

1 ALAMEDA COUNTY WATER DISTRICT  
 2 ALAMEDA COUNTY FLOOD CONTROL AND  
 3 WATER CONSERVATION DISTRICT, ZONE 7  
 4 CONTRA COSTA WATER DISTRICT  
 5 KERN COUNTY WATER AGENCY  
 6 METROPOLITAN WATER DISTRICT OF  
 7 SOUTHERN CALIFORNIA  
 8 STATE WATER CONTRACTORS  
 9 SAN LUIS & DELTA-MENDOTA WATER  
 10 AUTHORITY  
 11 SANTA CLARA VALLEY WATER DISTRICT  
 12 WESTLANDS WATER DISTRICT

13 *See List of Counsel for Water Agencies in*  
 14 *Attachment 1*

15  
 16  
 17  
 18  
 19  
 20  
 21  
 22  
 23  
 24  
 25  
 26  
 27  
 28

BEFORE THE  
 CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Sacramento Regional County  
 Sanitation District's Petition for Review of Action  
 and Failure to Act by Regional Water Quality  
 Control Board, Central Valley Region, in Adopting  
 Waste Discharge Requirements Order No.  
 R5-2010-0114 (NPDES No. CA0077682) and  
 Time Schedule Order No. R5-2010-0115 for  
 Sacramento Regional County Sanitation District,  
 Sacramento Regional Wastewater Treatment Plant.

SWRCB/OCC File Nos. A-2144(a) and  
 A-2144(b) (Consolidated)

**ERRATA TO WATER AGENCIES'  
 RESPONSE TO DISCHARGER'S  
 PETITION FOR REVIEW**

1	I.	SUMMMARY STATEMENT .....	1
2	II.	THE PROFOUND IMPACTS ON THE DELTA OF THE DISCHARGER’S WASTEWATER WARRANT A PERMIT AT LEAST AS STRINGENT AS THE ONE ISSUED BY THE REGIONAL BOARD .....	2
3	III.	BACKGROUND AND PROCEDURAL HISTORY .....	9
4	A.	The Discharger Has A Long History Of Resisting Treatment Plant Upgrades .....	10
5		1. The Discharger Has Repeatedly Prepared And Then Rejected Master Plans Providing Treatment Upgrades .....	11
6			
7	B.	The Treatment Plant Is Out Of Date .....	17
8	C.	The Permit Is A Product Of A Comprehensive Five-Year Permit Review Process, And Significant Interaction Between The Discharger And The Regional Board On The Major Permit Issues For At Least A Decade.....	20
9	IV.	STANDARD OF REVIEW .....	28
10	A.	The Regional Board’s Permit Is Supported By Substantial Evidence In The Record.....	28
11	B.	The State Board May Further Strengthen The Permit By Considering Additional Evidence And Making Further Findings .....	31
12	V.	THE NITROGEN LIMITS IN THE PERMIT ARE APPROPRIATE FOR THE LARGEST SINGLE DISCHARGER OF WASTE NITROGEN TO THE DELTA .....	31
13	A.	Total Ammonia Nitrogen From The Treatment Plant Violates Various Water Quality Standards And Clean Water Act Principles, Causing Profound, Adverse Effects On The Delta .....	32
14	B.	Controlling Nitrogen To Protect Primary Productivity And Prevent Nuisance Is Consistent With NPDES Precedent .....	35
15	VI.	THE TOTAL AMMONIA NITROGEN LIMITS IN THE PERMIT ARE APPROPRIATE .....	37
16	A.	The Regional Board Properly Established a Water Quality Based Effluent Limitation (WQBEL) for Total Ammonia Nitrogen .....	37
17	B.	The Regional Board’s Denial Of A Total Ammonia Nitrogen Mixing Zones Was Proper.....	41
18		1. The Regional Board’s Reliance on SIP Criteria When Denying the Mixing Zone Request Was Proper.....	42
19		2. The Regional Board’s Decision To Deny A Mixing Zone Request Was Well Supported By The Record.....	44
20		a. The record documents that concentrations of total ammonia nitrogen downstream of the proposed mixing zone would present toxic and chronic impacts on aquatic life.....	45
21		b. The Regional Board properly relied on Dr. Swee Teh’s November 10, 2010 expert letter report.....	49
22		c. The ammonium is inhibiting nitrate uptake, contributing to low diatom abundance and reducing diatom primary production .....	53
23			
24			
25			
26			
27			
28			

1	d.	The pending proposed U.S. EPA aquatic life criteria for ammonia provides another basis to reject the mixing zone .....	61
2	e.	The Regional Board reasonably considered the formation of nitrosamines in denying the request for a mixing zone .....	62
3	f.	Additional peer-reviewed published research by Professor Glibert establishes that the nutrient discharge is causing a shift in algal communities by changing the nutrient ratios to favor harmful, invasive species .....	63
4			
5	g.	The Regional Board demonstrated that total ammonia nitrogen removal is required to meet dissolved oxygen (DO) requirements .....	73
6			
7			
8	VII.	THE NITRATE LIMITS IN PERMIT ARE APPROPRIATE .....	78
9	1.	It Is Appropriate To Base The Nitrate Limit On the Drinking Water MCL.....	79
10	2.	Excess Nitrogen Creates Nuisance Aquatic Weed and Algal Growth and Causes Taste and Odor Problems in Domestic Water Supplies .....	82
11	3.	Excess Algal Growth Increases Total Organic Carbon (TOC) Loading to Domestic Water Treatment Plants.....	89
12	4.	Excess Nitrogen Has Adversely Affected The Nutrient Balance And Changed the Aquatic Community.....	91
13	5.	The Regional Board Appropriately Set the Nitrate Limit in Consideration of All Adverse Impacts to Beneficial Uses .....	94
14	VIII.	TERTIARY TREATMENT IS REQUIRED TO PROTECT PUBLIC HEALTH .....	96
15	A.	The Discharger's Reliance On The 20:1 Dilution Ratio Is Misplaced .....	97
16	1.	The Discharger Mischaracterizes the Available Level of Dilution .....	98
17	2.	The Discharger Misconstrues the Department of Public Health's Guidance Concerning Application of the 20:1 Dilution Ratio .....	99
18	3.	The Discharger's Treatment Facility is not Similar to Other Facilities Where the 20:1 Dilution Ratio Has Been Applied.....	102
19	B.	Filtration Is Required to Protect Recreational And Agricultural Beneficial Use .....	104
20	1.	DPH's Recommended Risk Criterion Is Appropriate; The 1986 U.S. EPA Criteria Are Not .....	104
21	2.	The Discharger's Recreational Use Risk Assessment Was Not "Overly Conservative".....	109
22	C.	Filtration is Required to Protect Municipal Use .....	113
23	D.	The Regional Board Was Not Required To Adopt 13241 Findings.....	116
24	IX.	THE INTERIM TOTAL AMMONIA NITROGEN EFFLUENT LIMITS MUST BE RESCINDED .....	118
25	A.	The Interim Total Ammonia Nitrogen Effluent Limits Are Higher than the Existing Discharge .....	119
26	B.	The Pollution Prevention Plan For Ammonia Is Not Rigorous Enough .....	121
27			
28			

1	X.	THE PERMIT’S REQUIREMENTS FOR NUTRIENT REMOVAL ARE NECESSARY TO REDUCE UNAUTHORIZED TAKE OF LISTED DELTA FISH SPECIES, AND THE INTERIM LIMITS SHOULD BE REDUCED OR ELIMINATED.....	122
2			
3	A.	The Existing Discharge and the Proposed Interim Limits Cause “Take” in Violation of the ESA and the CESA.....	122
4			
5	1.	Total Ammonia Nitrogen Discharge Causes Unlawful Take .....	124
6	2.	Temperature Impacts Cause Unlawful Take .....	126
7	B.	The Board Should Revise the Permit and Address the Continued Take of Endangered Species .....	128
8	XI.	BECAUSE THE DISCHARGER HAS A HISTORY OF VIOLATING THE TOXICITY STANDARD IN ITS PERMIT, THE REGIONAL BOARD SHOULD HAVE ENHANCED THE TOXICITY PROGRAM USING A SCIENCE BASED APPROACH .....	130
9			
10	XII.	THE CHRONIC MIXING ZONE MAY NOT PROTECT AQUATIC SPECIES .....	133
11	XIII.	THE EXCEPTION FROM THE THERMAL PLAN MAY NOT PROTECT AQUATIC SPECIES .....	135
12	A.	Evidence Suggests That Delta Smelt Are Already Being Impacted by the Discharger’s Thermal Plume .....	136
13	B.	Evidence Suggests That Chinook Salmon Are Already Being Impacted by the Discharger’s Thermal Plume .....	142
14	XIV.	ANTIDEGRADATION POLICY REQUIRES NUTRIENT REMOVAL AND TERTIARY FILTRATION .....	145
15	A.	The Applicable Antidegradation Policy Stems From State Law Which Implements Federal Antidegradation Policy .....	148
16			
17	1.	Federal Antidegradation Policy .....	148
18	2.	State Antidegradation Policies.....	149
19	B.	The Regional Board’s Consideration Of The State’s Antidegradation Policy In The Permit Proceedings Was Necessary.....	150
20	C.	The Regional Board Properly Determined That A Complete Antidegradation Analysis Is Required For The Permit .....	151
21			
22	1.	None Of The Circumstances Which Allow For A “Simple” Antidegradation Analysis Are Present Here.....	151
23	2.	Several Circumstances Which Explicitly Require A “Complete” Antidegradation Analysis Are Present Here.....	152
24	D.	The Regional Board Followed The Correct Procedure For A Complete Antidegradation Analysis And Made The Proper Findings .....	152
25			
26	1.	The Regional Board Considered The Appropriate Baseline .....	152
27	2.	The Regional Board Properly Balanced The Permit Against The Public Interest .....	155
28	E.	State Antidegradation Policy Requires The Discharger To Maintain And Improve Receiving Water Quality Through Best Practicable Treatment Or Control .....	156

1           1.    Nitrification/Denitrification And Tertiary Filtration Are Best  
2           Practicable Treatment Or Control..... 157  
3           2.    Tertiary Filtration Is Necessary To Protect Human Health And To  
4           Avoid Water Quality Degradation..... 158  
5           3.    Nitrification/Denitrification And Tertiary Filtration At Other  
6           Wastewater Treatment Plants Throughout The Central Valley, State  
7           And Country Supports The Regional Board’s BPTC Determination..... 160  
8           a.    Wastewater plants in the Central Valley require nitrification/  
9           denitrification and tertiary filtration ..... 160  
10          b.    Wastewater plants around the state and across the country  
11          require nitrification/denitrification and tertiary filtration ..... 160  
12          4.    Nitrification/Denitrification And Tertiary Filtration Can Be  
13          Implemented At A Reasonable Cost..... 161  
14          a.    The \$2 billion cost estimate developed by the discharger is  
15          nearly double other estimates ..... 162  
16          b.    Nitrification/denitrification process and costs ..... 164  
17          c.    Tertiary filtration and disinfection process and costs ..... 165  
18          5.    The Cost To Accomplish BPTC Is Reasonable..... 166  
19          6.    The Cost For Tertiary Filtration And Nitrification/Denitrification  
20          Together As Full BPTC Is Reasonable..... 170  
21          7.    Regional Economic Impacts Of BPTC Are Minimal ..... 173  
22          F.    The Discharger Failed To Account For The Socioeconomic Impacts That  
23          Its Discharge Is Causing ..... 178  
24          G.    The State’s Antidegradation Policy Requires Stronger Interim Measures ..... 180  
25          XV. THE PERMIT’S REQUIREMENTS FOR NUTRIENT REMOVAL AND  
26          TERTIARY FILTRATION AND DISINFECTION ARE CONSISTENT WITH  
27          CALIFORNIA’S FUNDAMENTAL WATER POLICY ..... 183  
28          XVI CONCLUSION ..... 184

1 **I. SUMMARY STATEMENT**

2 The “Water Agencies”<sup>1</sup> submitting this brief are concerned that the Sacramento Regional  
3 County Sanitation District (Discharger) petition for review (Petition) of Waste Discharge  
4 Requirements Orders R5-2010-0114 (NPDES No. CA0077682) (Permit) and R5-2010-0115 will  
5 delay implementation of critically needed improvements to the Sacramento Regional Wastewater  
6 Treatment Plant and will result in further and unnecessary harm to the Bay-Delta ecosystem and  
7 drinking water supply. The discharger has spent millions of dollars over three decades on a  
8 “waste is good,” or at least harmless, campaign, despite ever mounting scientific evidence that its  
9 discharge is one of the principal stressors damaging the Delta, and instead of investing those  
10 funds in the wastewater plant improvements so apparently necessary. The process of repermitting  
11 this wastewater treatment plant facility has taken many years over which time there has been  
12 considerable decline in the Bay-Delta health. The data, as can be found in the record, are now  
13 accumulating to indicate the current treatment processes are significantly contributing to this  
14 decline in health. It is imperative that the State Board act quickly to uphold the Regional Board’s  
15 permit requirements and, to protect the endangered species of the Bay-Delta, even accelerate  
16 implementation of nutrient removal.

17 During the State Water Resources Control Board (State Board) periodic review of the  
18 2006 Water Quality Control Plan for the San Francisco Bay-Sacramento-San Joaquin Delta  
19 Estuary, if not before, representatives for many of the Water Agencies submitting this brief  
20 brought to the State Board their concerns with the discharger’s impacts to the Delta. On page 5 of  
21 the State Board staff report prepared in support of that periodic review, the staff responded. Staff  
22 explained:

23 Ammonia and toxicity are priority issues for the Water Boards and,

24 \_\_\_\_\_  
25 <sup>1</sup> The Water Agencies participated as designated parties in the Permit proceedings of the Central  
26 Valley Regional Water Quality Control Board (Regional Board) that are the subject of the  
27 Petition. The Water Agencies are Alameda County Water District, Alameda County Flood  
28 Control and Water Conservation District, Zone 7, Kern County Water Agency, Metropolitan  
Water District of Southern California, Santa Clara Valley Water District, Contra Costa Water  
District, State Water Contractors, Westlands Water District and the San Luis & Delta-Mendota  
Water Authority.

1 at this time, staff recommends that they be addressed primarily by  
 2 the San Francisco Bay and Central Valley Regional Water Quality  
 3 Control Boards (Regional Boards) as part of their water quality  
 4 control programs for control of point and non-point sources of  
 5 waste. The State Water Board and Regional Boards will continue to  
 6 coordinate their efforts on these issues through the Water Boards  
 7 Bay-Delta Team, which consists of representatives from the  
 8 Division of Water Rights, the Division of Water Quality, the  
 9 Division of Financial Assistance, and the Regional Boards.  
 10 Ammonia and toxicity effects on beneficial uses will also continue  
 11 to be considered during the State Water Board's review of various  
 12 flow objectives.

13 The State Water Board accepted its staff's recommendation. *See* SWRCB Resolution 2009-0065.  
 14 *See also* Strategic Workplan for Activities in the Bay-Delta (July, 2008).

15 Consistent with the approach endorsed by the State Board, the State Board and Regional  
 16 Boards (Water Boards) coordinated their efforts on total ammonia-related issues through the  
 17 Water Boards Bay-Delta Team, but left primary responsibility with the Regional Boards. The  
 18 Regional Boards built on many years of prior work and investing heavily in additional research  
 19 and data analyses.<sup>2</sup> The Central Valley Regional Water Quality Control Board (Regional Board)  
 20 considered the results of those scientific efforts and issued Waste Discharge Requirements Orders  
 21 R5-2010-0114 (NPDES No. CA0077682) (Permit) and R5-2010-0115. The final discharge  
 22 limitations contained in the Permit require the Discharger to perform long overdue improvements  
 23 to treat pollutants in its wastewater discharges. To allow for the protection and enhancement of  
 24 beneficial uses of water within the Delta, the Water Agencies ask the State Board to take all  
 25 actions needed to support those final discharge limitations and to ensure they are achieved as  
 26 quickly as possible.

27 **II. THE PROFOUND IMPACTS ON THE DELTA OF THE DISCHARGER'S**  
 28 **WASTEWATER WARRANT A PERMIT AT LEAST AS STRINGENT AS THE**  
**ONE ISSUED BY THE REGIONAL BOARD**

Sacramento Regional County Sanitation District (Discharger) has petitioned for review  
 (Petition) of Waste Discharge Requirements Orders R5-2010-0114 (NPDES No. CA0077682)  
 (Permit) and R5-2010-0115, which require the Discharger to perform long overdue improvements

<sup>2</sup> See [www.waterboards.ca.gov/centralvalley/water\\_issues/delta\\_water\\_quality/ambient\\_ammonia\\_concentrations/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/index.shtml)

1 to treat pollutants in its wastewater discharges. The “Water Agencies” respond to the Petition as  
2 parties that are directly, substantially, and adversely impacted by the Discharger’s Sacramento  
3 Regional Wastewater Treatment Plant (Treatment Plant).

4 The Petition largely consists of a critique of the Regional Board’s permitting actions under  
5 *Topanga Ass’n for a Scenic Comm. v. County of Los Angeles* (1974) 11 Cal.3d 506, which  
6 requires an agency to draw relevant sub-conclusions supportive of its ultimate decision, as such  
7 “roadsigns” present an agency’s analysis distilled from a potentially vast and disconnected  
8 evidentiary record.<sup>3</sup> It is this roadmap that the State Water Resources Control Board (State  
9 Board) will look to in order to determine whether the Permit is warranted. Should the State  
10 Board find any gaps in the roadmap that can be filled with evidence in the record, it is incumbent  
11 on the State Board to perform that function, or order the Regional Board to do so.

12 The reasons for requiring the Discharger to install advanced treatment facilities are  
13 compelling. The discharge is through a giant, 10-foot diameter, 400-foot long diffuser in the  
14 Sacramento River (River) that occupies designated critical habitat for various protected fish, and  
15 impacts a broad area because of poor mixing and documented engineering problems. The plume  
16 near the diffuser likewise occupies designated critical habitat, and consists of a turbulent brew of  
17 heated, toxic water, inhospitable to coldwater salmon and weak swimmers like the Delta smelt,  
18 displacing fish to narrow, unproven “zones of passage,” if they exist and can even be found.  
19 Waste constituents in the discharge consume precious oxygen, depressing levels in the River  
20 below those safe for aquatic life miles downstream. Wastewater constituents are being detected  
21 not only in the River, but also downstream in the Sacramento and San Joaquin Delta, and further  
22 downstream in Suisun Bay, a full 80 miles from the diffuser. The wastewater is contributing to  
23 nuisance algal growth in distant water supply reservoirs filled with Delta water, and associated  
24 water treatment problems. These and other problems are manifest.

25 The real question here is: how was this failure of the federal Clean Water Act allowed to  
26 go on unabated for so long? Ultimate responsibility rests with the Discharger. Instead of

27 \_\_\_\_\_  
28 <sup>3</sup> *Id.* at 516-517.

1 accepting the considered judgment of the Regional Board and moving forward to address its  
2 discharge, the Discharger filed a 177-page petition, finding fault in almost every nook and cranny  
3 of the Permit. The Petition has foisted on the Water Boards a need to assure a robust set of  
4 Topanga “roadsigns,” so that no Superior Court is tempted by the sheer volume of objection from  
5 the Discharger to find some fault. We stand ready to assist and are counting on the Water Boards  
6 to protect the waters upon which 25 million people rely, and which support a trillion dollar  
7 economy, including \$27 billion for agriculture.

8 Notwithstanding the positive step represented by the Permit, the Delta crisis may not be  
9 over until the Discharger’s harmful practices are curtailed. Given that reality, we respectfully  
10 request the Permit not just be upheld, but strengthened. The importance of our request is  
11 underscored by the Discharger’s remarkable insistence that its waste is not adversely affecting the  
12 receiving waters, and that the Board’s Antidegradation Policy does not even apply to it. At a  
13 minimum, we request the following permit improvements:

- 14 • **First**, the Permit’s 10-year timeframe for treatment plant improvements is too  
15 long. A decade for these improvements exposes the Delta to continued harm from  
16 the discharge, impacting precious resources, violating the water quality standards,  
17 and impairing beneficial uses. Under no circumstances should this timeframe ever  
18 be relaxed, and any opportunity to shorten it should be seized upon. The Permit  
19 should incorporate additional provisions that keep the Discharger on a strict  
20 schedule, with milestones identified and specified far in advance, and significant  
21 penalty for failure to comply. There is nothing infeasible with meeting this  
22 schedule **if** the Discharger is motivated to do so.
- 23 • **Second**, interim limits on total ammonia nitrogen are too lax, and would allow  
24 total ammonia discharges to increase in coming years, despite the Discharger’s  
25 demonstrated ability to use process improvements and operational approaches to  
26 limit these wastes to at or below recent performance. Interim measures like side-  
27 stream treatment need to be explored aggressively, as such measures have the  
28

1 potential to mitigate further current conditions while permanent wastewater  
2 treatment facilities are being built. The pollution prevention plan must be  
3 strengthened as a vehicle to implement interim measures and allow for public  
4 oversight and comment.

- 5 • Third, the Water Boards should remove the interim total ammonia nitrogen limits  
6 from the Permit and issue them through a stand-alone enforcement order. Such  
7 would be consistent with requirements imposed on other large municipal waste  
8 dischargers, such as the City of Stockton treatment plant, and serve to keep the  
9 Discharger focused on achieving timely compliance. The Discharger's pervasive  
10 non-compliance with water quality standards warrants such an approach, and  
11 corresponding findings.

12 Despite these concerns, a permit with requirements at least as stringent as those in the  
13 Permit unequivocally is required. Ample evidence to support such permit terms is present  
14 including, without limitation, the following:

- 15 • The Discharger is the dominant source of nitrogen to the Delta, a sensitive estuary that has,  
16 and will continue to be, impacted adversely by such large nitrogen loading. Nitrogen loading,  
17 in the form of total ammonia nitrogen, is problematic on many levels in the Delta, resulting in  
18 adverse impacts such as the following:

- 19 ○ It degrades the integrity of at least three water bodies (the Sacramento River, the  
20 Sacramento-San Joaquin River Delta, and Suisun Bay), detectable at harmful levels 80  
21 miles downstream of the discharge.
- 22 ○ It exerts toxic effects at the base of the food web, depressing the primary productivity  
23 of the most important estuary on the Pacific coast.
  - 24 • Field samples and laboratory tests analyzed by highly regarded researchers,  
25 including from the University of California and the California State University  
26 systems, demonstrate that total ammonia nitrogen would have to be reduced by  
27 a factor of at least 21 to protect various small organisms upon which local fish  
28

1 and other creatures graze.

- 2
- 3 • A peer-reviewed scientific paper (Glibert 2010) links these total ammonia  
4 nitrogen effects to the food supply of the Delta smelt, and explains that the  
5 smelt will not likely recover until total ammonia nitrogen is controlled.
  - 6 • Depressing the food supply upon which fish rely impacts those fish, and may  
7 depress overall fisheries' yields.
    - 8 ○ At the same time, the ammonium stimulates the growth of undesirable and harmful  
9 bacteria, such as cyanobacteria, which itself can be toxic and adversely impact  
10 municipal water supplies.
    - 11 ○ The nuisance algal growth stimulated by these excess nutrients further violates the  
12 standards by creating harmful tastes and odors in violation of the Basin Plan. The  
13 Discharger must not be allowed to violate these water quality standards.
  - 14 • The Discharger's total ammonia nitrogen converts to nitrate once in the river, depleting  
15 precious oxygen. The Discharger is illegally using the Delta to treat its total ammonia  
16 nitrogen, relying on Delta processes to convert it to nitrate. This conversion consumes  
17 significant amounts of dissolved oxygen essential to healthy fisheries such as the endangered  
18 salmon and Delta smelt. The oxygen demand is so high that it causes violations of dissolved  
19 oxygen standards miles downstream from the Treatment Plant. The Permit requires the  
20 Discharger to internalize this nitrification process at the Treatment Plant, finally stopping the  
21 Discharger from using the river for waste treatment.
    - 22 ○ The Discharger has expressed some willingness to add partial nitrification at the  
23 Treatment Plant, but wants to do no more to address its total nitrogen load. This is  
24 completely unacceptable as it simply exchanges one form of nitrogen (total ammonia)  
25 for another (nitrate). The proposed discharge of this new form of waste nitrogen  
26 (nitrate) is one of the clearest examples of how Antidegradation Policy is essential in  
27 this permit proceeding, as the Regional Board recognized.
    - 28 ○ Full nitrification (meaning total ammonia nitrogen in discharge is limited to no more

1 than 2.2 mg L on a daily basis and 1.8 mg L on an average monthly basis) is necessary  
2 for the reasons discussed above, among others.

3 ○ Denitrification (meaning nitrate in discharge is limited to no more than 10 mg L) is  
4 necessary as it can be anticipated based on current conditions and basic science that  
5 the nitrate will create major problems itself.

6 ○ Nitrate from the Treatment Plant reasonably would be expected to cause significant  
7 problems such as the following:

- 8 • Because of the in-stream conversion from total ammonia nitrogen, the  
9 Treatment Plant already is doubling the nitrate load in the Sacramento River,  
10 as seen from upstream/downstream stations. Downstream concentrations are  
11 above thresholds where eutrophication potential is present. Excessive aquatic  
12 growth has been documented in Delta channels, and even the Clifton Court  
13 Forebay, presenting nuisance conditions likely from total nitrogen loads.
- 14 • Once in shallow water supply canals or distant reservoirs where sunlight is  
15 more prevalent and light penetration greater, nitrate problems from Delta water  
16 and the Treatment Plant become manifest.

- 17 • The wastewater filtration requirements in the Permit will remove harmful pathogens known to  
18 be present in the wastewater like Giardia and Cryptosporidium, restoring the integrity of the  
19 River and water supplies derived from it. The plumbing of the Delta is upside down, with the  
20 waste coming in at the top, and the water supply coming out at the bottom. Advanced  
21 filtration not surprisingly has become the norm at wastewater treatment plants in this  
22 watershed, preserving the integrity of the high-quality receiving waters and the municipal and  
23 irrigation uses that depend on them. Advanced filtration has become the norm, so that  
24 dischargers are not allowed to export public health problems, or any non-negligible risk  
25 thereof. The filtration requirements in the Permit will bring the Discharger in step with other  
26 treatment plants, protect people swimming in the Sacramento River, prevent pathogens from  
27 being applied to local crops irrigated with river water, and will preserve the integrity of  
28

1 municipal water from the Delta now and in the future, whether from existing diversions or  
2 new ones.

3 • Antidegradation Policy requires full nitrification and denitrification, and advanced filtration.

4 This discharge has never gone through a meaningful Antidegradation Policy analysis until the  
5 Regional Board insisted on one for this Permit. The Discharger proposes to increase its  
6 wastewater discharge volumes by about 28% (from 141 mgd to 181 mgd), and would do so  
7 without removing the many pollutants in these new wastes. At most, the Discharger would  
8 convert one waste (total ammonia) for another (nitrate) – wastewater ledgerdmain. The  
9 Discharger tried to process its stripped down version of plant expansion (i.e., expand volume,  
10 but not treatment) through CEQA, but was overturned by the Superior Court. The treatment  
11 package of the Permit has not been subject to an EIR as a preferred alternative.

12 Notwithstanding, Discharger argues it is immunized from anti-degradation because its new  
13 permit does not authorize wastewater volumes above previously authorized volumes. This is  
14 wrong; the Permit’s treatment requirements ineluctably flow from Antidegradation Policy as:

- 15 ○ Nitrification/denitrification and tertiary filtration needed to comply with the Permit are  
16 affordable and routinely used in many districts in surrounding communities, including  
17 Stockton, Roseville, Tracy and Lodi.
- 18 ○ Other similarly situated treatment plants such as in the Santa Ana watershed where  
19 waste discharges are upstream of municipal water supply diversions employ similar  
20 advanced treatment.
- 21 ○ Plants that discharge to rivers above other sensitive estuaries (e.g., Chesapeake and  
22 Narragansett Bays) employ similar advanced treatment.
- 23 ○ Sewer fees for the Discharger’s customers would be within the range of comparable  
24 districts even assuming the unlikely and perhaps exaggerated rate cases asserted by the  
25 Discharger.
- 26 ○ The Discharger has no right to discharge and pollute receiving waters, and in doing so  
27 has placed an undue burden on the surrounding regions, and has resulted in significant  
28

1 environmental damage and cost.

- 2
- 3 • The Regional Board provided more than ample process to the Discharger. The Regional
- 4 Board exercised extraordinary patience over a decade allowing the Discharger to try to make
- 5 its case. The Regional Board’s series of informal and formal proceedings have resulted in a
- 6 robust Permit and extensive record that is the product of intensive analysis by Regional Board
- 7 staff. The Discharger seems to forget that it — not the Water Boards — bears the burden of
- 8 persuasion here, a burden the Discharger plainly has not met.
- 9 • The record demonstrates that the Regional Board fully considered the Discharger’s input and
- 10 properly documented the Permit. Indeed, the Regional Board designed many Permit features
- 11 in light of that input, and fully was within its discretion when it adopted a Permit that did not
- 12 grant the Discharger the relief it was seeking. The Discharger argues, without merit, that the
- 13 Regional Board’s Response to Comments is inadequate because it fails to address each and
- 14 every report incorporated by reference in the Petition. The Regional Board never had an
- 15 obligation to respond in this manner, particularly when it had been so responsive over the
- 16 course of the prior decade.

17 This Petition presents an important opportunity to address a key Delta plumbing problem

18 and stressor – the Treatment Plant. There is no time to waste as this Plant goes about its business

19 every day; the Delta and the millions of Californians who rely on it are suffering the

20 consequences.

### 21 **III. BACKGROUND AND PROCEDURAL HISTORY**

22 The Permit provides an accurate but brief description of the Discharger and its Treatment

23 Plant.<sup>4</sup> A more complete historical look shows a discharger that has resisted investments in

24 improved treatment for decades. Its current resistance to deal squarely with the major impacts of

25 its discharge is adversely affecting the Delta and downstream beneficial uses which is consistent

26 with a long history of focusing on cost avoidance.

27 \_\_\_\_\_

28 <sup>4</sup> Permit, pp 4-5.

1           The history also shows that the core issues in the current Permit – the need to upgrade the  
2 Discharger’s secondary level plant with nitrification/denitrification and filtration – are not new.  
3 The Discharger has long known these treatment upgrades would one day be necessary and has  
4 planned for their implementation at least as far back as 1992. Yet it has until now avoided any  
5 significant upgrades to its Treatment Plant. Despite the fact that the Regional Board has required  
6 such improvements in treatment technology from numerous other dischargers throughout  
7 Region 5, the Discharger’s Treatment Plant, originally financed with extensive state and federal  
8 grant funds, remains essentially unchanged from its original 1970s era design.

9           The record similarly shows that the Regional Board did not impose the Permit  
10 requirements at the last minute, in a “renewal characterized by haste.”<sup>5</sup> To the contrary, the  
11 Regional Board has been discussing with the Discharger the need for nitrification/denitrification,  
12 filtration, and other plant improvements for nearly a decade. The Permit terms were developed  
13 through a comprehensive five-year review process conducted by the Regional Board that  
14 involved considerable deliberation with the Discharger despite no legal obligation to do so.

15           **A.       The Discharger Has A Long History Of Resisting Treatment Plant Upgrades**

16  
17           The Discharger was formed in 1973 to take advantage of state and federal funding to  
18 centralize the greater Sacramento area’s approach to sewage collection and treatment.<sup>6</sup> Design  
19 and construction of the Treatment Plant began in 1977 and it was brought on line in 1982.<sup>7</sup>

20           Increasing treatment capacity. The Treatment Plant was originally designed with an  
21 Average Dry Weather Flow (ADWF) capacity of 136 million gallons per day (mgd).<sup>8</sup> Two years  
22 after the Treatment Plant came on line, the Discharger sought and received a capacity re-rating to  
23

24 <sup>5</sup> Petition, p. 15.

25 <sup>6</sup> *See, e.g.*, SRCSD 2011, Notice of Proposed Rate Adjustment and Public Hearing Date (2011)  
26 <http://www.srcsd.com/pdf/218-mailer.pdf>.

27 <sup>7</sup> *Id.*

28 <sup>8</sup> Regional Board, Order No. 77-137, Waste Discharge Requirements, June 24, 1977.

1 150 mgd.<sup>9</sup> Soon thereafter, the Discharger estimated that the re-rated capacity of 150 mgd would  
 2 be exceeded by 1990, and so began a program to investigate ways of further increasing capacity.<sup>10</sup>  
 3 The Discharger settled on a plan that squeezed even more capacity out of the original plant by  
 4 focusing on hydraulic capacity improvements (i.e., processes that treat wastewater flow).<sup>11</sup> This  
 5 expansion plan would bring the Treatment Plant to its current permitted capacity of 181 mgd.<sup>12</sup>  
 6 In 1988 the Discharger completed a supplemental Environmental Impact Report (EIR) for the  
 7 expansion and in 1990 sought and obtained approval for the re-rated capacity of 181 mgd.<sup>13</sup>

8  
 9 **1. The Discharger Has Repeatedly Prepared And Then Rejected Master  
 Plans Providing Treatment Upgrades**

10 In the early 1990s, the Discharger began a series of master planning efforts to prepare for  
 11 further capacity increases and treatment process upgrades that were likely to be imposed on its  
 12 Treatment Plant's secondary treatment process. A primary regulatory driver for the first master  
 13 planning effort was the State Board's adoption of the Inland Surface Waters and the Enclosed  
 14 Bays and Estuary Plan,<sup>14</sup> which contained standards for toxic pollutants to fulfill requirements of  
 15 the federal Clean Water Act – standards that could not be met with the Discharger's secondary  
 16 treatment level.

17 **1992 Master Plan:** The 1992 Master Plan outlined treatment plant upgrades over a  
 18 twenty-year period (ending in 2010), including four scenarios of treatment requirements:  
 19 (1) continuation of existing secondary treatment; (2) advanced filtration for metals removal and  
 20 nitrifying trickling filters for total ammonia reduction; (3) tertiary filtration and reverse osmosis  
 21 but no total ammonia reduction; and (4) an advanced scenario that included filtration, reverse

22 <sup>9</sup> Regional Board, Order No. 84-077, Waste Discharge Requirements, June 22, 1984.

23 <sup>10</sup> SRCSD 1992, Sacramento Regional Wastewater Treatment Plant Master Plan, prepared by  
 24 John Carollo Engineers, September 1992.

25 <sup>11</sup> *Id.*

26 <sup>12</sup> *Id.*

27 <sup>13</sup> Regional Board, Order No. 90-284, Waste Discharge Requirements, November 2, 1990.

28 <sup>14</sup> State Board Resolution No. 91-33, April 11, 1991.

1 osmosis, and total ammonia reduction.<sup>15</sup> Regulatory drivers for tertiary treatment upgrades  
2 included the Inland Surface Waters and Enclosed Bays plans, a shift to a water-quality based  
3 method of control prompted by 1987 Clean Water Act amendments, the 1989 Central Valley  
4 Water Quality Control Plan (Basin Plan), the 1990 Pollutant Policy Document for the Delta, and  
5 state and federal Antidegradation Policies.<sup>16</sup> With regard to antidegradation, the 1992 Master  
6 Plan noted that these “policies . . . have remained dormant for years. However, both have  
7 recently resurfaced as a result of legal action against EPA.”<sup>17</sup>

8 The Discharger won a reprieve in 1994 when, in litigation brought by the City and County  
9 of Sacramento, among others, a court ordered the State Board to rescind the Inland Surface  
10 Waters Plan and the Enclosed Bays and Estuary Plan.<sup>18</sup> With the regulatory requirements pushed  
11 back, the Discharger began an update to its 1992 Master Plan.

12 **1994 Master Plan:** In 1995, the Discharger completed its “1994 Master Plan Update.”  
13 The 1994 Master Plan recognized that future regulatory requirements for metals and total  
14 ammonia reduction might nonetheless require implementation of tertiary treatment in the future,  
15 and maintained a plan for tertiary treatment including total ammonia reduction, filtration, and  
16 possibly reverse osmosis.<sup>19</sup>

17 **Draft EIR for 1994 Master Plan Update:** In April 1996, the Discharger released a Draft  
18 EIR for the updated Master Plan 2010.<sup>20</sup> The draft EIR acknowledged the impacts of the  
19 discharge, including the “[a]dditional quantities of metals, salts, organics, and other compounds  
20 would be discharged into the river due to the increased flow” and that “the increase in the effluent

21 

---

<sup>15</sup> SRCSD 1992, pp 1-4; 2-2.

22 <sup>16</sup> *Id.*, pp 2-12 – 2-25.

23 <sup>17</sup> *Id.*, p. 2-24.

24 <sup>18</sup> *See* State Board Resolution 94-87.

25 <sup>19</sup> SRCSD 1995, Sacramento Regional Wastewater Treatment Plant Master Plan, prepared by  
26 John Carollo Engineers, August 1995, pp. 5-1, 5-3.

27 <sup>20</sup> SRCSD 1996a, Sacramento Regional Wastewater Treatment Plant Master Plan DEIR, prepared  
28 by ESA, April 1996.

1 discharge to the Sacramento River [] could cause detrimental warming of the river water,” but the  
2 EIR did not propose tertiary treatment mitigation. Many of the Water Agencies reviewed the  
3 1996 Draft EIR and submitted written comments detailing concerns, including impacts on aquatic  
4 species (i.e., Delta smelt, salmon) and corresponding restrictions on State Water Project (SWP)  
5 and Central Valley Project (CVP) operations, and other significant water quality impacts caused  
6 by the Treatment Plant’s discharge, including salinity loading, total organic carbon (TOC), and  
7 pathogens (Giardia and Cryptosporidium).<sup>21</sup>

8 The State of California also expressed concern over loadings of TOC and dissolved  
9 organic carbon, pathogens, salinity, and an inadequate discussion of adverse effects on  
10 downstream beneficial uses in the 1996 Draft EIR.<sup>22</sup> The Discharger released a Final EIR for its  
11 Master Plan in August 1996.<sup>23</sup> The commenting Water Agencies reiterated their concerns.<sup>24</sup> In  
12 light of the comments, the Discharger abandoned this EIR process and started over “because of  
13 disagreements among technical experts . . . , particularly impacts to surface water quality.”<sup>25</sup>

14 **1997 Revised Draft EIR for Master Plan:** In 1997, the Discharger released a revised  
15 Draft EIR for its Master Plan.<sup>26</sup> In the 1997 Draft EIR, the Discharger acknowledged the  
16 potential for significant water quality impacts from its Treatment Plant, including from increased  
17 loading of salinity, TOC, pathogens, and from thermal effects.<sup>27</sup> The 1997 Draft EIR concluded  
18 that source control, expansion of water reclamation programs, tertiary treatment of effluent, and  
19

20 \_\_\_\_\_  
21 <sup>21</sup> SRCSD 1996a, Sacramento Regional Wastewater Treatment Plant Master Plan FEIR, August  
1996, pp. 2-3 – 2-17.

22 <sup>22</sup> *Id.*, p. 2-18.

23 <sup>23</sup> See SRCSD 1997a, Sacramento Draft Environmental Impact Report (Revised), September  
24 1997, preface page.

25 <sup>24</sup> *Id.*, pp. H-17 – H-31.

26 <sup>25</sup> *Id.*, preface page.

27 <sup>26</sup> *Id.*

28 <sup>27</sup> *Id.*, pp. 2-11, 2-12, 2-13, 2-16.

1 changed operations would reduce water quality impacts to less-than-significant levels.<sup>28</sup> With  
 2 regard to tertiary treatment, the Draft EIR specifically acknowledged the potential need for  
 3 filtration, total ammonia reduction facilities, and reverse osmosis.<sup>29</sup>

4 ***Abandoned 1997 EIR:*** For unspecified reasons, the Discharger abandoned the 1997 EIR  
 5 process and started over.

6 The Discharger’s entirely new Treatment Plant master planning effort sought to avoid  
 7 significant compliance expenditures in part through a “watershed approach” of addressing water  
 8 quality issues.<sup>30</sup> This was in keeping with the Discharger’s overarching philosophy of cost  
 9 avoidance, with which the 1997 Draft EIR was apparently out of step: “Over the past eight years  
 10 [since 1990] the District has identified several regulatory proposals which would have required  
 11 significant expenditures by the District without commensurate benefits to the river. The District  
 12 has successfully opposed such proposals.”<sup>31</sup>

13 ***2003 Revised Draft EIR for 2020 Master Plan:*** In 2003, the Discharger released a Draft  
 14 EIR on its new “2020 Master Plan” (2003 Draft EIR).<sup>32</sup> This new, draft EIR attempted to analyze  
 15 only constructing additional conventional secondary treatment facilities to increase the Treatment  
 16 Plant capacity to 218 mgd.<sup>33</sup> While the 1997 Draft EIR identified several potentially significant  
 17 water quality impacts from the Treatment Plant’s discharge, the 2003 Draft EIR now concluded  
 18 that all water quality and aquatic biological impacts were not significant.<sup>34</sup> Indeed, the 2003

19 <sup>28</sup> *Id.*

20 <sup>29</sup> *Id.*, pp. 4-29 – 4-32.

21 <sup>30</sup> See SRCSD 1997b, Letter to Board of Directors, Resolution Authorizing the Chair to Execute  
 22 an Agreement with Carollo Engineers for Engineering Services to Prepare the 1998 Master Plan  
 23 Update, September 10, 1997; SRCSD 1998, letter to Board of Directors, Presentation on the  
 24 Sacramento Regional County Sanitation District’s Watershed Approach to Addressing Regional  
 25 Water Quality Issues, June 10, 1998.

26 <sup>31</sup> *Id.*

27 <sup>32</sup> SRCSD 2003, Sacramento Regional Wastewater Treatment Plant 2020 Master Plan Draft EIR,  
 28 prepared by EDAW, Inc., August 2003.

<sup>33</sup> *Id.*, pp. 2-2, 3-22.

<sup>34</sup> *Id.*, pp. 2-13 – 2-23, 2-24 – 2-25.

1 Draft EIR found that the Treatment Plant expansion’s sole significant impact was from  
 2 construction impacts, like “dust.”<sup>35</sup> The 2020 Master Plan had a contingency plan for tertiary  
 3 treatment.<sup>36</sup> Yet despite finding that tertiary filtration was “environmentally superior to the  
 4 proposed project because it would result in similar or lesser loadings of mercury, TDS, pathogens,  
 5 chlorpyrifos, and diazinon and other constituents,” the Discharger rejected it since it “would not  
 6 reduce any of the project’s significant or potentially significant impacts.”<sup>37</sup> The other tertiary  
 7 treatment option – reverse osmosis – was dismissed out of hand based on cost and energy  
 8 consumption grounds.<sup>38</sup>

9 ***Objections to 2020 Master Plan:*** Many of the Water Agencies objected to the  
 10 Discharger’s water quality analysis and impact conclusions; failure to adequately consider tertiary  
 11 treatment and other alternatives; inadequate analysis of cumulative impacts; lack of data; and  
 12 truncated project description.<sup>39</sup> The Regional Board also objected to the 2003 Draft EIR, noting  
 13 concerns with the lack of a full tertiary treatment alternative including total ammonia removal;  
 14 compliance with the Thermal Plan; Antidegradation Policy; the data used; the computer model  
 15 used; cumulative effects; the analysis of impacts from chlorine, toxicity, and total ammonia; river  
 16 dilution; dissolved oxygen; nearby water intakes; and groundwater/sludge disposal.<sup>40</sup>

17 ***Litigation invalidated EIR:*** The Discharger proceeded to approve the project in 2004  
 18 without adopting mitigation for the water quality impacts identified in the extensive comments.  
 19 Following a year of attempted settlement negotiations, six of the Water Agencies successfully  
 20 challenged the Discharger’s project approval under the California Environmental Quality Act

21 \_\_\_\_\_  
 22 <sup>35</sup> *Id.*, p. 2-27.

23 <sup>36</sup> *Id.*, pp. 2-5 – 2-6.

24 <sup>37</sup> *Id.*, p. 6-15.

25 <sup>38</sup> *Id.*, p. 6-12 – 6-13.

26 <sup>39</sup> SRCSD 2004, Sacramento Regional Wastewater Treatment Plant 2020 Master Plan Responses  
 27 to Comments and Additional Information (Final EIR), prepared by EDAW, Inc., May 21, 2004,  
 pp. 3-69 – 3-71, 3-79 – 3-82, 3-98 – 3-100, 3-103 – 3-108.

28 <sup>40</sup> *Id.*, pp 3-11 - 3-20.

1 CEQA).<sup>41</sup> In February 2008, the Sacramento Superior Court entered Final Judgment against the  
2 Discharger, invalidating its EIR and project approval.<sup>42</sup> The trial court found the EIR's analysis  
3 of water quality impacts was deficient and violated CEQA with respect to nutrient loading,  
4 pathogen loading, total organic carbon, chloride, chlorine, double dosing, and cumulative water  
5 quality impacts.<sup>43</sup> The Discharger has appealed the trial court decision and that appeal remains  
6 pending before the Third District Court of Appeal.<sup>44</sup> The Discharger has not done a remedial  
7 CEQA review.

8 **2005 Permit Application:** In 2005, the Discharger sought a new discharge Permit from  
9 the Regional Board for an expanded discharge of 218 mgd, corresponding with the planned  
10 expansion under the 2020 Master Plan. With the court's invalidation of the Discharger's EIR and  
11 expansion approval, the Water Agencies maintained that the Discharger did not have authority  
12 under CEQA to request the capacity increase.<sup>45</sup> On June 10, 2010, the Discharger withdrew its  
13 request for a capacity increase to 218 mgd and instead sought renewal of its discharge Permit at  
14 the existing permitted capacity of 181 mgd.<sup>46</sup>

15 For 29 years the Discharger has been able to avoid any significant investments in its  
16 Treatment Plant (originally constructed with grant funding), even though it has maintained  
17 backup tertiary treatment plans for at least 19 of those years. It has avoided making needed  
18

---

19 <sup>41</sup> See Robinson, E. 2010. Memorandum to State Water Contractors, Contra Costa Water District,  
20 and San Luis & Delta-Mendota Water Authority from Eric Robinson, Kronick, Moskovitz,  
21 Tiedemann & Girard, re: Impact of 2020 Master Plan EIR Litigation On Sacramento Regional  
Sanitation District NPDES Permit Application for Sacramento Regional Wastewater Treatment  
Plant, NPDES Permit No. CA0077682, May 26, 2010.

22 <sup>42</sup> *Id.*, p. 2.

23 <sup>43</sup> *Id.*, Ruling, p. 27 of 29.

24 <sup>44</sup> *Id.*, p.2.

25 <sup>45</sup> Robinson, E. 2010; Water Agencies 2010, Comments on Drinking Water Supply and Public  
26 Health Issues Concerning the Sacramento Regional Wastewater Treatment Plant NPDES Permit  
Renewal, February 1, 2010, pp. 2-3.

27 <sup>46</sup> SRCSD 2010, Press Release "SRCSD Withdraws Treatment Plant Capacity Increase Request,  
28 June 10, 2010.

1 upgrades by aggressively attacking regulatory programs and steadfastly holding on to its claim  
 2 that its discharge has no adverse water quality effects, despite mounting evidence to the contrary.  
 3 The Treatment Plant is now woefully out of step with the times and with other dischargers within  
 4 the Central Valley region and beyond.

### 5 **B. The Treatment Plant Is Out Of Date**

6  
 7 The Permit will require that the Discharger upgrade its Treatment Plant with nitrification  
 8 and denitrification (i.e., nutrient removal) and filtration facilities. In facing that requirement, the  
 9 Discharger is not being singled out to invest in new or unproven technology. To the contrary, a  
 10 review of NPDES Permits throughout the region shows that the Discharger is among 24 other  
 11 treatment plants that are required to incorporate both nutrient removal and tertiary filtration.  
 12 These plants are illustrated in Table 1. A spreadsheet summarizing the major Permit  
 13 requirements for these wastewater plants is provided in Attachment 2.<sup>47</sup>

14 *Table 1. Treatment Requirements for Central Valley Wastewater Treatment Plants.*

15 <b>Discharger</b>	16 <b>Permitted Average Dry Weather Flow, mgd</b>	17 <b>Treatment Requirements</b>	
		18 <b>Nitrification Denitrification</b>	19 <b>Tertiary Filtration</b>
20 Sacramento	181	✓	✓
21 Stockton	55	✓	✓
22 Turlock	20	✓	✓
23 Roseville - Dry Creek	18	✓	✓
24 Manteca	17.5	✓	✓
25 Tracy	16	✓	✓
26 Roseville - Pleasant Grove	15	✓	✓
27 Vacaville	15	✓	✓
28 Woodland	10.4	✓	✓
Lodi	8.5	✓	✓
Davis	7.5	✓	✓

47 This table has been updated from Attachment 2 of the Water Agencies Comments on the Tentative Order to reflect orders that have since been adopted by the Regional Board. *See also* West Yost Associates, Wastewater Control Measures Study (March 2011), available at [http://www.swrcb.ca.gov/rwqcb5/water\\_issues/drinking\\_water\\_policy/dwp\\_wastewtr\\_ctrl\\_meas\\_stdy.pdf](http://www.swrcb.ca.gov/rwqcb5/water_issues/drinking_water_policy/dwp_wastewtr_ctrl_meas_stdy.pdf). This report, prepared for the Regional Board, lists 26 treatment plants that are currently achieving nutrient removal and tertiary filtration and 9 additional treatment plants that are required by current NPDES permits to achieve this standard of treatment. The report also identifies three treatment plants that are currently required to filter their effluent but do not have nutrient removal requirements.

Discharger	Permitted Average Dry Weather Flow, mgd	Treatment Requirements	
		Nitrification Denitrification	Tertiary Filtration
Mountain House	5.4	✓	✓
Olivehurst	5.1	✓	✓
Brentwood	5.0	✓	✓
Linda County Water District	5.0	✓	✓
Galt	4.5	✓	✓
El Dorado Irrigation District – El Dorado Hills	4.0	✓	✓
El Dorado Irrigation District – Deer Creek	3.6	✓	✓
Grass Valley	2.78	✓	✓
Placerville	2.3	✓	✓
Placer County Sewer Maintenance District	2.18	✓	✓
Auburn	1.67	✓	✓
Willows	1.2	nitrification	✓
Rio Vista – Northwest	1.0	✓	✓

Nitrification/denitrification has been required of many other dischargers to control water quality degradation due to discharge of total ammonia and nitrate, which affect the same beneficial uses designated for the River and Delta. In many instances, nitrification/denitrification and tertiary filtration implements Best Practicable Treatment or Control (BPTC).

Celeste Cantu, the General Manager of the Santa Ana Watershed Project Authority, in her testimony before the Regional Board, discussed standards for wastewater treatment plants in the Santa Ana Region.<sup>48</sup> Dischargers in the Santa Ana Region discharge into a drinking water source as well as important habitat, much like the Delta.<sup>49</sup> But since the 1990s, the Santa Ana Region has reached full tertiary treatment standards to protect its water for reclamation, habitat, and as a drinking water source.<sup>50</sup> “The Santa Ana River is protected because of its vital importance regionally. The Delta needs protection because of its vital state and national importance.”<sup>51</sup>

<sup>48</sup> Meeting, State of California, Central Valley Regional Water Quality Control Board, Partial Transcript (December 9, 2010), Tiffany C. Kraft, CSR (Hearing Transcript), p. 34.

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> *Id.*

1           The Water Agencies noted in their testimony that given the magnitude of impact from the  
2 Discharger’s Treatment Plant – both in terms of sheer volume of discharge and the environmental  
3 sensitivity of discharging within the fragile Delta – few dischargers in the region are truly  
4 “similarly situated.”<sup>52</sup> The Water Agencies suggested the Blue Plains Wastewater Treatment  
5 Plant in the District of Columbia would provide a more appropriate comparison.<sup>53</sup> Like the  
6 Discharger’s Treatment Plant, that facility is the largest POTW in its watershed and discharges to  
7 the largest estuary on its coast – in each case an estuary which supports an extremely valuable but  
8 fragile ecosystem and significant recreation, fishing, municipal, and other important uses.<sup>54</sup> But  
9 unlike the Discharger’s Treatment Plant, for years the Blue Plains facility has been addressing the  
10 water quality problems of its discharge by implementing nutrient reduction facilities and tertiary  
11 filtration.<sup>55</sup> The information presented to the Regional Board on this point is reproduced in Table  
12 2. Since implementing nitrogen reduction, Chesapeake Bay and Potomac River aquatic health  
13 has rebounded, with improved habitat quality, increased diversity, and native species  
14 abundances.<sup>56</sup>

15  
16  
17  
18  
19  
20  
21  
22  
23 <sup>52</sup> Hearing Transcript, pp. 271-271.

24 <sup>53</sup> *Id.*

25 <sup>54</sup> *Id.*

26 <sup>55</sup> *Id.*

27 <sup>56</sup> Ruhl, H.A. and N.B. Rybicki. 2010. Long-term reductions in anthropogenic nutrients link to  
28 improvements in Chesapeake Bay habitat.

**Table 2. Comparing the Sacramento Regional and Blue Plains Wastewater Treatment Plants**

Sacramento Regional WWTP	Blue Plains WWTP
Discharges to the Sacramento River and Bay-Delta: <ul style="list-style-type: none"> <li>• Largest estuary on the west coast</li> <li>• Valuable ecosystem supporting a wealth of plants and animals and several listed species.</li> <li>• Also supports significant recreation, fishing, municipal, and other important uses.</li> </ul>	Discharges to the Potomac River and Chesapeake Bay: <ul style="list-style-type: none"> <li>• Largest estuary on the east coast</li> <li>• Valuable ecosystem supporting a wealth of plants and animals and several listed species.</li> <li>• Also supports significant recreation, fishing, municipal, and other important uses.</li> </ul>
<ul style="list-style-type: none"> <li>• Largest POTW in watershed</li> <li>• 181 mgd, serves 1.3 million</li> </ul>	<ul style="list-style-type: none"> <li>• Largest POTW in watershed</li> <li>• 370 mgd, serves 2.0 million</li> </ul>
<ul style="list-style-type: none"> <li>• No significant upgrades since 1982 on-line date</li> </ul>	<ul style="list-style-type: none"> <li>• Began nutrient reduction in 1996; latest permit requires total reduction of 60%*</li> <li>• Tertiary filtration completed in 2007</li> </ul>
<i>Only major WWTP in watershed without advanced treatment</i>	<i>Largest advanced WWTP in the world</i>

\*The Blue Plains facility must achieve a total nitrogen (TN) effluent limit of 4.4 million lbs/year by 2015. (U.S. EPA 2010, NPDES Permit No. DC0021199, August 31, 2010, p. 55.)

**C. The Permit Is A Product Of A Comprehensive Five-Year Permit Review Process, And Significant Interaction Between The Discharger And The Regional Board On The Major Permit Issues For At Least A Decade**

The Discharger suggests that the Regional Board imposed the Permit requirements at the last minute, in a “renewal characterized by haste, particularly as related to the major issues that are the subject of this appeal.”<sup>57</sup> To the contrary, the Regional Board has been discussing with the Discharger the need for nitrification/denitrification, filtration, and other plant improvements for at least a decade.

In February 2005, the Discharger filed its application. After years of coordination with

<sup>57</sup> Petition, p. 15.

1 the Discharger, the Regional Board issued a Tentative Permit in September 2010 and released a  
2 revised Tentative Permit in November 2010. By order dated December 9, 2010, the Regional  
3 Board approved the Permit on substantially the same terms as the revised Tentative Permit. The  
4 Regional Board's process, which went well beyond its statutory duties, ensured that the  
5 Discharger's and stakeholders' voices were heard.

6 Even prior to the Discharger's 2005 permit renewal application, however, the Discharger  
7 and the Regional Board engaged in substantive discussions regarding the principal issues now  
8 raised by the Discharger's Petition. Technical support for the 2005 permit application effectively  
9 began with development of the "2020 Master Plan" and the Discharger's August 2003 Draft EIR,  
10 discussed *supra*. As early as September 2003, in its comments on the 2003 Draft EIR on the  
11 2020 Master Plan, the Regional Board expressed concerns regarding issues that would later  
12 become the subject of Permit requirements, including total ammonia and nutrient removal,  
13 tertiary treatment, compliance with the State Board's Thermal Plan, Antidegradation Policy  
14 requirements, dynamic modeling, and toxicity.<sup>58</sup>

15 The Regional Board continued to address each of these issues with the Discharger  
16 throughout the permit renewal process through various forms of correspondence. From 2004 into  
17 2010, Permit Renewal Meetings were held regularly at the offices of the Regional Board. During  
18 these meetings, the Discharger's staff and consultants met with Regional Board staff to discuss all  
19 topics related to permit renewal. Additionally, formal letters as well as frequent informal email  
20 correspondence were exchanged throughout the same period. A chronology of correspondence  
21 between the Regional Board and the Discharger is provided in Attachment 3 ("Chronology").<sup>59</sup>

22 \_\_\_\_\_  
23 <sup>58</sup> SRCSD 2004, Sacramento Regional Wastewater Treatment Plant 2020 Master Plan Responses  
24 to Comments and Additional Information (Final EIR), prepared by EDAW, Inc., May 21, 2004,  
pp. 3-11 – 3-20 [hereinafter Comments on DEIR; also on attached CD at RB020009].

25 <sup>59</sup> This correspondence was obtained by various requests by the Water Agencies for documents  
26 pursuant to the California Public Records Act. As correspondence between the Regional Board  
27 and the Discharger concerning the discharge facility, it is properly part of the record under Cal.  
28 Code Regs., Tit. 23, § 2050.5. However, since the Regional Board's record has not yet been  
filed, this correspondence is also provided on CD with Water Agencies' Response. Citations to  
these documents herein include a Bates Stamp page number reference corresponding with  
numbers assigned on the CD.

1 As evident from the following summary of this correspondence, the Discharger and the  
2 Regional Board have thoroughly discussed and debated the major issues of dispute for years, if  
3 not decades.

- 4 • **Total ammonia and nutrient removal:** The Regional Board has expressed concerns  
5 about the Discharger’s total ammonia discharge into the Sacramento River for years.  
6 By virtue of the Regional Board’s comments on the 2003 Draft EIR,<sup>60</sup> its 2007 letter  
7 to the Discharger and other organizations making a “Request for Maximum Effort to  
8 Protect the Delta Waters,”<sup>61</sup> and through joint total ammonia studies and analyses that  
9 the Regional Board and Discharger engaged in from 2007 forward to examine the  
10 potential link between total ammonia and the Pelagic Organism Decline (POD) in the  
11 Delta.<sup>62</sup> When study results began to indicate a potential link between total ammonia

12 \_\_\_\_\_  
13 <sup>60</sup> Specifically, in response to the 2003 Draft EIR, the Regional Board urged the Discharger to  
14 consider treatment alternatives to reduce total ammonia in its discharge because, “acute and  
15 chronic ammonia criteria could be exceeded in the near field, and the proposed project is  
16 predicted to contribute to significant increases in total ammonia concentrations in the far field,  
17 both of which could potentially be significant impacts.” *Id.* at 3-18, RB020016. Additionally, the  
18 Regional Board requested further analyses of the Treatment Plant’s effects on Dissolved Oxygen  
19 levels in the River resulting from the increased volumes of BOD and total ammonia in its  
20 discharge. *Id.* at 3-18, RB020016. In contrast, the Discharger repeatedly argued that “[p]roject-  
21 specific contributions of ammonia would not adversely affect any of the existing or future  
22 anticipated beneficial uses of the Sacramento River or Delta waters, or substantially impair the  
23 integrity of the Sacramento River or Delta,” thus having a “less-than-significant impact on water  
24 quality.” *Id.* at 3-32, RB020030 (SRCSD Responses to Comments).

25 <sup>61</sup> Central Valley Regional Water Quality Control Board, Request for Maximum Effort to Protect  
26 Delta Waters (July 16, 2007), SRCSD064700–03. The Request referred to the decline in the  
27 aquatic species of the Delta, including the Delta smelt, and contained the following message for  
28 the Discharger and other dischargers: “[Y]ou must make every effort to operate your wastewater  
treatment facility to reduce or eliminate any potential aquatic impacts from your discharge to  
Delta waters or to tributaries to the Delta.” *Id.* The Regional Board asked the dischargers to  
“[o]perate the treatment facilities to minimize any toxic substances in the wastewater discharge,  
including effluent ammonia” and “to minimize oxygen-demanding substances in the wastewater  
discharge.” *Id.*

<sup>62</sup> *See, e.g.*, SRCSD, Meeting with SRCSD, RB, CH2M HILL, Larry Walker Ass., and Dugdale  
Laboratory (Dec. 17, 2008), SRCSD04626; Email from Pamela Creedon, Executive Officer,  
CVRWQCB, to Mary Snyder, District Engineer, SRCSD (July 8, 2008 10:19 PM),  
SRCSD01749; Email from Cameron Irvine, Project Scientist, SRWTP to Chris Foe, CVRWQCB  
(July 5, 2008 04:42 PM), SRCSD0125310; Letter from Wendell Kido, SRCSD, to Karen Larson,  
CVRWQCB (Mar. 25, 2008), SRCSD126536; SRCSD, Meeting with RWQCB and DWR:  
Ammonia Analyses Discussion (Oct. 9, 2007), SRCSD02403 [hereinafter Ammonia Analyses  
Discussion]. *See also* Chronology of Correspondence Between SRCSD and CVRWQCB  
[hereinafter Chronology] (chronology of meetings held, and emails and letters exchanged

1 and the POD, the Discharger's position shifted from one of participation to one of  
 2 opposition, challenging the protocol of the studies themselves and the results they  
 3 produced.<sup>63</sup>

- 4 • **Tertiary treatment, including filtration:** Discussions between the Discharger and the  
 5 Regional Board regarding tertiary treatment, including filtration, go back as far as the  
 6 Regional Board's comments on the 2003 Draft EIR.<sup>64</sup> Furthermore, throughout the  
 7 permit renewal process, the Discharger worked hard to convince the Regional Board  
 8 and the California Department of Public Health (DPH) (formerly the Department of  
 9 Health Services) to use enterococci as an alternative pathogen indicator instead of total  
 10 coliform because it has lower detection rates, which, if adopted, would have lowered  
 11 the Discharger's treatment costs and weakened the basis for requiring filtration.<sup>65</sup> The  
 12 Discharger's approach was ultimately rejected by the Regional Board, based on  
 13 DPH's recommendation.<sup>66</sup> The Discharger and Regional Board also debated the  
 14 merits of tertiary treatment, with filtration, throughout 2008.<sup>67</sup>

15 In March 2005, the Discharger released a "Pathogen White Paper," in which it  
 16

---

17 between the Regional Board and SRCSD regarding the NPDES Permit Renewal).

18 <sup>63</sup> See, e.g., Email from Robert Seyfried, Senior Civil Engineer, SRCSD to Chris Foe and Karen  
 19 Larsen, CVRWQCB (Feb. 2, 2009 03:07PM), SRCSD01769; Email from Stephanie Fong,  
 20 CVRWQCB to Cameron Irvine, Project Scientist, SRWTP (April 16, 2009 10:02 AM),  
 21 SRCSD109319. See also Chronology.

22 <sup>64</sup> Comments on 2003 Draft EIR, at 3-13, RB020011.

23 <sup>65</sup> Larry Walker Associates, Pathogen White Paper (2009), RB016236.

24 <sup>66</sup> See Email from Kathleen Harder, CVRWQCB, to Vyomini Pandya, Assistant Engineer, and  
 25 Robert Seyfried, Senior Civil Engineer, SRCSD (Apr. 28, 2009 9:43 AM), SRCSD07893.

26 <sup>67</sup> SRCSD, Meeting with the Regional Board (July 21, 2008), SRCSD06269 (Discharger arguing  
 27 that water recycling efforts would be discouraged if tertiary filtration treatment was required);  
 28 Letter from Kenneth Landau, Assistant Executive Officer, CVRWQCB, to Robert Seyfried,  
 Senior Civil Engineer, SRCSD (Aug. 19, 2008), SRCSD062998 [hereinafter August 19 Letter]  
 (Regional Board staff request that the Discharger add a chapter on BPTC and include alternatives  
 for "nitrification/denitrification & filtration & ultraviolet light disinfection that are treatment  
 methods used for the majority of wastewater treatment plants discharging to surface waters in the  
 Delta or tributaries").

1 advocated for the use of an alternative pathogen indicator.<sup>68</sup> The Discharger thereafter  
 2 sought to persuade the Regional Board to use enterococci, as opposed to total  
 3 coliform, due to its lower detection rates, ultimately lowering the Discharger's  
 4 treatment costs and potentially avoiding the need for filtration.<sup>69</sup> The Discharger also  
 5 met with the California Department of Health Services (now DPH) to persuade them  
 6 to accept the alternative indicator recognizing the Regional Board relies on DPH  
 7 guidance in setting pathogen limits. DPH made clear, however, that it would not  
 8 accept the alternative.<sup>70</sup>

- 9 • **Thermal Plan compliance:** Thermal Plan compliance was similarly discussed over  
 10 the course of several years. Foreshadowing its analysis in the Permit, the Regional  
 11 Board voiced its concern that the 2003 Draft EIR's "alternatives analysis . . . should  
 12 have included alternatives for achieving full compliance with the State Board's  
 13 Thermal Plan" and noted that it would reevaluate, during the upcoming discharge  
 14 Permit renewal process, whether an exception to the Thermal Plan for the Treatment  
 15 Plant would be appropriate in the renewed Permit.<sup>71</sup> The Discharger filed an  
 16 application for an exception to the Thermal Plan in 2005, and argued that its discharge  
 17 did not have a thermal impact.<sup>72</sup> The Discharger and Regional Board discussed this  
 18 issue at length throughout the permit renewal process.<sup>73</sup>

19 \_\_\_\_\_  
 20 <sup>68</sup> Larry Walker Associates, Pathogen White Paper (2009), RB016236.

21 <sup>69</sup> *Id.*

22 <sup>70</sup> SRCSD, Agenda, Pathogen Indicator Selection for NPDES Permit Renewal (Sept. 24, 2008),  
 SRCSD08550.

23 <sup>71</sup> Comments on DEIR, *supra*, at 3-11, RB02009.

24 <sup>72</sup> *See* Letter from Robert Seyfried, Senior Civil Engineer, SRCSD, to Ken Landau, Assistant  
 25 Executive Officer, CVRWQB (Mar. 10, 2006), SRCSD00469-70 (application for exception to  
 26 Thermal Plan); Letter from Robert Seyfried, Senior Civil Engineer, SRCSD, to Ken Landau,  
 27 Assistant Executive Officer, CVRWQCB (May 12, 2005), SRCSD05017-22 [hereinafter May 12  
 Letter] (arguing that Treatment Plant effluent qualified for an exception to the Thermal Plan  
 because it did not have a thermal impact);

28 <sup>73</sup> *See, e.g.*, Email from Kathleen Harder, CVRWQCB, to Robert Seyfried, SRCSD (Aug. 20,  
 2008 10:10 AM), SRCSD 062557; SRCSD, Meeting with the Regional Board, *supra*; SRCSD,

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- **Antidegradation Policy:** The Discharger and the Regional Board likewise engaged in numerous discussions relating to the Antidegradation Policy beginning with the 2020 Master Plan and throughout the permit renewal process. Initially, the Discharger performed a Capacity Rating Study that showed the Treatment Plant was operating at 154 mgd, had a potential capacity of 207 mgd, and would have an operating capacity of 218 mgd after the Master Plan expansion.<sup>74</sup> The Discharger evaluated the water quality impacts of the expansion in its 2003 Draft EIR and found the increased discharge would have no significant water quality impacts.<sup>75</sup> The Discharger submitted its Antidegradation Policy analysis with its Permit application in 2005. Through many meetings over the permit renewal period, the Regional Board submitted numerous comments relating to the need for a more thorough Antidegradation Policy analysis.<sup>76</sup> In response, the Discharger submitted an Administrative Draft of the Antidegradation Policy analysis in 2009, but abruptly withdrew its analysis in 2010, and asked the Regional Board to base its permit renewal on its existing permitted 181 mgd capacity. In addition, the Discharger began arguing that withdrawal prevented the Antidegradation Policy analysis requirement from being triggered, “[b]ecause compliance with the [antidegradation] policies was previously considered, and the Permit does not allow for a reduction in water quality.”<sup>77</sup>
  - **Toxicity:** Toxicity discussions for the Permit renewal dates at least as far back as

---

21 NPDES Renewal Meeting Summary (May 10, 2007), SRCSD 054684–88.

22 <sup>74</sup> Carollo Engineers, SRWTP Capacity Rating Study (Feb. 2005), RB015004.

23 <sup>75</sup> Comments on DEIR, *supra*, at 3-25, RB020023. See May 12 Letter, *supra*.

24 <sup>76</sup> See May 12 Letter, *supra*, August 19 Letter, *supra*, see also Chronology, *supra*.

25 <sup>77</sup> In the Matter of the Sacramento Regional County Sanitation District’s Petition for Review of  
26 Action and Failure to Act by Regional Water Quality Control Board, Central Valley Region, in  
27 Adopting Waste Discharge Requirements Order No. R5-2010-0114 (NPDES No. CA0077682)  
28 and Time Schedule Order No. R5-2010-0115 for Sacramento Regional County Sanitation  
District, Sacramento Regional Wastewater Treatment Plant, Petition for Review, 134 (Jan. 10,  
2011).

1 2003, when the Regional Board questioned the Discharger’s conclusions in the 2003  
 2 Draft EIR that the Treatment Plant discharges would not have toxic effects on passing  
 3 and benthic organisms, and stated the need for the Discharger to “identify the specific  
 4 chemical constituents causing the toxicity, and implement measures to remove those  
 5 constituents from its discharge.”<sup>78</sup> In 2004, the Discharger began conducting a  
 6 Toxicity Reduction Evaluation at the Treatment Plant, and the Regional Board and the  
 7 Discharger continued this dialogue through meetings, letters and emails discussing  
 8 whole effluent toxicity test results, the Toxicity Reduction Evaluation and Toxicity  
 9 Identification Evaluation, and toxicity violations.<sup>79</sup> In March 2005, the Discharger  
 10 submitted a “Toxicity White Paper” to the Regional Board, advocating the use of  
 11 alternative whole effluent toxicity tests and triggers.<sup>80</sup> In 2007, the Discharger  
 12 submitted a request to the Regional Board to change the Permit’s Monitoring and  
 13 Reporting Program to reference new whole effluent toxicity testing methods, in order  
 14 to avoid toxicity violations.<sup>81</sup> Continued discussion of the Toxicity White Paper and  
 15 the Discharger’s request for the test method change is reflected in a series of emails  
 16 and letters between the Discharger and the Regional Board, as well as in Permit  
 17 Renewal Meetings.<sup>82</sup>

- 18 • **Dynamic modeling:** The coordinated effort between the Regional Board and the  
 19 Discharger to review the Discharger’s dynamic model began in 2001 in conjunction  
 20 with the 2020 Master Plan EIR. These discussions continued through the Regional  
 21

22 \_\_\_\_\_  
 23 <sup>78</sup> Comments on DEIR, *supra*, at 3-17, RB020015.

24 <sup>79</sup> See Chronology, *supra*.

25 <sup>80</sup> See May 12 Letter, *supra*.

26 <sup>81</sup> Letter from Mitch Maidrand, Principal Civil Engineer, SRCSD to Jim Marshall, CVRWQCB  
 (July 30, 2007), SRCSD08139.

27 <sup>82</sup> See, e.g., Email from Cameron Irvine, SRCSD, to James Marshall, CVRWQCB (Oct. 15, 2007  
 28 10:38 AM), SRCSD08161. See also Chronology, *supra*.

1 Board's comments on the 2003 Draft EIR,<sup>83</sup> at Permit renewal meetings (which began  
 2 in 2004) and in letters,<sup>84</sup> through the Regional Board's decision to hire Tetra Tech to  
 3 review the Discharger's model and assist the Regional Board in developing an  
 4 approach to use the model to prepare the Permit due to the complexity of the model;<sup>85</sup>  
 5 through the Discharger's supplemental dye studies and corresponding reports during  
 6 2005, 2006, and 2007 to respond to Regional Board and Tetra Tech comments;<sup>86</sup> and  
 7 through Regional Board staff acceptance of the Discharger's model for use in the  
 8 permit renewal in 2009,<sup>87</sup> and continued discussions regarding the same.<sup>88</sup>

- 9 • **Stakeholder views:** In addition to providing opportunities for extensive input from the  
 10 Discharger, the Regional Board provided opportunities for public input. In 2009 and  
 11 2010, Regional Board staff prepared and circulated two issue papers concerning the  
 12 Discharger's Permit and asked for comment, one of which summarized the major  
 13 permitting issues related to drinking water supply and public health, and the other  
 14 summarized the major permitting issues related to aquatic life and wildlife  
 15 preservation. Certain of the Water Agencies, as well as many other stakeholders,  
 16 including the Discharger, provided comments on these papers.<sup>89</sup> Previously, on  
 17

18 <sup>83</sup> See Comments on DEIR, *supra*, at 3-13-3-15, RB020011-13.

19 <sup>84</sup> Letter from Robert Seyfried, Senior Civil Engineer, SRCSD, to Ken Landau, Assistant  
 Executive Officer, CVRWQCB (Nov. 15, 2004), SRCSD05272-78.

20 <sup>85</sup> See Letter from Robert Seyfried, Senior Civil Engineer, SRCSD, to Ken Landau, Assistant  
 Executive Officer (Nov. 28, 2005), SRCSD064796-00; CVRWQCB, Comments on Dynamic  
 21 Model (Apr. 14, 2005), RB010411-26.

22 <sup>86</sup> See, e.g., SRCSD, NPDES Permit Renewal Meeting Summary (May 10, 2007),  
 SRCSD054684-88. See also Chronology, *supra*.

23 <sup>87</sup> Letter from Ken Landau, Assistant Executive Officer, CVRWQCB, to Mary K. Snyder, District  
 24 Engineer, SRCSD (Apr. 2, 2009), SRCSD11205-06.

25 <sup>88</sup> See, e.g., SRCSD, NPDES Permit Renewal Discussion Items (July 21, 2009), SRCSD06274-  
 26 77. See also Chronology, *supra*.

27 <sup>89</sup> Alameda County Water District, et al., Comments on Drinking Water Supply and Public Health  
 Issues Concerning the Sacramento Regional Wastewater Treatment Plant NPDES Permit  
 Renewal, February 1, 2010 (Water Agencies' 2010 Comments on Drinking Water Issues);  
 Alameda County Water District, et al., Comments on Aquatic Life and Wildlife Preservation  
 28

1 July 10, 2007, Regional Board staff met with certain Water Agencies to discuss some  
 2 of the major concerns with the discharge. Those Water Agencies supplemented their  
 3 meeting with a technical submittal to Regional Board staff in December 2007.<sup>90</sup>

#### 4 **IV. STANDARD OF REVIEW**

5 The State Board must uphold a Regional Board permit if it is based on substantial  
 6 evidence in the record and is not contrary to law.

7 Under Water Code section 13320, the State Board reviews the Petitions in light of “the  
 8 record before the regional board, and any other relevant evidence which, in the judgment of the  
 9 State Board, should be considered to effectuate and implement the policies of” the Porter-  
 10 Cologne Water Quality Control Act.<sup>91</sup> The State Board may uphold the Regional Board’s  
 11 approval of the Permit as appropriate and proper or the State Board may take appropriate action  
 12 itself, direct the Regional Board to take the appropriate action, refer the issue to another state  
 13 agency with jurisdiction, or take any combination of these actions.<sup>92</sup>

##### 14 **A. The Regional Board’s Permit Is Supported By Substantial Evidence In The** 15 **Record**

16 It is well-established that, “while [the State Board] can independently review the Regional  
 17 Board record, in order to uphold a Regional Board action, we must be able to find that [the  
 18 Regional Board’s action] was founded upon substantial evidence.”<sup>93</sup>

19 Substantial evidence includes, “facts, reasonable assumptions predicted upon facts, and  
 20 expert opinion supported by facts.”<sup>94</sup> The Regional Board may also rely upon the opinion of its

---

21 Issues Concerning the Sacramento Regional Wastewater Treatment Plant NPDES Permit  
 22 Renewal, June 1, 2010 (Water Agencies’ 2010 Comments on Aquatic Life Issues).

23 <sup>90</sup> Summary of Drinking Water Quality Issues and Requested Permit Conditions for the  
 24 Sacramento Regional Waterwater Treatment Plant NPDES Renewal, December 2007 (Water  
 25 Agencies’ 2007 Comments).

26 <sup>91</sup> Water Code § 13320(b).

27 <sup>92</sup> Water Code § 13320(c).

28 <sup>93</sup> *Exxon*, WQ 85-7, 1985 WL 20026, at \*6.

<sup>94</sup> *See Citizens for Responsible and Open Gov’t v. City of Grand Terrace* (2008) 160 Cal.App.4th  
 1323, 1332.

1 staff in reaching decisions and such opinion constitutes substantial evidence.<sup>95</sup>

2 To be “substantial,” evidence need only provide enough relevant information and  
 3 reasonable inferences from this information that a fair argument can be made to support a  
 4 conclusion, even though other conclusions might also be reached.<sup>96</sup> Absolute certainty is not  
 5 required. As the U.S. EPA recently noted, “We do not demand certainty where there is none.  
 6 There may be no strong reason for choosing [a particular numerical standard] rather than a  
 7 somewhat higher or lower number. If so, we will uphold the agency’s choice of a numerical  
 8 standard if it is within a ‘zone of reasonableness.’”<sup>97</sup> As long as the “agency’s reasons and policy  
 9 choices . . . ‘conform to certain minimal standards of rationality’ . . . the [agency decision] is  
 10 reasonable and must be upheld.”<sup>98</sup>

11 The substantial evidence standard applies to conclusions, findings and determinations, as  
 12 well as to challenges to the scope of analysis of a topic, the method used to assess a beneficial use  
 13 impairment and the reliability or accuracy of the data upon which the Regional Board based its  
 14 Permit decision, because these types of challenges involve factual questions.<sup>99</sup>

15 The State Board is to indulge all reasonable inferences from the evidence that would  
 16 support the Regional Board’s determinations.<sup>100</sup> If reasonable minds may disagree as to the  
 17 wisdom of the Regional Board’s Permit decision, the Regional Board’s decision should be  
 18 upheld.<sup>101</sup>

19 \_\_\_\_\_  
 20 <sup>95</sup> See *Anthony v. Snyder* (2004) 116 Cal.App.4th 643, 660-61; *McBail & Co. v. Solano County LAFCO* (1998) 62 Cal.App.4th 1223.

21 <sup>96</sup> *Id.*

22 <sup>97</sup> *In re Upper Blackstone Water Pollution Abatement District*, slip. op., \_\_\_ E.A.D. \_\_\_, 2010  
 23 WL 2363514 at \*41 (E.A.D. May 28, 2010) (quoting *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 525 (D.C. Cir. 1983) (citation omitted).)

24 <sup>98</sup> *Sanofi-Aventis U.S. LLC v. Food and Drug Administration*, 733 F.Supp.2d 162, 172 (D.D.C.  
 25 2010) (quoting *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d at 520-21.)

26 <sup>99</sup> See *San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, 654  
 [describing substantial evidence review of environmental impact assessments].

27 <sup>100</sup> See *Western States*, *supra*, 9 Cal.4th at 571.

28 <sup>101</sup> See *Laurel Heights Improvement Ass’n v. Regents of University of California* (1988) 47 Cal.3d

1 This deferential standard applies to review of all numerical limits imposed under the  
 2 NPDES Permit, including water quality based effluent limitations (WQBELs) imposed pursuant to  
 3 40 C.F.R. 122.44(d)(1)(i). Section 122.44(d)(1)(i) requires WQBELs to control pollutants which,  
 4 among other things, have the reasonable potential to cause violations of state numeric water  
 5 quality standards or narrative criteria for water quality. Reasonable potential findings can be  
 6 based on application of state standards, such as the State Board's Policy for Implementation of  
 7 Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2005)  
 8 SIP), but the Regional Board may use any method, so long as the Regional Board describes the  
 9 method and rationale.<sup>102</sup> The reasonable potential determination need not be based on statistical  
 10 analysis, nor even on a numeric analysis of any particular pollutants.<sup>103</sup>

11 The Permit is supported by evidence far surpassing the substantial evidence threshold.  
 12 The Discharger's Petition challenges the Permit's stringency based on unsubstantiated fears,  
 13 speculation and opinion about purportedly high economic costs and allegedly low environmental  
 14 benefits. But substantial evidence does not include speculation, unsubstantiated opinion or  
 15 evidence that is clearly erroneous.<sup>104</sup> "Unsubstantiated fears and desires of [a Permit] opponent  
 16 do not constitute substantial evidence."<sup>105</sup>

17 Many of the Permit defects alleged in the Discharger's Petition arise from the  
 18 Discharger's failure to meet *its* burden to prove that relatively lax Permit terms were justified,  
 19 rather than from any failure of the Regional Board to support its Permit approval with substantial  
 20 evidence. The Discharger's failure to meet its burden of proof under state and federal

---

21 376, 393 [detailing substantial evidence review of environmental impact assessments].

22 <sup>102</sup> *In The Matter Of Own Motion Review Of Waste Discharge Requirements For The University*,  
 23 WQ 2010-0005, 2010 WL 2023327, at \*3 (citing WQO 2004-0013, at 6).

24 <sup>103</sup> *Divers' Environmental Conservation Organization v. State Water Resources Control Board*  
 25 (2006) 145 Cal.App.4th 246, at 257-58.

26 <sup>104</sup> *See Citizens for Responsible and Open Gov't v. City of Grand Terrace* (2008) 160 Cal.App.4th  
 1323, 1332.

27 <sup>105</sup> *See Porterville Citizens for Responsible Hillside Dev. v. City of Porterville* (2007) 157  
 28 Cal.App.4th 885, 901 [citing *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1417].

1 Antidegradation Policy is a prime example.

2 **B. The State Board May Further Strengthen The Permit By Considering**  
 3 **Additional Evidence And Making Further Findings**

4 The State Board may supplement the record with “other relevant evidence” supporting or  
 5 strengthening the Permit terms.<sup>106</sup> The State Board may make additional findings supporting or  
 6 strengthening the Permit terms and may even take original jurisdiction over, and directly approve,  
 7 the Discharger’s Permit.<sup>107</sup> Although the Regional Board’s record and findings more than  
 8 adequately support the Permit limits requiring nutrient removal and tertiary filtration, the State  
 9 Board has the discretion to supplement the record and findings to strengthen the Permit even  
 10 further. The Water Agencies are submitting here supplemental information that responds to  
 11 issues raised in the Petition to which the Water Agencies did not have the opportunity to respond  
 12 in the proceedings before the Regional Board. The specific evidence and bases for asking the  
 13 State Board to consider this information is outlined in the Water Agencies' Appendix of  
 14 Supplemental Information Supporting Response to Discharger's Petition for Review.

15 **V. THE NITROGEN LIMITS IN THE PERMIT ARE APPROPRIATE FOR THE**  
 16 **LARGEST SINGLE DISCHARGER OF WASTE NITROGEN TO THE DELTA**

17 The Discharger is discharging on average 14 tons of total ammonia into the Delta every  
 18 day, resulting in the presence of total ammonia nitrogen in the Sacramento River, across the entire  
 19 Delta, and all the way to Suisun Bay, 80 miles downstream. The Discharger’s Treatment Plant is  
 20 the dominant source of total ammonia to the Sacramento River and Delta. Once the Treatment  
 21 Plant’s total ammonia is discharged, it slowly is converted to nitrate, which itself causes major  
 22 problems. The total ammonia nitrogen and nitrate limits in the Permit are long overdue, and  
 23 represent a good first step towards correcting the profound problems caused by this discharge.

24 The Permit is on solid ground in imposing total ammonia nitrogen and nitrate limits that  
 25 reduce the total nitrogen discharged by the Treatment Plant. The *Topanga* “analytic road map”

26 <sup>106</sup> Water Code § 13320(b).

27 <sup>107</sup> See Water Code § 13320(c) [“In taking any action, the state board is vested with all the powers  
 28 of the regional boards under this division.”].

1 supporting the nitrogen limits is compelling; reasonable potential analysis of this discharge  
 2 ineluctably leads to nitrogen limits at least as stringent as those in the Permit. Further, the Permit  
 3 is consistent with precedent recognizing the need to impose nitrogen effluent limitations to  
 4 protect beneficial uses that include protecting primary productivity and preventing nuisance.

5 **A. Total Ammonia Nitrogen From The Treatment Plant Violates Various Water**  
 6 **Quality Standards And Clean Water Act Principles, Causing Profound,**  
 7 **Adverse Effects On The Delta**

8 The Regional Board succinctly summarized why total ammonia nitrogen discharges to  
 9 surface waters can cause profound, adverse effects in a watershed: “it is toxic to aquatic life,  
 10 affects the nutrient balance in the river, reduces dissolved oxygen, affects aquatic ecosystem food  
 11 supply, and is a precursor for the formation of nitrosamines.”<sup>108</sup> Key points supporting the  
 12 nitrogen limits include without limitation:

- 13 • *The Treatment Plant’s total ammonia nitrogen is toxic to plankton at the base of the*  
 14 *food chain, where adverse impact can propagate up trophic levels, depressing*  
 15 *fisheries’ yields, and causing other problems.* Published research demonstrates that  
 16 the total ammonia nitrogen is toxic to planktonic organisms called copepods, such as  
 17 *Eurytemora affinis* and *Pseudodiaptomus forbesi*, upon which larval fish graze.  
 18 Published research also demonstrates that the ammonium is toxic to some  
 19 phytoplankton such as diatoms. These toxic impacts depress the food supply for the  
 20 Delta smelt and other fish, and reduce fisheries yields in critical habitat for federally  
 21 listed fish, including the winter and spring-run Chinook salmon, the Delta smelt, and  
 22 green sturgeon. These impacts violate the toxicity standard for the Delta which  
 23 requires that the Delta “be maintained free of toxic substances in concentrations that  
 24 produce detrimental physiological responses in human, plant, animal, or aquatic life,”  
 25 and violate various beneficial uses of the Delta, including SPWN (spawning,  
 26 reproduction, and early development), WARM and COLD (warm and cold freshwater

27 \_\_\_\_\_  
 28 <sup>108</sup> Regional Board Staff Report, at 13.

1 habitat) and MIGR (migration of aquatic organisms). The Delta has “one of the  
 2 lowest primary production rates of any major estuary in the world,” and the  
 3 Discharger’s total ammonia nitrogen discharge plays a role in that condition.<sup>109</sup>

- 4 • *Ammonium stimulates the growth of undesirable and harmful cyanobacteria that itself*  
 5 *can be toxic.* The Discharger’s ammonium creates conditions conducive to the growth  
 6 of less nutritious, and often toxic, cyanobacteria (i.e., bluegreen algae), and also  
 7 flagellates. The growth of these nuisance cyanobacteria and flagellates violates the  
 8 biostimulatory standard for the Delta which requires the Delta to be free of,  
 9 “biostimulatory substances which promote aquatic growth in concentrations that cause  
 10 nuisance or adversely affect beneficial uses.” The growth of these nuisance  
 11 cyanobacteria also violates the Delta’s toxicity standard because species like  
 12 *Anabaena flos-aquae*, *Microcystis aeruginosa*, and *Aphanizomenon flos-aquae* are  
 13 known to produce neurotoxins that are toxic to humans, fish, and wildlife.
- 14 • *Once released to the Delta, the Treatment Plant’s total ammonia nitrogen begins to*  
 15 *convert to nitrate, which consumes precious oxygen in the water column.* Converting  
 16 total ammonia nitrogen (which contains no oxygen) into nitrate (which does)  
 17 adversely scavenges oxygen dissolved in the water column. This adverse process  
 18 causes oxygen levels in the Delta miles downstream from the Treatment Plant to fall  
 19 repeatedly below the applicable oxygen standard. This oxygen is essential to aquatic  
 20 life in the Delta, including the fish species listed above. Even the Discharger agrees it  
 21 must reduce the total ammonia nitrogen to achieve compliance with the oxygen  
 22 standard.
- 23 • *Excess nitrogen creates nuisance aquatic weeds that are choking Delta channels;*  
 24 *nuisance algal blooms in water supply aqueducts and reservoirs that create risk to*  
 25

26 <sup>109</sup> Staff Response to Comments at 20-21 (SRCSD “does not appear to dispute the fact that  
 27 ammonia concentrations are suppressing nitrogen uptake and primary production in Suisun  
 28 Bay”). Slide 41, TR page 294, lines 6-16; *see also* Water Agencies’ Hearing Presentation, Slide  
 41.

1                    public health, increase drinking water treatment costs and cause taste and odor  
 2                    problems in municipal water supplies if not controlled. These effects demonstrate that  
 3                    nitrogen from the Treatment Plant is adversely flooding the Delta and water supply  
 4                    facilities with excess nutrients causing nuisance and violating the biostimulation  
 5                    standard. High nutrient levels produce excess algae growth in water supply reservoirs  
 6                    and conveyance facilities, which increases total organ carbon (TOC), a disinfection  
 7                    byproduct precursor, loading to water treatment plants. This TOC increases the risk to  
 8                    public health by increasing production of harmful disinfection byproducts, many of  
 9                    which are known carcinogens or adversely impact reproductive health, as well as  
 10                    increasing water treatment plant operational costs. Excessive algal growth causes  
 11                    taste and odor problems in municipal water supplies and increases costs to water  
 12                    treatment plant operations. These impacts violate the domestic and municipal water  
 13                    supply designation (MUN) for the Delta, as well as the taste and odor standard, and  
 14                    impose significant costs on water suppliers.

- 15                    • The Discharger has the temerity to suggest that its total ammonia nitrogen actually is  
 16                    having a beneficial effect on the Delta,<sup>110</sup> an argument that turns the federal Clean  
 17                    Water Act on its head. “In no case shall a State adopt waste transport or waste  
 18                    assimilation as a designated use for any waters of the United States.”<sup>111</sup> This federal  
 19                    regulation was promulgated, “to prevent water bodies from being used as open  
 20                    sewers,”<sup>112</sup> which is exactly what the Discharger proposes to do under its “waste-is-  
 21                    good” theory. The Regional Board’s regulations make clear: “disposal of wastewaters  
 22                    . . . cannot be satisfied to the detriment of beneficial uses.”<sup>113</sup>

24                    <sup>110</sup> See, e.g., Petition at p. 90 (“nitrogen-limited phytoplankton upstream from the SRWTP[ ]  
 25                    potentially benefit from the ammonia introduced at the discharge”).

26                    <sup>111</sup> 40 C.F.R. 131.10(a).

27                    <sup>112</sup> 48 Fed. Reg. 51400, 51410 (Nov. 8, 1983).

28                    <sup>113</sup> Basin Plan, p. II-1.00.

1 In sum, the Discharger's total ammonia nitrogen is violating water quality standards.  
2 These far-reaching effects adversely impact the River, the Delta, Suisun Bay, designated critical  
3 habitat for various listed species, distant water supply reservoirs, and municipal water treatment  
4 plants. These impacts mandate numeric nitrogen limits at least as stringent as those in the Permit.  
5 The rational basis for, and requirements of, the Permit's nitrogen limits, in the form of limits on  
6 total ammonia nitrogen and nitrate, are more particularly described in Sections V and VI, *infra*).

7  
8 **B. Controlling Nitrogen To Protect Primary Productivity And Prevent Nuisance  
Is Consistent With NPDES Precedent**

9 Many other jurisdictions have limited discharges of nitrogen and other contaminants that  
10 affect primary productivity at the base of the food web. U.S. EPA began implementing the  
11 Chesapeake Bay Total Maximum Daily Load (TMDL) program in 2005, which limits the  
12 discharge of nitrogen and phosphorous by municipal (including 402 municipal wastewater  
13 facilities) and industrial sources from Maryland, Virginia, Delaware, West Virginia,  
14 Pennsylvania, New York, and Washington, D.C. to address excessive nutrient loading to  
15 Chesapeake Bay.<sup>114</sup> These limits are necessary to achieve dissolved oxygen criteria, as well as  
16 other criteria, set for Chesapeake Bay.<sup>115</sup>

17 The Blue Plains Wastewater Treatment Plant, which falls within the Chesapeake Bay  
18 program, employs nitrification/denitrification technology to remove and limit nitrogen as a  
19 nutrient from its discharge.<sup>116</sup> As part of the Chesapeake Bay program, the Blue Plains facility is  
20 undergoing a major upgrade to further reduce the Treatment Plant's nutrient loading to the  
21 Chesapeake Bay watershed.<sup>117</sup>

22 Similarly, permits have been upheld that have imposed strict restrictions on nitrogen

23  
24 <sup>114</sup> U.S. EPA, Region 3, "Progress on Reducing Pollution from Wastewater Facilities," *available*  
*at* <http://www.epa.gov/reg3wapd/npdes/index.htm> (last visited April 18, 2011).

25 <sup>115</sup> *Id.*

26 <sup>116</sup> U.S. EPA Final Fact Sheet, NPDES Permit Reissuance, NPDES Permit No. DC0021199 at 7  
27 (Aug. 31, 2010).

28 <sup>117</sup> *Id.*

1 discharges. For example, the U.S. EPA’s Environmental Appeals Board (EAB) recently upheld a  
 2 5.0 mg/L monthly average total nitrogen limit for the months of May – October for the Upper  
 3 Blackstone Water Pollution Abatement District, based on eutrophication effects seen in the  
 4 Seekonk and Providence Rivers and Narragansett Bay from municipal wastewater discharges,  
 5 which in turn lead to violations of Rhode Island water quality standards.<sup>118</sup> The EAB found the  
 6 eutrophication in the region is “adversely affecting the composition of fish and wildlife; adversely  
 7 affecting the physical, chemical or biological integrity of the habitat; and causing dissolved  
 8 oxygen to drop well below 5.0 mg/L. The effects of eutrophication, including [nuisance] algae  
 9 blooms and fish kills, are also interfering with the designated uses of the water.”<sup>119</sup> The EAB also  
 10 found no evidence challenging the conclusion that the predominant sources of nitrogen to the  
 11 watershed were municipal wastewater treatment facilities in Rhode Island and Massachusetts.<sup>120</sup>

12 The District’s references to uncertainty or lack of precision in the  
 13 Region’s determination of the District’s contribution to the problem  
 14 relative to the contributions of non-point sources of nitrogen and  
 15 other municipal waste treatment plants are simply insufficient to  
 16 overcome the substantial weight of scientific evidence in the record  
 17 that, even if the precise relative contribution is uncertain, the  
 18 District’s discharges are a significant contributor of nitrogen to the  
 19 Blackstone River, which discharges to the Seekonk and Providence  
 20 Rivers, thereby contributing to those rivers’ nitrogen-driven  
 21 eutrophication problem that frequently violates Rhode Island’s  
 22 water quality criteria.<sup>121</sup>

23 Similarly, in Mount Hope Bay, Somerset, Massachusetts, the EAB upheld thermal  
 24 discharge requirements in the NPDES Permit for the Brayton Point Station power plant based on  
 25 primary productivity concerns.<sup>122</sup> The permittee had requested a variance to thermal discharge  
 26 Permit requirements, but the agency rejected the variance in part due to the “negative effects on  
 27

28 <sup>118</sup> *In re Upper Blackstone Water Pollution Abatement District*, slip op., \_\_\_ E.A.D. \_\_\_, 2010  
 WL 2363514 (E.A.D. May 28, 2010).

<sup>119</sup> *Id.* at \*27 (citation omitted).

<sup>120</sup> *Id.* at \*30 (quotations and citations omitted).

<sup>121</sup> *Id.* at \*32.

<sup>122</sup> *In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490 (2006).

1 the phytoplankton (i.e., absence of the normal winter-spring phytoplankton bloom, appearance of  
 2 nuisance algal blooms).”<sup>123</sup> The agency found that the proposed variance would not  
 3 “significantly relieve any of these impacts.”<sup>124</sup>

4 The above cases join a long history of precedent recognizing the need to impose effluent  
 5 limitations to protect primary productivity in watersheds from the effects of excessive nutrient  
 6 loading.<sup>125</sup>

7  
 8 **VI. THE TOTAL AMMONIA NITROGEN LIMITS IN THE PERMIT ARE APPROPRIATE**

9 The Discharger spends dozens of pages in its Petition fly-specking the Regional Board’s  
 10 findings and supporting science on total ammonia nitrogen.<sup>126</sup> These criticisms are groundless.  
 11 Stripped of the confusion sowed by the Discharger, the Regional Board has in fact followed a  
 12 simple, two-step analysis with which this Board is very familiar. First, the Regional Board  
 13 determined the end-of-pipe water quality based effluent limitations for total ammonia nitrogen.  
 14 Second, the Regional Board properly exercised its discretion to deny Discharger’s request for a  
 15 mixing zone.

16 **A. The Regional Board Properly Established a Water Quality Based Effluent  
 17 Limitation (WQBEL) for Total Ammonia Nitrogen**

18 The Regional Board properly set a WQBEL for total ammonia nitrogen. NPDES permits  
 19 must include effluent limitations for all pollutants that are or may be discharged at levels that  
 20 have the reasonable potential to cause or contribute to an exceedance of a narrative water quality  
 21 standard.<sup>127</sup> Water quality standards are established to protect the beneficial uses of state waters,

22 <sup>123</sup> *Id.* at 554.

23 <sup>124</sup> *Id.* at 555.

24 <sup>125</sup> See *Montgomery Environmental Coalition v. Costle*, 646 F.2d 568, 575 (D.C. Cir. 1980) (with  
 25 respect to the Potomac River, “[e]xcessive nutrient levels degrade water quality both because the  
 26 proliferation of algae is itself a nuisance and because algae respiration and subsequent death and  
 decay use up oxygen dissolved in the river’s waters”); *U.S. v. Smithfield Foods*, 972 F. Supp. 338,  
 346 (E.D. Va. 1997) (discharge of phosphorus and nitrogen impair organisms “which participate  
 in metabolic activities of the estuaries and serve as food for fish.”).

27 <sup>126</sup> The limits are on total ammonia, the bulk of which is ionized total ammonia.

28 <sup>127</sup> 40 C.F.R. § 122.44(d)(1)(i).

1 including freshwater habitat, and the spawning, reproduction, development, and/or migration of  
 2 aquatic life.<sup>128</sup> The water quality objectives established by the Basin Plan include the narrative  
 3 standard that “all waters shall be maintained free of toxic substances in concentrations that  
 4 produce detrimental physiological responses in human, plant, animal or aquatic life.”<sup>129</sup>

5 The Regional Board reasonably concluded that the Discharger’s untreated total ammonia  
 6 nitrogen “has a reasonable potential to cause or contribute to an exceedance of the Basin Plan’s  
 7 narrative toxicity objective in the receiving water.”<sup>130</sup> The Clean Water Act provides three  
 8 options for setting limits to determine if a narrative standard is being exceeded:

9  
 10 Where a State has not established a water quality criterion for a  
 11 specific chemical pollutant that causes, has the reasonable potential  
 12 to cause, or contributes to an excursion above a narrative criterion  
 within an applicable State water quality standard, the permitting  
 authority must establish effluent limits using one or more of the  
 following options:

13 (A) . . . using a calculated numeric water quality criterion.  
 14 . . . Such a criterion may be derived using a proposed State  
 15 criterion, or an explicit State policy or regulation  
 interpreting its narrative water quality criterion,  
 supplemented with other relevant information . . . ; or

16 (B) . . . on a case-by-case basis, using EPA’s criteria  
 17 guidance under CWA section 304(a), supplemented where  
 necessary by other relevant information; or

18 (C) [using] an indicator parameter for the pollutant of  
 19 concern. . . .<sup>131</sup>

20 Thus, while effluent limits “must” be set, any “one or more” of the three “options” could  
 21 be applied when setting them.

22 In the Permit, the Regional Board applied Option (B), “using EPA’s criteria guidance” for  
 23 total ammonia nitrogen – the National Recommended Ambient Water Quality Criteria for the  
 24 Protection of Freshwater Aquatic Life for Total Ammonia (1999) – to calculate an average

25 <sup>128</sup> Basin Plan II-1.00 - 2.00.

26 <sup>129</sup> Basin Plan III.8.01.

27 <sup>130</sup> Permit at F-55.

28 <sup>131</sup> 40 C.F.R. § 122.44(d)(1)(vi)(A)-(C).

1 monthly ammonia effluent limitation (1.8 mg/L<sup>-1</sup>) and maximum daily effluent limitation (2.2  
 2 mg/ L<sup>-1</sup>).<sup>132</sup> Following the procedures in the SIP, the Regional Board then compared the  
 3 calculated effluent limits to the existing data.<sup>133</sup> Because Discharger does not remove total  
 4 ammonia nitrogen, its discharge is 10-20 times greater than the applicable limits; as such, the  
 5 discharge unquestionably has the “reasonable potential to cause or contribute to an exceedance”  
 6 of the narrative toxicity objective in the receiving water.<sup>134</sup>

7           In evaluating the “reasonable potential to exceed” and setting the effluent limits, the  
 8 Regional Board needed to go no further and, on that basis alone, the first step in the Regional  
 9 Board’s analysis should be affirmed. The Regional Board further supported the limits, however,  
 10 by reference to numerous studies and extensive data showing the serious harms caused to aquatic  
 11 life by the Discharger’s waste, including the work of Dr. Inge Werner, Dr. Swee Teh, Dr. Richard  
 12 Dugdale and his colleagues, and others.<sup>135</sup> That research, discussed below, provides further  
 13 support for the effluent limitations.

14           Discharger’s assertion that the Regional Board erred in setting the limits is clearly wrong  
 15 under the law.<sup>136</sup> Discharger asserts, incorrectly, that in setting effluent limitations, the “Regional  
 16 Board **must use** a calculated numeric water quality criteria derived from ‘ . . . a proposed state  
 17 criteria, or an explicit State policy or regulation interpreting narrative water quality criterion  
 18 . . . .’<sup>137</sup> As outlined, however, there are three **options** for a permitting authority to apply in setting  
 19 the effluent limits. Nothing required the Regional Board to use the option the Discharger cites.  
 20 The Regional Board’s use of Option (B) is perfectly proper and lawful.

21 \_\_\_\_\_  
 22 <sup>132</sup> Permit at F-54-57 (developing limits using the “NAWQC for the protection of freshwater  
 23 aquatic life . . .”). *See also* Regional Board Staff Response to Comments (RTC) at 18 (“The  
 ammonia limits in the tentative permit were developed to meet the 1999 U.S. EPA ammonia  
 criteria at the end of pipe without dilution.”).

24 <sup>133</sup> SIP § 1.3, Appx 2 (flowchart).

25 <sup>134</sup> *See* Staff RTC at 18, Table 1.

26 <sup>135</sup> *See* Permit, Attachment J.

27 <sup>136</sup> *See* Petition at 78-81.

28 <sup>137</sup> *See* Petition at 79 (emphasis added); *see also* Petition at 111-112 (repeating argument).

1           The Discharger also cites the Basin Plan and argues that research by Dr. Teh, Dr.  
 2 Dugdale, and others should not have been considered because it is not “relevant and appropriate.”  
 3 This contention is frivolous. The Basin Plan directs that, when regional boards “evaluate  
 4 compliance with the narrative water quality objectives” the boards may consider:

5                           on a case-by-case basis, direct evidence of beneficial use impacts,  
 6 all material and relevant information submitted by the discharger  
 7 and other interested parties, and relevant numerical criteria and  
 8 guidelines developed and/or published by other agencies and  
 9 organizations . . . . [T]he Board evaluates whether the specific  
 10 numerical criteria, which are available through these sources and  
 11 through other information supplied to the Board, are relevant and  
 12 appropriate to the situation at hand and, therefore, should be used in  
 13 determining compliance with the narrative objective.<sup>138</sup>

14           This direction in the Basin Plan is designed to give the Board the ability to evaluate a  
 15 range of additional information and then to use its judgment to consider whether the information  
 16 is relevant “to the situation at hand.” The “situation at hand” is whether the daily dumping of 14  
 17 tons of total ammonia nitrogen has the potential to cause or contribute to violations of water  
 18 quality standards and impact beneficial uses. Dr. Teh has done toxicity testing evaluating the  
 19 impacts of total ammonia nitrogen and the Discharger’s effluent on copepods that are essential to  
 20 the food web in the River and Delta, concluding the total ammonia nitrogen is acutely toxic and  
 21 disruptive to the reproductive life cycle at levels present in the River.<sup>139</sup> Dr. Dugdale similarly  
 22 has evaluated the effect of total ammonium on the uptake of nitrate by phytoplankton, concluding  
 23 the ammonium is preventing spring blooms that help feed aquatic life in the Delta.<sup>140</sup> The  
 24 Regional Board would have abused its discretion had it not recognized this work to be relevant  
 25 and appropriate for consideration.

26           The Discharger appears to be arguing that the Regional Board is obligated to conduct a  
 27 separate and distinct analysis on each shred of information presented to it, and commits error if it  
 28 does not. This strained interpretation is inconsistent with the plain language of the Basin Plan –

<sup>138</sup> *Id.* Basin Plan at IV-17.00 (4th Ed.).

<sup>139</sup> Permit at Attachment J; *see also* Declaration of Dr. Swee Teh (“Teh Decl.”), Exhibits 1-6.

<sup>140</sup> Permit at Attachment J; *see also* Report of Dugdale, Wilkerson and Parker.

1 where “case-by-case” logically refers to each permit action; not each piece of evidence – and also  
 2 would turn the substantial evidence test on its head. Here, the Regional Board weighed and  
 3 evaluated supplemental information, including the work of Dr. Teh and Dr. Dugdale, as described  
 4 in a separate Attachment to the Permit. (Permit, Attachment J.) The Basin Plan does not require  
 5 more.

6 The Discharger wholly has failed to establish any error in setting the total ammonia  
 7 nitrogen WQBEL. Under the Clean Water Act, setting an effluent limit, including deciding what  
 8 information may be “relevant” in making that determination, falls squarely within the permitting  
 9 authority’s discretion and technical expertise.<sup>141</sup> That is precisely what the State Board has  
 10 directed Regional Boards to do in the SIP – exercise their informed discretion and determine what  
 11 information to consider.<sup>142</sup>

12 **B. The Regional Board’s Denial Of A Total Ammonia Nitrogen Mixing Zones**  
 13 **Was Proper**

14 The Regional Board has broad discretion to accept or deny mixing zones and dilution  
 15 credits.<sup>143</sup> Here, because the Regional Board fully explained its decision and based it on the facts

16 <sup>141</sup> See, e.g., *In Re: Upper Blackstone Water Pollution Abatement District*, NPDES Permit No.  
 17 MA 0102369, 2010 WL 2363514 (EAB May 28, 2010).

18 <sup>142</sup> SIP at 5 (when setting WQBELs, “the RWQCB shall use all available, valid, relevant,  
 19 representative data and information, as determined by the RWQCB” and “shall have discretion to  
 20 consider if any data are inappropriate or insufficient for use in implementing this Policy.”). See  
 21 *In Re: Upper Blackstone, supra* (“As such, the petitioner bears a particularly heavy burden to  
 22 establish clear error or an abuse of discretion because the [EPA Environmental Appeals] Board  
 23 generally defers to the permit issuer on questions of technical judgment.”); *American Paper  
 Institute, Inc. v. EPA*, 996 F.2d 346, 351 (D.C. Cir. 1993) (“a permit writer will inevitably have  
 some discretion in applying the criteria to a particular case.”); *In re: City of Attleboro, Ma  
 Wastewater Treatment Plant*, Permit No. MA 0100595, 2009 WL 2985479 (EAB Sept. 15, 2009)  
 (citing *In re Town of Ashland Wastewater Treatment Facility*, 9 E.A.D. 661, 667 (EAB 2001))  
 (“the [Environmental Appeals] Board generally gives substantial deference to the permit issuer on  
 questions of technical judgment.”).

24 <sup>143</sup> SIP § 1.4.2 at 15 (“The allowance of mixing zones is discretionary...”); see, e.g., *In the Matter  
 25 of the Petition of Sacramento County*, WQO 2003-0014, 2003 WL 25914833, at \*4 (Sept. 16,  
 26 2003) (the Regional Board acted within its discretion in not including a “mixing zone” for  
 27 compliance with groundwater limitations); *In the Matter of the Petition of City of Stockton*, WQO  
 2003-0002, 2003 WL 25914826, \*2 (March 19, 2003) (Regional Board did not abuse its  
 28 discretion in denying mixing zone where the Regional Board identified numerous factors in its  
 decision to reject the Petitioner’s flow studies and deny dilution credits); *In the Matter of the  
 Petitions of Napa Sanitation District, Bay Area Clean Water Agencies, and San Francisco  
 Baykeeper*, WQO 2001-16, 2001 WL 1773995, \*10 (Dec. 5., 2001) (“In all cases, the Regional

1 of the discharge, the decision is entitled to deference and should be upheld by this Board.<sup>144</sup>

2 **1. The Regional Board's Reliance on SIP Criteria When Denying the**  
 3 **Mixing Zone Request Was Proper**

4 The Regional Board correctly found that a mixing zone for total ammonia nitrogen was  
 5 not warranted under the California SIP. The SIP provides that certain "conditions must be met"  
 6 before "allowing a mixing zone."<sup>145</sup> For one, a mixing zone "shall not" cause or compromise  
 7 specific listed conditions.<sup>146</sup> Further, the SIP directs that the permitting authority "shall deny or  
 8 significantly limit a mixing zone and dilution credit as necessary to protect beneficial uses, meet  
 9 the conditions of this Policy, or comply with other regulatory requirements. Such situations may  
 10 exist based upon the quality of the discharge, hydraulics of the water body, or the overall  
 11 discharge environment."<sup>147</sup>

12 Following the SIP, the Regional Board examined an extensive body of literature and  
 13 concluded that, to protect beneficial uses, the total ammonia nitrogen WQBEL must be met at the  
 14 discharge point.<sup>148</sup> The Board listed 11 reasons for its decision. Generally, these include the  
 15 following:

- 16 • Research indicates the total ammonia nitrogen from the Discharger is found in the  
 17 River downstream at levels that are acutely/chronically toxic to native copepods many  
 18

---

19 Boards have the discretion to determine whether or not a mixing zone and dilution credits are  
 20 appropriate for a discharge." A regional board's decision to deny a mixing zone is thus entitled  
 21 to deference so long as the regional board has explained the basis for the denial. *In the Matter of*  
*the Petition of Yuba City*, WQO 2004 – 0013, 2004 WL 1859680, \*7 (July 22, 2004).

22 <sup>144</sup> In *Yuba City*, cited by the Discharger, Petition at 200, although the State Board held that the  
 23 Regional Board erred in denying a mixing zone, it did so because the State Board concluded that  
 24 "the Regional Board did not consider the City's submittals prior to adopting the Permit." *Id.* at  
 25 \*7. In contrast, here, the Regional Board has thoroughly considered the Discharger's submissions  
 26 and has explained its denial of a mixing zone (for total ammonia).

27 <sup>145</sup> SIP § 1.4.2.2 at 17.

28 <sup>146</sup> SIP § 1.4.2.2(A)(1)-(11).

<sup>147</sup> SIP § 1.4.2.2(B) at 17.

<sup>148</sup> F-41; F-54 to F-58, Attachment J; *see also* F-91 to F-94.

1 miles beyond the requested mixing zone.<sup>149</sup> This pervasive, toxic loading is a major  
 2 stressor to the health of the ecosystem and thereby compromises beneficial uses across  
 3 the water body.

- 4 • Research indicates the total ammonium from the Discharger is found in the River  
 5 downstream at levels that inhibit nitrate uptake by diatoms, preventing phytoplankton  
 6 blooms that support a healthy ecosystem. These impacts likewise occur many miles  
 7 downstream and into Suisun Bay – far beyond the requested mixing zone.<sup>150</sup>
- 8 • The Regional Board found the discharge consumes the assimilative capacity of oxygen  
 9 needed for aquatic life, which necessarily includes species listed under the federal and  
 10 state endangered species laws.<sup>151</sup>
- 11 • Further, the Regional Board referenced the evidence that the discharge is shifting the  
 12 food web that supports biologically sensitive aquatic life in the River and Delta by  
 13 altering the nitrogen to phosphorous ratio of nutrients.<sup>152</sup>

14 The Regional Board reasonably found the discharge would not satisfy the requirements  
 15 for a mixing zone outlined in the SIP, as it would (1) compromise the integrity of the entire water  
 16 body; (2) adversely impact biologically sensitive or critical habitats, including, but not limited to,  
 17 habitat of species listed under federal endangered species laws; and (3) produce undesirable or  
 18 nuisance aquatic life.<sup>153</sup>

19 The Discharger challenges this approach, arguing that even assuming there were  
 20 downstream effects, because the concentrations do not exceed the U.S. EPA’s 1999 Water  
 21 Quality Criteria for Ammonia, the Regional Board *had* to grant the request for a mixing zone.<sup>154</sup>

22 <sup>149</sup> Permit at F-56, J-1 to J-3.

23 <sup>150</sup> Permit at F-56, J-5 to J-7.

24 <sup>151</sup> Permit F-56 to F-57, J-8 to J-10.

25 <sup>152</sup> Permit F-56, J-5 to J-8.

26 <sup>153</sup> See Permit, citing SIP § 1.4.2.2(A)(1)-(11).

27 <sup>154</sup> Petition at 57-64.

1 This novel argument fails as a matter of law, because while the Regional Board may choose to set  
 2 the effluent limit based on the U.S. EPA criteria (Option B above), the SIP provides wholly  
 3 different standards for determining whether or not to allow a source to dilute its discharge in state  
 4 waters.<sup>155</sup> Nothing in the SIP – or any other provision of federal or state law – required the  
 5 Regional Board to put blinders on when making a mixing zone decision and consider only one  
 6 12-year old U.S. EPA criteria. Instead, the Regional Board properly retains the authority under  
 7 the SIP to decide whether or not there would still be “adverse effects to the overall water  
 8 body,”<sup>156</sup> including those listed in section 1.4.2.2(A)-(B).

9 The 12-year old criteria are not the most current scientific evaluation of the toxic effects  
 10 of total ammonia nitrogen, particularly on the species of concern in the Delta. At the August  
 11 2009 Ammonia Summit, Drs. Werner, Teh and Johnson each independently, and using different  
 12 methods, reported that the U.S. EPA 1999 Criteria are not fully protective of local species of  
 13 concern.<sup>157</sup> Further research (outlined in Permit Attachment J and supplemented below) confirms  
 14 that levels below the U.S. EPA 1999 Criteria are toxic to aquatic life. In deciding whether to  
 15 allow the Discharger to continue to dilute its waste in the Delta, it was not only appropriate to  
 16 look beyond the 12-year old criteria, it would be irresponsible to do otherwise.

## 17 **2. The Regional Board’s Decision To Deny A Mixing Zone Request Was** 18 **Well Supported By The Record**

19 The record fully and credibly supports the Regional Board’s decision not to grant the  
 20 requested mixing zone.<sup>158</sup> None of Discharger’s scattershot attacks on the extensive data and  
 21 research have merit.

22 <sup>155</sup> See SIP § 1.4.2.

23 <sup>156</sup> SIP, Appendix 1-3 (definition of mixing zone).

24 <sup>157</sup> See Werner, I. 2009. Effects of total ammonia and wastewater effluent associated  
 25 contaminants on Delta smelt. Oral Presentation at the Ammonia Summit, Rancho Cordova, CA,  
 26 August 18-19, 2009; Teh, S. J 2009. “Acute toxicity of ammonia, copper, and pesticides to key  
 27 copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary,” Oral  
 Presentation at the Ammonia Summit, Rancho Cordova, CA, August 18-19, 2009; Johnson, M.L.  
 2009. Species sensitivity distributions and exposure concentrations; placing recent results into  
 context. Oral Presentation at the Ammonia Summit, Rancho Cordova, CA, August 18-19, 2009.

28 <sup>158</sup> Permit at F-56 and Attachment J.

1                   **a.     The record documents that concentrations of total ammonia**  
 2                   **nitrogen downstream of the proposed mixing zone would**  
 3                   **present toxic and chronic impacts on aquatic life**

4                   The record strongly supports the decision to deny a mixing zone because the evidence  
 5 demonstrates the total ammonia nitrogen discharge is toxic to copepods and fish at levels  
 6 observed far downstream of the discharge.<sup>159</sup>

7                   Scientific data in the record and analyzed by Professor Swee Teh and his colleagues at the  
 8 University of California – Davis,<sup>160</sup> for example, demonstrates that the enormous daily loadings  
 9 of total ammonia nitrogen are causing acute and chronic toxicity impacts on aquatic life in the  
 10 River and Delta.<sup>161</sup> Dr. Teh’s initial tests on Sacramento River water at Hood Station 8 miles  
 11 downstream, conducted in 2008, showed 95% mortality to *Eurytemora affinis*, a Delta copepod  
 12 and food for Delta smelt.<sup>162</sup> Additional 96-hour toxicity tests in 2009 documented that  
 13 concentrations of total ammonia nitrogen and copper in Delta water collected many miles  
 14 downstream from the proposed mixing zone exceed the lethal concentration for the Delta

15 <sup>159</sup> See Permit at J-1 to J-4; Staff Response to Comments at 18, Central Valley Regional Water  
 16 Quality Control Board Meeting – December 9, 2010 (Staff RTC); see also Water Agencies’  
 17 Comments at 9-11 (citing literature).

18 <sup>160</sup> Professor Teh is a PhD in Comparative Pathology and a Research Toxicologist and Pathologist  
 19 in the Department of Anatomy, Physiology, and Cell Biology at the University of California -  
 20 Davis. He is the Interim Director of the Aquatic Toxicology Laboratory at the UC-Davis School  
 21 of Veterinary Medicine, and a UC-Davis Faculty Member for the Graduate Group in 1)  
 22 Agricultural and Environmental Chemistry, 2) Ecology, and 3) Pharmacology and Toxicology, at  
 23 the Center for Aquatic Biology and Aquaculture, the Center for Health and the Environment, and  
 24 the John Muir Institute of Environment. Teh Decl. Exhibit 1.

25 <sup>161</sup> The relevant work include Dr. Teh’s presentation at the Ammonia Summit at Central Valley  
 26 Regional Water Board [http://www.waterboards.ca.gov/centralvalley/water\\_issues/delta\\_water\\_](http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/index.shtml)  
 27 [quality/ambient\\_ammonia\\_concentrations/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/index.shtml) (August 18-19, 2009), Teh Decl.  
 28 Exhibit 2; Werner, et al., Pelagic Organism Decline (POD): Acute and Chronic Invertebrate and  
 Fish Toxicity Testing in the Sacramento-San Joaquin Delta 2008-2010, Final Report Submitted to  
 the California Department of Water Resources (July 24, 2010), Teh Decl. Exhibit 3; Full Life-  
 Cycle Bioassay Approach to Assess Chronic Exposure of *P. forbesi* to Ammonia/Ammonium to  
 the Delta Pelagic Organism Decline Contaminants Work Team (July 2010), Teh Decl. Exhibit 4;  
 Letter from S. Teh to C. Foe (November 10, 2010), Teh Decl. Exhibit 5; S. Teh, et al., Final  
 Report, Full Life-Cycle Bioassay Approach to Assess Chronic Exposure of *Pseudodiaptomus*  
*forbesi* to Ammonia/Ammonium – Submitted to C. Foe and M. Gowdy (March 4, 2011), Teh  
 Decl. Exhibit 6.

<sup>162</sup> Permit at J-4.

1 copepods *P. forbesi* and *E. affinis*.<sup>163</sup> In follow-up 31-day full-life cycle chronic toxicity studies,  
 2 which Dr. Teh reported at the July 6, 2010, Interagency Ecological Program (IEP) Contaminant  
 3 Work Team meeting, Dr. Teh found that *P. forbesi* reproduction and survival was negatively  
 4 affected by total ammonia nitrogen concentrations as low as 0.36 mg/L.<sup>164</sup> Total ammonia  
 5 nitrogen concentrations at such levels were present in 2009 and 2010 up to *30 miles downstream*  
 6 of the discharge.<sup>165</sup> Given these results, it is entirely reasonable to reject the Discharger's request  
 7 for a mixing zone.

8 The Discharger claims Dr. Teh's 96-hour toxicity tests used a pH of 7.2 that allegedly was  
 9 not representative, asserting that the average River pH is 7.8.<sup>166</sup> This criticism is groundless  
 10 because the pH of 7.8 is at most an *average* value during a period of time. The record establishes  
 11 that the River pH has in fact ranged to 7.2 and lower, meaning the copepods are exposed to total  
 12 ammonia nitrogen at the lower pH. As Dr. Teh explains:

13 The actual pH in the River and the discharge fluctuates over time  
 14 and so the actual pH is both lower and higher than 7.8. In fact, the  
 15 pH value between April 1, 2009 and August 31, 2009 from the  
 16 California Data Exchange Center ([http://cdec.water.ca.gov/cgi-  
 17 progs/staMeta?station\\_id=SRH](http://cdec.water.ca.gov/cgi-progs/staMeta?station_id=SRH) for Sacramento River at Hood is  
 7.33±0.12. The mean ± Standard deviation pH value during the 30  
 days period in July 2009 for Sacramento River at Hood is  
 7.22±0.08.<sup>167</sup>

18 Thus, there are substantial periods of time when the average pH is at the 7.2 pH level. In  
 19 fact,

20 \_\_\_\_\_  
 21 <sup>163</sup> Permit at J-2; Teh Decl. at ¶ 6 and Exhibit 3 Werner, et al., Pelagic Organism Decline (POD):  
 22 Acute and Chronic Invertebrate and Fish Toxicity Testing in the Sacramento-San Joaquin Delta  
 2008-2010, Final Report Submitted to the California Department of Water Resources (July 24,  
 2010).

23 <sup>164</sup> Permit at J-2 to J-3; Teh Decl. ¶ 9 and Exhibit 4.

24 <sup>165</sup> Permit at J-3; Teh Decl. ¶ 14 and Exhibit 5 (total ammonia nitrogen exceeded 0.36 mg/L in  
 25 *44% of the samples* collected between Hood and Isleton in 2009-2010). *See also* Data provided  
 26 by Chris Foe, Central Valley Regional Water Quality Control Board, collected between March  
 2009 and February 2010; *and* Permit at J-2 to J-3.

27 <sup>166</sup> Petition at 74, 77.

28 <sup>167</sup> Teh Decl. ¶ 11.

1 the pH in the Sacramento River at R3 below the treatment plant  
 2 **ranges to 7.2 and lower over 20% of the time.** That indicates the  
 3 unsafe, toxic effects from the ammonia-nitrogen concentration I  
 4 observed would have been present over 20% of the time and  
 5 thereby interfered with the normal growth, survival, and  
 6 propagation of the *P. forbesi* in the receiving water.<sup>168</sup>

7 Dr. Teh repeated his analysis and observed toxic effects at a higher pH of 7.8, finding that  
 8 “conditions with a pH of 7.8 and a total ammonia nitrogen concentration of 0.73 mg/L would be  
 9 toxic to *P. forbesi*.”<sup>169</sup> These levels are present in the River outside of the mixing zone a  
 10 significant percentage of the time. According to the Discharger’s own data “from January 2005  
 11 to April 2010, the total ammonia nitrogen concentration in the Sacramento River at R3, 4,200 feet  
 12 below the Treatment Plant and well outside the Discharger’s proposed mixing zone of 350 feet,  
 13 exceeds 0.73 mg/L nearly 20% of the time. The river pH was 7.8 or lower on all occasions when  
 14 the total ammonia nitrogen level exceeded 0.73 mg/L.”<sup>170</sup>

15 Despite the fact that Dr. Teh has been performing toxicity tests for two decades, the  
 16 Discharger criticizes Dr. Teh’s testing for using a copepod from the Delta, *P. forbesi*, known to  
 17 be important to the pelagic food web. Apparently, the Discharger would rather that Dr. Teh used  
 18 a test species of little relevance, or one not even native to the Delta. This criticism is without  
 19 merit. For example, a report that Petitioner cites, Meyer et al. (2009) (cited at Petition at 104),  
 20 expressly recommends conducting acute and chronic toxicity tests with major prey items of the  
 21 POD species such as the copepod *E. affinis*.<sup>171</sup> As Dr. Teh explains:

22 These are well-established toxicity test protocols, which I followed,  
 23 and there is no scientific basis that precludes using the EPA method  
 24 to test the toxic effects on an organism other than those specified in  
 25 the methods. In this instance, as we wanted to test the specific  
 26 effect on aquatic organisms of particular concern in the Delta, it

27 <sup>168</sup> Teh Decl. ¶ 11 (emphasis added). A pH less than 7.2 occurred in 24% of the samples between  
 28 January 2005 and April 2010. See data file provided by Kathy Harder, Regional Board, entitled  
 “Compilation of SRCSD Effluent and Receiving Water Concentration Data,” (July 13, 2010).

<sup>169</sup> Teh Decl. at ¶ 12 and Exhibit 6.

<sup>170</sup> Teh Decl. at ¶ 12.

<sup>171</sup> Meyer, J.S., P. J. Mulholland, H. W. Paerl, and A. K. Ward. 2009. “A Framework for research  
 addressing the role of ammonia/ammonium in the Sacramento-San Joaquin Delta and the San  
 Francisco Bay Estuary ecosystem.” Report to CalFed Science Program at p. 12.

1           only made sense to use a copepod that is a central part of the Delta  
2           food web.<sup>172</sup>

3           The genesis of this work by Dr. Teh was a group of nationally recognized experts who  
4           urged that this very type of testing should be done. As Dr. Teh explains, “testing a Delta copepod  
5           that was part of the underlying food web was needed in order to evaluate the overall effect of  
6           ammonia on aquatic life in the Delta. *A Framework for Research Addressing the Role of*  
7           *Ammonia/Total ammonia in the Sacramento-San Joaquin Delta and the San Francisco Bay*  
8           *Estuary Ecosystem* 12 (April 13, 2009) (“ . . . analogous acute and chronic toxicity tests should be  
9           conducted with major prey items of the POD species”).<sup>173</sup>

10          The assertion that an aquatic life criterion for total ammonia nitrogen should be based  
11          solely on ambient *un-ionized* ammonia is likewise groundless.<sup>174</sup> Having created that straw man,  
12          the Discharger then claims there is no cause for concern, because the reported ambient *un-ionized*  
13          ammonia concentrations in the River outside the mixing zone are below the 72-hour effects  
14          observed.<sup>175</sup> This analysis is misleading and wholly irrelevant. The reason is simple: *Un-ionized*  
15          ammonia is only a small fraction of the total ammonia-nitrogen to which organisms are exposed  
16          in the River and Delta. In fact, “*almost all of the total ammonia in the Sacramento River (98-*  
17          *99%) is ionized ammonia.*”<sup>176</sup> Using only the un-ionized fraction would exclude from testing the  
18          vast majority of the total ammonia nitrogen dumped by Discharger. That would be nonsensical,  
19          as “organisms are in fact exposed to total ammonia, and not just the unionized fraction.”  
20          “[W]here the actual results demonstrate that the “*total ammonia concentrations . . . affected the*  
21          *survival and reproduction of P. forbesi,*” it is that total ammonia that should be evaluated.<sup>177</sup>

22          <sup>172</sup> Teh Decl. ¶ 13.

23          <sup>173</sup> Teh Decl. ¶ 13.

24          <sup>174</sup> Petition at 75-76.

25          <sup>175</sup> Petition at 77. Even using un-ionized ammonia, the chronic criteria for *P. forbesi* are  
26          exceeded in 13% of the samples from R3-1, 4,200 feet downstream of the point of discharge and  
27          well outside the Discharger’s requested chronic mixing zone of 350 feet, between 2005 and 2010  
28          (criteria=0.006 un-ionized ammonia).

29          <sup>176</sup> Teh Decl. ¶ 16 (emphasis added).

30          <sup>177</sup> Teh Decl. ¶ 16. It would also be inconsistent with the 1999 Update of Ambient Water Quality



1           The Discharger’s attempt to exclude one aspect of Dr. Teh’s analysis should be rejected.  
 2 The Discharger objected at the December 9, 2010, hearing to the admission into the record of Dr.  
 3 Teh’s November 10, 2010 letter report to Dr. Chris Foe, a Regional Board Environmental  
 4 Scientist, arguing that the public comment period on the draft Permit had closed on October 8,  
 5 2010. The Regional Board overruled the objection and entered the letter report into the record, a  
 6 decision supported on multiple grounds as follows:

- 7           • Rebuttal Evidence: The Regional Board properly used Dr. Teh’s letter report to rebut  
 8 challenges to Dr. Teh made in the Discharger’s October 8, 2010, comments. Those  
 9 comments challenged the findings and conclusions Dr. Teh presented on July 6, 2010,  
 10 to the IEP Delta Pelagic Organism Decline (POD) Contaminants Work Team.<sup>181</sup> That  
 11 presentation contained data regarding test methods, results and conclusions. In its  
 12 October 8, 2010 comments, the Discharger proffered several objections to the results,  
 13 including how the studies were conducted.<sup>182</sup> In part in response to those objections,  
 14 Dr. Teh redid that work and reproduced the results, rebutting any inference that those  
 15 results were unreliable. As staff testified at the December 9 hearing, the letter report  
 16 confirmed

17                           [I]nformation . . . was presented to the contaminant work  
 18                           team meeting several months earlier. Essentially, the  
 19                           numbers have not changed. The organism did not change.  
 20                           We just redid the tests.<sup>183</sup>

- 21           • Report Addressed Discharger’s “Oral Talk” Objection: The Discharger complained  
 22 that Dr. Teh’s July presentation was an “oral talk,” suggesting that somehow that  
 23 made it an improper basis upon which the Regional Board might rely. The Discharger  
 24 cannot have it both ways – complain about an oral talk, and then object when the

25 <sup>181</sup> See Exhibit 4 to the Declaration of Dr. Swee Teh, submitted herewith.

26 <sup>182</sup> SRCSD letter to Kathleen Harder, CVRWQCB, Subject: SRCSD Comments and Evidence  
 27 regarding Tentative NPDES Permit, Time Schedule Order, and Permitting Options Circulated on  
 28 September 3, 2010. dated, October 11, 2010. at 38.

<sup>183</sup> Hearing Transcript at 410:21-411:1.

1 Regional Board responds to the criticism by furnishing a written document confirming  
2 what was said orally at an earlier time.

- 3 • Access To Written Presentation Underlying July “Oral Talk”: Dr. Teh’s oral  
4 presentation was complemented by a written presentation of which the Discharger was  
5 well aware. The Discharger’s expert, Dr. Diane Engle, indicated at the December  
6 hearing that Dr. Teh had emailed his presentation to a small group; in fact, it had been  
7 emailed to no less than four representatives of the Discharger, including Dr. Engle, on  
8 July 19, 2010. But the Discharger did not act on its knowledge, choosing instead to  
9 try to create an evidentiary issue.
- 10 ○ Dr. Engle apparently did not pursue the matter herself, despite having received  
11 a copy of the July presentation. Given Dr. Engle’s involvement with the IEP  
12 POD Contaminants Work Team and her work as a panel member at the Central  
13 Valley Regional Board’s Ammonia Summit, she had access to the study  
14 information and conclusions since early July 2010. As a recipient of the State  
15 Board’s Reg5 Delta Water Quality email distribution list, Dr. Engle would also  
16 have received the “2010 Ammonia Update” written by Dr. Chris Foe, and  
17 available on the Regional Board’s website on October 7, 2010, which  
18 contained reference to Dr. Teh’s study results.
  - 19 ○ Indeed, on October 7, 2010, Dr. Foe summarized the status of total ammonia  
20 nitrogen research since the Regional Board’s August 2009 Ammonia Summit.  
21 Part of the update included a summary of Dr. Teh’s presentation to the IEP  
22 Work Team. That summary clearly states that “. . . *P.forbesi* reproduction and  
23 nauplii survival was negatively affected by ammonia concentrations as low as  
24 0.36 mg-N/L.”<sup>184</sup> The update was provided nearly a week before the comment  
25 period for the September draft Permit expired. The Discharger had ample  
26 opportunity to raise questions regarding Dr. Teh’s findings or studies.

27  
28 <sup>184</sup> Foe, Chris, CV-RWQCB Letter to Jerry Bruns, CVRWQCB and Karen Taberski, SFB-  
RWQCB, Subject: 2010 Ammonia Update, October 7, 2010.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- *The Regional Board Independently Evaluated The Underlying Tests And Is Relying On Its Own Expertise – Not Solely On Dr. Teh’s:* The subject studies were conducted in conjunction with Dr. Foe, of the Regional Board, who is indentified on the July presentation as a co-presenter.<sup>185</sup> Dr. Foe testified that, “we have also gone to the lab, looked at the test methods, and reviewed the actual data.”<sup>186</sup> He confirmed that he independently reviewed the data from the studies.<sup>187</sup>
  - *Other Indicia of Trustworthiness:* As noted above, Dr. Teh is an experienced research and faculty member at the University of California, Davis. His letter report confirmed the results of earlier studies and also updated results of the continuing studies that were funded by the State Water Board researching the effects of total ammonia nitrogen on copepods. The Discharger is challenging a UC Davis professor collaborating with a Regional Board Ph.D. scientist, properly using State Water Board funding to test propositions very important to this Permit. The Regional Board acted properly in allowing the letter report which enabled the Regional Board members to act upon the most recent and relevant information.

17 Overall, the Discharger’s objection on the basis of fairness of process was properly

18 overruled. The Discharger had ample notice of Dr. Teh’s research and findings prior to the

19 December 2010 hearing; it had notice that the Regional Board was, in part, relying on his findings

20 and conclusions to support the Permit as was set forth in the September draft Permit. In

21 comments on the draft Permit, the Discharger addressed Dr. Teh’s July 2010 presentation and

22 attacked his conclusions. The Discharger had the opportunity to subpoena Dr. Teh for the hearing

23 to examine him regarding his conclusions, but failed to do so. At the hearing, the Regional

24 Board’s staff, as well as persons directly affected by or interested in the adjudicatory proceeding,

25 \_\_\_\_\_

26 <sup>185</sup> See Hearing Transcript at 410:21 – 411:1.

27 <sup>186</sup> Hearing Transcript at 411:5-6.

28 <sup>187</sup> Hearing Transcript at 410:21 – 411:10.

1 may present evidence. The staff and the other persons are then subject to cross-examination.<sup>188</sup>  
 2 The Discharger had the opportunity to cross-examine Dr. Foe as to his assertion that Dr. Teh’s  
 3 November 10 letter was a corroboration of earlier studies and findings, and as to Foe’s assertion  
 4 that he independently examined the study methods and data to confirm the findings regarding the  
 5 affects of total ammonia nitrogen on *P. foresbi*. The Discharger did not engage in any cross-  
 6 examination of Dr. Foe as to his assertions and should therefore be estopped from asserting the  
 7 deprivation of an opportunity to do so. The Regional Board determination to overrule the  
 8 Discharger’s objections should be upheld.

9  
 10 **c. The ammonium is inhibiting nitrate uptake, contributing to low diatom abundance and reducing diatom primary production**

11 The Regional Board reasonably concluded that the Discharger should not be allowed to  
 12 dilute its effluent in a mixing zone because the ammonium is depressing primary productivity by  
 13 inhibiting nitrogen uptake by diatoms and reducing diatom productivity and biomass.<sup>189</sup> Regional  
 14 Board monitoring data demonstrate that while “[a]nnual average ammonia concentrations  
 15 increased 11.5-fold in the River downstream of the SRWTP,”<sup>190</sup> nitrate uptake essentially ceases  
 16 and primary production declines after the discharge.<sup>191</sup> The “primary productivity” of the  
 17 phytoplankton and zooplankton at the base of the Delta food web – essential to a healthy  
 18 ecosystem – has been depressed. Most of the world’s largest estuaries have a higher primary  
 19 productivity rate than the Delta,<sup>192</sup> and declines in several zooplankton species have followed the  
 20 observed declines in phytoplankton biomass as measured by chlorophyll *a* (“chl-*a*”). Research  
 21 indicates that Delta-wide chl-*a* levels are now low enough to limit zooplankton abundance,<sup>193</sup> and

22 <sup>188</sup> 23 Cal. Code Regs. § 648.5.1.

23 <sup>189</sup> See Permit at 56; J-5 to J-8.

24 <sup>190</sup> Permit at J-5.

25 <sup>191</sup> See Water Agencies’ Slide 40; Hearing Tr. 293:9-240:4. See also Dugdale Report at ¶¶ 20 and  
 26 21.

27 <sup>192</sup> Hearing Tr. at 125:5 to 125:9.

28 <sup>193</sup> Müller-Solger, A., A.D. Jassby and D.C. Müller-Navarra. 2002. Nutritional quality of food  
 resources for zooplankton (*Daphnia*) in a tidal freshwater system (Sacramento-San Joaquin River

1 zooplankton are an essential prey item for endangered fish species in the Delta, including the  
2 Delta smelt.<sup>194</sup>

3           The Delta’s algal species composition has shifted from diatoms to flagellates,  
4 cryptophytes and cyanobacteria, which are a lower quality food, and to invasive macrophytes  
5 such as *Egeria densa*.<sup>195</sup> The shift from diatoms to smaller celled phytoplankton results in a less  
6 efficient food web. Cloern and Dufford (2005) state, “[s]ize is important because many metazoan  
7 consumers, such as calanoid copepods, cannot capture small particles, including the nutritionally-  
8 rich nanoflagellates. . . .”<sup>196</sup> Recent studies in the Delta’s low salinity zone by Slaughter and  
9 Kimmerer (2010) observed lower reproductive rates and lower growth rates of the copepod,  
10 *Acartia* sp., in the low salinity zone compared to taxa in other areas of the estuary. They conclude  
11 that “[t]he combination of low primary production, and the long and inefficient food web have  
12 likely contributed to the declines of pelagic fish.”<sup>197</sup> Research has shown that “[t]he efficiency of  
13 energy transfer from phytoplankton to consumers and ultimate production at upper trophic levels  
14 vary with algal species composition: diatom-dominated marine upwelling systems sustain 50  
15 times more fish biomass per unit of phytoplankton biomass than cyanobacteria-dominated lakes.  
16 . . .”<sup>198</sup>

---

17  
18 Delta). *Limnol Oceanogr* 47(5):1468-1476.

19 <sup>194</sup> Sommer, T, C. Armor, R. Baxter, R. Breuer, L. Brown, M. Chotkowski, S. Culbertson, F.  
20 Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga and K. Souza.  
21 2007. The Collapse of Pelagic Fishes in the Upper San Francisco Estuary. *Fisheries* 32(6):270-  
22 277; Winder, M. and A.D. Jassby. In press. Shifts in zooplankton community structure:  
23 Implications for food web processes in the Upper San Francisco Estuary. *Estuaries and Coasts*.  
24 DOI 10.1007/s12237-010-9342-x.

25 <sup>195</sup> See Water Agencies’ June 1 Comments at 13.

26 <sup>196</sup> Cloern, J.E., and R. Dufford. 2005. Phytoplankton community ecology: principles applied in  
27 San Francisco Bay. *Mar. Ecol. Prog. Ser.* 285:11-28.

28 <sup>197</sup> Slaughter, A. and W. Kimmerer. 2010. Abundance, composition, feeding, and reproductive  
rates of key copepod species in the food-limited Low Salinity Zone of the San Francisco Estuary.  
Poster Presentation at the 6<sup>th</sup> Biennial Bay-Delta Science Conference, Sacramento, CA,  
September 27-29, 2010.

<sup>198</sup> Cloern and Dufford, 2005, *supra*.

1 To draw the connection to the Discharger, the Regional Board cited the work, among  
 2 others, of Drs. Richard Dugdale, Frances Wilkerson and Alexander Parker, from the Romberg  
 3 Tiburon Center, San Francisco State University, who have found ammonium concentrations from  
 4 the discharge are so high they “are suppressing nitrogen uptake and algal primary production in  
 5 both Suisun Bay and the Delta.”<sup>199</sup> “[A]mmonia begins to suppress nitrate assimilation and  
 6 primary production rates at 0.014 mg/L N with complete shutdown by 0.056 mg/L N,” equivalent  
 7 to 4µmol/L (4 micro moles/L).”<sup>200</sup> This has inhibited spring phytoplankton blooms, a crucial  
 8 food source for aquatic life in the Delta and estuary.

9 Dugdale and his colleagues found nitrogen uptake declined with increasing ammonium  
 10 concentrations in the five stations immediately downstream of the Treatment Plant and at Rio  
 11 Vista, far beyond the requested mixing zone.<sup>201</sup> Indeed, the annual average ammonium  
 12 concentrations at Chipps Island, 40 miles downstream, was 0.1 mg/L N in 2009 and 2010, almost  
 13 ten times the level that would begin to suppress nitrate uptake.<sup>202</sup> Primary production has not  
 14 only declined, but the remaining production has shifted to less desirable species.<sup>203</sup>

15 The Discharger criticizes the Regional Board’s reliance on the Dugdale work, arguing first  
 16 that because invasive clams could otherwise preclude a summer-fall bloom,<sup>204</sup> the 30,000 pounds

17 \_\_\_\_\_  
 18 <sup>199</sup> Permit at J-5 to J-6 (citing research by Dugdale et al 2007; Wilkerson et al 2006); *see also*  
 19 Water Agencies’ Slide 39. The Dugdale research team are well known experts in the field. Their  
 20 CVs are attached as Exhibit 1 to the Dugdale Report.

21 <sup>200</sup> Permit at J-6.

22 <sup>201</sup> *See* Parker, A.E., A.M. Marchi, J.Drexel-Davidson, R.C. Dugdale, and F.P. Wilkerson. 2010.  
 23 “Effect of Ammonium and Wastewater Effluent on Riverine Phytoplankton in the Sacramento  
 24 River, CA. Final Report. May 29, 2010. *See* Water Agencies’ Comments at 12; Wilkerson, F., R.  
 25 Dugdale, A. Marchi, and A. Parker. 2010. “Different response types of phytoplankton to  
 26 changing nutrient regimes in SF Bay/Delta: Bottom up effects of ammonium and nitrate.” Oral  
 27 Presentation at 6<sup>th</sup> Biennial Bay-Delta Science Conference, Sacramento, CA, September 27-29,  
 28 2010.

<sup>202</sup> Permit at J-5; *see* Hearing Tr. 123:34 to 124:1.

<sup>203</sup> Permit at J-7 (“larger algal cells (diatoms) are favored and grow faster in the nitrate-dominated  
 river above the SRWTP while smaller phytoplankton species (flagellates and blue green algae)  
 are competitively superior and grow faster at the higher ammonia levels present downstream of  
 the SRWTP.”)

<sup>204</sup> Petition at 84-85.

1 of total ammonia nitrogen per day should be left unregulated. Surely the Clean Water Act does  
2 not envision unlimited discharge of toxic discharges because the full benefits of removing the  
3 harmful discharge may not always be achieved at all times. This is not the first time the  
4 Discharger has argued for inaction on the basis that “existing conditions are already bad.”<sup>205</sup> The  
5 Superior Court in the CEQA case regarding the Discharger’s 2020 Master Plan rejected the  
6 argument that nutrient controls could be avoided where “significant impact may have been  
7 concealed” because the Discharger was discharging to waters already over-enriched.<sup>206</sup> The court  
8 relied on CEQA precedent that concluded such arguments “trivialize the project’s impact.”<sup>207</sup>

9 In this case, the clams are no excuse for the Discharger. It is undisputed that the clams are  
10 not abundant in the spring, and thus removing the total ammonia nitrogen would facilitate a  
11 spring bloom. These blooms would provide substantial benefit to the Delta ecosystem.<sup>208</sup> While  
12 clams could interfere with summer/fall blooms now, they may not be as abundant in the  
13 summer/fall in the future. This invasive species largely has disappeared in both South San  
14 Francisco Bay and in San Pablo Bay and may well undergo a similar decline in Suisun Bay. In  
15 addition, removing total nitrogen under the Permit may mitigate the effects of clams, as studies in  
16 other systems have shown that clams are most prevalent when the Nitrogen (N) to Phosphorus (P)  
17 ratio – the N:P ratio (discussed further, *infra*) – is high. Peer reviewed literature has shown that  
18 invasive clams and aquatic weeds invaded the Delta, the Potomac River and the Ebro River  
19 Estuary in Spain only when N:P ratios increased.<sup>209</sup> It has been observed in the Potomac River  
20 that as controls on total ammonia and nitrogen were implemented and the N:P ratio declined, the  
21 invasive clams receded and native grasses began to return.<sup>210</sup>

22 <sup>205</sup> CEQA SOD, at 21.

23 <sup>206</sup> CEQA SOD, at 21.

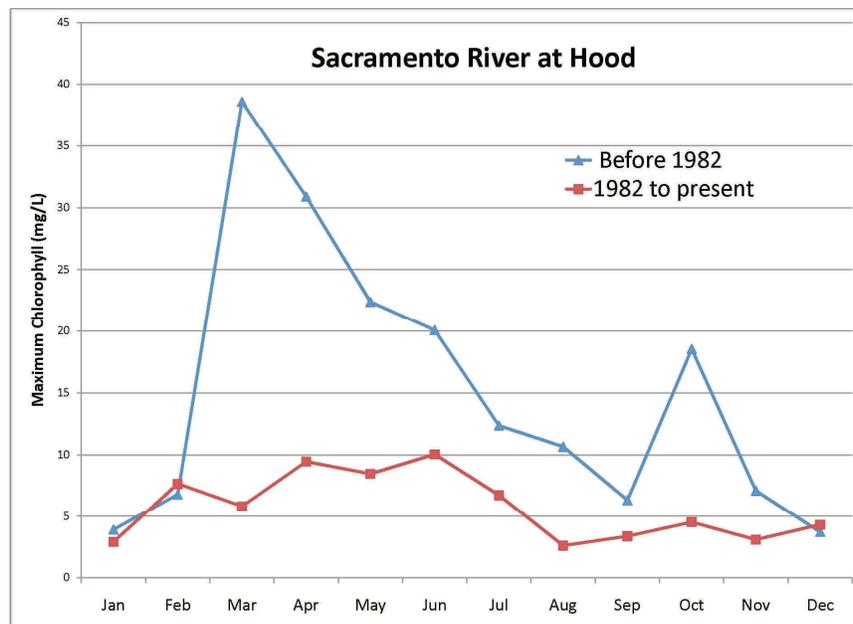
24 <sup>207</sup> CEQA SOD, at 21.

25 <sup>208</sup> Dugdale Report ¶ 4.

26 <sup>209</sup> See Water Agencies’ Comments at 20 (citing research by Glibert (2010), Ruhl and Rybicki  
27 (2010) and Ibanez et al (2008)).

28 <sup>210</sup> Slide 49, Water Agencies Hearing Presentation.

1 The claim that the spring blooms would be small, citing data from 1977-1986, is likewise  
 2 without merit.<sup>211</sup> Representative data indicate that spring blooms likely would be very  
 3 significant. Large spring blooms occurred *before* the Plant started-up (1982), and “for the period  
 4 1969 – 1977, Suisun Bay chlorophyll *a* concentrations were as high as 30-40 µg/L during  
 5 spring.”<sup>212</sup> Dugdale Report ¶ 5, Figure 2.<sup>213</sup> Spring blooms in the Sacramento River downstream  
 6 of the plant were also as high as 30-40 µg/L between 1975 and 1981, prior to the Treatment Plant  
 7 coming on line in 1982.



10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

Figure 1. Maximum monthly chlorophyll *a* concentrations measured in the Sacramento River at Hood prior to 1982 and from 1982 to present. Data is from the California Department of Water Resources Environmental Monitoring Program stations C3 and C3a from January 1975 through December 2010.

<sup>211</sup> Petition at 85-86 and SR Figure 4.

<sup>212</sup> Ball, M. and J. Arthur, Planktonic Chlorophyll Dynamics in the Northern San Francisco Bay and Delta, in T. Conomos, San Francisco Bay: The Urbanized Estuary. Pacific Division, American Association for the Advancement of Science, San Francisco at 265-285 (1979).

<sup>213</sup> Sacramento Regional’s Figure 4 (Petition at 86) is misleading. It uses *average* data during each month over the ten year period. Therefore, it does not depict the range of concentrations that actually occurred. Figure 1 in the Dugdale Report, attached, shows the range of concentrations; spring blooms during this same time period reached 30-40 µg L<sup>-1</sup>. Moreover, as the treatment plant started up in 1982, the earlier data from Ball and Arthur (cited by Dugdale) is more representative, Figure 2 in the Dugdale Report.

1 Consistent with the current Dugdale research, the spring blooms observed in 2000 and  
2 2010 when ammonium concentrations were low reached a comparable level to the historic spring  
3 blooms.<sup>214</sup> Moreover, “diatoms were the dominant phytoplankton during [the 1969-1977 blooms]  
4 and in 2000 and 2010.”<sup>215</sup> “[T]hese results strongly suggest that high chlorophyll *a*  
5 concentrations characteristic of the pre-1987 period should occur more frequently during spring if  
6 the low NH<sub>4</sub> conditions were restored to Suisun Bay.”<sup>216</sup> Unlike the recent blooms in Suisun  
7 Bay, Figure 1 above shows that there have not been any blooms in the Sacramento River region  
8 of the Delta since the Treatment Plant came on line, likely because ammonium concentrations  
9 have never been low enough for long enough to remove the inhibitory effect.

10 The Discharger misinterprets time series data of chlorophyll *a* and ammonium  
11 concentration in Suisun Bay from Dugdale *et al.* (2007).<sup>217</sup> Dugdale reported five periods from  
12 2000-2003 during which the ammonium concentration reached 4  $\mu$ M/L or lower in Suisun Bay.  
13 While a bloom did not occur in three of these five instances, each was *during the summer* when  
14 clam grazing, as Discharger itself alleges, was expected to discourage a bloom.<sup>218</sup> The fourth  
15 instance was during spring (Spring 2003), but the field program ended mid-spring without  
16 recording further data. Thus, there “are no data to support the assertion that 10  $\mu$ g/L was the peak  
17 chlorophyll, as that value could very well have represented the beginning of an upward slope in  
18 chlorophyll” as was observed in April 2000 when “ammonium reduced to 1.9  $\mu$ mol/L.”<sup>219</sup>

19 The Discharger erroneously disputes the relationship between the discharge and reduced  
20 phytoplankton growth by noting there is no dramatic step change in biomass (as measured by  
21

---

22 <sup>214</sup> Dugdale Report ¶ 7.

23 <sup>215</sup> Dugdale Report ¶ 5.

24 <sup>216</sup> Dugdale Report ¶ 7.

25 <sup>217</sup> Petition at 86-87.

26 <sup>218</sup> Dugdale Report ¶ 10.

27 <sup>219</sup> Dugdale Report ¶ 11.

1 chl-*a*) concentrations immediately after the discharge point (at River Mile 44).<sup>220</sup> But, biomass  
 2 measured after the discharge point includes the phytoplankton which have floated downstream, so  
 3 “the full effect of the discharge on biomass will not be seen until further downstream.”<sup>221</sup> The  
 4 data show that further “downstream of the treatment plant chlorophyll declines by up to 75%  
 5 compared to chlorophyll above the SRWWTP discharge.”<sup>222</sup> Even more important are the  
 6 phytoplankton process rates which do show a step change at the discharge point and are an  
 7 indication of the phytoplankton physiological health. Those data show “both primary production  
 8 rates and phytoplankton nitrogen uptake rates are suppressed in downstream stations . . . as  
 9 compared to rates above the discharge.”<sup>223</sup> Indeed, “beginning immediately downstream of the  
 10 SRWWTP diffuser, primary production and phytoplankton NH<sub>4</sub> uptake rates decline by 20 to  
 11 36% and NO<sub>3</sub> uptake decreases by 80%.”<sup>224</sup>

12 Pointing to data showing there are also declines in chlorophyll *a* upstream of the  
 13 Treatment Plant, the Discharger claims those data mean their daily discharge of 14 tons of total  
 14 ammonia nitrogen is not the cause of the decline in productivity, suggesting there is some  
 15 unknown upstream cause.<sup>225</sup> But, whether reductions in chlorophyll *a* have been observed in the  
 16 data collected above the discharge point is beside the point, at least absent evidence of a common  
 17 causative agent both upstream and downstream.<sup>226</sup> The Discharger identifies no such agent; its

18 \_\_\_\_\_  
 19 <sup>220</sup> Petition at 91-92 (and Figure 7).

20 <sup>221</sup> Dugdale Report ¶ 20.

21 <sup>222</sup> Dugdale Report ¶ 20, citing Parker, A.E., A.M. Marchi, J. Drexel-Davidson, R.C. Dugdale and  
 22 F.P. Wilkerson, 2010, “Effect of ammonium and wastewater effluent on riverine phytoplankton in  
 the Sacramento River, CA, Final Report to the State Water Resources Control Board.

23 <sup>223</sup> Dugdale Report ¶ 21.

24 <sup>224</sup> Dugdale Report ¶ 21, citing Parker *et al.*, 2010, *supra*.

25 <sup>225</sup> See Petition at 91-96.

26 <sup>226</sup> The reason for the decline in chlorophyll found at upstream stations is not well understood,  
 27 “although the input of freshwater from the American River (between I-80 and station “TOW;  
 Tower Bridge”) has been suggested to dilute chlorophyll in the Sacramento River. Additional  
 losses from zooplankton grazing or sinking of phytoplankton cells may also be important.”  
 28 Dugdale Report ¶ 22; see Water Agencies’ Comment at 15.

1 argument is non-scientific and speculative. What is relevant is that the total biomass and rate of  
2 nitrate, ammonium and carbon uptake are markedly lower downstream, as compared with  
3 upstream. That is well documented and supports a decision to deny a mixing zone.

4 The polluter even claims that its waste is facilitating phytoplankton growth.<sup>227</sup> Nothing  
5 could be further from the truth. To support its novel claim, Petitioner distorts “enclosure” or  
6 “grow-out” experiments presented by Dr. Parker,<sup>228</sup> claiming because the total biomass was  
7 higher in the enclosure containing downstream river water, the River was nitrogen limited and  
8 benefited from the discharge. However, the grow-out experiments are isolated from the natural  
9 river flows and biogeochemical processes, so they “cannot be used to assess nutrient limitation in  
10 a natural system.”<sup>229</sup> What they can assess is whether ammonium inhibits growth by measuring  
11 the nitrogen and carbon uptake rates, and, in these experiments, the tests showed the water  
12 collected from downstream of the discharge had a lower nitrate, ammonium and carbon uptake  
13 rates than that upstream.<sup>230</sup> The results are fully consistent with the core aspect of the Dugdale  
14 work considered by the Regional Board in rejecting the mixing zone: elevated ammonium  
15 concentrations suppress nitrogen uptake and primary production.

16 The Discharger points to data presented by Dr. Parker (SR-Figure 10) to argue that  
17 because that figure shows the carbon uptake increasing in the confluence zone (where the  
18 Sacramento and San Joaquin rivers join), factors other than ammonium must be controlling  
19 phytoplankton and primary production in the River.<sup>231</sup> Figure 10 does not support this  
20

---

21 <sup>227</sup> Petition at 89-91.

22 <sup>228</sup> These experiments collected water from upstream of the Treatment Plant (at Garcia Bend) in  
23 one enclosure and water from downstream (at River Mile 44) and ran tests for four days.  
24 Dugdale Report ¶ 14. The ammonium concentration in the downstream enclosure was above the  
25 4uM L-1 inhibition threshold and higher than in the upstream enclosure. After four days the total  
26 biomass was higher downstream, and Discharger asserts that means the additional ammonium in  
27 the discharge enhanced growth. Petition at 89-90.

26 <sup>229</sup> Dugdale Report ¶ 15.

27 <sup>230</sup> Dugdale Report ¶ 21.

28 <sup>231</sup> Petition at 95-96.

1 speculation, but, rather, is fully consistent with the proposition that excessive ammonium is  
 2 inhibiting both nitrate and ammonium uptake. As the Dugdale group explains, “the decline in  
 3 primary production downstream of the [Treatment Plant] was the result of both the shutdown of  
 4 NO<sub>3</sub> uptake by NH<sub>4</sub> and the inhibition of NH<sub>4</sub> uptake by the elevated ammonium concentration.  
 5 We interpret the increase in carbon fixation at the confluence as a result of the declining NH<sub>4</sub>  
 6 concentration allowing NH<sub>4</sub> uptake and associated primary production to increase.”<sup>232</sup>

7  
 8 **d. The pending proposed U.S. EPA aquatic life criteria for ammonia provides another basis to reject the mixing zone**

9 It would be reasonable for the Regional Board to rely on the U.S. EPA’s 2009 proposed  
 10 Ammonia Criteria Update as part of the evidence to reject the requested mixing zone.<sup>233</sup> The  
 11 2009 Ammonia Criteria are based on current science to update the U.S. EPA’s 1999 Ammonia  
 12 Criteria. These include more stringent total ammonia criteria for native freshwater mussels,  
 13 which are known to reside in the Sacramento River.<sup>234</sup> Total ammonia concentrations in the  
 14 River exceeded the 2009 Ammonia Criteria downstream of the mixing zone 21 percent of the  
 15 time between 2007 and 2008 and 41 percent of the time in 2009.<sup>235</sup>

16 The Discharger does not dispute the scientific analysis underlying U.S. EPA’s proposed  
 17 2009 toxicity criteria. Nor does it question the fact that the proposed criteria repeatedly have  
 18 been exceeded. Discharger argues that it is improper for the Regional Board to rely on U.S.  
 19 EPA’s 2009 Ammonia Criteria when deciding whether to grant a mixing zone “because it is a  
 20 draft and not available for use in a regulatory setting.”<sup>236</sup> But the Regional Board did not apply

21 <sup>232</sup> Dugdale Report ¶ 24.

22 <sup>233</sup> Permit at F-56. Draft 2009 Update Aquatic Life Ambient Water Quality Criteria For  
 23 Ammonia – Freshwater (December 2009), available at [http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/ammonia/upload/2009\\_12\\_23\\_criteria\\_ammonia\\_2009update.pdf](http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/ammonia/upload/2009_12_23_criteria_ammonia_2009update.pdf).

24 <sup>234</sup> Permit at F-56. While the Discharger is correct that the “without mussels” criteria is not more  
 25 stringent than existing criteria, Petition at 123-24, this fact is irrelevant because mussels are  
 26 present and thus the “with mussels” criteria is applicable.

27 <sup>235</sup> Permit at J-4.

28 <sup>236</sup> Petition at 122.

1 the criteria as a binding regulatory standard. The Regional Board may have considered the 2009  
2 Ammonia Criteria as part of its responsibility to consider the best, currently available data. It  
3 would be a reasonable exercise of the Regional Board's authority to protect water quality for it to  
4 consider these criteria as one of several reasons it rejected the Discharger's request to dilute its  
5 waste in the River. U.S. EPA reported to the Regional Board that it expects to adopt the criteria  
6 this year.<sup>237</sup> The criteria are available and represent the most current analyses, and thus  
7 appropriately could be considered in establishing effluent limits in the Permit.

8  
9 **e. The Regional Board reasonably considered the formation of  
nitrosamines in denying the request for a mixing zone**

10 The Discharger contends that the Regional Board improperly denied mixing zones for  
11 total ammonia on the basis of nitrosamines. It is beyond dispute that the Discharger currently  
12 must disinfect its discharge, and that disinfection generates harmful nitrosamines in the effluent  
13 discharged to the River. It is also not contested that nitrosamines are "highly mutagenic  
14 compounds that are suspected of carcinogenic activity to the human body."<sup>238</sup> The mixing zone  
15 requested by Discharger would allow these harmful compounds to persist. It was entirely  
16 reasonable for the Regional Board to reject a mixing zone and thereby largely eliminate the  
17 discharge of these harmful compounds.

18 The Discharger argues there is no regulatory level for nitrosoamines, and that drinking  
19 water notification levels for nitrosoamines are not mandatory.<sup>239</sup> Discharger's claims miss the  
20 mark, as they fail to demonstrate that it was in any way unreasonable for the Regional Board to  
21 consider the potential effects of nitrosoamines in exercising its discretion to grant or deny a  
22 mixing zone. To the contrary, the Regional Board reasonably exercised its discretion and  
23 considered all the data available to it, including data that showed the precursors to harmful  
24 nitrosamines, such as nitrosodimethylamines (NDMA), were present at significantly higher levels

25 \_\_\_\_\_  
26 <sup>237</sup> Permit at F-56.

27 <sup>238</sup> Permit at J-10.

28 <sup>239</sup> Petition at 120-122.

1 below the discharge.<sup>240</sup> Specifically, DWR found “NDMA precursors significantly greater (3-4  
2 times) below the discharge compared with above the discharge.”<sup>241</sup> The nitrosamine precursors  
3 found in the effluent also may result in nitrosamines at downstream drinking water treatment  
4 plants.<sup>242</sup>

5 **f. Additional peer-reviewed published research by Professor**  
6 **Glibert establishes that the nutrient discharge is causing a shift**  
7 **in algal communities by changing the nutrient ratios to favor**  
8 **harmful, invasive species**

8 As further support for its decision to deny the mixing zone, the Regional Board referred to  
9 the research by Dr. Patricia Glibert that finds altered nutrient ratios in the Delta are the likely  
10 source of the observed shift in the phytoplankton community.<sup>243</sup> Dr. Glibert, a professor at the  
11 University of Maryland Center for the Environmental Science Horn Port Laboratory, is an aquatic  
12 ecologist and nutrient biogeochemist with over 30 years of experience working on issues related  
13 to nutrient loading, nutrient ratios, eutrophication, changes in trophic dynamics, harmful algae,  
14 and management implications of nutrients loading all over the world. Dr. Glibert has studied and  
15 published on a wide range of topics related to nutrients and food web dynamics.<sup>244</sup>

16 While not essential to confirm the decision of the Regional Board, Dr. Glibert’s published,  
17 peer-reviewed work<sup>245</sup> provides additional record support to deny the requested mixing zone and  
18 require total ammonia and nitrate removal. Dr. Glibert’s work has revealed significant  
19 correlations between the shifting nutrient ratios in the Delta, as a result of the significant nutrient  
20

21 <sup>240</sup> Permit at J-10 to J-11.

22 <sup>241</sup> *Id.* at J-11.

23 <sup>242</sup> *See* Water Agencies’ Comments at 27-28; Staff RTC at 23-24.

24 <sup>243</sup> Permit at J-7 to J-8.

25 <sup>244</sup> Dr. Glibert’s experience is described in her declaration responding to the issues raised by the  
26 Discharger, Declaration of Dr. Patricia Glibert (Glibert Decl.) and her CV (Glibert Decl.  
Exhibit 1).

27 <sup>245</sup> In contrast, the challenges by Dr. Engle and Mr. Suverkropp were neither published nor peer  
28 reviewed.

1 loadings from the Treatment Plant, and the composition of the base of the food web.<sup>246</sup> Dr.  
2 Glibert found a measureable change in the ratio of nitrogen to phosphorous (the N:P ratio) in the  
3 Delta, an increase in total N loading, a decrease in total P loading, and a change in the dominant  
4 form of nitrogen from nitrate to total ammonia.<sup>247</sup> The variation in these nutrient concentrations  
5 and ratios is highly correlated to variations in the nutrient composition of the Treatment Plant's  
6 discharges. These nutrient variations are in turn related to variations at all levels of the food web,  
7 to variations in the composition of phytoplankton,<sup>248</sup> to variations in the composition of  
8 zooplankton, and to variations in the abundance of several fish species. Dr. Glibert proposed that  
9 the food web changed over time in response to altered nutrient loads, forms and ratios and these  
10 relationships, in turn, were related to changes in Delta smelt. Common to all of these loads and  
11 ratios was not only the increase in ammonium loads from wastewater discharge in the upper  
12 Sacramento River but the timing of these changes. In addition, as evidenced by the recent  
13 increase in annual blooms of *Microcystis*, and in the shift in the algal composition in the Delta,  
14 the algal community that comprises the food web has been shifting at the same time that the  
15 nutrient ratio has been changing.<sup>249</sup>

16 The core principles of Dr. Glibert's research are well-established in the record and  
17 supported by other research from around the globe. For example, the N:P ratio has long been  
18 shown to influence phytoplankton composition and the presence – or absence – of native species  
19 and vegetation, as extensive studies have repeatedly demonstrated across a range of estuaries in  
20 the United States and elsewhere around the globe, as well as in the laboratory.<sup>250</sup>

21 \_\_\_\_\_  
22 <sup>246</sup> See Water Agencies' Comments at 16-23 (citing and discussing research by Dr. Glibert and others).

23 <sup>247</sup> Glibert, P., 2010a. "Long-term changes in nutrient loading and stoichiometry and their  
24 relationships with changes in the food web and dominant pelagic fish species in the San Francisco Estuary, California," Reviews in Fisheries Science.

25 <sup>248</sup> Glibert, P. 2010b. Changes in the quality and quantity of nutrients over time and the  
26 relationships with changes in phytoplankton composition. Oral Presentation at 6th Biennial Bay-Delta Science Conference, Sacramento, CA, September 27-29, 2010.

27 <sup>249</sup> Water Agencies' Comments at 18.

28 <sup>250</sup> See Water Agencies' Comments at 19-23 (collecting and discussing literature).

1 The Discharger, however, makes a series of attacks on Dr. Glibert's work. As detailed in  
2 Dr. Glibert's rebuttal (Glibert Declaration) these challenges are without scientific merit.<sup>251</sup>

3 First, the Discharger erroneously claims that factors other than ammonium are the cause  
4 of the *Microcystis* blooms, such as water transparency, flows, specific conductivity and others.<sup>252</sup>  
5 In fact, considerable data and an extensive literature suggests that *Microcystis* blooms have been  
6 associated with ammonium, as cyanobacteria favor an environment in which ammonium is  
7 available and "the literature demonstrates that abundance and toxicity of *Microcystis* are  
8 significantly enhanced by ammonium, particularly under high nutrient ratios."<sup>253</sup> While these  
9 invasive blooms may do better under certain water conditions, those conditions are not the root  
10 cause. Quite simply, it is the nutrients that are – "there is no biological way to produce biomass  
11 from 'transparency, flows and specific conductivity.' Nutrients, including nitrogen, phosphorus  
12 and carbon (along with other micronutrients), are the fundamental elements on which biomass is  
13 made."<sup>254</sup>

14 Second, the Discharger alleges several "defects" in Dr. Glibert's analytical approach,  
15 including the use of the cumulative sums of variability statistic (CUSUM).<sup>255</sup> Dr. Glibert used

16  
17 <sup>251</sup> The bulk of the Discharger's attacks are based on the unpublished work prepared by  
18 consultants. Thus, while the Discharger took great pains to challenge certain data the Regional  
19 Board considered because those data were not published, e.g., Petition at 79-80, 95, 122, in  
20 contrast to Dr. Glibert's research, the SRCSD's critiques of Dr. Glibert's work have not been  
21 published or peer reviewed. Petition at 98-102.

22 <sup>252</sup> Petition at 97-98.

23 <sup>253</sup> Glibert at 4. In addition to Dr. Glibert's work, Lehman found significant relationships  
24 between nitrogen and *Microcystis* for several seasons and sites and noted that *Microcystis* is a  
25 "nitrogen lover." See Lehman, P. 2010. Factors that have influenced the increase of *Microcystis*  
26 blooms in the San Francisco Estuary since 2003. Oral Presentation at the 6th Biennial Bay-Delta  
27 Science Conference, Sacramento, CA, September 27-29, 2010. Also, Dr. Carol Kendall of the  
28 USGS, based on analyses of stable isotopes, observed that *Microcystis* in the Delta is growing  
ammonium. See Water Agencies' Comments at 21; Kendall, C. 2010. Use of stable isotopes for  
evaluating environmental conditions associated with *Microcystis* blooms in the Delta. Oral  
Presentation at the 6th Biennial Bay-Delta Science Conference, Sacramento, CA, September 27-  
29, 2010 and Kendall, C. 2011; see also Use of stable isotopes for evaluating environmental  
conditions associated with *Microcystis* blooms in the Delta. Oral Presentation at the 2011 IEP  
Annual Workshop, Folsom, CA, March 30, 2011.

<sup>254</sup> Glibert at 5.

<sup>255</sup> CUSUM represents a cumulative sum of scaled deviations from a target value. A simple

1 CUSUM as a tool, in context of established principles of biology and ecology, to assess trends in  
 2 nutrients, phytoplankton, zooplankton and fish, in the Delta, including the relationship between  
 3 the presence of ammonium and the decline of certain fish species, such as the Delta smelt.<sup>256</sup>

4 There is nothing unusual about using CUSUM to investigate these relationships. In fact, CUSUM  
 5 is an accepted statistical tool that “is increasingly being applied in ecological analysis” by many  
 6 researchers.<sup>257</sup>

7 Among other claims by the Discharger:

- 8 • The Discharger asserts that, “CUSUM series mute seasonal and other short term  
 9 variation.”<sup>258</sup> However, this contention shows the Discharger’s wholesale lack of  
 10 understanding of the analysis. A central purpose of the CUSUM series is in fact to  
 11 identify long-term patterns and it does that by smoothing short-term variation so that  
 12 the long-term variation and changes over time are not masked by the noise associated  
 13 with short-term variation.<sup>259</sup> Thus, this is in no way a “defect” in the analysis.
- 14 • The Discharger asserts that CUSUM cannot be interpreted in the same way as a  
 15 regression analysis and results in “inflated R2” values.<sup>260</sup> Again, that completely  
 16 misses the point. CUSUM shows relationships or trends in the data and is not  
 17 intended to be the equivalent to running a regression analysis on the raw data. As  
 18 such, the regression statistics (like R2) will be different. Indeed, there would be no  
 19

20  
 21 analogy is the scoring in golf – the total score is the raw score, but the CUSUM type score is the  
 22 running sum of the deviation from “par.”

23 <sup>256</sup> Glibert at 18.

24 <sup>257</sup> Glibert at 12-16 (describing a series of peer reviewed articles and published reports). Among  
 25 the researchers are Briceño and Boyer (2010a) who are using CUSUM statistics in the course of  
 26 their work directed by the United States related to the ongoing development of nutrient discharge  
 27 limits in Florida.

28 <sup>258</sup> Petition at 100, lines 7-9.

<sup>259</sup> Glibert at 19, *citing* Breaker and Flora (2009).

<sup>260</sup> Petition at 101, lines 3-7.

1 reason to do the CUSUM analysis if it were the same as a regression on the raw  
2 data.<sup>261</sup>

- 3
- 4 • The Discharger makes the fantastic claim that Dr. Glibert’s CUSUM correlations –  
5 which were accepted for publication after peer review – “violate virtually every  
6 assumption of a standard correlation analysis.”<sup>262</sup> In reality, the use of CUSUM plots  
7 to detect change “are well known and well described in the statistics literature. The  
8 heteroscedastic nature, or nature of the variance of the residuals, of the data of these  
9 curves, is not relevant to the nature of their trends over time.”<sup>263</sup> The issues raised by  
10 the Discharger are not factors that affect the direction of the trends in CUSUM curves.  
11 Dr. Glibert used the CUSUM curves as guidance as to when inflection points occurred  
12 and when one variable changed and another did not. This guidance, combined with her  
13 vast knowledge of nutrient biogeochemistry and phytoplankton physiology, provided  
14 the basis for her conclusions. Indeed, these types of analyses are currently being used  
15 in a variety of contexts, including to provide guidance in evaluating when total  
16 phosphorus (TP) and algal biomass (chlorophyll *a*) for a site in Florida changed in  
17 order to assess the relationship between those two variables.<sup>264</sup>
- 18 • The Discharger asserts that “autoregressive” time series data are not appropriate for  
19 CUSUM change point analysis.<sup>265</sup> (“Autoregressive” data are data in which a point in  
20 time is a function of a previous point in time.) Notwithstanding the Discharger’s  
21 claims, the published literature makes plain this is a non-issue. Breaker (2007) and  
22

23 \_\_\_\_\_  
24 <sup>261</sup> Glibert at 20.

25 <sup>262</sup> Petition at 100, lines 16-19. (The Discharger bases this assertion on the work of its consultant,  
26 Mr. Suverkropp, who has a Master’s degree in animal science.)

27 <sup>263</sup> Glibert at 21.

28 <sup>264</sup> Briceño and Boyer 2010a.

<sup>265</sup> Petition at 100, lines 16-19.

1 Breaker and Flora (2009) addressed this extensively and found no evidence that  
2 autoregressive data can affect the direction of change in a CUSUM analysis.<sup>266</sup>

- 3
- 4 • The Discharger further asserts that Dr. Glibert paired CUSUM series which spanned  
5 different ranges of years.<sup>267</sup> This assertion is flatly wrong. All the analyses in Glibert  
6 2010 were performed for data pairs spanning the same years.<sup>268</sup>
  - 7 • The Discharger also claims that Dr. Glibert’s analyses (in her peer-reviewed and  
8 published 2010 paper) were based on an inadequate geographic coverage.<sup>269</sup> The  
9 Discharger offers absolutely no data, calculations or other support for this blanket  
10 assertion that data from two stations was inadequate. Since Dr. Glibert was looking at  
11 how nutrient changes may have affected the Delta, it was appropriate that the stations  
12 bracket the area impacted by the largest source of ammonium/nitrogen on the  
13 Sacramento River, the Discharger’s Treatment Plant.<sup>270</sup>
  - 14 • The Discharger complains that Dr. Glibert used a biased selection of variables,  
15 suggesting there are other pairings of other variables that should be considered.<sup>271</sup> The  
16 fact that other data could be studied in no way diminishes the ability of the Regional  
17 Board to rely on Dr. Glibert’s peer-reviewed research to support the Permit. Dr.  
18 Glibert never intended that her paper “would be the only analysis evaluating the  
19 relationship between nutrients and components of the food web of the Bay Delta.”<sup>272</sup>

20 \_\_\_\_\_  
21 <sup>266</sup> Glibert at 23-26.

22 <sup>267</sup> Petition at 101, lines 1-2.

23 <sup>268</sup> Glibert at 27.

24 <sup>269</sup> Petition at 99, lines 15-18.

25 <sup>270</sup> Dr. Glibert has since expanded her analysis to other areas of the Delta and the relationships  
26 she observed and reported in Glibert 2010 between nutrients and the various trophic levels  
remains the same. *See* Glibert at 30.

27 <sup>271</sup> Petition at 101, lines 10-11.

28 <sup>272</sup> Glibert at 30.

1 Other relationships may be explored, and Dr. Glibert has continued to explore those in  
2 a follow up paper.

- 3 • The Discharger complains that Dr. Glibert omitted “many well-known hypotheses”  
4 from her article.<sup>273</sup> Her paper was focused on the relationships between nutrients and  
5 the food web. While it is true that Dr. Glibert did not analyze every known hypothesis  
6 in her paper, the assertion that this somehow invalidates the findings in her paper is  
7 absurd.

8 In short, none of the Discharger’s criticisms of Dr. Glibert’s CUSUM analysis have merit.  
9 Most importantly, none affect the overarching conclusion from Glibert (2010) that changes in  
10 nutrients are related to changes in phytoplankton and to changes in zooplankton and ultimately to  
11 changes in fish abundance in the Delta. Dr Glibert has repeated her statistical analyses comparing  
12 CUSUM relationships to relationships using raw data for *10 different sets of comparisons*  
13 (shown in Table 3 below) and, regardless of the method used, the overall trends are the same.  
14 These examples “demonstrate that while the actual statistical significance of CUSUM-CUSUM,  
15 log-log and untransformed relationships vary, those of CUSUM-CUSUM do not change the  
16 overall trend or pattern as the direction of change is never altered. Application of CUSUM curves  
17 allows a new window into the dynamics of change. It expands our horizons with which data can  
18 be interpreted.”<sup>274</sup>

19 **Table 3. Example comparisons from Bay Delta time series data illustrating the correlations**  
20 **of variables when regressed using untransformed, “raw” data, log-transformed data and**  
21 **CUSUM-transformed data. The untransformed DIN/TP values are mg L<sup>-1</sup>/mg L<sup>-1</sup>; those of**  
22 **NH<sub>4</sub><sup>+</sup> are mg L<sup>-1</sup>; *Eurytemora* and *Neomysis* are individuals m<sup>-3</sup>; diatoms are cells mL<sup>-1</sup>;**  
23 **delta smelt is summer townet index and young of the year striped bass are fall midwater**  
24 **trawl catch per tow. The nutrient data were from the confluence to Suisun Bay. The table**  
25 **displays the regression coefficient on the "X" variable of a Prais Winston Regression of "Y"**  
26 **on "X". The p column displays the density in the tail of a student t distribution with n-2**  
27 **degrees of freedom for a one tailed test. The R<sup>2</sup> column indicates the share of the variation**  
28 **in "Y" explained by variation in "X" around an intercept as all regressions include an**  
**intercept. The p-values are calculated from a covariance matrix robust to first order serial**

<sup>273</sup> Petition at 101, lines 23-26.

<sup>274</sup> Glibert at 36.

1 **correlation and heteroskedasticity.**<sup>275</sup>

Parameter X	Parameter Y	n	Untransformed		Log-Log		CUSUM	
			p	R <sup>2</sup>	p	R <sup>2</sup>	p	R <sup>2</sup>
DIN/TP	Chl a	32	0.0000	0.58	0.0000	0.67	0.0000	0.60
	Diatoms	32	0.0001	0.49	0.0000	0.79	0.0000	0.57
	Eurytemora	32	0.0007	0.44	0.0000	0.55	0.0000	0.53
	Neomysis	32	0.0000	0.52	0.0000	0.67	0.0000	0.62
NH <sub>4</sub> <sup>+</sup>	Corbula	20	0.0001	0.54	0.0003	0.76	0.0086	0.19
	Chl a	32	0.0016	0.36	0.0005	0.41	0.0227	0.24
	Diatoms	32	0.0060	0.36	0.0002	0.56	0.0050	0.30
Eurytemora	Neomysis	32	0.0039	0.56	0.0004	0.45	0.0001	0.64
	Delta Smelt	32	0.0022	0.42	0.0581	0.12	0.0002	0.51
	YoY Str Bass	31	0.0015	0.32	0.0015	0.29	0.0001	0.40

9

10 After unsuccessfully trying to discredit Dr. Glibert's statistical analysis, the Discharger

11 goes on to assert that the "Permit ignores alternative hypotheses that would explain observed

12 changes in phytoplankton composition in the Delta."<sup>276</sup> This is a red herring. Whether or not

13 other factors are also impacting phytoplankton composition is irrelevant to whether the Regional

14 Board properly denied the request to use the River to dilute the discharge. It has been more than

15 adequately demonstrated that the Discharger's 14 tons of total ammonia nitrogen per day has the

16 reasonable potential to affect phytoplankton abundance and species composition. That other

17 factors might also be affecting phytoplankton may be an issue in other forums; however, it should

18 not influence the limits imposed by this Permit.

19 Even if it were relevant, the other factors that the Discharger claims are important to

20 consider may also be due to the Discharger's nitrogen loads. The Discharger asserts that top-

21 down effects on phytoplankton composition – such as selective grazing by clams and zooplankton

22 – are not acknowledged in the Permit, but are likely to influence species composition."<sup>277</sup> There

23 are several problems with this assertion. First (as discussed *supra*), Dugdale et al. (2007) point

24 out that clam abundance and grazing is low in spring. Therefore, clam grazing cannot be the

25 <sup>275</sup> Table 1 from Glibert at 35.

26 <sup>276</sup> Permit at 104, lines 4-6.

27 <sup>277</sup> Petition at 105, lines 6-8.

1 cause of the decline in spring blooms. Second, while the Amur River clam, *Corbula amurensis*,  
 2 may have been introduced in ballast water, the record evidences the clam's ability to outcompete  
 3 other bivalve species may be the result of the nutrient imbalance caused by the Discharger's own  
 4 effluent discharges.<sup>278</sup> This relationship is further supported by similar trends of bivalve  
 5 invasions following changes in nutrient regimes in other systems including in the Potomac River  
 6 (Cummins et al. 2010), the Ebro River Estuary (Ibáñez et al., 2008), and the Dutch Delta, Lake  
 7 Veere (Wijnhoven et al., 2010).<sup>279</sup> In addition, there is no evidence of a long term relationship  
 8 between abundance of *C. amurensis* and calanoid copepods. In fact, *Eurytemora affinis*,  
 9 preferred food for Delta smelt, was already in decline before the clams became established  
 10 (Glibert 2010).

11 The Discharger asserts that grazing by clams and zooplankton may contribute to the  
 12 occurrence of *Microcystis*;<sup>280</sup> however, none of the references cited by the Discharger provide  
 13 direct evidence of this effect. The closest connection provided is reference to a study on zebra  
 14 mussels in the Great Lakes (Vanderploeg et al 2001). "However, in a survey of 61 lakes in  
 15 Michigan, where a strong association between invasive zebra mussels and *Microcystis* was  
 16 observed, the relationship was *only for lakes with P levels less than 25 µg/L* (Raikow et al.,  
 17 2004), thus implying that there is nutrient control as well as grazing control."<sup>281</sup>

18 The Discharger goes on to assert that the Permit fails to include evidence that a shift in  
 19 phytoplankton composition represents a degradation of food resources.<sup>282</sup> The State Board should  
 20 not be moved by this sleight of hand, as a shift in species composition in and of itself is a  
 21

22 \_\_\_\_\_  
 23 <sup>278</sup> Glibert (2010) shows a strong relationship between clam abundance and nutrient  
 24 concentrations and forms in Suisun Bay. *See also* Table 3, Glibert at 4 and 32 and Water  
 25 Agencies Comments on Aquatic Life Issue Paper at 21.

26 <sup>279</sup> *See* Water Agency Testimony on December 9 (2010) at Slide 49; *see also* Glibert at 32 and 44.

27 <sup>280</sup> Petition at 105, lines 6-9.

28 <sup>281</sup> Glibert at 38.

<sup>282</sup> Petition at 106, lines 3-4.

1 violation of the Basin Plan requirement to protect aquatic life.<sup>283</sup>

2           Regardless, second, there is ample evidence in the record to support the Permit assertion  
3 that the observed shift in phytoplankton composition is detrimental to the ecosystem. The Permit  
4 recognizes that diatoms are more nutritious to primary consumers like zooplankton than  
5 flagellates and bluegreen algae and that “changes in algal food availability and its quality or a  
6 “bottom up” effect is one factor hypothesized to contribute to the POD.”<sup>284</sup> There is no doubt that  
7 the increasing frequency and magnitude of *Microcystis* blooms in the Delta is detrimental, a point  
8 even the Discharger concedes.<sup>285</sup> The literature is extensive on the negative effects of *Microcystis*  
9 on ecosystem as well as human health.<sup>286</sup>

10           The Discharger has the audacity to claim that a shift away from diatoms may actually be  
11 beneficial, asserting that “direct feeding on diatoms can cause reproductive failure in copepods.”<sup>287</sup>  
12 To support this claim the Discharger provides a table summarizing results of feeding experiments  
13 on “copepod species from the Delta or their cofamilials.”<sup>288</sup> “While it is true that *some* diatoms  
14 can cause reproductive failure in *some* copepods when fed at specific feeding rates, **there is no**  
15 **evidence that *all* diatoms cause detrimental effects in *all* copepods at *all* feeding rates.**”<sup>289</sup>  
16 The table provided by the Discharger does not include any study results for the two copepod  
17 species, *Eurytemora affinis* and *Pseudodiaptomus forbesis*, known to be “important forage  
18 organisms for larval fish, including Delta smelt, in the Delta.”<sup>290</sup> In fact, Bouley and Kimmerer

19 \_\_\_\_\_  
20 <sup>283</sup> See Basin Plan III.8.01, *supra* (“all waters shall be maintained free of toxic substances in  
21 concentrations that produce detrimental physiological responses in human, plant, animal or  
22 aquatic life.”)

23 <sup>284</sup> Permit at J-8.

24 <sup>285</sup> Petition at 108, line 16-17.

25 <sup>286</sup> See Water Agencies Comments on Aquatic Life Issue Paper at 19 (citing literature).

26 <sup>287</sup> Permit at 107, line 17.

27 <sup>288</sup> Permit at 109.

28 <sup>289</sup> Glibert at 40.

<sup>290</sup> Permit at J-2.

1 (2006) did show experimentally that *P. forbesi* feed on diatoms and dinoflagellates in the  
 2 laboratory.<sup>291</sup> Jones and Flynn (2005) and Ask, et al. (2006) demonstrated that diatoms do  
 3 support *E. affinis* growth, egg production and metabolism.<sup>292</sup> And Glibert (2010) observed that  
 4 “as diatoms declined, so did *E. affinis*.” In addition, Slaughter and Kimmerer (2010) observed  
 5 lower reproductive rates and lower growth rates of the copepod, *Acartia* sp., in the low salinity  
 6 zone compared to taxa in other areas of the estuary. They conclude that “[t]he combination of  
 7 low primary production, and the long and inefficient food web have likely contributed to the  
 8 declines of pelagic fish.”<sup>293</sup> Cloern and Dufford (2005) also state, “[t]he efficiency of energy  
 9 transfer from phytoplankton to consumers and ultimate production at upper trophic levels vary  
 10 with algal species composition: diatom-dominated marine upwelling systems sustain 50 times  
 11 more fish biomass per unit of phytoplankton biomass than cyanobacteria-dominated lakes. . . .”<sup>294</sup>

12 Contrary to the Discharger’s arguments, the work of Dr. Glibert is further credible and  
 13 reliable support for the Regional Board’s denial of total ammonia nitrogen mixing zones.

14 **g. The Regional Board demonstrated that total ammonia nitrogen**  
 15 **removal is required to meet dissolved oxygen (DO)**  
 16 **requirements**

17 The Regional Board reasonably concluded that total ammonia nitrogen removal was  
 18 needed, and no mixing zone should be granted for total ammonia nitrogen, because the massive  
 19 discharge was consuming the available oxygen capacity in the Delta and causing violations of the  
 20 Basin Plan’s water quality objective for dissolved oxygen of not less than 7.0 mg/L.<sup>295</sup> Meeting  
 21 this water quality objective is critical, as dissolved oxygen is essential to maintaining aquatic life.  
 22 That Discharger’s daily discharge of thousands of pounds of untreated total ammonia nitrogen

23 \_\_\_\_\_  
 24 <sup>291</sup> Glibert at 40.

25 <sup>292</sup> Water Agencies Comments on Aquatic Life Issue Paper at 20.

26 <sup>293</sup> Water Agencies Comments on Tentative Order at 12.

27 <sup>294</sup> Water Agencies Comments on Tentative Order at 12.

28 <sup>295</sup> Permit. at F-56, J-8 to J-10.

1 would deplete DO in the River is standard chemistry and well established by observed data.<sup>296</sup>

2 More specifically, the subject discharge includes total ammonia nitrogen and biological  
3 oxygen demand (BOD); it is standard chemistry that these substances demand and consume  
4 oxygen in water. As a result, it is not at all surprising that the Discharger's massive discharge is  
5 depleting DO in the Sacramento River for miles downstream.<sup>297</sup> As the Regional Board found,  
6 "[t]he oxygen depleting constituents from the SRWTP use or will use all the assimilative capacity  
7 of the River and Delta leaving no assimilative capacity available to other communities that  
8 currently reduce oxygen demanding constituents by implementing advanced treatment  
9 processes."<sup>298</sup> While other communities are already implementing advanced nutrient removal at  
10 their facilities,<sup>299</sup> the Discharger is not. As the Permit explains, these impacts on DO are among  
11 the many reasons the Regional Board is requiring the Discharger to implement nitrification,  
12 denitrification, and advanced filtration.<sup>300</sup>

13 The record supports the Regional Board's finding of repeated violations of the DO  
14 requirements. The data gathered by state agencies confirm the current discharge is contributing to  
15 depressed DO levels downstream of the Treatment Plant. The California Department of Water  
16 Resources (DWR) observed repeatedly in 2008 and again in 2009 that DO levels were below the  
17 Basin Plan's established objective of 7 mg/L at Hood, which is located about eight miles  
18 downstream from the discharge – and well beyond the proposed mixing zone.<sup>301</sup> DWR "found  
19 *over 12,000 data points* showing the dissolved oxygen is less than the water quality objective.  
20

21 <sup>296</sup> See Water Agencies' Comments at 26-27.

22 <sup>297</sup> See Permit at F-95, J-8 to J-10; Water Agencies' Comments at 25-27.

23 <sup>298</sup> Permit at F-95.

24 <sup>299</sup> See Permit at J-10.

25 <sup>300</sup> See Permit at F-95, J-8 to J-10.

26 <sup>301</sup> DWR monitoring data, 2008-2009, attached to, Department of Water Resources Office Memo  
27 from Sal Batmanghlich, Chief Real-time Monitoring Section to Kathleen Harder, Central Water  
28 Quality Control Board re Hood water quality station Dissolved Oxygen QA/QC data. July 22,  
2010.

1 This represents 17 percent of the time from May 2008 to June of [2010].<sup>302</sup> These depressed  
 2 levels have an adverse impact on aquatic life in the River and Delta. As the staff explained at the  
 3 December 2010 hearing, the Basin Plan objective is important for protecting aquatic life,  
 4 including sensitive salmon species, “especially larval salmon moving downstream.”<sup>303</sup>

5 Discharger argues that the DWR’s Hood data are unreliable, and emphasizes that its data  
 6 at Hood do not show DO concentrations less than the Basin Plan objective.<sup>304</sup> The Regional  
 7 Board expressly considered these very same objections and reasonably concluded it could not  
 8 exclude DWR’s DO data and only consider the Discharger’s data, as Discharger urged.<sup>305</sup>

9 Although Discharger’s data showed uniformity with DWR’s data at other monitoring locations,  
 10 its Hood data differed.<sup>306</sup> This difference does not demonstrate, as Discharger argues, that the  
 11 DWR Hood data are unreliable. Instead, the Regional Board reasonably decided that “to protect  
 12 beneficial uses it must be assumed that the River at times, is less than the water quality objective  
 13 of 7.0 mg/L and the Discharger is currently using all the assimilative capacity in the Sacramento  
 14 River from Freeport to Rio Vista for oxygen demanding constituents.”<sup>307</sup>

15 The Regional Board was justified in raising concerns about Discharger’s DO “Low  
 16 Dissolved Oxygen Prevention Assessment” model. The model is based on limited ambient  
 17 dissolved oxygen sampling and “the Discharger’s data generally reports higher dissolved oxygen  
 18 concentrations than data from other sources.”<sup>308</sup> In addition, the methodologies used to calibrate  
 19 and validate the Discharger’s model make its predictions unreliable.<sup>309</sup>

20 \_\_\_\_\_  
 21 <sup>302</sup> Hearing Tr. at 127:16 to 127:19 (emphasis added).

22 <sup>303</sup> *Id.* at 127:20 to 128:1.

23 <sup>304</sup> Petition at 112-17.

24 <sup>305</sup> *See* Hearing Tr. at 128:13 to 128:14; Permit at J-9 to J-10.

25 <sup>306</sup> Permit at J-9 to J-10.

26 <sup>307</sup> *Id.* at J-10.

27 <sup>308</sup> Permit at J-10.

28 <sup>309</sup> *See* Water Agencies’ Comments at 26-27.

1           The Discharger’s model validation is unreliable because when the Discharger compared  
 2 its modeling results to actual data; and the two did not match, the Discharger rejected the data  
 3 rather than its model, which is incompatible with standard model validation practices. And,  
 4 contrary to the representations of the Discharger, DWR did provide a QA/QC of the Hood  
 5 monitoring data.<sup>310</sup> DWR compared its continuous QA/QC’d data and its CDEC data, corrected  
 6 for PST.<sup>311</sup> The DWR’s summary chart that it provided to the Regional Board shows that while  
 7 there were a limited number of minor instrument errors, those instrument errors did not occur  
 8 during the times in question, when DO values dropped below the 7.0 mg/L objective.<sup>312</sup>

9           Moreover, the Discharger misrepresented the facts when it stated that there have been no  
 10 criticisms of its model.<sup>313</sup> As explained in the Mixing Zone Section, below, the Bureau of  
 11 Reclamation (“Reclamation”) objected to the basic underpinning of the model, as the  
 12 Dischargers’ model incorporates two of Reclamation’s outdated hydrodynamic and temperature  
 13 models. Reclamation also objected to the Discharger’s removal of many years of the most recent  
 14 hydrologic data, thereby raising serious questions about its ability to model current conditions in  
 15 the river.

16           The Discharger also failed to mention that the Regional Board’s consultant, Tetra Tech,  
 17 recommended that the Regional Board reject the Dischargers’ Low Dissolved Oxygen Prevention  
 18 Assessment (2010) (“LDOPA”). As the independent Tetra Tech reviewers concluded:

19                           . . . no statistical analysis of the model fit is provided and the  
 20 crowded multi-year plots tend to hide relatively large discrepancies  
 21 between individual measurements and predictions that are often on  
 the order of 2 mg L<sup>-1</sup> or more.<sup>314</sup>

22 <sup>310</sup> Memorandum from DWR to Regional Board, Re: Hood water quality station, dissolved  
 23 oxygen QA/QC data, July 22, 2010.

24 <sup>311</sup> *Ibid.*

25 <sup>312</sup> *Ibid.*

26 <sup>313</sup> SRCSD Petition, p. 115.

27 <sup>314</sup> Tetra Tech Memorandum, to Diana Messina, Central Valley Regional Water Quality Control  
 28 Board, from Jonathan Butcher, Ph.D., P.H., Re: Sacramento Regional LDOPA, June 29, 2010,  
 p. 6.

1 And:

2 The modeling framework . . . seems to have been driven more by  
3 the desire to do a Monte Carlo statistical analysis across the range  
4 of upstream flows and effluent loads . . . than by an intent to  
accurately simulate DO in the lower Sacramento River.<sup>315</sup>

5 And:

6 The 7 mg L<sup>-1</sup> target is written as an instantaneous criterion. The  
7 LDOPA modeling, however, produces only daily average DO  
8 concentrations and is calibrated only at the daily average scale.  
9 This is an inevitable result of the approach to model development,  
10 which ignores tidal reversals, works with daily average travel times,  
and does not consider diurnal algal growth and respiration cycles.  
11 As such, the modeling cannot represent the intra-day variability in  
DO concentrations, and cannot assess the maximum intra-day DO  
depression that will occur during tidal reversals and near-reversal  
stagnation events when reaeration declines.<sup>316</sup>

12 With these uncertainties, the Discharger's LDOPA is unreliable and cannot be used as a  
13 predictive tool to determine either the magnitude or frequency of future violations of the Basin  
14 Plan. The Tetra Tech reviewers ultimately concluded that, "As presently formulated, the LDOPA  
15 does not ensure attainment of the water quality objective specified in the Basin Plan."<sup>317</sup>

16 Discharger argues that its compliance or non-compliance with DO objectives is unrelated  
17 to whether a total ammonia mixing zone should be granted, or the need for the total ammonia  
18 nitrogen limits and full nitrification.<sup>318</sup> The Permit documents numerous factors, including the  
19 DO levels that weigh in favor of denying the requested mixing zone. The DO levels already drop  
20 below the water quality standard in the Basin Plan, thereby indicating that protected beneficial  
21 uses are impaired. In addition, Discharger's model likely underestimates potential future impacts.  
22 The Regional Board's decisions to require nutrient removal and reject the requested mixing zone  
23 were reasonable.

24 \_\_\_\_\_  
25 <sup>315</sup> *Id.* at p. 4.

26 <sup>316</sup> *Id.* at p. 7.

27 <sup>317</sup> *Id.* at p. 2.

28 <sup>318</sup> Petition at 118-19.

**VII. THE NITRATE LIMITS IN PERMIT ARE APPROPRIATE**

The Discharger mischaracterizes the Regional Board's approach in setting the Plant's nitrate limit. The Discharger's Petition suggests that the Regional Board based the 10 mg/L nitrate limit and denial of a nitrate mixing zone solely on the drinking water maximum contaminant level (MCL) and the protection of the MUN designated use from a public health standpoint.<sup>319</sup> The Discharger has grossly oversimplified the Regional Board's analytic roadmap that supports the 10 mg/L nitrate limit.

The Regional Board appropriately started its analytical roadmap with the 10 mg/L end-of-pipe drinking water MCL for nitrate, as the entire Sacramento River and Delta are designated MUN. But it did not stop there, as excessive nutrient levels from the plant can and do significantly and adversely affect a number of designated uses in addition to MUN's public health aspects. In addition to the Basin Plan's incorporation of the public health drinking water MCLs, the Regional Board recognized the Basin Plan's requirement that waters not contain biostimulatory substances which promote nuisance aquatic growths or otherwise adversely affect beneficial uses, and not contain taste or odor producing substances.<sup>320</sup> The Regional Board considered the evidence and found that excess nitrogen creates nuisance algae growth in water supply aqueducts and reservoirs, causing taste and odor problems in municipal water supplies and impacting water treatment plant operations. The Regional Board found that excessive algal growth increases total organic carbon (TOC) loading to water treatment plants, increasing the potential for formation of trihalomethanes. The Regional Board found that excess nitrogen is affecting the N:P ratio, adversely affecting the aquatic community. After considering the evidence of these significant and adverse water quality effects, all far downstream of the Treatment Plant's discharge, the Regional Board appropriately denied a mixing zone.<sup>321</sup> Granting

---

<sup>319</sup> See, e.g., Petition at pp. 125 ("the denial (of a mixing zone) has nothing to do with the merits of a human health mixing zone"); 127 ("there is no need for an end-of-pipe limit equal to the MCL to protect the Municipal (MUN).")

<sup>320</sup> Basin Plan, pp III-3.00, III-7.00.

<sup>321</sup> Permit, pp. F-45 – 46.

1 a mixing zone – in effect requiring no nitrogen removal and allowing a pass on denitrification  
 2 facilities – would result in continued and indeed worsened adverse beneficial use effects,  
 3 compromising the integrity of the entire water body, adversely impacting biologically sensitive  
 4 and critical habitats, and producing undesirable nuisance aquatic cpmdotopms, all of which are  
 5 violations of State Implementation Plan criteria for granting mixing zones in the first place.<sup>322</sup>

6 In addition to mischaracterizing the Regional Board’s analytical roadmap, the Discharger  
 7 asserts that the 10 mg/L nitrate limit is unnecessary to protect MUN use; that adverse impacts of  
 8 excess nutrients have not been identified and documented; that a reasonable potential analysis has  
 9 not been performed; that the State Implementation Plan (SIP) for denial of a mixing zone is  
 10 inapplicable and regardless its criteria are not met; and that costs have not been considered. None  
 11 of these arguments has any merit. The claims regarding Reasonable Potential Analysis and costs  
 12 are addressed in Sections IV and XIV; the others are addressed below.

13 **1. It Is Appropriate To Base The Nitrate Limit On the Drinking Water**  
 14 **MCL**

15 The entire Sacramento River and Delta are designated for municipal and domestic water  
 16 supply beneficial use (MUN). The Basin Plan requires that waters designated for MUN meet, *at*  
 17 *a minimum*, primary and secondary drinking water MCLs adopted by the Department of Public  
 18 Health (DPH).<sup>323</sup> The primary MCL for nitrate (as N) is 10 mg/L, which is equivalent to 45 mg/L  
 19 as nitrate.<sup>324</sup> Exposure to nitrate in drinking water at levels greater than the MCL increases the  
 20 probability of adverse health effects, particularly for infants.<sup>325</sup>

21 <sup>322</sup> *Id.*

22 <sup>323</sup> Basin Plan, Exh. 25, III-3.00.

23 <sup>324</sup> California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, § 64431.

24 <sup>325</sup> *See, e.g.*, Cal. Code Regs., tit. 22, § 64482(b), which requires that drinking water systems that  
 25 detect nitrate at levels above 23 mg/L (as nitrate) but below the MCL of 45 mg/L (as nitrate)  
 26 notify consumers that “Nitrate in drinking water at levels above 45 mg/L [nitrate] is a health risk  
 27 for infants of less than six months of age. Such nitrate levels in drinking water can interfere with  
 28 the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include  
 shortness of breath and blueness of the skin. Nitrate levels above 45 mg/L [nitrate] may also  
 affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and  
 those with certain specific enzyme deficiencies. If you are caring for an infant, or you are  
 pregnant, you should ask advice from your health care provider.”

1           The Regional Board imposed an AMEL of 10 mg/L for nitrate (as N), in part based on the  
 2 primary drinking water MCL of 10 mg/L (as N).<sup>326</sup> Given the MUN designation for the entire  
 3 Sacramento River and Delta, and the health risks of nitrate at levels exceeding the MCL, it was  
 4 fully appropriate for the Regional Board to base the nitrate limit on the drinking water MCL.  
 5 Indeed, the Basin Plan requires this limit as a minimum level of human health protection.

6           The Permit follows the Regional Board’s past practice of imposing nitrate limits where  
 7 “the conversion of ammonia to nitrate and the conversion of nitrite to nitrate present a reasonable  
 8 potential for the discharge to cause or contribute to an in-stream excursion above the Primary  
 9 MCLs for nitrite and nitrate.”<sup>327</sup> The Regional Board has imposed such an effluent limit for  
 10 nitrogen on many permits that discharge to the Delta or upstream of the Delta, and has used  
 11 nearly identical language in justifying such a limit for nitrogen on those dischargers.<sup>328</sup> In the  
 12 majority of these permits, the Regional Board set the limit “to assure the treatment process  
 13 adequately nitrifies and denitrifies the waste stream to protect the beneficial use of municipal and  
 14 domestic supply.”<sup>329</sup> In each one of these cases, the Regional Board provides the same analysis  
 15 as that provided in the Discharger’s Permit.<sup>330</sup>

16           The Discharger argues that since “the closest drinking water diversion is Barker Slough  
 17 Pumping Plant, 40 miles distant,”<sup>331</sup> its Treatment Plant should be the exception to the rule and  
 18 allowed to exceed the Basin Plan’s minimum limits of MUN protection in the intervening  
 19 reaches, since “effluent will be sufficiently diluted at downstream drinking water diversion points

20 \_\_\_\_\_  
 21 <sup>326</sup> Permit, p. 72.

22 <sup>327</sup> *Id.*

23 <sup>328</sup> *See, e.g.*, Order No. R5-2009-0085 (City of Manteca), p. F-45; Order No. R5-2007-0036 (City  
 24 of Tracy), p. F-37; Order No. R5-2006-0096 (County of Linda Water District), p. 41; Order No.  
 25 R5-2010-0092 (Placer County Sewer Maintenance District No. 1), p. F-46.

26 <sup>329</sup> *Id.*

27 <sup>330</sup> *Id.*

28 <sup>331</sup> Actually, the Freeport Regional Water Authority intake is only 6,000 feet upstream from the  
 discharge location and during reverse flow events can be exposed to diluted effluent from the  
 Treatment Plant. *See* discussion in Section VII.C., *infra*.

1 to meet the Primary MCL.”<sup>332</sup> In other words, the Regional Board should ignore the fact that the  
 2 Sacramento River and Delta are designated MUN by applying MUN only where an actual  
 3 physical municipal water use diversion currently exists.

4 The State Board considered and rejected this argument in its 2002 Review of Waste  
 5 Discharge Requirements for Vacaville’s Easterly Wastewater Treatment Plant.<sup>333</sup> In that matter,  
 6 the Regional Board set an effluent nitrate limit for a wastewater treatment plant discharging to a  
 7 tributary to the Delta – Old Alamo Creek – in order to protect the MUN use in the Delta.<sup>334</sup> The  
 8 limit was based on the primary drinking water MCL of 10 mg/L for nitrate and assumed no  
 9 dilution.<sup>335</sup> The discharger objected to the nitrate limit because Old Alamo Creek is not used for  
 10 drinking water and because the plant effluent is significantly diluted by the time it reaches an  
 11 actual drinking water intake.<sup>336</sup> The State Board rejected the argument, stating that “[t]he Basin  
 12 Plan requires that waters designated for MUN meet, at a minimum, primary and secondary  
 13 drinking water MCL’s adopted by the Department [of Public Health].”<sup>337</sup> In the Vacaville matter,  
 14 there was a question concerning Alamo Creek’s ability to assimilate nitrate and whether it could  
 15 be dedesignated MUN in the future. On these questions, the State Board indicted that the 10  
 16 mg/L nitrate MCL at a minimum would have to be met at the Delta boundary: “If MUN is  
 17 designated for Old Alamo Creek, it is uncertain whether the nitrate limits could be relaxed. MUN  
 18 is designated an *existing Delta use*. There is at least minimal dilution *at the Delta boundary*.”<sup>338</sup>

19 The Regional Board appropriately can base its nitrate limit on the drinking water MCL

20 \_\_\_\_\_  
 21 <sup>332</sup> Petition, pp. 126-127.

22 <sup>333</sup> SWRCB, In the Matter of the Review of Waste Discharge Requirements Order No. 5-01-044  
 23 for Vacaville’s Easterly Wastewater Treatment Plant, Order No WQO 2002-0015, 2002 Cal.  
 24 ENV LEXIS 29.

25 <sup>334</sup> *Id.*, p. 109.

26 <sup>335</sup> *Id.*

27 <sup>336</sup> *Id.*, pp. 109-110.

28 <sup>337</sup> *Id.*, p. 110.

<sup>338</sup> *Id.*, p 113, italics added.

1 and appropriately rejected the Discharger's proposal to disregard the public health MUN  
2 protections except at actual, far field drinking water intakes.

3 **2. Excess Nitrogen Creates Nuisance Aquatic Weed and Algal Growth**  
4 **and Causes Taste and Odor Problems in Domestic Water Supplies**

5 The Regional Board considered evidence of nuisance aquatic weed and algae growth and  
6 taste and odor problems caused by excess nitrogen in setting the Permit's nitrate limit.<sup>339</sup>  
7 Elevated levels of nutrients (phosphorus and nitrogen compounds) can stimulate nuisance algal  
8 and aquatic weed growth that includes production, by specific Cyanobacteria, of noxious taste  
9 and odor compounds and algal toxins. In addition to algal produced taste and odor and algal  
10 toxin concerns, increases in algal and aquatic weed biomass can impede flow in conveyances, and  
11 shorten filter run times and increase solids production at drinking water treatment plants.

12 Nitrogen levels in water diverted from the Delta are at concentrations that can produce  
13 nuisance algal and aquatic weed growth and adversely affect MUN beneficial uses. Mean annual  
14 concentrations of nitrogen and phosphorous at points in the Sacramento River above and below  
15 the Treatment Plant, downstream in the Delta at the confluence of the Sacramento and San  
16 Joaquin Rivers, and at the SWP and CVP intakes is shown in Table 4. All nitrogen levels are  
17 higher than the 0.25 to 0.30 mg/L concentration that has been associated with a high risk of  
18 nuisance growth and eutrophication; phosphorus is also higher than the 0.035 to 0.042 mg/L  
19 values associated with eutrophication.<sup>340</sup> Levels of both nutrients exceed U.S. EPA Ecoregion I  
20 (which includes the Central Valley) total nitrogen and phosphorus reference conditions of 0.31  
21 mg/L and 0.047 mg/L, respectively.<sup>341</sup> The reference condition is the 25<sup>th</sup> percentile of the

22 <sup>339</sup> See, e.g., Staff RTC pp. 28-30.

23 <sup>340</sup> Van Nieuwenhuysse and Jones (1996) and OECD (1992), cited in U.S. Environmental  
24 Protection Agency, Office of Water, *Ambient Water Quality Criteria Recommendations:*  
25 *Information Supporting the Development of State and Tribal Nutrient Criteria; Rivers and*  
*Streams in Ecoregion I*, EPA 822-B-01-012 (December 2001): 20,  
[http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/rivers\\_1.pdf](http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/rivers_1.pdf).

26 <sup>341</sup> U.S. Environmental Protection Agency, Office of Water, *Ambient Water Quality Criteria*  
27 *Recommendations: Rivers and Streams in Ecoregion I* (December 2001),  
28 [http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/rivers\\_1.pdf](http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/rivers_1.pdf). Ecoregion 1  
consists of the Central Valley in California and Willamette Valley in Oregon.

1 nutrient data for sites within the ecoregion and is meant to represent the nutrient concentrations in  
2 minimally impacted water bodies.

3 Table 4. Mean annual nitrogen and phosphorous concentrations in the Delta (From Foe 2010)

Location	Total N (mg/L)	Total P (mg/L)
EPA EcoRegion I Reference Condition	0.31	0.047
Upstream – Sacramento River at Garcia Bend	0.41	0.08
Downstream – Sacramento River at Hood	0.88	0.11
Downstream at Confluence – Chipps Island	0.80	0.14
SWP Intake – Bethany Reservoir	1.04	0.12
CVP Intake – DMC off Highway 4	1.36	0.15

11  
12 The Discharger's Treatment Plant is the major source of the excess nutrients in the  
13 Sacramento River. As indicated by the data in the above table, the Plant's effluent significantly  
14 increases the nutrient concentrations in the Sacramento River.<sup>342</sup> Based on Foe 2010 data, the  
15 Treatment Plant *more than doubles* the total nitrogen and total dissolved nitrogen concentrations  
16 in the Sacramento River.<sup>343</sup> Jassby 2008 calculated that the Treatment Plant's discharges  
17 accounted for *90 percent* of the total ammonia nitrogen load in the Sacramento River at Hood.<sup>344</sup>  
18 Fullerton 2009, showed that total ammonia from Hood can be traced to the confluence of the San  
19 Joaquin and Sacramento Rivers and to Potato Point in the Central Delta.<sup>345</sup> It is important to note  
20 that reducing only total ammonia from the discharge (e.g., nitrification without denitrification  
21

22 <sup>342</sup> See Foe 2010 at p.11: ("The SRWTP increased nutrient concentrations in the Sacramento  
23 River. . . . The average ammonia concentration increased 11.5 fold.")

24 <sup>343</sup> *Id.* at p. 28: (TN from 0.41 mg/L upstream to 0.88 mg/L downstream; TDN from 0.32 mg/L  
25 upstream to 0.82 mg/L downstream.)

26 <sup>344</sup> Jassby, Alan. 2008. Phytoplankton in the Upper San Francisco Estuary: recent biomass trends,  
27 their causes and their trophic significance. San Francisco Estuary and Watershed Science.  
28 6(1):Article 2.

<sup>345</sup> Fullerton, David. 2009. Ammonium concentrations and the food chain in Suisun Bay and the  
Delta. Presentation at August 2009 Ammonia Summit, Rancho Cordova, CA August 18-19, 2009.

1 facilities) will not reduce the Treatment Plant's total nitrogen to the Sacramento River and Delta.  
2 The average of 14 tons of total ammonia nitrogen discharged each day will merely convert to 14  
3 tons of nitrate nitrogen.<sup>346</sup>

4 The Discharger asserts that there is no evidence of any adverse effects of nitrogen from its  
5 plant.<sup>347</sup> To the contrary, evidence in the record is more than sufficient to show that the  
6 substantial nutrient loading from the Treatment Plant is contributing to serious nuisance  
7 conditions.

8 In 2007 (and resubmitted by reference in Water Agencies' comments on Tentative Permit  
9 at 29), the Water Agencies provided the Regional Board with comments and technical  
10 information on permitting issues of major concern.<sup>348</sup> Chief among their concerns was nutrient  
11 loading from the Discharger's Treatment Plant. The Water Agencies provided information and  
12 sworn declarations of their officials documenting on-going, nutrient-related adverse impacts from  
13 Delta water. For example, evidence shows that DWR has treated Clifton Court Forebay for  
14 aquatic weeds and algae multiple times each summer.<sup>349</sup> "Aquatic weed accumulation may be so  
15 severe that pumping at the Harvey O. Banks Delta Pumping Plant is restricted or halted and water  
16 delivery to the California and South Bay Aqueducts is shut down."<sup>350</sup> The practice of treating  
17 Clifton Court for control of nuisance aquatic growth was halted in 2007, however, over concerns  
18 of potential impacts to listed fish species. DWR also has treated the South Bay Aqueduct (SBA)  
19 to control algae that are stimulated by nutrient-rich Delta exports. Including preventative  
20 treatments, DWR has treated the SBA for algal control between 10 and 16 times per year.  
21 Periodic treatment of the California Aqueduct and Southern California SWP reservoirs is also  
22

23 \_\_\_\_\_  
<sup>346</sup> See Staff RTC, p. 28.

24 <sup>347</sup> See, e.g., Petition p. 127 ("What are the negative effects? Where?"); p. 131 ("Nitrate discharge  
25 above 10 mg/L AMEL would not cause pollution or nuisance").

26 <sup>348</sup> Water Agencies' 2007 Comments, *supra*.

27 <sup>349</sup> *Id.*, Exhibit 5.

28 <sup>350</sup> *Id.*

1 necessary for the same reason.<sup>351</sup>

2 The experiences of many of the Water Agencies provide further evidence of the effects of  
3 nutrient-related impairments. In the Declaration of Leah Orloff, Senior Water Resource  
4 Specialist for the Contra Costa Water District (CCWD), Dr. Orloff explained that CCWD  
5 experiences algal growth in its Mallard, Martinez and Los Vaqueros reservoirs and in the Contra  
6 Costa Canal.<sup>352</sup> The Delta is the source water for all of these facilities. Regular application of  
7 copper sulfate is standard in Mallard and Martinez Reservoirs, especially in the summer months,  
8 to control for the formation of toxins, to prevent taste and odor (T&O) problems, and to maintain  
9 healthy levels of dissolved oxygen. Copper sulfate is applied in the Contra Costa Canal.<sup>353</sup>

10 Even with treatment of the South Bay Aqueduct (SBA), which conveys Delta water to the  
11 East Bay and South Bay regions, water agencies still contend with algal-related T&O problems.  
12 According to Doug Chun, Water Quality Manager for the Alameda County Water District, even  
13 though the majority of SBA water is treated with ozone, some 226 T&O complaints were  
14 received from 2000 to 2005, indicating that present treatment is unable to fully meet consumer  
15 acceptance criteria.<sup>354</sup> The T&O complaints were related to the presence of MIB (2-  
16 methylisoborneol) and/or Geosmin, two algal compounds that are noticeable even at extremely  
17 low nanogram/L levels. Mr. Chun stated that ACWD has experienced filter clogging in its water  
18 treatment plants from algal die-off following the application of algaecides in the SBA.<sup>355</sup>

19 Retail water supply contractors of the Alameda County Flood Control & Water  
20 Conservation District, Zone 7 (Zone 7) have experienced customer complaints due to T&O  
21 events.<sup>356</sup> According to G.F. Duerig, Zone 7 General Manager, Zone 7 has been operating using

22 \_\_\_\_\_  
23 <sup>351</sup> *Id.*

24 <sup>352</sup> *Id.*, Exhibit 6 (Declaration of Leah Orloff at ¶ 4).

25 <sup>353</sup> *Id.*

26 <sup>354</sup> *Id.*, Exhibit 7 (Declaration of Doug Chun at ¶ 3).

27 <sup>355</sup> *Id.*

28 <sup>356</sup> *Id.*, Exhibit 8 (Declaration of G. F. Duerig at ¶ 4).

1 interim T&O control measures since 2004. In 2006, which was a relatively mild algal growth  
2 season, these control measures cost approximately \$300,000 and were marginally effective.  
3 According to Ms. Duerig, Zone 7's retailers have continued to urge Zone 7 to include permanent,  
4 more effective T&O improvements to existing treatment plants. As of 2007 a feasibility study  
5 was underway to identify costs related to such improvements. Initial estimates for the T&O  
6 improvements to control algal derivatives ranged from \$9,000,000 to \$21,000,000.<sup>357</sup>

7 Similarly, Bruce Cabral, Water Quality Manager for the Utility Operations Division of the  
8 Santa Clara Valley Water District (SCVWD) stated that SCVWD has had to upgrade its  
9 powdered activated carbon (PAC) systems at its Penitencia and Rinconada water treatment plants  
10 (WTP) to address algae-related tastes and odors.<sup>358</sup> In addition, Mr. Cabral stated that SCVWD  
11 had to upgrade its Penitencia and Santa Teresa WTPs to ozone for primary disinfection in order to  
12 reduce disinfection byproducts and to improve the ability to remove taste and odors from source  
13 waters. SCVWD also added hydrogen peroxide which, when used together with ozone is  
14 intended to help with extreme T&O control. The Penitencia WTP and Rinconda WTPs had to use  
15 PAC in each year from 2003 to 2007 to ensure that water delivered to the public was aesthetically  
16 acceptable. In 2004, the Penitencia WTP used PAC for each of 97 days.<sup>359</sup>

17 According to Mic Stewart, Water Quality Manager for the Metropolitan Water District of  
18 Southern California (MWD), MWD has experienced a large number of T&O episodes.<sup>360</sup> Dr.  
19 Stewart stated that in 2002, MWD experienced 12 T&O events in reservoirs and conveyance  
20 facilities that required treatment with copper sulfate. Most of these facilities contained SWP

---

21  
22 <sup>357</sup> *Id.*

23 <sup>358</sup> *Id.*, Exhibit 9 (Declaration of Bruce Cabral at ¶ 4).

24 <sup>359</sup> *Id.*

25 <sup>360</sup> *Id.*, Exhibit 10 (Declaration of Mic Stewart at ¶ 6). *See also* attachments to this exhibit which  
26 include presentations given by MWD to its member agencies to report on the T&O incidents and  
27 the resulting management efforts taken during 2002, 2004, 2005 and 2006. Excerpts from  
28 MWDSC's Annual Report to the Drinking Water Program for 2003 through 2006 are also  
included in Exhibit 10. These excerpts document and describe the complaints received as well as  
the corrective actions taken.

1 water. Dr. Stewart explained that algal productivity is significantly greater in SWP water than in  
2 MWD's other source, the Colorado River water (a finding that has been confirmed in lab tests).<sup>361</sup>  
3 In 2005, MWD experienced another 12 episodes requiring treatment. Even so, water delivered to  
4 the public exceeded public acceptance threshold levels for MIB and/or Geosmin in each year  
5 from 2001 to 2005. In 2004, concentrations of Geosmin reached 55 ng/L in water served from  
6 MWD's Joseph Jensen Filtration Plant. Geosmin has an earthy/musty odor that some consumers  
7 can begin to detect at concentrations as low as 5 ng/L. The SWP is the source of supply for the  
8 Jensen Filtration Plant.<sup>362</sup>

9 Information in the record submitted with the Water Agencies comments on the Regional  
10 Board's Public Health Issue paper further document on-going nuisance conditions within MWD's  
11 service area due to excess nutrients in the SWP supply and MWD's comprehensive program to  
12 monitor and manage algae in its source water reservoirs.<sup>363</sup>

13 Managing algal blooms through the application of copper sulfate and other aquatic  
14 herbicides to reservoirs and conveyance facilities creates other problems. SBA SWP contractors  
15 have reported spikes in T&O compounds after the application of copper sulfate due to the large  
16 mass of decaying algae and release of off-flavor compounds from within their cells.<sup>364</sup> Large  
17 masses of decaying algae resulting from copper sulfate treatments can also impact water  
18 treatment plant operations, especially during the first couple events of the year.<sup>365</sup>

19 Algal cell death can have more serious consequences as well, since algal toxins can be  
20 released. Microcystin, an algal neurotoxin, is currently under consideration for regulation by U.S.

21 \_\_\_\_\_  
22 <sup>361</sup> *Id.* at ¶ 8. *See also* Staff RTC, p. 30.

23 <sup>362</sup> Water Agencies' 2007 Comments, *supra*, Exhibit 10 (Declaration of Mic Stewart at ¶ 6).

24 <sup>363</sup> *See* Taylor, W. D., et al., "Early Warning and Management of Surface Water Taste-and-Odor  
25 Events", Project No. 2614 (Denver, CO: AwwaRF, 2006); Taylor, B., "T&O Events 2008 and  
26 Quagga Mussel Management in Lakes" (Presentation). MWDSC Member Agency Water Quality  
27 Managers Meeting, Los Angeles, CA, November 6, 2008.

28 <sup>364</sup> *See, e.g.*, Water Agencies' 2007 Comments, *supra*, Exhibit 9 (Declaration of Bruce Cabral at  
¶ 3).

<sup>365</sup> *See, e.g., id.*, Exhibit 7 (Declaration of Doug Chun at ¶ 3).

1 EPA under the Safe Drinking Water Act. The North Coast Regional Water Quality Control  
2 Board and the U.S. EPA have warned that microcystins from algae blooms in the Klamath River  
3 present a significant potential health threat to humans.<sup>366</sup> Blooms of *Microcystis aeruginosa*,  
4 cyanobacteria that produce microcystin, have been detected in Delta waters at an increasing  
5 frequency and magnitude since 1999 (Water Agencies Comments on the Tentative Permit at  
6 18).<sup>367</sup> There has been sufficient concern among local public health officials to post warnings  
7 against body contact recreation in Delta waters.<sup>368</sup>

8 In recent years, there have been greater restrictions placed on the use of copper sulfate and  
9 other aquatic herbicides in source water reservoirs. As previously mentioned, the application of  
10 aquatic herbicides by DWR at Clifton Court Forebay was recently suspended over concerns of  
11 impacts to listed fish species in the Delta. The use of aquatic pesticides is also regulated under  
12 the Statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed  
13 Control in Waters of the U.S., adopted by the State Board in May 2004.<sup>369</sup> U.S. EPA has revised  
14 the copper sulfate label to limit the relative size of the area that can be treated in any one  
15 application and limit the timing of successive applications to protect non-target species. These  
16 constraints challenge water agencies' abilities to address T&O and other algae related issues.<sup>370</sup>

17  
18 <sup>366</sup> Eureka Reporter. "Authorities Advise Caution on Klamath River," *The Eureka Reporter*,  
October 4, 2005.

19 <sup>367</sup> Lehman, P. W., G. Boyer, C. Hall, S. Waller and K. Gehrts. 2005. Distribution and toxicity of  
20 a new colonial *Microcystis aeruginosa* bloom in the San Francisco Bay Estuary, California.  
*Hydrobiologia* 541:87-99. Water Agencies Comments on the Tentative Permit at 18.

21 <sup>368</sup> Breitler, A. "Tainted Delta Water May Pose Danger; Toxic Algae Levels High Enough To Kill  
22 Pets, Sicken Users," *The Record* (Stockton, CA), September 14, 2007.

23 <sup>369</sup> In November 2006, U.S. EPA adopted a regulation that adds pesticide application to waters of  
24 the U.S. to the list of discharges that do not require NPDES permits. It is uncertain if the  
25 SWRCB will rescind the General Permit in response to the U.S. EPA regulation. The SWRCB's  
26 chief counsel has recommended that the permit not be rescinded, pending the outcome of legal  
27 challenges to the new U. S. EPA regulation (*see* State Water Resources Control Board, Office of  
28 Chief Counsel, "New Pesticide Regulation" (memorandum, January 2, 2007),  
<http://www.waterboards.ca.gov/npdes/docs/aquatic/memorandum.pdf>). Permittees can file a  
Notice of Termination to terminate coverage under the General Permit or continue coverage until  
the SWRCB determines if any action is needed.

<sup>370</sup> *See, e.g.,* William D. Taylor et al., *Early Warning and Management of Surface Water Taste-  
and-Odor Events*, Project No. 2614 (Denver, CO: American Water Works Association Research



1 as much as 1 mg/L TOC as Delta water travels down the California Aqueduct from San Luis  
2 reservoir to Lake Silverwood.<sup>375</sup>

3 As the Regional Board noted, an increase in TOC results in an increased potential for the  
4 formation of trihalomethanes and other disinfection byproducts (DBPs) through drinking water  
5 treatment, as increased TOC in source water supplies (1) increases the quantity of DBP precursors  
6 available to react with disinfectants, and (2) increases the amount of disinfectant required. Since  
7 DBPs have been linked to cancer formation and harmful reproductive effects, U.S. EPA requires  
8 water suppliers to remove TOC from water treatment plant source waters.

9 An increase in source water TOC represents a degradation of water quality and a  
10 substantially increased burden on domestic water treatment plant operators to ensure that public  
11 health protection can be maintained. Both Mr. Chun of ACWD and Dr. Stewart of MWD  
12 detailed some of the water quality concerns that TOC poses to their respective agencies'  
13 operations.<sup>376</sup> Mr. Chun, for example, explained that for agencies like ACWD that use ozone as  
14 the primary disinfectant, "enhanced coagulation" treatment is often required to respond to higher  
15 TOC in the source waters and comply with the U.S. EPA's Stage 1 Disinfectants and Disinfection  
16 Byproducts Rule. Under these regulations, if the TOC running annual average is between 2.0 and  
17 4.0 mg/L, drinking water utilities must remove 25% of the TOC in the source water influent; if  
18 the running annual average exceeds 4 mg/L, utilities must achieve at least 35% removal. Mr.  
19 Chun explained that if ACWD's source water TOC concentrations increased by a mere 0.2 mg/L,  
20 ACWD's running annual average TOC would *exceed 4.0 mg/L with 8% greater frequency*,  
21 requiring more treatment and higher ozone doses and associated costs.<sup>377</sup>

---

22 Initial Assessment 6\_2005.pdf; U.S. Environmental Protection Agency, Region IX, 2006,  
23 Conceptual Model For Organic Carbon In The Central Valley And Sacramento-San Joaquin  
24 Delta, prepared by Tetra Tech, Inc.

25 <sup>375</sup> See MWD 2004, Letter to R. Caikoski, County of Sacramento, from Stewart, M.,  
26 Metropolitan Water District of S. Calif., Additional Information Relating to Comments on the  
27 Draft Environmental Impact Report for the Sacramento Regional Wastewater Treatment Plant  
28 2020 Master Plan, Jun 21, 2004.

<sup>376</sup> See Water Agencies' 2007 Comments, 2007, *supra*, Exhibits 7 and 10.

<sup>377</sup> *Id.*, Exhibit 7.

1 Another DBP of particular concern to water agencies that use ozone for disinfection of  
 2 Delta source water is bromate. Delta water is influenced by the salty waters of the San Francisco  
 3 Bay and therefore contains bromide, which is oxidized by ozone to form bromate. Bromate is a  
 4 regulated disinfection by-product and a known human carcinogen. When higher ozone dosages  
 5 are required to counteract the added demand of increased TOC loading, including algae growth,  
 6 bromate formation is increased,<sup>378</sup> and may jeopardize compliance with regulatory limits.

7  
 8 **4. Excess Nitrogen Has Adversely Affected The Nutrient Balance And  
 Changed the Aquatic Community**

9 The Regional Board also considered the effect of nitrogen from the Plant's discharge on  
 10 the N:P ratios in the Delta and the potential adverse consequences on the aquatic community.<sup>379</sup>  
 11 Numerous studies in systems around the world have repeatedly demonstrated that the N:P ratio  
 12 influences phytoplankton composition and the presence – or absence – of native species and  
 13 vegetation. Studies in North Carolina, Hong Kong, Tunisia, Germany, Florida, Norway,  
 14 Michigan, Spain, Korea, Japan, Washington DC (Chesapeake Bay), Tampa (Tampa Bay), and  
 15 Denmark, as well as in the laboratory support this finding.<sup>380</sup> In addition, there are several  
 16 examples of systems in Chesapeake Bay, Tampa Bay and coastal areas of Denmark where native  
 17 species rebounded and invasive species declined following a restoration of N:P ratios through  
 18 point source controls on nutrient loading.<sup>381</sup> Dr Glibert provides additional examples from the  
 19 Potomac River, the Ebro River Estuary, the Dutch Delta, Lake Veere, and the Hawkesbury-  
 20 Nepean River Estuary in Australia in her Declaration.<sup>382</sup>

21 Dr. Glibert explains the mechanism for the relationship between species composition and  
 22 the ratio of nitrogen to phosphorus available in the aquatic environment as follows:

23 <sup>378</sup> Issam N. Najm and Stuart W. Krasner, "Effects of Bromide and NOM on By-product  
 24 Formation," in *Journal AWWA* 87 (1995): 106-115.

25 <sup>379</sup> Permit p. J-7; RTC p. 31.

26 <sup>380</sup> Water Agencies Comments on the Tentative Permit at 19-23.

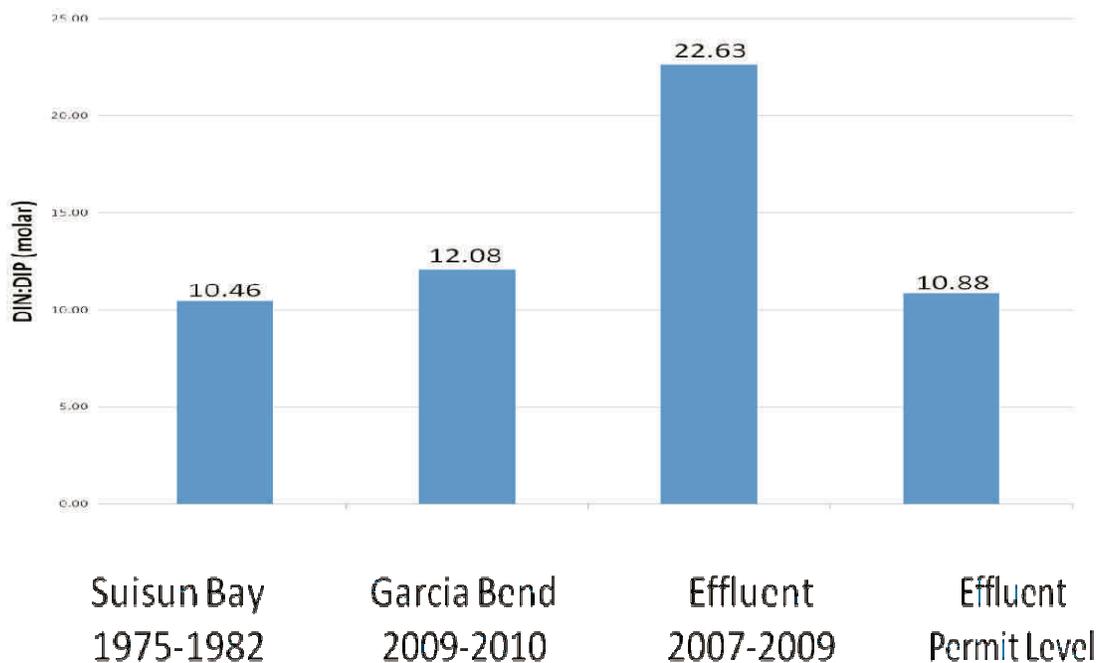
27 <sup>381</sup> Water Agencies Comments on the Tentative Permit at 23-24.

28 <sup>382</sup> Glibert at 44.

1 “The relative balance of nutrients affects all aspects of behavior  
 2 (i.e., in meeting nutritional demands), including growth rate,  
 3 fecundity, and ultimately the success of different populations  
 4 (Jeyasingh and Weidner 2005, 2007)... The different relative needs  
 5 for nutrients can be better understood by understanding the  
 6 elemental composition of different organismal structures. For  
 7 example, there is a greater need for P in skeleton and bone than in  
 8 skin, heart, kidney, muscle or brain (Sterner and Elser, 2002). The  
 9 latter all have a high N:P content (Sterner and Elser, 2002). As  
 10 emphasized by Sterner and Elser (2002, p. 254), ‘as one ascends the  
 11 pelagic food web... trophic groups grow increasingly nutrient and  
 12 especially P rich...’ Thus, fish community composition as well as  
 13 fish size should change as a function of N:P ratio (Sterner and  
 14 George, 2000; Sterner and Elser 2002).<sup>383</sup>

15 Thus, the nitrate limits set by the Regional Board are appropriate because reducing nitrate  
 16 will help to restore the nutrient balance to the levels that were present when native, pelagic  
 17 species were more abundant. Absent denitrification, the total ammonia nitrogen would be  
 18 removed, but because the total ammonia nitrogen would be converted to nitrate nitrogen, the  
 19 nutrient N:P ratios would not improve. In contrast, if the nitrate is also treated and reduced as in  
 20 the new Permit, the nutrient ratios would move towards a healthier, un-impacted level.

21 *Figure 2.*



27 <sup>383</sup> Glibert at 43; *see also* Glibert 2010a.

1 As shown in Figure 2,<sup>384</sup> with the nitrate and total ammonia nitrogen limits, the nutrient  
 2 ratios would approach a healthier, un-impacted ratio as found in Suisun Bay before the Treatment  
 3 Plant was constructed – and as is observed upstream of the Treatment Plant. Specifically, here,  
 4 the nitrate and total ammonia nitrogen limits set by the Permit would result in an N to P ratio of  
 5 approximately 10.88. As such, the discharge would approximate the N:P ratio of 10.46 that was  
 6 present in Suisun Bay *before* the Discharger began to impact the River and the Delta. That  
 7 provides one clear benchmark by which this Board can confirm the validity of the Regional  
 8 Board’s 10 mg/L nitrate limit. Indeed, as detailed above, before the Treatment Plant began  
 9 discharging tons of total ammonia nitrogen every day, there regularly were chlorophyll *a* blooms  
 10 in Suisun Bay.<sup>385</sup> Indeed, the Discharger agrees, pointing to substantially higher chlorophyll *a*  
 11 levels that pre-date the Treatment Plant.<sup>386</sup> These blooms are critical to a healthy estuary.

12 The reduced nitrate would likewise result in a nutrient ratio that approximates the nutrient  
 13 N:P ratio (12.08) from Garcia Bend just upstream of the Treatment Plant. The nutrient balance  
 14 upstream of the Plant – and therefore un-impacted by the Plant – provides yet another  
 15 straightforward metric that confirms the correctness of the nitrate limit in the Permit. Indeed,  
 16 using upstream water quality as support for the proper nitrate WQBEL would be fully consistent  
 17 with the Basin Plan which provides that “[m]aintenance of the existing high quality of water  
 18

19 <sup>384</sup> Figure 2 was presented by the Water Agencies at the Regional Board hearing, Slide 46. The  
 20 Suisun measurements are from the California Department of Water Resources EMP dataset 1975-  
 21 1982, Nitrate + nitrite 0.293 mg/L, total ammonia 0.043 mg/L and ortho-phosphate 0.071 mg/L.  
 22 The Garcia Bend data from Foe et al 2010: nitrate 0.116, nitrite 0.002, total ammonia 0.024,  
 23 phosphate 0.026. The effluent data are from the Discharger’s nitrate, total ammonia and total  
 24 phosphorus data for years 2007-2009 as provided to interested parties by Ms. Kathy Harder of the  
 Regional Board. Based on differences in total phosphorus and ortho-phosphate concentrations at  
 Hood and at Garcia Bend from Foe et al 2010, we assume that most of the total phosphorus  
 reported by the Discharger is inorganic ortho-phosphate and therefore comparable to the DIN:DIP  
 calculations for the other locations. If this assumption is false, then the effluent DIN:DIP would  
 be even higher than what is shown here.

25 <sup>385</sup> See, e.g., Ball, M. and J. Arthur, Planktonic Chlorophyll Dynamics in the Northern San  
 26 Francisco Bay and Delta, in T. Conomos, San Francisco Bay: The Urbanized Estuary. Pacific  
 27 Division, American Association for the Advancement of Science, San Francisco at 265-285  
 (1979); Dugdale Report, *supra*, at ¶ 5.

28 <sup>386</sup> Pet. at 85-86 and SR Figure 4 (graphing chlorophyll *a* data).

1 means maintenance of ‘background’ water quality conditions, i.e., the water quality found  
2 upstream or upgradient of the discharge, unaffected by other discharges.”<sup>387</sup>

3 Dr. Glibert confirms the need to reduce total nitrogen levels through both total ammonia  
4 nitrogen effluent limits and nitrate effluent limits,

5 without a rebalancing of the N:P ratios, the food web cannot  
6 recover to one supportive of higher pelagic production. Without  
7 rebalancing of the N:P ratios, the benthic food web, driven by  
8 invasive weed production and invasive bivalves will continue to  
9 thrive. Without rebalancing the N:P ratio, fish communities will  
10 continue to be dominated by predators. The N:P balance can and  
11 should be lowered and this can be accomplished without driving the  
12 system to severe nitrogen limitation. Removal of a significant  
13 amount of nitrogen (both ammonium and nitrate) through the  
14 requirements of the new permit is a move in the right direction and  
15 can be accomplished without developing severe nitrogen limitation  
16 in the system. Examples from the Potomac River and elsewhere  
17 support the conclusion that the food web will be altered favorably if  
18 and when nitrogen loads are reduced.<sup>388</sup>

### 13 **5. The Regional Board Appropriately Set the Nitrate Limit in 14 Consideration of All Adverse Impacts to Beneficial Uses**

15 The Regional Board set the nitrate limit at 10 mg/L, disallowing a human health mixing  
16 zone, “because elevated nitrogen discharges from the Facility have been shown to be negatively  
17 affecting the receiving water far downstream of the discharge within the Delta, not just the areas  
18 defined by the requested mixing zone. The allowance of the requested mixing zone for nitrate  
19 would compromise the integrity of the entire water body, adversely impact biologically sensitive  
20 or critical habitats, and produce undesirable or nuisance aquatic life.”<sup>389</sup>

21 The Discharger objects, arguing that the Regional Board based its finding on the SIP  
22 criteria for mixing zones when it should have used the Basin Plan.<sup>390</sup> The SIP criteria for mixing  
23 zones is only for priority pollutants, the Discharger says, and nitrate is not a priority pollutant.<sup>391</sup>

24 <sup>387</sup> See Basin Plan at IV-17.00.

25 <sup>388</sup> Glibert at 46.

26 <sup>389</sup> Staff report, p. 7; Permit pp. F-44 – F-45.

27 <sup>390</sup> Petition, p. 129.

28 <sup>391</sup> *Id.*

1 The Discharger admits that the Regional Board “considered the Basin Plan policy and TSD  
2 procedures and guidelines,” which it says is the correct criteria for consideration of mixing zones  
3 for nitrate.<sup>392</sup> But the Discharger says that doesn’t matter because the Regional Board specifically  
4 referenced the SIP criteria.<sup>393</sup> One problem with the Discharger’s hypertechnical argument is that  
5 the SIP and the Basin Plan criteria are effectively one and the same. The Basin Plan criteria state  
6 that a mixing zone shall not be granted unless “the discharger has demonstrated to the satisfaction  
7 of the Regional Board that the mixing zone will not adversely impact beneficial uses.” As the  
8 Regional Board found and the record shows, the downstream beneficial uses clearly would be  
9 impacted. Specifically, the integrity of the entire water body would be compromised, biologically  
10 sensitive or critical habitats would be adversely impacted and undesirable or nuisance aquatic life  
11 would be produced.

12 The Regional Board’s denial of a mixing zone for nitrate based on SIP criteria of adverse  
13 effects on biologically sensitive species and undesirable and nuisance conditions follows well  
14 established past practice. In a recently issued permit to Placer County Sewer Maintenance  
15 District 1, the Regional Board denied a mixing zone for the WQBEL of 10 mg/L nitrate on  
16 similar grounds as found in the Discharger’s permit. Having reviewed the mixing zone study  
17 provided by the discharger, the Regional Board denied the mixing zone finding that the mixing  
18 zone requirements as found in the SIP were not fulfilled. The Regional Board stated, “[e]xcess  
19 nutrients in the receiving water can have many detrimental effects on beneficial uses, including  
20 municipal and domestic supply, contact recreation, and aquatic life,” and denied a mixing zone  
21 based on the lack of analysis from the discharger, “demonstrating that granting a mixing zone  
22 would not adversely impact biologically sensitive aquatic resources or critical habitats, or produce  
23 undesirable or nuisance conditions.”<sup>394</sup> Thus, the Regional Board in establishing the nitrate  
24 WQBEL and denying the Discharger a mixing zone was consistent with past permitting practices

---

25 <sup>392</sup> *Id.*

26 <sup>393</sup> *Id.*

27 <sup>394</sup> Order No. R5-2010-0092 (Placer County Sewer Maintenance District No. 1), p. F-29 to F-31.  
28

1 protecting human health as well as preventing adverse effects to aquatic life and nuisance  
2 conditions.

3 In sum, the Regional Board properly found that the discharge of nitrate above 10 mg/L  
4 would violate primary water quality standards and standards for biostimulation, taste and odor,  
5 and adversely affect many of the Delta's designated beneficial uses. Far-reaching effects would  
6 adversely impact the River, the Delta, Suisun Bay, designated critical habitat for various listed  
7 species, distant water supply reservoirs, and municipal water treatment plants. Numeric nitrogen  
8 limits, at least as stringent as those in the permit, are mandated by these impacts. An acute  
9 mixing zone under these circumstances would be an abuse of agency discretion.

#### 10 **VIII. TERTIARY TREATMENT IS REQUIRED TO PROTECT PUBLIC HEALTH**

11 As stated previously in the Water Agencies' comments on the Tentative Permit<sup>395</sup>, while  
12 many of the Water Agencies provide drinking water and subject their supplies to advanced  
13 drinking water treatment to ensure that the water provided to their customers meets or exceeds all  
14 drinking water standards, maintaining high quality water at the source is an essential barrier in  
15 protecting customers from contaminants. The California Department of Public Health (CDPH)  
16 recognizes that multiple barriers are fundamental for ensuring water that is reliably safe to drink  
17 in light of real and potential threats to source water quality. The multi-barrier approach  
18 recognizes that while each individual barrier may not be able to completely remove or prevent  
19 contamination, and therefore protect public health, together the barriers of source water  
20 protection, multiple drinking water treatment processes, and protection of water quality in the  
21 distribution system, work to provide greater assurance that the water will be safe to drink. The  
22 Regional Board also recognized the importance of the multi-barrier approach to protecting public  
23 health in Resolution R5-2010-0079, Establishment of a Central Valley Drinking Water Policy for  
24 the Sacramento-San Joaquin Delta and Upstream Tributaries. Requiring the Discharger's effluent  
25 to meet tertiary treatment requirements is an important step in providing the first barrier to  
26 pathogens in drinking water supplies.

27 \_\_\_\_\_  
28 <sup>395</sup> See Water Agencies' October 8, 2010 Comments at 37.

1 In its Petition, the Discharger argues that in requiring tertiary treatment standards for  
 2 pathogens, the Regional Board “departed from its own precedent; employed an unreasonable  
 3 standard; made findings that are inconsistent with the Water Code or are completely without  
 4 evidentiary support (or both); misconstrued or mischaracterized evidence; ignored relevant  
 5 evidence altogether; and failed to respond to comments submitted by the District.”<sup>396</sup> More  
 6 specifically, the Discharger asserts that the Regional Board: (1) failed to conduct a Reasonable  
 7 Potential Analysis (RPA) as needed to support imposition of tertiary treatment requirements; (2)  
 8 ignored and re-characterized its “typical” practice of requiring tertiary treatment only where  
 9 dilution of the discharger’s effluent is less than 20 to 1; (3) mischaracterized the results of a risk  
 10 assessment performed by Dr. Charles Gerba which, in the Discharger’s view, shows that the risk  
 11 of illness from exposure to pathogens in its effluent falls within acceptable levels; (4) failed to  
 12 engage in a “balancing of factors,” as required under Water Codes sections 13241 and 13263(a);  
 13 and (5) erred in concluding that tertiary treatment represents BPTC for the Treatment Plant.<sup>397</sup>

14 None of these arguments has any merit and all have been addressed before at length by the  
 15 Regional Board, the Water Agencies and other stakeholders.<sup>398</sup> The claims regarding the RPA  
 16 and BPTC are ones that the Discharger makes with respect to several aspects of the Permit and,  
 17 for that reason, are addressed globally in Sections IV and VI.C of this Response. The  
 18 Discharger’s claims concerning the applicability of the 20:1 dilution ratio, the import of Dr.  
 19 Gerba’s risk assessment and the need for a balancing of factors are addressed below.

20 **A. The Discharger’s Reliance On The 20:1 Dilution Ratio Is Misplaced**

21 According to the Discharger, “Daily dilution of SWRTP effluent is always greater than  
 22 20:1, and ordinarily it is considerably much greater. It is not disputed that the average dilution of  
 23 the SRWTP effluent is over 50:1.”<sup>399</sup> The Discharger therefore believes that it should not be

24 <sup>396</sup> Petition, p. 26.

25 <sup>397</sup> *Id.*, pp. 25-55.

26 <sup>398</sup> *See, e.g.*, Permit, Attachment F (Fact Sheet), pp. F-72 to F-80; Staff RTC, , pp. 4-105; Water  
 27 Agencies’ Comments on Tentative Permit, pp. 37-41.

28 <sup>399</sup> Petition, p. 29.

1 required to implement tertiary treatment at its facility.<sup>400</sup> For the reasons discussed below, the  
2 Discharger's reliance on the 20:1 dilution ratio is misplaced.

3 **1. The Discharger Mischaracterizes the Available Level of Dilution**

4 At the outset, it should be noted that the Discharger's characterization of the available  
5 level of dilution is both false and misleading. First, the Discharger ignores the fact that under the  
6 Permit it is allowed to discharge effluent at a 14:1 dilution ratio on a rolling one-hour basis.<sup>401</sup>  
7 Only where the dilution ratio drops below this level is the Discharger prohibited from discharging  
8 into the Sacramento River.<sup>402</sup>

9 Second, while it is true that there are times when the available level of dilution is much  
10 more than 20:1 (typically in the winter and spring), historical data indicates that when low river  
11 flows are present they often persist for an extended period of time. For example, flows on the  
12 Sacramento River (Freeport Station) in April 1977 and in April, May and October 1992 were  
13 such that the available level of dilution for the Treatment Plant's effluent would have been less  
14 than 20:1 most of the time.<sup>403</sup> More recently, the available level of dilution was between 20:1 and  
15 30:1 for several weeks in January 2009, from mid-November to mid-December 2008, all of  
16 October 2008 and most of May 2008,<sup>404</sup> which is far less than the average dilution cited by the  
17 Discharger.

18 Third, operating at these lower river flows and dilution ratios for extended periods  
19 significantly increases the likelihood that effluent from the Treatment Plant will be diluted less  
20 than 20:1 at one or more times during the day. This is especially true given that the Permit allows  
21 the Discharger to discharge effluent at a 14:1 ratio on an hourly basis. This situation is  
22

23 <sup>400</sup> *Id.*, pp. 29-32.

24 <sup>401</sup> See Permit, p. 13, Discharge Prohibition III.F.

25 <sup>402</sup> *Ibid.*

26 <sup>403</sup> See Flow and River Discharge Data for Sacramento River at Freeport, found at  
27 [http://cdec.water.ca.gov/cgi-progs/staMeta?station\\_id=FPT](http://cdec.water.ca.gov/cgi-progs/staMeta?station_id=FPT).

28 <sup>404</sup> *Ibid.*

1 exacerbated by the fact that “[t]he Sacramento River at the point of discharge experiences tidal  
 2 flows that slow the river flow, and at times cause flow reversals.”<sup>405</sup> Reverse flow events can  
 3 occur throughout the year,<sup>406</sup> and when the river returns to flowing downstream, the Treatment  
 4 Plant’s ongoing discharge “double doses” the river with pollution.<sup>407</sup>

5 Support for the conclusion that the Treatment Plant’s effluent is not being consistently and  
 6 adequately diluted at all times comes from a dye study conducted by Brown and Caldwell in  
 7 November 2007, after diffusers at the Treatment Plant were modified in an effort to provide better  
 8 mixing of the effluent.<sup>408</sup> According to the study report, “The dates and times were selected to  
 9 correspond to predicted low river flows (under 3000 cubic feet per second (cfs)), during daylight  
 10 hours such that discharge plume measurements could be obtained prior to required effluent  
 11 diversion.”<sup>409</sup> This study revealed dilution ratios at or below 5:1 at locations 30 feet and 60 feet  
 12 downstream of the Treatment Plant’s diffusers and at or below 10:1 at locations 100 feet and 175  
 13 feet downstream of the diffusers, including at the surface of the river.<sup>410</sup>

## 14 2. The Discharger Misconstrues the Department of Public Health’s 15 Guidance Concerning Application of the 20:1 Dilution Ratio

16 In addition to mischaracterizing the available level of dilution, the Discharger also  
 17 misconstrues guidance issued by the California Department of Health Services (DHS) (the  
 18 predecessor to CDPH), regarding use of the 20:1 dilution ratio. Specifically, the Discharger cites  
 19 a letter dated July 1, 2003, in which the DHS indicated that a 23 most probable number (MPN)  
 20 standard (i.e., secondary treatment only) could be applied to wastewater discharges into receiving

21 <sup>405</sup> See Permit, Appendix F (Fact Sheet), pp. F-32, F-82; see also SRCSD 2003, Sacramento  
 22 Regional Wastewater Treatment Plant 2020 Master Plan Draft EIR, prepared by EDAW, Inc.,  
 August 2003, p. 7-18 [hereafter “Master Plan Draft EIR”].

23 <sup>406</sup> Permit, Appendix F (Fact Sheet), pp. F-32, F-82; Master Plan Draft EIR, p. 7-19.

24 <sup>407</sup> Permit, Appendix F (Fact Sheet), pp. F-32, F-82.

25 <sup>408</sup> See Brown and Caldwell, November 2007 Data Report Effluent Discharge Dilution And  
 26 Velocity Profiling Field Study In The Sacramento River.

27 <sup>409</sup> *Id.*, p. 1-1.

28 <sup>410</sup> See *id.*, Appendix A.

1 waters that are used for food crop irrigation or body contact recreation provided those discharges  
2 are diluted at least 20:1.<sup>411</sup> However, as the subject line of this letter makes clear, DHS was  
3 merely providing *recommendations* to the Regional Board for disinfection of wastewater  
4 discharges and simply stated that the 23 MPN standard was *acceptable* where the dilution of the  
5 effluent is greater than 20:1.<sup>412</sup> Nowhere in the letter does DHS suggest that the Regional Board  
6 could not or should not impose a more stringent treatment standard based on factors specific to  
7 the facility being permitted.<sup>413</sup>

8 Furthermore, in that letter DHS was not responding to inquiries from the Regional Board  
9 about a particular facility or permit. Rather, DHS was addressing general questions regarding the  
10 applicability and use of its uniform guidelines for disinfection of treated wastewater discharges.<sup>414</sup>  
11 As with the 2003 DHS letter, nothing in these guidelines indicates that they are binding when  
12 determining whether a discharger should be required to implement tertiary treatment.<sup>415</sup>

13 Had DHS been focused on a particular facility or specific set of facts (as CDPH was in  
14 this case), its recommendations may have been very different. For example, the Discharger notes  
15 that the 2003 DHS Letter states, “For wastewater discharges into streams that experience tidal  
16 influences, an instantaneous DR [dilution ratio] of less than 20:1 is acceptable as long as the  
17 average for each day exceeds 20:1.”<sup>416</sup> But clearly, the Sacramento River is not a “stream” and  
18 nothing suggests that this guidance from DHS was intended to apply to a very large river whose  
19 flow drops dramatically or reverses entirely on a relatively frequent basis.

21 <sup>411</sup> Petition, p. 29 [citing Letter from David P. Spath, Chief, Division of Drinking Water and  
22 Environmental Management, DHS, to Thomas R. Pinkos, Executive Officer, Regional Board,  
dated July 1, 2003 (hereafter “2003 DHS Letter”)].

23 <sup>412</sup> 2003 DHS Letter, p. 1.

24 <sup>413</sup> *Id.*, pp. 1-2.

25 <sup>414</sup> See *id.*, p. 1 [citing “Uniform Guidelines for Disinfection of Treated Wastewater Discharges”  
26 (hereafter “Uniform Guidelines”)].

27 <sup>415</sup> See Uniform Guidelines, pp. 1-4.

28 <sup>416</sup> Petition, p. 29.

1 Above all, the Discharger ignores the fact that the purpose of the recommendations and  
 2 guidance provided by DHS is to ensure that human health is protected. DHS makes this purpose  
 3 clear in yet another memorandum, which was issued to clarify the applicability of its Water  
 4 Recycling Criteria versus its Uniform Guidelines to surface water discharges and to “help in  
 5 assessing discharge proposals and making recommendations to the RWQCB’s [sic] which the  
 6 Department considers reasonable for public health.”<sup>417</sup> In discussing how the Uniform Guidelines  
 7 should be used, DHS stated:

8 It is important to note that under these circumstances, we are not  
 9 directly applying the nonrestricted, recreational impoundment  
 10 requirements of the [Water Recycling] Criteria, but instead are  
 11 simply making recommendations with supporting rationale for  
 12 treatment and quality requirements *which we consider to be*  
*protective of public health, taking into account case specific issues*  
 13 *such as percent dilution.*<sup>418</sup>

14 Finally, all of these points are reiterated by Carl Lischeske, current Chief of CDPH’s  
 15 Northern California Drinking Water Field Operations Branch. He states:

16 The Department developed the Uniform Guidelines nearly 30 years  
 17 ago in order to provide general guidance and a rough assessment of  
 18 health risks from a wastewater discharge. This was before the risks  
 19 associated with *Giardia* and *Cryptosporidium* were fully  
 20 understood. Also, the Uniform Guidelines were developed before  
 21 modern microbial risk assessment methodologies based on  
 22 monitoring data for pathogens were considered practical. While the  
 23 Uniform Guidelines and subsequent interpretation of the Uniform  
 24 Guidelines suggests that secondary treatment may be adequate if  
 25 dilution is 20:1 or greater, it is important to understand that an  
 26 actual risk assessment based on site-specific pathogen data is  
 27 superior to old, general guidance. *The overarching purpose of the*  
 28 *various recommendations and guidance provided by the*  
*Department has always been to ensure that human health is*  
*adequately protected, and in this respect site specific data and risk*  
*assessment studies will always trump the general guidance.*<sup>419</sup>

23 <sup>417</sup> See Memorandum from Jeff Stone, Recycled Water Unit, to Regional/District Engineers,  
 24 dated September 28, 2000 [hereafter “2000 DHS Memo”], p. 1.

25 <sup>418</sup> *Id.*, p. 3, emphasis added; see also Uniform Guidelines, p. 1 [“The Sanitary Engineering  
 26 Branch, State DHS, has prepared guidelines for various wastewater discharge situations for health  
 27 protection.”].

28 <sup>419</sup> Declaration of Carl Lischeske, Chief, Northern California Drinking Water Field Operations  
 Branch, California Department of Public Health, Drinking Water Program [hereafter “Lischeske  
 Declaration”], ¶ 11, emphasis added.

1 As discussed more fully below, the Regional Board sought specific guidance from DPH  
 2 on what level of pathogen treatment should be required as a condition of the new permit being  
 3 issued to the Discharger.<sup>420</sup> After conducting an initial review of available information, DPH  
 4 recommended that a formal risk assessment be conducted to determine the risks posed by the  
 5 facility's effluent to swimmers and other beneficial users.<sup>421</sup> Two separate assessments were  
 6 conducted<sup>422</sup>, both of which indicated that the risks of infection and/or illness from Giardia and  
 7 Cryptosporidium are above the levels that DPH considers acceptable (1:10,000), even when a  
 8 dilution factor of 20:1 is taken into account.<sup>423</sup> Accordingly, the Permit appropriately requires the  
 9 Discharger to meet a tertiary treatment standard for pathogens.

10 The Discharger is now trying to fall back on the general recommendations and guidance  
 11 from CDPH and its predecessor, DHS, suggesting that secondary treatment is sufficient where a  
 12 facility's effluent is diluted at least 20:1. But these recommendations and guidance are just that,  
 13 and while it may be appropriate to use them when the risks from a discharger's effluent stream  
 14 are not known, it is not appropriate to adhere to them in the face of actual data indicating that  
 15 these risks are above acceptable levels.<sup>424</sup>

### 16 **3. The Discharger's Treatment Facility is not Similar to Other Facilities** 17 **Where the 20:1 Dilution Ratio Has Been Applied**

18 The Discharger also argues the Regional Board ignored its "normal practice" of imposing  
 19 a tertiary treatment standard only where a facility's dilution ratio is less than 20:1.<sup>425</sup> The

20 <sup>420</sup> See discussion Section VII.B.2; see also Permit, Attachment F (Fact Sheet), pp. F-72 to F-80;  
 21 Lischeske Declaration, ¶ 3.

22 <sup>421</sup> *Ibid.*

23 <sup>422</sup> See Memorandum re: [Draft] Assumptions Used for Basic Risk Assessment, from Hope  
 24 Taylor, Ph.D., Larry Walker Associates, to Robert Seyfried, Discharger, dated June 10, 2009  
 25 [hereafter "LWA Risk Assessment"]; Final Report, Estimated Risk of Illness from Swimming in  
 26 the Sacramento River, prepared by from Charles Gerba, Ph.D., for the Discharger, dated February  
 27 23, 2010 [hereafter "Gerba Risk Assessment"].

28 <sup>423</sup> *Ibid.*; see also discussion Section VII.B.2; Permit, Attachment F (Fact Sheet), pp. F-72 to F-80;  
 Lischeske Declaration, ¶ 9

<sup>424</sup> Lischeske Declaration, ¶¶ 3-11.

<sup>425</sup> Petition, pp. 30-32.

1 Discharger cites to various permits where tertiary treatment is not required where the available  
2 dilution was at least 20:1 or, alternatively, has required tertiary treatment where the available  
3 dilution was not at least 20:1.<sup>426</sup>

4 As noted by the Regional Board, the 20:1 criterion is a “rule of thumb” and not a  
5 regulation.<sup>427</sup> Ignoring this common sense purpose of the 20:1 criterion, the Discharger tries to  
6 characterize it as rigid rule that is always followed, but which the Discharger itself acknowledges  
7 is not.<sup>428</sup> Indeed a closer look at the permits cited by the Discharger reaffirms the point that the  
8 20:1 criterion is merely a guideline, not a rule.

9 The Discharger tries but fails to distinguish two POTWs where 20:1 is dilution available,  
10 but tertiary filtration was not required: City of Angeles (Order No. R5-2007-0031) and Iron  
11 House Sanitation District (Order No. R5-2008-0057).<sup>429</sup> The Discharger attempts to distinguish  
12 these two POTWs on the basis that the decision to implement tertiary filtration was made by the  
13 POTW’s themselves as a result of their CEQA analyses.<sup>430</sup> But that does not distinguish these  
14 permits; rather, it provides more evidence that the 20:1 criterion always gives way to better, site-  
15 specific data and analyses. In the case of these “exceptions,” the better data just happened to be  
16 in the context of CEQA review proceedings as opposed to a subsequent NPDES permitting  
17 proceeding.

18 The Discharger next claims that it is similarly situated to the other permits where the  
19 available dilution is always greater than 20:1 and tertiary filtration has not been required.<sup>431</sup> First,  
20 as previously discussed, the Discharger does not always have 20:1 dilution available; it is  
21 permitted to discharge at 14:1 and in low river flow conditions can sometimes “double dose” the

22 \_\_\_\_\_  
23 <sup>426</sup> *Ibid.*

24 <sup>427</sup> Permit, Attachment F (Fact Sheet), p. F-74; *see also* Lischeske Declaration ¶ 11..

25 <sup>428</sup> Petition, pp. 29-30.

26 <sup>429</sup> *Id.*, p. 31.

27 <sup>430</sup> *Ibid.*

28 <sup>431</sup> Petition pp. 30-31.

1 river. Second, as the Regional Board pointed out, many of these other POTW's have far greater  
 2 than 20:1 dilution available.<sup>432</sup> Third, none of the other discharges are anywhere comparable to  
 3 the Discharger's Treatment Plant in terms of volume of discharge or potential water quality  
 4 degradation. These POTWs are orders of magnitude smaller, ranging in size from a permitted  
 5 flow of 0.65 mgd (City of Rio Vista, Beach WWTO, Order No. R5-2009-0037) to 12 mgd (City  
 6 of Chico, Order No R5-2010-0019). By contrast, the Discharger is permitted to discharge up to  
 7 181 mgd of treated wastewater into the middle of an extremely important ecological resource that  
 8 is used for wide array of environmental, recreational, agricultural and domestic water supply  
 9 purposes.

10 **B. Filtration Is Required to Protect Recreational And Agricultural Beneficial**  
 11 **Use**

12 **1. DPH's Recommended Risk Criterion Is Appropriate; The 1986 U.S.**  
 13 **EPA Criteria Are Not**

14 The Discharger argues that the risks posed by pathogens in its effluent fall below those  
 15 that formed the basis of the Ambient Water Quality Criteria for Bacteria issued by the U.S. EPA  
 16 in 1986 ("1986 EPA Criteria").<sup>433</sup> In those criteria, U.S. EPA indicated that mean levels of E.  
 17 coli and enterococci in freshwater bodies used for full contact recreation should not exceed 126 or  
 18 33, respectively, per 100 ml sample, which corresponded to an estimated illness rate of 8 per  
 19 1,000 swimmers.<sup>434</sup> The Discharger repeatedly refers to this risk level as one that is  
 20 "recommended" by or "acceptable" to U.S. EPA, implying that this is the standard against which  
 21 the need for tertiary treatment should be measured.<sup>435</sup> But that is not the case.

22 As noted in the Forward to the 1986 EPA Criteria, "The bacteriological water quality  
 23 criteria recommended in this document are based on an estimate of bacterial indicator counts and  
 24 gastrointestinal illnesses *that are currently being accepted, albeit unknowingly in many instances,*

25 <sup>432</sup> Permit, p. F-74.

26 <sup>433</sup> See Petition, pp. 34-35, 37-39.

27 <sup>434</sup> 1986 EPA Criteria, pp. 9, 16.

28 <sup>435</sup> See Petition, pp. 34-35, 37-39.

1 by the States.”<sup>436</sup> Similarly, on page 10 it states, “The levels displayed in Table 4 depend not  
 2 only on the assumed standard deviation of log densities, but also on the chosen level of acceptable  
 3 risk. *While this level was based on historically accepted risk, it is still arbitrary insofar as the*  
 4 *historical risk was itself arbitrary.*”<sup>437</sup> Clearly, the 1986 EPA Criteria do not constitute a gold  
 5 standard, but rather represent the *minimum* level of bacterial control recommended by U.S. EPA.  
 6 In this regard, the 1986 EPA Criteria expressly notes, “Wherever bacteriological indicator counts  
 7 can consistently be calculated to give illness rates lower than the general estimate, or when the  
 8 State desires a lower rate indicator bacteria levels commensurate with the lower rate should be  
 9 maintained in State water quality standards.”<sup>438</sup>

10 That “risk levels from the [1986 EPA Criteria] have been used in recent U.S. EPA  
 11 regulations adopting *regulatory* criteria for various states”<sup>439</sup> misses the point. What is relevant is  
 12 that CDPH has stated emphatically that it does *not* consider the 1986 EPA Criteria to be adequate  
 13 for protection of public health:

14  
 15 Federal Standards for water quality where recreational bathing may  
 16 occur were developed for freshwaters which are not directly  
 17 influenced by sewage discharges (treated or untreated). Under  
 18 these situations, a bathing standard for fecal coliform was  
 19 established at 200 mpn/100 ml based on not less than five samples  
 20 collected over not more than a 30 day period. *The Department has*  
 21 *taken the position that this standard is not adequately protective of*  
 22 *public health for water that receive all, or a large portion, of the*  
 23 *flow from treated municipal discharges.*<sup>440</sup>

24 <sup>436</sup> 1986 EPA Criteria, p. iii, emphasis added.

25 <sup>437</sup> *Id.*, p. 10, emphasis added; see also *id.*, p. 9.

26 <sup>438</sup> *Id.*, p. iii.

27 <sup>439</sup> Petition, p. 38. Specifically, the Discharger cites the Beaches and Environmental Assessment  
 28 and Coastal Health Act of 2000, Pub.L. No. 106-284 (Oct. 10, 2000) 114 Stat. 870 [codified at 33  
 U.S.C. § 1313(i)], and 2004 Water Quality Standards for Coastal and Great Lakes Recreation  
 Waters, 40 C.F.R. § 131.41. The former required states to adopt criteria and standards *at least* as  
 stringent as those set forth in the 1986 EPA Criteria for coastal recreation waters [see 33 U.S.C. §  
 1313(i)(2)], whereas the latter imposed such criteria and standards on certain states that had failed  
 to do so.

<sup>440</sup> 2000 DHS Memo, p. 2, underscoring in original, italics added; see also Lischeske Declaration,  
 ¶ 7.

1           The focus of the 1986 EPA Criteria and the standards that have been adopted by U.S. EPA  
 2 and states to implement the 1986 EPA Criteria is on *ambient* levels of pathogens,<sup>441</sup> which may  
 3 come from a number of sources and be impacted by a variety of factors. These standards are not  
 4 effluent limitations, which necessarily must be more stringent in order to ensure compliance with  
 5 such standards. This point was aptly addressed by the Regional Board in its Permit Fact Sheet,  
 6 which stated:

7           If a controllable sewage treatment plant discharge is allowed to add  
 8 pathogens to a receiving water such that the health risk is at the  
 9 USEPA Beach Standard [1986 EPA Criteria], the uncontrollable  
 10 sources and contribution of pathogens from wildlife, non-point  
 11 source pollution, and the recreationalists, will cause the overall  
 12 health risk to exceed the 8 illness per 1000 exposures. If the Beach  
 13 Standard is applied to the SRCSD discharge, under the most critical  
 14 river conditions, the SRCSD discharge would cause nearly 1 of  
 15 every 100 people ingesting river water during recreation to become  
 16 ill from pathogens in the SRCSD discharge, which is in addition to  
 17 any contribution of health risk from other sources.<sup>442</sup>

18           The Discharger takes issue with these statements asserting, “[T]he U.S. EPA acceptable risk level  
 19 was developed with specific attention to waters affected by wastewater discharge. The U.S. EPA  
 20 freshwater recreational criteria are values developed to assist states in the development of bathing  
 21 standards, and the criteria are intended to represent an acceptable rate of illness.”<sup>443</sup>

22           As discussed, the risks levels in the 1986 EPA Criteria are ones that were “historically  
 23 accepted,” not ones that are ideal, and U.S. EPA has expressly encouraged states to maintain  
 24 lower risk levels where possible. Furthermore, while it is true that the health risk studies that  
 25 formed the basis of the 1986 EPA Criteria focused on water bodies that were impacted by point  
 26 sources, it is not clear that all of these were sewage treatment plants.<sup>444</sup> More importantly,

27 <sup>441</sup> See, e.g., 1986 EPA Criteria, p. iii [“Water quality criteria associated with specific ambient  
 28 water uses when adopted as State water quality standards under section 303 become enforceable  
 maximum levels of a pollutant in ambient waters.”].

<sup>442</sup> Permit, Appendix F (Fact Sheet), pp. 76-77; see also Lischeske Declaration, ¶ 5 [stating that  
 “not only should health standards be met, but also, when lower exposure levels can be reasonably  
 achieved, those lower levels should be used”].

<sup>443</sup> Petition, p. 37.

<sup>444</sup> See 1986 EPA Criteria, pp. 3-4 [describing study design]. Ironically, the 1986 EPA Criteria  
 notes that for the marine studies conducted in New York City and Boston Harbor, the “barely

1 whether these studies were focused on point sources or nonpoint sources does not alter the fact  
 2 the 1986 EPA Criteria and their progeny establish *ambient* limits on the amount of bacteria  
 3 present in waters affected by discharges, not *effluent* limits on the amount of bacteria present in  
 4 those discharges. The Discharger essentially concedes this point when it states that 1986 EPA  
 5 Criteria were intended “to assist states in developing bathing standards,” in other words, water  
 6 quality standards.<sup>445</sup>

7 The Discharger tries to skirt around the distinction stating, “The District has *not*  
 8 contended that the U.S. EPA recommended risk level should be the water quality objective or that  
 9 the SRWTP disinfection requirements should be changed to allow discharge that would precisely  
 10 result in this risk level in the Sacramento River; the District has consistently pointed out that  
 11 under all conditions, the actual risks in the river are dramatically lower than the acceptable risk  
 12 level used by U.S. EPA and many states.”<sup>446</sup> But this statement conflates water quality standards  
 13 with effluent limitations, which might result in unlawfully avoiding the obligations associated  
 14 with the latter.

15 In this case, the requirement for tertiary treatment is an effluent limitation<sup>447</sup> that is  
 16 appropriately based on reducing the risk of infection to 1 in 10,000 or less as recommended by  
 17 DPH.<sup>448</sup> The Discharger cannot avoid that effluent limitation on the basis that its discharges may

---

19 acceptable” beaches selected for analysis were ones that “were contaminated with pollution from  
 20 multiple point sources, *usually treated effluents that have been disinfected.*” 1986 EPA Criteria,  
 21 p. 3, emphasis added.

22 <sup>445</sup> Petition, p. 37.

23 <sup>446</sup> Petition, pp. 38-39.

24 <sup>447</sup> See Permit, § IV.A.1.g.

25 <sup>448</sup> See letter from Gary Yamamoto, CDPH to Ken Landau, dated June 15, 2010  
 26 [recommending that Discharger provide “additional treatment sufficient to reduce the  
 27 additional risk of infection posed by exposure to its discharge to as close to 1 in 10,000 as  
 28 can be achieved by a cost-effective combination of using filtration and/or a disinfection  
 process that effectively inactivates *Giardia* cysts and *Cryptosporidium* oocysts”]; see also  
 Section VII.B.2, *infra* [discussing DPH recommendations]; Lischeske Declaration, ¶¶ 3-  
 11.

1 already meet the ambient water quality standard for pathogens.<sup>449</sup> It must comply with *both*, and  
 2 that is exactly what is being required in the Permit.<sup>450</sup>

3 Finally, the Discharger asserts that the tertiary treatment requirements are inappropriate  
 4 because they are based on Title 22 regulations pertaining to the direct use of recycled water for  
 5 irrigation of food crops, unrestricted contact recreation and other purposes.<sup>451</sup> The Discharger  
 6 notes that these regulations apply only where there is no intervening discharge of the recycled  
 7 water into waters of the State and, as such, they “have no application or relevance here.”<sup>452</sup>

8 In the Permit Fact Sheet, the Regional Board acknowledged that Title 22 was not directly  
 9 applicable to surface waters.<sup>453</sup> But it then went on state:

10 The Central Valley Water Board finds it is appropriate to apply an  
 11 equivalent level of treatment to that required by the Department of  
 12 Public Health’s reclamation criteria because the receiving water is  
 13 used for irrigation of agricultural land and for contact recreation  
 14 purposes. The stringent disinfection criteria of Title 22 are  
 appropriate since the partially diluted effluent may be used for the  
 irrigation of food crops and/or for body-contact water recreation.<sup>454</sup>

15 Thus, the Regional Board did *not* directly apply the Title 22 reclamation criteria, but instead  
 16 required “an equivalent level of treatment.” The Regional Board then devoted six single-spaced  
 17 pages to explain why that level of treatment is needed at the Treatment Plant.<sup>455</sup>

18 This exact argument was raised in a State Board petition filed by the City of Woodland in

---

19 <sup>449</sup> This standard is found in the Basin Plan’s water quality objective for bacteria in inland surface  
 20 waters which provides, “In waters designated for contact recreation (REC-1), the fecal coliform  
 21 concentration based on a minimum of not less than five samples for any 30-day period shall not  
 exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of  
 samples taken during any 30-day period exceed 400/100 ml.” (See Basin Plan, Chapter III, p. III-  
 3.)

22 <sup>450</sup> See Permit, § IV.A.1.g [total coliform effluent limitation] and § V.A.1 [bacteria receiving  
 23 water limitation].

24 <sup>451</sup> Petition, p. 26.

25 <sup>452</sup> *Id.*, p. 28.

26 <sup>453</sup> See Permit, Attachment F (Fact Sheet), p. 73.

27 <sup>454</sup> *Ibid.*

28 <sup>455</sup> *Id.*, pp. F-73 to F-78.

1 April 2003.<sup>456</sup> As in this case, Woodland asserted it should not be required to implement tertiary  
 2 treatment for control of pathogens at its Water Pollution Control Facility.<sup>457</sup> Among other things,  
 3 Woodland argued that the requirement for tertiary treatment was “illegally based on the  
 4 Department of Health (Department) reclamation criteria.”<sup>458</sup> The State Board rejected this  
 5 argument stating:

6           The Regional Board did not illegally apply the Department’s  
 7 reclamation criteria, found in Title 22 of the California Code of  
 8 Regulations, to Woodland discharge. The permit recognizes that  
 9 the criteria govern the reuse of wastewater and are not directly  
 10 applicable to a surface water discharge. Nevertheless, the Regional  
 11 Board found that the treatment level and total coliform effluent  
 12 limit prescribed in Title 22 for wastewater reused for spray  
 irrigation of food crops, parks and other publicly-accessible areas  
 were appropriate to protect Tule Canal’s agricultural irrigation and  
 contact recreation uses. *In reaching this conclusion, the Regional  
 Board properly applied its judgment, guided by the Department’s  
 recommendation, to the facts specific to the Woodland discharge.*<sup>459</sup>

13 Here, too, the Regional Board has properly exercised its discretion, guided by DPH  
 14 recommendations and facts specific to this case, in requiring the Discharger to implement tertiary  
 15 treatment at the Treatment Plant. That discretion should be respected.

## 16           **2. The Discharger’s Recreational Use Risk Assessment Was Not “Overly 17           Conservative”**

18           The conclusion in the Gerba Risk Assessment that pathogens in the Discharger’s effluent  
 19 do not pose a risk to human health was based on a comparison of the computed risks with the risk  
 20 levels set forth in 1986 EPA Criteria.<sup>460</sup> In June 2010, CDPH reiterated its prior position that  
 21 these criteria are not appropriate stating, “In the case of the SRCSD discharge, the CDPH does  
 22 not consider conformance with the EPA’s Recreational Water Quality Criteria (Criteria) to

23 \_\_\_\_\_  
 24 <sup>456</sup> See State Board Order WQO 2004-0010.

25 <sup>457</sup> *Id.*, pp. 2-4.

26 <sup>458</sup> *Id.*, p. 9.

27 <sup>459</sup> *Id.*, p. 11, emphasis added.

28 <sup>460</sup> See Gerba Risk Assessment, pp. 3-4, 9-10.

1 provide adequate public health protection.”<sup>461</sup> Yet, when CDPH restated that the acceptable risk  
2 level of 1 in 10,000 was the appropriate one to use, the Discharger started recasting the  
3 assumptions used in the Gerba Risk Assessment as being too conservative.

4 Indeed, the Discharger now claims that the assumptions used in the Gerba Risk  
5 Assessment were overly conservative and that changing only one assumption would reduce the  
6 risk to below the CDPH level.<sup>462</sup> But this ignores the reality that these assumptions were agreed  
7 to by the Discharger, CDPH and Regional Board staff as reasonable and appropriate for the risk  
8 assessment, and the report was reviewed and finalized based on these agreed-upon assumptions.

9 <sup>463</sup> As discussed in the following paragraphs, the assumptions used in the Gerba Risk Assessment  
10 were not overly conservative.

11 Another consultant hired by the Discharger concluded that the risk was substantially  
12 higher than Dr. Gerba concluded based on the same Discharger data, the same risk assessment  
13 methodology, and assumptions that better protect public health.<sup>464</sup>

14 CDPH requested a formal risk assessment be conducted after a rough assessment of the  
15 Discharger data.<sup>465</sup> As stated previously, CDPH uses an acceptable risk level of 0.01% or 1 in  
16 10,000.<sup>466</sup> The Discharger contracted with Larry Walker Associates to conduct a risk assessment  
17 and Larry Walker Associates concluded there was a 0.07% to 0.72% chance of becoming infected  
18 with *Cryptosporidium*.<sup>467</sup> This corresponds to 7 in 10,000 to 72 in 10,000 swimmers becoming  
19 infected and is substantially higher than the CDPH acceptable risk level

20 The Discharger then contracted with Dr. Gerba to conduct a risk assessment. The Gerba

21 \_\_\_\_\_  
22 <sup>461</sup> See letter from Gary Yamamoto, CDPH, to Ken Landau, Regional Board, dated June 15, 2010.

23 <sup>462</sup> Petition, p. 36.

24 <sup>463</sup> Lisheske Declaration, ¶¶ 3, 6.

25 <sup>464</sup> See LWA Risk Assessment.

26 <sup>465</sup> Lisheske Declaration, ¶ 3.

27 <sup>466</sup> *Ibid.*

28 <sup>467</sup> See LWA Risk Assessment, p. 5.

1 Risk Assessment shows that the average risk of infection (which is roughly twice the risk of  
 2 illness that he reported in his report) exceeded the CDPH guidance of 1 additional illness in  
 3 10,000 in 20:1 diluted effluent and at River Mile 44, 3 miles downstream of the discharge.<sup>468</sup> As  
 4 stated previously, the assumptions used by Dr. Gerba were agreed to by the Discharger, CDPH,  
 5 and Regional Board staff.<sup>469</sup> We review these assumptions here to provide perspective on how  
 6 reasonable or conservative they really were.

7 ***Efficiency of Analytical Method*** – Dr. Gerba based his assumptions on efficiency of the  
 8 analytical methods on a study that was conducted by the Department of Water Resources (DWR)  
 9 with Delta water.<sup>470</sup> Dr. Gerba, the Discharger, CDPH, and the Regional Board agreed to use an  
 10 efficiency of 25% for *Giardia* and 54% for *Cryptosporidium* based on the average efficiencies  
 11 from the DWR study. Four sites were analyzed in the DWR study (Sacramento River at Hood,  
 12 Barker Slough, Bethany Forebay, and the San Joaquin River at Vernalis).<sup>471</sup> The Hood site is  
 13 approximately 8 miles downstream of the Discharger’s discharge location and represents the site  
 14 that is most similar to the discharge location. This site had the lowest recoveries for *Giardia*  
 15 (0.5%) and *Cryptosporidium* (36%).<sup>472</sup> Rather than use the percent recoveries most applicable to  
 16 the discharge location, the Gerba Risk Assessment rationalizes using the average recoveries from  
 17

18 <sup>468</sup> Gerba Risk Assessment, p. 13-16. The Gerba Risk Assessment shows that the average risk  
 19 triples from upstream of the discharge (Freeport) to downstream of the discharge (River Mile 44).  
 20 Neither of the upstream sites that were evaluated in the Gerba Risk Assessment is truly  
 21 representative of upstream conditions. The Veteran’s Bridge site is too far upstream. The high  
 22 quality American River enters the Sacramento River between Veteran’s Bridge and the discharge  
 23 location so Veteran’s Bridge data are not useful for comparing pathogen risks upstream and  
 24 downstream of the discharge. Freeport is immediately upstream and is impacted by the discharge  
 25 due to reverse flows that occur during high tides, so it does not reflect conditions that are truly  
 26 upstream of the discharge. The next section on drinking water impacts contains more information  
 27 on the impact of the discharge on Freeport.

28 <sup>469</sup> Lischeske Declaration, ¶¶ 3, 6.

<sup>470</sup> See DiGiorgio, C., *et al.*, December 2002, *Cryptosporidium* and *Giardia* Recoveries in Natural  
 Waters by Using Environmental Protection Agency Method 1623, *App. Environ. Micro*, vol. 68,  
 pp. 5952-55.

<sup>471</sup> *Id.* pp. 5952-53.

<sup>472</sup> *Id.* p. 5952.

1 all four sites evaluated in the DWR study by conducting an analysis of turbidity data and claiming  
 2 that the turbidity was generally much lower than the turbidity found at Hood during the DWR  
 3 study. The DWR report clearly states, “Recoveries of 50% or less occurred in low- and high-  
 4 turbidity waters, suggesting that the nature of the turbidity or the background matrix of the water  
 5 was as important to recovery as was an absolute turbidity value. In the case of oocyst recoveries,  
 6 turbidity was unable to account for recovery differences between sites, while for cyst recoveries,  
 7 turbidity could explain inter-site differences.”<sup>473</sup> Apparently the Discharger did not provide Dr.  
 8 Gerba with data on the percent recovery for each of the District’s samples (a common practice  
 9 among laboratories conducting testing for *Giardia* and *Cryptosporidium*), so assumed recoveries  
 10 had to be used. Despite the poor recoveries at Hood, the only sample collected during the DWR  
 11 study that was positive for *Cryptosporidium* came from this site. A conservative assumption  
 12 would have been to use the recoveries from the Hood site (0.5% for *Giardia* and 36% for  
 13 *Cryptosporidium*).<sup>474</sup>

14 ***Percent of Cysts that are Infectious*** – Dr. Gerba, the Discharger, CDPH, and the  
 15 Regional Board agreed to use an assumption that 24% of the *Giardia* cysts and *Cryptosporidium*  
 16 oocysts are viable in treated wastewater. This assumption was based on one study that showed  
 17 that 40% of the *Cryptosporidium* oocysts are viable in untreated sewage. The 40% was  
 18 “adjusted” to 24% to reflect decreased viability after treatment. The most conservative  
 19 assumption would have been to assume that 100% of the cysts were viable.

20 ***Infectivity of Pathogens*** – Dr. Gerba, the Discharger, CDPH, and the Regional Board  
 21 agreed to use an assumption that the probability of infection is 2% from ingestion of one *Giardia*  
 22 cyst and 0.4% from ingestion of one *Cryptosporidium* oocyst. The 0.4% was originally used as  
 23 the infectivity constant a number of years ago. More recently, U.S. EPA reviewed  
 24 infectivity/dose response data for the Long Term 2 Enhanced Surface Water Treatment Rule and  
 25

26 <sup>473</sup> *Id.* p. 5954.

27 <sup>474</sup> In fact, Dr. Gerba used a more conservative assumption of 17% (rather than 25%) for  
 28 *Cryptosporidium* in a draft of his report.

1 produce a more realistic range of infectivity constants of 7 to 10% with an upper range of 16% for  
2 *Cryptosporidium*. The infectivity used in the Gerba Risk Assessment is a factor of 4 lower than  
3 the upper value of 16%. A conservative assumption would be that the probability of infection is  
4 16% and the most conservative assumption, since the Gerba Risk Assessment adjusted for  
5 infectivity of oocysts (see previous paragraph), would be that the probability of infection from  
6 ingesting one cyst or oocyst is 100%.

7 ***Risk Assessment with more Conservative Assumptions*** – If the more conservative  
8 assumptions are used, the risk increases by a factor of 1000. When evaluating a 20:1 dilution of  
9 the effluent, the risk of infection from *Cryptosporidium* from a single swimming event increases  
10 from 0.005% (Gerba Risk Assessment) to 7.6% at the 95 percentile level. The average risk  
11 increases from 0.003% to 4.7%. The true risk probably lies somewhere between the risk  
12 estimated in the Gerba Risk Assessment and the risk calculated with conservative assumptions.  
13 The point is that the Gerba Risk Assessment did not use overly conservative assumptions as the  
14 Discharger is currently claiming. This is substantiated by the fact that the District's other  
15 consultant, Larry Walker Associates, employed more conservative assumptions than those used in  
16 the Gerba Risk Assessment.

17 **C. Filtration is Required to Protect Municipal Use**

18 The Discharger's discharge is impacting the drinking water beneficial use of the  
19 Sacramento River. The CDPH and Regional Board position was that protecting the recreational  
20 beneficial use would also protect the drinking water beneficial use.

21 The entire Sacramento River is designated as a source of drinking water under State Water  
22 Board Resolution 88-63 and the high quality of that source must be maintained under State Water  
23 Board Resolution 68-16. There are currently no drinking water intakes immediately downstream  
24 of the Discharger's discharge location; however, there may be intakes on the Sacramento River  
25 downstream of the discharge in the future. The Bay Delta Conservation Plan is evaluating up to  
26 five intakes between Freeport and Courtland. The entire Sacramento River must be protected as a  
27 high quality source of drinking water.  
28

1 While there are currently no receiving water quality objectives for pathogenic protozoans  
 2 such as *Cryptosporidium* and *Giardia*, there are drinking water treatment requirements that are  
 3 based on source water levels of these organisms. The Interim Enhanced Surface Water Treatment  
 4 Rule (<http://water.epa.gov/lawsregs/rulesregs/sdwa/mdbp/ieswtrfr.cfm>) requires all water  
 5 treatment plants that treat surface water and serve more than 10,000 people to provide 2-log (99  
 6 percent) reduction/inactivation of *Cryptosporidium*. Water treatment plants are classified in one  
 7 of four bins based on monitoring for *Cryptosporidium* required by the Long-term 2 Enhanced  
 8 Surface Water Treatment Rule ([http://www.epa.gov/fedrgstr/EPA-WATER/2006/February/Day-](http://www.epa.gov/fedrgstr/EPA-WATER/2006/February/Day-06/w004.htm)  
 9 [06/w004.htm](http://www.epa.gov/fedrgstr/EPA-WATER/2006/February/Day-06/w004.htm)) as shown in Table 5. If the monitoring results place a water treatment plant in Bins  
 10 2 through 4, additional reduction/inactivation of *Cryptosporidium* is required. This rule  
 11 established a “microbial toolbox”, which contains various methods of achieving the additional  
 12 treatment requirements including watershed management, pretreatment, additional treatment, and  
 13 optimizing existing treatment processes.

14 Table 5. LT2ESWTR Bin Classification and  
 15 Action Requirements

Bin Classification	Maximum Running Annual Average (oocysts/L)	Action Required (log)
1	<0.075	none
2	0.075 to <1.0	1
3	1.0 to <3.0	2
4	≥3.0	2.5

20 Discharger data collected upstream of the discharge in the Sacramento River at Freeport  
 21 Marina (R1), 4,200 feet downstream of the discharge at Cliff’s Marina (R3), and in the SRWTP  
 22 effluent were analyzed to determine the bin levels that water treatment plants would fall into if an  
 23 intake was located upstream and downstream of the discharge. Table 6 shows that water  
 24 upstream of the discharge is high quality, requiring no additional treatment to remove/inactivate  
 25 *Cryptosporidium*. At the minimum 14:1 dilution of the effluent during normal operations, a water  
 26 treatment plant would be required to provide an additional two log (99.99 percent)  
 27 reduction/inactivation of *Cryptosporidium*. At 20:1 dilution and 50:1 dilution of the effluent, one  
 28

1 additional log reduction/inactivation would be required. The data collected from the Sacramento  
 2 River 4,200 feet downstream of the discharge show that one additional log removal would be  
 3 required at R3. The R3 data were collected under a variety of flow and discharge conditions  
 4 between December 2002 and April 2006 and are therefore representative of many different  
 5 dilutions of effluent and receiving water.

6 Table 6. Impacts of Current Discharger Discharge on  
 7 Drinking Water Treatment Requirements

8 Location	Highest 12- month Mean <sup>a</sup>	LT2ESWTR Bin Classification	Additional Log Removal
9 R1 (upstream)	0.05	1	None
10 14:1 Dilution of Effluent	1.02	3	2
11 20:1 Dilution of Effluent	0.73	2	1
12 50:1 Dilution of Effluent	0.30	2	1
R3 (0.5 mile downstream)	0.18	2	1

13 <sup>a</sup> Based on Discharger data collected between December 2002 and April 2006

14 The Discharger's *Cryptosporidium* data clearly indicate that the discharge is degrading  
 15 water quality and affecting the potential future use of the Sacramento River as a drinking water  
 16 supply downstream of the discharge. Requiring the Discharger's effluent to meet the recycled  
 17 water criteria will protect municipal water supplies as well as agricultural water supplies and  
 18 recreational use of the Sacramento River.

19 The discharge has already had impacts on the MUN beneficial use of the Sacramento  
 20 River. The Freeport Regional Water Authority intake is 6,000 feet upstream from the discharge  
 21 location. During high tides and low Sacramento River flows, the Sacramento River reverses  
 22 direction and flows upstream. Water cannot be diverted at the intake during reverse flows due to  
 23 concerns about the discharge adversely affecting water quality at the intake.<sup>475</sup> In addition, the  
 24

25 <sup>475</sup> Regional Board, NPDES Permit Renewal Issues Drinking Water Supply and Public Health  
 26 Issue Paper re Sacramento Regional County Sanitation District Sacramento Regional Wastewater  
 27 Treatment Plant (December 14, 2009) at p. 4 (stating: "The nearest drinking water intake to the  
 28 SRWTP discharge to the Sacramento River is the East Bay Municipal Utility District's (EBMUD)  
 Freeport Intake, approximately 1 mile upstream of the District's discharge. Under low river flow  
 and high tides, effluent could move up river to the vicinity of the Freeport Intake. An operational  
 agreement between SRCSD and EBMUD requires the diversion at the intake to cease during

1 North Bay Aqueduct Contractors have decided to pursue an intake upstream of the discharge  
2 rather than a less costly one downstream of the discharge.<sup>476</sup>

3 **D. The Regional Board Was Not Required To Adopt 13241 Findings**

4 The Discharger contends, among other things, that the Permit is problematic because the  
5 Regional Board gave only “cursory and superficial attention to its obligations under [California  
6 Water Code] section 13241.”<sup>477</sup> When applicable, Section 13241 requires a regional board to  
7 consider six factors in the promulgation of new Water Quality Objectives (“WQO”), including  
8 the beneficial uses of the water, environmental characteristics of the hydrographic unit, water  
9 quality conditions that could be reasonably achieved, economic considerations, the need for  
10 developing housing, and the need to develop and use recycled water. In particular, the Discharger  
11 argues that the Regional Board’s alleged failure to adequately consider the costs of treatment  
12 under Section 13241 has resulted in permit requirements that place an unjustified economic  
13 burden on the Discharger.<sup>478</sup>

14 When the Discharger commented on the Regional Board’s initial absence of findings  
15 under Section 13241, the Regional Board responded by providing an analysis of each of the six  
16 Section 13241 factors.<sup>479</sup> Although the Discharger contends that this analysis was insufficient, its  
17 argument is without merit because the Regional Board performed a Section 13241 analysis, and  
18 the method by which the Regional Board performed the analysis was within its discretion.<sup>480</sup> The  
19 only “economic considerations” that a Regional Board must consider under Section 13241 is the  
20

21 these conditions . . .”).

22 <sup>476</sup> See Hearing Transcript, p. 270.

23 <sup>477</sup> Petition, p. 9.

24 <sup>478</sup> *Id.*, pp. 50-51.

25 <sup>479</sup> Permit, Attachment F, at pp. F-77 to F-78.

26 <sup>480</sup> *City of Arcadia v. State Water Resources Control Board*, 135 Cal. App. 4th 1392, 1415 (2006)  
27 (Section 13241 “does not . . . specify a particular manner of compliance, and thus . . . the matter  
28 is within a regional board’s discretion”).

1 “cost of compliance,” which was clearly considered by the Regional Board here.<sup>481</sup>

2 In any event, the Regional Board did not need to engage in any Section 13241 analysis  
3 because the Regional Board’s permitting action was not a promulgation of a WQO. Rather, it  
4 was merely the implementation of an already-existing objective in the Basin Plan.<sup>482</sup> Water  
5 boards engage in a consideration of Section 13241 factors at the time they create a basin plan, and  
6 thus, need not repeat the analysis each and every time they institute a permit under that plan.  
7 Because the tertiary treatment limits set by the Regional Board in the Permit are not separate  
8 WQOs, the Regional Board had no obligation to conduct a Section 13241 analysis.

9 The Discharger argues alternatively that the Section 13241 requirements apply because  
10 the Permit contains Waste Discharge Requirements (“WDR”) governed by Section 13263, which  
11 exceed federal Clean Water Act standards. Section 13263 requires that a regional board consider  
12 certain factors in the implementation of WDRs, including those outlined in Section 13241. This  
13 statute, however, is pre-empted by federal law—in particular, the Clean Water Act—where the  
14 permit does not set standards more stringent than those required by the Clean Water Act.<sup>483</sup>  
15 Section 13377 of the Porter-Cologne Act (implementing the Clean Water Act) specifies that  
16 WDR permits must comply with federal standards, which in effect “forbids a regional board’s  
17 consideration of any economic hardship on the part of the permit holder if doing so would result  
18 in the dilution of the requirements set by Congress in the Clean Water Act.”<sup>484</sup> Accordingly,  
19 allowing the Regional Board to weigh economic considerations in its Permit would conflict with  
20 the Clean Water Act’s requirement that “publicly operated wastewater treatment plants . . . must  
21

22 \_\_\_\_\_  
23 <sup>481</sup> *City of Burbank v. State Water Resources Control Bd.*, 35 Cal. 4th 613, 625 (2005); Permit at F-77.

24 <sup>482</sup> *See In the Matter of the Petitions of Napa Sanitation District, et al., For Review of Waste*  
25 *Discharge Requirements*, Order No. 00-059, State Water Resources Control Board, Order No.  
26 WO 2001-16, at \*45 (December 5, 2001) (“Regional Boards are not required to consider the  
27 Section 13241 factors when implementing an existing Basin Plan objective”).

28 <sup>483</sup> *City of Burbank*, 35 Cal. 4th at 626 (internal citations omitted).

<sup>484</sup> *Id.*

1 comply with the act's clean water standards, regardless of cost."<sup>485</sup>

2 It is well-established that water boards need not address the factors in Sections 13241 and  
3 13263 for a WDR/NPDES permit "unless the permit is more stringent than what federal law  
4 requires."<sup>486</sup> A permit is not more stringent than the Clean Water Act simply because it places  
5 numerical limits where the Basin Plan had only narrative requirements. The State Board  
6 elaborated on this concept in its review of the discharge limits in the general NPDES permit for  
7 storm water associated with construction activities:

8 Federal law authorizes both narrative and numeric effluent  
9 limitations to meet state water quality standards. The use of  
10 [numeric effluent limits] to achieve compliance with water quality  
11 standards is not a more stringent requirement than the use of BMPs.  
Accordingly, the State Water Board does not need to take into  
account the factors in Water Code sections 13241 and 13263.<sup>487</sup>

12 Because the Permit at issue here is simply a numerical interpretation of the existing  
13 narrative WQOs (which themselves comply with but do not exceed Clean Water Act standards),  
14 and cannot be considered more stringent than what federal law requires, the Regional Board was  
15 prohibited from considering economic factors by the Clean Water Act. Finally, even assuming  
16 arguendo that the Permit is more stringent than the requirements of the Clean Water Act (which it  
17 is not), the Discharger's arguments are moot because, as discussed above, the Regional Board  
18 completed a fully sufficient Section 13241 analysis and issued corresponding findings.

19 **IX. THE INTERIM TOTAL AMMONIA NITROGEN EFFLUENT LIMITS MUST BE**  
20 **RESCINDED**

21 The Water Agencies request the State Water Board amend the Permit as follows:

- 22 • Revise the interim total ammonia nitrogen effluent limits to the lowest feasible limits.

23 In no respect should the Facility be permitted to increase its total ammonia nitrogen  
24

25 <sup>485</sup> *Id.*; see also 33 U.S.C. 1311(a), (b)(1)(B) & (C), 1342(a)(1) & (3).

26 <sup>486</sup> *NPDES General Permit for Storm Water Discharges*, State Water Resources Control Board,  
27 Order No. 2009-0009-DWQ, at \*39 (September 2, 2009).

28 <sup>487</sup> *Id.* at \*39-40.

1 concentration and loadings above the daily average and monthly average total  
2 ammonia nitrogen discharged over the past decade.

- 3 • Remove the interim total ammonia nitrogen effluent limits from the Permit setting the  
4 Waste Discharge Requirements and include them in an enforcement order.
- 5 • Revise the pollution prevention plan for total ammonia nitrogen to: (1) require an  
6 expedited evaluation of interim measures that would reduce the mass of total ammonia  
7 nitrogen loadings in the effluent until the full nitrification and denitrification are  
8 completed, and (2) expand and make certain that stakeholders will have the right to  
9 participate in a public process governing the development of the interim measures.

10 **A. The Interim Total Ammonia Nitrogen Effluent Limits Are Higher than the**  
11 **Existing Discharge**

12 The Permit set interim total ammonia nitrogen effluent limitations that exceed the  
13 Facility's current level of discharge. The Permit's interim total ammonia nitrogen effluent limits  
14 allow discharges that would further impair water quality, because the Order sets an interim daily  
15 average concentration limit for total ammonia nitrogen of 45 mg/L and a maximum daily total  
16 ammonia nitrogen loading limit of 67,929 lbs/day.<sup>488</sup> The Permit also sets an interim monthly  
17 average concentration limit for total ammonia nitrogen of 35 mg/L.<sup>489</sup> These limits allow the  
18 Discharger to discharge up to 140% more total ammonia nitrogen than the current average load  
19 until November 3, 2020.

20 These interim limits are too high because the Discharger can achieve significantly lower  
21 total ammonia nitrogen discharge levels during the interim period with the *existing* plant  
22 configuration. Indeed, the Permit's proposed interim daily total ammonia nitrogen concentration  
23 is close to double the plant's actual current discharge.<sup>490</sup> Further, the current discharge is not  
24 atypical. As demonstrated by the Discharger's own discharge monitoring data in the record

25 \_\_\_\_\_  
26 <sup>488</sup> Permit, at 16.

27 <sup>489</sup> Permit, at 16.

28 <sup>490</sup> Permit, at 16.

1 below, the Facility has consistently been discharging total ammonia nitrogen at levels lower than  
2 the interim limits. Indeed, as presented to the Regional Board at the December 9, 2010 hearing,  
3 over the past decade the Discharger has achieved a daily maximum total ammonia nitrogen  
4 concentration of less than 34 mg/L 99% of the time and a monthly average ammonia  
5 concentration of less than 30 mg/L 100% of the time.<sup>491</sup> Because these lower daily and monthly  
6 average total ammonia nitrogen concentrations can be achieved, the Orders should be revised to  
7 direct the Discharger to meet these lower daily and monthly average total ammonia nitrogen  
8 levels during the interim period.

9 To do otherwise would allow the Discharger another decade to exacerbate the impacts that  
10 the Regional Board found are being caused by the tons of total ammonia nitrogen discharged by  
11 the Discharger every day. The Water Agencies urge the Board to rescind the interim total  
12 ammonia nitrogen effluent limits. The overwhelming scientific evidence demonstrates that  
13 untreated total ammonia nitrogen is a key contributor to the decline of the food web that is  
14 essential to aquatic species in the Delta. Research by Richard Dugdale, Ph.D., and others  
15 indicates that until total ammonia nitrogen levels are lowered, the Delta's ecosystem will not be  
16 adequately protected and primary productivity will be impaired because ammonium from the  
17 discharge inhibits phytoplankton nitrate uptake and prevents phytoplankton blooms. Given these  
18 significant detrimental effects on the Delta ecosystem, interim total ammonia nitrogen effluent  
19 limits should not be set that allow an *increase* in total ammonia nitrogen loadings over the next  
20 ten years as increased levels of total ammonia nitrogen will necessarily result in increased harm to  
21 beneficial uses.

22 The interim limits violate federal antidegradation policy,<sup>492</sup> and California's  
23 Antidegradation Policy, State Water Resources Control Board Resolution No. 68-16 (Oct. 28,  
24 1968). Any activity that can lower the quality of high quality waters must comply with waste  
25

26 <sup>491</sup> Excerpt from December 9, 2010 slides accompanying "Water Agencies" Testimony (slides 47  
27 and 48 titled "Interim Limits Are Too High And Lower Levels Can Be Attained").

28 <sup>492</sup> 40 C.F.R. § 131.12.

1 discharge requirements that “will result in the best practicable treatment or control of the  
2 discharge necessary” to prevent pollution and nuisance and to maintain “the highest water quality  
3 consistent with maximum benefit to the people of the State.” BPTC certainly cannot be a *lesser*  
4 degree of treatment or control than is in place today.

5 For years, the Discharger has violated the narrative toxic objective established by the  
6 Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Under the Permit,  
7 the Discharger will continue, for ten years or more, to discharge total ammonia nitrogen waste in  
8 violation of that objective, waste that will continue to cause serious harm to the Delta ecosystem  
9 and the fish that depend on it. The Water Agencies urge the Board, as they urged the Regional  
10 Water Board, to lower the interim total ammonia nitrogen limits to a level that does not allow any  
11 further increase over existing levels.

12 **B. The Pollution Prevention Plan For Ammonia Is Not Rigorous Enough**

13 The Permit includes a pollution prevention plan for total ammonia nitrogen that directs the  
14 Discharger to submit its plan to the Regional Board within one year after the Permit is final.<sup>493</sup>

15 The Water Agencies recommend that the plan’s required activities be accelerated as much  
16 as possible. To that end, the Discharger should be directed to submit an Interim Measures Plan  
17 (recommended within 60 days of final approval of the Permit) that would propose measures to  
18 reduce the mass of total ammonia and nitrogen loadings in the effluent until full nitrification and  
19 denitrification treatment and control are completed. There may be options available to  
20 accomplish significant interim reductions, including side-stream treatment and expanded use of  
21 the Discharger’s recycled water program, that should be considered expeditiously and fully. As  
22 the Permit is silent on the role of the public in the process, the Water Agencies request that this  
23 Board clarify and confirm that the plan to study interim measures be made available to the public  
24 for comment before any further decisions are made, but that the Discharger begin implementing a  
25 plan to implement interim measures within six months of final approval of the Permit.

26  
27 \_\_\_\_\_  
28 <sup>493</sup> Permit, at 34.

1 **X. THE PERMIT'S REQUIREMENTS FOR NUTRIENT REMOVAL ARE**  
2 **NECESSARY TO REDUCE UNAUTHORIZED TAKE OF LISTED DELTA FISH**  
3 **SPECIES, AND THE INTERIM LIMITS SHOULD BE REDUCED OR**  
4 **ELIMINATED**

5 The adverse effect of the discharge on threatened and endangered fish species has not  
6 been authorized under either the federal Endangered Species Act (ESA) or the California  
7 Endangered Species Act (CESA), and has in fact resulted in a disproportionate regulatory burden  
8 being placed on the communities in the San Francisco Bay Area, the Central Coast, the San  
9 Joaquin Valley and Southern California. Without more stringent requirements, over the next  
10 decade the Discharger will continue to violate the ESA and CESA, because the ammonia nitrogen  
11 loadings and the thermal effects of the discharge will result in the "take" of protected species  
12 during the interim period. The Water Agencies recognize that the long delayed, advanced  
13 treatment facilities cannot be built overnight. However, the Board should include aggressive  
14 interim measures to mitigate the ongoing effects of the discharge to mitigate the impacts on  
15 protected species during development and construction. Accordingly, the Water Agencies urge  
16 the Board to revise the Permit and the Time Schedule Order to restrict interim discharges of total  
17 ammonia and nitrogen and require installation of full nutrient removal as soon as feasible. In  
18 addition, the Discharger must be required to take the steps needed to comply with the applicable  
19 Thermal Plan as soon as possible.

19 **A. The Existing Discharge and the Proposed Interim Limits Cause "Take" in**  
20 **Violation of the ESA and the CESA**

21 The Discharger is located within the designated critical habitat for five federally-listed  
22 fish species including winter- and spring-run Chinook salmon (*Oncorhynchus tshawytscha*),  
23 Steelhead (*O. mykiss*), Delta smelt (*Hypomesus transpacificus*) and Green sturgeon (*Acipenser*  
24 *medirostris*). California State Species of Special Concern include the Sacramento Splittail  
25 (*Pogonichthys macrolepidotus*) and the Central Valley Fall/Late-Fall Salmon (*Oncorhynchus*  
26 *tshawytscha*).

27 However, scientific evidence in the record demonstrates that the levels of total ammonia  
28 nitrogen in the discharge, and temperature changes caused by the discharge, have contributed to

1 the decline of listed species listed under the federal ESA and/or CESA that are dependent upon  
 2 the Sacramento River and the Delta. The high levels of total ammonia nitrogen in the discharge  
 3 directly (through increased toxicity) or indirectly (through adverse habitat modification and  
 4 degradation) injure or kill Delta smelt. The discharge causes temperature increases in the  
 5 Sacramento River to levels that are near lethal or lethal to Delta smelt and multiple runs of  
 6 salmon. This discharge violates section 9 of the ESA and section 2080 of the California Fish and  
 7 Game Code (the take prohibition under the CESA).

8 Section 9 of the ESA makes it unlawful for any person to “take” a listed species.<sup>494</sup>  
 9 “Take” means “harass, harm, pursue, hunt, wound, kill, trap, capture, or collect” any listed  
 10 species, or “to attempt to engage in any such conduct.”<sup>495</sup> Take is defined “in the broadest  
 11 possible manner to include every conceivable way in which a person can ‘take’ or attempt to  
 12 ‘take’ any fish or wildlife.”<sup>496</sup> The term “harass” means “an intentional or negligent act or  
 13 omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to  
 14 significantly disrupt normal behavioral patterns which include, but are not limited to, breeding,  
 15 feeding, or sheltering.”<sup>497</sup> The term “harm” is any act “which actually kills or injures wildlife,”  
 16 including “significant habitat modification or degradation where it actually kills or injures  
 17 wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or  
 18 sheltering.”<sup>498</sup> Therefore, the ESA is violated if “significant modification or damage to the  
 19 habitat of an endangered or threatened species is likely to occur so as to injure that species.”<sup>499</sup>

20 \_\_\_\_\_  
 21 <sup>494</sup> 16 U.S.C. § 1538(a)(1) (prohibiting take of endangered species); 50 C.F.R. §§ 17.21, 17.31(a)  
 (applying same regulatory take prohibitions to threatened species).

22 <sup>495</sup> 16 U.S.C. § 1532(19).

23 <sup>496</sup> *Strahan v. Coxe*, 127 F.3d 155, 162 (1st Cir. 1997) (citations omitted).

24 <sup>497</sup> 50 C.F.R. § 17.3.

25 <sup>498</sup> 50 C.F.R. § 17.3; *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515  
 U.S. 687 (1995) (upholding regulation as reasonable).

26 <sup>499</sup> *U.S. v. Town of Plymouth*, 6 F. Supp. 2d 81, 90 (D. Mass. 1998) (citing *Tennessee Valley*  
 27 *Authority v. Hill*, 437 U.S. 153, 172 (1978)); see *Environmental Prot. Info. Ctr. v. The Simpson*  
 28 *Timber Co.*, 255 F.2d 1073, 1075 (9th Cir. 2001) (“Eliminating a threatened species’ habitat thus  
 can constitute ‘taking’ that species for purposes of section 9 [of the ESA].”)

1 Similar to the ESA, the CESA prohibits “take” of any State-listed threatened or endangered  
2 species.<sup>500</sup> The CESA defines take as “hunt, pursue, catch, capture, or kill, or attempt to hunt,  
3 pursue, catch, capture, or kill.”<sup>501</sup>

#### 4 **1. Total Ammonia Nitrogen Discharge Causes Unlawful Take**

5 The record establishes that a growing number of scientific studies show that the Treatment  
6 Plant’s historical and ongoing discharges, particularly of total ammonia nitrogen, are toxic to  
7 Delta smelt and cause significant habitat modification and degradation that is harming the Delta  
8 smelt’s food sources and otherwise injuring and killing members of the species. The Permit,  
9 however, does not reduce those impacts during the interim period, and thus the Discharger would  
10 continue to discharge total ammonia nitrogen at levels that will result in “take” of Delta smelt.

11 Indeed, the record, including the work of Dr. Teh, demonstrates that, at current levels, the  
12 un-ionized ammonia in the Treatment Plant’s discharges causes acute and/or chronic toxicity to  
13 Delta smelt.<sup>502</sup> Dr. Werner’s research likewise demonstrates that the long-term average  
14 concentrations of un-ionized ammonia downstream of the Treatment Plant already exceed the  
15 acute to chronic toxicity ratios in the Sacramento River.<sup>503</sup> The extensive research of Johnson,  
16 Glibert, Kendall, Dugdale, Wilkerson, Parker, Marchi, Lehman, and others further demonstrates  
17 the impacts being caused by the current discharge. Yet, the Permit’s interim limits would allow  
18 the level of total ammonia nitrogen in the discharge to more than double over the next ten years.

19 Further, unless restricted during the interim period, the Discharger would continue to  
20 cause “significant habitat modification or degradation” that will injure and/or kill members of the  
21 threatened Delta smelt species. The studies described above, and in Appendix J of the Permit,  
22 describe how the current total ammonia nitrogen discharge is adversely affecting the pelagic food  
23 web, which is a significant factor in the pelagic organism decline. The discharge substantially

24 \_\_\_\_\_  
25 <sup>500</sup> Cal. Fish & Game Code § 2080.

26 <sup>501</sup> *Id.* at § 86.

27 <sup>502</sup> *See* Permit, at App. J.

28 <sup>503</sup> *Id.* at J-2.

1 alters the ratio of nitrogen and phosphorus (the “N:P ratio”) in the Sacramento River and the  
2 Delta. As described above, these discharges devastate the aquatic ecosystem that would  
3 otherwise exist and impair aquatic life-related beneficial uses throughout the Delta.<sup>504</sup>

4 The recent work of Dr. Glibert of University of Maryland, described above, highlights the  
5 relationship between the ammonium discharged from the Treatment Plant and actual injury to the  
6 smelt. Dr. Glibert found that variations in the nutrient composition of the Treatment Plant’s  
7 discharges was highly correlated to the variation in nutrient concentrations in the receiving  
8 waters. These nutrient variations are, in turn, related to variations in the base of the food web,  
9 primarily the composition of algae, to variations in the composition of zooplankton, and to  
10 variations in the abundance of several fish species.<sup>505</sup>

11 The fact that nutrient ratios materially impact the underlying foodweb is not a novel  
12 proposition unique to Dr. Glibert’s research here in the Sacramento River/Delta ecosystem. To  
13 the contrary, the N:P ratio has long been shown to influence phytoplankton composition and the  
14 presence – or absence – of native species and vegetation. Extensive studies, described above and  
15 elsewhere in the record, have repeatedly demonstrated this relationship in study after study across  
16 a range of systems in the United States – such as in Florida, Michigan, North Carolina, Tampa,  
17 and Washington DC – and around the world – in Denmark, Germany, Hong Kong, Japan, Korea,  
18 Norway, Spain, and Tunisia.

19 \_\_\_\_\_  
20 <sup>504</sup> Specifically, increases in ammonium change the nutrient ratios and (1) inhibit phytoplankton  
21 primary production; (2) shift the speciation of algal communities from nutritious species to less  
22 desirable species; and (3) create conditions favorable for the spread of invasive species and  
23 unfavorable for native species. A growing body of scientific evidence demonstrates that these  
24 conditions will significantly impair essential behavioral patterns, such as feeding, and thus injure  
25 or kill individual delta smelt. Studies by Dr. Teh show that the total ammonia nitrogen from the  
26 SRTWP is causing acute and chronic toxicity to *Eurytemora affinis* and *Pseudodiaptomus fobesi*,  
27 which are an important food source for larval and juvenile delta smelt. (Permit, at J-2 n.3.) In  
28 addition, the shift in the algal community from nutritious species such as diatoms to less desirable  
forms like *Microcystis* is also disrupting the Delta smelt’s behavioral patterns.

<sup>505</sup> The fact that nutrient ratios materially impact the underlying foodweb is not a novel  
proposition unique to Dr. Glibert’s research here in the Sacramento River/Delta ecosystem. The  
N:P ratio has long been shown to influence phytoplankton composition and the presence – or  
absence – of native species and vegetation. Extensive studies, described above and elsewhere in  
the record, have repeatedly demonstrated this relationship in study after study across a range of  
systems in the United States and around the world.

1 Thus, changes in abundance of Delta smelt and several other fish species are ultimately  
 2 related to changes in ammonium load from wastewater discharge in the upper Sacramento River  
 3 which cause significant modification or degradation to the species' habitat. The discharge thus  
 4 constitutes take under the ESA.<sup>506</sup> *Cf., e.g., Forest Conservation Council v. Rosboro Lumber Co.,*  
 5 *50 F.3d 781 (9th Cir. 1995)* (allegations that proposed clearcutting was reasonably certain to  
 6 injure Northern spotted owls by significantly impairing their essential behavioral patterns were  
 7 actionable under the ESA.)

8 As described above, advanced nutrient removal has proven effective at restoring native  
 9 systems in areas that had been impacted by nutrient discharges from large wastewater treatment  
 10 plants, such as Tampa Bay and the Chesapeake Bay. As Dr. Glibert has concluded, reduction of  
 11 the ammonium loading into the Delta "is essential to restoring historic pelagic fish populations,"  
 12 like the Delta smelt.<sup>507</sup> Given the recent declines in Delta smelt and other listed species, the State  
 13 Board should take steps to reduce the discharge while the Treatment Plant is built and to require  
 14 advanced nutrient removal as soon as feasible.

## 15 **2. Temperature Impacts Cause Unlawful Take**

16 Discharging pursuant to the Permit's exception from the Thermal Plan would result in  
 17 unauthorized "take" of Delta smelt, salmon, steelhead and sturgeon. The Discharger has not  
 18 satisfied its threshold burden of proof, justifying an exception by establishing that the Thermal  
 19 Plan is, ". . . more stringent than necessary to assure the protection and propagation of a balanced,  
 20 indigenous population of shellfish, fish and wildlife in and on the body of water into which the  
 21

22 \_\_\_\_\_  
 23 <sup>506</sup> Even if an action's affect on critical habitat will not jeopardize the survival of a listed species,  
 24 the courts have held that it will still be a "take" under the ESA if it appreciably diminishes the  
 25 value of critical habitat for the recovery of the listed species. *See Gifford Pinchot Task Force v.*  
 26 *U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1069-70 (9th Cir. 2004); *Sierra Club v. U.S. Fish &*  
*Wildlife Serv.*, 245 F.3d 434, 441-42 (5th Cir. 2001). The ESA is enacted not merely to forestall  
 the extinction of species, but also to allow species to recover to the point where they can be  
 delisted. (*Gifford Pinchot*, 378 F.3d at 1070.)

27 <sup>507</sup> *See Glibert, P., "Long-term changes in nutrient loading and stoichiometry and their*  
 28 *relationships with changes in the food web and dominant pelagic fish species in the San Francisco*  
*Estuary, California," Reviews in Fisheries Science (2010).*

1 discharge is made. . . .<sup>508</sup> The Discharger has similarly failed to provide sufficient evidence to  
 2 support a finding that the higher ESA standard of avoidance of “take” is satisfied.

3 The Discharger releases high-temperature water into the Sacramento River from a diffuser  
 4 immediately downstream of Freeport.<sup>509</sup> Delta smelt, Chinook salmon, steelhead and sturgeon  
 5 occupy critical habitat that includes the discharge location and mixing zone.<sup>510</sup> Ambient  
 6 Sacramento River water temperatures downstream of the diffuser approach, and may exceed,  
 7 levels that are lethal to Delta smelt, Chinook salmon, steelhead, and sturgeon.<sup>511</sup> Even where  
 8 river temperatures are not immediately fatal, sublethal temperatures may cause harm to these  
 9 species by increasing their susceptibility to predation, and by inducing harmful physiological  
 10 changes that include advanced ageing and skin deterioration, elevated levels of heat shock  
 11 proteins, hypercortisolemia, and acute thermal shock.<sup>512</sup> Impacts to sturgeon are also expected,  
 12 particularly since the highest river temperatures are near the diffuser at the bottom of the river,  
 13 where sturgeon are found.<sup>513</sup>

14 The Discharger provided no analysis of the effect of its thermal discharge on Delta smelt.  
 15 The FWS agreed, specifically stating that the Discharger’s Delta smelt analysis was  
 16 insufficient.<sup>514</sup> For salmon and sturgeon, NMFS determined based on the thin record provided by

17 <sup>508</sup> 40 CFR §125.70.

18 <sup>509</sup> Permit at p. 5.

19 <sup>510</sup> NMFS Letter to Regional Board, September 9, 2010, p. 1; FWS letter to Regional Board, Re:  
 20 Recommendations on SRCSD State Thermal Plan Exception, August 18, 2010, p. 1.

21 <sup>511</sup> See Temperature section, below, for additional information; see also, Crammer (2010) and  
 22 Thompson and Baldrige (2010).

23 <sup>512</sup> *Ibid.*

24 <sup>513</sup> At the lower elevations of the water column where sturgeon migrate, the Discharger reports, “  
 25 A portion of the lower half of the water column could be elevated up to 7.5°F, relative to  
 26 background temperature, from October through March. . . .” (Thermal Plan Exception  
 27 Justification for the Sacramento Regional County Sanitation District, July 2010, p. 34.) This  
 28 raises concerns about the Dischargers’ ability to comply with the permit limitation of not  
 increasing water temperatures above ambient conditions by more than 4°F. It also raises concerns  
 about the effect of these dramatic temperature increases on sturgeon.

<sup>514</sup> FWS letter to Regional Board, Re: Recommendations on SRCSD State Thermal Plan  
 Exception, August 18, 2010, p. 3.

1 the Discharger that these species are physically able to avoid the thermal plume, while also  
 2 recommending code wire tagging studies to determine if these species are in fact avoiding the  
 3 effects of the discharge.<sup>515</sup> In so doing, NMFS did not consider the results of prior tagging  
 4 studies that indicate some salmon are not avoiding the thermal plume, and in fact are lingering for  
 5 8-10 hours in the mixing zone searching for cover (Bureau et al. 2007).<sup>516</sup> NMFS also failed to  
 6 recognize that the zone of passage is very small and primarily located on the western bank of the  
 7 river.<sup>517</sup> The Discharger did not provide any evidence that salmon would, or even could, find that  
 8 small passage zone. Interestingly, all of the state and federal fishery agencies are in agreement  
 9 that the discharge is likely causing the attraction of predatory fishes to the Discharger's mixing  
 10 zone, which would further increase mortality.<sup>518</sup>

11 The evidence supports the finding that operating the Discharge pursuant to the Permit's  
 12 Thermal Plan exception will result in unauthorized "take" of several listed species.

13 **B. The Board Should Revise the Permit and Address the Continued Take of**  
 14 **Endangered Species**

15 The Board should revise the Tentative Permit to address the continued take of endangered  
 16 species. The Water Agencies urge the Board to remove the interim limits and 10-year  
 17 compliance schedule from the Permit, and to remove the exemption from the Thermal Plan.  
 18 Instead, the Permit should incorporate limits that are required to satisfy full nutrient removal, and  
 19 contemporaneous with issuing Permit, the Board should issue a new Time Schedule Order, or a  
 20 Cease and Desist Order, to address permitting and construction of nutrient removal and the

21 \_\_\_\_\_  
 22 <sup>515</sup> NMFS Letter to Regional Board, September 9, 2010, p. 3.

23 <sup>516</sup> Bureau, Jon, Blake, Aaron, and Perry, Russell, Sacramento/San Joaquin River Delta, Regional  
 24 Salmon Outmigration Study Plan: Developing Understanding for Management and Restoration,  
 December 10, 2007, pp. C.4 – C.6; *see also* Temperature Section.

25 <sup>517</sup> *See* Temperature Section for discussion of zone of passage.

26 <sup>518</sup> Letter from FWS to Regional Board, Re: Recommendations on SRCSD Thermal plan  
 27 exception request, NPDES Renewal, Sacramento Regional County Sanitation District, August 18,  
 28 2010; NMFS Letter to Regional Board, September 9, 2010; Letter from DFG to Regional Board,  
 Re: Response to the proposed NMDES permit renewal for the Sacramento Regional County  
 Sanitation District, Sacramento Regional Wastewater Treatment Plan, October 7, 2010.

1 interim limits that would govern until the work is completed. The Water Agencies further urge  
2 the Board to use the following framework in developing such an Order:

- 3 • An expedited schedule to construct full nutrient removal should be established. The  
4 Water Agencies submit that full nutrient removal can be accomplished more  
5 expeditiously (and at a lower cost) than proposed in Permit. We urge the most  
6 expedited schedule be adopted reflecting the ongoing take of species from the  
7 continued discharge.
- 8 • The dramatic increase in total ammonia nitrogen concentration and total ammonia  
9 nitrogen loadings above current levels authorized in the Permit must be rescinded.  
10 The Permit sets an interim daily limit of 45 mg/L and a mass limit of almost 68,000  
11 pounds per day. The daily mass limit – which equates to almost 34 tons per day –  
12 would allow the Discharger more than double its current discharge, which is generally  
13 in the range of 14 tons per day. This limit was based on the maximum concentration  
14 measured on one single day out of nearly 1,000 measurements over the last 9 years.  
15 That is not a reasonable limit to govern this Treatment Plant for the next decade, when  
16 the daily average for total ammonia nitrogen over the same time period was 23 mg/L.
- 17 • There should be an Interim Measures Plan developed and approved by the Regional  
18 Board, with public input. The Discharger should be directed to submit an Interim  
19 Measures Plan within 60 days of final approval of the Permit that would propose  
20 interim measures to reduce the mass of total ammonia nitrogen loadings in the effluent  
21 each year until the full nitrification and denitrification are completed. The Plan  
22 should be made available to the public for comment. The Discharger should have the  
23 burden to show that it could not achieve the required reduction.
- 24 • Interim concentration and mass limits should be set that reflect the ongoing harm  
25 being caused by the discharge. The Board should impose interim limits that are the  
26 lowest feasible limits for total ammonia nitrogen and nitrate. In no respect should the  
27 Discharger be permitted to increase its mass total nitrogen and nitrate loadings beyond  
28

1 the current monthly average discharge.

- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- Consistent with the Permit as issued by the Regional Board, the reduced interim limits should include weekly and monthly average mass loading and concentration limits for total ammonia nitrogen. It is common for dischargers to not only have a daily effluent concentration limit, but to also have either a weekly and/or 30-day average discharge limit. That affords some flexibility to the discharger in the event that an issue arises that causes an unforeseen change in the discharge on a particular day, but ensures that overall, the system is operated to ensure the maximum possible reductions. The maximum monthly average over last 9 years is 29 mg/L. The Board should set a monthly concentration that is as protective as possible for River and the Delta, but in all events the monthly concentration limit should not exceed the historic average.
  - The interim limits should also specifically include daily, weekly and monthly mass loading and concentration limits for total nitrogen. The Permit only sets interim daily limits on total ammonia nitrogen. A mass loading limit on total nitrogen should be established to prevent further degradation of the N:P ratio in the effluent and thereby reduce the ongoing harm from the discharge.
  - The Board should require sufficient monitoring of each total ammonia nitrogen and nitrate limit. Sufficient daily monitoring should be required to determine whether the Discharger is in compliance with the total ammonia nitrogen and nitrate loadings and concentration limits. Further, the monitoring should be representative of the discharge, which can vary at different times during the day.

13

14

15

16

17

18

19

20

21

22

23

24

25

The Board should include a schedule for implementing the required measures to address the temperature of the discharge. The Water Agencies urge the most expedited schedule be adopted reflecting the ongoing take of species from the continued discharge.

26

27

**XI. BECAUSE THE DISCHARGER HAS A HISTORY OF VIOLATING THE TOXICITY STANDARD IN ITS PERMIT, THE REGIONAL BOARD SHOULD HAVE ENHANCED THE TOXICITY PROGRAM USING A SCIENCE BASED APPROACH**

28 The Treatment Plant has an ongoing problem with acute and chronic toxicity, and a

1 history of permit violations. Toxic episodes have been occurring regularly since approximately  
2 2004, with toxicity reaching as high as 50 toxicity units (TU), which is significantly higher than  
3 the 8TU trigger for heightened testing contained in the Sanitation District's existing permit.<sup>519</sup>  
4 The Regional Board has characterized the Discharger as being in violation of its permit's toxicity  
5 standards 15% of the time.<sup>520</sup>

6         However, the Discharger's WET testing is not the only evidence suggesting that the  
7 Treatment Plant has an ongoing toxicity issue. Weston, et al. (2010) observed mortality or  
8 immobility of at least 70% of the test organisms (*Hyaella azteca*) exposed in every sample of the  
9 Treatment Plant's effluent.<sup>521</sup> Weston concluded that pyrethroids were responsible for most, but  
10 not all of the observed toxicity.

11         Werner, et al. (2009) concluded that the long-term average concentrations of un-ionized  
12 ammonia downstream of the treatment plant already exceed the acute to chronic toxicity ratios in  
13 the Sacramento River.<sup>522</sup> As the Treatment Plant is the primary source of total ammonia  
14 downstream of the treatment plant, Dr. Werner's research indicates that the Treatment Plant is  
15 already causing chronic toxicity in Delta smelt, and possibly other important aquatic species. (See  
16 Total Ammonia Nitrogen discussion, above.) In addition, Connon et al. (2010) found "[e]xposure  
17 to water from Hood elicited significant transcriptional differences of genes involved  
18 predominantly in neuromuscular functions, suggesting that contaminants originating from the  
19 Treatment Plant effluent may impact on swimming performance, growth and development of  
20

21 <sup>519</sup> SRWTP TRE Status Report, August 23, 2007.

22 <sup>520</sup> NPDES Permit Renewal Issues, Aquatic Life and Wildlife Preservation, Sacramento Regional  
23 County Sanitation District, Sacramento Regional Wastewater Treatment Plan, 29, April 2010, p.  
16.

24 <sup>521</sup> Weston, D. P and M.J. Lydy. 2010. Urban and agricultural sources of pyrethroid insecticides  
25 to the Sacramento-San Joaquin Delta of California. *Environmental Science and Technology*,  
doi:10.1021/es9035573

26 <sup>522</sup> Werner, I., L.A. Deanovic, M. Stillway, and D. Markiewicz. 2009. "Acute toxicity of  
27 ammonia/um and wastewater Treatment effluent-associated contaminants on Delta smelt. Final  
28 Report. April 3, 2009.

1 larval Delta smelt.”<sup>523</sup>

2 Werner, et al. (2009) further concluded that the Treatment Plant effluent is more toxic  
3 than can be explained just by un-ionized ammonia concentrations.<sup>524</sup> In toxicity tests using  
4 un-ionized ammonia from effluent dilutions and un-ionized ammonia from ammonium chloride  
5 additions, the effluent was significantly more toxic than the ammonium chloride. Parker, et al.  
6 (2010) observed the same effect in algal enclosure experiments.<sup>525</sup> In the case of Parker, et al.  
7 (2010), the increased effects were observed at effluent concentrations commonly occurring in the  
8 Sacramento River well downstream of the treatment plant.<sup>526</sup> These findings indicate that  
9 additional contaminants are present in the Treatment Plant’s effluent and are consistent with other  
10 research.<sup>527</sup>

11 The Discharger has apparently evaluated a range of possible causes of the toxicity, but has  
12 yet to resolve the problem. In the meantime, an alarmingly high level of toxicity has been  
13 originating from the Treatment Plant for nearly a decade. The Regional Board should provide  
14 more direction to the Discharger, perhaps hiring its own consultant to draft the Workplan required  
15 by the Permit and to develop more rigorous toxicity testing procedures. The Regional Board  
16 should also adopt a numeric toxicity standard instead of the existing narrative standard. This is  
17 the recommendation of U.S. EPA, which explained that:

18 The Clean Water Act (CWA), NPDES regulations, and EPA’s  
19 Technical Support Document for Water Quality- based Toxics  
20 Control (TSD, USEPA 1991a) all envision that effluent limits

21 <sup>523</sup> Connon, Richard, Linda Deanovic, Inge Werner. 2010. Application of novel biomarkers to  
22 determine sublethal contaminant exposure and effects in delta smelt. Poster presented at  
Interagency Ecological Program 2010 Annual Workshop. Sacramento, CA, May 26, 2010.

23 <sup>524</sup> Werner et al., 2009, *supra*.

24 <sup>525</sup> Parker, A.E., A.M. Marchi, J.Drexel-Davidson, R.C. Dugdale, and F.P. Wilkerson. 2010.  
25 “Effect of ammonium and wastewater effluent on riverine phytoplankton in the Sacramento  
26 River, CA. Draft Final Report. March 17, 2010.

27 <sup>526</sup> *Ibid.*

28 <sup>527</sup> *See also* Teh Declaration.

1 should be expressed numerically.<sup>528</sup>

2 And, citing the preamble to 40 CFR 122.44(d)(1), U.S. EPA stated:

3 EPA requires [WET] limits where necessary to meet water quality  
4 standards. EPA does not believe that a whole effluent toxicity  
5 trigger alone is fully effective because it does not by itself, restrict  
6 the quantity, rate, or concentrations of pollutants in the effluent.<sup>529</sup>

7 The Water Agencies recommend making the current toxicity trigger of 8TU the new numeric  
8 standard, with 6TU as the trigger for additional analysis.

## 9 **XII. THE CHRONIC MIXING ZONE MAY NOT PROTECT AQUATIC SPECIES**

10 The Regional Board's decision to deny an acute mixing zone is based on substantial  
11 evidence in the record. The U.S. EPA, FWS, and DFG agree.<sup>530</sup> The disagreement arises with  
12 the granting of a chronic mixing zone for cyanide and chlorpyrifos, where no other regulatory  
13 agency supports the Regional Board's decision. Based on concerns for the fishery, the FWS  
14 stated, "The Service recommends that compliance with water quality criteria be met at the 'end-  
15 of-the-pipe' and that no dilution or mixing be permitted."<sup>531</sup> The FWS objected to dilution credits  
16 for cyanide and chlorpyrifos because, "... concentrations of these chemicals have potential  
17 impacts on aquatic life. . . ."<sup>532</sup> The Water Agencies share these concerns.

18 The Regional Board's primary justification for the granting of chronic mixing zone is that,  
19 "The zone of passage is small but at this time there is no evidence that aquatic life would not  
20 avoid the effluent plume."<sup>533</sup> The problem with this statement is that there is little or no evidence  
21 that the fish would, or even could, avoid the plume. The Discharger did not carry its burden of

22 <sup>528</sup> Letter from EPA to Regional Board, Re: Tentative Order/NPDES Permit for Sacramento  
23 Regional County Sanitation District, Sacramento regional Wastewater Treatment Plant, October  
24 7, 2010, p.2.

25 <sup>529</sup> *Ibid.*

26 <sup>530</sup> Staff RTC, p. 118, Response to Water Agencies Comment #45.

27 <sup>531</sup> FWS Letter to Regional Board, Re: Comments on the September 3, 2010, Tentative Waste  
28 Discharge Requirements Renewal for the Sacramento Regional County Sanitation District,  
October 6, 2010, p.4.

<sup>532</sup> *Ibid.*

<sup>533</sup> Staff RTC, p. 118, Response to Water Agencies Comment #45.

1 proof. For example, the Discharger has provided no analysis of the ability of Delta smelt to avoid  
2 the toxic plume. As the FWS has explained, “Delta smelt are not strong swimmers”, thereby  
3 indicating that Delta smelt may not be able to avoid the plume.<sup>534</sup> This is particularly true for the  
4 Delta smelt larvae and eggs, which the sampling data suggests are in the mixing zone.<sup>535</sup>

5 The Dischargers’ evidence of successful fish passage is similarly weak for salmon and  
6 steelhead. As explained in the temperature section, partially undiluted effluent accumulates along  
7 the eastern bank of the river, even after the diffuser modification. Moreover, even if salmon and  
8 steelhead could swim away from the diffuser, the Discharger has not provided any evidence that  
9 these fish would be able to find the “small” zone of passage along the western bank of the river.  
10 In fact, the results from code wired tagging studies show that salmon do not swiftly move through  
11 the effluent plume, rather some salmon maintain a holding pattern during the daylight hours  
12 searching for cover along the banks of the river (Bureau et al. 2007).<sup>536</sup> These same studies further  
13 indicate that this holding pattern likely occurs along the eastern bank of the river, where there  
14 does not appear to be a zone of passage.<sup>537</sup> With this extended exposure, chronic effects would be  
15 expected.

16 The Regional Board’s other evidentiary basis is the Dischargers’ dynamic modeling.<sup>538</sup>  
17 However, as the Regional Board acknowledged, the Bureau of Reclamation (Reclamation)  
18 explained that the Dischargers’ model uses the outdated version of CALSIM and the outdated  
19

---

20 <sup>534</sup> Letter from FWS to Regional Board, Re: Recommendations on SRCSD State Thermal plan  
21 exception request, NPDES renewal, Sacramento Regional County Sanitation District, August 18,  
2010, p. 4.

22 <sup>535</sup> See Temperature Section for discussion of results of FWS beach seine surveys.

23 <sup>536</sup> Bureau, Jon, Blake, Aaron, and Perry, Russell, Sacramento/San Joaquin River Delta, Regional  
24 Salmon Outmigration Study Plan: Developing Understanding for Management and Restoration,  
25 December 10, 2007, pp. C.4 C.6; see also, Temperature Section for detailed discussion of the  
26 results of the tagging studies.

27 <sup>537</sup> See Temperature Section for results of Discharger’s mixing zone dye studies; see also Tetra  
28 Tech, Inc., Final Memorandum to Regional Board, Re: Review of the SRCSD dynamic modeling  
study for the SRWTP, June 30, 2008, pp. 9-10.

<sup>538</sup> Staff RTC, p. 118, Response to Water Agencies Comment #45.

1 version of Reclamation’s temperature model, which raise serious questions about the validity of  
 2 the Dischargers’ dynamic modeling.<sup>539</sup> Reclamation further explained that the period of record  
 3 used by the Discharger is inappropriate as it ignores the hydrologic record from 1992 to  
 4 present.<sup>540</sup> The result is that the Dischargers’ hydrodynamic model fails to capture existing  
 5 conditions in the river. For example, the operational changes contained in the Central Valley  
 6 Project Improvement Act (CVPIA), which affected flows, temperatures, and water quality in the  
 7 Sacramento River, is not reflected in the Dischargers’ dynamic modeling.<sup>541</sup> The Dischargers  
 8 modeling also excludes the severe drought of 1991-1992.<sup>542</sup>

9 With unresolved questions regarding the source of the Dischargers’ ongoing problems  
 10 with toxicity, and the listing of the Delta for “unknown toxicity,” the Water Agencies are  
 11 concerned that the allowance of a chronic mixing zone may be harmful to aquatic life in and  
 12 around the diffuser. Further studies are therefore needed on an expedited basis to ensure that  
 13 aquatic species in the mixing zone are not impaired by the elevated levels of cyanide and  
 14 chlorpyrifos originating from the Treatment Plant.

15 **XIII. THE EXCEPTION FROM THE THERMAL PLAN MAY NOT PROTECT**  
 16 **AQUATIC SPECIES**

17 The Regional Board has enough information to reject the Discharger’s request for an  
 18 exception from the Thermal Plan. Nevertheless, the Regional Board’s decision was to: 1.) reject  
 19 the Discharger’s request for an expanded exception; 2.) renew the prior exception; and 3.) require  
 20 studies of the effects of the thermal discharge to determine if the renewed exception is sufficiently  
 21 protective.

22 For a decade, the federal agencies have been advising that the Discharger that it needs a  
 23 plan for coming into compliance with the Thermal Plan. As the FWS observed, “[t]here has been

24 \_\_\_\_\_  
 25 <sup>539</sup> Staff RTC, p. 119, Response to Water Agencies’ Comment #47.

26 <sup>540</sup> *Ibid.*

27 <sup>541</sup> *Ibid.*

28 <sup>542</sup> *Ibid.*

1 a tendency for the SRCSD to request incremental increases in Thermal Plan exceptions with each  
 2 permit request for the SWRTP. . . . A long-term plan is needed to address how the facility will  
 3 minimize future thermal discharges and adequately protect beneficial uses. . . .”<sup>543</sup> Consistent  
 4 with this recommendation, the Discharger should be required to develop a plan and schedule for  
 5 coming into compliance with the Thermal Plan. At the same time, the studies already mandated  
 6 by the Regional Board should be fast tracked so measures to protect the beneficial fishery uses in  
 7 the Sacramento River can be identified and implemented as soon as possible.

8 **A. Evidence Suggests That Delta Smelt Are Already Being Impacted by the**  
 9 **Discharger’s Thermal Plume**

10 Delta smelt are present at the diffuser. The Regional Board’s permit findings include  
 11 evidence that Delta smelt are exposed to the discharge:

12 Delta smelt enter the Sacramento River and Deep Water Ship  
 13 Channel year round and specifically from later December to June to  
 14 spawn . . . Pre-spawning adults could be expected in the vicinity of  
 15 the City of Sacramento from the latter part of December through  
 16 June. Some Larvae could be expected in the vicinity of the City of  
 Sacramento during February through June. During the larval stage  
 delta smelt are at their most vulnerable to zones of poor water  
 quality or high water temperature due to their small size and limited  
 mobility.<sup>544</sup>

17 The Water Contractors provided the Regional Board with the FWS’ monitoring data that  
 18 supports these findings. The Water Contractors presented data showing that Delta smelt are  
 19 regularly found upstream (Garcia Bend) and downstream (Clarksburg) of the Discharger’s  
 20 diffuser from December to June.<sup>545</sup> The Water Contractors’ also provided the FWS’ sampling  
 21 information for 2010, indicating that Delta smelt were identified in the most recent surveys as  
 22 well.<sup>546</sup> This suggests that Delta smelt pass through the discharge area multiple times and may

23 <sup>543</sup> Letter from FWS, to Central Valley Regional Water Quality Control Board, Re:  
 24 Recommendations on SRCSD State Thermal plan exemption request, NPDES permit renewal,  
 August 18, 2010, p. 3.

25 <sup>544</sup> Permit at p. F-82 - F-86, *see also* CSPA at pp. 73-76.

26 <sup>545</sup> See, Graphs 1 and 2, p. 25, Water Contractor’s Comments on the Regional Board’s Aquatic  
 27 Life and Wildlife Preservation Issues Paper.

28 <sup>546</sup> *Id.*, *see also* <http://www.fws.gov/stockton/jfmp/datamanagement.asp>.

1 also reside for period of time in the near field mixing zone.

2 There is further evidence in the record that temperatures in the near field mixing zone are  
3 sufficiently high as to affect Delta smelt. As the Regional Board observed in its findings, the  
4 thermal thresholds for Delta smelt are well established:

5 The Critical Thermal Maxima (CTM) is the temperature for a given  
6 species above which most individuals respond with unorganized  
7 locomotion and is considered to be the lethal temperature, for  
8 juvenile and adult delta smelt it is reported as 25.4°C (77.7°F).  
Delta smelt egg survival decreases at temperatures above 15-16°C  
(about 60°F) and is greatly reduced by 20°C (68°F).<sup>547</sup>

9 The FWS further explained that, “It should be noted that adverse temperature effects  
10 occur to Delta smelt . . . [at] temperatures lower than their respective CTMs.”<sup>548</sup>

11 The Discharger’s 2010 Thermal Plan Exception Justification provides data on water  
12 temperatures immediately upstream of the diffuser, at Freeport. It is evident from the  
13 Discharger’s Figure 1, p. 10 that background water temperatures are often at or near temperatures  
14 where Delta smelt survival (particularly egg survival) is diminished.<sup>549</sup> Thompson and Baldrige  
15 (2010)<sup>550</sup> summarized the Discharger’s Figure 1, below:

16 **Table 2 Sacramento River Temperature at Freeport from January 1, 1993 to October 31, 2009**

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean Temp ( F) <sup>1</sup>	47.9	49.9	53.9	58	63	67.1	69.2	69.4	67.1	61.6	55	49
Max Temp ( F) <sup>1</sup>	52.9	56	63	68	74	74.2	74.7	75	72.6	69.2	61.8	56

17 <sup>1</sup> Temperature data from RBI (2010) Figure 1, p. 10.

18  
19  
20 The Discharger’s 2010 Thermal Plan Exception Justification, Table 5, p. 27,<sup>551</sup> indicates

21 <sup>547</sup> Permit at p. F-82 - F-86.

22 <sup>548</sup> Letter from United States Fish and Wildlife Service, August 18, 2010, p. 2.

23 <sup>549</sup> Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment  
24 Plant, prepared for the Sacramento Regional County Sanitation District, prepared by Robertson-  
Bryan, Inc., July 2010, p. 10, Fig. 1.

25 <sup>550</sup> Thompson, Rosie, and Baldrige, Jean, Review of the Sacramento Regional Wastewater  
26 Treatment Plant (SRWTP), Impact of Tentative Order and Thermal Plan Exception on Delta  
Smelt, October 6, 2010, p.6.

27 <sup>551</sup> Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment  
28 Plant, prepared for Sacramento Regional County Sanitation District, prepared by Robertson-  
Bryan, Inc., July 2010, p.27.

1 that the temperature differential between the effluent and the background river temperatures at the  
 2 14:1 dilution ratio are 28°F in January; 25°F in February and March; 20°F from April through  
 3 September; 25°F in September and 28°F from November to December.<sup>552</sup> Throughout the day,  
 4 particularly in drier seasons and in drier years, the Discharger's discharge will be controlled by  
 5 the 14:1 dilution ratio. In wetter years, at an assumed 46:1 dilution ratio, the Discharger predicts  
 6 its temperature differentials are less than those reported above, being between 12.9°F and  
 7 20.7°F.<sup>553</sup>

8 The permit prohibits the discharge from creating more than a 4°F rise in surface water  
 9 temperatures at any place or time.<sup>554</sup> The permit also prohibits the creation of a zone that exceeds  
 10 25% of the cross section of the river that is 2°F warmer than receiving water temperatures, when  
 11 river temperatures are less than 65°F.<sup>555</sup> It is evident based on the receiving water temperatures  
 12 identified above that a 2°F to 4°F increase in water temperatures could affect Delta smelt.<sup>556</sup>  
 13 These temperature increases already occur in the river downstream of the Discharger's diffuser.  
 14 In fact, the Discharger is already having difficulty maintaining temperatures below the 2°F

15 \_\_\_\_\_  
 16 <sup>552</sup> The Discharger's predicted temperature differentials in November and December violates  
 17 Objective 5.A.(1)a of its exception, which raises questions about the Regional Board finding that  
 the Sanitation District is currently able to comply.

18 <sup>553</sup> Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment  
 19 Plant, prepared for Sacramento Regional County Sanitation District, prepared by Robertson-  
 Bryan, Inc., July 2010, p. 27.

20 <sup>554</sup> Central Valley Regional Water Quality Control Board, Central Valley Region, Order No. R-5-  
 21 2010, NPDES No. CA0077682, Waste Discharge Requirements for the Sacramento Regional  
 County Sanitation District, Sacramento Regional Wastewater Treatment Plant, Sacramento  
 County, p. F-84.

22 <sup>555</sup> *Ibid.*

23 <sup>556</sup> The Permit's exception to the Thermal Plan imposes limits on thermal increases only, "outside  
 24 the zone of initial dilution." (Thermal Plan Exception Justification, 2010, p. 3.) The EPA  
 25 objected, stating, ". . . the receiving water limits in the new permit appear to allow for a  
 26 temperature mixing zone. The exception, as quoted in the fact sheet, does not include any  
 27 reference to a zone of initial dilution (mixing zone). As we were unable to identify a mixing zone  
 28 provision in the Thermal Plan, it appears that allowance of a temperature mixing zone, in addition  
 to the exceptions, conflicts with Thermal Plan requirements. The Regional Board should clarify  
 how a temperature mixing zone is consistent with the Thermal Plan." (Letter from EPA, To  
 Regional Board, Re Tentative Order/Draft NPDES Permit for Sacramento Regional County  
 Sanitation District, p. 5.)

1 threshold, which is what promoted the Discharger's request for a more lenient Thermal Plan  
2 exception.<sup>557</sup>

3 The Discharger modeled the thermal mixing of its effluent plume. However, the  
4 Discharger's FLOWMOD model, which is used to estimate dilution and transport of the effluent  
5 in the near-field mixing zone, is unable to accurately predict mixing in the near field mixing zone.  
6 The Final Tetra Tech review of FLOWMOD states:

7  
8 Some phenomena were observed in the field that were not  
9 reproduced in the model, most notably a region of high dye  
10 concentration near the eastern river bank just downstream from the  
11 diffuser in the October 2005 dye release. The subsequent November  
12 2006 dye release was conducted in an effort to further resolve this  
13 observed behavior, however the model failed in all cases to  
14 reproduce this high concentration region.<sup>558</sup>

15 The Discharger ultimately closed 25 ports on its diffuser in an attempt to direct effluent away  
16 from shore, but as illustrated below, the subsequent dye studies indicate that effluent continues to  
17 flow toward the eastern bank even though the model cannot reproduce it.  
18  
19  
20  
21  
22

---

23 <sup>557</sup> The Discharger's diffuser modification makes it more difficult for it to comply with its  
24 existing exception from the Thermal Plan. (SRCSD. 2007. Analysis of water quality effects of  
25 modified diffuser scenarios, SRWTP, July 2007, p. 8.) This is not a new problem, however. The  
26 Discharger has had an increasingly difficult time meeting its Thermal Plan exception as the  
27 volume of its discharge has increased. (Letter from James R. Bybee (NMFS) to Mark Gowdy  
28 (CVRWQCB), February 18, 2000.)

<sup>558</sup> Final Memorandum, from Tetra Tech, to Central Valley Regional Water Quality Control  
Board, Re: Review of the Sacramento Regional County Sanitation District's dynamic Modeling  
Study for the Sacramento Regional Wastewater Treatment Plant, June 30, 2008, pp. 9-10.

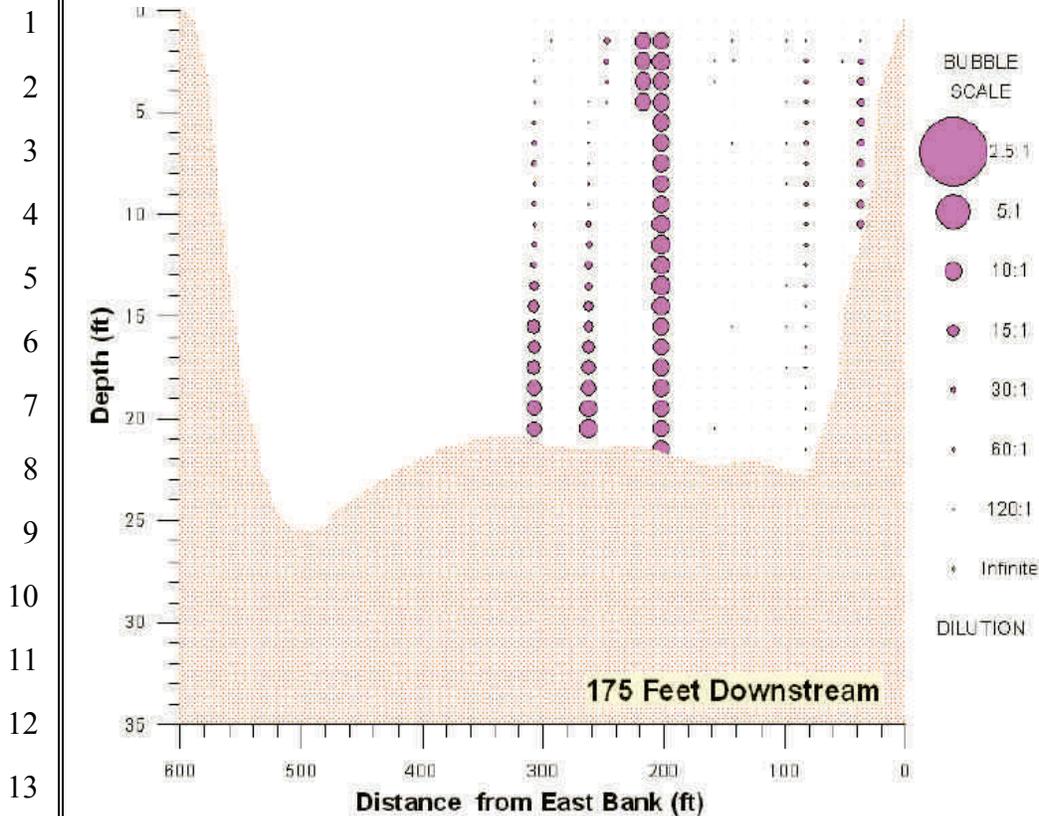


Figure 3. (November 2007 Data Report, *Effluent Discharge Dilution and Velocity Profiling Field Study in the Sacramento River* (Prepared for Flow Sciences, Inc.), by Brown and Caldwell, 2008, p. A-25.)

This is important as it suggests there isn't a zone of passage on the eastern bank of the river. Delta smelt would have to travel all the way to the western bank of the river to avoid the thermal plume. However, juvenile and adult Delta smelt are poor swimmers with a maximum swimming speed of approximately 28 centimeters/second (cm/sec) (0.9 feet/second) and swim in short bursts followed by a glide (rest period) at swim speeds below 10 cm/sec.<sup>559</sup> With such weak swimming abilities, individuals that come in contact with lethal temperatures may not be able to move away to cooler waters.

Unfortunately, the Regional Board has weak support for its conclusion that Delta smelt

<sup>559</sup> Thompson, Rosie and Baldrige, Jean, Review of the Sacramento Regional Wastewater Treatment Plant (SRWTP) Impact of Tentative Order and Thermal Exception on Delta Smelt, October 6, 2010, p. 5, *citing*, Swanson, C., P.S. Young, and J.J. Cech, Jr. 1998. Swimming Performance of Delta Smelt: Maximum Performance, and Behavioral and Kinematic Limitations on Swimming at Submaximal Velocities. *J. Experimental Biology* 201: 333-345.

1 will be adequately protected under the Discharger's renewed exception from the Thermal Plan.  
 2 The Discharger did not evaluate the effect of its thermal discharge on Delta smelt in its 2010  
 3 Thermal Plan Exception Justification, rather focusing exclusively on salmon. The FWS advised  
 4 that, "... the District's Thermal Plan Justification did not adequately address Delta Smelt."<sup>560</sup>  
 5 The Discharger's prior Thermal Plan Exception Justification (2005) also failed to evaluate the  
 6 thermal effect of the discharge on Delta smelt.<sup>561</sup>

7 The only evidence relied on by the Regional Board to support renewing the Discharger's  
 8 Thermal Plan exception were communications with the FWS, an agency that expressed its own  
 9 serious reservations about the continuation of the Thermal Plan exception. The FWS advised  
 10 that, "The Service has concerns regarding fish and wildlife considerations in development of the  
 11 draft ... ("NPDES") permit ...," and, "Fish passing through the discharge plume face reduced  
 12 dissolved oxygen concentration, increased thermal stress and exposure to ammonia and copper.  
 13 ..."<sup>562</sup> The FWS ultimately agreed to the renewal of the Discharger's prior Thermal Plan  
 14 exception, provided extensive studies were undertaken.<sup>563</sup> However, this acquiescence should not  
 15 be interpreted as the FWS being satisfied that Delta smelt in the Sacramento River would be  
 16 protected in the interim, as just the opposite is true. The FWS concluded that:

17 The type of information needed to evaluate the effects of the  
 18 proposed thermal exception on delta smelt is not present in the  
 19 analysis, nor is any information about smelt behavior or its  
 20 susceptibility to such conditions available on the existing body of

21 <sup>560</sup> Regional Board Staff Response to Comments – Proposed NPDES Permit Renewal and TSO,  
 22 Sacramento Regional County Sanitation District, Sacramento County, p. 69, Response to  
 23 Question #63.

24 <sup>561</sup> Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment  
 25 Plant, prepared for Sacramento Regional County Sanitation District, prepared by Robertson-  
 26 Bryan, 2005.

27 <sup>562</sup> FWS Comments on the NPDES Permit Renewal Issues: Aquatic Life and Wildlife  
 28 Preservation, Sacramento Regional County Sanitation District, Sacramento Regional Wastewater  
 Treatment Plant, June 15, 2010.

<sup>563</sup> Letter from the FWS to Regional Board, Re: Recommendations on SRCSD State Thermal plan  
 exception request, NPDES permit renewal, Sacramento Regional County Sanitation District,  
 Sacramento Regional Wastewater Treatment Plant, August 18, 2010, p. 4.

1            science.<sup>564</sup>

2            More specifically, the FWS' unresolved concerns include:

- 3            1)        There has not been an analysis linking the synergistic effects  
4            of multiple pollutants, like chemical and thermal  
5            contamination, on aquatic organisms in the Sacramento  
6            River . . .
- 7            2)        Thermal discharges have the potential to create winter  
8            thermal refugia for fish species that do better in warmer  
9            temperatures, specifically non-native predators... The  
10           anecdotal knowledge of the area around the outfall as a spot  
11           for good fishing reinforces the concern. Whether or not  
12           predators aggregate in the zone of elevated water  
13           temperature needs to be evaluated.
- 14           3)        The assumption that near-field conditions provide adequate  
15           passage for delta smelt is not fully supported by Sacramento  
16           River-specific information. Our uncertainty about the  
17           thermal discharge is included with concerns about the  
18           effects of the discharge field and mixing zone overall... Site-  
19           specific information about the behavior of delta smelt and  
20           other fishes is needed to ensure that current and future  
21           thermal conditions are protective.<sup>565</sup>

22           The Regional Board has weak support for its decision to renew the Discharger's Thermal  
23           Plan exception. The Discharger must be held to a rigorous schedule of scientific investigation to  
24           ensure that Delta smelt are protected.

25           **B.        Evidence Suggests That Chinook Salmon Are Already Being Impacted by the  
26           Discharger's Thermal Plume**

27           The Water Contractors provided evidence of the thermal tolerances of Chinook salmon.  
28           Cramer (2010) explained that the optimum range for growth of juvenile Chinook salmon is from  
29           10°-16°C.<sup>566</sup> They begin to die from heat exposure at temperatures near 24°C.<sup>567</sup> While  
30           temperatures above 24°C are directly lethal, temperatures above 18°C accelerate other causes of

31           \_\_\_\_\_  
32           <sup>564</sup> *Id.* at p. 3 (emphasis added).

33           <sup>565</sup> *Id.* at pp. 3-4.

34           <sup>566</sup> Impact of Sacramento Regional Wastewater Treatment Plant Effluent Discharges on  
35           Salmonids, Technical Review Report, Cramer Fish Sciences, September 2010, p. 5.

36           <sup>567</sup> *Ibid.*, citing, Baker, P.F., T.P. Speed., and F.K. Ligon. 1995. Estimating the influence of  
37           temperature on the survival of Chinook salmon smolts (*Oncorhynchus tshawytscha*) migrating  
38           through the Sacramento – San Joaquin River Delta of California. *Can. J. Fish. Aquat. Sci.* 52:  
39           855-863.

1 mortality. A variety of studies indicate that, in a natural stream setting with competitors, predators  
 2 and diseases, survival begins to decline as temperatures rise above 18°C.<sup>568</sup> As explained above,  
 3 water temperatures upstream of the treatment plant are already close to these thresholds in some  
 4 years. A 2°F to 4°F Discharger induced increase in water temperatures could cause sublethal or  
 5 lethal effects.

6 As explained by Cramer (2010), p. 8, the longer the exposure to elevated temperatures, the  
 7 more likely it is that Chinook salmon will be adversely affected.<sup>569</sup> Cramer (2010) further  
 8 reported that a minimum exposure time is required before fish exhibit adverse effects from thermal  
 9 stress.<sup>570</sup> An exposure duration of approximately 30 minutes is required at 26° C (78.8°F), which is  
 10 well within the range of both the expected temperature on the margins of the thermal plume  
 11 associated with the effluent and the expected time of exposure (Cramer, 2010).<sup>571</sup>

12 Some Chinook salmon passing the diffuser would be exposed to the thermal plume for as long  
 13 as 8 to 10 hours. The results of radio tagging studies in the Sacramento River immediately  
 14 downstream of the diffuser, at Clarksburg, show that salmon have a definite migration pattern. Bureau  
 15 et al. (2007) observed that salmon move primarily at night; and during the day, salmon move to the  
 16 sides of the river seeking cover.<sup>572</sup> They stated that:

17 . . . even within a population with large variance in the over-all  
 18 length of daytime holding period, there are predictable periods

19 \_\_\_\_\_  
 20 <sup>568</sup> *Ibid.*, citing, Baker, P.F. and J.E. Morhardt. 2001. Survival of chinook salmon smolts in the  
 21 Sacramento-San Joaquin Delta and Pacific Ocean. Contributions to the Biology of Central Valley  
 22 Salmonids. Fish Bulletin 179(2): 163-182; Newman, K. B. 2003. Modeling paired release-recovery  
 data in the presence of survival and capture heterogeneity with application to marked juvenile salmon.  
 Statistical Modeling 3:157-177.

23 <sup>569</sup> Impact of Sacramento Regional Wastewater Treatment Plant Effluent Discharges on  
 Salmonids, Technical Review Report, Cramer Fish Sciences, September 2010, p. 8.

24 <sup>570</sup> *Ibid.*, citing, Coutant, C.C. 1973. Effect of thermal shock on vulnerability of juvenile salmonids to  
 25 predation. J. Fish. Res. Bd. Canada. 30: 765-973, pp. 969-970.

26 <sup>571</sup> *Ibid.*

27 <sup>572</sup> Bureau, Jon, Blake, Aaron, and Perry, Russell, Sacramento/ San Joaquin River Delta, Regional  
 28 Salmon Outmigration Study Plan: Developing Understanding for Management and Restoration,  
 December 10, 2007, pp. C.4 – C.6.

1 when the vast majority of the population holds.”<sup>573</sup>

2 And:

3 If fish move into areas with either physical structures or velocity  
4 structures that facilitated holding they appear to stay in these areas  
5 for extended periods of time, often for the duration of their holding  
6 period [references omitted]. If holding fish do not encounter  
7 significant structure, they often continue to move about the edges of  
8 the river until holding behavior ends [references omitted].<sup>574</sup>

9 The location of the holding period is also dictated by the curvature of the river. Burau et al  
10 (2007) further concluded that:

11 The overall distribution of fish shows a clear bias in fish  
12 distribution towards the outside of the bend . . . disaggregating this  
13 distribution into day and night periods reveals a very distinct  
14 difference between the spatial distribution of fish during the day  
15 and night. From this data it is very clear that fish are moving down  
16 the outside of the bend during dark and crepuscular periods, and  
17 holding in low velocity, near-bank areas on the inside of the bend  
18 during the day.<sup>575</sup>

19 Applying these principles, Chinook salmon would be located on the outside bend, along  
20 the west side, of the river immediately upstream of the Discharger and then holding for an  
21 extended period of time on the inside, or eastern side, of the bend in river near the diffuser for  
22 prolonged periods during the day.

23 This research strongly suggests that the most likely location of salmon in the mixing zone  
24 during the daylight hours is along the eastern bank of the Sacramento River. The eastern bank of  
25 the river near the diffuser is where the partially undiluted effluent was identified in 2006. As  
26 shown above, even after the resulting diffuser modifications, effluent would be expected at  
27 elevated concentrations along the eastern bank of the river.<sup>576</sup>

28 This prolonged exposure to the thermal plume would be expected to affect the overall

---

29 <sup>573</sup> *Id.* at p. C.5.

30 <sup>574</sup> *Id.* at p. C.6.

31 <sup>575</sup> *Id.* at p. C.5.

32 <sup>576</sup> November 2007 Data Report, Effluent Discharge Dilution and Velocity Profiling Field Study  
33 in the Sacramento River (Prepared for Flow Sciences, Inc.), by Brown and Caldwell, 2008, p.  
34 A-25.

1 health of a salmon. Cramer (2010) stated that Chinook salmon:

2 . . . that are exposed to the thermal plume for sufficient duration  
3 may experience significant consequences to their overall health.  
4 These may include advanced ageing and skin deterioration, elevated  
5 levels of heat shock proteins, hypercortisolemia, and acute thermal  
6 shock (Quigley and Hinch 2006, p.429). In addition, the stress  
7 response evident from elevated levels of cortisol (i.e.  
8 hypercortisolemia) can be delayed by 30 minutes or longer (Donaldson  
et al. 1984), leaving the fish vulnerable to predation even after they  
have left the immediate vicinity of the thermal plume. Thus, exposure  
to the thermal plume would be expected to reduce the probability of  
survival for some of the juvenile salmonids migrating past the SRWTP  
diffuser.<sup>577</sup>

9 Based on the above, there is little evidence to support the finding that Chinook salmon  
10 would move away from the Discharger's discharge plume. The more compelling evidence, which  
11 is based on actual radio tagging studies in the river immediately downstream from the Treatment  
12 Plant, is that some Chinook salmon are exposed for many hours to the Discharger's partially  
13 diluted discharge plume.

14 NMFS is in agreement with the FWS that the Discharger must complete additional studies  
15 of the effect of the Discharger's discharge on salmon in the near field mixing zone.<sup>578</sup> More  
16 specifically, NMFS shared the FWS concern about the fact the discharge appears to be attracting  
17 fish, including predators of Chinook salmon, to the area.<sup>579</sup> These studies must be completed  
18 quickly so measures to protect Chinook salmon may be adopted as soon as possible. The  
19 Discharger must also develop a plan for coming into compliance with the Thermal Plan.

#### 20 **XIV. ANTIDegradation Policy Requires Nutrient Removal and** 21 **Tertiary Filtration**

22 The Discharger asked the Regional Board to issue a NPDES Permit allowing it to increase  
23 its discharge of secondarily treated sewage from approximately 141 mgd to 181 mgd, a 28%  
24 increase. As a result, the Discharger's preferred Permit would also have increased its discharge

25 <sup>577</sup> Impact of Sacramento Regional Wastewater Treatment Plant Effluent Discharges on  
26 Salmonids, Technical Review Report, Cramer Fish Sciences, September 2010, p. 8.

27 <sup>578</sup> Letter from National Marine Fisheries Service to Regional Board, September 9, 2010.

28 <sup>579</sup> *Ibid.*

1 of a number of pollutants, including total ammonia nitrogen (already at 14 tons per day), waste  
 2 pathogens, and toxins into the Sacramento River and Delta—critical habitat for listed fish species  
 3 and the largest single source of fresh water supply in all California.<sup>580</sup> Before the Regional Board  
 4 can issue, reissue, amend, or revise a water quality permit in this manner, however, federal and  
 5 state Antidegradation Policy require it to determine whether any water quality degradation that  
 6 will result is permissible when balanced against the benefit to the public from issuing the permit.

7 The Regional Board properly determined that Antidegradation Policy applied to the  
 8 Discharger’s Permit request, competently performed the analysis, and determined that such  
 9 degradation to the Sacramento River and Delta were not warranted. Accordingly, it issued the  
 10 Discharger a Permit with discharge limits requiring nutrient removal, tertiary filtration, and  
 11 disinfection as Best Practicable Treatment or Control (BPTC) to assure that neither pollution nor  
 12 nuisance will occur and to maintain the highest water quality consistent with maximum benefit to  
 13 the people of the state.<sup>581</sup>

14 The Discharger contends its 28% discharge increase is exempt from the application of  
 15 Antidegradation Policy or, alternatively, that the Regional Board erred in its antidegradation  
 16 analysis.<sup>582</sup> On these points, the Discharger is wrong. Key points supporting that an  
 17 antidegradation analysis was warranted and properly performed include:

- 18 • *A 28% increase in wastewater discharge is significant, and antidegradation analysis*  
 19 *is clearly warranted because this large increase is likely to further degrade the Delta.*

20 Increasing the Treatment Plant’s discharge from approximately 141 mgd to 181 mgd  
 21 will cause a large influx of new waste to the Delta. This new waste, if not properly  
 22 treated, will in turn cause a huge increase in the amount of pollutants in the Delta. It is

23 \_\_\_\_\_  
 24 <sup>580</sup> Permit at F-93.

25 <sup>581</sup> 63 Fed. Reg. 36741 *et seq.* [July 7, 1998]; Permit at F-93 to F-99 [citing SWRCB Res. No. 68-  
 16].

26 <sup>582</sup> See Petition at 133:1 [“Renewal of the District’s Permit Did not Trigger State or Federal  
 27 Antidegradation Review”]; 134:8-11 [“the requirement of an antidegradation analysis under the  
 28 state and federal antidegradation policies has not been triggered”]; 141:9-10 [“assuming the  
 antidegradation policies apply, there are additional reasons they were misapplied here”].

1 plain that an increase of this magnitude has the potential to degrade water quality, and  
 2 thus, triggers the need for an antidegradation analysis.

- 3 • The Discharger's solution to address increased pollutants released into the Delta is  
 4 partial nitrification, but this too triggers the need for an antidegradation analysis.

5 The Discharger proposes to avoid the need for an antidegradation analysis by turning  
 6 one waste into another, as partial nitrification will create a discharge that contains  
 7 nitrate instead of total ammonia nitrogen. Even if this were a viable plan for the Delta,  
 8 which it is not, the Discharger cannot use this to avoid an antidegradation analysis.

9 Antidegradation is triggered for the discharge of nitrate because there has never been  
 10 an antidegradation analysis performed for nitrate associated with the Treatment Plant.

- 11 • An antidegradation analysis is needed for the Permit because a full antidegradation  
 12 analysis has never been completed. The Discharger has had six previous NPDES  
 13 permits.<sup>583</sup> The first three permits did not mention antidegradation, while the three  
 14 most recent permits make only passing reference to antidegradation. The Discharger  
 15 argues this brief treatment of antidegradation in its prior permits eliminates any  
 16 current need for an antidegradation analysis. To the contrary, in no way can a four  
 17 sentence reference to antidegradation be considered a proper antidegradation analysis.  
 18 In fact, the Regional Board has never previously performed an antidegradation  
 19 analysis for the Treatment Plant, making it a necessity during this permit proceeding.

- 20 • There is a wealth of new information and science available since the last permitting  
 21 cycle, making antidegradation analysis appropriate at this time. Because the Delta is  
 22 the state's most important water resource, and one of the most important water  
 23 resources in the nation, it is also one of the most studied water resources. As  
 24 discussed throughout this brief and as demonstrated in the record, since the last permit  
 25

26 <sup>583</sup> See Regional Board Order No. 77-137; Regional Board Order No. 84-077; Regional Board  
 27 Order 85-245; Regional Board Order No. 90-285, ¶ 17 at 3; Regional Board Order 94-006, ¶ 21 at  
 28 4; Regional Board Order No. 5-00-188, ¶ 34 at 11. To the extent a request is necessary, the  
 Water Agencies request that the State Board take official notice of the orders of the State Board  
 and Regional Board cited herein, in accordance with 23 Cal. Code. Regs. section 648.2.

1 proceeding for the Treatment Plant, a wealth of scientific research has formed a new  
 2 understanding of what degradation in the Delta means. Because of this new  
 3 understanding, even if there had been a prior antidegradation analysis, which there  
 4 was not, performance of a new antidegradation analysis would be appropriate and  
 5 necessary in this permit proceeding.

- 6 • Because the treatment required by the permit has not undergone a CEQA analysis, a  
 7 complete antidegradation analysis is required. State Board guidance indicates that  
 8 where a complete environmental review has been performed under CEQA, a simple  
 9 antidegradation analysis may be appropriate. No CEQA analysis has been performed  
 10 to evaluate the Discharger's proposed 28% increase in wastewater discharge (from  
 11 approximately 141 mgd to 181 mgd), so a simple antidegradation analysis is  
 12 inappropriate. Furthermore, the Discharger's 2020 Master Plan EIR was found to be  
 13 deficient by a Sacramento Superior Court Judge in 2007, and remains on appeal.
- 14 • The subject discharge is into a high quality water, and this is a strong indicator that  
 15 antidegradation analysis is required. The Delta, as a vital resources for fish  
 16 propagation, recreation, agricultural water supply, and municipal water supply, is a  
 17 high quality water. Before degradation of a high quality water is allowed, certain  
 18 findings must be made as part of an antidegradation analysis. This is yet another  
 19 reason that an antidegradation analysis is required.

20 For the reasons stated above, the Regional Board recognized that an antidegradation  
 21 analysis was required for this permit proceeding, and ably completed that analysis. Furthermore,  
 22 the Regional Board's antidegradation analysis properly concluded that the treatment required in  
 23 the Permit constitutes "best practicable treatment or control" and is affordable.

24 **A. The Applicable Antidegradation Policy Stems From State Law Which**  
 25 **Implements Federal Antidegradation Policy**

26 **1. Federal Antidegradation Policy**

27 Federal regulations require that states develop and adopt antidegradation policies that  
 28

1 meet minimum requirements set out in the regulations.<sup>584</sup> For all waterbodies, a state’s  
 2 implementation plan shall, at a minimum, protect existing uses in the waterbody.<sup>585</sup> For “high  
 3 quality” waters where the quality exceeds that necessary to support the propagation of fish,  
 4 shellfish, and wildlife, and recreation in or out of the water,<sup>586</sup> the state Antidegradation Policy  
 5 shall prevent degradation of that water quality, except where lowering water quality is necessary  
 6 to foster economic development in the area.<sup>587</sup> Finally, for “outstanding national resources  
 7 waters,” the regulations prohibit any new or increased discharges that would lower the quality of  
 8 the waterbody.<sup>588</sup> Further guidance regarding these regulations aids to interpret them and helps to  
 9 guide development and implementation of state policies like California’s.<sup>589</sup>

## 10 **2. State Antidegradation Policies**

11 California’s Antidegradation Policy is best summarized by a 1990 Administrative  
 12 Procedures Update (“APU”) from the State Board, which was meant to “provide guidance for the  
 13 Regional Boards for implementing State Board Resolution No. 68-16 . . . and the Federal  
 14 Antidegradation Policy, as set forth in 40 C.F.R. § 131.12.”<sup>590</sup> As such, the APU is designed to  
 15 help the Regional Boards implement both federal policy (40 C.F.R. § 131.12) and the State  
 16 Board’s Antidegradation Policy (Resolution No. 68-16).

17 For high quality waters, Resolution 68-16 mandates that the water quality must be  
 18

---

19 <sup>584</sup> 40 C.F.R. § 131.12(a).

20 <sup>585</sup> 40 C.F.R. § 131.12(a)(1).

21 <sup>586</sup> U.S. EPA *Water Quality Standards Handbook: Second Edition (Water Quality Handbook)*, at  
 22 § 4.5. (The *Water Quality Handbook* was originally published in 1994, but certain provisions,  
 23 including Chapter 4, were updated in July, 2007. The original version is available in .pdf form,  
 24 and the updated versions are available in .html form, at  
<http://www.epa.gov/waterscience/standards/handbook/>. This Response refers to the updated  
 version.)

25 <sup>587</sup> 40 C.F.R. § 131.12(a)(2).

26 <sup>588</sup> 40 C.F.R. § 131.12(a)(3).

27 <sup>589</sup> See *Water Quality Handbook*, Chapter 4.

28 <sup>590</sup> *Administrative Procedure Update 90-04*, (July 1, 1990) (“APU 90-04”), at p. 1.

1 maintained—unless the Discharger can prove that lowering the water quality: (1) will provide  
2 “maximum benefit” to the state; (2) will not impair present or anticipated beneficial uses of the  
3 receiving water; and (3) will not violated water quality objectives.<sup>591</sup> Additionally, discharges  
4 which increase the volume or concentration of waste in high quality waters must comply with  
5 discharge limits based on the “best practicable treatment or control,” which ensures that no  
6 pollution or nuisance will occur and that the highest water quality will be maintained.<sup>592</sup>

7 The APU implements this policy and instructs Regional Boards on: (1) when an  
8 antidegradation analysis is required; (2) whether a “simple” or “complete” analysis is required;  
9 and (3) the procedure for performing a complete antidegradation analysis. The APU also  
10 instructs Regional Boards as to which factors are to be considered at each step in the analysis and  
11 decision-making process.

12 In the instant case, the Regional Board followed the instructions of the APU, properly  
13 determined a complete antidegradation analysis was warranted, performed that analysis to  
14 determine the level of protection needed in the Permit, and appropriately set those limits in the  
15 Permit.

16 **B. The Regional Board’s Consideration Of The State’s Antidegradation Policy**  
17 **In The Permit Proceedings Was Necessary**

18 Regional Boards must apply the state’s Antidegradation Policy “when issuing, reissuing,  
19 amending, or revising an NPDES permit.”<sup>593</sup> An Antidegradation Policy compliance finding may  
20 be avoided only in two instances: (1) when the discharge is prohibited by law; or (2) where there  
21 is “no reason to believe that existing water quality will be reduced due to the proposed action.”<sup>594</sup>  
22 A discharge which is illegal does not require an antidegradation analysis because no discharge  
23 would be allowed.<sup>595</sup>

24 <sup>591</sup> SWRCB Reso. No. 68-16.

25 <sup>592</sup> *Id.*

26 <sup>593</sup> APU 90-04 at p. 1.

27 <sup>594</sup> *Id.* at p. 2.

28 <sup>595</sup> *Id.*

1           The record contains ample evidence that the quality of the River and Delta would be  
2 significantly reduced by the discharge contemplated by the Discharger’s requested permit, as  
3 demonstrated by prior discussion of the impacts caused by the Discharger’s waste. Considering  
4 all of these impacts, the Regional Board could not reasonably conclude that there is “no reason to  
5 believe that existing water quality will be reduced due to the proposed action.” Therefore,  
6 application of the state’s Antidegradation Policy applies to this Permit.

7  
8           **C.     The Regional Board Properly Determined That A Complete Antidegradation  
Analysis Is Required For The Permit**

9           **1.     None Of The Circumstances Which Allow For A “Simple”  
Antidegradation Analysis Are Present Here**

10           A Regional Board must determine what level of antidegradation analysis is appropriate:  
11 the “simple” analysis, or the “complete” analysis.<sup>596</sup> A “simple” analysis is only appropriate if:  
12 (1) reduction of water quality will be spatially localized; (2) reduction of water quality will be  
13 temporally limited; (3) the action will only result in minor effects; or (4) the action was  
14 “adequately subjected to the environmental and economic analyses in an environmental impact  
15 report (EIR) required under the California Environmental Quality Act (CEQA).”<sup>597</sup>

16           Here, as discussed elsewhere in this brief, the effects of the Treatment Plant’s discharge  
17 and the commensurate reduction of water quality will be neither spatially nor temporally limited.  
18 Also, the effects associated with the discharge, including changes to the food web of the critical  
19 habitat of endangered species and the stimulation of nuisance growth, are significant effects.  
20 Finally, this action has not undergone a CEQA analysis. To the contrary, in 2007 the  
21 Discharger’s 2020 Master Plan EIR was found deficient by a Sacramento Superior Court  
22 Judge.<sup>598</sup> Accordingly, because none of the circumstances that would allow the Regional Board

23 \_\_\_\_\_  
24 <sup>596</sup> *Id.*

25 <sup>597</sup> *Id.*

26 <sup>598</sup> *Contra Costa Water District v. Sacramento Regional County Sanitation District, et al.*,  
27 Sacramento Superior Court Case No. 05CS00909, Judgment (February 5, 2008). The Discharger  
28 has appealed this decision, and the case remains pending on appeal. *Contra Costa Water District  
v. Sacramento Regional County Sanitation District*, Third District Court of Appeal Case No.  
C058460 (filed March 19, 2008).

1 to conduct a “simple” analysis were present here, the Regional Board properly conducted a  
2 “complete” antidegradation analysis.

3  
4 **2. Several Circumstances Which Explicitly Require A “Complete”  
Antidegradation Analysis Are Present Here**

5 A Regional Board must conduct a complete antidegradation analysis when a proposed  
6 discharge would cause either: (1) a substantial increase in mass emissions of a pollutant, even if  
7 the receiving waters are not polluted by the discharge; or (2) mortality or reproductive effects to  
8 resident species.<sup>599</sup> A complete analysis must also be conducted when the terms of a reissued or  
9 modified permit would allow a significant increase in the amount of pollutants discharged.<sup>600</sup>

10 The record contains ample evidence that demonstrates that the discharge already causes  
11 mortality, significant nuisance growth, and reproductive impairment of resident species.  
12 Allowing the discharge to increase to 181 mgd would significantly increase mass emissions and  
13 loadings, and would result in further harm to resident species. Because several of the  
14 circumstances that require a complete analysis were present here, a complete antidegradation  
15 analysis was required for the Permit.

16 **D. The Regional Board Followed The Correct Procedure For A Complete  
17 Antidegradation Analysis And Made The Proper Findings**

18 The APU specifies a procedure for Regional Boards to follow when conducting a  
19 complete antidegradation analysis. This procedure includes: (1) a determination of the baseline;  
20 (2) a balancing of the proposed action against the public interest; and (3) a consideration of  
21 factors relevant to the balancing of the proposed action against the public interest. The Regional  
22 Board went through each of these steps correctly, and as such, the Regional Board complied with  
23 the required procedure for a complete antidegradation analysis.

24 **1. The Regional Board Considered The Appropriate Baseline**

25 “The baseline quality of the receiving water determines the level of water quality

26 \_\_\_\_\_  
27 <sup>599</sup> APU 90-004 at p. 3.

28 <sup>600</sup> *Id.*

1 protection.”<sup>601</sup> Setting the proper baseline is important because, “[r]epeated or multiple small  
 2 changes in water quality can result in significant water quality degradation. To prevent such  
 3 cumulative adverse impacts, a baseline of water quality must be established for each potentially  
 4 affected water body.”<sup>602</sup> The Discharger has long sought to evade an antidegradation analysis by  
 5 gradually increasing its discharge and presenting the increments as individually insignificant—  
 6 even though the cumulative impact of its discharge on receiving water quality and beneficial use  
 7 is significant and adverse. Now that its discharge is subject to an antidegradation analysis, the  
 8 Discharger contends that the appropriate baseline is the maximum discharge allowed under its last  
 9 Permit (181 mgd)—even though the Discharger has never actually discharged at anywhere near  
 10 that maximum level.<sup>603</sup> The Discharger’s baseline argument is wrong.

11 The state’s Antidegradation Policy sets out the proper method for determining the  
 12 baseline:

13 Baseline quality is defined as the best quality of the receiving water  
 14 that has existed since 1968 when considering Resolution No. 68-16,  
 15 or since 1975 under the federal policy, *unless subsequent lowering*  
 16 *was due to regulatory action consistent with State and federal*  
 17 *antidegradation policies*. If poorer water quality was permitted, the  
 most recent water quality resulting from permitted action is the  
 baseline water quality to be considered in any antidegradation  
 analysis.<sup>604</sup>

18 Here, while the Discharger has subsequently lowered the water quality of the Delta, that  
 19 lowering was not “due to regulatory action consistent with State and federal antidegradation  
 20 policies” because no antidegradation analysis has ever been conducted for the Treatment Plant.  
 21 None of the Discharger’s first three permits (issued in 1977,<sup>605</sup> 1984,<sup>606</sup> and 1985<sup>607</sup>) mention

22 <sup>601</sup> *Id.* at p. 4.

23 <sup>602</sup> *Id.* at p. 6.

24 <sup>603</sup> Petition at 135-136.

25 <sup>604</sup> APU 90-04 at p.4 (emphasis added).

26 <sup>605</sup> Regional Board Order No. 77-137.

27 <sup>606</sup> Regional Board Order No. 84-077.

28 <sup>607</sup> Regional Board Order No. 85-245.

1 State or federal Antidegradation Policy. The Discharger's fourth through sixth permits (issued in  
2 1990<sup>608</sup>, 1994<sup>609</sup>, and 2000<sup>610</sup>) all contained only four sentences on the Antidegradation Policy.  
3 At no time was an actual antidegradation analysis conducted. Likewise, the subsequent lowering  
4 of the Delta's water quality by the Discharger is of no moment when considering the applicable  
5 baseline. That the lowering of water quality caused by the Discharger was not consistent with  
6 State and federal antidegradation policies leads to the appropriate baseline being set at either the  
7 conditions present in 1968 or 1975, depending on whether state or federal Antidegradation Policy  
8 is considered. The Discharger has degraded the quality of the Delta using either baseline, ever  
9 since it started operation in 1983, and this degradation is readily apparent in total ammonia  
10 nitrogen concentration data collected over time in the Sacramento River, near the confluence with  
11 the San Joaquin River, downstream from the Treatment Plant.<sup>611</sup> Additional data in the record  
12 demonstrate that the Discharger has also caused consistent degradation through its discharge of  
13 other pollutants, including waste pathogens.<sup>612</sup>

14 Furthermore, even assuming that the poorer water quality was "permitted" does not  
15 support the Discharger's argument to use 181 mgd as the baseline. Under APU 90-04, "if poorer  
16 water quality was permitted, the most recent water quality resulting from permitted action is the  
17 baseline water quality to be considered in any antidegradation analysis."<sup>613</sup> Accordingly, the  
18 baseline would be the Discharger's approximately 141 mgd discharge, not the 181 mgd limit in  
19 its prior permit.<sup>614</sup>

20 \_\_\_\_\_  
21 <sup>608</sup> Regional Board Order No. 90-285, ¶ 17 at 3.

22 <sup>609</sup> Regional Board Order No. 94-006, ¶ 21 at 4.

23 <sup>610</sup> Regional Board Order No. 5-00-188, ¶ 34 at 11.

24 <sup>611</sup> See Water Agencies' Comments on Tentative Permit at pp. 75-76 (showing ammonium  
concentrations in lower Sacramento River before and after start of Treatment Plant discharge).

25 <sup>612</sup> *Id.*

26 <sup>613</sup> APU 90-04 at p.4.

27 <sup>614</sup> Notably, this statement from APU 90-04 comports with CEQA, which does not permit the use  
28 of a permit upper limit to be used as the baseline if actual discharge is lower than that maximum  
permitted level. See *Comm. For A Better Environment v. South Coast Air Quality Mgt. Dist.*

1 Finally, the Discharger’s baseline argument contradicts fundamental principles of water  
 2 quality law. It is well-established that a discharger has no vested right to discharge waste.<sup>615</sup> Yet  
 3 the Discharger’s argument that the proper baseline is its maximum permitted discharge suggests  
 4 just that. Waste transport and assimilation are not beneficial uses of the Sacramento River and  
 5 Delta,<sup>616</sup> but suggesting that the baseline for consideration of the discharge is the maximum  
 6 permitted amount puts this discharge above beneficial uses in the pecking order of beneficial use  
 7 of the River. Applying the state’s Antidegradation Policy here is essential to achieving the  
 8 federal Clean Water Act’s objectives “to restore and maintain the chemical, physical, and  
 9 biological integrity of the Nation’s waters,” and to eliminate “the discharge of pollutants into the  
 10 navigable waters.”<sup>617</sup>

11 **2. The Regional Board Properly Balanced The Permit Against The**  
 12 **Public Interest**

13 Once a baseline is established, the final step in a complete antidegradation analysis is to  
 14 balance the proposed action against the public interest to ensure that any degradation to a high  
 15 quality water is warranted by achieving the maximum public benefit to the people of  
 16 California.<sup>618</sup> The Regional Board cannot permit the action unless all of the following conditions  
 17 are met:

- 18 • The proposed action is necessary to accommodate important economic or social  
 19 development in the area;
- 20 • The reduction in water quality is consistent with maximum public benefit;
- 21 • Neither actual nor potential beneficial uses will be unreasonably affected; and
- 22 • Water quality will not fall below the water quality objectives in the Basin Plan.<sup>619</sup> |

23 (2010) 48 Cal. 4th 310, 320-321.

24 <sup>615</sup> Water Code § 13263(g).

25 <sup>616</sup> 40 C.F.R. § 131.10(a).

26 <sup>617</sup> 33 U.S.C. § 1251(a)(1).

27 <sup>618</sup> APU at 4.

28 <sup>619</sup> APU at 4.

1 State Antidegradation Policy also provides factors to consider when determining whether  
2 the discharge is necessary to accommodate social or economic development and is consistent with  
3 the public benefit. These factors include:

- 4 • The past, present, and probable beneficial uses;
- 5 • The economic and social costs;
- 6 • The environmental aspects of the proposed discharge; and
- 7 • Whether feasible alternative control measures can be implemented which might  
8 eliminate the negative impacts of the proposed action.

9 Here, the record demonstrates that the Regional Board adequately considered all of the  
10 required conditions and factors, and made the appropriate determination that the discharge would  
11 be allowed, but only with the implementation of “best practicable treatment or control.”

12 **E. State Antidegradation Policy Requires The Discharger To Maintain And**  
13 **Improve Receiving Water Quality Through Best Practicable Treatment Or**  
14 **Control**

15 State Antidegradation Policy requires that any activity that produces and discharges waste  
16 into high quality waters must meet waste discharge requirements that will result in the best  
17 practicable treatment or control (BPTC).<sup>620</sup> In identifying BPTC, the Regional Board must  
18 assure that: (a) a pollution or nuisance will not occur, and (b) the highest water quality consistent  
19 with maximum benefit will be maintained.<sup>621</sup> The current quality of receiving waters in the Delta  
20 falls below water quality objectives in the Regional Board’s Basin Plan. The Discharger’s new  
21 Permit must therefore prescribe effluent limits that will maintain or *improve* receiving water  
22 quality to a level that achieves all applicable numeric and narrative objectives as explained below.

23 The Regional Board properly determined that BPTC for the Discharger required nutrient  
24 removal and tertiary filtration for all discharges. In response, the Discharger complains that state  
25 Antidegradation Policy cannot require improvement to the existing quality of receiving waters.  
26 This is directly contradictory to well-established state policy:

27 <sup>620</sup> SWRCB Reso. No. 68-16.

28 <sup>621</sup> *Id.*

1 If baseline water quality is equal to or less than the quality as  
 2 defined by the water quality objective, *water quality shall be*  
 3 maintained or *improved* to a level that achieves the objectives.  
 4 Baseline water quality should be compared to all numerical and  
 5 narrative objectives that protect the actual and potential beneficial  
 6 uses which would be affected by the proposed discharge. . . .<sup>622</sup>

7 The record shows that the Treatment Plant, which was not brought on line until 1983,  
 8 contributes up to 90 percent of the total ammonia nitrogen that makes its way into the Delta.<sup>623</sup>  
 9 This discharge has contributed to the deterioration of water quality in the Delta and impairs  
 10 beneficial uses, even at current levels. This deterioration has resulted in the Delta failing to meet  
 11 water quality standards in the Basin Plan, and therefore, the Regional Board properly set Permit  
 12 limits to help improve water quality and help remedy the water quality objective violations that  
 13 the Discharger helped to create.

14 **1. Nitrification/Denitrification And Tertiary Filtration Are Best  
 15 Practicable Treatment Or Control**

16 The Regional Board properly determined that total ammonia nitrogen removal is BPTC  
 17 necessary to prevent significant impairment of aquatic life beneficial uses, including acute and  
 18 chronic toxicity, depletion of dissolved oxygen, production of harmful nitrosamines, and  
 19 detrimental impacts to the Delta food web.<sup>624</sup> Ample record evidence shows that the Treatment  
 20 Plant's total ammonia nitrogen discharge is significantly degrading aquatic life beneficial uses  
 21 due to changes in the nutrient balance, which have adversely affected the entire aquatic food web  
 22 of the Delta, resulting in conditions more favorable to non-native and invasive species and less  
 23 favorable to native species, particularly the threatened Delta smelt.<sup>625</sup>

24 The Regional Board properly determined that denitrification is BPTC necessary to remove  
 25 nitrate produced by the treatment processes. If the Regional Board had only required removal of

26 \_\_\_\_\_  
 27 <sup>622</sup> APU 90-004 at p. 4 (emphasis added).

28 <sup>623</sup> Jassby, 2008, *supra*.

<sup>624</sup> Permit at p. F-95.

<sup>625</sup> The Water Agencies submit that the food web impacts from the discharge of ammonium alone  
 justify total ammonia nitrogen removal as necessary and BPTC, and this water quality impact  
 should be specifically listed among the factors shown on pages F-94 and F-96.

1 total ammonia nitrogen through nitrification, it would have significantly increased nitrate loading  
2 in the Treatment Plant's discharge, causing a significant increase in the concentration and mass  
3 emission of nitrate. The Discharger concedes that its "current discharge utilizes zero percent of  
4 assimilative capacity for nitrate."<sup>626</sup> The state's Antidegradation Policy prohibits the sudden and  
5 very significant discharge of nitrate into the Sacramento River and Delta, and denitrification  
6 appropriately alleviates this problem.

7           The record demonstrates that total nitrogen removal, including total ammonia and nitrate  
8 removal, is necessary to prevent water quality degradation and adverse impacts on aquatic life  
9 caused by degraded N:P ratios. In addition, total ammonia removal by nitrification, without also  
10 requiring denitrification, would exacerbate existing nuisance conditions from algal growth in the  
11 reservoirs, conveyance systems, and treatment plants that receive Delta water, including those  
12 owned and operated by the Water Agencies. Total ammonia removal without denitrification  
13 would also increase the potential for developing eutrophic conditions in the Delta and more  
14 frequent *Microcystis* outbreaks and consequent public health impacts. Denitrification would  
15 reduce overall levels of nitrogen, improving water quality by restoring proper N:P ratios and  
16 preventing nuisance conditions and toxic algae blooms.

## 17                           **2.       Tertiary Filtration Is Necessary To Protect Human Health And To** 18                           **Avoid Water Quality Degradation**

19           The Regional Board properly determined that Title 22 or equivalent filtration and  
20 disinfection, or "tertiary filtration" as used herein, is BPTC necessary to prevent significant water  
21 quality degradation to beneficial uses, including swimming, municipal drinking water use and  
22 agricultural irrigation use. Tertiary filtration is necessary for the protection of human health and  
23 to avoid water quality degradation due to the discharge of pathogens, particularly the protozoa  
24 *Giardia* and *Cryptosporidium*.

25           Removing pathogens from the Treatment Plant's discharge is necessary to maintain and  
26 restore existing designated uses of the Delta as well as for downstream drinking water uses.

27 \_\_\_\_\_  
28 <sup>626</sup> Petition at 139:3-5 [citing Permit, Table F-18].

1 Drinking water treatment plants above and below the discharge rely on multiple barriers to ensure  
2 public health protection. Controlling sources of contamination, like the Treatment Plant's  
3 discharge, is the very first barrier.

4 The Discharger contends that the municipal drinking water beneficial use designation is a  
5 "red herring," because "[t]he nearest drinking water intake . . . is approximately 40 miles  
6 downstream of the discharge."<sup>627</sup> That argument must be rejected because it contradicts the  
7 state's Antidegradation Policy, which not only protects present beneficial uses, but also  
8 "anticipated beneficial uses" of receiving waters, and requires BPTC to prevent pollution and to  
9 assure "the highest water quality consistent with maximum benefit to the people of the State will  
10 be maintained."<sup>628</sup> The River and Delta are designated for municipal drinking water use, which  
11 indicates that this is at least an "anticipated beneficial use." The state's Antidegradation Policy  
12 requires the Discharger to incorporate tertiary filtration as BPTC, so that drinking water providers  
13 do not have to design or operate their systems around this Discharger's secondarily treated  
14 sewage.<sup>629</sup>

15 As identified in the Permit, there are ancillary water quality benefits to providing tertiary  
16 filtration, in that other pollutant concentrations will be reduced. In addition, providing tertiary  
17 treatment will result in an effluent quality that is suitable for reuse. In 2009, the Discharger  
18 produced less than 1 mgd of recycled water.<sup>630</sup> The Discharger has a goal of increasing water  
19 recycling by 30 to 40 mgd by 2024.<sup>631</sup> If the Regional Board requires the Discharger to treat the  
20 entire effluent flow to tertiary levels, the Discharger will have an incentive to provide its treated

21 \_\_\_\_\_  
22 <sup>627</sup> Petition at 47:18-19.

23 <sup>628</sup> SWRCB Reso. No. 68-16.

24 <sup>629</sup> While the Freeport Regional Water Diversion's agreement to shut down during certain  
25 reverse flow events is a poignant example of how the Discharger is impairing the municipal  
26 drinking water beneficial use, impairment also arises from the Discharger's nutrient loading,  
27 which contributes to nuisance algae impacts in SWP and CVP diversion, conveyance and  
28 terminal reservoir facilities.

<sup>630</sup> SRCSD. 2009. State of the District Report.

<sup>631</sup> See <http://www.srcsd.com/water-recycling-environemnt.php>.

1 effluent as a source of supply to meet non-potable water demands in the Sacramento region. This  
 2 would result in less effluent being discharged to the Sacramento River, further protecting the  
 3 beneficial uses of the Sacramento River and Delta by reducing the load of all pollutants in the  
 4 discharge.

5  
 6 **3. Nitrification/Denitrification And Tertiary Filtration At Other  
 Wastewater Treatment Plants Throughout The Central Valley, State  
 And Country Supports The Regional Board's BPTC Determination**

7  
 8 **a. Wastewater plants in the Central Valley require nitrification/  
 denitrification and tertiary filtration**

9 An examination of similarly situated treatment plants in the region, around the state, and  
 10 across the country reveals that the requirements in the Permit are BPTC. In determining what  
 11 discharge limitations are needed to achieve BPTC, it was reasonable and appropriate for the  
 12 Regional Board to take note of the large number of wastewater treatment plants in the Sacramento  
 13 River and Delta region that already are required to provide advanced treatment (tertiary filtration  
 14 and nitrification/denitrification). The Regional Board has required nitrification/denitrification  
 15 and tertiary filtration plus disinfection for most wastewater treatment plants in the Central Valley.  
 16 In fact, 24 other treatment plants in the Central Valley, with discharges ranging from 1.0 to 55  
 17 mgd, and a total discharge of 228 mgd, have all been required to employ  
 18 nitrification/denitrification and tertiary filtration.<sup>632</sup> The Regional Board has specifically found  
 19 nitrification/denitrification and tertiary filtration to be BPTC for these existing plants in many  
 20 cases. The beneficial uses the Regional Board has previously protected by mandating BPTC at  
 21 other plants are the same beneficial uses that are designated for the Sacramento River at and  
 22 downstream of the Treatment Plant's discharge.

23 **b. Wastewater plants around the state and across the country  
 require nitrification/denitrification and tertiary filtration**

24 Wastewater treatment plants around the state and across the country employ the same  
 25 BPTC required by the Regional Board in the Permit. For example, the Chesapeake Bay TMDL  
 26 program limits the discharge of nitrogen and phosphorous by municipal (including 402

27  
 28 <sup>632</sup> See Attachment 2

1 wastewater facilities) and industrial sources from Maryland, Virginia, Delaware, West Virginia,  
2 Pennsylvania, New York, and Washington, D.C. to address excessive nutrient loading to  
3 Chesapeake Bay.<sup>633</sup>

4 Just as the Sacramento River and Delta is the largest estuary on the west coast, the  
5 Potomac River and Chesapeake Bay is the largest estuary on the east coast. Both ecosystems  
6 support a wealth of plants and animals, as well as recreation and other important uses. The Blue  
7 Plains WWTP is comparable to the Treatment Plant here, because both are the largest POTWs in  
8 their respective watersheds. The Blue Plains facility employs nitrification/denitrification  
9 technology to remove and limit nitrogen as a nutrient from its 370 mgd discharge and it employs  
10 tertiary filtration.<sup>634</sup> As part of the Chesapeake Bay program, Blue Plains is undergoing a major  
11 upgrade to further reduce the plant's nutrient loading.<sup>635</sup> The Discharger contends, without merit,  
12 that it should not be subject to the exact same standards already in place across the country for  
13 similarly situated plants. On the contrary, these standards should have been implemented years  
14 ago.

15 In addition, treatment plants in other parts of California also use  
16 nitrification/denitrification and tertiary filtration as BPTC. For example, treatment plants in the  
17 Santa Ana watershed use tertiary treatment, including all Santa Ana Watershed Project Authority  
18 member agencies. This level of treatment is BPTC to protect the beneficial uses of the Santa  
19 Ana River, which is the source of over 50% of Orange County's drinking water.

#### 20 **4. Nitrification/Denitrification And Tertiary Filtration Can Be** 21 **Implemented At A Reasonable Cost**

22 The Discharger's principal complaint about the BPTC set forth in the Permit is that it  
23 costs too much.<sup>636</sup> Although the Discharger overstates the legal relevance of compliance costs to

24 <sup>633</sup> U.S. EPA, Region 3, "Progress on Reducing Pollution from Wastewater Facilities," *available*  
25 *at* <http://www.epa.gov/reg3wapd/npdes/index.htm> (last visited April 18, 2011).

26 <sup>634</sup> U.S. EPA Final Fact Sheet, NPDES Permit Reissuance, NPDES Permit No. DC0021199 at 7  
(Aug. 31, 2010).

27 <sup>635</sup> *Id.*

28 <sup>636</sup> *See* Petition at 9:12-20 (claiming failure to give Permit compliance cost "required")

1 the lawful determination of the Permit’s discharge limits, cost does play a certain role under the  
2 state’s Antidegradation Policy. Specifically, “antidegradation policy allows States to lower water  
3 quality in high-quality waters only if it is necessary to accommodate important economic and  
4 social development,” so that lower water quality may be allowed in those “extraordinary cases  
5 where the benefits of the economic and social development unquestionably outweigh the costs of  
6 lowered water quality.”<sup>637</sup> This is not one of those “extraordinary” cases.

7 The record shows that the Discharger dramatically overstated the cost to comply with the  
8 Permit, failed to acknowledge the significant past, current, and future socioeconomic impacts of  
9 lowered water quality within and beyond the Discharger’s service area, and failed to meet its  
10 burden of demonstrating specific important benefits of local socioeconomic development that  
11 unquestionably outweigh those costs.

12 **a. The \$2 billion cost estimate developed by the discharger is**  
13 **nearly double other estimates**

14 The Discharger developed an estimated Permit compliance cost that it contends will  
15 reduce socioeconomic development in its local service area. The Discharger claims it will have  
16 to invest more than \$2 billion to update its Treatment Plant to comply with the Permit—a big  
17 number that the Discharger has translated into hypothetical rate increases it says are too much for  
18 the local service area to bear. But the actual compliance cost is projected to be about half the  
19 Discharger’s estimated figure. The hypothetical rate increases publicized by the Discharger are  
20 so vastly overstated that the Discharger’s own economic expert questioned the validity of using  
21 them to estimate local economic effects of Permit compliance.<sup>638</sup>

22 The Permit cites a total compliance cost for BPTC (including nitrification/denitrification  
23 and tertiary filtration) of \$2.066 billion.<sup>639</sup> That cost estimate was developed by the Discharger’s

24 consideration); *see, e.g.*, Petition at 19:4 (citing compliance cost as “overriding” Permit issue).

25 <sup>637</sup> U.S. EPA. 1995. Interim Economic Guidance for Water Quality Standards Workbook (EPA-  
26 823-B-95-002).

27 <sup>638</sup> Hearing Transcript at pp. 258-260.

28 <sup>639</sup> Permit at p. F-96.

1 engineering consultant, Carollo, and is detailed in an August 19, 2010, memorandum as one of  
2 four advanced treatment trains investigated.<sup>640</sup> The \$2.066 billion estimate corresponds to  
3 “Treatment Train C”, which consists of nitrifying trickling filters, fluidized bed reactors,  
4 microfiltration, and UV disinfection.<sup>641</sup> The Discharger’s consultant estimates the  
5 nitrification/denitrification component will cost \$783 million.<sup>642</sup> The cost for the filtration and  
6 disinfection component is the difference—\$1.283 billion.<sup>643</sup>

7  
8 Given the Discharger’s surprisingly high cost estimate, the Regional Board obtained  
9 separate analyses by two independent wastewater treatment plant engineering firms familiar with  
10 the Permit’s requirements. PG Environmental, LLC analyzed the proposed waste treatment  
11 process changes (i.e., treatment trains) and their associated costs and concluded that significant  
12 costs savings could be achieved by substituting granular filtration for the Discharger’s proposed  
13 microfiltration, which would reduce the Permit’s overall compliance cost to \$1.346 billion —  
14 about two-thirds of the compliance cost claimed by the Discharger.

15 Trussell Technologies, Inc. (Trussell), reviewed the Tentative Permit and the Discharger’s  
16 cost and engineering documents to assess the reasonableness of the Discharger’s claimed  
17 compliance costs. Trussell conservatively based its analyses upon a treatment train with the  
18 greatest probability of achieving a discharge quality complying with the Permit’s limits, including  
19 removal of ammonia and pathogens, while consistently meeting Title 22 requirements for  
20 unrestricted use of reclaimed wastewater and oxidizing (i.e., neutralizing) many constituents of  
21 emerging concern.<sup>644</sup> Trussell concluded that the most appropriate upgrades for the Treatment

22 <sup>640</sup> Carollo Engineers 2010a, *supra*. See also Carollo Engineers 2010b. Memo from Elisa Garvey  
23 to Bob Seyfried, Vyomini Pandya, “Clarification of base construction costs and construction cost  
24 factors as presented in the ‘Advanced Treatment Alternatives for the Sacramento Regional  
25 Wastewater Treatment Plant’ (Carollo Engineers, March 2009)” (August 25, 2010).

26 <sup>641</sup> *Id.*

27 <sup>642</sup> *Id.*, Table 1 (from Treatment Train B).

28 <sup>643</sup> PG Environmental. 2010. Memo to Kathleen Harder, Regional Board, “Technical Review of  
Estimated Costs for Proposed Changes to the Sacramento Regional Wastewater Treatment Plant”  
(August 18, 2010).

<sup>644</sup> Trussell Technologies, Inc. 2010b, p. 2. Letter to Adam Kear, Metropolitan Water District,  
970832.1

1 Plant required to achieve BPTC would cost up to \$1.173 billion—about half the compliance cost  
2 claimed by the Discharger.<sup>645</sup>

3 During the Regional Board’s December hearing, the Discharger contended that the \$1.173  
4 billion compliance cost required certain adjustments that would make it higher, and more  
5 comparable, to the Discharger’s \$2 billion estimate.<sup>646</sup> Trussell subsequently analyzed those  
6 proposed adjustments and concluded that inflation of their estimated costs to reflect assumptions  
7 made by the Discharger’s consultant is unjustified and inappropriate.<sup>647</sup> The Discharger’s  
8 consultant, Carollo Engineers, increased Trussell’s estimates to reflect a higher plant peaking  
9 factor based on a truncated historical flow data set of 1994 through 2002, which is inconsistent  
10 with the peaking factor Carollo used itself in its prior work for the Discharger based on 1994 to  
11 2004 data.<sup>648</sup> Carollo apparently also adjusted Trussell’s estimates by adding additional  
12 contingencies, when those estimates already contained appropriate multipliers for project soft  
13 costs and contingencies (40% to 67% additions to base construction costs).<sup>649</sup>

14 Based on these independent assessments, the record demonstrates that the Discharger’s  
15 compliance costs will be much lower than it claims they will be, and the local economic effects  
16 will be far more modest than the Discharger has publicized in its campaign to scare the Water  
17 Boards into acquiescing with its unreasonable and unsupportable wish to avoid the Permit.

18 **b. Nitrification/denitrification process and costs**

19 The administrative record shows that the Modified Ludzack-Ettinger (MLE) process may  
20

---

21 “Summary of Preliminary Findings in Response to the Tentative SRCSD NPDES Permit”  
22 (October 1, 2010); Trussell Technologies, Inc. 2011a. Technical Memorandum No. 1, Summary  
23 of Findings in Review of SRCSD NPDES Permit (April 29, 2011), pp. 9-10.

24 <sup>645</sup> Trussell 2010b, p. 3; Trussell 2011a, p. 13.

25 <sup>646</sup> Petition at 21-22 (citing Hearing Transcript at pp. 170-174).

26 <sup>647</sup> See Declaration of Shane Trussell, ¶ 16 (Trussell 2011c).

27 <sup>648</sup> *Id.*, ¶¶ 4-6.

28 <sup>649</sup> *Id.*, ¶¶ 8-11.

1 be the best approach to accomplish nutrient removal as BPTC for the Treatment Plant.<sup>650</sup> This  
2 conclusion stems from an analysis that initially examined seven potential treatment alternatives.  
3 The two most viable alternatives—nitrifying biofilters and converting to the MLE process—were  
4 selected for further analysis. Trussell showed that the MLE process would provide both total  
5 ammonia nitrogen removal and nitrate removal, thus achieving BPTC, and would have the added  
6 benefit of reducing some biological oxygen demand. Conceptual designs for both options were  
7 developed and construction costs estimated. The analysis showed that conversion to MLE  
8 process would involve constructing a retrofit of the existing High Purity Oxygen Activated  
9 Sludge process to anoxic conditions, aeration units, blower and power building, pump station,  
10 lime storage and feeding facility, and rail spur at a capital cost of \$432.3 million, or about 1.6  
11 cents per pound removed. The analysis acknowledged that the MLE options would increase  
12 power costs and increase costs due to required lime addition, but would reduce other costs by  
13 decreasing sludge production by approximately 25 percent. Trussell estimated that  
14 nitrification/denitrification with an MLE process would cost \$663.2 million—\$120 million less  
15 than the BPTC compliance cost claimed by the Discharger.<sup>651</sup>

16 **c. Tertiary filtration and disinfection process and costs**

17 Granular filtration is an appropriate and cost-saving filtration process, but the Discharger  
18 and Water Agencies both have demonstrated that membrane filtration would be the most prudent  
19 filtration approach for the Treatment Plant. Granular media filters are not the best alternative  
20 here, because they would require pretreatment and significant chemical addition.<sup>652</sup>

21 Although Trussell concurred with the Discharger's process choice, it demonstrated that  
22 the Discharger's estimated costs for membrane filtration were unreasonably conservative and  
23 inappropriately based on much smaller plants constructed during the past 10 years. The record  
24

25 <sup>650</sup> Trussell Technologies, Inc. 2010a. Ammonia Removal Cost Alternatives for the Sacramento  
26 Regional Wastewater Treatment Plant (May 31, 2010), pp. 13-22.

27 <sup>651</sup> Trussell 2010b, p. 3 (citing Carollo 2005); Trussell 2011a.

28 <sup>652</sup> Trussell 2010b at p. 2; Trussell 2011a.

1 shows that, based upon more recent and larger capacity membrane filtration projects, a far more  
 2 realistic cost for installed membranes would be between \$1/gal<sup>653</sup> and \$2/gal<sup>654</sup>—less than half  
 3 the cost claimed by the Discharger.

4 For disinfection, Trussell concurred with PG Environmental’s recommendation to replace  
 5 the UV system with an ozone system, but determined that adding hydrogen peroxide was  
 6 unnecessary. Ozone is a highly effective disinfection system with well documented costs, which  
 7 also provides ancillary benefits by reducing other constituents of concern, including many EDCs.  
 8 Ozone alone has been shown destroy estrogen and pharmaceuticals.<sup>655</sup>

9 The membrane filtration and ozone cost estimate were estimated based upon a recently  
 10 awarded large wastewater construction project for CCWRD, which is more comparable in size  
 11 than projects previously used for points of reference. Trussell’s estimated project cost for  
 12 microfiltration and ozone is \$510 million, and the total estimated costs for the full BPTC  
 13 treatment train described above is \$1.173 billion—nearly a 50 percent reduction from the  
 14 Discharger’s estimated cost of \$2.066 billion.<sup>656</sup>

## 15 **5. The Cost To Accomplish BPTC Is Reasonable**

16  
 17 The Discharger argues that for the Permit’s BPTC determinations to pass muster, the  
 18 state’s Antidegradation Policy requires that “the *Regional Board* . . . find that the proposed  
 19 requirements do not unduly impact social and economic development . . . .”<sup>657</sup> Discharger’s  
 20 argument must be rejected, because it would disregard the *Discharger’s* burden of proving the  
 21 extraordinary case where a lower water quality is demonstrated to be necessary to accommodate

22 \_\_\_\_\_  
 23 <sup>653</sup> Trussell 2010 b; Trussell 2011a at p. 11 (Membrane costs for a 86 mgd being installed at the  
 Orange County Water District’s [OCWD] Groundwater Replenishment System).

24 <sup>654</sup> *Id.* (Membrane costs for a 30 mgd under construction at Clark County Water Reclamation  
 District [CCWRD]).

25 <sup>655</sup> Trussell 2011a at p. 11.

26 <sup>656</sup> Trussell 2010b; Trussell 2011a at p. 13.

27 <sup>657</sup> Petition at 150:5-7 (emphasis added).  
 28

1 important socioeconomic development. The burden of proof is on the Discharger, and the  
2 administrative record demonstrates that the Discharger has failed to meet its burden.

3 While it is not the Regional Board's burden to prove an absence of substantial  
4 socioeconomic impacts associated with the Permit, it had a wealth of socioeconomic analyses  
5 before it that did just that. The Regional Board itself at looked costs per capita to implement  
6 tertiary treatment at the Treatment Plant and for other similarly situated POTWs and found that  
7 even using the Dischargers inflated costs, costs per capita were similar.<sup>658</sup> The Water Agencies  
8 submitted economic analyses using the official U.S. EPA Guidance, which showed compliance  
9 costs were affordable and with negligible impacts on the regional economy.<sup>659</sup> The Regional  
10 Board also considered economic and soicioeconomic studies provided by the Discharger, the  
11 North State Building Industry Association, and the University of the Pacific (UOP).<sup>660</sup>

12 U.S. EPA has prescribed guidance for states to apply in assessing whether the economic  
13 impacts of preventing water quality degradation are so large as to justify the lowering of water  
14 quality (where all applicable water quality objectives still would be met). That guidance is set  
15 forth in the U.S. EPA's March 1995 Interim Economic Guidance for Water Quality Standards  
16 Workbook ("U.S. EPA Economic Guidance"), and degradation of high quality waters is allowed  
17 "in only a few extraordinary cases where the benefits of the economic and social development  
18 unquestionably outweighs the costs of lowered water quality."<sup>661</sup> To this end, the discharger must  
19 demonstrate that it "would face *substantial financial impacts* due to the costs of the necessary  
20 pollution controls (substantial impacts or would interfere with development).<sup>662</sup>

21 The U.S. EPA Economic Guidance prescribes a multi-step process for assessing whether  
22

---

23 <sup>658</sup> Permit, p. F-96.

24 <sup>659</sup> See Water Agencies' Comments on Tentative Permit.

25 <sup>660</sup> Permit, p. F-97.

26 <sup>661</sup> U.S. EPA. 1995. Interim Economic Guidance for Water Quality Standards Workbook (EPA-  
27 823-B-95-002) at pp. 1-3, 4.

28 <sup>662</sup> *Id.* at p. 1-5.

1 the economic impacts of pollution control (i.e., treatment) are substantial. For public agencies  
2 (like the Discharger), the multi-step process to assess whether impacts are “substantial” includes:

- 3 • Estimating capital and operation and maintenance costs of the pollution controls.
- 4 • Identifying the area and number of households affected by the increased cost of  
5 pollution control and calculating annual pollution control costs per household.
- 6 • Performing a primary economic test by dividing the annual pollution control cost per  
7 household by the median household income to develop a screening value.<sup>663</sup>
- 8 • Performing a secondary economic test by evaluating (1) community bond ratings, (2)  
9 net debt as a percentage of market value of taxable property, (3) the unemployment  
10 rate, (4) median household income, (5) property tax revenue as a percent of full  
11 market value of taxable property, and (6) property tax collection rate.
- 12 • Comparing the results from the primary and secondary tests with U.S. EPA’s  
13 “Substantial Impacts Matrix” to determine if the economic impacts are substantial.<sup>664</sup>

14 If the tests indicate that economic impacts may be substantial, a series of additional steps may be  
15 appropriate to determine if the impacts are widespread. Those steps include assessing how the  
16 pollution control costs would affect such factors as median household income, the community  
17 unemployment rate, overall net debt as a percent of full market value of taxable property, tax  
18 revenues, development opportunities, and relocation of businesses resulting from the increased  
19 costs.<sup>665</sup>

20 The U.S. EPA Economic Guidance employs a screening test to ascertain whether the ratio  
21 of total annual pollution control costs per household (including both existing costs and those  
22 which ascribed to the proposed project) over the median household income exceeds a threshold  
23 value. If the ratio is less than 0.01 (1.0 percent of median household income), the project is not  
24

---

25 <sup>663</sup> If the screening value is less than 1 percent of the median household income, the economic  
26 cost is presumed to not represent an unreasonable economic hardship.

27 <sup>664</sup> *Id.* at pp. 2-1 to 2-13.

28 <sup>665</sup> *Id.* at pp. 4-1 to 4-7.

1 expected to impose a substantial economic hardship, or as stated by the Guidelines, that “the  
2 community can clearly pay for the project.”<sup>666</sup> If the cost exceeds 2.0 percent of median  
3 household income, the project may place an unreasonable financial burden on ratepayers. Mid-  
4 range impacts are expected when the ratio falls between 1.0 and 2.0 percent. It is assumed that  
5 ratios well below 1.0 percent indicate that dischargers will be able to pay for the pollution control  
6 project without substantial economic impacts. Readings above 1.0 percent may be used as an  
7 indication that a Secondary Test should be applied.

8 **a. The Cost For Nitrification/Denitrification Alone Is Reasonable**

9 The impacts on sewer rates from the nitrification/denitrification treatment train  
10 recommended by Trussell are reasonable. As demonstrated in the record, the sewer rate for  
11 current residential users would increase by an estimated \$9.39 per month (or \$112.68 per year),  
12 which is in addition to charges for collection and conveyance of wastewater.<sup>667</sup> The total sewer  
13 fee would vary based on provider of collection and conveyance services. On a monthly basis,  
14 total sewer fees would range between \$34.33 and \$45.29, and between \$411.96 and \$543.48  
15 annually.

16 **Table 7. Sewer Rate Impacts (Nitrification/Denitrification Alternative)<sup>668</sup>**

Contributing Agency	Sewer Fee (Treatment and Disposal)		Sewer Fee (Collection and Conveyance)	Total Sewer Fee	
	Existing Monthly Rate	Monthly Increase <sup>2</sup>		Monthly	Annual
Sacramento Area Sewer District	\$19.75	\$9.39	\$15.00	\$44.14	\$529.68
City of Sacramento			\$11.10	\$40.24	\$482.88
City of West Sacramento			\$5.19	\$34.33	\$411.96
City of Folsom			\$16.15	\$45.29	\$543.48

23  
24  
25 <sup>666</sup> Water Agencies’ Comments on Tentative Permit at 91 (Oct. 8, 2010) (citing U.S. EPA  
Economic Guidance).

26 <sup>667</sup> Entrix 2010. Technical Memoranda by Paul, Duane and Steve Pavich, “Economic Analysis of  
27 the Advanced Treatment Trains in the Tentative NPDES Permit. October 8, 2010.

28 <sup>668</sup> Water Agencies’ Comments on Tentative Permit at p. 91.

1           Applying the U.S. EPA Economic Guidance demonstrates that the  
 2 nitrification/denitrification alternative would not impose a substantial economic hardship on the  
 3 community and that the community can clearly pay for the project. Based on the assumptions  
 4 previously outlined, the nitrification/denitrification alternative has an annualized cost of \$69.7  
 5 million, the current residential share of the project is \$39.0 million, and the number of existing  
 6 households in the region is 477,804 ESD.<sup>669</sup> Because the U.S. EPA Economic Guidance focuses  
 7 on the local households' ability to pay for the project, only current residential costs are  
 8 considered. The total annualized pollution control cost per household for this scenario is \$112.68.  
 9 This value must be added to the baseline costs of \$417 per year (within the Discharger's service  
 10 area), resulting in a total annual cost of \$524.83 per household. According to data from the U.S.  
 11 Census Bureau, the median annual household income for Sacramento County in 2008 was  
 12 \$56,882. This value was adjusted to 2009 levels using the Consumer Price Index (CPI) to be  
 13 consistent with project costs, which are estimated in 2009 dollars; the 2009 figure is \$56,706.  
 14 Dividing \$529.68 by \$56,706 results in a preliminary "screener" value of 0.93 percent, which is  
 15 below the threshold value of 1.0 percent up to which a "community can clearly pay for the  
 16 project." With project costs spread out over a growing number of households, the preliminary  
 17 screener value would be lower still. Because the preliminary screener value is less than 1.0, there  
 18 is no need to implement the secondary test in the U.S. EPA Economic Guidance, and the cost for  
 19 implementing nitrification/denitrification is reasonable.

20           **6. The Cost For Tertiary Filtration And Nitrification/Denitrification**  
 21           **Together As Full BPTC Is Reasonable**

22           The estimated impacts on sewer rates for full BPTC (nitrification, denitrification and  
 23 filtration) recommended by Trussell and PG Environmental, respectively, are reasonable. The  
 24 Discharger's sewer rate for current residential users would increase by an estimated \$16.13 to  
 25 \$22.18 per month when full BPTC is implemented. The total sewer fee would vary based on the  
 26 provider of collection and conveyance services. On a monthly basis, total sewer fees would range

27 \_\_\_\_\_  
 28 <sup>669</sup> LWA 2009 at p. 6-10.

between \$41.07 and \$58.08, and between \$492.89 and \$696.96 annually.

**Table 8. Sewer Rate Impacts of Full BPTC - Trussell Assumptions<sup>670</sup>**

Contributing Agency	Sewer Fee (Treatment and Disposal)		Sewer Fee (Collection and Conveyance)	Total Sewer Fee	
	Existing Monthly Rate	Monthly Increase <sup>2</sup>		Monthly	Annual
Sacramento Area Sewer District	\$19.75	\$16.13	\$15.00	\$50.88	\$610.61
City of Sacramento			\$11.10	\$46.98	\$563.81
City of West Sacramento			\$5.19	\$41.07	\$492.89
City of Folsom			\$16.15	\$52.03	\$624.41

**Table 9. Sewer Rate Impacts of Full BPTC - PG Environmental Assumptions<sup>671</sup>**

Contributing Agency	Sewer Fee (Treatment and Disposal)		Sewer Fee (Collection and Conveyance)	Total Sewer Fee	
	Existing Monthly Rate	Monthly Increase <sup>2</sup>		Monthly	Annual
Sacramento Area Sewer District	\$19.75	\$22.18	\$15.00	\$56.93	\$683.16
City of Sacramento			\$11.10	\$53.03	\$636.36
City of West Sacramento			\$5.19	\$47.12	\$565.44
City of Folsom			\$16.15	\$58.08	\$696.96

Applying the U.S. EPA Economic Guidance as previously described for the total annual cost of \$119.7 million to \$164.6 million estimated in the Trussell and PG Environmental BPTC scenarios, respectively (current residential allocation of \$67.0 to \$92.2 million) results in preliminary screener scores just above the threshold of 1.0%. The preliminary screener score for BPTC as recommended by Trussell is 1.08%, and the score for BPTC as recommended by PG Environmental is 1.2%. Where the preliminary screener score falls above 1.0 percent, the U.S. EPA Economic Guidance calls for a second test to determine if “substantial” economic impacts would be incurred in order to avoid lowering water quality.

<sup>670</sup> Water Agencies’ Comments on Tentative Permit at p. 92.

<sup>671</sup> Water Agencies’ Comments on Tentative Permit at p. 93.

1           The secondary test established by U.S. EPA focuses on the community’s ability to obtain  
 2 financing and the socioeconomic health of the community. Six indicators are used to develop a  
 3 composite score for the community: (1) bond rating; (2) overall net debt as a percent of full  
 4 market value of taxable property; (3) unemployment rate; (4) median household income;  
 5 (5) property tax revenue as a percent of full market value of taxable property; and (6) property tax  
 6 collection rate. The application of these indicators to Sacramento County is presented below.

- 7           • Bond Rating: The bond rating in Sacramento County as rated by Moody’s is A3.  
 8           Bond ratings above Baa (Moody’s) are considered “strong” and receive a rating of 3  
 9           for this indicator.
- 10          • Overall Net Debt as a Percent of Full Market Value of Taxable Property: Overall net  
 11          debt (repaid by property taxes) in Sacramento County in Fiscal Year 2009 was \$1.4  
 12          billion. The full market value of taxable property in the county is unknown; however,  
 13          a conservative estimate can be obtained using the total assessed value of taxable  
 14          property, which was \$138.7 billion in Sacramento County in 2009. Based on these  
 15          values, this parameter is estimated at 1.02 percent. Values below 2 percent are  
 16          considered “strong” and receive a rating of 3 for this indicator.
- 17          • Unemployment Rate: This parameter considers the unemployment in the affected  
 18          community to the national rate. In 2009, the average annual unemployment rate in  
 19          Sacramento County was 11.3 percent compared to 9.3 percent for the U.S. The  
 20          unemployment rating in the county is more than 1 percent above the national average.  
 21          This indicator is considered “weak” and receives a rating of 1. |List Paragraph
- 22          • Median Household Income: This parameter considers the median household income  
 23          in the affected community relative to the income levels in the state where it is located.  
 24          Using census data (adjusted to 2010 levels), the median household income in  
 25          Sacramento County is \$58,039 compared to \$62,258 in California. The median  
 26          household income level in the county is within 10 percent of the state level.  
 27          Therefore, this indicator is considered “mid-range” and receives a rating of 2.

- 1 • Property Tax Revenue as a Percent of Full Market Value of Taxable Property: This  
2 parameter is excluded from the analysis because property taxes in California are  
3 subject to a statutory limit per Proposition 13. The EPA Economic Guidance states  
4 that there is no appropriate substitute in these cases, and that this indicator should be  
5 dropped and the other five factors are assigned equal weights.
- 6 • Property Tax Collection Rate: The property tax collection rate in Sacramento County  
7 is 96.2 percent. The collection rate falls between 94-98 percent, which is considered  
8 “mid-range” and receives a rating of 2.
- 9 • The total composite score for all five applicable indicators is 11 and the average is 2.2.  
10 The average score (2.2) is the secondary score under the U.S. EPA Economic  
11 Guidance.

12 To determine whether a community would incur substantial economic impacts, both the  
13 preliminary screener value and secondary score are considered in the “assessment of substantial  
14 impacts matrix” shown as Table 11 and Figure 8 in the Water Agencies’ comments on the  
15 Tentative Permit. For BPTC, the preliminary screener value is 1.1 to 1.2 percent and the  
16 secondary score is 2.2.

17 The U.S. EPA Economic Guidance has provisions if both the screener value and  
18 secondary score are borderline, which is the case here, and indicates that the community should  
19 move into the category closest to it. Here, the preliminary screener value is close to being less  
20 than 1 percent and the secondary score is close to being greater than 2.5 (particularly if full  
21 market value of property is considered). As a result, the project would fall into the “able to pay  
22 category,” which indicates that the impact is not likely to be substantial. This is particularly true  
23 for the BPTC using the process and cost assumptions recommended by Trussell.

## 24 **7. Regional Economic Impacts Of BPTC Are Minimal**

25 Applying the U.S. EPA Economic Guidance shows that achieving BPTC will not result in  
26 substantial economic impacts on households in the Discharger’s service area. Economics  
27 Professor David Sunding, University of California Berkeley, evaluated the regional economic  
28

1 impacts of the compliance costs of implementing BPTC and testified to the Regional Board on his  
2 findings.<sup>672</sup> As part of his evaluation, Dr. Sunding considered a study by Jeffrey Michael and  
3 Thomas Pogue of the University of the Pacific (UOP) that was prepared at the request of the  
4 request of the Discharger.<sup>673</sup> This UOP study used the IMPLAN model and found, based on the  
5 District's \$2 billion cost estimate and the modeling assumptions used, that although construction  
6 would generate jobs and income, the overall impact would result in an annual income loss of  
7 \$246 million and an annual job loss of 976. The UOP study also determined that higher  
8 connection fees resulting from the facility upgrade would delay economic recovery in the  
9 region.<sup>674</sup>

10 Dr. Sunding, however, found that the implementing the Treatment Plant compliance  
11 upgrades would have a stimulus effect, *increasing* rather than decreasing regional income and  
12 employment, and have only a small effect, if any, on the economic recovery underway in the  
13 Sacramento area.<sup>675</sup> He also found that the Discharger's proposed wastewater rate increase  
14 structure is inefficient, imposing too little burden on existing ratepayers and too much on new  
15 ones, which places a needless potential drag on new construction.<sup>676</sup> Dr. Sunding explained that  
16 much of the differences between his finding and those in the UOP study can be explained by a

17  
18 <sup>672</sup> Hearing Transcript, pp. 282-288; Water Agencies' Hearing presentation, slides 25-32;  
Declaration of David L. Sunding, May 4, 2011 (Sunding 2011).

19 <sup>673</sup> Michael, J. and Thomas Pogue, "Assessing the Impact of the Tentative Discharge Permit for  
20 the Sacramento Regional Wastewater Treatment Plant on Sacramento Area Income and  
Employment," Eberhardt School of Business – Business Forecasting Center, University of the  
21 Pacific, November 10, 2010. ("Michael and Pogue 2010b", also referred to as the "second UOP  
Study" in the Petition [p. 151, fn 592].)

22 <sup>674</sup> Sunding 2011, pp. 1-2. The record contains two additional regional economic impact studies:  
23 one, conducted by Larry Walker Associates for the Discharger (Larry Walker Associates  
"Antidegradation Analysis for Proposed Discharge Modifications for the Sacramento Regional  
24 Wastewater Treatment Plant, Administrative Draft" (May 20, 2010)), and the other conducted by  
Entrix for the Water Agencies (Entrix 2010.) The Entrix analysis used the framework of the  
25 Larry Walker study but with appropriate inputs and concluded that regional economic impacts of  
implementing BPTC is negligible. All of the regional economic studies have used IMPLAN, an  
26 economic modeling program commonly used to conduct regional economic analyses.

27 <sup>675</sup> Sunding 2011, p. 2.

28 <sup>676</sup> *Id.*, ¶ 5, p. 2.

1 unconventional and improper modeling technique used by the UOP researchers.

2 As an initial assessment of the Discharger's claim that its customers will face  
3 "unprecedented rate increases,"<sup>677</sup> Dr. Sunding looked at the Discharger's existing wastewater  
4 rates in comparison to other communities.<sup>678</sup> The Discharger has offered the following  
5 comparison of several sewer collection and wastewater treatment agency rates in California  
6 depicting their rates to be primarily mid-range.<sup>679</sup>

7 Table 10.

Agency	Monthly Rate**		
	Collection	Treatment	Total
Union Sanitary District	*	\$24.15	\$24.15
City of Fresno	*	\$25.75	\$25.75
Central Contra Costa County Sanitation District	*	\$25.92	\$25.92
City of West Sacramento + SRCSD	\$6.01	\$20.00	\$26.01
Fairfield-Suisun Sewer District	*	\$26.82	\$26.82
City of Stockton	*	\$27.07	\$27.07
Dublin San-Ramon Service District	*	\$27.40	\$27.40
City of Roseville	*	\$29.00	\$29.00
City of Vacaville	*	\$34.53	\$34.53
City of Sacramento + SRCSD	\$14.74	\$20.00	\$34.74
City of Folsom + SRCSD	\$16.15	\$20.00	\$36.15
Orange County Sanitation District	\$17.33	\$20.33	\$37.66
City of Oakland + East Bay Municipal Utility District	\$22.24	\$17.05	\$39.29
Sacramento Area Sewer District + SRCSD	\$19.85	\$20.00	\$39.85
City of Woodland	*	\$40.00	\$40.00
City of Davis	*	\$44.00	\$44.00
City of Berkeley + East Bay Municipal Utility District	\$27.99	\$17.05	\$45.04
Placer County (Granite Bay)	*	\$48.12	\$48.12
City of San Diego	*	\$66.95	\$66.95

21 \* These agencies have combined collection and treatment rates which are totaled in the  
22 "Treatment" column.

23 \*\* These are current monthly rates and do not address future rate increase projections.

24 Recently, the American Water Works Association (AWWA) and Raftelis Financial

25 <sup>677</sup> Petition, p. 152.

26 <sup>678</sup> Sunding 2011, ¶¶ 14-16, pp. 5-6.

27 <sup>679</sup> *Id.*; SRCSD, Notice of Proposed Rate Adjustment and Public Hearing Date (2010)  
28 <http://www.srcsd.com/pdf/218-mailer.pdf>.

1 Consultants, Inc. (RFC) released their 2010 Water and Wastewater Survey, providing wastewater  
 2 rate data for 228 utilities from across the country. The Discharger's rates are shown below with  
 3 the rates of utilities in the survey similar to the District (i.e. with a total population service area of  
 4 1 million or greater).<sup>680</sup>

5 Table 11.

Utility Name	Total Monthly Bill
Clark County Water Reclamation District	\$18.17
Orange County Sanitation District	\$20.33**
City of West Sacramento + SRCSD	\$26.01
San Antonio Water System	\$27.81
Phoenix Water Services Department	\$34.42
City of Sacramento + SRCSD	\$34.74
City of Folsom + SRCSD	\$36.15
Sacramento Area Sewer District + SRCSD	\$39.85
City of Houston	\$45.45
Pima County Regional Wastewater Reclamation Department	\$45.95
Philadelphia Water Department	\$48.09
City of Los Angeles Bureau of Sanitation	\$49.05
City of Baltimore Department of Public Works	\$49.78
Miami-Dade Water and Sewer Department	\$50.23
Dallas Water Utilities	\$51.57
City of Columbus, Dept. of Public Utilities	\$53.98
District of Columbia Water and Sewer Authority	\$54.15
Group A Systems Average (>70mgd Treated)	\$55.63
Northeast Ohio Regional Sewer District	\$61.13
New York City Department of Environmental Protection	\$62.25

27 <sup>680</sup> *Id.* (citing 2010 Water and Wastewater Rate Survey Interactive Database (American Water  
 28 Works Association and Raftelis Financial Consulting, Inc., rel. 2011).

Utility Name	Total Monthly Bill
Washington Suburban Sanitary Commission	\$70.74
City of San Diego Water Department	\$71.78
Atlanta Water Department	\$172.94

\*Total Bill represents a combination of treatment and collection costs, although some of these dischargers do not perform collection and is thus not included in the total.

\*\*Total does not include sewer collection costs.

As the table shows, the Discharger's wastewater rates are nearly the lowest amongst other similarly situated dischargers who were surveyed. The Discharger, in its challenges to the permit requirements, claims that these requirements will raise the rates to unreasonable levels, but fails to recognize that across the nation it currently charges drastically lower rates than other similarly situated dischargers.<sup>681</sup>

As previously detailed, the District's compliance cost estimates are at the upper bound of the various cost estimates prepared and nearly double the costs estimated by Trussell. Modeling a lower project cost reduces revenue requirements and thereby the rate increases required to cover them. This smaller impact on rates, in turn, reduces the negative impact on household spending.<sup>682</sup> (But lower costs also reduce the stimulus effect of job creation during the construction and operating phases.) Dr. Sunding found that by incorporating a lower project cost estimate into the model, expected rate increases do not impose a particularly high burden on ratepayers in comparison to rates elsewhere in California, and the Discharger's rates would still remain relatively low by nationwide standards.<sup>683</sup>

With respect to the regional economic impacts of capital expenditures to upgrade the Treatment Plant, the technique used in the UOP study to estimate net impacts is both unconventional and improperly executed. Rather than modeling the District's estimated \$2 billion in upgrade costs as a new construction project, as is typically done when modeling the

<sup>681</sup> *Id.*, ¶ 15.

<sup>682</sup> *Id.*, ¶ 6.

<sup>683</sup> *Id.*, ¶ 6, 13.

1 impacts of capital expenditure, Dr, Sunding found that the UOP researchers improperly treated  
 2 the project as a government program. By inappropriately using a modeling technique known as  
 3 “institutional spending, the UOP researchers failed to capture the full economic stimulus effects  
 4 of construction. Applying the proper conventional method results in more job creation during the  
 5 construction phase of the project and fewer job losses during the operating phase of the project.<sup>684</sup>  
 6 Dr. Sunding also found that the District’s rate treatment overstates the aggregate negative  
 7 economic impact of compliance since it assumes that new connections would bear a substantial  
 8 share of the compliance costs. Shifting this non-growth related rate burden back to existing  
 9 households would eliminate any potential drag on new construction, and wastewater fees would  
 10 still remain well with the range of similarly situated wastewater districts.<sup>685</sup>

11 By applying Trussell’s more realistic costs estimates, the conventional modeling  
 12 approach, and assigning rate increases to existing households, Dr. Sunding found that  
 13 implementing the compliance upgrades would create a net 1,677 new jobs during the construction  
 14 phase, and a net employment loss of only 382 jobs during the operating period.<sup>686</sup> Considering  
 15 that the local employment base currently totals 830,130 jobs,<sup>687</sup> estimated job losses anticipated  
 16 with implementation of BPTC is negligible, accounting for less than 0.05 percent of the local  
 17 employment base. Even assuming the District’s \$2 billion cost estimate and its assumed rate  
 18 treatment, net operating period job losses would total 852,<sup>688</sup> again a negligible impact.

19 **F. The Discharger Failed To Account For The Socioeconomic Impacts That Its**  
 20 **Discharge Is Causing**

21 The Regional Board properly rejected the Discharger’s bid to improperly shift the burden  
 22 of proof by narrowly focusing on the purported socioeconomic cost of maintaining or improving

23 \_\_\_\_\_  
 24 <sup>684</sup> *Id.*, ¶¶ 17, 18.

25 <sup>685</sup> *Id.*, ¶¶ 12, 13

26 <sup>686</sup> *Id.*, Figures 1 and 2

27 <sup>687</sup> *See* Entrix 2010 at p. 15.

28 <sup>688</sup> Sunding 2011, Figure 2.

1 receiving water quality. The Regional Board reasonably and appropriately recognized the  
2 socioeconomic costs of allowing the Discharger to continue degrading the receiving water quality  
3 of the River and Delta. The state's Antidegradation Policy requires the Discharger to assess the  
4 broader environmental and socioeconomic harm caused when secondarily treated sewage is  
5 discharged directly into the heart of California's water supply system.

6 Direct and indirect total ammonia impacts, impacts from other toxic pollutants (including  
7 additive toxicity impacts from copper, pesticides, etc.), temperature impacts, dissolved oxygen  
8 impacts and other water quality impacts of the Treatment Plant's discharge are contributing to the  
9 decline of federally protected fish species. The decline of these fish has caused dramatic  
10 reductions in SWP and CVP water availability, which the Discharger's proffered  
11 "Antidegradation Analysis" failed to consider.

12 The administrative record reveals no Discharger analysis assessing the specific  
13 socioeconomic impacts the Discharger is causing to the areas served by the Water Agencies. The  
14 record does contain a report, however, that considers the overall socioeconomic impacts from  
15 reduced water availability in 2009.<sup>689</sup> In that report, economists from U.C. Davis and the  
16 University of the Pacific concluded that in 2009, as a result of a relatively dry hydrology and  
17 water supply restrictions imposed on the SWP and CVP, the San Joaquin Valley population lost  
18 as many as 7,434 jobs, more than \$278 million in income, and more than \$368 million in overall  
19 economic output. The economists were able to estimate that the ESA-based restrictions alone  
20 caused the San Joaquin Valley to lose as many as 3,000 jobs, more than \$111 million in income,  
21 and more than \$318 million in overall economic output.<sup>690</sup> In testimony filed in federal court,

22 \_\_\_\_\_  
23 <sup>689</sup> Michael J., et al. 2009. A Retrospective Estimate of the Economic Impacts of Reduced Water  
24 Supplies to the San Joaquin Valley in 2009 (September 28, 2010) (U.O.P-U.C. Davis Report),  
Table 11 at p. 14.

25 <sup>690</sup> Those impacts do not begin to cover the full breadth and depth of socioeconomic costs  
26 because reduced SWP and CVP water availability harms more than the San Joaquin Valley.  
27 Ongoing SWP and CVP water delivery reductions arising from listed species regulations harm  
28 family households and businesses from the San Francisco Bay Area to San Diego every year.  
(See, e.g., California Department of Water Resources, 2009 State Water Project Delivery  
Reliability Report, Table 6.3-6.4 [projecting reduction in long-term average annual SWP water  
delivery reliability to 60 percent of contract Table A amounts]).

1 U.C. Berkeley economics professor Dr. Sunding estimated that the 2009 water supply restrictions  
2 resulted in the loss of over 5,000 farm jobs in the San Joaquin Valley, which is equivalent to  
3 around 5 percent of the relevant workforce.<sup>691</sup>

4 Dr. Sunding has also measured economic losses suffered by the urban sector due to  
5 shortages of water from the Delta. These losses are significant. Dr. Sunding found that urban  
6 economic losses among all agencies exporting water from the Delta and its tributaries amount to  
7 \$858 million per year for a 10 percent reduction in end water use, \$2.6 billion per year for a 20  
8 percent reduction, and \$6.7 billion per year for a 30 percent reduction.<sup>692</sup>

9 Research and data demonstrate that the Discharger is harming aquatic species and  
10 materially contributing to the pelagic organism decline in the Delta. Nevertheless, the Discharger  
11 failed to address how its operations are redirecting environmental regulatory impacts to the 25  
12 million Californians and 2 million acres of prime farmland served by the SWP and CVP.

13 The Discharger's failure to analyze and disclose the environmental and socioeconomic  
14 impacts of the degraded water quality caused by its discharge is a failure to meet the burden of  
15 proof that the state's Antidegradation Policy imposes before water quality may be lowered.

#### 16 **G. The State's Antidegradation Policy Requires Stronger Interim Measures**

17 The Permit's compliance schedule for effluent limitations gives the Discharger ten years  
18 to achieve BPTC. Given the severe degradation of water quality and impairment of beneficial  
19 uses that will be caused by the discharge during that period, Trussell was asked to evaluate the  
20 compliance schedule for BPTC upgrades, as well as to identify interim measures that could  
21 reduce the extent of degradation and impairment in the intervening years.

22 With respect to the overall BPTC implementation schedule, Trussell concluded that a 10-  
23 year project schedule for completion of the entire upgrade program with traditional design, bid,  
24 build project delivery approach is aggressive.<sup>693</sup> However, Trussell identified measures that

25 <sup>691</sup> Sunding 2011, ¶ 31.

26 <sup>692</sup> *Id.*, ¶¶ 28-30.

27 <sup>693</sup> Trussell Technologies, Inc. 2011a. Technical Memorandum No. 1, Summary of Findings in  
28 Review of SRCSD NPDES Permit (April 29, 2011) (Trussell 2011a).

1 could accelerate the schedule relative to the traditional delivery approach as well as achieve water  
2 quality improvements in advance of project completion. For example, the Discharger could  
3 implement alternative project delivery systems, like Construction Manager at-risk (“CM at-risk”),  
4 or Design-Build (“DB”), and alternative project approaches such as phased or modular  
5 construction could be employed. Phased or modular approaches to project construction may not  
6 expedite the overall schedule, but either alternative could achieve water quality improvements at  
7 much earlier milestones in the project schedule, and should have been considered as appropriate  
8 means to reduce water quality degradation while upgrading the Treatment Plant to fully achieve  
9 BPTC.<sup>694</sup>

10 The Regional Board should have considered the availability of interim measures designed  
11 to improve the effluent quality prior to project completion. Trussell investigated such interim  
12 measures,<sup>695</sup> which could begin achieving water quality improvements. Two such measures were  
13 identified, which can be implemented with minimal impact to the overall project duration or cost:

- 14 • **Sidestream treatment:** Treating in-plant recycle flows that are high in ammonia  
15 separately and putting treatment processes in for these streams as soon as possible  
16 could reduce the mass total ammonia loading to the Sacramento River in the interim.  
17 An example is the centrate flow generated from solids handling, which is high in  
18 ammonia and currently returned to the head of the plant.<sup>696</sup>
- 19 • **Reclaimed water:** The expanded use of the Discharger’s recycled water program  
20 could also offset total ammonia discharges to the Sacramento River in the short-  
21 term.<sup>697</sup> The Discharger has completed the design for its Phase II Water Recycling  
22 Program (“WRP”) expansion project and it is feasible that this project could be  
23

24 \_\_\_\_\_  
25 <sup>694</sup> *Id.*, Trussell 2010b at p. 4-5; Trussell 2011a at p. 3.

26 <sup>695</sup> *Id.* at p. 4.

27 <sup>696</sup> *Id.*; at pp. 1-4.

28 <sup>697</sup> *Id.*

1 constructed and operational within 12 to 24 months.<sup>698</sup> The Discharger's South  
2 Sacramento County Ag. & Habitat Lands Recycled Water Project is a long-term  
3 recycled water project that could dramatically increase the quantity of recycled water  
4 delivered by the Discharger. This project should also be pursued with urgency. With  
5 the addition of Phase II WRP capacity, the Discharger could distribute 3,750 acre-  
6 ft/year (3.34 mgd) of recycled water, reducing the total ammonia discharge by 1 to  
7 3%.

8 The side-stream treatment concept was suggested in the Water Agencies' comments on  
9 the Tentative Order and was subsequently further developed by Trussell.<sup>699</sup> Trussell considered  
10 side-stream treatment solutions that could be used as part of the ultimate solution for ammonia  
11 reduction. Trussell identified nitrification treatment of the centrate produced from dewatering  
12 anaerobically digested biosolids as a promising interim measure. That centrate is currently  
13 returned to the plant and contributes to the total ammonia load currently discharged to the  
14 Sacramento River.<sup>700</sup>

15 Trussell selected the membrane bioreactor (MBR) technology to treat the digester centrate  
16 as this technology produces high quality effluent, has a relatively small footprint, can be  
17 constructed relatively quickly, and allows for pre-purchase of equipment, which can further  
18 accelerate the construction schedule. Trussell estimates that treating the centrate with a  
19 sidestream reactor would reduce the current ammonia loading to the Sacramento River by about  
20 8%. This interim measure could be completed in 4.5 years at a total project cost (including  
21 planning and administrative costs) of \$32.4 million.<sup>701</sup>

22 The interim measures described herein are not a long-term solution and are only examples  
23

24 <sup>698</sup> SRCSD 2010. "SRCSD Water Recycling Program." Presentation, June 24, 2010.

25 <sup>699</sup> Trussell Technologies, Inc. 2011b. Technical Memorandum No. 2, Sidestream Treatment to  
26 Reduce the Ammonia Discharge (April 29, 2011).

27 <sup>700</sup> *Id.*

28 <sup>701</sup> *Id.*

1 of where there is potential room for improvement which would give the Delta’s food web some  
 2 relief from the Discharger’s discharge until the Treatment Plant fully incorporates  
 3 nitrification/denitrification facilities to comply with the new Permits effluent limits and achieve  
 4 BPTC as required under the state’s Antidegradation Policy.

5 **XV. THE PERMIT’S REQUIREMENTS FOR NUTRIENT REMOVAL AND**  
 6 **TERTIARY FILTRATION AND DISINFECTION ARE CONSISTENT WITH**  
 7 **CALIFORNIA’S FUNDAMENTAL WATER POLICY**

8 The CSPA Petition argues that “[t]he granting of a mixing zone is an unreasonable use of  
 9 water when proper treatment of the wastestream can be accomplished to meet end-of-pipe  
 10 limitations.”<sup>702</sup> The Water Agencies agree with CSPA on this point, to the extent that the  
 11 Permit’s treatment requirements, including full nutrient removal and microfiltration, square with  
 12 long held California water policies set by the State Board, the State Constitution, and the State  
 13 Supreme Court to protect state water resources. Additional requirements urged by the Water  
 14 Agencies in their comments before the Regional Board, and in this Response, likewise are  
 15 supported by these fundamental principles of California law.

16 Indeed, the State Board decided almost 40 years ago in the “Delta Water Rights Decision”  
 17 that specifically protecting the Delta from pollution through the use of “stringent controls” was a  
 18 “prime objective.” As the State Board held:

19 Recent state and regional board activity in the regulation of waste  
 20 discharges demonstrates an intent to protect the Delta environment  
 21 with stringent controls on waste discharges at the earliest  
 22 reasonable date. Waste discharges will be managed and where  
 23 possible reused with a view toward achieving these prime  
 24 objectives. No one has a right to pollute the waters of the state  
 25 regardless of the quality of water that may flow in the particular  
 26 streams.<sup>703</sup>

27 The full nutrient removal and filtration requirements are also consistent with California’s  
 28 most fundamental declaration of water policy in Article X of the State Constitution to protect the  
 full beneficial uses of our state’s waters:

26 \_\_\_\_\_  
 27 <sup>702</sup> CSPA Petition, at 56; *see also id.* at 58, 85.

28 <sup>703</sup> State Board Decision 1379 at p. 40 (1971.)

1 It is hereby declared that because of the conditions prevailing in this  
 2 State the general welfare requires that the water resources of the  
 3 State be put to beneficial use to the fullest extent of which they are  
 4 capable, and that the waste or unreasonable use or unreasonable  
 5 method of use of water be prevented, and that the conservation of  
 6 such waters is to be exercised with a view to the reasonable and  
 7 beneficial use thereof in the interest of the people and for the public  
 8 welfare.<sup>704</sup>

9 Requiring the Discharger to stop its continued pollution of the Bay-Delta is also consistent  
 10 with the California Supreme Court's holding that pollution of a water supply effects an invasion  
 11 of a legal right. In *Wright v. Best* (1942) 19 Cal.2d 368, the Court held that an appropriator of  
 12 water:

13 is entitled to have the water at his point of diversion preserved in its  
 14 natural state of purity and any use which corrupts the water so as to  
 15 essentially impair its usefulness for the purposes to which he  
 16 originally devoted it, is an invasion of his rights. Any material  
 17 deterioration of the quality of the stream by . . . others without  
 18 superior rights entitles him to both injunctive and legal relief.<sup>705</sup>

19 The Discharger's continued use of developed SWP and CVP storage releases to dilute its  
 20 wastewater would violate these principles established by the California Legislature, the State  
 21 Board, and the State Supreme Court and would directly harm the Water Agencies' legal rights  
 22 and interests in the stored and released water. Indeed, the Discharger's continued use of SWP and  
 23 CVP reservoir releases to dilute, transport and dispose of the Discharger's wastewater is precisely  
 24 the unreasonable waste of water that the State Constitution declared should be prevented. That  
 25 unreasonable use and waste of SWP and CVP stored water will be addressed, at least in part, by  
 26 the State Board upholding the Permit's nutrient removal and filtration requirements, as well as the  
 27 others terms and conditions set forth in the Permit or as requested in the Water Agencies'  
 28 comments and in this Response.

## 23 **XVI. CONCLUSION**

24 For all the preceding reasons, the State Board should uphold and strengthen the discharge  
 25 limits and related water quality protection conditions that the Regional Board imposed on the

26 \_\_\_\_\_  
 27 <sup>704</sup> Cal. Const., Art. X, § 2.

28 <sup>705</sup> *Wright v. Best*, 19 Cal.2d at 378.

1 Discharger's new Permit. Nothing less will protect listed Delta fish species and the largest single  
2 source of fresh water supply in all California.

3  
4 DATED: 5-6-11

HANSON BRIDGETT LLP

5  
6 By Michael B. McNaughton  
7 Michael B. McNaughton  
8 Attorneys for Respondent ALAMEDA COUNTY  
WATER DISTRICT

9 DATED: 5-6-11

DOWNEY BRAND LLP

10  
11 By David R. Aladjem  
12 David R. E. Aladjem  
13 Attorneys for Respondent ALAMEDA COUNTY  
14 FLOOD CONTROL AND WATER  
CONSERVATION DISTRICT, ZONE 7

15 DATED: 5-6-11

BOLD, POLISNER, MADDOW, NELSON & JUDSON

16  
17 By Robert B. Maddow  
18 Robert B. Maddow  
19 Attorneys for Respondent CONTRA COSTA  
20 WATER DISTRICT

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

DATED: 5/6/11

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD  
A Professional Corporation

By   
Eric N. Robinson  
Attorneys for Respondents STATE WATER  
CONTRACTORS and KERN COUNTY WATER  
AGENCY

DATED: 5/6/11

THE METROPOLITAN WATER DISTRICT OF  
SOUTHERN CALIFORNIA

By   
Adam C. Kear  
Attorneys for Respondent THE METROPOLITAN  
WATER DISTRICT OF SOUTHERN CALIFORNIA

DATED: 5/6/11

DIEPENBROCK HARRISON

By   
Jon D. Rubin  
Attorneys for Respondent SAN LUIS & DELTA-  
MENDOTA WATER AUTHORITY  
  
SAMUEL B. BOXERMAN  
SIDLEY AUSTIN LLP  
Of Counsel for WESTLANDS WATER DISTRICT

DATED: 5/6/11

SANTA CLARA VALLEY WATER DISTRICT

By   
Anthony T. Fulcher  
Attorney for Respondent SANTA CLARA VALLEY  
WATER DISTRICT

## ATTACHMENT 1

1  
2 Adam C. Kear, State Bar No. 207584  
3 Sr. Deputy General Counsel  
4 THE METROPOLITAN WATER DISTRICT  
5 OF SOUTHERN CALIFORNIA  
6 700 North Alameda Street  
7 Los Angeles, CA 90012-2944  
8 Mailing address: P.O. Box 54153  
9 Los Angeles, CA 90054-0153  
10 Telephone: (213) 217-6057  
11 Facsimile: (213) 217-6890

12 Paul N. Singarella, State Bar No. 155393  
13 LATHAM & WATKINS LLP  
14 650 Town Center Drive, 20th Floor  
15 Costa Mesa, CA 92626-1925  
16 Telephone: (714) 540-1235  
17 Facsimile: (714) 755-8290

18 Attorneys for Respondent  
19 THE METROPOLITAN WATER DISTRICT  
20 OF SOUTHERN CALIFORNIA

21 Michael B. McNaughton, State Bar No. 168244  
22 HANSON BRIDGETT LLP  
23 425 Market Street, 26th Floor  
24 San Francisco, CA 94105  
25 Telephone: (415) 777-3200  
26 Facsimile: (415) 541-9366

27 Attorneys for Respondent  
28 ALAMEDA COUNTY WATER DISTRICT

David R. E. Aladjem, State Bar No. 152203  
DOWNEY BRAND LLP  
621 Capitol Mall, 18th Floor  
Sacramento, CA 95814  
Telephone: (916) 444-1000  
Facsimile: (916) 444-2100

Richard "Ren" E. Nosky, State Bar No. 130726  
General Counsel  
DOWNEY BRAND LLP  
3425 Brookside Road, Suite A  
Stockton, CA 95219  
Telephone: (209) 473-6450  
Facsimile: (209) 473-6455

Attorneys for Respondent  
ALAMEDA COUNTY FLOOD CONTROL AND  
WATER CONSERVATION DISTRICT, ZONE 7

1 Robert B. Maddow, State Bar No. 41675  
BOLD, POLISNER, MADDOW, NELSON & JUDSON  
2 500 Ygnacio Valley Road, Suite 325  
Walnut Creek, CA 94596  
3 Telephone: (925) 933-7777

4 Attorneys for Respondent  
CONTRA COSTA WATER DISTRICT

5 Eric N. Robinson, State Bar No. 191781  
6 KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD  
A Law Corporation  
7 400 Capitol Mall, 27th Floor  
Sacramento, California 95814  
8 Telephone: (916) 321-4500  
Facsimile: (916) 321-4555

9 Attorneys for Respondents  
10 KERN COUNTY WATER AGENCY  
and STATE WATER CONTRACTORS

11 Amelia T. Minaberrigarai, State Bar No. 192359  
12 General Counsel  
KERN COUNTY WATER AGENCY  
13 P.O. Box 58  
Bakersfield, CA 93302-0058  
14 Telephone: (661) 634-1400  
Facsimile: (661) 634-1428

15 Attorney for Respondent  
16 KERN COUNTY WATER AGENCY

17 Jon D. Rubin, State Bar No. 196944  
DIEPENBROCK HARRISON  
18 400 Capitol Mall, 18th Floor  
Sacramento, CA 95814  
19 Telephone: (916) 492-5000  
Facsimile: (916) 446-4535

20 Attorneys for Respondent  
21 SAN LUIS & DELTA-MENDOTA WATER AUTHORITY

22 Anthony T. Fulcher, State Bar No. 192690  
Office of District Counsel  
23 SANTA CLARA VALLEY WATER DISTRICT  
5750 Almaden Expressway,  
24 San Jose, CA 95118  
Telephone: (408) 265-2600  
25 Facsimile: (408) 979-5649

26 Attorneys for Respondent  
SANTA CLARA VALLEY WATER DISTRICT

27

28

**PROOF OF SERVICE**

1  
2 I, Do Gentry, declare:

3 I am a citizen of the United States and employed in Sacramento County, California. I am  
4 over the age of eighteen years and not a party to the within-entitled action. My business address  
5 is 400 Capitol Mall, 27th Floor, Sacramento, California 95814. On May 6, 2011, I served a copy  
6 of the within document(s):

**ERRATA TO WATER AGENCIES' RESPONSE TO DISCHARGER'S  
PETITION FOR REVIEW**

- 7  by transmitting via facsimile the document(s) listed above to the fax number(s) set  
8 forth below on this date before 5:00 p.m.
- 9  by placing the document(s) listed above in a sealed envelope with postage thereon  
10 fully prepaid, the United States mail at Sacramento, California addressed as set  
11 forth below.
- 12  by placing the document(s) listed above in a sealed Federal Express envelope and  
13 affixing a pre-paid air bill, and causing the envelope to be delivered to a Federal  
14 Express agent for delivery.
- 15  by personally delivering the document(s) listed above to the person(s) at the  
16 address(es) set forth below.
- 17  by transmitting via e-mail or electronic transmission the document(s) listed above  
18 to the person(s) at the e-mail address(es) set forth below.

***See attached Service List***

19 I am readily familiar with the firm's practice of collection and processing correspondence  
20 for mailing. Under that practice it would be deposited with the U.S. Postal Service on that same  
21 day with postage thereon fully prepaid in the ordinary course of business. I am aware that on  
22 motion of the party served, service is presumed invalid if postal cancellation date or postage  
23 meter date is more than one day after date of deposit for mailing in affidavit.

24 I declare under penalty of perjury under the laws of the State of California that the above  
25 is true and correct.

26 Executed on May 6, 2011, at Sacramento, California.

27  
28  
  
Do Gentry

## Service List

<p>1 Paul S. Simmons  2 Theresa A. Dunham  3 Cassie N. Aw-Yang  4 Somach, Simmons &amp; Dunn  5 500 Capitol Mall, Suite 1000  6 Sacramento, CA 95814  7 E-mail: psimmons@somachlaw.com  8 E-mail: tdunham@somachlaw.com  9 E-mail: cawyang@somachlaw.com</p>	<p>Bill Jennings, Executive Director  California Sportfishing Protection Alliance  3536 Rainier Avenue  Stockton, CA 95204  E-mail: deltakeep@aol.com</p>
<p>8 Robert A. Ryan, Jr., County Counsel  9 Lisa A. Travis  10 Supervising Deputy County Counsel  11 County of Sacramento  12 700 H Street, Suite 2650  13 Sacramento, CA 95814  14 E-mail: ryanr@saccounty.net  15 E-mail: travisl@saccounty.net</p>	<p>Stanley R. Dean, District Engineer  Sacramento Regional County Sanitation  District  10060 Goethe Road  Sacramento, CA 95827  E-mail: deans@sacsewer.com</p>
<p>13 Clay Rodgers, Assistant Executive Officer  14 Central Valley Regional Water Quality  15 Control Board, Fresno Office  16 1685 E Street  17 Fresno, CA 93706-2020  18 E-mail: crodgers@waterboards.ca.gov</p>	<p>Robert Crandall, Assistant Executive Officer  Central Valley Regional Water Quality  Control Board, Redding Office  415 Knollcrest Drive  Redding, CA 96002  E-mail: rcrandall@waterboards.ca.gov</p>
<p>17 Rick Moss, Assistant Executive Officer  18 Central Valley Regional Water Quality  19 Control Board  20 11020 Sun Center Drive, Suite 200  21 Rancho Cordova, CA 95670-6114  22 E-mail: rmoss@waterboards.ca.gov</p>	<p>Mike Jackson  Law Office of Mike Jackson  P.O. Box 207  429 W. Main Street  Quincy, CA 95971  E-mail: mjatty@sbcglobal.net</p>
<p>21 Andrew L. Packard  22 The Law Offices of Andrew L. Packard  23 100 Petaluma Boulevard North, Suite 301  24 Petaluma, CA 94952  25 E-mail: andrew@packardlawoffices.com</p>	<p>Pamela C. Creedon, Executive Officer  Central Valley Regional Water Quality  Control Board  11020 Sun Center Drive, Suite 200  Rancho Cordova, CA 95670-6114  E-mail: pcreedon@waterboards.ca.gov</p>

1	David P. Coupe San Francisco Bay Regional Water Quality Control Board 1515 Clay Street, Suite 1400 Oakland, CA 94612 E-mail: dcoupe@waterboards.ca.gov	Alex P. Mayer Office of Chief Counsel State Water Resources Control Board 1001 I Street, 22nd Floor P.O. Box 100 Sacramento, CA 95812-0100 E-mail: amayer@waterboards.ca.gov
2	Kenneth D. Landau Assistant Executive Officer Central Valley Regional Water Quality Control Board 11020 Sun Center Drive, Suite 200 Rancho Cordova, CA 95670-6114 E-mail: klandau@waterboards.ca.gov	Kathleen Harder Water Resource Control Engineer Central Valley Regional Water Quality Control Board 11020 Sun Center Drive, Suite 200 Rancho Cordova, CA 95670-6114 E-mail: kharder@waterboards.ca.gov
3	Philip G. Wyels Office of Chief Counsel State Water Resources Control Board 1001 I Street, 22nd Floor P.O. Box 100 Sacramento, CA 95812-0100 E-mail: pwyels@waterboards.ca.gov	Patrick E. Pulupa Office of Chief Counsel State Water Resources Control Board 1001 I Street, 22nd Floor P.O. Box 100 Sacramento, CA 95812-0100 E-mail: ppulupa@waterboards.ca.gov
4	David W. Smith, Chief Permits Office U.S. EPA, Region 9 75 Hawthorne Street San Francisco, CA 94105 E-mail: smith.davidw@epa.gov	
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		