August 12, 2014

Ben R. Hodges, Ph.D.
Associate Professor
Department of Civil, Architectural, and Environmental Engineering
University of Texas at Austin
ECJ 8.208, 301 E. Dean Keaton Street
Austin, TX 78712

Dear Professor Hodges,

REQUEST FOR EXTERNAL SCIENTIFIC PEER REVIEW: PROPOSED AMENDMENT TO WATER QUALITY CONTROL PLAN FOR CALIFORNIA OCEAN WATERS TO ADDRESS DESALINATION FACILITY INTAKES, BRINE DISCHARGES, AND TO INCORPORATE OTHER NONSUBSTANTIVE CHANGES

My letter today is intended to initiate the next phase of the external review – the actual review itself.

The State Water Resources Control Board will receive reviewers' comments and curriculum vitae from me after the review has concluded, and not be a party to the process.

The following documents are provided through a secure FTP site. Access instructions are given at the end of this letter.

a) **June 18, 2014 memorandum signed by Victoria Whitney: "Request for External Peer Review of A Proposed Amendment to the Water Quality Control Plan for California Ocean Waters…Desalination Facility Intakes, Brine Discharges...".**

   Three attachments are included in the memorandum:

   Attachment 1: Summary of the Proposed Amendment.

   Attachment 2: Description of (five) Scientific Conclusions to be addressed by Peer Reviewers.

   Clear guidance for the review is provided in the preamble. **Please address all conclusions, as expertise allows, in the order listed.**

   Once conclusions have been addressed, reviewers are given latitude to provide further comments - see text following listing of the conclusions.

   Attachment 3: Names of Participants Involved in Developing the Proposed Desalination Amendment.

b) **Ocean Plan with Proposed Desalination Amendment**

c) **Draft Staff Report, Including Draft Substitute Environmental Documentation**

d) **Instructions and Table of Contents for reviewing (b) and (c) above and five conclusions listed in Attachment 2 of June 18, 2014 request letter. The instructions and table of contents also are provided as an attachment to this letter initiating the review. Thirteen key references are identified, each of which supports one of the five conclusions as clearly described in the table of contents.**

e) **Complete references provided in five folders.**

f) **Spreadsheet titled "Online Access and Relevant Sublinks" provides links to key external documents cited within references.**

g) **January 7, 2009 Supplement to the Cal/EPA Peer Review Guidelines.**
In part, this provides guidance to ensure the review is kept confidential through its course. The Supplement notes reviewers are under no obligation to discuss their comments with third-parties after reviews have been submitted. **We recommend they do not.** All outside parties are provided opportunities to address a proposed regulatory action through a well-defined regulatory process. Please direct enquiring parties to me.

Please download all information within two weeks of receiving this letter. It will no longer be available after two weeks. The URL, username and password are as follows:

< FTP connection information removed for security purposes >

Return your comments directly to me, on Tuesday, September 9, 2014, and not before. Questions about the review should be for clarification, in writing – email is fine, and addressed to me. My responses will be in writing also. I subsequently will forward all reviews together to Ms. Victoria Whitney with reviewers' Curriculum Vitae. All this information will be posted at the appropriate State Water Board program web site, and at the State and Regional Water Boards' Scientific Peer Review web site.

Your acceptance of this review assignment is most appreciated.

Sincerely,

Gerald W. Bowes

Gerald W. Bowes, Ph.D.
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Peer Review: Desalination and Brine Discharge Amendment and SED Instructions and Table of Contents

The exact number of pages depends on which field you, the reviewer, are representing. The proposed Desalination Amendment and Substitute Environmental Document (approximately 230 pages of material combined) must be read carefully. In addition, there are thirteen references which vary in length. Some references will be more relevant than others to a particular reviewer's expertise. For example, a toxicologist will want to focus more attention on references related to brine discharge than those on screening technology.

All documents identified below are located at the secure FTP site.

Step 1

Begin by reviewing the proposed **Desalination Amendment** and supporting **Substitute Environmental Document (SED)**.

"Desal Appendix A" – The document titled "Desal Appendix A" (Appendix A of the California Ocean Plan) contains the proposed Desalination Amendment. The proposed new language can be found in **Section L** (text in blue). **Only the new language is relevant for this review. Approximately 30 pages**

"Desal SED" – The Substitute Environmental Document (SED) provides comprehensive explanation and rational for the conclusions put forth in the proposed amendment.
206 pages

Step 2

Review the references. Thirteen key references from the SED were selected for peer review.

Each reference supports one of the five conclusions in the Amendment.

Conclusion 1: A receiving water salinity limit of two parts per thousand (ppt) above natural background salinity is protective of marine communities and beneficial.

"Brine"- 101 pages
Management of Brine Discharges to Coastal Waters: Recommendations of a Science Advisory Panel. Roberts, P. (Chair), S. Jenkins, J. Paduan, D. Schlenk and J. Weis. 2012. Southern California Coastal Water Research Project (SCCWRP) Environmental Review Panel (ERP). Report Prepared for the State Water Resources Control Board.

"Toxicity"- 9 pages
Hyper-Saline Toxicity Thresholds for Nine California Ocean Plan Toxicity Test Protocols. Phillips, B.M., B.S. Anderson, K. Siegler, J.P. Voorhees, S. Katz, L. Jennings and R.S. Tjeerdema. 2012. University of California, Davis, Department of Environmental Toxicology at Grand Canyon. Report prepared for the State Water Resources Control Board; Contract No. 11-133-250.

"In-Plant Dilution/Diffusion Alternatives"- 53 pages

Analytic Comparisons of Brine Discharges Strategies Relative to Recommendations of the SWRCB Brine Panel Report: In-Plant Dilution vs. High Velocity Diffuser Alternatives at the Carlsbad Desalination Project.Jenkins, S.A. and J. Wasyl. 2013.

Conclusion 2: A subsurface seawater intake will minimize impingement and entrainment of marine life.

"Subsurface Intakes"- 15 pages
Subsurface intakes for seawater reverse osmosis facilities: Capacity, limitation, water quality improvement, and economics. Missimer, T.M., N. Ghaffour, A.H.A. Dehwah, R. Rachman, R.G. Malvia and G. Amy. 2013. Desalination. Vol. 322: 37-51.

Conclusion 3: A 0.5 mm, 0.75 mm, 1.0 mm, or other slot size screens installed on surface water intake pipes reduces entrainment.

"Entrainment 1"- 61 pages
Length-Specific Probabilities of Screen Entrainment of Larval Fishes Based on Head Capsule Measurements (incorporating NFPP Site-Specific Estimates). Tenera Environmental. 2013. Report prepared for Betchel Power Corporation JUOTC Project.

"Entrainment Supplement"- 57 pages
The supplement document to the above report. Length-Specific Probabilities of Screen Entrainment of Larval Fishes Based on Head Capsule Measurements (incorporating NFPP Site-Specific Estimates). Tenera Environmental. 2013. Report prepared for Betchel Power Corporation JUOTC Project.

"Entrainment 2"- 44 pages
Variation in Entrainment Impact Based on Different Measures of Acceptable Uncertainty. Raimondi, P. 2011. Report prepared for California Energy Commission, Public Interest and Energy Research Program.

"Intake Feasibility Study"- 264 pages
$scwd^2$ Seawater Desalination Intake Technical Feasibility Study. Kennedy/Jenks Consultants. 2011. Report prepared for the Santa Cruz Water Department ($scwd^2$) Desalination Program.

"Fine-mesh Screen" - 23 pages
Evaluation of Fine-mesh Intake Screen System for the Diablo Canyon Power Plant. Tenera Environmental. 2013. Report prepared for Betchel Power Corporation JUOTC Project.

"Wedgewire Screens"- 130 pages
Field Evaluation of Wedgewire Screens for Protecting Early Life Stages of Fish at Cooling Water Intakes. Electric Power Research Institute (EPRI). 2005.

Conclusion 4: Multiport diffusers and commingling brine with other effluents can dilute brine discharge and provide protection to aquatic life.

"ERP III"- 55 pages

Desalination Plant Entrainment Impacts and Mitigation. Expert Review Panel III. Foster, M.S., G.M. Cailliet, J. Callaway, K.M. Vetter, P. Raimondi and P.J.W. Roberts. 2013. Report prepared for the State Water Resources Control Board; Contract No. 11-074-270.

“In-Plant Dilution/Diffusion Alternatives”- 53 pages
Analytic Comparisons of Brine Discharges Strategies Relative to Recommendations of the SWRCB Brine Panel Report: In-Plant Dilution vs. High Velocity Diffuser Alternatives at the Carlsbad Desalination Project.Jenkins, S.A. and J. Wasyl. 2013.

Conclusion 5: The Area Production Forgone (APF) method using Empirical Transport Model (ETM) can effectively calculate the mitigation area for a facility’s intakes.
Supporting references

“ERP III”- 55 pages
Desalination Plant Entrainment Impacts and Mitigation. Expert Review Panel III. Foster, M.S., G.M. Cailliet, J. Callaway, K.M. Vetter, P. Raimondi and P.J.W. Roberts. 2013. Report prepared for the State Water Resources Control Board; Contract No. 11-074-270.

“Intakes”- 254 pages
Mitigation and Fees for the Intake of Seawater by Desalination and Power Plants. Foster, M.S., G.M. Cailliet, J. Callaway, P. Raimondi and J. Steinbeck. 2012. Report prepared for the State Water Resources Control Board; Contract No. 09-052-270-1.

“Equivalent Adult and Production Foregone”- 104 pages
Extrapolating Impingement and Entrainment Losses to Equivalent Adults and Production Foregone. Electric Power Research Institute (EPRI). 2004.

Note: The spreadsheet titled “Online Access and Relevant Sublinks” provides links to key external documents cited within references.