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RESPONSE TO DRAFT EIR/EIS SANTA ROSA LONG-TERM WASTEWATER PROJECT

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1. GENERAL COMMENTS AND QUESTIONS

1.1. UNEQUAL ANALYSIS OF IRRIGATION IMPACTS 001

Existing irrigation areas that will be used in the long-term project were not analyzed for their impact. On the other hand considerable analysis was provided for new areas, including the soils, irrigation returns, agricultural practices, sedimentation and erosion. Some of the impacts were revealed to be significant in the new areas, and are probably already effecting the Laguna irrigation area. Even without a legal requirement to do so, it would be prudent to perform the same analyses for the Laguna.

1.2. INADEQUATE SCOPE OF CUMULATIVE IMPACT ANALYSES 002

The cumulative analyses presented in this EIR/EIS ignore the cumulative impact of past and current activities. For example, irrigation analyses for the West County alternative indicate that irrigation in the Laguna has probably had a significant water quality impact. Thus an evaluation based simply on a change from current conditions ignores the distinct possibility of "adding insult to injury". Another example would be an assessment of upstream water quality.

Besides the past, there are several cumulative impacts that might need mitigation in the 003
near future, and that were not evaluated in this EIR/EIS. The first example would be the need for more stringent measures for the Waste Reduction Strategy, specifically to directly increase Dissolved Oxygen. A second example would be more stringent water 004
quality measures for the Russian River and the Laguna, to protect endangered fish species.

1.3. CHAPTER 5

1.3.1. Section 5.3 005

1. Were the opinions of local elected officials, public interest/community groups, Chambers of Commerce, and academics surveyed to validate the conclusions

reached in the Infrastructure section? Were any recent local opinion polls, surveys, or studies reviewed to validate the conclusions reached in the Infrastructure section? If not, why not? Can local opinions be included for the Final EIR/EIS? 005 (cont.)

2. What might be the impact of current deliberations in several localities to (a) expand spheres-of-influence, (b) annex properties, and (c) extend wastewater collection systems and sewer-hookups? 006

2. WATER BALANCE MODEL COMMENTS AND QUESTIONS 007

My questions and comments about the water balance model are offered to help identify where additional analysis and calculations could improve confidence in the results.

I have tried to arrange the following questions and comments so that the responses from previous sections to become the basis for responses in subsequent sections. The section titles are taken from the Draft EIR/EIS.

2.1. MEASUREMENT OF RUSSIAN RIVER FLOWRATES 008

1. Why does the EIR/EIS report use a 70-year record of measurements when the SCWA model relies on records only from 1941 (the year from which continuous measurements are available to establish reliable correlations)? How would the use of the 55-year record effect the water balance model and water quality model? 009
2. Were incremental inflows used to evaluate the alternatives based on (a) the SCWA correlations with stream-gauge measurements since 1941, or (b) on the synthesized values from the SCWA simulations since 1986? 010
3. Since Mr. Miles Ferris (Director of the Utilities department and City Engineer for the City of Santa Rosa) has testified in Federal Court that the crucial gauge at Hacienda Bridge is too unreliable to evaluate compliance with environmental regulations, how could inaccuracies be quantified and verified for the 70-year (or 55-year) period used in the EIR/EIS? How could an uncertainty/error factor be included in the water balance model and the water quality model? What might be the effect of the error factor on the results of these models? What might be the subsequent change of impacts for each alternative? 011 012 013|014 015

2.2. APPENDIX D-4

2.2.1. page1-2

1. What is the current volume of I/I, and what is the forecast for the life of this project? 016
2. What is the City of Santa Rosa's annual expenditure currently for I/I reduction, and what is the forecast for the life of this project? 017 018
3. Is there an evaluation of the impact of Inflow/Infiltration reduction measures in the EIR/EIS? 019

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a. If not, why not? What attempts were made to validate this reasoning, in general 020
and specifically for this project?

b. If yes (or for further refinement of the EIR/EIS), what are the projected. 021
reductions, and what is the basis for the projections? How do the I/I projections 022
effect:

i. The water balance calculations and model, and how would they change Appendices D-8 through D-13 (especially D-9), D-15, and D-18?

ii. The Russian River and Laguna water quality models, and how would 023
they change the results of Appendix I-8?

iii. The water quality impact assessment, and how would they change 024
Appendices I-16 and I-17, and Chapter 4.6?

iv. The selection of the Environmentally Superior Alternative in Chapter 5.5, 025
and the elimination of alternatives in Appendix D-6? 026

v. The size of storage reservoirs, irrigation areas, direct discharges, and 027
indirect discharges for each alternative, and how would they change the
descriptions in Chapter 3 and the mitigations listed in Chapter 2? 028

2.3. APPENDIX D-9

2.3.1. Storage

1. What are the "preset percentages" of total storage used to calculate the target 029
storage for each month, and what is the basis of their derivation?

2. How are the target storage volumes calculated for each day in the daily water 030
balance? How were daily target storage volumes included in the water quality 031
model in Appendix I-8?

3. To help visualize and verify the comparisons, can tables similar to Tables 4.2 and 032
4.3 in Appendix I-8, and graphs of Operations Curves similar to Figure 2 in Appendix D-12 be added in the Final EIR/EIS?

2.3.2. Contingency Discharge

1. How were multiple daily contingency discharges in the same month counted in 033a
the conversion to monthly occurrences? How many months had multiple daily 033b
contingency discharges during the 70-year evaluation period?

2. To help visualize and verify the comparisons between daily and monthly models, 034
especially for large dilutions at high cumulative frequencies, can the following details be added to Figures 2, 4, 6, and 8?

   a. To show the points (on "X" and "Y" axes) at which the dilution limit (1%, 5%, 10%,20%) is exceeded for both the monthly and daily water balances

   b. To show the cumulative frequency ("X" axis) range from 95% (if not already 035
   included to show the limit points)

3. Is the very low 20 cfs flow referred to on p.4 an individual daily average, an 036
individual daily maximum, a monthly average, or some other value? How often 037

were individual daily average flows less than 1000 cfs at Hacienda Bridge "masked" by higher monthly averages? For each dilution limit, how many times did discharges occur before the first time in each season that an hourly flowrate at Hacienda Bridge reached 1000 cfs? 037 (cont.) 038

2.3.3. Further Improvements to Daily Water Balance Model Storage Operations

1. Was a different distribution of target storage volumes also evaluated (not only additional 5 or 10%)? If not, why not? 039
2. What other target storage volume distributions are possible and feasible (e.g. as described in Appendix I-8, p.36)? What would be their effect on the need for contingency discharges? 040 041
   a. How would their results compare to Table 1 and Figures 2, 4, 6, and 8 (with the additional details described in items 2a and 2b above)? 042
   b. How would these distributions effect the results of the water quality model in Appendix I-8? 043
      i. How would the calibration change for all the water quality variables discussed in section 3.2 (Calibration Results)? 044
      ii. What changes would there be in section 4 (Alternatives Analysis), in particular in Tables 4.2 and 4.3, for a monthly evaluation and for a daily evaluation? 045

2.3.4. Other Differences in Model Construction and Results

1. What is the equation used to estimate annual wastewater volumes from annual Russian River volumes recorded at Hacienda Bridge? What is the correlation coefficient (R^2) for the linear regression? 046 047
2. What the "historical distribution of annual flows" used to convert the annual wastewater volume to monthly volumes? 048
3. What is the equation used to estimate daily wastewater volumes from daily incremental inflows to the Russian River below Healdsburg? What is the correlation coefficient (R^2) for the linear regression? 049 050

2.3.5. Summary

1. How would the daily water balance model and its refinements effect: 051
   a. The water balance contingency plan in Appendix D-10?
      i. How would Tables 1, 2, and 3, and Figures 1 through 8 change for daily balances? 052
      ii. How would the contingency measures and their results change? How would Tables 6, 7, and 8 change for daily balances? 053
   b. The water quality model in Appendix I-8? 054
      i. How would the calibration change for all the water quality variables discussed in section 3.2 (Calibration Results)?

ii. What changes would there be in section 4 (Alternatives Analysis)? 055

2. Were the impacts of the larger dilutions calculated from the daily water balance model evaluated? If not, why not? If yes, where and how? 056

2.4. APPENDIX D-10

2.4.1. Background

1. What is the exact wording of the agreement with the NCRWQCB about reliability? Is it in writing? Was it authorized by the Board, or proposed by staff? 057
2. What are the currently authorized reliability requirements? 058
   a. In the NPDES permit?
   b. In the Basin Plan? 059
3. What is the technical basis for the 95% reliability requirement? 060
4. Were 99%, 99.9%, and 100% reliability requirements also considered and evaluated? If not, why not? If yes, where, how, and what were the conclusions? 061

2.4.2. Contingency Volume Characterization

1. Based on the methodologies used in Appendix D-9, how do the values in Table 1 change for daily (rather than monthly) water balance calculations? Similarly, how do Figures 1 to 4 change for daily calculations? 062
2. What is the range and average contingency volume for each month, using daily calculations (i.e. expand Table 1 into 12 monthly columns)? How do the resulting values compare to the target storage volumes and the total storage volume for each design discharge rate (i.e. superimpose the contingency volumes over the Storage Operations Curve)? 063
3. Will the contingency volumes for each design discharge rate remain zero at the 95th percentile after applying the daily calculations? 064 At what frequency/percentile will the contingency volume be zero after applying the daily calculations? 065 What changes in storage volume and/or irrigation area would be required to maintain zero contingency volume at the 95th percentile? 066

2.4.3. Contingency Volume Monthly Occurrences

1. Based on the methodologies used in Appendix D-9, how would the values in Table 2 change for daily (rather than monthly) water balance calculations? 067
2. What is the range of consecutive daily contingency volumes (for each month and design discharge rate) arising from the daily water balance calculations? 068

2.4.4. Total Russian River Discharge Frequency

1. How were the discharge volumes in Table 3 generated? What equation was used, and what was the correlation coefficient? 069

2. Using the linear regression equation from Appendix D-9 for daily discharge volumes, what would be the daily values (MG/day) in Table 3? Similarly, what would be the shape of the daily volume-frequency curves corresponding to Figures 5 through 8? 070 071

2.4.5. Discharge Rate Distribution

1. Figure 9 is not clear, and cannot be used to clearly compare and validate distributions. Figures 2, 4, 6, and 8 from Appendix D-9 provide a far better representation, including a comparison between daily and monthly calculations. The additional details proposed in my comments (item 2.3.2 (2a)) also allow comparisons of different reliability requirements (e.g. 99%, 99.9%, and 100%). 072

2.4.6. Contingency Volume Program

1. Was Inflow/Infiltration reduction considered and analyzed for this program? If not, why not? If yes, how, and why was it eliminated? 073
2. What would be the impact of I/I reduction on the need for contingency discharges, based on my questions (item 2.2.1)? How would I/I reduction change the values in Tables 4 and 5? 074 075
3. Is Laguna and existing irrigation included in Table 4? Why are alternatives 4 and 5 not listed in Table 4? What are their corresponding values for Table 4? 076 077
4. Were adjustments made in the length of periods of "summer" and "winter" irrigation according to the type of year (dry, average, wet)? How were irrigation rates varied according to the month (e.g. as described in Appendix I-8, p.35) and type of year? How would the values in Table 4 and 5 change for different types of year if such considerations were included? 078 079 080
5. Does the sentence "*As the design rate for Russian River discharge increases, system requirements for irrigation acreage decreases.*" (p.11, Appendix D-10) mean for some alternatives at high discharge rates, less irrigation acreage will be utilized than is available for the project at lower rates? For which alternatives and design discharge rates would additional irrigation acreage be available (do Tables 1 and 2 in Appendix D-8 show all possibilities?)? Was additional irrigation acreage considered and analyzed for this program? If not, why not? If yes, how, and why was it eliminated? 081
6. For each alternative and design discharge rate, how would additional acreage (up to the maximum value available or considered for lower discharge rates) change the values listed in Table 4 and 5? 082

2.4.7. Contingency Event Russian River Discharge Rates

1. How would the values in Table 7 and 8 change using (a) daily water balance calculations (item 2.3.2), and (b) an expanded contingency volume program of I/I 083 084

reduction, variable winter irrigation rates, and additional irrigation acreages (item 2.4.6)? 084 (cont.)

2. For the same modifications above, what are the corresponding values for Table 7 and 8 when a 99%, 99.9%, and 100% reliability requirement for the design discharge rate is imposed? 085

3. For Table 8, was a different distribution of target storage volumes also evaluated (not only additional an 5% of design storage)? Based on my questions in (item 2.3.3), what effect would a different distribution have on the values in Table 8 (after including the daily water balance calculations and the expanded contingency volume program)? 086

2.4.8. Summary

1. Since the current reliability requirement for the discharge rate is not 95%, would it not be prudent to obtain results for a range of possible requirements (e.g. 99%, 99.9%, and 100%), from which to evaluate the impact of contingency discharges? 087
2. Since the data and methodology for daily water balance calculations are used in other sections of this EIR/EIS, and since there are clear indications (from Appendix D-9) that daily calculations result in much larger and often more frequent contingency discharges than the monthly calculations, would it not be more prudent to evaluate impacts of contingency discharges from daily rather than the monthly calculations used in this section of the EIR/EIS? 088
3. Since some reasonably anticipated measures to reduce contingency discharges were not evaluated in this section, would it not be more prudent to include them to mitigate the impact of contingency discharges? 089

2.5. APPENDIX D-8

Table 1 and 2 are used as the input for the water quality model, which in turn, is the basis for most of the water quality impact evaluations in the EIR/EIS. In my questions and comments in all the preceding sections, I have attempted to indicate where additional analysis and calculations could improve confidence in, and also significantly change, the values in Tables 1 and 2. This is because the results currently shown in Tables 1 and 2 are based on monthly calculations rather than daily calculations, ignore measures that could reduce contingency discharges, and use a relatively low, unconfirmed reliability requirement. 090

The comparison in Appendix D-9 between daily and monthly water balance calculations shows that there are very large differences in volumes and frequencies of contingency discharges. The implications of these differences were not fully evaluated, nor were they incorporated into Appendix D-10 and D-8. It is thus difficult to verify that "*.... the analysis is thorough and conservative assumptions were made, to ensure that adequate storage volume and irrigation areas are provided by the reclamation system.*" (p.7, Appendix D-8). In my questions and comments in all the preceding sections, I have attempted to indicate where additional analysis and calculations could help improve and confirm any results summarized in Appendix D-8. 090 (cont.)

The cautionary remark about the 1995 winter storms supports my conclusion that further refinements of the water balance model will improve the evaluation of potential impacts in the EIR/EIS for this project.

3. WATER QUALITY MODEL COMMENTS AND QUESTIONS

My questions and comments about the water quality model are offered to help identify where additional data and iterations could improve confidence in the results. 091

I have tried to arrange the following questions and comments so that the responses from previous sections to become the basis for responses in subsequent sections. The section titles are taken from the Draft EIR/EIS.

3.1. APPENDIX I-4

3.1.1. Tables 6-8

1. What is the statistical distribution about the averages reported in the Tables? 092
2. How was the representativeness of the sampling data in the Appendices verified? 093
   How were statistical inferences (e.g. probability distributions, averages) from the data validated (e.g. tests for randomness)? 094
3. What was the wastewater discharge volume and dilution for each of the measurements in the Appendices, from which the averages were calculated? 095
4. Why were no DO samples in the Appendices collected at night/dawn? 096 Why were no diel DO measurements taken? 097 Are such sampling measurements reported in Tables elsewhere in the EIR/EIS, or available from other sources? 098 How would such measurements change the calculation method and the value of average DO concentrations? 099

3.1.2. Table 9

1. Why were no tests conducted with larval fathead minnows on 4 dates? 100
2. Do the results for the green algae on 4-May-94 and 10-Apr-95 indicate potential problems for larval fathead minnows? 101 Were follow-up tests conducted to include the fish? 102
3. Is the 1-July-92 test representative of the conditions in the Laguna? 103 Since the weather was unusually wet, was runoff/drainage the main factor for the low threshold of Ceriodaphnia toxicity? 104 Why were there no results for the green algae? 105

3.1.3. Table 10

1. What was the wastewater discharge volume and dilution for each of the tests? 106

3.2. APPENDIX I-5

1. What is the source of flow in the irrigation and storage streams in summer? Which 107 108
streams are seasonal and which are naturally perennial? Is it possible that the 109
main sources are un-permitted/illegal discharges, irrigation runoff, or subsurface drainage?

3.3. APPENDIX I-6

1. Were diel DO measurements in the Russian River taken during the winter/discharge season? Are there diel DO variations in the winter/discharge seasons? 110
2. Are the results at the Oddfellows and Monte Rio sampling sites effected by failing septic systems? 111

3.4. APPENDIX I-8

3.4.1. Calibration

3.4.1.1. Strategy

1. After calibration, were the adjusted values of all parameters within previously 112
known and expected ranges? Were the values appropriate for each reach and 113
season; how was this verified?
2. What criteria were used to define an acceptable tolerance for the match between 114
simulation results and observed data? How were the criteria applied to verify the
calibration of this model? What were the results for this calibration, i.e. how close 115
was the tolerance?
3. How was uncertainty considered in the observed data during the calibration? For 116 117
which variables was it most important; in which reaches and in which seasons?
4. Granted that only available data could be used, did the calibration indicate where additional data in the future could reduce large sensitivities, or even instabilities, in the model results? 118
5. Given the sparsity in space and time of available data relative to the model requirements and results, did the calibration indicate where additional data in the future could improve validation, and the accuracy of the calibration? 119

3.4.1.2. Calibration Results

3.4.1.2.1. Flow 120

1. How is the daily flow volume calculated from the hourly flowrates available from the Hacienda Bridge gauge (e.g. average of recorded hourly flowrates from midnight to midnight, times 24 hours)?
2. Do the results for flow in Figures 3.1 and 3.2 not demonstrate that where more (nearly every day, corresponding to the daily step in the model) data is available, the calibration is more accurate? 121 Why is there any scatter at all in the data in Figure 3.3? 122

3.4.1.2.2. Temperature

1. Does Figure 3.4 show continuous (e.g. hourly) measurements in 1995? 123 How were these measurements and similar measurements (for much shorter durations) at other locations used to verify calibration of temperature? 124 How was the sparsity of observed data accounted for? 125

3.4.1.2.3. Nitrate 126

1. During the discharge season, how does the nitrate load (not concentration) in the wastewater compare to other sources?
2. What criteria were used to define an acceptable tolerance for the match between simulation results and the measurements, especially for Figures 3.8 and 3.9? 127 How was the sparsity of observed data accounted for? 128 How does the 0.06 mg/l root-mean-squared deviation at Odd Fellows and Monte Rio, between observed data (without outliers) and simulated values, demonstrate statistical equality (i.e. absence of a statistically significant difference) without completing "paired t-tests"? 129
   What are the results of corresponding calculations for Occidental Road and Trenton-Healdsburg Road? 130 How do these criteria compare to corresponding criteria for flow (e.g. the 0.985 linear correlation factor) and temperature? 131
3. Would additional sampling help confirm "outliers" and investigate the existence of unknown boundary loadings? 132

3.4.1.2.4. Ammonia 133

1. During the discharge season, how does the ammonia load (not concentration) in the wastewater compare to estimated load of other sources?
2. How was the dairy ammonia load (a) timed according to total inflow rate, (b) biased towards early storm events, and (c) increased with increasing runoff, as mentioned on p.17? 134 Given the overestimation in 1995, and Dept. of Fish and Game investigations pinpointing individual mismanagement of manure ponds/intensive-use areas during large storms, could the model be refined to more reasonably estimate the impact of daily loads? 135
3. What criteria were used to define an acceptable tolerance for the match between simulation results and the measurements? 136 How do these criteria compare to corresponding criteria for flow (e.g. the 0.985 linear correlation factor), 137 nitrate (e.g. 138

root-mean-squared deviations)| and temperature?| How was the sparsity of observed data accounted for?| 139 | 140

3.4.1.2.5. *Phosphate* 141

1. Since it is stated that dairy is the principal source of phosphate, and that the same calculation procedures are used as for ammonia (with the same overestimation in 1995), is this not another reason to refine the procedures to more reasonably estimate the impact of daily loads?
2. What criteria were used to define an acceptable tolerance for the match between simulation results and the measurements?| How do these criteria compare to corresponding criteria for flow (e.g. the 0.985 linear correlation factor)| nitrate (e.g. root-mean-squared deviations)| and temperature?| How was the sparsity of observed data accounted for?| 142 143 144 145 | 146

3.4.1.2.6. *Dissolved Oxygen* 147

1. How can the mean or a day-time measurement of DO concentration be used to evaluate impact?| Were diurnal ranges and durations of critically low night-time concentrations estimated?| Were such estimations based on the observed diurnal data shown in Figures 3.20 to 3.23 (and any other sources not in the calibration years)?| 148 149
2. Since the model in its current form cannot simulate diurnal DO changes, especially those caused by algal blooms, how were such impacts evaluated? Was the average daily DO concentration calculated by the model used to predict the possibility of harmful conditions?| 150
3. Was it verified that "*.... large variations in DO concentrations in the Laguna are principally a result of transient loadings that cannot be precisely described as boundary conditions ....*" rather than a combination of warm weather, wastewater loads (nutrients and organic material), and biological activity (e.g. delayed discharges of wastewater during warm weather after a storm)?| Are the limiting factors actually the current inability of the current model to: 151 152
   a. Simulate diurnal DO concentrations?|
   b. Account for travel time and periods of delayed discharge of wastewater from the Laguna?| 153
4. What criteria were used to define an acceptable tolerance for the match between simulation results and the measurements? Specifically, how were the ranges of simulated DO concentrations in the upper Laguna compared to the ranges of observed data to reach the conclusion that the calibration was adequate?| How do these criteria compare to corresponding criteria for flow (e.g. the 0.985 linear correlation factor)| nitrate (e.g. root-mean-squared deviations)| and temperature?| 154 155 156 | 157

   How was the sparsity of observed data accounted for?| 158

3.4.1.2.7. *Planktonic Algae* 159

1. Based on the discussions of (a) uncertainty in the values of observed data, and (b) the need balance calibration priorities between nutrient and diurnal DO ranges as

opposed to more accurate predictions of planktonic algae, wouldn't additional data improve the accuracy of the calibration? 159 (cont.)

2. How was the sparsity of observed data in Figures 3.24 to 3.27 accounted for in the calibration? 160

3. After improving the validity of the observed data, what criteria would be used to define an acceptable tolerance for the match between simulation results and the measurements? 161

3.4.1.2.8. Benthic Algae 162

1. Based on the discussions of (a) the lack of observed data for the Laguna, (b) uncertainty in the values of observed data, and (c) the need balance calibration priorities between other variables and more accurate predictions of benthic algae, wouldn't additional data improve the accuracy of the calibration?

2. How was the sparsity of observed data in Figures 3.28 and 3.29 accounted for in the calibration? 163

3. After improving the validity of the observed data, what criteria would be used to define an acceptable tolerance for the match between simulation results and the measurements? 164

3.4.2. Alternative Analysis

3.4.2.1. Hydrology 165

1. Are the monthly values in Table 4.1 calculated from daily values, or are the daily values derived somehow the monthly values?

3.4.2.2. Reclaimed Water Production

1. From where is the incremental watershed inflow (Q_I) flowrate in cfs derived (i.e. is it a daily average, an annual average, or some other value)? 166

2. What is the correlation coefficient (R^2) of the regression fit between reclaimed water production and incremental watershed inflow? What is the significance of the 2.8 MGD root mean square error? 167 168

3. Is the relationship between reclaimed water production and incremental watershed inflow used in this section the same as used in the monthly or the daily water balance calculations of Appendix D-9? Using my questions in item 2.3.2, how would the daily volume of reclaimed water production change with the daily calculation method, and how would the monthly values in Tables 4.1 change? 169 170

3.4.2.3. Tables 4.2 and 4.3 171

1. Using my questions in items 2.3.2 and 2.3.3, how would the values in Tables 4.1 and 4.2 change?

3.5. APPENDIX I-16 AND I-17

3.5.1. Russian River and Santa Rosa Plain

3.5.1.1. Discharge Scenarios Evaluated

1. The "1 percent" discharge is not currently defined as the "*.... maximum monthly average discharge rate....* " as measured at Hacienda Bridge; was analysis performed for the current definition in the NPDES permit, or as a more stringent daily average? What is the averaging period for other discharge rates (20%, 10%, and 5%), and were analyses performed for different potential definitions? 172

3.5.1.2. Impact Evaluation Approach

1. What criteria were used in the selection of (a) the 10th percentile year (1976) as the "dry" year, and (b) the 90th percentile year (1982) as the "wet" year? 173 Was an evaluation performed for other values, for example 1st to 99th percentiles? Was an evaluation performed for combinations of years (e.g. 2 consecutive years of no precipitation until late November, followed by wet weather in April, May, and June)? 174
2. Was the monthly or daily water balance model used to calculate results in this evaluation? If wastewater discharge volumes are calculated from the monthly water balance model in *Water Balance Model - Overall Summary and Results* and *Water Balance Contingency Plan* (as stated at the bottom of p.27), they will be smaller than the volumes derived from the daily water balance model in Appendix D-9 (see my questions in items 2.3.2 and 2.3.3). This means that daily wastewater loads and concentrations will be underestimated, especially for larger volumes. 175
3. Are the model results for DO concentrations sufficiently accurate to evaluate compliance, and how was their validity confirmed (see my questions in item 3.4.1.2.6)? 176 How is the impact of diurnal variations in DO evaluated, especially the magnitude and duration of low night-time concentrations? 177 How is compliance with the instantaneous minimum DO concentration evaluated? 178
4. Are the model results for ammonia concentrations sufficiently accurate to evaluate compliance, 179 and how was their validity confirmed (see my questions in item 3.4.1.2.4)? 180
5. Given the acknowledged uncertainties of the simulated (and observed) data for algae, how can the validity of changes be confirmed by the model when evaluating impacts (see my questions in items 3.4.1.2.7 and 3.4.1.2.8)? 181 How is the impacts of algal blooms evaluated? 182
6. If turbidity evaluations rely on changes in algae concentrations, how can impacts be confirmed by the model? 183
7. For conservative constituents, what was the basis for choosing the 95th percentile concentration to evaluate impacts? 184 Since current standards for many constituents are maximums (100th percentile), were additional analyses performed for the range between 95th and 100th percentiles (e.g. for 95th, 99th, 99.9th, and 100th)? 185

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3.5.1.3. Impact Evaluation Results

1. Are the reclaimed water concentrations in Table 4-2 and Figures 4-1 to 4-12 based on daily water balance calculations (Appendix D-9)? 186
   Upon verifying or performing daily calculations (see my questions in item 2.3.2), can the following details be added to the table and figures? 187
   a. Results for Hacienda Bridge, to confirm compliance with limits on reclaimed water concentrations.
   b. The value of the cumulative frequency at which each curve in the figures for Hacienda Bridge crosses the design dilution rate.
   c. The 99th, 99.9th, and 100th percentile concentrations in Table 4-2, to help evaluate impact. 188
2. What reliability requirement was used for the discharge rate in the specification of the discharge scenarios? 189
   Were calculations performed for other values? 190
3. How do model calibration uncertainties effect algae concentrations, and their significance? How do larger reclaimed water concentrations (e.g. for the 99th percentile) effect the algae values in Table 4.3? 191
4. How would diurnal variations in DO concentrations effect the discussion of DO significance? 192
5. How would 99th, 99.9th, and 100th percentiles for (a) reliability of the design discharge rate, and (b) concentrations of the conservative constituents, effect the values in Tables 4-5 through 4-11, and the discussion of their significance? 193
6. How would 99th, 99.9th, and 100th percentiles for reliability of the design discharge rate effect the values in Table 4-12, and the discussion of significance?
7. How would 99th, 99.9th, and 100th percentiles for reliability of the design discharge rate effect the discussion of cyanide significance?
6. How would 99th, 99.9th, and 100th percentiles for reliability of the design discharge rate effect the values in Table 4-15, and the discussion of toxicity significance?

3.5.1.4. Proposed Mitigation 194

<u>3.5.1.4.1. Summary of Proposed Mitigation</u>

1. The mitigation measures are not clearly described. Were Inflow/Infiltration reduction and additional irrigation acreage (see my questions in (item 2.4.6) considered?
2. For the discharge management strategy, can the following details be added to the Tables 4-21 and Figures 4-24 to 4-35? 195
   a. Results for Hacienda Bridge, to confirm compliance with limits on reclaimed water concentrations.
   b. The value of the cumulative frequency at which each curve in the figures for Hacienda Bridge crosses the design dilution rate.
   c. The 99th, 99.9th, and 100th percentile concentrations in Table 4-21, to help evaluate impact. 196

3.5.1.4.2. Effectiveness of Proposed Mitigation 197

1. Tables 4-26 and 4-27 show changes only in the frequency of significant impacts; changes in the magnitude of the impacts does not necessarily follow (the remaining events might still have as severe an impact as before). In addition, calculations for some of the variables might have underestimated both the magnitude and the frequency of significant impacts.
2. Does Table 4-30 include differences between adverse and beneficial impacts that do not occur at the same time and place? 198 Do the all beneficial impacts effect the same variable as the adverse impacts? 199

3.5.2. Contingency Discharge

1. The contingency program is not defined clearly; are they the same as in Appendices D-9, and D-10? 200
2. What are the reliability requirement for discharges, the percentiles for variable concentrations, and distribution of target storage used to derive Table 4-32? 201 Were analyses performed to evaluate the effect of different values for these parameters? 202
3. How do the values in Table 4-34 change for reliability requirements larger than the 95th percentile? 203 Were analyses performed with higher percentiles for variable concentrations, and different distributions of target storage? 204
4. Were the values in Tables 4-35, 4-36, and 4-37 based on the reclaimed water concentrations in Table 4-34? 205 If so, what would be the impact of changes in Table 4-34 (e.g. higher reliability requirement for discharges, higher percentiles for variable concentrations, and different distributions of target storage? 206

4. IMPROVEMENTS FOR WATER QUALITY IMPACT ANALYSIS

1. Collect more data to adequately characterize the Laguna and Russian River, to validate calibration of the model, and improve its reliability. 207

2. Provide analysis method for algal blooms, diurnal DO variation, and travel time for wastewater in the Laguna. 208

3. Verify that all water balance calculations are based on the daily model. 209

4. Analyze additional mitigation and contingency measures: 210

   Reduce Inflow/Infiltration.

   Revise target storage requirements. 211

   Increase irrigation areas and application rates. 212

5. Provide sensitivity analyses in the water balance and water quality models for: 213

95-100% compliance of reclaimed water discharges with design discharge rates (final level subject to regulatory proceedings).

95-100% compliance of predicted variables with numerical limits (final level subject to regulatory proceedings). 214

0-1000 cfs limit at hacienda Bridge for initial winter discharges (final level subject to regulatory proceedings). 215