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State Water Resources Control Board
Attention: Jeanine Townsend, Clerk of the Board
1001 I Street, 24th Floor
Sacramento, CA 95814

RE: AGENDA ITEM No. 9

COMMENTS RE PROPOSED AMENDMENTS TO THE WATER QUALITY CONTROL PLAN FOR OCEAN WATERS OF CALIFORNIA (OCEAN PLAN) ADDRESSING DESALINATION FACILITY INTAKES, BRINE DISCHARGES, AND OTHER NON-SUBSTANTIVE CHANGES (DESALINATION AMENDMENTS), AND THE DRAFT STAFF REPORT, INCLUDING THE DRAFT SUBSTITUTE ENVIRONMENTAL DOCUMENTATION (SED)

Dear Chairwoman Marcus and Members of the Board:

Our office represents Mesa Water District ("Mesa Water"). On behalf of Mesa Water, we appreciate the opportunity to comment on the State Water Resources Control Board's (hereinafter "State Board" or "Board") Draft Staff Report including the Draft Substitute Environmental Documentation ("SR/SED") for the "Amendment to the Water Quality Control Plan for Ocean Waters of California" addressing "Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Nonsubstantive Changes" ("Amendment").

Since 1960, Mesa Water has provided water service to residents in the City of Costa Mesa, parts of Newport Beach, and some unincorporated sections of Orange County, including the John Wayne Airport.

Given the water supply challenges facing California, multiple water sources will be necessary to meet future needs. Mesa Water supports the development of cost-effective and environmentally-sensitive sources of water, including recycling, groundwater cleanup, water use efficiency and conservation, and desalination. As you know, ocean desalination offers a variety of benefits, four (4) of which merit noting:

(1) A safe and reliable water supply source that is functionally independent of regional water conveyance systems and their associated seismic vulnerability and susceptibly to interruption due to regulatory, supply or environmental constraints;

(2) A reduced dependence on limited State Water Project supplies and sensitive Delta habitat;

(3) Alleviating the burden on both freshwater sources which have associated environmental and regulatory constraints, and groundwater supplies which are often limited due to contamination, overdraft or water rights issues; and,

(4) The opportunity for local agencies to have greater control of their water supplies.

The need for quickly ensuring desalination facilities are available is underscored by the Governor's declaration that California is in an "Extreme Drought" condition, noting that "the driest months are still to come in California and extreme drought conditions will get worse…". With this in mind, Mesa Water's fundamental concern is that the SR/SED and Regulations, as proposed, may jeopardize, delay, or add unnecessary or unclear regulatory and economic burdens to this essential water supply source, thereby impacting the State's and Mesa Water's ability to meet water supply needs.

Mesa Water recognizes and appreciates the enormous task that the State Board and Staff have undertaken in this effort, and understands that the intent was to create guidance that is protective of the environment and "seeks to ensure an efficient approach to permitting desalination facilities to address needed water supplies," with the limited resources at the Regional Water Board level. However, Mesa Water believes that, if the Amendment to the Ocean Plan is adopted "as is", the unintended effect of the Regulations would result in greater regulatory burden at the State and local Regional Water Board level, as well as conflict with other relevant State policies related to water supply planning. Among these are various existing and proposed policies including those set forth in the 2013 California Water Plan Draft Update, excerpted below:

"Policy 1 – The State recognizes that desalination is an important water supply alternative and, where economically, socially and environmentally appropriate, should be part of a balanced water supply portfolio, which includes other alternatives such as conservation and water recycling."

"Policy 6 – Desalination should be evaluated using the same well-established planning criteria applied to all water management options, using feasibility criteria such as: water supply need within the context of community and regional planning, technical feasibility, economic feasibility, financial feasibility, environmental feasibility, institutional feasibility, social impacts, and climate change. The California Desalination Planning Handbook published by DWR should be one of the resources used by water supply planners…"

"Policy 8 – DWR, in collaboration with regulatory agencies, should lead an effort to create a coordinated streamlined permitting process for desalination projects. Because of the many regulatory agencies involved in desalination of ocean, bay or estuarine waters, a coordinated

framework to streamline permitting approvals without weakening environmental and other protections should be explored. Establishing an appropriate sequencing of approval by the various agencies may be appropriate. The Ocean Protection Council may be appropriate for the role of coordinating regulatory reviews and guiding project sponsors through the regulatory process…"

I. INTRODUCTION

Mesa Water welcomes the opportunity to continue an open dialogue with the Board in developing Regulations that meet the Board's objectives while recognizing the importance of considering financial feasibility and the need for site-specific considerations in designing, evaluating, and permitting ocean desalination facilities.

Specifically, it provides these comments to ensure compliance with all applicable laws and to avoid any potential delay in pursuit of additional sources of water for Mesa Water's customers. The below highlights the SR/SED's inadequate analysis of the Amendment, which violates the California Environmental Quality Act ("CEQA"), the State Board's SED regulations and the California Coastal Act. This conclusion is supported by an analysis from experts at MBC Applied Environmental Sciences that address the SR/SED's (and supporting documentations) technical analysis of impacts to marine life. (See attached Exhibits A and B.)

As more fully discussed below, the SR/SED fails as an informational document. Specifically, it fails: (1) to adequately define the Project as it does not accurately reflect the actual intended action of the regulations nor their reasonably foreseeable future effects; (2) to analyze all significant environmental impacts of the Project as it is limited to a less than one page discussion for five topical impacts; and (3) to properly analyze Project alternatives. Stated differently, the SR/SED's analysis is deficient because it omits relevant data and rather than thoroughly analyzing the proposed Amendment's environmental impacts, it analyzes desalination projects in general and then frames the Project as an alternative with only a cursory analysis of its impacts.

For example, the SR/SED fails to adequately discuss the various types of construction/operational impacts associated with subsurface intakes or the magnitude of those impacts in any detail. Specifically, the SR/SED fails to adequately consider recent coastal desalination projects which have readily available scientific literature and environmental documents. By failing to conduct this analysis, the State Board has created a conclusory document which supports its Proposed Amendment instead of complying with CEQA and providing an analysis of environmental impacts that the State Board must consider before approving or denying the Amendment. In addition, the SR/SED and Amendment contain inaccurate definitions, mischaracterizations, incorrect or unclear citations to technical literature and unsupported claims. (See Exhibits A [Comments on Ocean Plan Amendment, pp. 18-21] and B.)

Mesa Water disagrees that: (1) subsurface intakes are by default the preferred technology for seawater intakes for all new or expanded desalination facilities; and (2) the guidelines for brine discharges should be set at a limit of 2 ppt above the natural background salinity at 100 meters from the point of discharge. Mesa Water recommends that the Proposed Amendment be

revised to provide applicants with greater site design flexibility in selecting what is most appropriate for new projects including the latest available technology for new desalination projects. Further, the SR/SED arbitrarily chooses subsurface intakes to the exclusion of analysis of other demonstrated methods. As described below, desalination projects require site-specific analysis instead of a one-size-fits-all approach.

Accordingly, Mesa Water respectfully requests that the entire SR/SED and Regulations be revised to include a more robust discussion of the potentially significant environmental impacts of subsurface intakes, as well as reflecting the potentially benign effects of properly designed passive screened surface intakes. Alternatively, the SR/SED should be revised to include a full analysis of the impacts of subsurface intakes and then be recirculated for public comment.

II. THE SR/SED DOES NOT MEET THE PROCEDURAL AND SUBSTANTIVE REQUIREMENTS OF THE SED STATUTE AND CEQA

A. Background

The SED is a substitute environmental document prepared by the State Board to support the proposed amendment to the Water Quality Control Plan for Ocean Waters of California ("Ocean Plan") that would address desalination facility intakes and brine discharges.

The preparation of the SED is governed by various laws, including the State CEQA guidelines,[1] the Public Resources Code, the Porter-Cologne Act, and the Clean Water Act (as it applies to water quality standards promulgated by the Board). These various laws charge the Board with, among other things, reasonably describing and analyzing potentially significant direct and indirect environmental impacts of a project; describing and analyzing reasonably foreseeable methods of compliance with the regulatory requirements of each alternative; analyzing potentially feasible mitigation measures and the economic considerations of establishing objectives in water quality control plans; and, analyzing related direct and indirect impacts on the regional economy including estimating the total cost of implementing the Desalination Amendment.

B. SED Requirements

Although the SED is, by definition, a substitute environmental document, the Board must comply with the requirements of CEQA when adopting water quality control plans. Environmental review documents prepared by certified programs may be used instead of environmental documents that CEQA would otherwise require. Documents prepared by certified programs are considered the "functional equivalent" of documents CEQA would otherwise require. When conducting its environmental review and preparing its documentation, a certified regulatory program[2] is subject to the broad policy goals and substantive standards of CEQA. In a certified

[1] While not binding, CEQA's implementing regulations, the CEQA Guidelines, (Cal. Code Regs., tit. 14, §§15000 et seq. adopted pursuant to CEQA (§21083) (CEQA Guidelines) are entitled to great weight. (*Laurel Heights Improvement Assn. v. Regents of Univ. of Cal*. (1988) 47 Cal.3d 376, 391, fn.2 (*Laurel Heights I*).)

[2] The Secretary for Natural Resources has certified the State Water Boards' regulatory program for adoption or approval of standards, rules, regulations, or plans to be used in the Basin/208 Planning program for the protection, maintenance, and enhancement of water quality in California as an exempt

program, an environmental document used as a substitute for an EIR [such as the SED in this case] must include "[a]lternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment[.]' (CEQA Guidelines, § 15252(a)(2)(A).)" (*City of Arcadia v. SWRCB,* (2006) 135 Cal.App.4th 1392, 1421–1422.) "A regional board's submission of a plan for State Board approval must be accompanied by a brief description of the proposed activity, a completed environmental checklist prescribed by the State Board, and a written report addressing reasonable alternatives to the proposed activity and mitigation measures to minimize any significant adverse environmental impacts." (*Id*. at 1423, citing Cal. Code Regs., tit. 23, § 3777(a).)

C. Standard of Review

CEQA has two primary purposes. First, CEQA is designed to inform decision-makers and the public about the potential, significant environmental effects of a project, (CEQA Guidelines, § 15002(a)(1).) "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR 'protects not only the environment but also informed self-government.'" (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553, 564.)

For the first time in May 2014 in an unpublished decision, a California appellate court reviewed the adequacy of a SED prepared by the State Board for an amendment to the Water Quality Control Plan for the San Francisco Bay Region Water Quality Control Board. (*Living Rivers Council v. State Water Resources Control Board*, 2014 WL 1813289 (1st Dist., May 7, 2014) ("*Living Rivers"*).) While non-precedential, this case is instructive in that the Court explained the standard of review for a SED is that set forth by the California Supreme Court in *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412 ("*Vineyard Area Citizens"*):

> "[A]n agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence. (§ 21168.5.) Judicial review of these two types of error differs significantly: while we determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA requirements' [citation], we accord greater deference to the agency's substantive factual conclusions. In reviewing for substantial evidence, the reviewing court 'may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable,' for, on factual questions, our task 'is not to weigh conflicting evidence and determine who has the better argument.'
>
> "In evaluating an EIR for CEQA compliance, then, a reviewing court must adjust its scrutiny to the nature of the alleged defect,

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regulatory program for the purpose of complying with CEQA. (Pub. Res. Code § 21080.5; CEQA Guidelines, §§ 15250-15252; Cal. Code Regs., tit. 23, § 3775.)

> depending on whether the claim is predominantly one of improper procedure or a dispute over the facts. For example, where an agency failed to require an applicant to provide certain information mandated by CEQA and to include that information in its environmental analysis, we held the agency 'failed to proceed in the manner prescribed by CEQA.' [citation]. In contrast, in a factual dispute over 'whether adverse effects have been mitigated or could be better mitigated' [citation], the agency's conclusion would be reviewed only for substantial evidence." (*Vineyard Area Citizens*, 40 Cal.4th at 435.)

In the sole SED case, the Court carefully reviewed the SED for compliance with the SED regulations and CEQA requirements. Unlike here, the amendment at issue in *Living Rivers* sufficiently evaluated vineyard drainage, and did "extensive analyses of the potential environmental impacts caused by requiring compliance with the 125 percent of background TMDL." (2014 WL 1813289 at 6.)

III. ANALYSIS

A. The SR/SED Fails to Include an Executive Summary

Missing from the Introduction section is an executive summary which is fundamental to assisting the public in understanding the key impacts and areas of controversy associated with the Amendment. Without this explanation or summary, it is difficult to digest the myriad of documents, which are lengthy and randomly organized. For example, it is unclear what is actually being analyzed, what the significant impacts are, and where the Staff Report ends and the SED begins.

To avoid this problem, the CEQA Guidelines require that an EIR contain a brief summary of the proposed project and its consequences, using language that is as clear and simple as is reasonably practical. (CEQA Guidelines, § 15123(a).) The summary should normally not exceed 15 pages. (CEQA Guidelines, § 15123(c).)

Under CEQA Guidelines section 15123(b), an EIR summary must identify:

- Each significant environmental effect of the project and proposed mitigation measures and project alternatives that would reduce or avoid each effect;
- Areas of controversy that are known to the lead agency, including issues raised by other agencies and issues raised by the public; and
- Issues to be resolved, including the choice among project alternatives, and whether or how to mitigate the project's significant effects.

To assist the public, Mesa Water recommends that the SR/SED be revised to include an executive summary that complies with CEQA.

B. The Background on "Seawater Desalination In California" Contains Inaccuracies (Section 2)

Section 2 of the SR/SED, entitled "Seawater Desalination in California," contains inaccuracies and lacks relevant analysis, and therefore should be revised to correct those statements. Specifically, the following revisions are recommended:

Page/Paragraph No.	Necessary Correction
Page 12, Paragraph 4	The references to impingement should be deleted or clarified as none of the proposed coastal desalination facilities listed in Table 2-2 would have impingement impacts due to the facilities' low intake velocity.
Page 12, Paragraph 5	The statement that "few impingement or entrainment studies are available" is misleading as the SR/ SED does not include the extensive analysis conducted by various ocean desalination proponents. The SR/SED and proposed Amendment should be revised to include and consider the information contained in the impingement/entrainment studies conducted at pilot and demonstration plants, including at minimum the following locations: • Carlsbad (Poseidon Resources) • Camp Pendleton (San Diego County Water Authority) • Redondo Beach (West Basin Municipal Water District) • Santa Cruz (City of Santa Cruz and Soquel Creek Water District) • Marin (Marin Municipal Water District)
Page 12 – Continuing to Page 13	The discussion beginning on the bottom of page 12 and continuing to page 13 regarding "cooling water intakes" (OTC) is inappropriate and should be deleted. Desalination intakes draw in substantially less volume than typical OTC plants. In addition, the proposed desalination plants would utilize modern intake structures, likely either subsurface intakes or passive ocean intakes, which effectively eliminates impingement and substantially reduces entrainment. In general, the Amendments should entirely avoid, or clearly distinguish, references to OTC in these documents.
Page 13, Paragraph 1	The last sentence of the first full paragraph, the reference to a two to four ppt salinity range tolerance, should be clarified to indicate which indigenous species showed effects at this level and should state that depending on site-specific conditions, proposed desalination plant

Page/Paragraph No.	Necessary Correction
	discharge locations may not affect these sensitive species.
Page 14, Table 2-1	This should be updated to reflect the current status of Duke Energy (Station ID 5) as "Inactive" and Santa Barbara (Station ID 8) as "Pursuing Reactivation."
Page 17, Table 2-2	This should be updated to reflect the current status of proposed coastal desalination facilities. At minimum, the table should be corrected as follows: • Station ID Nos. 4 and 5 are mutually exclusive, meaning either one or the other may be built, but it is unlikely that both will be built. • Add an entry for "Monterey Peninsula Water Supply Project, California American Water," listing the Location as "TBD," Production Capacity as "6.4-9.6 MGD," and Intake as "Subsurface, Commingled." • Station ID No. 10 (West Basin Municipal Water District) should list Location as "Redondo Beach/El Segundo," and Production Capacity as "20-80 MGD."

C. The SR/SED Contains an Inadequate Project Description and Goals (Section 4)

The SR/SED's half-page Project Description (Section 4.2) fails to accurately set forth the elements of the Amendment, as required by CEQA. An "accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR." (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193.) An inaccurate or truncated project description is prejudicial error because it fails to "adequately apprise all interested parties of the true scope of the project." (*See City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1454-55.) An EIR is therefore flawed when an "enigmatic or unstable project description draws a red herring across the path of public input," because "[o]nly through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost." (*County of Inyo*, 71 Cal.App.3d at 198, 192.)

Here, the Project Description describes the "components" of the Amendment in vague terms without clearly identifying the changes the Amendment would make to the Ocean Plan. Not until Chapter 8 (*Issues Considered In the Development of the Proposed Desalination Amendment*) are the elements of the Amendment finally revealed: (1) defining the type of facilities to be covered by Amendment policies; (2) developing definitions for new, expanded and existing facilities; (3) identifying a preferred method of seawater intake; (4) establishing statewide guidelines for evaluating site alternative; (5) establishing statewide mitigation guidelines for

desalination-related impacts; (6) establishing guidelines for regulation of brine discharge; and (7) developing a receiving water limit for salinity. None of these elements are called out in the Project Description in a way that enables the public to understand the scope of the Amendment. More importantly, the inaccurate and vague Project Description fails to disclose that the Amendment is designed to discourage or preclude open ocean intakes in favor of subsurface intakes. Further, it is unclear whether the Amendment governs only desalination projects using ocean water, or whether it proposes to regulate brackish water desalter facilities that discharge brine into the ocean.

The SR/SED's nebulous Project Description is problematic as the adequacy of an EIR's analysis of significant environmental effects is closely linked to the adequacy of its project description. An EIR must contain a project description that is sufficient to allow an adequate evaluation of the project's environmental impacts. (*Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 27.) A failure to adequately describe anticipated project operations can also result in a flawed impact analysis. (See *San Joaquin Raptor Rescue Ctr. v. County of Merced* (2007) 149 Cal.App.4th 645 [project description for mining project failed to describe increase in levels of production that would occur under new permit].) Even if the Project Description was amended to accurately reflect the Amendment's key purpose, which is to promote subsurface intakes, there is insufficient analysis provided to support Staff's recommendation and conclusions that this method is the environmentally superior alternative to justify it being mandated unless proven infeasible. (See Alternatives discussion detailed in SR/SED Section 12.4.) As a threshold matter, the term "infeasible" in the SR/SED should be specifically defined as it is unclear what would need to be shown to demonstrate that a subsurface intake is infeasible.

1. The Project Objectives Fail to Contain All of the Amendment's Goals

A legally sufficient project description also must include a "clearly written statement of objectives" that accurately explains "the underlying purpose of the project." (CEQA Guidelines, § 15124(b).) Misleading project objectives give "conflicting signals to decisionmakers and the public about the nature and scope of the activity being proposed." (*San Joaquin Raptor Rescue Ctr.,* 149 Cal.App.4th at 655-56.) The SR/SED's Project Goals (Section 4.3) are analogous to project objectives in an EIR, are part of the project description, and should accurately explain the underlying purpose of the Project (i.e., adoption of the Amendment).

The Project Goals are narrowly focused on minimizing mortality of marine life and fail to include, among other things, minimizing onshore impacts. As the SR/SED makes clear, a primary purpose of the Amendment is to establish a regulatory preference for use of subsurface intakes over open ocean intakes and to require desalination facilities to use subsurface intakes to the greatest extent possible. The Amendment's goal of establishing this preference and the other policies reflected in Section 8's Staff Recommendation for each element should be clearly stated as Project Goals in order to accurately reflect the true scope of the Amendment.

The Project Goals should also include a statement reflecting the State Board's desire to adopt Amendments that are consistent with applicable State policy and regulations, including the California Water Plan and the Governor's California Water Action Plan (discussed above). Each identified "Option" discussed in the SR/SED and each Alternative identified in Section 12.4

should be evaluated in light of the Project Goals and consistency with other existing State policies, plans and regulations.

D. The SR/SED Fails to Establish an Accurate Baseline for the Project (Section 7)

The baseline environmental setting of the SR/SED does not accurately describe the environmental setting. An "environmental setting," is defined as "the physical environmental conditions in the vicinity of the project." CEQA Guidelines provide that the existing physical conditions in the vicinity of the project "will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant." (CEQA Guidelines, § 15125(a).)

While the SR/SED sets forth a general overview of marine ecosystems in California, it should note that the identified sensitive species and habitats are site-specific, and that some proposed desalination facilities may have intake and/or discharge facilities proposed in relatively benign locations such as sandy substrates. In addition, as identified in Exhibit A, there are several inaccuracies in the Environmental Setting's description of Kelp Beds, Surfgrass and Eelgrass Beds, Sensitive Habitats, Broadcast Spawners and Larval Recruitment, and Fisheries in California. (See Exhibit A, pp. 2-4; see, e.g., SR/SED, pp. 33-38.) These inaccuracies should be corrected in the recirculated SED.

In addition, Section 7 of the SR/SED (and other sections) repeatedly refers to *The Brine Panel Report* as "Roberts, et al. 2012." This is not a valid citation; and because it is referenced so often in the document, it should be cited property. The title page of The Brine Panel Report appears in Attachment 1, and a proper citation by authorship is:

> Jenkins, S. A., J. Paduan, P. Roberts, D. Schlenk, and J. Weis, "Management of Brine Discharges to Coastal Waters; Recommendations of a Science Advisory Panel", submitted at the request of the California Water Resources Control Board, Southern California Coastal Water Research Project, Tech. Rpt. 694, March, 2012, 56 pp. + App.

By mutual agreement of the Brine Panel members, the order of authorship was by alphabetical order, although by page and figure count, the contributions by Jenkins and Roberts was roughly equal. Since this document was released as a technical report of the Southern California Coastal Water Research Project (SCCWRP) an appropriate alternative for referencing this document would be:

> SCCWRP (20 12), Management of Brine Discharges to Coastal Waters Recommendations of a Science Advisory Panel," submitted at the request of the State Water Resources Control Board by the Southern California Coastal Water Research Project, Costa Mesa, CA, Technical Report 694, March 2012, 56 pp. + App.

E. Comments on "Issues Considered in the Development of the Proposed Desalination Amendment" (Section 8)

Section 8 of the SR/SED, entitled *Issues Considered in the Development of the Proposed Desalination Amendment* contains multiple inaccuracies and should be revised to correct those statements.

Page/Paragraph No.	Necessary Correction
Page 62, Paragraph 1	The second sentence of paragraph 1 reads "The absence of sensitive species in an area can be used [as] an indicator of pollution…." This sentence should be modified to clarify that the absence of sensitive species may also simply reflect the nature of the underlying benthic environment, such as sandy substrates.
Page 62, Paragraph 2	This section reflects a bias in the documents against Once-Through Cooling (OTC), which occurs when desalination facilities are co-located with power plants and other industrial cooling water intakes. Although loss of the OTC source water flow creates a "stand alone" condition for a co-located desalination facility, these documents (SR/SED and Regulations) underplay or omit the remaining potential benefits of a co-located desalination facility, which should be factored into facility siting and intake/discharge considerations. These potential benefits include, but are not limited to: • Existing intake/discharge infrastructure minimize additional marine environment construction impacts; • Existing developed site, typically zoned for industrial use, minimizes potential land use conflicts; • Existing infrastructure such as electrical, gas, access, wastewater connections, etc.; • Opportunities to create GHG friendly hybrid water/power facilities through such technologies as thermal distillation; • Opportunities for reduced electricity costs; and • Accordingly, all references to OTC data should be deleted or carefully distinguished from desalination Impingement/Entrainment effects.
Page 64, Paragraph 2	The fourth sentence of paragraph 2 reads – "All other things being equal, locations where subsurface intakes are feasible would be considered the best…" This sentence should be modified to allow

Page/Paragraph No.	Necessary Correction
	evaluation of intake options on a site-specific basis, recognizing that some subsurface intake locations could have significant environmental impacts, while ocean intakes in certain environments could have relatively nominal impacts or impacts that can be readily mitigated to less than significant levels.

In addition, this section should be updated to reflect the extensive work done to date studying desalination facilities' potential use of subsurface intakes (at Doheny and Marina) and passive wedgewire intakes (at Camp Pendleton, Redondo Beach, Santa Cruz and Marin). Further, because of the length of the technical comments and suggested edits to Section 8, they are not included here but are discussed in detail in Exhibit A. (Exhibit A, pp. 4-17.)

F. The SR/SED'S Economic Analysis Is Inadequate Because It Is Based on a Narrow Data Set that Does Not include Data for All Existing Seawater Desalination Plants Thus Excluding Analysis of both Potential Physical Impacts and Impacts to Ratepayers (Section 9 & Appendix G)

While an EIR must evaluate a project's physical impacts on the environment, consideration of a project's economic and social impacts are appropriate when determining whether a project's physical impacts are significant. Though "[e]conomic and social changes" are not themselves significant effects on the environment, "economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment." (CEQA Guidelines, § 15064(e).) "If the physical changes cause adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant." (CEQA Guidelines, §§ 15064(e), 15832; 1 Kostka & Zischke, *Practice Under the California Environmental Quality Act* (2d ed. Cal CEB 2014), §§ 6.36, 6.52.)

As discussed above, the SR/SED's failure to address environmental impacts, specifically the inland impacts to water supply and water quality likely to result from requiring subsurface intakes, leads to the omission of associated economic costs (e.g., increased well drilling/maintenance costs, impairment of water supply, etc.) from the Economic Analysis found in Appendix G (Appendix G Economic Analysis). Accordingly, the Economic Analysis is inaccurate and potentially undervalues the extent of economic costs associated with subsurface intakes. This omission prevents a fair comparison of the scope of costs associated with subsurface intakes relative to costs for open ocean intakes. For example, the costs for subsurface intakes are likely to be greater than simply the capital costs of constructing a subsurface intake at a desalination facility and will include the costs associated with the environmental impacts that flow from use of that method.

To exacerbate the inadequacy of Section 9 *Economic Analysis*, it simply incorporates the Appendix G Economic Analysis without providing any substantive or contextual discussion of the Amendment's total costs or the relative costs of subsurface versus surface water intakes for new facilities and the associated financial considerations.

Further, the analysis also fails to account for the potential economic costs created by the greater regulatory burden and compliance requirements associated with implementing subsurface intakes. The increased duration of the permitting and approval periods impacts the timing of construction, which in turn has financial implications for financing and construction costs, none of which are reflected in the Economic Analysis. These considerations should be discussed in Section 9 and analyzed in the Appendix G Economic context as required.

The Economic Analysis also fails to reconcile some obvious inconsistencies.

Appendix G Economic Analysis Discussion	**Explanation of Inaccuracy/Deficiency**
P. G-8: States "when compared to the cost of surface water intakes, subsurface intakes could decrease total project capital costs by 2% to 9% due primarily to reduced pretreatment costs."	This statement as a generalization is misleading. While it is true that subsurface intakes may reduce pretreatment costs, it is not necessarily true that pretreatment can be eliminated. Further, assuming that site specific geology exists to even consider subsurface intakes, a capital cost comparison of subsurface intakes with surface intakes must consider not only the differences in pretreatment costs (which do favor subsurface intakes) but also the differences associated with the configuration, number, sites, and site access characteristics of the intakes (which generally do not favor subsurface intakes, particularly at larger capacity desalination plants). Each site and situation requires a specific site specific analysis, and it is inaccurate to state that total project capital costs will be reduced in all cases for desalination projects using subsurface intakes.
P. G-27: States that subsurface intake wells are generally associated with higher capital and construction costs than open or screened ocean intakes and with higher land acquisition costs because subsurface intakes require larger footprints than open ocean intakes. It further notes that subsurface intakes have much lower operating costs due to reductions in feedwater pretreatment, biofouling and mitigation costs. (*Id*.)	Exhibit 12-4, which compares the total capital costs for subsurface and surface intake structures for two proposed projects (taking into account differences in pretreatment), shows lower total capital costs for the subsurface intake option on both projects relative to surface intakes. (Appendix G, Economic Analysis, pp. G28-29.) The Economic Analysis does not explain why these projects do not fit the norm of having higher capital costs for subsurface intakes.

Appendix G Economic Analysis Discussion	Explanation of Inaccuracy/Deficiency
The Economic Analysis provides no cost analysis or discussion of operation and maintenance (O&M) costs (including pretreatment) associated with the two projects.	The appendix to the Economic Analysis contains several charts that appear to estimate operation and maintenance (O&M) costs but there is no discussion of the significance of those costs relative to total overall project costs (capital + O&M costs). (See Appendix G, Economic Analysis, pp. G-35 to G-46.)

In short, the Economic Analysis makes general assertions but then fails to marshal data supporting those assertions or provide why real world data contradicts its assertions. Such inconsistencies and omissions of relevant data cast doubt on the credibility of the document and the appropriateness of basing decisions on its analysis.

G. The SR/SED Fails to Address All Potentially Significant Impacts of the Proposed Amendment (Section 12)

The SR/SED impact analysis fails as an informational document for 2 reasons: (1) it only provides analysis for 5 of the 18 resource areas associated with the Proposed Amendment essentially omitting 13 areas of information; and (2) fails to analyze a key component of the Amendment—the impact of subsurface intakes on coastal areas. (Cal. Code Regs., tit. 23, § 3777; Pub. Resources Code, § 21092.1.)

1. Analysis contains only 5 of 18 resource categories

Fundamentally, an EIR must be prepared with a sufficient degree of analysis to provide decision-makers with the information needed to make an intelligent judgment concerning a project's environmental impacts. (CEQA Guidelines, § 15151; *Napa Citizens for Honest Gov't v Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 356 ("*Napa Citizens*").) An EIR should, when looked at as a whole, provide a reasonable, good faith disclosure and analysis of the project's environmental impacts. (*Laurel Heights I,* 47 Cal.App.3d at 392.)

In contrast to these standards, the majority of SR/SED analysis of potential adverse impacts concentrates on those which "generally occur from construction and operation of a coastal desalination facility, without regard to the requirements set forth in the State Water Board's proposed Desalination Amendment." (SR/SED, p. 115.) The SR/SED's analysis of desalination projects generally covers 18 resources areas. (SR/SED, pp. 121-172.) However, here the analysis of the "Project" specifically was arbitrarily limited to 5 resources areas: aesthetics, air quality, biological resources, greenhouse gas emissions and hydrology and water

quality. Surprisingly, each impact assessment is less than 1 page in length.[3] (SR/SED, pp. 177-192.) By analyzing the Amendment as an alternative (Alternative 2) the SR/SED avoided the comprehensive analysis required under the SED regulations and CEQA—an EIR must set forth the bases for its findings on a project's environmental impacts; a bare conclusion without an explanation of its factual and analytical basis is not a sufficient analysis of an environmental impact. (*Laurel Heights I,* 47 Cal.App.3d at 404; *City of Maywood v. Los Angeles Unified Sch. Dist*. (2012) 208 Cal.App.4th 362, 393.)

The truncated analysis was further complicated by the SR/SED only analyzing the Amendment as Alternative 2 in Section 12.4. (See further discussion of alternatives detailed in Section H.) Contrary to law, the SR/SED states that "[s]ince the project alternatives only describe activities related to the coastal and nearshore intakes and outfalls, only those issues potentially affected are included in this analysis of project alternatives." (SR/SED, p. 177.) While alternatives may be described in less detail than the impacts analysis for the Proposed Project, the impact analysis for the Project must contain an explanation of the reasoning supporting the EIR's impact findings, and of the supporting evidence. (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383; *Napa Citizens,* 91 Cal.App.4th at 359.)

Had the SR/SED used the general analysis as a foundation for an in-depth analysis of the Amendment, it might have avoided these deficiencies.

2. No analysis of impact of subsurface intakes on coastal areas

As explained on page 25 of the SR/SED, a SED is required to conduct an "environmental analysis of the reasonably foreseeable methods of compliance" with the Regulations. As noted below, the SR/SED does not evaluate the potential environmental impacts of imposing new regulations favoring subsurface intakes over screened ocean intakes, which is the clear intent and likely outcome of the Amendment.

a. Biological Resources (Section 12.1.4)

The SR/SED fails to adequately describe the types of organisms, numbers of organisms, area or type of habitat that could be affected during construction, operation and maintenance of a subsurface system. (SR/SED, pp. 184-189; Exhibit A, pp. 17-18).) Alternative 2 (Project) includes only a brief list of construction related impacts from subsurface intakes to onshore habitats such as "[c]onversion of riparian or wetland habitat supporting a variety of resident and migratory species," "[a]dverse impacts to migratory bird nesting and feeding habitat," and "[d]isturbance of marine and onshore habitat through generation of noise and vibration." (SR/SED, p. 186.) These and other impacts should be further developed for an adequate Project-related impact analysis. In addition, we invite the State Board to consider the results of the 2005 Cumulative Impacts Study prepared as a Conditions of Certification for the AES HBGS Retool Project as described on page 18 (Section 12.1.4 Biological Resources) of Exhibit A.

[3] The SR/ SED should specifically discuss areas where the Regulations deviate from Expert Panel recommendations, and provide a substantive scientific basis for any deviation.

b. Hydrology and Water Quality

Perhaps the most profound example of inadequate analysis is the one paragraph purporting to contain the entire hydrology and water quality impact analysis for Alternative 2 (Project). As explained below, this section must be augmented to include impacts from subsurface intakes on: (a) groundwater supplies; (b) drainage patterns; and (c) water quality. (See CEQA Guidelines, Appendix G, § IX [Hydrology and Water Quality].) Some of the impacts resulting from subsurface intakes are discussed in Alternative 1. For example, the SR/SED explains that it is "possible that a subsurface intake could cause or exacerbate saltwater intrusion into freshwater wells" and recognizes that "pumping from the subsurface intakes has the potential to alter groundwater flow to freshwater aquifers and wells." (SR/SED, pp. 190-191.) However, it fails to include a more comprehensive discussion of the consequences of saltwater intrusion, and the types of impacts normally discussed for hydrology and water quality, which then lead to the appropriate mitigation which may be required.

To illustrate this point, if a desalination facility's use of its subsurface intake infrastructure (e.g., slant wells) interferes with production of neighboring wells in an inland groundwater basin, the well owner may sue the desalination plant to protect its rights. In order to bring a well interference claim or injunction to stop interference with a superior water right, the complaining party must simply demonstrate that she possesses a senior water right and that the junior user—here the desalination plant—is impairing the use of that senior water right. (*Peabody v. City of Vallejo* (1935) 2 Cal.2d 351, 374-375; *Monolith Portland Cement Co. v. Mojave Public Utility District* (1970) 4 Cal.App.3d 840, 847-48.)

Under California water law, the general rules of water right priority are based upon a descending ranking of priority. In this priority scheme, riparian or overlying rights, which are based on the location of property in relation to a water source, are of higher priority than appropriative rights. (*City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199, 282-286; *City of Alhambra v. City of Pasadena* (1949) 33 Cal.2d 908, 925-926.) As between appropriators, first in time is first in right. (*Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist*. (1935) 3 Cal.2d 489.) These general rules of priority govern the allocation of water from both surface and subsurface flow and percolating groundwater. (*Prather v. Hoberg* (1944) 24 Cal.2d 549; *Rancho Santa Margarita v. Vail* (1938) 11 Cal.2d 501.) If operation of a desalination plant's subsurface intake wells interferes with an overlying or appropriative right holder's extraction of groundwater pursuant to those valid rights, the desalination plant could face litigation. The fundamental remedies available to the holder of that primary and paramount right are damages, injunction and declaratory relief.

c. Six (6) Additional Unidentified Impacts Require Analysis for Subsurface Intakes

In addition to providing additional analysis for biological resources and hydrology and water quality, the SR/SED's impact analysis should be revised to depict known potential impacts based on review of available environmental documents (including those noted in Section III.B), as well as consider the potential subsurface intake issues. Specifically, the SR/SED and Regulations' environmental findings rely in part on 9 past desalination projects spanning from 2006-2013, the majority of which are over 5 years old, but omit, or fail to adequately consider,

more recent coastal desalination projects which demonstrate there are at least 6 additional impacts requiring analysis for subsurface intake.

It would benefit the SR/SED to have Staff review and note subsurface intake impacts from publicly additional available CEQA documents[4], including those for: (1) Camp Pendleton (feasibility study); (2) Doheny (MND and permits for a pilot plant, now built); (3) Long Beach (EA/FONSI for subsurface pilot project); (4) Cambria (EA/FONSI for beach geotechnical sampling program, and EIR for full-scale project); (5) Sand City (full scale EIR, project now built); (6) Monterey Peninsula Water Supply Project (full scale EIR, test well MND—in process); and (7) dozens of subsurface intake facilities around the world.

While subsurface intakes eliminate impingement (as do properly designed ocean intakes) and effectively eliminate entrainment (which properly designed ocean intakes can mitigate to less than significant levels), subsurface intakes have at least the following 6 additional potential environmental impacts that should be reflected throughout the SR/SED and Regulations, including:

(i) Coastal Hazards (Hydrology & Water Quality)

Subsurface intakes may be more susceptible to coastal hazards due to the need to be in close proximity to the ocean. These potential hazards are well documented in the Coastal Commission's Draft Sea Level Rise Guidance document (although the potential severity of these hazards is conservatively estimated and therefore likely overstated). As noted in the CalAm Coastal Water Project Final EIR for the Monterey Peninsula Water Supply Project (Monterey EIR), flooding due to potential sea level rise could occur under some conditions. (Monterey Peninsula Water Supply Project, CalAm Coastal Water Project Final EIR (Monterey EIR), pp. 4.1-11, 6.1-20.)

(ii) Groundwater (Hydrology & Water Quality)

Subsurface intakes could be sited further inland to reduce coastal hazard issues, although this may raise other issues, including the likelihood of drawing in a higher percentage of groundwater. This may in turn create impacts related to groundwater rights, groundwater quality, existing public or private groundwater wells, etc. For example, as described above, in California if a desalination well threatens to interfere with priority water rights, such as in the case of well interference issues, the fundamental remedies available to the holder of a primary and paramount right are damages, injunction and declaratory relief. This could subject a desalination facility to additional legal challenges.

[4] Page 117 of the SR/SED lists the nine (9) projects, which should be supplemented to include West Basin Municipal Water District's "Temporary Ocean Water Desalination Demonstration Project EIR" (2008). In addition, on page 119 it is not clear what relationship Table 12-1 has to Tables 2-1 and 2-2. Table 12-1 is missing several ocean desalination facilities in the planning stages, including Camp Pendleton, Doheny, West Basin Municipal Water District, Santa Cruz and the Regional Desalination Project in the San Francisco Bay Area.

The Camp Pendleton Seawater Desalination Feasibility Study notes that use of a subsurface intake approach is more susceptible to local hydrogeology. (Camp Pendleton Seawater Desalination Feasibility Study (Pendleton Study), p. 8-17.) Specifically, the Pendleton Study states that pumping from coastal wells could potentially invoke a negative impact on nearby fresh groundwater aquifers, especially in light of the increased quantity of traditional onshore groundwater wells in confined coastal aquifers. (Pendleton Study, p. 3-31.) One of the possible impacts is saltwater intrusion. If the freshwater aquifer is depleted without being recharged through natural processes, saltwater intrusion from the ocean may occur. (*Id*.) Desalination has often been cited as a way to reduce saltwater intrusion by producing potable water without disturbing freshwater aquifers. (*Id*.) However, depending on the local groundwater profile, beach wells to supply the desalination plant could exacerbate intrusion problems. (*Id*.)

The Monterey EIR notes similar potential impacts due to construction and operation of one type of subsurface intake, slant wells. In this case, the EIR acknowledges that construction of subsurface wells (slant wells) may intercept shallow or perched groundwater. (Monterey EIR, pp. 4.1-32 to 4.1-33.) Operations of those slant wells are also expected to pull water from adjacent aquifers and to cause a local depression in groundwater level around the wells and within the shallow aquifer. (Monterey EIR, pp. 4.2-44 to 4.2-45, 4.2-48.) Neighboring wells screened in the same aquifer and within the local groundwater depression could be impacted by causing physical damage to the well if groundwater levels drop below the screens of neighborhood wells and/or by lowering the well yield of neighboring wells. (Monterey EIR, p. 4.2-45.) The Monterey EIR also explains the risk of increasing saltwater intrusion into the groundwater aquifer as a result of slant well operation. (Monterey EIR, p. 4.2-51.)

A more recent slant well test study stated that a subsurface intake system related to desalination facilities in the Monterey area could cause drawdown of freshwater supplies and potentially interfere with water levels in neighboring wells. (Draft Initial Study and Mitigated Negative Declaration for the California American Water Slant Test Well Project (May 2014), pp. 112-113.)

Similarly, the Draft Environmental Impact Report for the Sand City desalination plant also acknowledged the potential for use of the subsurface intake method to cause saltwater intrusion. (Sand City Desalination Facility, Draft Environmental Impact Report, p. 49.) The test well assessment for the Doheny Ocean Desalination Project indicated that operation of the subsurface intake slant wells could induce increased saltwater intrusion into the adjacent coastal aquifer. (Final Summary Report, Doheny Ocean Desalination Project, Phase 3 Investigation, Extended Pumping and Pilot Plant Test Regional Watershed and Groundwater Modeling Full Scale Project Conceptual Assessment (Jan. 2014) (Doheny Report), p. 22.)

(iii) Water Quality (Hydrology & Water Quality)

Subsurface intakes, while generally found to reduce pretreatment requirements, may in some cases have greater water quality impacts than an ocean intake, and require additional pretreatment or result in additional environmental impacts. Potential water quality impacts include marine water quality impacts associated with potentially lower dissolved oxygen, potential for groundwater contaminants, and potential for pumping “ancient water” or water with otherwise higher levels of iron, manganese or other constituents.

Installation of the extraction wells and related infrastructure has the potential to impact water quality and the marine environment by introducing boring spoils, mechanized equipment, and hydrocarbons into the nearshore marine environment. (California Coastal Commission, Substantial Issue and De Novo Staff Report, Sand City Desalination Facility (May 2005), p. 56.)

Differing levels of water quality were found during pumping of a test slant well related to development of the Doheny Ocean Desalination Project. It was discovered that the water extracted contained a high level of dissolved iron and manganese contained in the pocket of old marine groundwater that lies under the ocean. This water was anoxic (devoid of oxygen) and slightly acidic, and was found to be about 7,500 years old. The initial groundwater modeling work suggested that under full production capacity, the old marine groundwater would be mostly pumped out and replaced by ocean water within a year or so. (Doheny Report, pp. 13-14, 15-16.) Therefore, until the initial period of pump out of the old marine groundwater, it would be necessary to install a system to remove iron/manganese to levels that can meet discharge requirements through the ocean outfall. (*Id*. at p. 20.)

(iv) Nearshore Freshwater Bodies (Hydrology & Water Quality)

Subsurface intakes have the potential to create a drawdown upon nearby freshwater bodies, such as estuaries, lagoons or rivers. For example, the Pendleton Study notes that operation of slant wells (subsurface intake method) could have the indirect effects of dewatering an adjacent river estuary, which could be a concern for freshwater aquatic species and anadromous fish. (Pendleton Study, p. 3-31.)

(v) Sensitive Coastal Habitat and Species (Biological Resources)

Subsurface intakes located on or near the beach may affect sensitive coastal habitat or species, including coastal dunes, snowy plover, etc. As noted in the Pendleton Study, the subsurface intake option involves installing infrastructure in in close proximity to the coastal dunes and the Santa Margarita River, where several sensitive bird species have been identified. (Pendleton Study, p. 8-17.)

(vi) Local Coastal Program Consistency (Land Use & Planning)

Because subsurface intakes represent “new construction” and are by nature located in the Coastal Zone, they may create additional potential for conflict with Coastal Act or LCP policies, including but not limited to:

- Proximity to environmental sensitive habitat areas (E.S.H.A.)
- Coastal Access
- Visual Impacts

- Coastal parking facilities (for intakes sited in parking lots)

- Agricultural Land Impacts—subsurface intakes sited off of the beach, to reduce coastal hazard issues, may require agricultural land or otherwise adversely affect agricultural interests through groundwater or other effects.

Accordingly, the SR/SED fails to "demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action," especially as they relate to subsurface intakes. (*Laurel Heights I,* 47 Cal.3d at 392.) Not only is the SR/SED an accountability document, but it serves to protect the environment and foster "informed self-government." (*Id.*)

H. The SR/SED Errs by Analyzing the Project (Amendment) as an Alternative and By Not Analyzing A Reasonable Range of Alternatives (Sections 12.2, 12.3 and 12.4)

For unknown reasons, the SR/SED analyzes the Project as an Alternative, rather than as the project, and thus is missing a comparison of each alternative to the Project. The SED regulations require an "analysis of reasonable alternatives to the project…to avoid or reduce any significant or potentially significant adverse environmental impacts." (Cal. Code Regs., tit. 23, § 3777(b)(3), emphasis added.) It does not allow short-cutting a complete project analysis by erroneously including the proposed project as an alternative (less in depth analysis) to avoid the required comprehensive environmental review. To be clear, the SR/SED should be revised to analyze the Project against the alternatives instead of classifying the Project as an alternative. (The "Project" alternative did not receive full analytical treatment in the SR/SED (detailed in section 12.4).) To compound the issue, the proposed Project is not accurately described in Alternative 2. (SR/SED, pp. 174-175 [identifying Alternative 2 as the Project (Amendment)].)

Specifically, Alternative 2 is described as "an amendment to the Ocean Plan that would allow greater flexibility in intake and discharge methods than identified in Alternative 1. Facilities could use subsurface intake, surface intakes screened and operated at low intake velocities, or intake using an alternative method…." (SR/SED, p. 174.) It further states that this alternative would require that brine discharge achieve a receiving water limit of no more than 2 ppt above background salinity. (*Id*.) This description is misleading as the actual proposed Amendment establishes subsurface intakes as the preferred technology and provides that surface intakes will only be allowed if subsurface intakes are shown to be infeasible. (See SR/SED, p. 58 [describing Option 3].) While Mesa Water agrees that Alternative 2 as written is more reasonable than the actual Amendment, the SR/SED should be revised to accurately characterize the Project.

In addition, Alternative 2 (Project) states that it "would require desalination facilities to fully mitigate for all marine life mortality associated with construction and operational activities." (SR/SED, p. 175.) The requirement for "full" mitigation contradicts the SR/SED elsewhere, including existing State policy which only requires "minimizing" adverse effects (Coastal Act and Porter-Cologne), and CEQA, which requires mitigation to "less than significant" levels. (Pub. Resources Code, § 30231 [Coastal Act]; Wat. Code, § 13142.5(b) [Porter-Cologne provision that applies to coastal power plants and other industrial facilities that use seawater, including

desalination]; CEQA Guidelines, § 15370; Pub. Resources Code, § 21000(g); *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 254-56.) It would be helpful to clarify the Board's intent and regulatory basis regarding "full mitigation."

1. The three underlying Project goals preclude a more appropriate range of alternatives to the project.

The range of alternatives presented in the SR/SED is not reasonable, and violates CEQA and the SED regulations. The SED regulations require an "analysis of reasonable alternatives to the project…to avoid or reduce any significant or potentially significant adverse environmental impacts." (Cal. Code Regs., tit. 23, § 3777(b)(3).) "A major function of an EIR is to ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible official." (*Save Round Valley Alliance v. County of Inyo* (2007) 157 Cal.App.4th 1437, 1456.) Likewise, an EIR must "describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." (CEQA Guidelines, § 15126.6(a); see also Pub. Resources Code, § 21001(g).)

In evaluating whether there are an adequate range of alternatives, a review of the three underlying Project goals illustrates their narrowness precludes an adequate range of alternatives. The first objective is to "[p]rovide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters." (SR/SED, p. 21.) This objective ignores onshore impacts and by so doing, elevates the importance of marine impacts. A lead agency may not preordain the outcome of the alternative analysis by defining the project's objectives in an unreasonably restrictive manner. (*See County of Inyo v. City of Los Angeles* (1981) 124 Cal.App.3d 1, 9; Remy, Thomas, Moose, Manley, Guide to CEQA (Solano Press 11th ed., 2006) p. 589 ["The case law makes clear . . . that overly narrow objectives may unduly circumscribe the agency's consideration of project alternatives."].)

The second and third goals are fundamental – "support the use of ocean water as a reliable supplement to traditional water supplies and promote interagency collaboration for siting, design, and permitting of desalination facilities" (see SR/SED pp. 22-23) – but cannot overcome the effect of avoiding onshore impacts necessarily excludes other viable alternatives.

Courts have found that when a project and its objectives are defined too narrowly, an EIR's treatment of alternatives is inadequate. (*See City of Santee*, 214 Cal.App.3d at 1455 [inadequacy of the project description caused the EIR to discuss inadequate, unduly narrow project alternatives]; *Rural Land Owners Association v. City Council of Lodi* (1983) 143 Cal.App.3d 1013, 1024 [respondent agency defined its project too narrowly and thus avoided analyzing the full range of impacts that would follow from the proposed action].) There is a direct relationship between project objectives and the formulation of alternatives. The court in *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, held that an agency cannot "avoid an objective consideration of an alternative simply because, prior to commencing CEQA review, an applicant made substantial investments in the hope of gaining approval for a particular alternative. . .." (*Id*. at 736.)

In light of the three objectives, the SR/SED identifies five alternatives, including the Project itself, and "no project": (1) Alternative 1 would require that new desalination facilities use subsurface intakes and discharge brine by commingling effluent to achieve no more than 2 ppt above background salinity; (2) Alternative 2 claims to be the Proposed Desalination Amendment (Project); (3) Alternative 3 would provide for more flexibility by allowing new facilities to have an "open, uncontrolled intake and a simple large diameter outfall;" (4) Alternative 4 is the same as Alternative 2 (Project) but would allow a discharge that would achieve a receiving water limit of no greater than five percent above natural background salinity; and (5) Alternative 5 is the "no project alternative" under which there would be no Amendment of the Ocean Plan to address intakes and outfalls associated with new desalination facilities.

The range of alternatives in an EIR should allow informed decision-making and public participation. (CEQA Guidelines, § 15126.6(a)-(f).) The EIR must focus on alternatives to the project that "are capable of avoiding or substantially lessening any significant effects of the project, even if [those] alternatives would impede to some degree the attainment of the project objectives." (CEQA Guidelines, § 15126.6(b).) The reasonableness of alternatives is considered in light of the nature of the project, the nature and extent of the project's impacts, and other material facts. (*San Bernardino Valley Audubon Society v. County of San Bernardino* (1984) 155 Cal.App.3d 738, 750.)

The SR/SED's lack of a reasonable range of alternatives ensures that Alternative 2 (Project) is chosen as the preferred alternative. For example, while Alternative 1 purports to lessen the significant effects of the project by requiring subsurface intakes and thereby resulting in the "least intake and discharge related aquatic life mortality," the analysis demonstrates that subsurface impacts will increase onshore construction impacts. (SR/SED, p. 174.) The analysis of Alternative 1 throughout this section supports Mesa Water's position that subsurface intakes may have numerous onshore impacts, and therefore should not be identified as the preferred method of ocean water intake. (See SR/SED, pp. 174, 184, 190.) Alternative 1 is also closer to the actual Project, which mandates subsurface intakes unless infeasible.

In addition, Alternative 3—which boldly provides that new facilities would use an open, unscreened ocean intake—is a strawman. (SR/SED, p. 175-176.) This alternative is flawed by design, unreasonable and as written would not meet the main Project goals of safeguarding marine life or protecting water quality and related beneficial uses of ocean waters. The basis for this alternative is not substantiated, as a more appropriate version of this alternative could either be inferred from the various coastal desalination facilities being planned, or simply assumed and required as part of the alternative for State Board consideration. As explained in the SR/SED, "[t]here are numerous technologies that can help reduce or avoid impingement and entrainment of marine life, including intake structure design, configuration of screening systems, passive intake system, and fish diversion and avoidance technologies." (SR/SED, p. 46.) The inclusion of a clearly infeasible alternative allows the State Board to reject this alternative and choose the Project alternative. This violates the informational purpose of this document, and transforms it to one of advocacy.

An appropriate alternative for consideration, which meets the third goal of taking into consideration siting, design, and permitting, would be to allow the applicant flexibility in determining whether to use a surface or subsurface intake. This simple addition would have been

more viable and created a meaningful option for decision makers to consider in light of all three goals of the Project. Given CEQA Guidelines section 15204(a) states that comments on an EIR are particularly helpful if they suggest "additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects," Mesa Water respectfully requests consideration be given to evaluate this as a new alternative, or modify Alternative 3, to allow for the best site, design and technology on a site-specific basis. This alternative is feasible, satisfies most of the Project objectives, is environmentally responsible, and makes rational sense. An alternative is feasible if it is "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." (CEQA Guidelines, § 15364.) For analysis purposes, this alternative could include use of either subsurface intakes, or use of appropriately designed ocean intakes, including use of a passive wedgewire screen. The discharge can be assumed as either commingled with wastewater and/or dispersed via a diffuser jet.

IV. THE SR/SED FAILS TO HARMONIZE THE COASTAL ACT WITH THE AMENDMENT

Everyone in the State of California—including the State itself—is subject to the Coastal Act (Act) (Pub. Resources Code, §§ 21066, 30111, 30600; see also 65 Ops. Atty.Gen. 88). This includes all public agencies. (Pub. Resources Code, § 30003.)

While the SR/SED includes a policy discussion of the Act, as well as a few brief references elsewhere in the document, it fails to discuss the fundamental ways in which the amendment could harm local land planning by mandating only one intake method unless proven infeasible. Nor does the SR/SED provide guidance to those agencies on how infeasibility can be shown to satisfy the Amendment's preference for a single preferred intake method. Therefore, while it acknowledges that new desalination facilities in the coastal zone will require a Coastal Development Permit (at page 31), there is no analysis environmentally or otherwise as to demonstrate when "infeasibility" would occur.

Similarly, at page 57, under the heading "Should the State water board identify a preferred method of seawater intake?", the SR/SED again acknowledges that the Act requires issuing a permit, without any discussion of how mandating one technology (subsurface intake) may conflict with other applicable Act requirements dealing with ESHA, visual impacts, coastal access, coastal parking, and site-specific Local Coastal Program requirements.

These two points illustrate how the SR/SED violates the essential principle of the Act which is the importance of public participation in planning decisions involving the coast:

> "The Legislature further finds and declares that the public has a right to fully participate in decisions affecting coastal planning, conservation, and development; that achievement of sound coastal conservation and development is dependent upon public understanding and support; and that the continuing planning and implementation of programs for coastal conservation and development should include the widest opportunity for public participation." (Pub. Res. Code, sec. 30006). This principle is a

> fundamental part of the Coastal Commission's regulations for public works projects (14 Cal. Code Regs., sec. 13353.5), which require that a local public hearing on a public works plan be held "within a reasonable time prior to submission of the plan . . . such that the public is afforded an adequate and timely comment period on the proposed plan. . . .."

By remaining silent on environmental analysis which should be considered to demonstrate infeasibility, the standards for public participation have not been met.

V. RECIRCULATION IS REQUIRED BECAUSE THE SR/SED FAILED TO EVALUATE THE SUBSTANTIAL ENVIRONMENTAL AND ECONOMIC IMPACTS OF THE PROJECT REQUIRED BY LAW

The SED regulations mandate that a Draft SED be recirculated for additional public comment if "significant new information" is added to the Draft SED. (Cal.Code Regs., tit. 23, § 3779(e).) These regulations mirror CEQA's: Recirculation is required if significant new information is added to an EIR after notice of public review has been given, but before final certification of the EIR. (Pub. Resources Code, § 21092.1; CEQA Guidelines, § 15088.5; *Vineyard Area Citizens*, 40 Cal.4th at 447). Recirculation is required when the addition of new information deprives the public of a meaningful opportunity to comment on substantial adverse project impacts or feasible mitigation measures or alternatives that are not adopted. (*Laurel Heights Improvement Assn. v. Regents of Univ. of Cal.* (1993) 6 Cal.4th 1112 (*Laurel Heights II*); CEQA Guidelines, § 15088.5(a).) The new information may include changes in the project or environmental setting as well as additional data or other information. (CEQA Guidelines, § 15088.5(a).) Recirculation is also required if "[t]he draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded." (CEQA Guidelines, § 15088.5(a)(4); *Mountain Lion Coalition v. Fish & Game Com*. (1989) 214 Cal.App.3d 1043.)

Specifically, as set forth above, the SR/SED did not adequately analyze the potential impacts associated with the Amendment's onshore environmental impacts and the economic cost when determining the significance of physical impacts and when considering feasible mitigation measures and alternatives. This information should be included and the Draft SED recirculated so informed decision making can occur. Further, Mesa Water has provided additional information about desalination projects using environmentally sensitive ocean water intakes and the potential adverse impacts of subsurface intakes on coastal areas. This significant new information must be incorporated into the SR/SED and recirculated for public review.

VI. CONCLUSION

Mesa Water believes that by addressing its substantive concerns the SR/SED can be redrafted to fully disclose all impacts of the Project to the public. As presently drafted, the Amendment could adversely impact development of desalination projects in California. Therefore, the SR/SED should be revised to include fully address the responses to comments, provide the required additional analysis, and include the missing analysis of impacts where absent. It should then be recirculated for the benefit of the community and decision-makers.

Thank you for your consideration of these comments.

Respectfully submitted,

Diane C. De Felice

DCD:ibc

Attachments: Exhibits A-B

cc: Paul E. Shoenberger, Gen. Manager Mesa Water District

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EXHIBIT A

15 August 2014

Paul Shoenberger, PE
General Manager
Mesa Water District
1965 Placentia Ave.
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Re: Comments on Ocean Plan Amendment

Dear Mr. Shoenberger:

Attached are MBC Applied Environmental Sciences' comments on the proposed Ocean Plan Amendment covering desalination intakes and brine discharges (proposed policy). MBC is an environmental consulting firm that was established in 1969, and has been involved with more than a dozen desalination projects in the last 15 years. Our participation has included entrainment/impingement studies, environmental impact analyses, CEQA support, interfacing with Regional Board staff, and toxicity studies. In addition, MBC has performed the NPDES receiving water monitoring for most of southern California's coastal power plants since the 1970s. This has included water quality surveys (including temperature and salinity measurements), biological surveys, and permitting support. We have also performed 316(b) entrainment and impingement assessments at southern California's coastal power plants. MBC operates an ELAP-certified toxicity laboratory, and has performed toxicity tests on discharge samples from desalination pilot plants. We have worked on multiple desalination projects, and served on the following:

- WateReuse Research Foundation, Technical Advisor (DSB) "*Improvements to Minimize Impingement Mortality and Entrainment at Existing Intakes" (2011-2012)*
- WateReuse Research Foundation, Project Advisory Committee (DSB) *"Methodology for Development of an IM&E Mitigation Program" (2013-present)*

We identified several areas of concern within the proposed policy, including:

- Inaccurate definitions,
- Mischaracterizations,
- Unsupported claims, and
- Omission of relevant data

The State Board has classified subsurface intakes as the preferred option for design, but did not discuss the various types of construction/operational impacts associated with those intakes, or the magnitude of those impacts, in any detail. Their justification of the brine discharge limits (and potential effects to larvae) is also weak. The following pages include our comments to specific sections or language within the proposed policy. We have copied language from the policy in italics, and our comments follow in normal font.

Comments on the Draft Staff Report and Draft SED

Section 2.2 Impacts to Aquatic Life Related Beneficial Uses

"No direct estimates exist for the amount of invertebrate larvae, zooplankton, or phytoplankton entrained within this same period, although the numbers are likely orders of magnitude larger (on a per organism basis) based on the relative abundance of plankton in seawater compared to fish larvae."

This is incorrect, and we note that this assertion is repeated in Section 8.3.1.1.2. We recommend deleting this sentence. The year-long entrainment studies conducted at most of California's power plants analyzed effects due to entrainment of "target" invertebrate species (e.g., market squid, California spiny lobster, rock crabs, etc.). These direct estimates were published in reports and submitted to multiple agencies, including Regional Water Quality Control Boards. Entrainment studies for Los Angeles area power plants can be viewed online at: http://www.waterboards.ca.gov/losangeles/water_issues/programs/power_plants/

"In addition to impacts from the intake of ocean water, the discharge from a desalination facility can also impair beneficial uses."

The text following this statement provides no supporting information on what beneficial uses are impaired, or how these impairments occur. Industrial service supply (IND) is also considered a beneficial use. We recommend deleting this sentence.

Section 6 Regulatory Setting for Desaliantion in Ocean Water

"Desaliantion" is spelled incorrectly. The correct spelling is "Desalination".

Section 6.2 Porter-Cologne Authority over Seawater Intakes

"The Porter-Cologne provision is both broader and narrower than CWA section 316(b), which governs cooling water intake structures. Section 13142.5(b) addresses only new or expanded facilities, unlike CWA section 316(b), which does not differentiate between new or existing intakes."

This is incorrect. The §316(b) rule that was released in May 2014 applies to existing facilities, including new units at existing facilities. However, new facilities are still regulated by the Phase I §316(b) rule that was enacted in 2001. The compliance pathways are different between the two phases. We recommend deleting the two sentences excerpted above.

Section 7.1.1 Kelp beds

"Kelp beds are common in areas with rocky substrates because kelp often attaches to hard substrates. Kelp reproduces by releasing spores into the water column that are carried by currents before the spores settle to the bottom and geminate. Giant kelp, Macrocystis pyrifera*, releases spores continuously from spring to fall in California's coastal waters. The spores differentiate into sperm and eggs and fertilization occurs in the water column. Many of the spores, sperm, and eggs become food for other organisms in the marine food web. The planktonic reproductive life stages of kelp are at risk of entrainment in surface water systems. Fertilized eggs that avoid predation and entrainment develop into the adult organisms that make up kelp beds."*

The last sentence is incorrect and should be deleted. Not all eggs that avoid predation and entrainment develop into adult kelp. Only those that first settle onto suitable substrate (i.e., cobble or rocky reef) that is not already colonized have the potential to develop into adult kelp plants. While spore supply could potentially limit growth of kelp beds, this would be more likely to occur during years when kelp beds are eliminated due to prolonged warm-water events (such as during 1983-4 and 1997-8), and there is no local supply of spores.

Note that the San Onofre kelp bed, which is just downcoast from the intake structures at San Onofre Nuclear Generating Station, reached a larger size in 2008 (when the plant was operating) than it did in the 1960s and 1970s before the plant was operating.

Section 7.1.2 Surfgrass and Eelgrass Beds

"Seagrass beds are critical near shore habitats for a variety of species because the beds serve as nursery grounds for many invertebrates and fishes. (Larkum et al. 2006)"

In order to fully inform the governing board and the public, it should be clarified that seagrass (*Phyllospadix*) and eelgrass (*Zostera* spp.) beds are very limited in their distribution in California due to the specific habitat requirements of each. We recommend adding the following: "However, seagrass and eelgrass have specific habitat requirements that generally limit their distribution in California."

Section 7.1.6 The Need for Special Considerations or Protections of Sensitive Habitats

"Eggs, larval organisms, and juvenile organisms are at the highest risk of entrainment at surface intakes. Most larval and juvenile organisms are not developed enough to swim and avoid entrainment and may be susceptible to entrainment through even small slot sized intake screens."

We recommend deleting the first sentence. The proposed policy has not yet defined by Section 7.1.6 what a "surface" intake is, but we presume it is an intake above the seafloor (i.e., such as a vertical riser or bulkhead intake). There is no known data to support the statement that eggs and larvae "are at the highest risk of entrainment at surface intakes". To our knowledge, there have been no published studies in California examining the biological effects (or potential effects) due to the operation of a subsurface intake. Fish and invertebrates that use the seafloor (such as gobies) could be more susceptible to entrainment/impingement depending on the intake design.

Section 7.2.1 Broadcast Spawners and Larval Recruitment

"Dispersal of larvae from spawning grounds occurs via ocean currents and the planktonic stage can be as short as a few days or as long as a month depending on the species, meaning larvae can travel many miles away from where they were originally spawned. (Strathmann 1993; Swearer et al. 1999)"

Larval duration—the period of time larvae can potentially be susceptible to entrainment—has exceeded one month. For example, the Probability of Mortality (P_M) for northern anchovy at the AES Huntington Beach Generating Station was estimated (based on the range of larval sizes and published growth rates) to be 38 days (MBC and Tenera 2005). We recommend changing "as long as a month" to "to more than one month".

Section 7.2.2 Fisheries in California

"Additionally, squid larvae have a high probability of entrainment through screened surface

intakes due to their small size. Consequently, squid nurseries should be protected from unnecessary environmental disturbances to ensure the sustainability of the market squid fishery."

Note that market squid fishery landings increased almost ten-fold--from 12,000 metric tons in 1977 to 119,000 metric tons in 2000—during which time cooling water flows from coastal power plants and wastewater discharges from POTWs increased. The market squid is managed under a fishery management plan that regulates the fishery, including among other restrictions the implementation of fishery closures to ensure uninterrupted spawning (Sweetnam 2007). The seasonal catch limit in California's Market Squid Fishery Management Plan (CDFG 2005) is 118,000 tons (236 million pounds). There are no population estimates available for market squid, but the fishery has been sustained for the last nine years under the limits of the Fishery Management Plan. We recommend deleting all discussion pertaining to the special status of market squid and their spawning areas.

The SED does not provide a reference for the statement in the SED *"…spawning grounds commonly occur within a few hundred meters of the same location year after year*" and on review appears to be a misstatement of work by Young et al. (2011). The actual wording in Young et al. (2011) is:

"… it is clear that while D. opalescens *do return to spawn in the same general area each year, the precise location (i.e. within a few hundred meters) of their egg laying within the well-known historical spawning area off of Monterey cannot be predicted in advance"* and *"Because they do not show a strong association with specific habitat features, we are unable to predict exactly where they will spawn each year"* (our emphasis). There is no mention of spawning site fidelity in the State Market Squid Fishery Management Plan (CDFG 2005) or the Coastal Pelagic Species Fishery Management Plan (PFMC 1998). We recommend deleting all discussion pertaining to the special status of market squid and their spawning areas.

The assertion that "*brine discharge associated with desalination facilities has the potential to significantly impact the viability and survivorship of squid offspring*" is unsupported and should be deleted. The statement is based on email communication without supporting evidence. If toxicity evaluation work has been conducted to support this claim the results should be presented, the protocols used need to be made available to evaluate methods and techniques, and statistical evaluation of multiple tests needs to be referenced to make a claim of "potentially significant impact". Yang, et al. (1986) were able to raise California market squid from eggs to successfully reproductive mature individuals in laboratory conditions in water that ranged in salinity from 34 to 37 ppt. This range is within the limits proposed by this amendment, suggesting that squid do not need special consideration for brine impacts at the levels proposed in the policy.

The citation for Hixon (1983) (p. 38) is not included in the References section. This citation should be added to the References.

The citation for Young (2011) (p. 38) should be "Young, et al. (2011)". This citation should be corrected.

Section 8.1 What Types of Facilities Should the Amendment Cover?

"Oil and gas refineries, pulp and paper mills, iron and steel manufacturers, and OTC facilities are well established in California and the number of these industrial facilities is not expected to increase dramatically in coming years. However, the number of desalination facilities in California is expected to more than double in the near future."

While the number of OTC facilities is not expected to increase dramatically in the coming years, the volume of cooling water used will be substantially reduced to comply with the State Water Resource Control Boards' OTC policy. Power plants at El Segundo, Redondo Beach, Long Beach, and Huntington Beach have all proposed compliance measures that eliminate the use of ocean water for cooling. It is therefore misleading to state that the number of facilities is not expected to increase with the knowledge that cooling water withdrawal and discharge will substantially decrease. We recommend modification as follows: "…and OTC facilities are well established in California and the number of these industrial facilities is not expected to increase dramatically in coming years. However, OTC use will be substantially reduced in the near future (10-15 years) as facilities comply with the State's OTC policy."

Section 8.1.2 Options

"Option 2 would result in clear and consistent application of the Amendment among all regions and facilities. However, there is not enough information about the types of impacts from all industrial facilities using seawater for cooling, heating, or industrial processing. There is a risk that the Amendment provisions would be inappropriately applied to non-desalination facilities in a way that could lead to unintended consequences for facility operations or ineffective regulatory controls. The Amendment may restrict specific needs or prohibit necessary steps in a facility's process. Given the currently available information, it would not be appropriate to broadly apply the Amendment to all facilities using seawater for cooling, heating, or industrial processing."

The justification for eliminating Option 2 is not clear. The State Board should be a little more open about what restricting specific needs or prohibiting necessary steps in a facility's process means. An example of the prohibition of "necessary steps in a facility's process" would be useful in determining why this option is not feasible.

Section 8.3 Should the State Water Board identify a preferred method of seawater intake?

"In 2005, coastal facilities in California withdrew approximately 12.5 billion gallons of seawater per day. More than 95 percent of that water was used for power plant cooling purposes, with the remainder used by other industrial sources such as desalination facilities. (Kenny et al. 2009)."

The authors (Kenny et al.) noted the level of precision in their estimates varied, and their listed sources (US Census Bureau, US Dept. of Agriculture, etc.) would probably not provide reliable estimates of actual cooling water used. The Regional Water Quality Control Boards require discharge volumes to be reported by coastal power plants; the State Board could gather that information and compile it for a more accurate estimate of cooling water use.

"The OTC Policy establishes a technology-based standard for power plants, allows for no impingement, and requires a 93 percent reduction of the intake flow rate."

The State's OTC Policy allows for impingement. The policy requires reduction in the intake velocity to 0.5 feet per second, which is presumed to lower impingement. To accurately and completely inform the Board and the public, the phrase "allows for no impingement" should be replaced with "requires an intake velocity of 0.5 feet per second or less, or a reduction in impingement" to a level that could be achieved through conversion to a closed-cycle cooling system. However, there is no scientific information presented in the policy to indicate that a reduction in velocity to 0.5 feet per second would reduce (or eliminate) impingement. In EPA's Phase II regulations, they state: *"As discussed in that notice, EPA compiled data from three swim speed studies (University of Washington study, Turnpenny, and EPRI) and these data indicated*

that a 0.5 ft/s velocity would protect at least 96 percent of the tested fish. As further discussed, EPA also identified federal documents (Boreman, DCN 1–5003–PR; Bell (1990); and National Marine Fisheries Service (NMFS), (1997)), an early swim speed and endurance study performed by Sonnichsen et al. (1973), and fish screen velocity criteria that are consistent with this approach." The proposed policy does not indicate if any of the species in these three studies are from the West Coast, or if the data are applicable to fish species in California. The Board should determine if the swim speed studies used as the basis for this requirement were derived from any species in California, and if not, why the species used are applicable.

Section 8.3.1.1 Effects of surface water intakes on the intake and mortality of marine life

"Construction-related intake and mortality of marine life is relatively limited, and can be minimized if construction occurs away from sensitive habitats and areas of high habitat productivity."

This section does not identify what the components of a surface intake include, how they would be constructed, over what time frame they would be constructed and the types of "marine life" considered in the State's analysis.

"During 2000 to 2005, power plants in California annually entrained on average 19.4 billion fish larvae with estimated intakes of 78-2,670 MGD. (SWRCB 2010)…. During the same time period, approximately 2.7 million fish (84,250 pounds) annually were impinged at power plants, along with a number of marine mammals and sea turtles. (SWRCB 2010)"

These estimates are now 9 to 14 years old. With the retirement of San Onofre Nuclear Generating Station Units 2 and 3, it is likely impingement and entrainment are substantially lower. For instance, SWRCB (2010) reported that San Onofre accounted for roughly 40% of the estimated impingement abundance and 31% of the impingement biomass. Likewise, entrainment at San Onofre represented about one-third of the state-wide estimate. However, both Units 2 and 3 have since been retired from service. Three of the four units at El Segundo Generating Station have also been retired. Therefore, the estimates listed in the proposed policy are misleading and do not represent current conditions. We recommend adding the following sentence above: "However, these estimates are now 9–14 years old, and many of the generating units have since been removed from service or retired, including the two units at San Onofre, which accounted for roughly 40% of the state-wide impingement and about one-third of the state-wide entrainment."

The entrainment and impingement estimates should also be placed into context. Nineteen billion fish larvae seems like a large number, but a single female California halibut (*Paralichthys californicus*) can produce more the 50 million eggs per year, and captive females can spawn 13 times per season (which would be equivalent to 650 million eggs, so only 30 individuals could potentially produce more than 19 billion eggs in a single year). Likewise, the 84,000 pounds of fish impinged is a small percentage of the commercial fish landed in California. In 2012 alone, there was almost 353 million pounds of fish/invertebrates landed commercially in California (more than 4,000 times higher than the statewide impingement).

Section 8.3.1.2 Approaches to Reduce Impingement and Entrainment at Surface Water Intakes

"There are numerous technologies that can help reduce or avoid impingement and entrainment of marine life, including intake structure design, configuration of screening systems, passive intake systems, and fish diversion and avoidance technologies. (U.S. EPA 1976)."

This statement is correct. However, the document cited from 1976 is outdated, and was updated as part of EPA's §316(b) Phase I and Phase II regulation processes. The performance/efficacy and feasibility information in the 2004 document would be more applicable. The 2004 Technical Development Document can be viewed online at: http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Cooling-Water_Phase-2_TDD_2004.pdf .

Section 8.3.1.2.2 Reducing Through-Screen Intake Flow Velocity

"Based on many swim speed studies, the State Water Board's OTC Policy also requires that through-screen velocities must be limited to 0.5 ft/s (0.15 m/s) or less for existing power plant seawater or estuarine water intakes in order to reduce impingement mortality."

EPA's 0.5 feet per second criteria was indeed based on available information regarding swimming speed of fishes. However, it is not clear if any of the species included in that analysis occurs in California. The State's OTC Policy mirrored the EPA criterion of 0.5 feet per second, but it was not based on any relevant swimming speed data. The State's OTC Policy explains "*The 0.5 ft/sec threshold is based on numerous swim speed studies and has been used in several federal regulations, including the Phase I rule.*" There is no evidence that reducing intake velocity to 0.5 feet per second would reduce or eliminate impingement mortality. We recommend deleting "Based on many swim speed studies,".

Section 8.3.1.2.3 Installing Intake Screens

"While fine-meshed screens can reduce entrainment of adult and juvenile fish, they still allow phytoplankton, zooplankton, eggs, and fish and invertebrate larvae to pass through."

Fine-meshed screens would eliminate entrainment of adult and juvenile fish; these fish would be impinged. However, fine-meshed screens can be equipped with mesh as fine as 0.5-mm, which could retain most larvae at some facilities. We recommend modifying the sentence as follows: "While fine-meshed screens can reduce entrainment, they still allow some phytoplankton, zooplankton, and ichthyoplankton to pass through."

"*The only pilot study that has implemented wedgewire screens on an intake is at West Basin Municipal Water District's (WBMWD) pilot desalination facility. (Tenera Environmental 2013b)"*

Wedgewire screens were also tested at the scwd2 (San Cruz Water Dept. and Soquel Creek Water District) intake site. Results can be viewed online at: http://scwd2desal.org/documents/Draft_EIR/Appendices/AppendixG.pdf

The section on wedgewire screens is fairly long, lists a lot of information from studies, and concludes with the following statement "*Consequently, there is only an approximate one percent reduction in entrainment mortality between screened and unscreened intakes. (Foster et al. 2013)*" This is in disagreement with Table 2 of Appendix 3 (Desalination Plant Intake Review) in Foster et al. (2013); the calculated reduction in Age-1 equivalents from use of 1-mm wedgewire in southern California was 75% for northern anchovy and 40% for CIQ gobies.

"Section 13142.5(b) requires that the Ocean Plan consider all forms of marine life, regardless of size. Subsurface intakes are more protective of marine life than surface water intakes." There is no data to justify this statement. "Marine life" presumably includes organisms living on the seafloor (epibenthos), in the seafloor (benthos), and the organisms that rely on the benthic and epibenthic community. In order to make a comparative statement regarding the effects of subsurface intakes versus other types of intakes, the State Board must provide some analysis of

the types of reasonably foreseeable environmental effects associated with each. In the absence of this, it cannot be concluded that "*subsurface intakes are more protective of marine life than surface water intakes*." Before reaching this conclusion, the Board should consider the range of effects associated with subsurface intake structures, including:

- Construction-related impacts, such as habitat disturbance, effects to water quality such as increased turbidity and suspension of contaminants, visual impacts, and increased air emissions, and
- Operational impacts, such as habitat modifications and changes in benthic/epibenthic biological communities, and the associated larval production from those communities..

Section 8.3.1.2.4 Velocity Caps

The section on velocity caps summarizes some of the data available, including data from the 1950s, but omits the results of a comprehensive study of velocity cap effectiveness at Scattergood Generating Station (Los Angeles County). The study can be viewed online at: http://www.waterboards.ca.gov/losangeles/water_issues/programs/power_plants/scattergood/08_0128/Velocity_Cap_Report.pdf

Section 8.3.2 Subsurface Intakes

"Beach galleries specifically have design potential for large scale facilities, and have been demonstrated to be able handle large volumes of water. (Missimer et al. 2013)"

What is a "large volume"? This should be explained further.

This section should also discuss intake water quality as a factor in the decision process for subsurface intakes. Legacy pollutants, high oxygen demand, or naturally occurring mineral constituents could make subsurface water difficult or expensive to treat.

Section 8.3.2.1.2 Slant Wells

"Like vertical intake wells, the wellheads of slat wells are generally buried in a vault beneath the ground to maintain shoreline aesthetics."

The reference to "slat" well should be "slant" well.

Section 8.3.2.1.4 Infiltration Galleries

The decision to utilize engineered sediments should include a discussion on possible changes to the benthic and epibenthic communities based on changes in sediment grain size as a result of the construction (and subsequent operation). Benthic community assemblages are reflective of the substrate in which they live (Johnson, 1970, Gray 1974). Usually, coarse sediments support smaller and less diverse infaunal communities than do finer sediments (Barnard 1963). Also the decision process should include an evaluation of local littoral cells and known regional sediment movement (longshore drift), including nearby dredging and beach replenishment projects. Based on these it should be possible to estimate maintenance requirements to determine the potential frequency of disturbance to the benthic and epibenthic communities.

Section 8.3.4 Options

The State Board is recommending Option 3, requiring subsurface intakes unless deemed infeasible. Option 3 is recommended without any analysis (general or specific) of the types of impacts associated with installation and operation of subsurface intakes. For example, a surface intake could be installed on an existing cooling water intake riser, thereby limiting any effects to seafloor habitat. However, installation of a subsurface intake could disrupt dozens (or hundreds) of acres of seafloor during construction and during maintenance.

While Option 3 allows surface intakes if subsurface intake is not feasible, it does not include a provision on the decision and constraints to locating land-based operations. These could be considerable and should be addressed here. Otherwise this option could result in a de-facto adoption of Option 2, requiring subsurface intake in all cases, by saying that the facility needs to be relocated to an area where subsurface intakes are feasible since they are considered here to be inherently superior (BTA). The onshore constraints for a desalination plant could be considerable, such as:

- Land availability,
- Zoning,
- Access to nearby utilities, and
- Access to water transmission lines.

Based on the information presented in the SED, and on our knowledge of the marine biological resources, Option 1 is the superior option. As summarized earlier in our comments to Section 8.3.1.2.3, wedgewire screens were calculated to be considerably effective in reducing entrainment of fishes, and can be designed to eliminate impingement if they are properly maintained. Environmental impacts during installation of wedgewire screens at existing power plants would likely be much lower than those associated with the installation of subsurface intakes, and wedgewire screens would not substantially alter the seafloor.

The State Board is also recommending the requirement of a single maximum slot size. I would refer the State Board back to the section Installing Intake Screens – the effectiveness of screens depends on the size distribution of the organisms at risk of entrainment. The State could recommend 1.0-mm slot size as the maximum, but what if an entrainment study shows that 2.0-mm would reduce entrainment to some acceptable level, and reduce cost considerably?

Section 8.4.1 U.S. EPA Phase I Rule

It should be clarified that this section refers to the ”Clean Water Act §316(b)” Phase I Rule.

Section 8.4.2 Surface and Subsurface Considerations

“Subsurface intakes typically have greater construction-related effects but negligible intake-related mortality. (Missimer et al. 2013; Hogan 2008; Pankratz 2004; Water Research Foundation 2011)”

This is the first place in the document that the scale of effects from subsurface intakes is discussed.

“For example, construction may take two years, but the facility will be operational for 30 years and the marine life mortality associated with the construction of subsurface intakes will be for a short

duration relative to intake-related mortality that would occur at surface intakes as long as a facility is operating."

This does not consider or mention the operation and maintenance activities associated with subsurface intakes.

The Fukuoka desalination facility in Japan uses a subsurface intake that has an area of 217,330 ft^2 (approximately five acres) (proposed policy p. 57). The installation of this intake may have substantially reduced or eliminated the potential for entrainment and impingement, but installation of a similar intake in southern California could permanently alter the seafloor habitat through changes in sediment particle size, which could subsequently alter the benthic and epibenthic community. This would affect production, yet this was not considered by the State Board in their proposed policy. The five-acre intake at Fukuoka can withdraw up to 13 million gallons per day (mgd). Therefore, approximately 40 acres of seafloor would be required for a comparable facility that could withdraw up to 100 mgd. For comparison, the size of the intake riser at the Huntington Beach Generating Station is 336 ft^2 (0.0077 acres).

Section 8.4.3 Siting of Discharges

"Discharge at sites with high advection and ambient mixing will increase dilution, and may be more protective of the surrounding environment. Conversely, siting a brine discharge near a bathymetric depression can result in the formation of a dense anoxic layer that smothers marine life on the sea floor. (Roberts et al. 2012)"

The potential for anoxia and smothering of marine life is unlikely and overstated. Roberts et al. (2012) described the effects of the shoreline discharge of a dense, undiluted concentrate discharge within a bay on the Gulf Coast. They also stated: ***"****Other far field bathymetric features to be avoided for the siting of a negatively buoyant brine discharge are bathymetric depressions (hollows). <u>These are not generally features found along the exposed open coast of California</u>, but can be common in embayments, either from natural shoaling effects or from man-induced activities such as the dredging of navigation channels and berthing areas,"* and *"<u>This is unlikely to occur with a well-designed discharge, however</u>"* (our emphasis). The precautionary inclusion of this information is appropriate, including the statement: *Depending on the mixing rates with ambient waters outside of the density layer, the dissolved oxygen (DO) supply to the density layer may not meet the net oxygen demand of the benthic fauna within the layer. In this case, DO will decrease over time and, if the layer persists long enough, hypoxia or anoxia within the bottom layer can produce lethal effects in the far field well away from the discharge*. However, the wording "*smothers marine life on the sea floor*" was not included in the original report. We recommend deleting the sentence that begins with "Conversely,".

Sections 7.2 Marine Biodiversity and 8.4.5 Sensitive Species and Habitats

California's diverse habitats support complex ecosystems with high species diversity. These biologically diverse species are extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy (discussed further in section 7.2.2). A sample of the algal, invertebrate, and fish diversity is provided in Appendix C. Some of the species in Appendix C may be sensitive species, which are species that can only live in a narrow range of environmental conditions. The presence of sensitive species can be used as an indicator of a healthy ecosystem and the absence may be an indicator of environmental changes. The types of sensitive species will vary among biogeographic regions in California and with habitats. Section 12 discusses state and federally listed threatened or endangered species that are also of interest when siting and designing a desalination facility.

Appendix C does not include any fish. *Table C-3. Life History Information for Selected California Marine Fishes* repeats the information presented in *Table C-2. Life History Information for Selected California Marine Invertebrates.* This should be corrected.

In addition, the definition of sensitive species utilized in the SED is extremely narrow, without reference, and to the extent we can determine, incorrectly presented:

Section 7.2*: "Some of the species in Appendix C may be sensitive species, which are species that can only live in a narrow range of environmental conditions. The presence of sensitive species can be used as an indicator of a healthy ecosystem and the absence may be an indicator of environmental changes. The types of sensitive species will vary among biogeographic regions in California and with habitats."*

And later:

Section 8.4.5*: "Sensitive species are organisms that can only survive within a narrow range of environmental conditions. The absence of sensitive species in an area can be used an indicator of pollution or change from the "natural" environmental conditions*."

It appears that this definition was incorrectly quoted from an online information source *Biology Online* (http://www.biology-online.org/dictionary/Sensitive_species). This quote is:

"Sensitive species

sensitive species

(Science: ecology, zoology) species that can only survive within a narrow range of environmental conditions and whose disappearance from an area is an index of pollution or other environmental change."

An essential difference here is that in the case of the source quote, it is implied that the *disappearance* of a species previously known to occur in an area is an indicator of impairment or change, not the mere *absence* of *any* species designated as sensitive in an area. Still this definition of sensitive species is too narrow.

The California Department of Fish and Wildlife maintains a list of "Special Animals" with the California Natural Diversity Database (CNDDB; http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf). According to the list ""*Special Animals" is a general term that refers to all of the taxa the CNDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of "species at risk" or "special status species". The Department of Fish and Game considers the taxa on this list to be those of greatest conservation need.*

The species on this list generally fall into one or more of the following categories:

- *Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts.*
- *State or Federal candidate for possible listing.*
- *Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act Guidelines.*
- *Taxa considered by the Department to be a Species of Special Concern (SSC)*
- *Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have a critical, vulnerable stage in their life cycle that warrants monitoring.*

- *There may be taxa that fall into this category but are not included on this list because their status has not been called to our attention.*
- *Populations in California that may be on the periphery of a taxon's range, but are threatened with extirpation in California.*"

Similar lists for plants are also available. This definition of "special" is essentially equivalent to the more typically used term "sensitive" as referenced in the SED. As can be seen above, inclusion on the list is considerably more comprehensive than the definition presented in the SED. Utilizing the absence of any sensitive species at a locale as an indication of impairment at that location is not appropriate.

To address the several concerns we recommend that the paragraph above from Section 7.2 be modified to:

California's diverse habitats support complex ecosystems with high species diversity. These biologically diverse species are extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy (discussed further in section 7.2.2). Life history information for selected California marine species is provided in Appendix C, which includes some sensitive species. Section 12 discusses state and federally listed threatened or endangered species that are also of interest when siting and designing a desalination facility.

We also recommend that the sentences "*Sensitive species are organisms that can only survive within a narrow range of environmental conditions. The absence of sensitive species in an area can be used an indicator of pollution or change from the "natural" environmental conditions"* from Section 8.4.5 be deleted.

Section 8.4.6 Co-Location

"The use of the power plant's cooling water discharge does not result in incremental marine life mortality because any organism in the cooling water is presumably already dead due to the use of the water within the power plant."

This is incorrect. Entrainment survival studies have demonstrated survival of ichthyoplankton, zooplankton, and phytoplankton after passage through once-through cooling water systems (see http://carlsbaddesal.com/Websites/carlsbaddesal/images/eir/Tenera.pdf). While survival of ichthyoplankton may be low, it is probably not 0%. In the entrainment study for the Carlsbad Desalination Project, entrainment survival ranged from 0% to 9%, and averaged 2.4%. At Scattergood Generating Station, thermal/mechanical stresses due to passage through the once-through cooling water system in winter resulted in an initial survival of 91% and a latent survival of 67% for adults of the copepod *Acartia* spp. (IRC 1981). In summer, survival of *Acartia* was 95%. We recommend the following wording: "*The use of the power plant's cooling water discharge would result in some incremental marine life mortality because some organisms survive transit through power plant cooling water systems. The survival rate varies by organism type and species, but ichthyoplankton survival is generally very low."*

Section 8.4.8 Options

Option 3: *"All other things being equal, locations where subsurface intakes are feasible would be considered the best because subsurface intakes do not impinge or entrain marine life. Desalination facilities could be sited at locations where subsurface intakes are infeasible as long as the regional water board determines it is otherwise the best site and in combination with the*

best design, technology and mitigation measures results in the least amount of marine life intake and mortality."

This makes no mention of potential effects from brine discharge. While co-location may employ a surface intake, it could also result in increased dilution with effluent streams (potentially from wastewater dischargers). The policy presumes co-location is with power plants, but it could also occur at wastewater treatment or reclamation facilities.

Section 8.5 Should the State Water Board provide direction in the Ocean Plan on mitigating for desalination-related impacts?

"Section 13142.5(b) (see section 8.1.1 of this staff report) requires an owner or operator of a new or expanded facility to mitigate for all intake and mortality of marine life, including mortality associated with facility's construction, intakes, and discharges."

That is the State Board's interpretation of Section 13142.5(b), which requires using "feasible" measures to "minimize" and "mitigate". Section 13142.5(b) states:

"For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."

The State Board should reference Section 13142.5(b) as it is written, not according to its interpretation.

Section 8.5.1 Marine Life Mortality Assessment

AEL and FH

"AEL and FH place a higher value on larger and older fish because older individuals have lower mortality rates than younger fish and consequently a higher probability of reaching reproductive maturity and reproducing."

This is poorly worded. AEL and FH do not "place values" on fish. They convert the numbers of eggs and/or larvae into numbers of equivalent adults or reproductive females. One of the advantages of AEL and FH is putting larval loss estimates into the context of numbers of adult fish. The end product can be the number of Age-1 equivalents, in which case the entrainment of a five-year-old fish (for example only) could equal several Age-1 equivalents. In contrast, entrainment of a 4-day-old larva could be equivalent to 0.05 Age-1 equivalents. The general public could benefit from knowing if the loss of several million larvae from a single species was equal to two adult fish or 200,000 adult fish. We recommend changing the wording to: "AEL and FH are commonly used to convert the numbers of eggs and/or larvae into numbers of equivalent adults (AEL) or the number of adult females whose reproductive output was eliminated by entrainment (FH)."

"AEL and FH discount the importance of the younger, smaller fish from a population standpoint and the methods do not assess the indirect impacts of the entrained organisms."

See response above. We recommend deleting this sentence.

"The loss of younger, smaller fish may seem inconsequential from a population standpoint because they have high natural mortality rates; however, AEL and FH do not quantify the loss of organisms from an ecosystem standpoint and how they."

This incomplete sentence does not make sense. We recommend deleting this sentence.

ETM/APF

"A key assumption in the APF method is that the production forgone for a subset of species is a representative sample of all species present at that location, even those that are not directly measured."

This is not a key assumption of the APF. This is how APF has been applied at power plant and desalination siting cases in California for the past 10 years, but it is not part of the actual method. The APF used for mitigation could be the highest value instead of the average. We recommend revising this sentence to: "*A key assumption in how the APF method has been applied to date in California is that the production forgone for a subset of species is a representative sample of all species present at that location, even those that are not directly measured."*

There is also no discussion regarding the type of habitat to be created.

"The creation of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model."

This statement uses the term "creation of habitat" instead of "restoration of habitat", and the two are not the same. This could imply the State Board will not consider the restoration of one acre to be equivalent to the creation of one acre. Restoration of habitat also needs to consider the organisms to be replaced. That is, restoration of wetlands will do little to directly replace the loss of coastal fish taxa, such as anchovies and croakers, but it will produce species such as gobies. It will also provide additional out-of-kind benefits, such as improvements to water quality, habitats for threatened and endangered species, and recreational opportunities. We recommend changing "creation of habitat" to "creation and restoration of habitat".

Section 8.5.1.2 Discharge-related Mortality

"To date, there is no empirical data showing the level of mortality caused by multiport diffusers. Foster et al. (2013) hypothesized that the actual level of mortality associated with multiport diffusers was very low, in part because the exposure time to organisms was very low. However, until additional data is available, we assume that larvae in 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence. The actual percentage of killed organisms will likely change as more desalination facilities are built and more studies emerge. Future revisions or updates to the Ocean Plan may reflect additional data that becomes available."

The State Board has no data on discharge-related mortality, but is assuming 23 percent mortality based on Foster et al. (2013). See Philip J. Roberts' comments on the Tenera report (in Foster et al. [2013]):

- Only 23-38% of the larvae in this water would likely be affected and only for short times;
- Although the exit velocity in the jets is quite high, this velocity attenuates rapidly with distance from the diffuser to near background level within a few meters.

- Any larvae entrained into the jets will travel along the jet axis and eventually be expelled; at most, they will be exposed to high turbulence levels for tens of seconds. Most larvae will only be exposed to low turbulence levels. The smallest scales of this turbulence are generally smaller than the smallest organisms, suggesting little effect.
- These have been extensively monitored, and show little environmental impact within a few tens of meters from the diffuser. It is not clear why Tenera did not include actual experience with brine diffusers in their report.
- While it is true that some damage to larvae may occur due to turbulence in the diffuser jets, it is probable that only a small fraction of those entrained will be subject to damaging levels and for durations long enough to cause significant impact.

In the absence of reliable estimates of potential mortality associated with diffuser discharges, the State Board should not impose their "best guess" as a regulatory requirement. If the State Board is requiring studies to determine entrainment estimates, then it should require some scientifically valid estimate of discharge-related mortality in lieu of the 2.0-ppt area/volume estimation.

"However, the volume of water susceptible to high shear stress should always be less than the volume of water where salinity exceeds 2.0 ppt above natural background salinity. Thus, shearing-related mortality would only occur within the area that exceeds 2.0 ppt above natural background salinity, and mitigating an area equivalent to the area that exceeds 2.0 ppt above natural background salinity would also compensate for shearing-related mortality."

There is no reference or justification for the 2 ppt assertion. If the State Board does not have a scientific basis for this requirement, then it should be included in study requirements of the facility owner/operator.

Section 8.5.2.2 Discharge-related Mortality

See response to Section 8.5.1.2. The comparison of larval mortality potential within a diffuser plume to a mortality assessment of 100% for water used for in-plant dilution was not included in this section of the SED.

Section 8.5.4 Adding Certainty to Mitigation Projects

Care should be taken when analyzing entrainment/source water data. We recommend deleting the requirement for analysis of confidence intervals. There are several other important steps to consider before reaching this step, such as: which species to analyze, how source waters will be calculated, how larval duration will be calculated, etc. In addition, there are questions to ask when applying APF estimates to a mitigation project, including the compatibility of habitat types.

Section 8.5.6 Options

"Because it does not provide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters."

This sentence is incomplete.

"Intake-related impacts would be assessed using an ETM/APF approach and the final APF would be calculated using a 90 percent confidence level. Although a 90th percentile confidence interval may appear to require a very high level of statistical certainty, the confidence level is less than other types of current Board requirements (e.g. Instream Flow Policy, cleanup standards). In

practice, the amount of additional acreage needed for a 90th percentile confidence level is relatively low in comparison to the total size of a mitigation project."

In 2011, Dr. Peter Raimondi prepared a report for the CEC entitled "VARIATION IN ENTRAINMENT IMPACT ESTIMATIONS BASED ON DIFFERENT MEASURES OF ACCEPTABLE UNCERTAINTY", available online at: http://www.energy.ca.gov/2011publications/CEC-500-2011-020/CEC-500-2011-020.pdf . In this report, he illustrates several examples of using different confidence intervals in calculating restoration. Based on the examples provided in that report, if the 90% confidence interval was used instead of the mean (50%) confidence interval (note: these numbers are estimated because raw data were not included, only illustrations), estimated mitigation projects could potentially triple in size. While this is dependent on the use of mean density versus species-specific density, and mean larval duration versus species-specific larval duration, mitigation may not always be "relatively low". Statistical outliers (anomalous data points) can greatly affect the confidence intervals. We recommend deleting references to the 90 percent confidence interval.

"Discharge-related impacts would be estimated by determining the area or volume in which salinity exceeds 2.0 ppt above natural background salinity (or an alternative facility-specific alternative receiving water limit)."

As stated before, there is no basis for the 2.0 ppt limit.

Section 8.6.2.2.1 Marine Life Entrainment at Multiport Diffusers

"Multiport diffusers are designed to increase turbulent mixing (Roberts et al. 1997) and as a result, organisms that are entrained into the brine discharge may experience high levels of shear stress for short durations, which is thought to cause some mortality."

The State Board is considering high-velocity multiport diffusers to facilitate mixing and dispersion. However, if shear stress is such an issue, why not consider low-velocity multiport diffusers that would minimize shear stress and still provide mixing. It would require more ports and a larger area, but why limit the discussion?

Section 8.7.1 Background: Effects of Saline Discharges on the Marine Environment.

In reference to Roberts et al. (2012), the SED states "*that the Panel reviewed scientific literature that addressed impacts of elevated salinity on marine organisms and found that most marine organisms started to show signs of stress when salinity was elevated by 2 to 3 ppt…*". This is an overstatement of the Panel's conclusions which is worded as *"…based on existing information, a salinity increase of no more than 2 to 3 ppt in the receiving waters around the discharge appears to be protective of marine biota*" (our emphasis).

8.7.2 Natural Background Salinity

Natural background salinity should be evaluated for each facility by averaging historical salinity data at the proposed facility location from at least 20 years prior. When historical data are not available, natural background salinity should be determined by measuring salinity at the depth of the proposed discharge for several years at relatively high frequency. Background salinity should be determined prior to discharging brine in order to best establish natural conditions.

If "natural background salinity" is to be measured, it should be measured at the location *and depth* of the proposed discharge. We would also suggest that the salinity of a reference location

of similar depth and bathymetric characteristics be established outside of the area of potential influence of the discharge to determine similarity of salinity characteristics for comparison after initiation of discharge. A 20-year data set of salinity at depth at the discharge location is not practical. Instead we suggest that long-term data be acquired from the nearest location(s) where the bottom salinity data is available for the period required. The Shore Station Program (http://shorestation.ucsd.edu/) would be a suggestion for one source of data, but there are others. Intensive sampling over a relatively short period of time of at least one year is sufficient to make meaningful comparisons of local salinity characteristic to those at established monitoring stations.

We recommend that the paragraph be reworded: "*Natural background salinity should be evaluated for each facility by averaging historical salinity data from the nearest available source of long-term salinity data (preferably 20 years prior). High frequency salinity testing at the proposed location and depth of the discharge, and at a nearby reference site expected to be outside of the area of influence of the proposed discharge, should occur over a one-year period. Comparison of this data between sites and to the historical data source will allow for the determination of natural background salinity in the project area and establish a site for later comparison and determination of naturally occurring variability."*

Section 8.7.5 Options

"Using laboratory or farm raised animals increases the accuracy and reproducibility of the studies. Wild-caught species will have different levels of physical fitness, which can result in inconsistencies in the toxicity test results. If toxicity tests are run on wild species any differences detected may be a result of environmental variability and not actual differences. There is a high probability toxicity studies on wild caught species will result in inconclusive results."

We note that one of the species required for toxicity testing (giant kelp [*M. pyrifera*]) is presently not raised in a lab due to its size. Instead, giant kelp is harvested by individuals with proper permits, and sold to laboratories for testing. Our ELAP-certified laboratory runs toxicity tests on this species on a regular basis. It should be clarified that giant kelp can be "wild caught". We recommend adding the sentence: "When possible, toxicity test organisms should be laboratory- or farm-raised; however, these organisms may not always be available."

There is an inconsistency to the approach to defining the maximum salinity limits in these options. Options 2, 3, and 4 utilize a maximum salinity limit of 2 ppt at the edge of the ZID, while Option 5 references a limit 3 ppt as being protective. Option 6 includes a reference to a range of 1.7 to 3 ppt, again stating the 3 ppt limit would be protective based on the Expert Review Panel. Since the limit of 3 ppt is justified as being protective for some of the options it is suggested that the 3 ppt limit be accepted for all options.

We recommend that the limit of 3 ppt be utilized for all options.

Section 12.1.4 Biological Resources

"Surface and Subsurface intake construction related impacts are compared in section 8.4.2 describing that although subsurface intakes could potentially have more construction related impacts, the construction period is much shorter and much less severe to the long term operation impacts caused by surface water intakes."

The State Board never describes (even conceptually) the types of organisms, numbers of organisms, area or type of habitat that could be affected during construction, operation, and maintenance of a subsurface intake system.

"Although the analysis for the four facilities described above results in few significant impacts, it is unlikely that all future facilities would result in similar impacts to biological resources for the following reasons. The abundance and distribution of state and federally listed marine and terrestrial threatened and endangered species vary significantly throughout the coast. Further, critical habitat designated for federally listed species and Essential Fish Habitat designated for fisheries management encompass significant portions of California's nearshore marine waters. In addition, entrainment studies conducted for the Huntington Beach and Marin facilities indicated that fish and invertebrates are entrained by surface water intakes. While these studies concluded that the observed entrainment would have a less than significant impact, it cannot be concluded that all future facilities will also result in no impact on the sustainability of local species, or the recovery and propagation of state and federally listed species. Further, the limited research conducted by the four proponents considered in this analysis did not attempt to evaluate potential impacts to the food web."

The State Board should consider the results of the Cumulative Impacts Study prepared as a Conditions of Certification for the AES HBGS Retool Project (MBC and Tenera 2005). The Cumulative Impacts Study analyzed impingement and entrainment impacts from the coastal power plants in southern California. The cumulative mortality due to entrainment ranged between 0 and 2% depending on location and larval duration. It should be noted that the estimates were calculated using the maximum permitted flow volumes of 13 power plants. Due to facility retirement (Long Beach, South Bay, and San Onofre) and repowering projects (El Segundo 1&2, Haynes 3-6), the flow volume has likely been reduced by 40%. In addition, the effects from some of the projects (San Onofre and Huntington Beach 3&4) were mitigated with agency oversight.

Based on the information presented by the State Board, and on our extensive studies with California's nearshore marine biological communities, surface intakes (if properly sited, constructed, and maintained) could minimize environmental impacts without large-scale, long-term impacts to biological communities associated with the seafloor and/or beaches. Without an example of what a likely or preferred subsurface intake would look like, the most likely comparison is that of the Fukuoka plant in Japan; a similar intake would alter 40 acres of seafloor to withdraw 100 mgd. The SED did not provide a any estimate of the area of seafloor disturbed due to construction of wedgewire; however, we can only conclude it would be much less. For example, it was estimated that 20 wedgewire screens would be required for approximately 500 mgd of cooling water at the AES Huntington Beach Generating Station (EPRI 2008). Each screen would be supported to the cooling water pipe by a 7-foot-diameter riser. Even if there were still 20 screens for a 100-mgd desalination facility, the footprint of the risers would only be about 770 ft^2 (or about 1.8 acres). Assuming a linear reduction between intake flow and screen area, the estimated footprint would be one-fifth of that, or 0.35 acres (more than 110 times smaller than the area required for a subsurface intake).

Comments on the Draft Amendment

L.2.5.b.(2). "…*that avoid impacts to sensitive habitats"* and sensitive species." The definition of sensitive habitats includes "market squid nurseries". Market squid spawn in waters from 3 to 180 m deep, but primarily at 15 m (MBC 1986). The definition of market squid nursery has been misconstrued and is incorrect (see comments above to Section 7.2.2). Squid do not necessarily return to the same areas to spawn. The way nursery is defined, any place where squid spawn could be classified as a nursery. We recommend deleting references to market squid nurseries and their designation as a special habitat.

L.2.d.1.(a).i In the consideration of criteria for determining feasibility of subsurface intakes, we would recommend the following additions: source water quality, impacts to benthic and epibenthic communities, habitat replacement, and littoral cell characteristics.

L.2.d.1.(c).ii It is unclear why the State Board is picking a slot size but has not yet presented any data on effectiveness of slot sizes (which will vary by location, season, etc.). The State Board should consider the trade-offs between slot size and affected habitat. For instance, for any given intake, reducing the slot size will require an increase in the surface area to maintain a low through-screen velocity (i.e., narrower slots require more surface area to achieve the same through-screen velocity). Therefore, there would be an incremental amount of seafloor habitat affected by requiring a smaller slot compared to a larger slot. Because the flow requirements (and marine life affected) will vary from site to site, the State Board should not require any particular slot size.

L.2.d.1.(c).iii "*An owner or operator may use an alternative method of preventing entrainment so long as the alternative method provides equivalent protection of eggs, larvae, and juvenile organisms as is provided by…."* This should be limited to fish, not all marine organisms. Otherwise, this would encompass all plankton. The requirement for 36 consecutive months of data is also excessive. The use of the *ETM* model accounts for year-to-year variability in larval densities.

L.2.d.1.(d) The justification for a through-screen velocity of 0.5 fps is not clear (see comments to Section 8.3).

L.2.d.2.(b) Multiport diffusers are to be engineered to "maximize dilution…and minimize marine life mortality." However, based on the information presented, the maximum dilution occurs at high jet velocity, which increases mortality.

L.2.d.2.(c) The term "marine life" is used in this section, and is not defined.

L.2.d.2.(d) The policy requires evaluation of "*all of the individual and cumulative effects of the proposed alternative discharge method on marine life mortality, including (Where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge."* Note that it may not be possible to parse out the contribution of different stresses to organism death. If we collected plankton in the field, how would one identify if the organism died from osmotic stress, turbulence during mixing, or shear stress? We recommend deleting the reference to individual effects.

L.2.d.2.(e).iv This process was <u>not</u> discussed in the Staff Report/SED. The option recommended by Staff allows for flexibility in design-based and site-specific constraints. If mitigation is based on flow augmentation, discharge impacts should be properly offset.

L.2.e.(1).a Thirty-six months is excessive for an entrainment study. The use of the *ETM* model accounts for year-to-year variability in larval densities. A study period of 12 to 24 months would be sufficient. The use of 200-micron mesh for "a broader characterization" is also excessive and this requirement should be deleted. The State Board staff attempted to include this into the Once-through Cooling Water Policy. We also recommend deleting references to the use of the 90 percent confidence interval (CI).

L.2.e.(1).b This section sets a salinity threshold of +2 ppt above background salinity. However, Roberts et al. (2013) recommended an increase of "no more than 2 to 3 ppt". This section requires use of "any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge" (?).

We recommend that the limit of 3 ppt be utilized.

L.2.e.3.b.ii **"***The owner or operator shall do modeling to evaluate the areal extent of the mitigation project's production area* to confirm that it overlaps the facility's source water body.* Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project."*

This language should be deleted. Here the State Board is (1) requiring evaluation of the mitigation project's "production area" , (2) requiring this area to overlap the source water body, and then (3) penalizing a facility for subsequent entrainment impacts. The alongshore length of the source water at the HBGS (for one species) extended about 85 km (53 miles). First, the term "production area" is not defined. Second, if the source water overlaps with the area that larvae from the mitigation site are ultimately transported to, the owner/operator should not be penalized for potential entrainment. This could be a never-ending cycle of penalization, as some percentage from each incremental offset could be entrained. It is not possible to determine where the true source of larvae are – for facilities on the open coast, the calculation of larval duration (the period of time larvae are exposed to entrainment) used in conjunction with ocean current data allow the determination of a length the larvae could have traveled. However, due to the complexity of ocean currents, the confidence in determining an actual source "point" would be low. Recently, high-frequency radar (CODAR) has been used to measure surface currents during source water studies, but we have not seen any data regarding the accuracy of this method. CODAR data may not be available for some areas of California. In addition, at HBGS a large fraction of the larvae entrained may not have originated in the nearshore waters, but instead were likely exported out of bays, estuaries, and harbors, and their point of origin could not be determined.

The goal of the mitigation project should be to create habitat sufficient to offset losses due to entrainment; the discharger should not be liable for what happens to larvae produced from the mitigation site. The State Board should also allow some flexibility in determining the best methods for determination of source waters.

"The regional boards may require additional habitat be mitigated to compensate for the annual entrainment of organisms between 200 and 335 microns." This sentence should be deleted. In Section 8.5.1.1 of the Staff Report, the use of ETM/APF is required because:

- It compensates for all entrained species and not just commercially valuable fish taxa,
- Requires less life history data for species compared to other methods (e.g., AEL and FH),
- Utilizes representative species that can be used as proxy species for rare, threatened, or endangered species, which may be challenging to acquire adequate data for, and
- The creation of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model.

Additional mitigation is not necessary with use of the APF. In Section L.2.e.1.a it is noted that the 200-micron mesh is for a "broader characterization".

L.2.e.3.b.iii ***"…shall restore one acre of habitat unless the regional water board determines that a mitigation ratio greater than 1:1 is needed."*** There will be issues with out-of-kind mitigation. At the HBGS, which intakes and discharges from nearshore, sandy habitat, the CEC required mitigation of wetlands. There should be flexibility in determining ratios, and it should not be limited to numbers greater than one. For instance, 0.5 acres of wetlands could offset losses of 1.0 acres of nearshore, sandy habitat. The same should apply to the next section regarding construction-related habitat.

L.3.b.1 It is not clear why the limit is expressed in "ppt" but measurements are required in "TDS". We can measure salinity *in situ* using instrumentation (moored sensors, profilers, water quality probes) in practical salinity units (psu; 1 psu $\simeq$ 1 ppt, as stated in the SED). However,

determination of TDS requires collection of grab samples, and delivery to an analytical lab. This requirement makes no sense. We recommend measurements using ppt/psu.

L.3.c.1.a. The 36-month requirement is excessive and should be deleted.

L.3.c.1.b. The policy requires toxicity testing using five species. We note that these species are not always available from suppliers and several of these may not spawn for several months during the year, including mussels, purple urchin, and red abalone. Inclusion of three invertebrate species for testing seems excessive and is not consistent with current testing requirements in the Ocean Plan. We recommend utilizing the test approach described in the Ocean Plan (Appendix III) that utilizes three species (a fish, an invertebrate and an aquatic plant, if possible) to measure compliance with the toxicity objective. In addition we recommend that WET testing allow a tiered approach to use of the species required for testing as presented in Table III-1 of the Ocean Plan (SWRCB 2012). This approach is a practical method to ensure that test organisms are available throughout the year

L.3.c.4. If a facility uses toxicity data and shows no effect, but the monitoring data or BACI study or "any other information" isn't to the Board's liking, they can "eliminate" or "revise" a facility-specific alternative receiving water limitation. This is fairly broad and open to interpretation (and potentially misuse). We recommend deleting L.3.c.4.

Definitions:

Eelgrass Beds: This definition is limited to *Z. marina* even though there are other *Zostera* species in California.

Empirical Transport Model (ETM): The ETM definition is incorrectly presented. The ETM provides an estimate of the probability of entrainment due to desalination (or power plant) intake. The source water body is not determined by the ETM, but is determined either *a priori* using available data, or it can be measured using current data. The ETM calculates the conditional mortality due to entrainment on an estimate of the population of organisms in the source water that are potentially subject to entrainment. See Steinbeck et al. (2007) for a more accurate definition.

Market Squid Nurseries: This should be deleted from the policy. The last sentence in the definition has been misquoted, and is incorrect. (see Comment to Section 7.2.2 of the Staff Report).

Natural Background Salinity: The requirement to use 20 years of background data is excessive. Weekly basis for three years is also excessive.

Salinity: The switch from ppt to TDS is strange. As described above, measurements of TDS and ppt are very different. Codify that "psu" and "ppt" can be used interchangeably for the presentation of monitoring reports.

Sensitive Habitats: Market squid nurseries should be deleted from this section. Market squid can spawn over sandy, nearshore habitat, and not necessarily in the same location from year to year. This definition could mean large stretches of sand would be "sensitive habitats".

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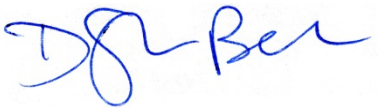
Conclusion

Please feel free to call myself (sbeck@mbcnet.net) or David Vilas (dvilas@mbcnet.net) if you have any questions or need anything else.

Respectfully,

MBC *Applied Environmental Sciences*



Shane Beck
President

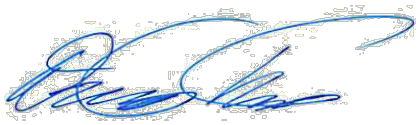


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EXHIBIT B

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Re: Comments on Ocean Plan Amendment Supporting Material

Dear Mr. Shoenberger:

Attached are MBC Applied Environmental Sciences' comments on the supporting material for the proposed Ocean Plan Amendment. Most of my concerns and comments were summarized in the letter transmitted earlier today on the actual amendment and SED. Excerpts from the supporting material are in italics, and my response/comment is in normal font.

Comments on Jenkins et al. (2013) – Recommendations for brine discharge

California Biota - *Data on the effects of elevated salinity and concentrate discharges on California biota are extremely limited, often not peer-reviewed, not readily available, or have flaws in the study design. Only one published study has documented impacts of a concentrate discharge on marine biota of California in the laboratory (Voutchkov 2006).*

Jenkins et al. (2013) notes the flaws in Voutchkov (2006), but does not mention the hyper-salinity studies that were underway (and finalized one month later) at West Basin.

Comments on Foster et al. (2013) – Mitigation and Fees

A.3 - "*The APF method is preferred because creation and restoration of coastal habitats compensates for all organisms impacted by entrainment, not just select groups such as fishes."*

This may not necessarily be true. If entrainment included larval lobster, and APF was used to calculate an area of 50 acres, the restoration of 50 acres of wetlands would do little to compensate directly for losses of larval lobster. Differences in productivity between the affected habitat and the restored/created habitat need to be taken into consideration.

C.8 – "*However, any biological impacts associated with a properly designed, constructed, and operated subsurface intake should be minimal since the withdrawal velocity through the sediment is very low….Large beach galleries or seabed filtration systems may have low IM&E impacts but large construction impacts on benthic organisms. Such construction impacts should be thoroughly evaluated for any projects proposing such intakes."*

This logic was not carried forward into the proposed policy.

C.9. – "*Other entrainment reduction technologies for surface intakes have not been evaluated in the coastal waters of California."*

SCE conducted field and laboratory tests of fine mesh screens and wedgewire screens at their Redondo Beach R&D lab in the 1970s (LMS 1981).

Reference: Lawler, Matusky, and Skelly Engineers (LMS). 1981. Larval exclusion study. Final Report. Prepared for Southern California Edison Company, Rosemead, CA. Research and Development Series 81-RD-30.

Appendix 1 – The appendix (Raimondi 2013) omits the project name, which is used in the text, so there is no way to verify the data.

Appendix 3 – This appendix (Steinbeck 2011) highlights how effective wedgewire could be in reducing entrainment of Age-1 equivalents. While this technology may not be as effective as a subsurface intake, benthic habitat would not be affected (or much less habitat would be affected) during construction/operation. *"The use of indirect or subsurface intake systems will likely be restricted to very site-specific application or low volume plants due to the high construction and maintenance costs, operational challenges, and uncertainty in using these intake designs for larger capacity desalination plants. The potential environmental effects of these intakes are largely unknown. There are likely to be*
impacts on later stage fish larvae for species that settle to the bottom to complete development (Jahn and Lavenberg 1986)." This logic was not carried forward into the proposed policy.

Comments on Foster et al. (2013)—Entrainment and Mitigation

1.A – *"Turbulence will likely be low because only 23-38% of the entrained water is exposed to potentially damaging turbulence, and exposure to such turbulence is on the order of seconds. Literature reports of damage to larvae caused by turbulence are generally based on longer exposure times. Moreover, the need for and efficacy of diffuser designs suggested by Jenkins (2013) to reduce turbulence are questionable (review in Appendix 3)."* This logic was not carried forward into the proposed policy.

Appendix 3 – Regarding exposure of larvae to shear stress during diffuser entrainment: *"The experiments on which the criteria are based consisted of injection of juvenile freshwater fish into the zone of flow establishment close to the nozzle at the edge of the jet where shear rates are much higher. This is a quite artificial situation for actual fish behavior, which would not be expected to enter this zone."* This logic was not carried forward into the proposed policy.

Appendix 4 – The table (Raimondi) includes the project name that was absent above in Appendix 1 of Foster et al. (2013). Note that the HBGS mitigation is listed as 66 acres, but it was actually 66.8. The amount listed in the table ($4.927 million) is also lower than required by the CEC ($5.511 million). See:
http://www.energy.ca.gov/sitingcases/huntingtonbeach/compliance/2006-09-27_COMMISSION_ORDER.PDF

Appendix 5 – Jenkins recommends measuring photosynthetically active radiation (PAR), but does not give a reason. There are multiple methods for measuring turbidity in the water column, including measurements of NTUs, light transmission, suspended solids, PAR, and colored dissolved organic materials (CDOM). While PAR may be the most appropriate, the reasoning is not spelled out.

Conclusion

Please feel free to call me or email me (sbeck@mbcnet.net) if you have any questions or need anything else.

Respectfully,

MBC *Applied Environmental Sciences*

Shane Beck
President