg/L in monitoring well MW-9 D, screened in the 400-Foot Aquifer).

The Stanford AEM study concludes that there are zones of low TDS groundwater in the Dune Sand and 180-Foot aquifers inland of the proposed MPWSP slant wells. While this may be the case in some areas, especially the Dune Sand Aquifer following one of the wettest months in recent history (May 2017 when the AEM survey was completed), it remains inconsequential to the analysis of groundwater impacts for the MPWSP because, as discussed in the EIR/EIS, the capture zone of the MPWSP slant wells would be located along the coast and would draw most of the source water from the ocean and not from inland groundwater sources. Comments on the Final EIR/EIS insist that the Stanford AEM study provides new information on the hydrogeologic conditions within the Dune Sands Aquifer and the 180-Foot Aquifer. However, most of these comments were previously addressed in the Final EIR/EIS after reviewing the preliminary AEM results.

Definition of Brackish Water

MCWD, CJW, Schiavone, and others continue to opine that the Final EIR/EIS inaccurately applies the range of 500 mg/L to 33,500 mg/L TDS as the definition of brackish water and argue that groundwater with 3,000 mg/L TDS or less must be considered suitable, or potentially suitable, for municipal or domestic water supply based on the SWRCB Resolution No. 66-83 (Sources of Drinking Water) as revised by Resolution No. 2006-0008. Comments state that the Stanford AEM study and water quality samples from MPWSP monitoring well MW-4 contain TDS concentrations below 3,000 mg/L TDS and, therefore, this water must be considered a source of drinking water. The defined range of brackish water used in the Final EIR/EIS is based on the California Code of Regulations (CCR) Title 22 recommended Secondary Maximum Contaminant Level (“Consumer Acceptance Contaminant Levels Ranges”) of 500 mg/L TDS for drinking water and the salinity of seawater (33,500 mg/L TDS) in the Monterey Bay. Regardless of what the SWRCB Resolution No. 66-68 defines as “a suitable or potentially suitable source of domestic or Municipal water supply,” water with TDS concentrations exceeding 500 mg/L and chloride concentrations exceeding

16 National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, some states may choose to adopt them as enforceable standards.

250 mg/L exceeds USEPA's "secondary maximum contaminant levels" (SMCLs) for these contaminants and is typically unfavorable to most customers and ultimately unsuitable for drinking water unless it is treated. The SMCLs are established in USEPA's National Secondary Drinking Water Regulations, which provide guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. As these contaminants are not considered to present a risk to human health at the SMCL, these guidelines are non-enforceable; however, they demonstrate the level at which TDS and chloride concentrations make water unsuitable for drinking.[17]

Furthermore, this water, as identified in the Stanford AEM study, is present in the Dune Sand Aquifer (which is not currently used for water supply) and allegedly in certain areas in the upper 180-Foot Aquifer. Based on groundwater monitoring reports, it is likely that there are isolated, discontinuous zones of lower TDS groundwater in the sediments of the Dune Sand Aquifer that are surrounded by zones of higher TDS groundwater, particularly following periods of heavy precipitation. Given the hydrogeological characteristics of the Dune Sand Aquifer and its proximity to the coast, even if the groundwater identified by the Stanford AEM study as a potential source of drinking water were suitable and were extracted for a water supply, the volume would not be adequate to sustain a domestic or municipal supply. Additionally, based on the potential distribution of lower and higher TDS groundwater, it is likely that a groundwater supply well in the Dune Sands Aquifer would soon become brackish or saline as the zones of low TDS water were evacuated and higher TDS groundwater entered the well.

Terrestrial Biological Resources

Environmentally Sensitive Habitat Areas (ESHA)

MCWD argues that physical ESHA impacts cannot be reduced to less than significant due to a land use conflict with the City of Marina Local Coastal Plan; however, the physical (Impacts 4.6-2 and 4.6-7) and policy (Impact 4.6-4) impacts are distinct, and both are adequately addressed in the Final EIR/EIS.

Western Snowy Plover

The Water Plus opening brief addresses impacts on western snowy plover and presents information obtained from Point Blue Conservation Science (PBCS), then presents a statistical analysis based on that information to argue that the test slant well has had adverse impacts on snowy plover nesting and use of the CEMEX site. At a meeting in April 2018 hosted by Mayor Bruce Delgado in Marina with participation from MBNMS, U.S. Fish and Wildlife Service, PBCS, and members of the public, the group discussed the PBCS-collected snowy plover data in detail. The lead scientist from PBCS had the opportunity to explain their data and collection methods and put the Marina site data into its proper context with the entire Monterey Bay snowy plover population. The agencies and PBCS encouraged more collaboration to accurately interpret the data, so that other members of the public would have the benefit of data analysis that was vetted by subject matter experts. The statistical analysis provided by Water Plus regarding the impacts of the test slant well is an improper and incomplete interpretation of the PBCS data because it does not include other variables identified by PBCS that directly affect the snowy plover population in this region, such as the increased number of disturbances from pedestrians and dogs observed along this section of the Monterey Bay beaches, noted especially at the CEMEX south monitoring site and explained by PBCS at the April 2018 meeting. There is a correlation between pedestrian/dog disturbances and fledging rates for plover. For example, PBCS's 2017

[17] USEPA, 2017. Secondary Drinking Water Standards: Guidance for Nuisance Chemicals. Available online at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

data at the CEMEX south site suggests that unmanaged pedestrian use may be negatively impacting fledging rates. In contrast, at the CEMEX north monitoring site (which includes the test well) the 2017 rate of fledging was greater than the bay-wide average. All of the groups at the meeting concurred that additional data analysis is needed for further illumination on the pedestrian disturbance factor impacting plovers at the CEMEX south site (personal communication, MBNMS staff).

Water Plus asserted that compensation for loss of western snowy plover habitat by developing habitat elsewhere does not qualify as mitigation for the loss of potential future use of the CEMEX lands as a “nature park” by the City of Marina; however, there is no CEQA impact on a potential future land use of this site. The impact is on the resource – the plover – and the mitigation is consistent with mitigation requirements of resource agencies with subject matter jurisdiction. Final EIR/EIS Master Response 14 provides relevant information about the future disposition of the CEMEX site under the CEMEX Settlement Agreement, and the status of CalAm’s easement within the CEMEX site.

Bird Nesting During Construction

The attachment by Renee Owens to CURE’s Opening Brief dated April 19, 2018, argues that birds that initiate nesting during construction could still be impacted, contrary to conclusions in the Final EIR/EIS. The commenter refers to Mitigation Measure 4.6-1i, part 3, which allows sustained construction activity at facility sites that began prior to nesting season to continue into the nesting season without performing bird nesting surveys of the construction disturbance area. The intent of this measure is not to allow the take of a bird that decides to nest within or near a facility site that is under construction. Mitigation Measure 4.6-1i provides protection for all nests found in the project area or vicinity to ensure that the construction activities do not cause the adult to abandon an active nest or young or change an adult’s behavior such that it could not care for an active nest or young. Even if a nest was not identified during a preconstruction nesting bird survey, once the nest has been identified within or near a facility site where sustained construction is ongoing, the biologist has the responsibility to implement appropriate protective measures around the nest to avoid take.

As an example, a black phoebe could decide to nest under the eaves of a building that is adjacent to a future facility site where grading has been ongoing. As the black phoebe would have established the nest while grading was occurring at the adjacent site, rather than nesting on any number of buildings farther from the construction site, it is reasonable to assume the black phoebe is comfortable nesting adjacent to site grading activities. Under this scenario, once grading is complete (i.e., the construction activity under which the nest was established is completed and the next activity begins, such as pouring a slab or framing a structure), the lead biologist (with authority under Mitigation Measure 4.6-1a, as set forth in part below) would have an opportunity to evaluate implementing protective measures around the nest to avoid take. Should the biologist determine the nest is at risk of take as a result of the change in construction activity, the biologist would establish appropriate protective measures around the nest, according to Mitigation Measure 4.6-1i, until the nest is no longer active.

> **Mitigation Measure 4.6-1a: Retain a Lead Biologist to Oversee Implementation of Protective Measures.**
>
> …In the event that construction-related activities have the potential to violate the prescribed special-status species and habitat protection measures, the project Lead Biologist, or other appointed qualified biological monitors shall report to construction or operational site supervisors with authority to stop work to prevent any violations. Work shall proceed only after the construction-related hazards to special-status species and habitats are removed and the species is no longer at risk. Violations shall be thoroughly documented as part of compliance monitoring activities…

For reference, Mitigation Measure 4.6-1i is included below.

Mitigation Measure 4.6-1i: Avoidance and Minimization Measures for Nesting Birds.

This measure applies to all nesting birds protected by the federal Migratory Bird Treaty Act and Section 3503 of the California Fish and Game Code, except for western snowy plover and western burrowing, which are addressed in Mitigation Measure 4.6-1d and 4.6-1h, respectively.

Nesting birds may be present at all of the proposed facility sites. A qualified biologist shall conduct preconstruction avian nesting surveys prior to initiation of construction activities at all facility sites, unless otherwise indicated below.

1. No preconstruction surveys or avoidance measures are required for construction activities that would be completed entirely during the non-nesting season (September 16 to January 31).
2. For all construction activities scheduled to occur during the nesting season (February 1 to September 15), the qualified biologist shall conduct a preconstruction avian nesting survey no more than 10 days prior to the start of staging, site clearing, and/or ground disturbance. Copies of the survey results shall be submitted to the CPUC.
3. If construction activities at any given facility site begins in the non-breeding season and proceeds continuously into the breeding season, no surveys are required as long as a similar type of construction continues.
4. If there is a break of 10 days or more in construction activities during the breeding season, a new nesting bird survey shall be conducted before reinitiating construction.
5. The surveying biologist shall be capable of determining the species and nesting stage without causing intrusive disturbance. The surveys shall cover all potential nesting sites within 500 feet of the project area for raptors and within 300 feet for other birds.

If active nests are found in the project area or vicinity (500 feet for raptors and 300 feet for other birds), the nests shall be continuously surveyed for the first 24 hours prior to any construction related activities to establish a behavioral baseline and, once work commences, all nests shall be continuously monitored to detect any behavioral changes as a result of the project, if feasible. If behavioral changes are observed, work causing the change shall cease and CDFW shall be consulted for additional avoidance and minimization measures. The avoidance and minimization measures shall ensure that the construction activities do not cause the adult to abandon an active nest or young or change an adult's behavior so it could not care for an active nest or young.

If continuous monitoring is not feasible, a no-disturbance buffer (at least 500 feet for raptors and 250 feet for other birds [or as otherwise determined in consultation with CDFW and USFWS] shall be created around the active nests). The buffer distance can be reduced with authorization from CDFW if construction activities would not cause an adult to abandon an active nest or young or change an adult's behavior so it could not care for an active nest or young. If the nest(s) are found in an area where ground disturbance is scheduled to occur, the project operator shall require that ground disturbance be delayed until after the birds have fledged.

This measure also applies to periodic maintenance of the subsurface slant wells.

Marine Biological Resources

Accumulation of organic matter infiltrating into the subsurface of the ocean floor over intakes

CURE's April 23, 2018 letter from Linda Sobczynski, and the attached Amended Exhibit A from Dr. Radoslaw Sobczynski, argue that particulate organic material (POM) accumulation in sediments resulting from the intake of water for the proposed project slant wells would result in negative and unmitigable impacts on water quality and, therefore, the marine environment. Dr. Sobczynski argues that if there are anaerobic conditions, for example, when the slant wells go offline, then accumulated biomass in the sediments that were drawn to and are surrounding the well screens will support growth of sulfate reducing bacteria (SRB) that are capable of releasing hydrogen sulfide (H_2S).

Rates and quantities of POM accumulation used by Dr. Sobczynski to demonstrate impacts on the marine environment in Monterey Bay as a result of pumping the proposed project slant wells are based on concentrations of POM in the water column and in sediments from eutrophic environments such as the Baltic Sea, and from experiments involving artificially high additions of POM to sediments. The following responses to Dr. Sobczynski's April 23, 2018 Amended Exhibit A demonstrate that data specific to Monterey Bay are readily available in the published literature and provide evidence to support the argument that POM accumulation would not result in significant impacts. The following response also explains that the infiltration of POM into the sediments that Dr. Sobcynski suggests would be caused by the proposed project slant well pumping should have occurred decades ago with the introduction of seawater intrusion into the Salinas Valley Groundwater Basin; the negative and unmitigable impacts described by Dr. Sobczynski have not, in fact, occurred.

Comment

In Exhibit A, Dr. Sobczynski argues that "dissolved organic matter (DOM) and suspended organic matter (SOM) … will easily infiltrate into the subsurface due to slant well operations … [and] once dragged into capillary channels of filter medium by the slant well suction forces, DOM and SOM will stay there."

Response

By definition, DOM is dissolved in the water and cannot accumulate or bind to particles. Only SOM, also called particulate organic material (POM), can accumulate. In this statement, Dr. Sobcyzynski is confusing DOM with POM and making the statements that "the boundary layer is penetrable and indeed it is already filled with DOM and SOM" is speculative and not supported by any scientific evidence.

Comment

"The CPUC and MBNMS did not provide sufficient responses to my comments on the DEIR/S. According to the CPUC and MBNMS, wave generated orbital velocities are so strong that no fine organic matter will impinge on the seafloor or infiltrate into the soft substrate." See Final EIR/EIS Response to Comment CURE-Sobczynski-2 on page 8.6-514.

Response

Dr. Sobczynski claims that infiltration will occur, biomass will accumulate, an anoxic subsurface will lead to toxic conditions, that reverse osmosis (RO) plant operators prefer water that is anoxic, that environmental impacts due to organic waste will stimulate production of hydrogen sulfide (H_2S), and that mitigation measures are required. Responses to these claims follow:

Comment: Infiltration will occur

Dr. Sobczynski maintains "organic matter will infiltrate into the subsurface. Over time this leads to accumulation of the organic matter... ." To emphasize this point, Dr. Sobczynski quotes Dr. Huettel as saying "If the statement of Jenkins [that wave generated water velocities would prevent accumulation of fine organic matter] would apply, microbes and meio- and macrofauna organisms living on detrital matter deposited in the sand would starve."

Response:

This comment confuses flux (the action or process of flowing), with accumulation. The organisms consuming organic matter will not starve as long as there is a constant supply of organic matter, which is possible with flux and without long-term accumulation. In order to get an idea of the amount of organic carbon accumulated in Monterey Bay sediments as compared to the data from the Baltic Sea that Dr. Sobczynski uses in his arguments, see Table 1 which contrasts the dramatic differences between an enclosed brackish water system like the Baltic Sea, with an oceanic upwelling system with relatively low plant nutrients and containing abundant dissolved oxygen, like Monterey Bay.

TABLE 1
COMPARISON OF WATER COLUMN CHLOROPHYLL CONCENTRATIONS AND SEDIMENT CARBON CONTENT OF THE BALTIC SEA AND MONTEREY BAY

System	Chlorophyll Concentration (spring/summer)	Sediment Carbon Content	Characteristics	Citations
Baltic Sea	60/25 µg/L	3-7%	enclosed brackish water system heavily influenced by cyanobacterial blooms	Kahru et al. 1994,[18] Berg et al. 2001,[19] Naik and Poutanen 1984,[20] Bianchi et al. 2000[21]
Monterey Bay	1-2/1 µg/L	0.3-0.5%	relatively oligotrophic oceanic upwelling system	Kudela and Dugdale 2000, Rice et al. 1993,[22] Berelson et al. 2003,[23] CCLEAN data[24]

18 Kahru Mati, Ulrich Horstmann, and Ove Rud, 1994. Satellite detection of increased cyanobacteria blooms in the Baltic Sea: natural fluctuation or ecosystem change? Ambio, Vol. 23, No. 8, pp. 469-472.

19 Berg, Gry Mine, Patricia M. Glibert, Niels O. G. Jørgensen, Maija Balode, and Ingrida Purina, 2001. Variability in inorganic and organic nitrogen uptake associated with riverine nutrient input in the Gulf of Riga, Baltic Sea. Estuaries, Vol. 24, pp. 204-214.

20 Naik, Sugandhini and Eeva-Liisa Poutanen, 1984. Humic substances in Baltic Sea sediments. Oceanologica Acta Vol. 7, No. 4, pp. 431-439.

21 Bianchi, T.S., E. Engelhaupt, P. Westman, T. Andren, C. Rolff, and R. Elmgren, 2000. Cyanobacterial blooms in the Baltic Sea: Natural or human-induced? Limnology and Oceanography Vol. 45, No. 3, pp. 716-726.

22 Rice, D.W., C.P. Seltenrich, R.B. Spies, and M.L. Keller, 1993. Seasonal and annual distribution of organic contaminants in marine sediments from Elkhorn Slough, Moss Landing Harbor and nearshore Monterey Bay, California. Environmental Pollution Vol. 82, pp. 79-91.

23 Berelson, William, Jim McManus, Kenneth Coale, Ken Johnson, David Burdige, Tammy Kilgore, Debbie Colodner, Francisco Chavez, Rafael Kudela, and Joceline Boucher, 2003. A time series of benthic flux measurements from Monterey Bay, CA. Continental Shelf Research Vol. 23, pp. 457–481.

24 Central Coast Long-term Environmental Assessment Network (CCLEAN), data available from California Environmental Data Exchange Network (CEDEN), http://www.ceden.org

Comment: Biomass will accumulate

Dr. Sobczynski supports his assertion that “organic matter will infiltrate and accumulate in the subsurface” by citing a study by Kotwicki from the Baltic Sea.

Response:

There is no doubt that POM raining down from the water column accumulates in sediments on the seafloor. This accumulation is a function of the rate of supply of organic material coupled with the physical environment and the degree to which it allows organic material to accumulate in the sediments. The greatest degree of accumulation tends to occur in relatively sheltered environments with a high rate of primary production and terrestrial inputs of organic matter. Conversely, the least amount of organic material accumulation in sediments occurs in environments with high wave energy that have low rates of primary production. An example of the former is the Baltic Sea and an example of the latter is Monterey Bay. As presented in Table 1, the Baltic Sea is a system that sustains massive blooms of phytoplankton during the spring and summer seasons, which result in a high concentration of POM in the sediments. Therefore, Baltic Sea sediments with POM concentrations that are 10 to 20 times higher (based on carbon content) than Monterey Bay sediments (see Table 1), and that have a different clay content than Monterey Bay sediments, cannot be used to infer binding of carbon and POM to Monterey Bay sediments during the operation of the proposed project slant wells.

Furthermore, Dr. Sobczynski cites research by Borodovskiy from the 1960s that seawater contains 0.5 to 1.5 grams per cubic meter (g/m^3) of SOM. This is also not relevant to the current discussion because: 1) the SOM differs by orders of magnitude based on the system/region discussed; and 2) as demonstrated in Table 1 and citations therein, typical chlorophyll concentrations (the principal constituent of SOM) in Monterey Bay are between 1 and 2 micrograms per liter (µg/L) with occasional concentrations of 4 to 8 µg/L in the fall;[25] this is two to three orders of magnitude below a concentration of 0.5 to 1.5 g/m^3 SOM cited by Dr. Sobczynski.[26] To date, a concentration of SOM close to 0.5 g/m^3 has only been witnessed once in Monterey Bay, during a dinoflagellate bloom in 2006, which lasted for a few days.[27] Dr. Sobczynski cites a study by Precht et al.[28] as support of Dr. Borodovskiy where Baltic Sea sediments were collected and placed into a wave tank before ground-up red algae was added at a rate of 2 grams per square meter (g/m^2) per week to the sediments. This amounts to organic matter deposition rates that are orders of magnitude greater than organic matter deposition rates in Monterey Bay (see Table 1). Therefore, the data that Dr. Sobczynski uses to reach the conclusions about

25 Kudela, R.M., and R.C. Dugdale, 2000. Nutrient regulation of phytoplankton productivity in Monterey Bay, California. Deep-Sea Research II 47, pp. 1023-1053.

26 1 microgram is equal to 1/1,000,000 of a gram, and one liter is equal to 1/1000 of a cubic meter. Therefore, 1 microgram per liter is equal to 1/1000 of a gram per cubic meter. Typical SOM concentrations in Monterey Bay are 0.001 to 0.002 g/m^3, compared to 0.5 to 1.5 g/m^3 in the Baltic Sea cited by Dr. Sobczynski.

27 Kudela, Raphael M., Jenny Q. Lane, and William P. Cochlan, 2008. The potential role of anthropogenically derived nitrogen in the growth of harmful algae in California, USA. Harmful Algae 8, pp. 103-110.

28 Precht, Elimar, Ulrich Franke, Lubos Polerecky, and Markus Huettel, 2004. Limnology and Oceanography, Vol. 49, No. 3, pp. 693-705.

the mass of SOM that could potentially accumulate during infiltration of Monterey Bay sediments are not relevant to Monterey Bay or the proposed MPWSP.

Dr. Sobczynski cites a study by Precht and Huettel[29] of wave-induced filtration rates through Weser River Estuary sediments that was used to estimate input of particulate organic carbon (POC) into Monterey Bay sands of 1.4 to 2 grams/m^2 per day. As mentioned above, these carbon deposition rates are not possible given the POC concentrations (based on primary productivity) found in the water column in Monterey Bay (see Table 1). Therefore, this entire discussion of the potential build-up of organic matter based on these deposition rates is not applicable to the MPWSP.

Lastly, regardless of concentration of SOM in the water, SOM will be kept suspended as long as ambient currents and wave-induced orbital velocities are greater than either settling rates or the velocity of water drawn into the desalination intake wells. Dr. Sobczynski has made no effort to calculate whether the intake velocities would be great enough to counteract wave-induced orbital velocities and lead to POM/POC accumulations in the sand. For example, high-energy beaches in Monterey Bay, under which the intake wells would be located, experience wave heights on the order of meters throughout the seasons in response to intense storms (e.g., Fort Ord beach[30]).

Comment: Anoxic Subsurface Will Lead to Toxic Conditions in the Aquatic Habitat and Reverse Osmosis Plant operators prefer to keep water anoxic

In his comments on the Draft EIR/EIS, Dr. Sobczynski indicated that "if there are anaerobic conditions, for example, when slant wells go offline, then accumulated biomass in the filter medium will be supporting growth of sulfate reducing bacteria (SRB) that are capable of releasing hydrogen sulfide (H_2S)." Final EIR/EIS Response to Comment CURE-Sobczynski-4, on page 8.6-516, explains that operation of the slant wells would not result in anaerobic conditions because oxygenated water would continue to move through the filter medium as a result of continuous operation of the other wells (typically, most wells would be operational with one on standby or "offline" at a time).

In opposition to this explanation in the Final EIR/EIS response, Dr. Sobczynski argues that the desalination process would inherently require or result in anaerobic/anoxic conditions, and thus the potential release of H_2S would remain a problem. To support this assertion, Dr. Sobczynski cites a CalAm Test Slant Well Long Term Pumping monitoring report showing high levels of iron and manganese, and argues that RO plant operators do not want feedwater to be oxygenated because such iron and manganese levels can cause fouling of RO membranes.

Dr. Sobczynski further argues that RO plant operators know that H_2S can be released due to accumulated organic matter in anaerobic conditions, and cites a portion of a Dow Chemical

29 Precht, Elimar, and Markus Huettel, 2003. Advective pore-water exchange driven by surface gravity waves and its ecological Implications. Limnology and Oceanography, Vol. 48, No. 4, pp. 1674–1684.

30 Dingler, John R., and Thomas E. Reiss, 2002. Changes to Monterey Bay beaches from the end of the 1982-83 El Niño through the 1997-98 El Niño. Marine Geology Vol. 181, pp. 249-263.

Company Technical Manual on how to prevent potential problems with the presence of H_2S in desalination feedwater.

Response:

The Final EIR/EIS discussion of the proposed pre-treatment system described in Section 3.2.2.1 on page 3-22 clearly indicates that iron and manganese concentrations could cause fouling of RO membranes (indicative of the operator *expecting* oxygenated feedwater) and states: “A low dosage of chlorine would be added to the source water to separate out iron and manganese, and the precipitate would be removed by the filters.” Thus, Dr. Sobczynski’s argument that the RO plant operator would endeavor to “keep water anoxic” to prevent precipitation of iron and manganese is contrary to the description of the proposed project.

The Dow Chemical Company manual cited by Dr. Sobczynski is titled, “Water Chemistry and Pretreatment: Treatment of Feedwater Containing Hydrogen Sulfide”[31] and what Dr. Sobczynski does not cite is the first sentence in the Dow manual, which says, “Some well waters, usually brackish waters, are in a reduced state typically lack of oxygen (therefore referred to as anoxic or anaerobic) and the presence of iron, manganese, ammonium and/or hydrogen sulfide (H_2S).” However, the feedwater from the proposed slant wells would be mostly seawater and would not lack oxygen. As described on Final EIR/EIS page 8.2-22, the long-term equilibrium of the feedwater is estimated to range from 96 to 99 percent ocean water and as discussed on Final EIR/EIS page 4.3-9, ambient dissolved oxygen levels in Monterey Bay at a depth of approximately 100 feet have ranged from 4.25 milligrams per liter (mg/L) to 8.00 mg/L.

As mentioned above, research in wave tanks using Baltic Sea sediments with a high organic carbon content is not germane to the current situation in Monterey Bay, and statements such as “Anoxic conditions occur [below a few millimeters of the surface] regardless of whether slant wells are taken offline” are baseless.

Comment: Environmental impact due to organic waste stimulating production of H2S

Dr. Sobczynski claims that “the production of toxic H2S will deteriorate, adversely disturb, and physico-chemically and bio-chemically modify the aquatic habitat resulting in a significant impact.”

Response:

This claim is speculative, and is based on a scenario of extreme POM deposition into the sediments. In particular, the statement that “I suspect that bioaccumulation of DOM and SOM has already occurred due to test slant well operation” is not supported by evidence. Furthermore, seawater has already intruded inland a maximum of approximately 8 miles within the 180-Foot Aquifer, and 3.5 miles within the 400-Foot Aquifer (see Final EIR/EIS Figures 4.4-10 and 4.4-11) as a result of

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[31] The Dow Chemical Company, undated. Water Chemistry and Pretreatment: Treatment of Feedwater Containing Hydrogen Sulfide. Available online at http://msdssearch.dow.com/PublishedLiteratureDOWCOM/dh_0042/0901b80380042b91.pdf.

groundwater pumping, and there is no evidence suggesting that the release of toxic H_2S is occurring today.

Comment: Mitigation measures are required for a significant impact

Dr. Sobczynski claims here that “the mere operation of the slant well will result in the production of deadly hydrogen sulfide” which will “modify the aquatic environment resulting in a significant impact” and uses Pescadero Lagoon, CA, as an example of how hydrogen sulfide can cause fish kills. It is Dr. Sobczynski’s “opinion that no mitigation measures will be sufficient to reduce the impact to less than significant.”

Response:

Because the extreme rates of POM deposition presented by Dr. Sobczynski are not reflective of the project location in Monterey Bay (see Table 1), it is our opinion that it is unlikely H_2S will be produced in the quantities/rates resulting in the scenario presented by Dr. Sobczynski. Since slant well pumping would not result in the wholesale death or fish kills of benthic or pelagic communities, mitigation for the less than significant impact is not required. The analysis in the EIR/EIS is supported by substantial evidence, while Dr. Sobczynski’s claim of a significant impact related to bioaccumulation of DOM and SOM and production of H_2S is speculative and based on data that is not relevant to this location. For example, the Pescadero Lagoon cited by Dr. Sobczynski (formally called the Pescadero Marsh Natural Preserve) is a seasonal lagoon system on the Central California Coast of California that is not dissimilar to the eutrophic conditions experienced in the Baltic Sea. The fish kill at the Pescadero Lagoon cited by Dr. Sobczynski occurred during dramatic draining events of the lagoon that take place when the sandbar that separates the lagoon from the ocean is breached. The conditions that precipitated the fish kills at Pescadero Lagoon are no more relevant to conditions in Monterey Bay and the proposed project, than are the rates of POM deposition from the Baltic Sea.

Comment: Additional Concerns with the Lead Agencies’ Responses to Comments

Dr. Sobczynski argues that desalination will result in an increase in the concentration of nutrients in the subsurface capture zone, particularly following a toxin-producing harmful algal bloom (HAB).

Response:

Toxic algal blooms are a regular feature of Monterey Bay (Kudela et al. 2008; CeNCOOS, 2018[32]) and they result from changes in circulation leading to warming of surface water and stratification (Ryan et al. 2009[33]). They do not result from nutrient input alone; rather, nutrients sustain blooms once they are initiated due to changes in circulation. While HABs can cause operational issues for desalination

32 Central and Northern California Ocean Observing System (CeNCOOS), 2018. Monterey Bay Algal Bloom History. https://www.cencoos.org/learn/blooms/monterey, accessed July 20, 2018.

33 Ryan, John P., Andrew M. Fischer, Raphael M. Kudela, James F.R. Gower, Stephanie A. King, Roman Marin III, and Francisco P. Chavez, 2009. Influences of upwelling and downwelling winds on red tide bloom dynamics in Monterey Bay, California. Continental Shelf Research Vol. 29, pp. 785-795.

pre-treatment systems, particularly for facilities incorporating open water intakes,[34] subsurface intakes are not affected by algal blooms. As described in Final EIR/EIS Section 4.5.5.2, various studies have documented that nearshore currents at the seafloor are dominated by the orbital velocities of waves, and there is no evidence that the HABs have been drawn into the Salinas Valley Groundwater Basin as a result of ongoing groundwater pumping, or would be drawn into and accumulate in the proposed slant well capture zone.

Conclusion

Dr. Sobczynski argues that POM accumulation in sediments resulting from pumping the slant wells for the MPWSP will result in a host of negative and unmitigable impacts on the marine environment. However, the rates and quantities of POM accumulation used by Dr. Sobczynski are based on concentrations of POM in the water column and in sediments from eutrophic environments such as the Baltic Sea, and from experiments with artificially high additions of POM to sediments. Dr. Sobczynski has chosen to use these sources of data rather than data on water column concentrations of POM, rain rates of POM to the sediments, as well as sediment organic matter concentrations from Monterey Bay, which, as demonstrated above, are readily available in the published literature. Furthermore, the phenomena described by Dr. Sobczynski are existing conditions; existing seawater intrusion within the 180-Foot and 400-Foot Aquifers has not resulted in the impacts that Dr. Sobczynski describes.

Alternatives

People's Project GHG Emissions

Water Plus provided an attachment dated March 2018, supporting the suggestion that the People's Project would use solar energy and argues that it would, therefore, have fewer GHG emissions than the MPWSP, resulting in an environmentally superior project. However, implementation of revised Mitigation Measure 4.11-1 would result in no net new GHG emissions from the MPWSP and the argument for environmental superiority on the basis of GHG emissions alone is not supported.

Reduced Capacity Alternative

Some comments state that the EIR/EIS should have considered a reduced capacity desalination alternative. Section 5.1.1, Alternatives Analysis – CEQA/NEPA Requirements, of the EIR/EIS (at pages 5.1-2 through 5.1-3) sets forth the requirements for developing and undertaking an alternatives analysis; Section 5.1.2, Project Objectives and Significant Impacts, of the EIR/EIS (at pages 5.1-3 through 5.1-6) discusses the purpose and need under NEPA and the project objectives under CEQA that pertain to the project. Briefly, CEQA provides that the range of alternatives considered in an EIR (here, an EIR/EIS) is governed by the "rule of reason" such that the EIR need only include those alternatives necessary to permit a reasoned choice. (CEQA Guidelines section 15126.6(f).) "The alternative shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the Lead Agency determines could feasibly obtain most of the basic objectives of the project." (Id.) As to NEPA, other than for the no action alternative, alternatives should meet the purpose and

[34] Caron, David, et al., 2009. Harmful algae and their potential impacts on desalination operations off southern California. https://dornsife.usc.edu/assets/sites/378/docs/Caron_pdfs/2009_Caron_etal_WR_Proofs.pdf

need (40 CFR § 1502.13), and be reasonable, i.e., practical or feasible from the technical and economic standpoint and using common sense. The discussion below pertains to both CEQA and NEPA considerations.

The EIR/EIS included an extraordinarily detailed and multi-level alternatives analysis exploring many options. Specifically as to the notion that the EIR/EIS should have included a reduced capacity alternative, this is not accurate because: (1) the EIR/EIS did evaluate in detail two reduced capacity alternatives (in addition to the No Project Alternative); (2) a further reduced capacity alternative would not meet the basic objectives of the project or the purpose and need for the project; (3) a further reduced capacity alternative would not likely avoid or substantially reduce significant environmental effects of the project; and (4) the Final EIR/EIS did discuss a further reduced capacity option. Any one of these is sufficient to explain why an even smaller desalination plant than those studied in the EIR/EIS need not be addressed in detail.

The EIR/EIS studied as the primary project throughout the document a 9.6 mgd desalination plant, and associated facilities (EIR/EIS Chapter 4). Two alternatives were examined in detail at a 6.4 mgd desalination plant size (Chapter 5). These were Alternative 5a (Intake Slant Wells at CEMEX) and Alternative 5b (Intake Slant Wells at Potrero Road). Each of these alternatives – a considerably smaller capacity than the 9.6 mgd plant project – was examined in detail in the EIR/EIS, which identified the impacts associated with such reduced capacity alternatives. As to each of these smaller alternatives considered on its own, the EIR/EIS concluded that the alternative would fail to meet the basic project objectives (and purpose and need) due to vastly insufficient water supply and reliability for all types of water years and seasons. (Final EIR/EIS pages 5.4-52 and 5.4-59.) Alternative 5a or 5b would meet the project objectives only when considered in the cumulative sense along with the approved Pure Water Monterey project (PWM, also known as GWR). When the MPWSP Draft EIR/EIS was prepared, the PWM project had been approved by the lead agency, as well as a Water Purchase Agreement approved by the CPUC for CalAm to secure 3,500 afy of water from that source. Thus, it was reasonable for the PWM project to be assumed in the cumulative analysis for Alternatives 5a and 5b. However, the PWM had not yet completed NEPA review, received all requisite permits and approvals and been constructed, nor (naturally) begun operating and reliably providing water to customers. Construction on elements of the PWM project has now begun, but not all permits have been secured (e.g., NEPA review is on-going and draft Waste Discharge Requirements have been issued by the Regional Water Quality Control Board). The EIR/EIS consideration of Alternatives 5a and 5b as reduced capacity desalination options on their own provides information concerning smaller desalination alternatives.

There is no requirement to analyze an even smaller desalination plant because it would fail to meet the basic project objectives. Given that each desalination unit is 1.6 mgd in size, the next reduced desalination plant size would be 4.8 mgd. Clearly, on its own, such a smaller desalination plant could not meet the basic objectives of the project to supply existing and projected future demand within CalAm's Monterey service territory (see project objectives 1 through 7 on Final EIR/EIS page 5.1-5). Even when considered in conjunction with water expected to be supplied by the PWM project currently under construction, a 4.8 mgd desalination alternative would not provide water supply sufficient to meet demand consistent with the project objectives (or the NEPA purpose and need). Furthermore, prudent water planning and applicable water planning standards and guidelines require planning for all types of water years, including inevitable droughts. Under drought circumstances when little to no water is available from the ASR system, there would be insufficient supply to reliably meet, and be able to satisfy, peak month and peak day demands. Seasonal variability and potential drought conditions would exacerbate the water deficit of a 4.8 mgd desalination plant, even with PWM water available. (See Final EIR/EIS Section 8.2.13.5, pages 8.2-117 through 8.2-118 and Appendix L for data concerning supply and demand and a possible smaller desalination plant.) For these reasons, a smaller capacity desalination plant would not come close to meeting the basic project objectives and was properly not analyzed in detail in the EIR/EIS.

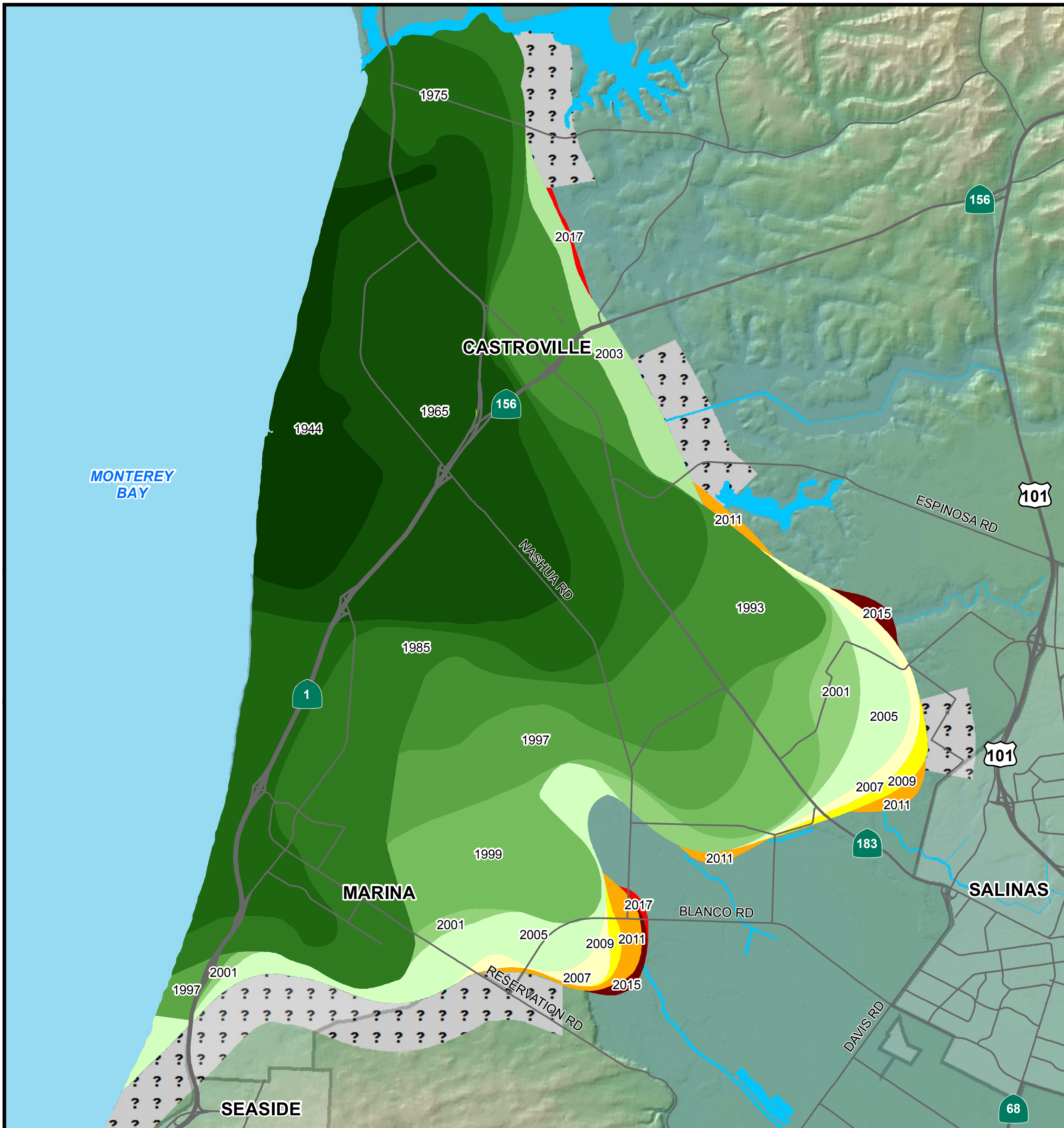
In addition, a smaller capacity desalination plant need not be analyzed in that it does not appear that such an option would avoid or substantially lessen any significant impacts of the project. Many significant impacts would result from construction of the project and those would remain as described for Alternative 5a since the same infrastructure would be constructed (pipelines, etc.), the desalination plant would be on the same site and the same five well pads would be needed at the CEMEX site. While operation of a 4.8 mgd desalination plant would require less energy and therefore generate fewer greenhouse gas emissions, the change may not be a substantial reduction in impacts and Alternative 5a would not have unavoidable adverse impacts in these areas in any event. As stated on page 8.5-663 of the Final EIR/EIS: "The magnitude of any potential adverse impacts resulting from the implementation of a desalination plant that is reduced in size from Alternative 5a and 5b would be reduced from what was evaluated for Alternatives 5a and 5b in EIR/EIS Section 5.5. However, it is expected that the classifications of all such impacts would remain the same as set forth in the EIR/EIS, as would the suggested mitigation measures."

The purpose of exploring alternatives in an EIR/EIS is to seek and fully consider a reasonable range of options that would alleviate or substantially reduce significant environmental impacts of the project. Since a further reduced capacity alternative would not meet this goal (and, as discussed above, would fall short of meeting project objectives), it need not be included in the EIR/EIS.

Finally, as this discussion shows, the Final EIR/EIS did indeed discuss a 4.8 mgd plant in myriad places and include data on such an infeasible option. (See EIR/EIS Section 8.2.13.5, pages 8.2-117 through 8.2-118; EIR/EIS page 8.5-663; and Appendix L.)

Additional Materials

Attached as Exhibit C is a letter received from the State Water Resources Control Board (SWRCB) dated September 4, 2018. The letter suggests numerous changes to the Commission's Administrative Law Judges' Proposed Decision concerning the project. The changes relate to specifics and minor suggested language changes concerning the SWRCB's orders and the topic of project water rights. None of the suggested text changes to the Proposed Decision alter or affect any analyses or conclusions of the Final EIR/EIS. The minor changes to the discussion of water rights in the Proposed Decision appear intended to reflect precise language used in the state Water Code, but do not affect the meaning or conclusions of the water rights discussion in either the Proposed Decision or the EIR/EIS.



Historical Seawater Intrusion Map

Pressure 180-Foot Aquifer - 500 mg/L or Greater Chloride Areas

? No Data **Cities**

1944	**1997**	**2007**
1965	**1999**	**2009**
1975	**2001**	**2011**
1985	**2003**	**2015**
1993	**2005**	**2017**

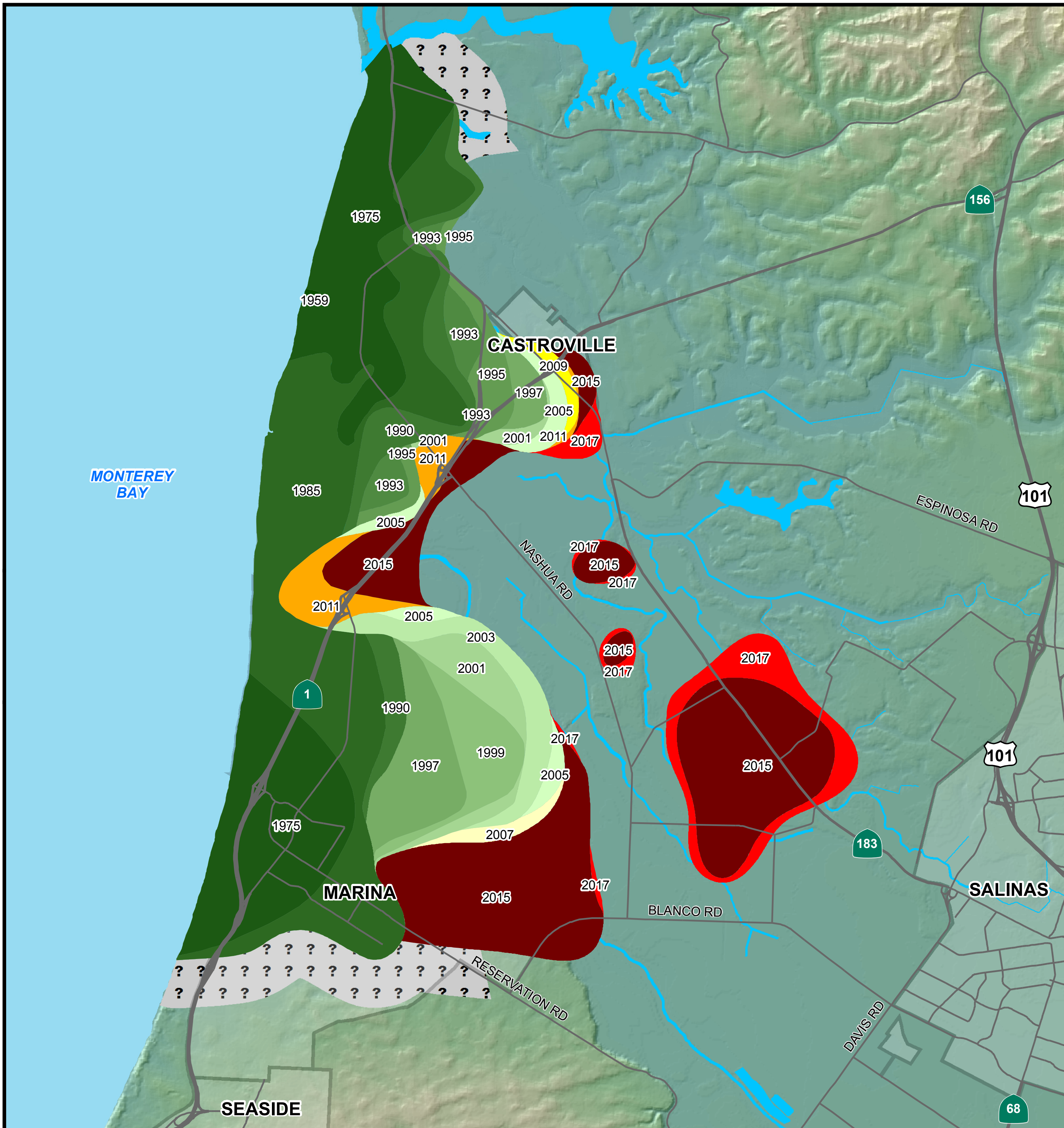
*** Seawater Intruded Areas By Year**

N
W E
S

Miles
0 0.5 1 1.5 2

The scale and configuration of all project boundaries and information shown herein are not intended as a guide for design or survey work.

Map Date: 4/11/2018



Historical Seawater Intrusion Map

Pressure 400-Foot Aquifer - 500 mg/L or Greater Chloride Areas

Cities
? ? No Data

1959	1997	2007
1975	1999	2009
1985	2001	2011/2013
1990	2003	2015
1993	2005	2017
1995		

*** Seawater Intruded Areas By Year**

N
W E
S

0 0.5 1 1.5 2 Miles

The scale and configuration of all project boundaries and information shown herein are not intended as a guide for design or survey work.

Map Date: 4/25/2018

EXHIBIT A

Chronology of Communications between the City of Marina as a Responsible Agency and the CPUC as Lead Agency

Oct 10, 2012: The CPUC issued a Notice of Preparation (NOP) for the MPWSP EIR. No comments were submitted by the City of Marina.

June 10, 2013: The CPUC CEQA Team attended a meeting with Local, State and Federal agencies at CalAm offices in PG to discuss alternative intake and discharge locations. Following a presentation by the CPUC CEQA Team and a discussion by the attendees of the alternatives, the attendees, including the City of Marina's Director of Community Development (Christine di Iorio) and Planning Services Manager (Theresa Szymanis), agreed that the active mining area at CEMEX was the preferred location for the proposed slant wells. The City declared itself the Lead Agency for preparing the Test Slant Well CEQA compliance, and said it would be preparing a CEQA Initial Study to determine if the Test Slant well was exempt from CEQA or if the City would require a Mitigated Negative Declaration.

Oct 17, 2013: The CPUC CEQA Team met with the Christine di Iorio and Theresa Szymanis at the City of Marina to make introductions, and to discuss the test slant well, the MPWSP project description, the 6.4 mgd Project Variant, the EIR Approach to Analyses, and the EIR Approach to Alternatives.

Jan 23, 2014: CPUC CEQA staff attended the City of Marina Planning Commission meeting where they considered and declined to make a determination on CalAm's application for a CDP for boreholes at CEMEX. CPUC CEQA staff met with Mayor Delgado following the meeting, and discussed a broad range of MPWSP issues of interest to the Mayor.

Feb 10, 2014: CPUC CEQA staff received a request from Theresa Szymanis for responses to questions about the boreholes from Mayor Delgado; CPUC CEQA staff provided responses the same day.

Feb 12, 2014: At the request of City staff, CPUC CEQA staff attended the Marina City Council meeting addressing the appeal of the decision by the City's Planning Commission to decline to make an interpretation of the City's Surface Mining and Reclamation Standards with regards to CalAm's CDP application for boreholes at CEMEX.

March 21, 2014: In response to a request, CPUC CEQA staff provided SWCA, the City of Marina's environmental consultant preparing the Test Slant Well's CEQA Initial Study, with the CPUC-prepared Coastal Hazard Mapping at the CEMEX property.

March 11, 2015:	CPUC CEQA/NEPA team contacted City of Marina City Manager Layne Long to notify the City of the scheduled Draft EIR release date, and to arrange for a briefing to City Council on the Draft EIR prior to the public meetings.
April 30, 2015:	CPUC published the Draft MPWSP EIR.
May 12, 2015:	CPUC CEQA team presented the results of the Draft EIR to the Marina City Council at a public meeting.
May 26, 2015	CPUC held a Public Meeting on the Draft EIR at the Marina Public Library.
July 1, 2015	CPUC CEQA Team received a comment letter on the Draft EIR from City Manager Layne Long, including attachments from the City's environmental consultant SWCA, and Robert Abrams Consulting Hydrogeologist.
July 7, 2015	CPUC CEQA Team received a supplemental comment letter on the Draft EIR from City Manager Layne Long.
August 26, 2015:	NOAA's Office of National Marine Sanctuaries issued a Notice of Intent (NOI) to prepare an EIS for the project and solicited input on the full spectrum of environmental issues and concerns relating to the scope and content of the EIS. The City of Marina did not submit comments in response to the NOI.
September 2015:	The CPUC Energy Division announced that the Draft EIR would be modified and recirculated as a joint EIR/EIS in coordination with MBNMS, and made clear that key substantive comments and themes of comments received on the April 2015 Draft EIR would be addressed in the appropriate sections of the EIR/EIS.
Sept. 11, 2015:	At the request of the City of Marina, the CPUC CEQA/NEPA team sent a hard drive with the NMGWM data files to the City of Marina, c/o Robert Abrams Consulting Hydrogeologist.
January 13, 2017:	CPUC/MBNMS published the MPWSP Draft EIR/EIS. Marina City Council members, Planning Commission members, City Manager Layne Long, and the Community Development Department were all mailed a CD copy of the Draft EIR/EIS. A hard copy was delivered to the City of Marina Community Development Department.
January 24, 2017:	At the request of the City of Marina, the CPUC CEQA/NEPA team provided the City with digital print files for the 4-volume Draft EIR/EIS, and provided an additional 15 executive summaries, extra CDs and 2 full hard copy sets of the Draft EIR/EIS.
February 2, 2017:	CPUC/MBNMS CEQA/NEPA staff and management met with City Manager Layne Long, SWCA representative Emily Creel, and Marina's counsel from Wellington Law, to discuss the Draft EIR/EIS and the CPUC's upcoming Draft EIR/EIS presentation to the Marina City Council.
February 3, 2017:	The CPUC CEQA/NEPA team responded to a follow up email request from Emily Creel at SWCA inquiring about test well data in the Draft EIR/EIS.
February 7, 2017:	CPUC CEQA/NEPA team presented the findings of the Draft EIR/EIS to Marina City Council at a public meeting.

February 15, 2017: CPUC/MBNMS held a Public Meeting on the Draft EIR/EIS at the Marina Public Library.

March 29, 2017: The law firm of Farella Braun + Martel provided comments on the Draft EIR/EIS on behalf of the City of Marina. The City's 97-page letter included 154 individual comments, and 29 additional pages in an attached letter from Robert Abrams that included 32 individual comments. Responses to these 186 individual comments are provided in Final EIR/EIS Section 8.5.1.

April 17, 2017: CPUC CEQA/NEPA team contacted Fred Aegerter, Director of City of Marina Community Development Department, to coordinate with and request the City's participation in an upcoming field visit to the MPWSP project area by biologists from the CA Coastal Commission, CPUC CEQA/NEPA team, and CalAm, to review potential impacts to ESHA (Environmentally Sensitive Habitat Areas).

April 18, 2017: CPUC CEQA/NEPA team emailed City Manager Layne Long, and Fred Aegerter, requesting a City of Marina biologist be available for the site walk with the CA Coastal Commission and CEQA/NEPA team and CalAm biologists.

April 27, 2017: CPUC CEQA/NEPA team emailed the CA Coastal Commission biologist leading the site visit, and copied Layne Long and Fred Aegerter at City of Marina, and Emily Creel at SWCA, regarding the upcoming site visit and associated lack of responses to prior attempts to contact the City of Marina.

May 3, 2017: CPUC CEQA/NEPA team contacted Emily Creel at SWCA by phone to inquire about their providing a biologist for the CA Coastal Commission-instigated site walk.

May 19, 2017: First habitat site walk by biologists from the CA Coastal Commission, CEQA/NEPA team, CalAm and City of Marina (Kristen Outten from SWCA).

July 19, 2017: Follow-up habitat site walk by biologists from the CA Coastal Commission, CEQA/NEPA team, CalAm and City of Marina (Kristen Outten from SWCA).

August 7, 2017: CPUC CEQA/NEPA team members attended a presentation of the draft results of the SkyTEM Airborne Electromagnetics investigations to a joint meeting of the MCWD Board of Directors and the Board of Directors of the MCWD Groundwater Sustainability Agency at the Marina City Council chambers.

March 28, 2018: CPUC and MBNMS published the Final EIR/EIS. A CD of the Final EIR/EIS was mailed to Farella Braun + Martel, and a Notice of Availability with a web link to the Final EIR/EIS was mailed to all City of Marina City Council and Planning Commission members. A hard copy set (8 books) and 20-CDs of the Final EIR/EIS were hand delivered to City Manager Layne Long.

April 13, 2018: CPUC CEQA/NEPA team members attended a meeting in the City of Marina, hosted by Mayor Bruce Delgado and attended by the U.S. Fish and Wildlife Service, Point Blue Conservation Service, and a number of members of the public. The group discussed the Point Blue-collected snowy plover data at CEMEX in detail.

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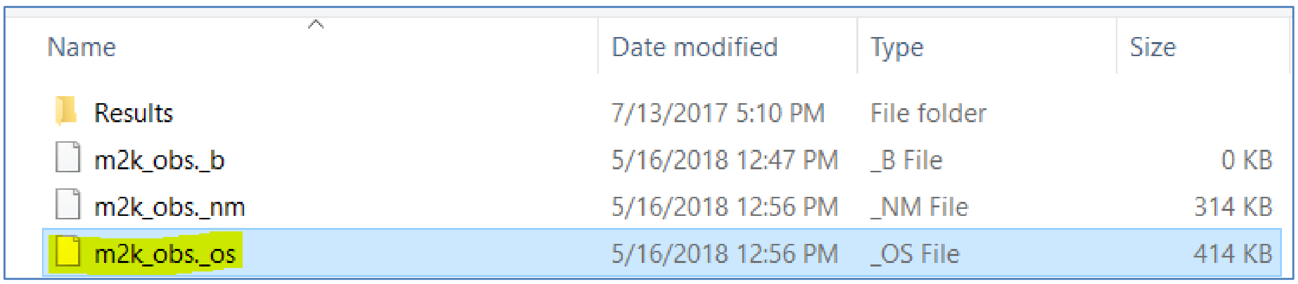
EXHIBIT B

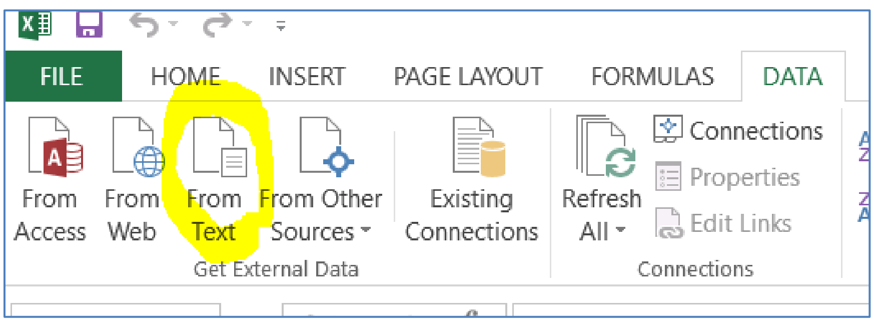
Converting MODFLOW Output Files to EXCEL

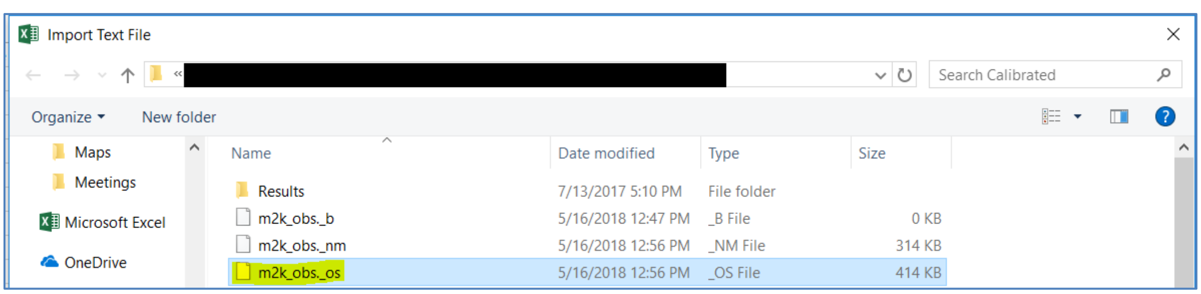
The screenshots below present the process by which the publicly available MODFLOW output file (available at http://www.cpuc.ca.gov/Environment/info/esa/mpwsp/comms_n_docs.html) is read directly into an Excel file.

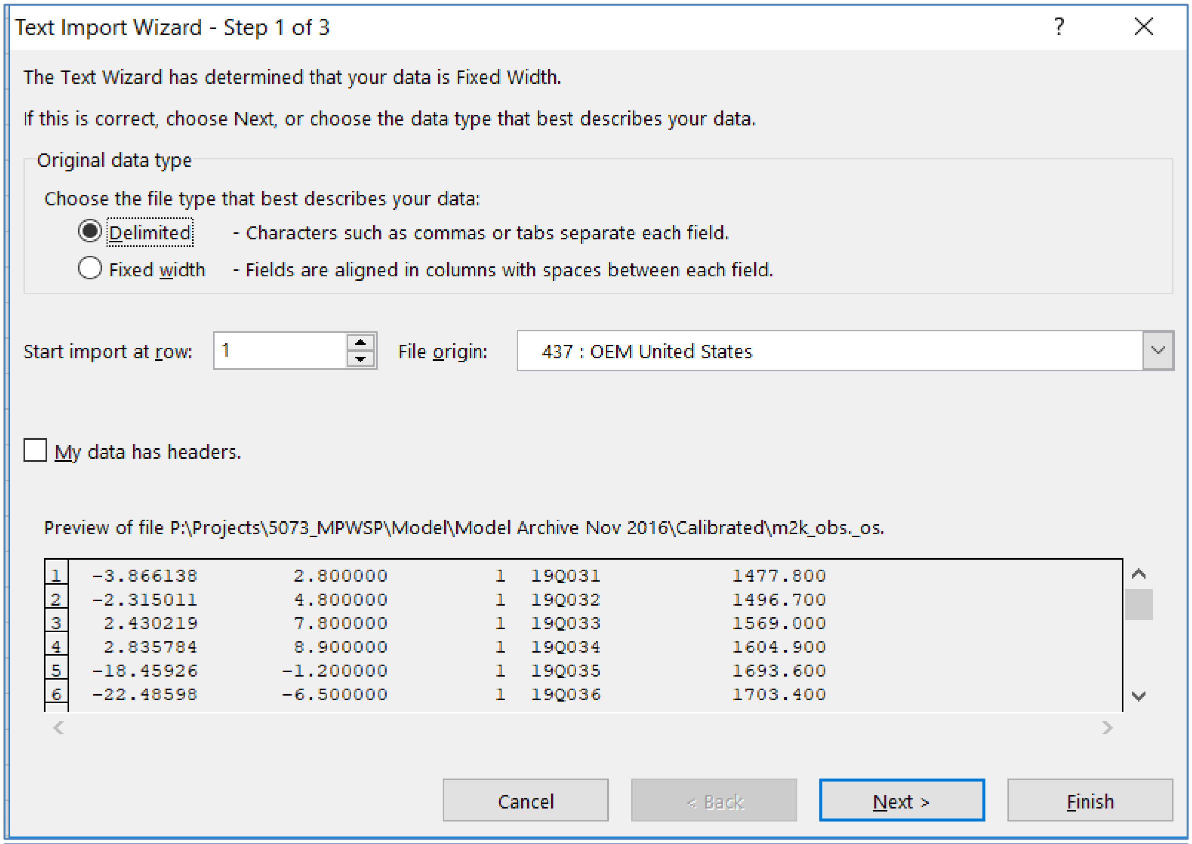
i. MODFLOW creates the “m2k_obs._os” output file within the model folder.

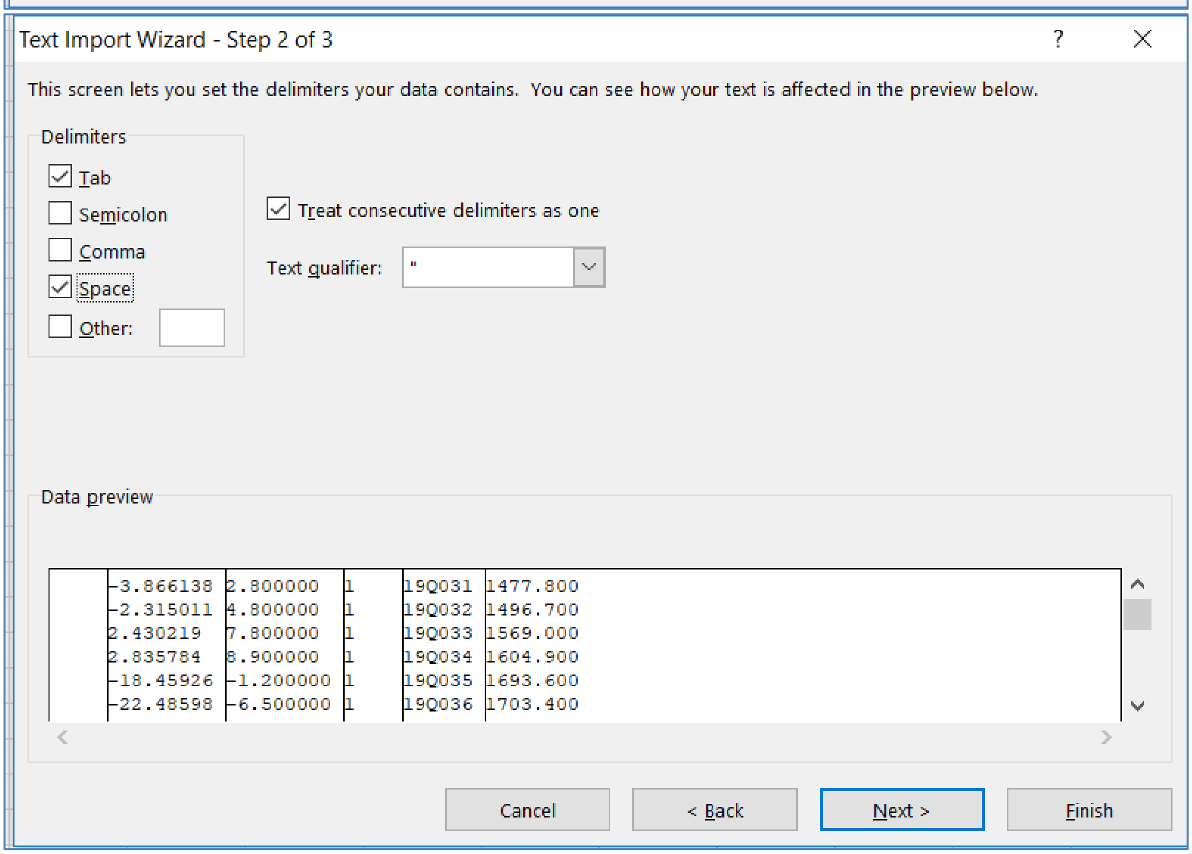


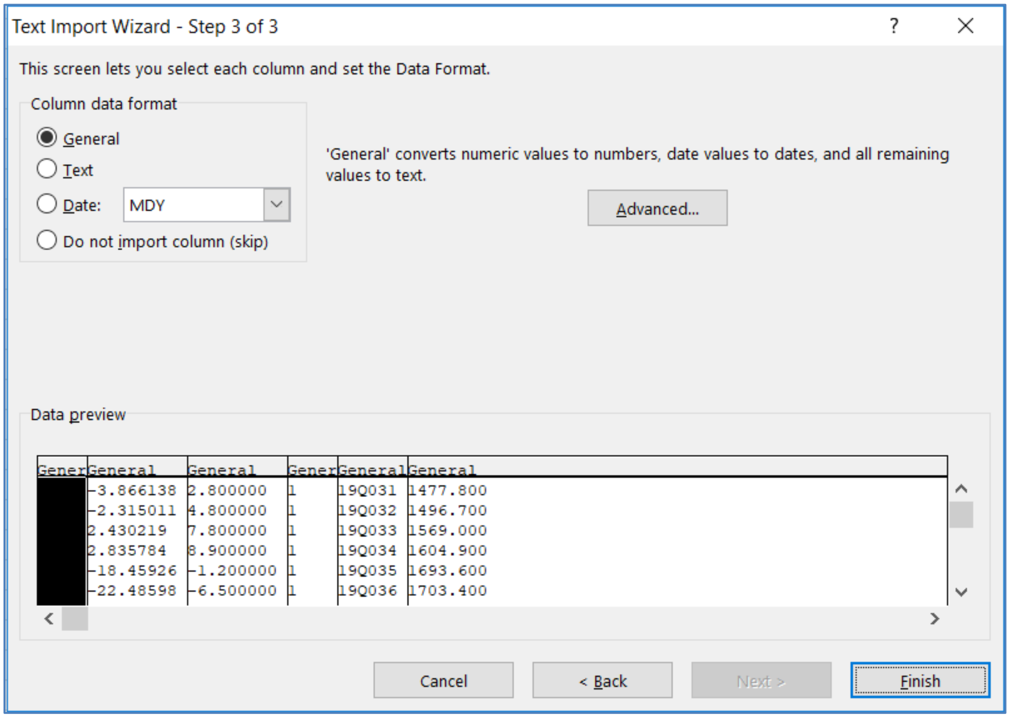
Excel opens the “m2k_obs._os” file via the “From Text” option in the Get External Data section of the DATA menu to import as a space-delimited file.

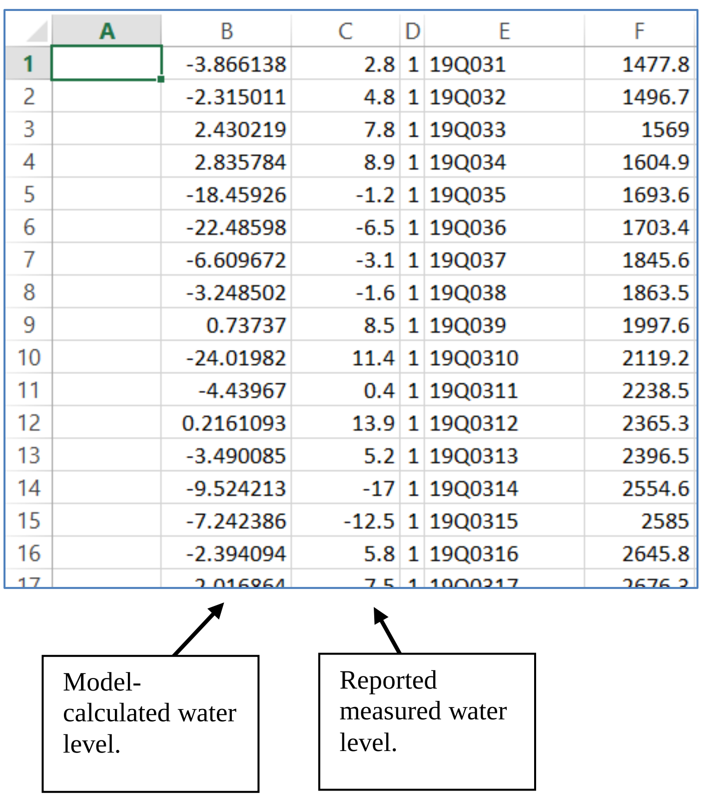





Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row: 1
File origin: 437 : OEM United States
My data has headers.
Preview of file P:\Projects\5073_MPWSP\Model\Model Archive Nov 2016\Calibrated\m2k_obs._os.
1 -3.866138 2.800000 1 19Q031 1477.800
2 -2.315011 4.800000 1 19Q032 1496.700
3 2.430219 7.800000 1 19Q033 1569.000
4 2.835784 8.900000 1 19Q034 1604.900
5 -18.45926 -1.200000 1 19Q035 1693.600
6 -22.48598 -6.500000 1 19Q036 1703.400
Cancel
< Back
Next >
Finish


Text Import Wizard - Step 2 of 3
This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.
Delimiters
Tab
Semicolon
Comma
Space
Other:
Treat consecutive delimiters as one
Text qualifier: "
Data preview
-3.866138 2.800000 1 19Q031 1477.800
-2.315011 4.800000 1 19Q032 1496.700
2.430219 7.800000 1 19Q033 1569.000
2.835784 8.900000 1 19Q034 1604.900
-18.45926 -1.200000 1 19Q035 1693.600
-22.48598 -6.500000 1 19Q036 1703.400
Cancel
< Back
Next >
Finish





As shown in these screenshots, the MODFLOW m2k_obs._os output file is imported into Excel exactly as previewed.

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EXHIBIT C

SWRCB Letter on Proposed Decision

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State Water Resources Control Board

September 4, 2018

Via Electronic Mail

John Edward Forsythe, AICP
Senior Environmental Planner
California Public Utilities Commission
Energy Division
Infrastructure Permitting and CEQA Section
300 Capitol Mall, Suite 518
Sacramento, CA 95814
John.Forsythe@cpuc.ca.gov

Dear Mr. Forsythe:

APPLICATION 12-04-019: COMMENTS ON PROPOSED DECISION OF ADMINISTRATIVE LAW JUDGES (ALJ's) HAGA, HOUCK, AND WEATHERFORD

The State Water Resources Control Board (State Water Board) appreciates this opportunity to provide comments to the California Public Utilities Commission (Commission) on the proposed decision, issued August 13, 2018, in the proceeding on the above-referenced application by California-American Water Company (Cal-Am) for its proposed Monterey Peninsula Water Supply Project (MPWSP).

The State Water Board is not a party to the proceeding before the Commission but has been, and will continue to be, involved in various related matters within its purview. Of particular focus in this comment letter, the State Water Board is strongly supportive of, and has in fact ordered, Cal-Am's diligent action to, no later than December 31, 2021, limit its diversion of Carmel River water to volumes for which it has a valid basis of right. When last considering modifying its cease and desist order against Cal-Am, the State Water Board articulated that its "interest is in ending unlawful diversions from the Carmel River, rather than in supporting a particular facility." (State Water Board Order WR 2016-0016, p. 16.)

The following comments and suggested revisions are focused primarily on clarifying certain technical points related to the proposed decision's description of the State Water Board's actions and requirements. Suggested textual edits are in quotation marks, with suggested deletions in strikethrough and suggested additions in bold and underline.

1. Page (p.) 5:

   "The SWRCB concluded that although Cal-Am had been diverting **an average of** 14,106 acre-feet per year (afy) from the Carmel River, it ha~~s~~**d** a legal right to only 3,376 afy from the Carmel River system, including surface water and water **flowing in the subterranean stream** pumped from the Carmel Valley wells. Thus, SWRCB ordered Cal-Am to replace what SWRCB determined to be unlawful diversions of **about** 10,730 afy from the Carmel River ~~with~~**through obtaining additional rights to the Carmel River or** other sources **of water,** and through other actions, such as conservation to offset 20 percent of demand."

2. P. 7, footnote (fn.) 7:

   “[7] SWRCB ~~Cease and Desist~~ Order No. WR 2009-0060 (Oct. ~~27~~**20**, 2009) (*Hereafter* SWRCB's Cease and Desist Order or CDO).”

3. P. 7, fn. 8:

   “[8] SWRCB~~'s~~ Draft ~~Cease and Desist~~ Order No. WR 2009-00xx (July 27, 2009).”

4. Pages (pp.) 7-8:

   “The CDO was **adopted by the SWRCB on October 20, 2009, and was** ~~issued~~ **distributed to the service list** on October 27, 2009**.** ~~and~~ **The adopted CDO maintained the December 31, 2016 compliance deadline from its earlier drafts, and** states in no uncertain terms that Cal-Am can and must reduce its unlawful diversions from the Carmel River without further delay. The SWRCB ~~presents a range of options for~~**ordered** Cal-Am to begin complying immediately with the CDO, including reducing its ~~system losses~~**diversions from the Carmel River** by five (5) percent or 549 afy starting in October 2009~~,~~**;** **further reducing diversions from the Carmel River in subsequent years through additional water savings from** ~~anticipating that approximately 41 afy of additional savings can be obtained as properties are retrofitted, and conservation measures are installed, reducing use of potable water for outdoor irrigation by approximately 12 afy, imposing additional~~ water demand management programs **implemented** ~~(~~in conjunction with Monterey Peninsula Water Management District (WD)~~),~~**;** and prohibiting new service connections **or certain increased uses of water at existing service connections**.[9] On July 19, 2016, the SWRCB adopted Order WR 2016-0016 (Revised CDO),[10] which ~~amends~~**partially supersedes** Orders 95-10[11] and 2009-0060.[12] Order 2016-0016 extends the date by which Cal-Am must terminate all unlawful diversions from the Carmel River from December 31, 2016, to December 31, 2021. The Revised CDO set an initial diversion limit from the Carmel River of 8,310 afy for Water Year 2015-2016 (October 1, 2015-September 30, 2016) and orders Cal-Am to terminate all unlawful diversions from the Carmel River ~~in excess of 3,376 afy~~ no later than December 31, 2021.[13]”

5. P. 8, fn. 10: We suggest deleting this footnote in its entirety and renumbering remaining footnotes accordingly. If the Commission wishes to maintain this footnote, please refer to Order WR 2016-00**16**.

   Order WR 2016-0016 was introduced earlier in the body of text on p. 8 corresponding to this footnote ("Revised CDO") but is referred to by other terms elsewhere in the Commission's proposed order. (See, e.g., pp. 8 [in sentence directly following first reference], 38, 62, 79, 112, 121, and Findings of Fact beginning at p. 148.) Whichever term the Commission chooses, we recommend consistent references to this order throughout its decision.

6. P. 8, fn. 11: Order WR 95-10 was introduced in the body of text on p. 5 ("Order 95-10") but is referred to by other terms elsewhere in the proposed order. (See, e.g. Findings of Fact, pp. 148 & 179.) If the Commission wishes to also cite, at some point in its decision, the full title as it appears on the cover page of Order WR 95-10, it is "Order on Four Complaints Filed Against The California-American Water Company." Whichever term the Commission chooses, we recommend consistent references to this order throughout its decision.

7. P. 8, fn. 12: Order WR 2009-0060 was introduced earlier in p. 7, fn. 7 ("SWRCB's Cease and Desist Order or CDO") but is referred to by other terms elsewhere in the proposed order. Whichever term the Commission chooses, we recommend consistent references to this order throughout its decision.

8. P. 11, section 1.2.: "SWRCB" shorthand was already introduced on p. 5. Whichever term the Commission chooses for the State Water Resources Control Board, we recommend consistent references throughout its decision. (See also pp. 38, 62, 72-73, "Findings of Fact" beginning at p. 148 [unless Findings of Fact and Conclusions of Law ordinarily do not utilize the shorthand from earlier in the decision].)

9. P. 18:

   > "[. . .] adequate sources of potable water well before the onset of the provisions of the [~~1995~~**2009**] CDO."

   [Note: In the proposed decision's in-text quotation of D.12-07-008, the "onset of the provisions of the CDO" refers to the December 31, 2016 compliance deadline in Order WR 2009-0060.]

10. P. 22:

    > "In order to calculate the demand to be served, Cal-Am must consider and balance the requirements of the CDO, this Commission's requirements, and the ~~Department of Public Health's~~**SWRCB's** requirements."

[Note: The State Water Board assumed the drinking water regulatory functions of the Department of Public Health as of July 1, 2014. (See Health & Saf. Code, § 116271.)]

11. P. 38, fn. 111: We request that the citation to the State Water Board's orders occur after the first sentence, not after the sentences which follow and include proposed conclusions regarding the proceeding before the Commission:

    "The SWRCB has already extended the CDO deadline for Cal-Am to reduce pumping from the Carmel River, and the effective diversion limit would be immediately reduced without Commission action by September 30, 2018. ***See,* SWRCB Order WR 2016-0016 at 21.** The extensive and exhaustive [. . . .] as a whole. ~~*See,* SWRCB Order WR 2009-0060, Cease and Desist Order, *modified by* SWRCB Order WR 2016-0016, Order Amending in Part Requirements of State Water Board Order WR 2009-0060.~~"

    [Note: The Commission may, if it wishes, utilize a different term for Order WR 2016-0016, e.g. "Revised CDO at 21."]

12. Pp. 72-73

    "In the ~~State Water Resources Control Board~~**SWRCB**'s **"**Final Review of California-American Water Company's Monterey Peninsula Water Supply Project**"** (SWRCB Report) issued on July 31, 2013, the ~~State Water Resources Control Board~~**SWRCB** advised that extracting **sea**water from the ocean does not require water rights**.** ~~and that~~ **SWRCB also stated that the aquifers into which** Cal-Am **proposes to construct slant wells and extract water** ~~would draw ocean from the Basin~~ **have a** landward ~~area of~~**gradient of groundwater flow that would likely result in the proposed wells' primarily extracting seawater**. However, as acknowledged in the ~~State Water Resources Control Board~~**SWRCB** Report and evaluated in detail in the FEIR/EIS, a portion of the project source water is expected to be brackish water, a combination of ocean water and fresh water originating from the inland aquifers of the **Salinas Valley Groundwater** Basin. In order for Cal-Am to possess appropriative rights to the ~~fresh~~**brackish** water under a "developed water" legal basis, whereby the project essentially creates a new water source, Cal-Am would need to be able to demonstrate that ~~any withdrawal of Basin water that is not ocean water~~ **its extraction and beneficial use of the water source** would not injure or harm other ~~existing Basin~~ **legal users of** water~~ rights holders~~. There is no permit for ~~such~~ appropriative **ground**water rights**;** ~~so~~ the project would have to be implemented **by Cal-Am** in a manner that meets the~~ criteria that would create the~~ **requirements for an** appropriative **ground**water right**, including establishing that that the project water source is surplus to the needs of groundwater users in the Salinas Valley Groundwater Basin and that operating the project will not injure other lawful users of water**."

[Note: Salinas Valley Groundwater Basin is referenced later in proposed decision as "SVGB," without that acronym being introduced. First reference to Salinas Valley Groundwater Basin is on p. 10. Section 5.4 (pp. 72-74) uses the term "Basin," which is not previously introduced and may be confusing, especially in light of the discussion of the Seaside Basin elsewhere in the proposed decision.]

13. P. 112, fn. 305:

"[. . .] *See,* SWRCB Order WR ~~2009-0060~~**2016-0016** at 21."

14. P. 121, fn. 328:

"*See also,* SWRCB Order WR ~~2009-0060~~**2016-0016**, extending the deadline for Cal-Am to end all unlawful diversions from the Carmel River from December 31, 2016 to December 31, 2021. ~~The amending order~~ ~~(~~Order WR 2016-0016~~)~~ includes **intermediate** milestones for **developing the Cal-Am portions of the GWR project and for developing the MPWSP desalination facility, with the intent of having both projects operational by the end of 2021.** ~~reducing annually (by water year) the unlawful diversions by 1,000 acre feet by each of the following dates: October 1, 2018 (2018-19), October 1, 2019 (2019-2020), October 1, 2020 (October 1, 2020-21), and October 1, 2021-December 31, 2021.~~ **To both incentivize timely progress on the projects and to more gradually terminate Cal-Am's unlawful Carmel River diversions by the compliance deadline in the event timely progress on the projects is not made, each failure to achieve a milestone will result in a reduction of Cal-Am's effective diversion limit by up to 1,000 afy.**"

15. Findings of Fact, pp 148-174:

"5. In 1995, the State Water Resources Control Board issued its Order No. WR 95-10, which concluded that although Cal-Am had been diverting **an average of** 14,106 afy from the Carmel River, it ha~~s~~**d** a legal right to only 3,376 afy from the Carmel River system, including surface water and water **flowing in a subterranean stream** pumped from the Carmel Valley wells.

[. . . .]

7. The State Water Resources Control Board ordered Cal-Am to replace what State Water Resources Control Board determined to be unlawful diversions of **about** 10,730 afy from the Carmel River with ~~with~~**through obtaining additional rights to the Carmel River or** other sources **of water,** and through other actions, such as conservation to offset 20 percent of demand.

8. On October 2~~7~~**0**, 2009, the State Water Resources Control Board iss**u**ed Order WR 2009-0060, which ordered Cal-Am to cease and desist

unlawful diversions of water from the Carmel River by December 31, 2016.

9. On July 19, 2016, the State Water Resources Control Board issued its Order Amending in Part Requirements of State Water Board Order WR 2009-0060, extending the deadline for ending all unlawful diversions from the Carmel River from December 31, 2016 to December 31, 2021. The amending order (Order WR 2016-0016) includes **intermediate** milestones for ~~reducing annually (by water year) the unlawful diversions by 1,000 acre feet by each of the following dates: October 1, 2018 (2018-19), October 1, 2019 (2019-2020), October 1, 2020 (October 1, 2020-21), October 1, 2021-December 31, 2021~~ **developing the Cal-Am portions of the GWR project and for developing the MPWSP desalination facility, with the intent of having both projects operational by the end of 2021**. **To both incentivize timely progress on the projects and to gradually terminate Cal-Am's unlawful Carmel River diversions by the compliance deadline in the event timely progress is not made on the projects, each failure to achieve a milestone will result in a reduction of Cal-Am's effective diversion limit by up to 1,000 afy.**

[. . . .]

23. Construction and operation of the MPWSP is necessary to ensure Cal-Am ~~remains~~ **operates** within its legal water rights which requires ~~reduction in~~ **cessation of** its **unlawful** diversions from the Carmel River by December 31, 2021, in compliance with the cease and desist order issued by the SWRCB, as well as required reductions to other constrained water supply sources such as the Seaside Basin.

[. . . .]

59. The SWRCB prepared, at the Commission's request, a draft report on water rights that was circulated for public comments**,** and then issued ~~as~~ its July 31, 2013 **"**Final Review of California-American Water Company's Monterey Peninsula Water Supply Project**"** ~~or SWRCB Report~~. This report determined that extracting **sea**water from the ocean does not require water rights and **that** Cal-Am could draw ocean water from the landward area of the **Salinas Valley Groundwater** Basin **under certain circumstances**.

60. A portion of the MPWSP source water is expected to be brackish water, a combination of ocean water and fresh water originating from the inland aquifers of the **Salinas Valley Groundwater** Basin.

61. In order for Cal-Am to possess appropriative rights to ~~fresh~~**brackish** water under a "developed water" legal basis whereby the MPWSP essentially creates a new water source, Cal-Am would need to be able to demonstrate that ~~any withdrawal~~ **its extraction and beneficial use of the water source** ~~of Basin water that is not ocean water and~~ would not injure or harm other ~~existing Basin~~ **legal users of** water ~~rights holders~~.

62. There is no permit for ~~such~~ an appropriative **groundwater** right. Cal-Am cannot obtain a water rights permit ~~before~~**for** MPWSP implementation.

[. . . .]

111. Based on the mandatory cumulative annual reductions, the estimated operational yield from the ASR project and the estimated afy supplied by the Sand City desalination plant, the 2009 Cease and Desist Order found that the total amount diverted **by Cal-Am** from the Carmel River was not to exceed Cal-Am's water rights of 3,376 afy by the end of December 20~~21~~**16**. **The 2016 Revised Cease and Desist Order extended the compliance deadline to the end of December 2021 and acknowledged that Cal-Am may, under certain circumstances, divert additional volumes of water from the Carmel River under water rights permits or under water transfers from other rights holders.**"

[Note: The proposed decision may not have explicitly discussed the findings in section 111 previously. The existing sentence appears to be based on Order WR 2009-0060, p. 64. For the suggested additional sentence regarding potential lawful diversions above 3,376 afy, see Order WR 2016-0016, p. 10.]

Again, thank you for this opportunity for the State Water Board to provide comments on the proposed order. State Water Board staff will be available to further discuss or clarify these comments, to the extent permitted by procedural rules governing this proceeding before the Commission.

Sincerely,

Michael A.M. Lauffer
Chief Counsel

cc:

[all via email only]

Application 12-04-019 Service List
(https://ia.cpuc.ca.gov/servicelists/A1204019_80356.htm)

Steven Westhoff, OCC