



July 3, 2012

Reply to:
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Via Electronic Mail

Charles R. Hoppin, Chair and Members
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SUBJECT: COMMENT LETTER – AMENDMENT TO THE RECYCLED WATER POLICY

Dear Chair Hoppin and Members of the Board:

The Association of California Water Agencies (ACWA), the California Association of Sanitation Agencies (CASA) and WaterReuse California (collectively, the Associations) are pleased to provide comments on the proposed Amendment to the Recycled Water Policy (Amendment) regarding monitoring of constituents of emerging concern (CECs) in recycled water used for groundwater recharge and landscape irrigation.

We offer our suggestions in the spirit of continuing the collaboration that resulted in the Recycled Water Policy (Policy) and the convening of the Science Advisory Panel (expert panel) that developed recommendations for CEC monitoring. As an overarching comment, we continue to urge the State Water Resources Control Board (Board) to adhere as closely as possible to the recommendations of the expert panel, as the June 2010 report represents the “best available science” on the potential health and environmental effects of CECs related to the use of recycled water for landscape irrigation and groundwater recharge. Basing decisions on recycled water permits on the “best available science” is a principle that has been consistently endorsed by the Board and by the Policy stakeholders group. In addition, relying on the expert panel’s specialized expertise is the best way for the Board to assure the public that CECs in recycled water are receiving appropriate scrutiny. The expert panel’s recommended approach ensures that agencies will identify the presence and concentrations of CECs well before those concentrations can pose any risk to public health. This approach, which addresses occurrence in recycled water and treatment plant performance, should give

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water users, regulators, and the public the confidence that CECs will not pose public health threats.

For the most part, we concur with the Amendment, which largely incorporates the expert panel's approach and many of our comments provided at the December 15, 2010 public hearing and in our January 10, 2011 written comments. In particular, we appreciate that the Amendment (and Attachment A thereto):

- Affirms that CEC monitoring is not required for landscape irrigation projects nor are landscape irrigation projects required to determine removal differentials for surrogate compounds.
- Limits CEC monitoring for groundwater recharge projects to the chemicals recommended by the expert panel;
- Does not provide authority for a Regional Water Quality Control Board (Regional Board) to add CECs for monitoring groundwater projects that use tertiary recycled water/soil aquifer treatment (SAT) or reverse osmosis/advanced oxidation (RO/AOP) beyond what is included in the Amendment.
- Creates a phased approach for CEC monitoring with refinements allowed based on the results of the previous phase.
- Allows for the use of historic monitoring data to be used to tailor programs to assess occurrence and removal.

Our detailed comments are attached. This letter highlights several issues where we recommend a different course than suggested in the Amendment. Based on input from the California Department of Public Health (CDPH), even though the draft regulations are likely to be revised based on comments submitted earlier this year, the major concepts, including CEC monitoring, are not going to change. Thus, it will be beneficial for the CEC provisions in the Amendment to be aligned with the recharge regulations as recommended by the expert panel in its June 2010 report.¹ Striving to achieve consistency between the Amendment and the CDPH recharge regulations is a critical step to promoting recycled water use, a primary goal of the Policy.

¹ Drewes, J.E., Anderson, P., Denslow, N., Olivieri, A., Schlenk, D., and Snyder, S. (2010) Final Report Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water Recommendations of a Science Advisory Panel, SWRCB, Sacramento, CA, June 25, 2010.

The Board Should Clarify in the Policy That Priority Pollutant Monitoring for Landscape Irrigation Projects Is Limited to Recycled Water.

The existing Policy language specifies that priority pollutant monitoring be conducted twice per year for landscape irrigation projects except for small disadvantaged communities. See Policy, Section 7.b.(3) at p. 9. The language in the Policy is vague and does not specify what has to be monitored (recycled water only, groundwater, etc.). Based on the June 8, 2012 meeting with WaterReuse California and Board staff, we understand that the intent of this Policy provision is for priority pollutant monitoring to be required for recycled water only. Groundwater monitoring would only occur on a case-by-case basis if recycled water data indicated that groundwater quality is threatened. Suggested clarifying language changes to implement this intent are presented in Appendix 1.

The Board Should Modify Attachment A to Conform the Monitoring Locations for Surface and Subsurface Groundwater Recharge Projects to the Expert Panel Recommendations.

The monitoring locations specified in Attachment A of the Amendment for CEC health-based indicators, CEC performance indicators, and surrogates for surface and subsurface application projects are not in conformance with the expert panel recommendations. See Attachment A, pp. 2, 6-14. While the expert panel provided examples in the June 2010 report, the expert panel specifically recommended that the precise monitoring locations be selected in consultation with CDPH. Based on our June 8, 2012 meeting with Board staff, we understand that because of uncertainty in CDPH finalizing the draft recharge regulations and their continued evolution, the Board staff have elected to proceed with their own interpretation of monitoring based on the expert panel report and recent communications with some of the expert panel members in cases where the report was unclear. However, the expert panel did explicitly recognize that monitoring locations for recharge projects would need to be selected on a case-by-case basis in consultation with CDPH, regardless of the status of the recharge regulations. We understand that the expert panel intends to submit comments confirming this intent.

CDPH has indicated that while some modifications may be made to the November 2011 draft groundwater recharge regulations, the general concepts, including CEC monitoring, will not change. It is important to remember that the draft regulations have been used for over 30 years to permit groundwater recharge projects with monitoring programs developed on a project-specific basis. This approach will continue even when the final regulations are adopted. Project sponsors would be much better able to achieve the Board's recycled water goals if the CDPH and Board monitoring efforts were harmonized rather than having this Policy Amendment establish conflicting requirements. Our specific comments and suggested language changes for the various provisions, footnotes, and tables in Attachment A of the Amendment are presented in Appendix 1.

The Board Should Modify Attachment A to Verify That a Goal of the Initial CEC Monitoring Assessment Is to Establish Project-Specific Expected Removal Rates.

We are concerned that the proposed requirements derive from a misinterpretation of the purpose of the initial CEC monitoring. In particular, Attachment A states that “calculated removal differentials less than the expected removal differentials [in Table 6] provide an indication that treatment processes may not be operating as expected or to technical specifications. If the removal differential is less than expected, assessment of the treatment processes may be warranted.” This inappropriately establishes Table 6 values as a benchmark for treatment effectiveness, fails to acknowledge that removal rates are highly project-specific, and that monitoring results will be used to establish the expected removal rates for CEC performance indicators and surrogates for baseline and subsequent monitoring. (See Attachment A, pp. 8, 16.) The June 2010 expert panel report provides an example of expected performance (Table 8.2, p. 66) based on one study and specific operational conditions that may not be representative of all recharge projects. The expert panel recognized that removals would be unique for each project and recommended that the initial monitoring phase be used to establish expected removals for use during subsequent monitoring phases. The removals will be project-specific as acknowledged by the expert panel. During the June 8, 2012 meeting with Board staff, we were informed that one expert panel member considers the expected removals included in Attachment A of the Amendment (e.g., those from Table 8.2 in the June 2010 report) to be “industry standards” that any project can meet. We believe the expert panel member in question has been misunderstood, and that the expert panel intends to submit a comment letter that clarifies this issue. The removal of CECs in groundwater recharge projects is a dynamic area of research with new results coming out on a frequent basis. While these studies have consistently shown that CEC are removed, the magnitude of removal for a particular CEC in a particular context is hardly settled science. Changes or variability in influent concentrations to treatment processes, variations in treatment processes, and differences in site conditions will all influence removal rates and may be different than the conditions that led to the removal rates in Attachment A. Drewes, et al. (2011) noted that it is important to consider initial concentration levels when utilizing and interpreting percent removal data as well as travel time.² This research report is incorporated by reference as part of our comments. An ongoing WateReuse Research Foundation Project (WRF 10-05) headed by Dr. Jörg Drewes, the chair of the expert panel, is further exploring the impact of project-specific site conditions on CEC performance. One preliminary finding is that differences in site conditions can lead to differences in CEC performance. The use of fixed expected removal differentials in the Amendment that could vary from project-specific removals

² Drewes, J.E., Dickenson, E., and Snyder, S. (2011) Development of Surrogates to Determine the Efficiency of Groundwater Recharge Systems for the Removal of Trace Organic Chemicals. Pg. 50. WateReuse Research Foundation, Alexandria, VA.

could trigger unwarranted response actions. Detailed comments and specific language changes to address this concern are presented in Appendix 1.

The Board Should Modify Attachment A to Clarify That CDPH Is the Lead Agency for Selection of CEC Monitoring for Treatment Processes Not Addressed In the Policy.

The expert panel addressed only two types of treatment processes for CEC monitoring: (1) tertiary recycled water and soil aquifer treatment (SAT) for surface spreading groundwater recharge projects; and (2) reverse osmosis/advanced oxidation (RO/AOP) for subsurface application groundwater recharge projects. In Attachment A of the Amendment, the Board allows for Regional Boards to establish CEC monitoring requirements “in consultation with CDPH” for treatment processes other than tertiary/SAT and RO/AOP. (See Attachment A, p. 2.) CDPH has the most knowledge and expertise related to the selection of CECs for monitoring groundwater recharge projects that utilize alternative technologies, both in terms of health relevance and technology performance. Thus, CDPH should be the lead agency for making determinations for selecting CECs for treatment processes not addressed by the expert panel, until such time as a future panel is convened and makes appropriate recommendations that would be considered by the Board as amendments to the Policy. This is a relevant and timely issue for one existing permitted recharge project that utilizes another technology, the Dominquez Gap Barrier Project, and several planned projects that are considering alternative technologies. In addition, our recommendation to designate CDPH the lead conforms to the permitting process for groundwater recharge projects whereby the process begins with CDPH making recommendations to the Regional Board, and the Regional Board then issuing the permit for the project. Per our June 8, 2012 meeting with Board staff, suggested language changes are presented in Appendix 1.

The Board Should Modify Attachment A to Clarify How Surrogates Are Selected for Monitoring.

We are concerned that the requirements in Attachment A of the Amendment are not particularly clear on how surrogate selection occurs, and thus could allow Regional Boards the discretion to increase the number of surrogates that must be monitored for groundwater recharge projects and landscape irrigation projects. (See Attachment A, p. 5.) Further modifications would help eliminate potential misinterpretations as presented in our comments and language recommendations in Appendix 1.

The Board Should Modify Attachment A to Clarify That an EPA Approved Method for CEC Monitoring Must Be a Promulgated Method.

In Attachment A of the Amendment, the Board specifies that if the U.S. Environmental Protection Agency (EPA) has “approved” an analytical method for a CEC or surrogate, that method must be used. (See Attachment A, p. 4.) We are concerned that any published EPA method could be improperly interpreted to mean that it is an approved method (for example two published but not promulgated methods: Method 1694 for the analysis of pharmaceuticals and personal care products and Method 1698 for the analysis of steroids and hormones). We understand, in accordance with the Board’s standard provisions, that only a method that has been promulgated in 40 Code of Federal Regulations (CFR) Part 136 or Part 141 is an approved method. As discussed during our June 8, 2012 meeting with Board staff, we recognize a lack of approved methods for CEC analyses. The lack of reliable methods to provide reproducible CEC data is a continued concern, particularly as it relates to how data will be interpreted for response actions pursuant to Policy Amendment. We believe that the approach in the CDPH November 2011 draft groundwater recharge regulations for CEC analytical methods should be utilized in the Policy Amendment because it recognizes the status of CEC methods and would allow for consistency in monitoring; namely, that unless a promulgated method is available for use, other methods for CECs should be proposed by the project sponsor in the project’s CDPH approved Operations Plan. Specific comments and language changes regarding this issue are included in Appendix 1.

Attachment A Should Be Modified to Allow Credit for Historical, Piloting, and Research Data to Satisfy or Offset Initial Assessment, Baseline, and Standard Operation Monitoring.

As previously noted, the Associations support the Board’s decision to allow for the use of historical monitoring data to assess the occurrence and removal of CECs and surrogates for the initial assessment, baseline monitoring, and standard operation phases. (See Attachment A, pp. 8-9. We believe this allowance should also apply to agencies that have already conducted pilot testing and other research for existing or planned projects. Because that these data sets may not exactly align with the proposed monitoring approaches in the Policy Amendment, projects should receive partial or total credit for the already collected data when CEC indicator and surrogate monitoring programs are established in terms of selection of constituents and frequency of sampling. At our June 8, 2012 meeting, Board staff noted that the details regarding use of historical data were not spelled out in the Amendment, but that available data should be allowed. We have included recommended language in Appendix 1 to clarify that intent.

Attachment A Should Be Modified to Clarify How CECs, Surrogates, Monitoring Frequencies, and Monitoring Durations Are Selected and Revised for the Various Monitoring Phases.

As previously noted, we appreciate that the Policy Amendment creates a phased approach for CEC monitoring with refinements allowed based on the results of the previous phase. Per the June 8, 2012 meeting with Board staff, we understand that Board's intent is to utilize data from each phase to make adjustments to the subsequent phases in terms of selection of CECs and surrogates and monitoring frequency. However, we believe that the language in Attachment A is not particularly clear with regard to how modifications will be made nor the circumstances for monitoring to be discontinued (e.g., a monitoring off ramp). For example, many of the monitoring trigger levels (MTLs) used to select the CECs may no longer represent the best available science. The Amendment should explicitly allow for new or updated MTLs to be used to evaluate data as well as to inform decisions regarding the need for continued monitoring and/or appropriate response actions. In addition, in cases where the continued collection of data is no longer yielding useful information for health-based or performance based parameters, the Amendment should provide off ramps to allow for data collection to cease. We believe that all monitoring programs should be evaluated over time, that adjustments should be made to ensure that scarce resources are used to collect useful information, and where appropriate non-essential monitoring should be reduced or eliminated. This approach is especially important in current times when public resources are at historically low levels. We have provided detailed comments and recommended language in Appendix 1.

The Board Should Modify Attachment A to Clarify That Responses to Health-Based CEC Results Should Be Based on Consultations With CDPH and Regional Board, and Not a Mandatory Framework.

We are concerned that the language in Attachment A of the Amendment (e.g., the use of "shall implement") establishes a mandatory regulatory framework for responses to CEC monitoring results, which is contrary to the expert panel's recommendations and our discussion with Board staff on June 8, 2012. (See Attachment A, pp. 16-17. While we agree the data should be assessed and responses undertaken by project sponsors based on the results, the specific responses should be developed based on consultation with CDPH and the Regional Board, and may not be the same in every case as those presented in Table 7. The responses in Table 7 reflect the "guidance" offered in the expert panel report; however, the expert panel explicitly recommended that specific actions would be developed in consultation with the regulatory agencies. We have provided comments and suggested language changes in Appendix 1.

The Board Should Provide Input on How Other Expert Panel Recommendations Will Be Implemented in Preparation for the Next Expert Panel Meeting.

The expert panel intended that the Board implement recommendations that are not included in the proposed Amendment, including (1) the Board should conduct a more thorough review of CECs likely to occur in recycled water using data from peer-reviewed literature and occurrence studies outside California for future expert panel evaluation; (2) the Board should develop a detailed procedure to estimate predicted environmental concentration for CECs for which MECs are currently not available based on production, use and environmental fate; and (3) the Board should develop a process to rapidly compile, summarize and evaluate monitoring data as they become available, and identify trends in occurrence pattern as a function of time and sampling locations. At our June 8, 2012 meeting, Board staff noted that the June 2010 Report contained numerous recommendations, and at this time, the Board has established bioassay research as a top priority to shift away from chemical-by-chemical monitoring. The Associations support this priority, but acknowledge that chemical-by-chemical monitoring may be necessary in the short-term, and we urge the Board to direct resources at the other panel recommendations to collect the information that will be critical for use by the next expert panel convened pursuant to the Policy.

We appreciate the direction the Board is poised to take to embrace the expert panel's recommendations. We commend the Board for its commitment to a science-based and consistent statewide approach to CEC monitoring in recycled water. Most importantly, we are truly encouraged that this process has not only allowed all of the stakeholders to engage with the best current science, but has established a framework we can all use in the future. We look forward to our continued partnership as we work for our shared goal of a safe, abundant water supply for California.

Sincerely,



Danielle Blacet
ACWA



Roberta L Larson
CASA

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A handwritten signature in black ink, appearing to read "D. R. Smith". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

David R. Smith, Ph.D.

WaterReuse California

cc: Leah Walker, CDPH
Ken Harris, SWRCB

Appendix 1 - Detailed Comments
Proposed CEC Amendment to the Recycled Water Policy (Issued May 7, 2012)

Comment #	Document Reference: (Section #, Page #, Paragraph #)	Issue	Comments
1	RW Policy, 7.b.(3), pg. 9	Landscape Irrigation and priority pollutant monitoring	<p>The existing Policy language specifies that priority pollutant monitoring be conducted twice per year for landscape irrigation projects except for small disadvantaged communities.</p> <p>Comment: The language in the Policy is vague and doesn't specify what has to be monitored (recycled water only, groundwater, etc.). Based on our June 8, 2012 meeting with Board staff, it is our understanding that the intent is that priority pollutant monitoring is only intended to apply to recycled water. Groundwater monitoring would only be required on a case-by-case basis if recycled water data indicated that there would be a threat to groundwater. We believe that any future decision regarding threats to groundwater should take into consideration attenuation and dilution in harmony with Water Quality Order 2003-0009 in which the Board found for a groundwater recharge reuse project that dilution and attenuation may properly be considered in calculating effluent limits. We recommend that the Policy be revised to clarify that the monitoring only occurs in recycled water as follows:</p> <p style="padding-left: 40px;">“For landscape irrigation projects, priority pollutants shall be monitored twice per year <u>at the recycling plant</u>, except for landscape irrigation projects owned by small disadvantaged communities¹ which shall be monitored for priority pollutants once every two years.” [Text in red denotes Board edits to the Policy]</p>
2	RW Policy, 8.b.(2), pg. 10	Groundwater Recharge and priority pollutant monitoring	<p>The Board is requiring that recycled water be monitored twice per year for priority pollutants.</p> <p>Comment: Several expert panels for groundwater recharge projects (such as the panel for the Groundwater Replenishment System and the proposed San Fernando Basin Groundwater Recharge Project) have recommended that priority pollutant monitoring be discontinued. The Groundwater Replenishment System Panel stated that: “Although monitoring for priority pollutants currently is required by regulatory agencies, there is serious question as to whether there is a need to include priority pollutants as a group. Our understanding of toxic chemicals has come a long way since this list was first developed in 1977. It may be worthwhile to initiate meetings with CDPH and the Santa Ana Regional Water Quality Control Board (RWQCB) to investigate the potential of eliminating monitoring for priority pollutants that historically have not been found in either the untreated wastewater or product water. The Panel supports reducing or eliminating monitoring for non-detected priority pollutants based on historical monitoring results.”</p> <p>Thus it is recommended that this provision be revised as follows (see double underline text):</p> <p style="padding-left: 40px;">“Groundwater recharge projects shall include monitoring of recycled water for <u>CECs on an annual basis</u> and priority pollutants <u>on a twice annual basis per year</u>. <u>Monitoring shall be reduced or</u></p>

Comment #	Document Reference: (Section #, Page #, Paragraph #)	Issue	Comments
			<u>eliminated for priority pollutants that have not been detected in the untreated wastewater or recycled water used for recharge based on the most recent five years of historical data.</u> "
3	RW Policy, 10.b.(1)(b), pg. 14	CECs – Board hearing date correction	<p><u>"In December, 2011, the State Water Board, in coordination with CDPH, held a public hearing to hear a presentation on the report and to receive comments from stakeholders."</u></p> <p>Comment: The hearing was held in December 2010; thus, the language should be revised to correct the hearing date to "December, 2010".</p>
4	RW Policy, 10.b.(2), pg. 14	CECs – expert panel updates	<p><u>"The panel or a similarly constituted panel shall update the report every five years."</u></p> <p>Comment: It is not clear how "every five years" will be counted or determined for the panel updates. We recommend that the timing for the panel update be based on when a Recycled Water Policy amendment regarding CEC monitoring is approved by the Office of Administrative Law and goes into effect. We recommend that the Policy be revised as follows:</p> <p><u>"The panel or a similarly constituted panel shall update the report every five years from the date that an amendment to the Recycled Water Policy regarding CEC monitoring has gone into effect."</u></p>
5	Attachment A, Section 1, ¶ 1, pg.1; et seq.	Terminology for CECs	<p>Beginning with this section of Attachment A, the Board uses the term "health-relevant CECs" and not "health-based CECs" per the June 2010 expert panel Report.</p> <p>Comment: It is not clear why the Board has elected to use a different term from that used by the expert panel. The process for selection of health-based CECs was "based" on comparing measured environmental concentrations (MECs) to monitoring trigger levels (MTLs) that were derived from toxicological data or models. The expert panel noted that: "It is for these reasons that the Panel urges people interpreting the results of the exposure screening that forms the core of the CEC prioritization framework shown in Figure 8.1, to always keep in mind that the exposure screening was developed to prioritize CECs for a monitoring program; not to conduct an evaluation of potential risk. Inclusion of a CEC on the priority monitoring list does not mean the CEC poses a health risk." June 2010 Report at pg. 64¹</p> <p>We are concerned that "health-relevant" may have additional implications from a public perception standpoint for monitoring programs. We recommend that whenever possible, that the Board use terminology utilized by the expert panel, and thus revise Attachment A to replace "health-relevant CECs" with "health-based CECs."</p>

¹ Drewes, J.E., Anderson, P., Denslow, N., Olivieri, A., Schlenk, D., and Snyder, S. (2010a) Final Report Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water Recommendations of a Science Advisory Panel, SWRCB, Sacramento, CA, June 25, 2010.

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6	Attachment A, Section 1, ¶ 2, pg. 2	Definition of surrogates	<p>“A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that provides a direct correlation with the concentration of an indicator compound.” [emphasis added]</p> <p>Comment: The expert panel Report defines a surrogate as follows: “A surrogate parameter is a quantifiable change of a bulk parameter that can measure the performance of individual unit processes (often in real-time) or operations in removing trace organic compounds.” See June 2010 Report at pg. 65. The expert panel noted that some research has shown correlations between surrogates and CECs; however, the panel did not elect to define surrogates in terms of direct correlation to CEC removal.</p> <p>We recommend that this language in Attachment A be revised to define a surrogate as follows:</p> <p>“A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that can be used to measure <u>provides a direct correlation with the concentration of an indicator compound</u> the efficiency of trace organic compounds removal by a treatment process.”</p>
7	Attachment A, Section 1, ¶ 3, pg. 2	Definition of soil aquifer treatment (SAT)	<p>“In addition, soil aquifer treatment⁵ is a passive treatment process that provides a level of removal of CECs.” [emphasis added]</p> <p>Comment: We disagree that soil aquifer treatment (SAT) is a passive treatment process. Fox et al. (2006) describes SAT as a natural treatment process comprised of three components with active treatment mechanisms including: infiltration interface (biological oxidation and transformation, assimilation, filtration, adsorption); soil percolation (biological oxidation and transformation, adsorption); and groundwater transport (biological and chemical transformation, humification, adsorption, dilution).²</p> <p>Thus we recommend that this language be revised as follows:</p> <p>“In addition, soil aquifer treatment⁵ is a passive <u>natural</u> treatment process that provides a level of removal of CECs.”</p>
8	Attachment A, Section 1, ¶ 4, pg. 2	CEC monitoring for other treatment processes not	<p>“CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the Regional Water Boards in consultation with CDPH.”</p>

² Fox, P., Houston, S., Westerhoff, P., Nellor, M., Yanko, W., Baird, R., Rincon, M., Gully, J., Carr, S., Arnold, R., Lansey, K., Quanrud, D., Ela, W., Amy, G., Reinhard, M., and Drewes, J., 2006, Advances in soil-aquifer treatment for sustainable reuse, Water Research Foundation, Denver, CO; Table 1-2.

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		addressed in the Policy	<p>Comment: As noted in the January 10, 2011 letter from the Association of California Water Agencies (ACWA), the California Association of Sanitation Agencies (CASA) and WateReuse California (collectively, the Associations), assigning Regional Boards with the responsibility of making determinations for monitoring CECs contradicts existing law, the existing MOU between the Board and CDPH, the outcome of the stakeholder negotiation process for the Policy and provisions in the Policy. This is relevant issue for at least one existing groundwater recharge project (the Dominquez Gap Barrier that uses RO and chlorination) and planned projects that are looking at alternative technologies. Until such time as a future Board expert panel addresses additional treatment processes and CEC monitoring, CDPH should be the lead in designating CEC monitoring for groundwater recharge projects as they have the most expertise, both in terms of health relevance and alternative technology performance. In addition, the CDPH groundwater recharge regulations include a process for assessing alternatives to any provision in the regulations, including alternative technologies. To obtain approval for an alternative, the project sponsor must demonstrate that the alternative provides the same level of public health protection; if required by CDPH or Regional Board the project sponsor must conduct a public hearing; and unless otherwise specified by CDPH, an expert panel must review the alternative.</p> <p>As discussed at the June 8, 2012 meeting with Board staff, we are fully cognizant of the existing permitting process for groundwater recharge projects, whereby CDPH makes recommendations to a Regional Board, and the Regional Board issues the permit. Our suggested language changes below conform to that process and our request for CDPH to be the lead in making CEC and surrogate monitoring decisions related to technologies not yet addressed by an expert panel.</p> <p>“This Policy provides CEC monitoring requirements for recycled water which undergoes additional treatment by soil aquifer treatment or RO/AOPs. CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the Regional Water Boards per CDPH’s written recommendations in consultation with CDPH.”</p>
9	Attachment A, Footnote 5, pg. 2	Travel time for CEC removal for surface spreading projects	<p>“For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater within a two-week travel time distance through an aquifer downgradient of the surface application area.”</p> <p>Comment: This footnote appears to reflect information provided in Table 8-2 of the June 2010 expert panel Report (see pg. 66) that presents expected removals for SAT based on the work by Drewes et al. (2008).³ These specific removals occurred based on a two-week travel time and no dilution. However, an</p>

³ Drewes, J. E., D. Sedlak, S. Snyder and E. Dickenson (2008). *Development of Indicators and Surrogates for Chemical Contaminant Removal during Wastewater Treatment and Reclamation* (WRF-03-014), Alexandria, VA, WateReuse Research Foundation.

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			<p>effective and safe groundwater recharge project could have actual removal rates that differ from these percentages if the conditions of the project differ from those used under Drewes et al., 2008. For example, if the influent concentration of a CEC was lower, the removal rate would be lower. As described on pg. 67 of the June 2010 Report, performance is initially defined during an individual project’s piloting/start-up phase in parallel with an occurrence study to confirm the presence of the proposed performance indicator CECs in the feedwater of each unit process (in the case of a surface spreading facility, recycled water prior to and after soil aquifer treatment).</p> <p>In addition, it may not be practicable to definitively collect a sample within a two-week travel time for every recharge project. For the Chino Basin Groundwater Recharge Project, the Inland Empire Utilities Agency (IEUA) notes that for the lysimeters used to monitor nitrogen and trihalomethane compliance, it can take 1-4 weeks to reach the sampling ports and at least another 3 months to reach the groundwater table. In addition, it may take multiple lysimeters or lysimeter volumes to collect sufficient sample volume to analyze all of the CECs, in particular N-Nitrosodimethylamine (NDMA). The sample collection point for SAT performance should be established based on consultation with CDPH in conformance with the draft CDPH groundwater regulations.</p> <p>The November 2011 draft CDPH groundwater recharge regulations establish SAT performance monitoring, but did not limit the point of monitoring at two weeks. The draft regulations require testing “prior to the soil treatment process and the water after the soil treatment process, but at a point no farther than 30 days downgradient of the treatment process.” Comments provided by WateReuse California (February 28, 2011 and incorporated herein by reference), recommended that project sponsors conduct occurrence studies of indicators and propose a monitoring reduction goal for each CEC and surrogate that would be project-specific and would be approved by CDPH.</p> <p>Thus, we recommend that Footnote 5 be revised as follows: “For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater after SAT and within a 30-day two-week travel time distance through an aquifer downgradient of the surface application area.”</p>
10	Attachment A, Section 1.1, ¶ 2, pg. 4	CEC methods	<p>“If the United States Environmental Protection Agency (U.S. EPA) has approved an analytical method for analysis of a CEC or a surrogate, then the CEC or surrogate shall be analyzed in conformance with the analytical method. The CDPH shall be consulted for the use of analytical methods for CECs or surrogates that do not have analytical methods approved by U.S. EPA.”</p> <p>Comment: EPA publishes a number of analytical methods, but restricts usage of these methods for monitoring until they have been added to the approved list of methods in 40 Code of Federal Regulations</p>

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			<p>(CFR) Part 136 for wastewater methods and 40 CFR Part 141 for drinking water methods. The term “approved” could be misinterpreted to mean that EPA has simply published a method, instead of formally approving it for usage. It is our understanding, in accordance with Board standard provisions, that only a method that has been promulgated in 40 CFR is an approved method. This type of misinterpretation has already occurred for CEC monitoring requirements issued by the Los Angeles Regional Board. This issue of particular concern for two EPA methods: Method 1694 for the analysis of pharmaceuticals and personal care products and Method 1698 for the analysis of steroids and hormones, which have been released but not promulgated. The primary concern with the two methods is their poor performance in a single lab validation study, particularly Method 1698. Despite strong recommendations from the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs to establish data quality objectives (DQOs) for the programs that use these methods before developing and/or publishing analytical methods, the two EPA methods were subjected to a validation study without DQOs to define what would or would not be acceptable performance. We would object if either of these methods were to be considered “approved.”</p> <p>We acknowledge that there is a lack of approved methods for CEC analyses. Analytical methodology and quality assurance/quality control (QA/QC) protocols were addressed by the expert panel in the June 2010 Report. Nevertheless, the lack of reliable methods to provide reproducible CEC data is still a concern, particularly as it relates to how data will be interpreted for response actions pursuant to the Policy Amendment (see Comments #18, #20, #29, and #30). This issue is corroborated by the results of Water Research Foundation Project #4167 <i>Evaluation of Analytical Methods for EDCs and PPCPs Via Interlaboratory Comparison</i>, which found that variability is both laboratory and compound specific, and that the rate of false positives (blank contamination) and false negatives (spiked but not detected) was related to both laboratory performance and method detection limits, as well as being compound dependent, including some of the compounds on the CEC monitoring list (Caffeine and Triclosan).⁴ This report is incorporated by reference.</p> <p>Additionally, to better align with the November 2011 draft CDPH groundwater recharge regulations, where there is no promulgated method for a chemical, the method must be described in the project’s CDPH approved Operations Plan.</p> <p>With regard to this specific provision, we recommend the following revision:</p>

⁴ Vanderford, B.J., Drewes, J.E., Hoppe-Jones, C., Eaton, A., Haghani, A., Guo, Y., Snyder, S.A., Ternes, T., Schluesener, M., Wood, C.J. (2012) *Evaluation of Analytical Methods for EDCs and PPCPs Via Interlaboratory Comparison*. Water Research Foundation, Project #4167, Denver Colorado.

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			<p>“If the United States Environmental Protection Agency (U.S. EPA) has approved <u>promulgated</u> an analytical method <u>or methods</u> for analysis of a CEC or a surrogate <u>in 40 CFR Parts 136 or 141</u>, then the CEC or surrogate shall be analyzed in conformance with such the <u>analytical method unless the project sponsor and Regional Water Board agree that an alternative U.S. EPA test method can be used</u>. The CDPH shall be consulted for the use of analytical methods for CECs or surrogates that do not have analytical methods approved by U.S. EPA. <u>If a U.S. EPA promulgated method is not available, a project sponsor will propose a method for use in a project’s CDPH approved Operations Plan.</u>”</p>
11	Attachment A, Section 1.2, ¶ 1 and 2, and Table 2, pg. 5	Surrogates	<p>“Table 2 presents a list of surrogates to be considered for monitoring treatment of recycled water used for groundwater recharge reuse and landscape irrigation.” [emphasis added]</p> <p>“Surrogates shall be selected on a case-by-case basis and shall be appropriate for the treatment process or processes. For example, chlorine residual is not an appropriate surrogate for projects that do not use chlorine-based compounds for disinfection.” [emphasis added]</p> <p>Comment: We are concerned that the requirements are not particularly clear on how surrogate selection occurs, and could allow Regional Water Boards the discretion to increase the number of surrogates that must be monitored for groundwater recharge projects and landscape irrigation projects. Further modifications would help eliminate potential misinterpretations. It is not clear why the Board is simply not adopting the surrogates recommended by the expert panel (see Table 8.2 in the June 2010 Report, pg. 66). In addition, chlorine residual is proposed as a surrogate for landscape irrigation projects, which in accordance with Title 22 must use disinfected recycled water, and thus is an appropriate surrogate based on the proposed monitoring location.</p> <p>If the Board intends to allow for fewer or different surrogates to be used and that not all of the expert panel recommended surrogates may be necessary (see Section 3.1, pg.8 “and the appropriate surrogates listed in Table 2”), then some further clarification to the language would be appropriate.</p> <p>We recommend that the Board revise this language as follows:</p> <p>“Table 2 presents a <u>the</u> list of surrogates to be considered for monitoring treatment of recycled water used for groundwater recharge reuse and landscape irrigation.”</p> <p>“Surrogates shall be selected <u>in consultation with CDPH and Regional Water Board from Table 2</u> on a case-by-case basis and shall be appropriate for the treatment process or processes. For example, chlorine residual is not an appropriate surrogate for projects that do not use chlorine-based compounds for disinfection.”</p>

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12	Attachment A, Section 2.1.1, ¶ 1 and Footnote 8, pg. 6	Groundwater recharge – health-based CEC monitoring locations for surface application projects	<p>“For groundwater recharge reuse projects implementing surface application of recycled water, health-relevant CECs shall be monitored at these locations: (1) Following tertiary treatment⁷ prior to discharge to the surface application area; (2) Either in the unsaturated zone or in the uppermost portion of the groundwater⁸ underlying the surface application area; and (3) Within groundwater at a location downgradient of the surface application area and upgradient of the point of extraction for drinking water supply.”</p> <p>“⁸ Groundwater monitoring location situated within a two-week travel time (groundwater travel through the aquifer) downgradient of the surface application area.”</p> <p>Comment: First, to be consistent with the expert panel’s recommendations, is it not necessary for the specific monitoring locations to be provided in Attachment A. The panel recommended that: “The location and monitoring criteria for selection and use of these sampling locations are site-specific and need to be defined on a case-by-case basis. The guidance provided within this report should be used to supplement the monitoring conducted as part of compliance with the draft CDPH regulations.” June 2010 Report at pg. 69.</p> <p>It is also helpful to reflect on monitoring requirements in the CDPH November 2011 draft groundwater recharge regulations. The draft regulations require that SAT performance monitoring occur in recycled or recharge water prior to SAT and after SAT, but at no point farther than 30 days downgradient of the treatment process. For other CEC monitoring, the draft groundwater regulations establish the following minimum monitoring well requirements: (1) at least one well located no less than 2 weeks, but no more than 6 months of travel through the saturated zone of the recharge project; (2) at least 30 days upgradient of the nearest drinking water well; and (3) at least one well located between the recharge project and the nearest downgradient domestic water supply well. Depending on project specifics and well locations, the first well classification could be used for SAT performance testing if it is located within a 30-day travel time (the travel times of the other wells are likely to be greater than one year).</p> <p>Second, the two groundwater points of monitoring (POMs) are not consistent with the expert panel guidance, nor are they practicable for all groundwater recharge projects. The panel correctly suggested that one of the locations would be “wells representing the underlying groundwater and/or from shallow lysimeter wells.” [emphasis added] June 2010 Report at pg. 69. The Board language essentially requires a well to be placed in a spreading basin, which is impractical in many cases and not necessary to capture a groundwater sample that is representative of underlying groundwater. For example, it is feasible to collect a sample consistent with the panel’s recommendation in a shallow monitoring well that collects representative water as illustrated by some of the existing permitted groundwater recharge projects.</p>

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			<p>Third, monitoring for tertiary-treated water prior to SAT should be conducted prior to application of the recycled water to the spreading area, not simply at the point of discharge of the recycled water. This is an important distinction for projects using surface water bodies to convey recycled water to a spreading grounds. In such cases, additional treatment of the recycled water for certain compounds can occur during conveyance. (The most notable example is UV-degradation of NDMA during surface water conveyance.)</p> <p>Fourth, it may be infeasible to collect sufficient sample volume from a lysimeter (for example in the case of IEUA) for all CEC analyses, in particular NDMA.</p> <p>We recommend that the language be revised as follows:</p> <p style="padding-left: 40px;">“For groundwater recharge reuse projects implementing surface application of recycled water, health-relevant CECs shall be monitored at these locations: (1) Following tertiary treatment⁷ prior to discharge application to the surface application spreading area; and (2) At monitoring well locations consistent with CDPH regulations for groundwater recharge projects. Either in the unsaturated zone or in the uppermost portion of the groundwater⁸ underlying the surface application area; and (3) Within groundwater at a location downgradient of the surface application area and upgradient of the point of extraction for drinking water supply.”</p> <p style="padding-left: 40px;">Footnote 8 should be deleted.</p> <p style="padding-left: 40px;">Also see Comment #9</p>
13	Attachment A, Section 2.1.1, ¶ 1, pg. 6 and ¶ 1, pg. 7	Groundwater recharge – performance-based CEC and surrogate monitoring locations for surface application projects	<p>“For surface application practices, performance indicator CECs shall be monitored in recycled water and groundwater at these locations: (1) Following tertiary treatment prior to discharge to the surface application area; (2) The unsaturated zone or the uppermost portion of the groundwater underlying the surface application area; and (3) Within groundwater at a location downgradient of the surface application area and upgradient of the point of extraction for drinking water supply.</p> <p>Surrogates shall be monitored in recycled water and groundwater at these locations: (1) Following tertiary treatment prior to discharge to the surface application area; and (2) The unsaturated zone or the uppermost portion of the groundwater underlying the surface application area.”</p>

Comment #	Document Reference: (Section #, Page #, Paragraph #)	Issue	Comments
			<p>Comment: Based on prior Comments #9 and #12, we recommend that this language be revised as follows:</p> <p>“For surface application practices, performance indicator CECs shall be monitored in recycled water and groundwater at these locations: (1) Following tertiary treatment prior to discharge application to the surface spreading area; and (2) At a monitoring location after SAT and within a 30-day travel time through an aquifer downgradient of the surface application area. The unsaturated zone or the uppermost portion of the groundwater underlying the surface application area; and (3) Within groundwater at a location downgradient of the surface application area and upgradient of the point of extraction for drinking water supply.</p> <p>Surrogates shall be monitored in recycled water and groundwater at these locations: (1) Following tertiary treatment prior to discharge application to the surface application spreading area; and (2) After SAT, but at no point farther than 30 days downgradient of the SAT treatment process The unsaturated zone or the uppermost portion of the groundwater underlying the surface application area.”</p>
14	Attachment A, Section 2.2.2, pg. 7	Groundwater recharge – performance-based CEC and surrogate monitoring locations for subsurface application projects	<p>“(1) Following upstream treatment units prior to treatment by RO; (2) Following treatment by RO prior to treatment by AOPs; and (3) Following treatment by AOPs prior to discharge to the aquifer.”</p> <p>Comment: To be consistent with the expert panel’s recommendations, is it not necessary for the specific monitoring locations to be provided in Attachment A. The panel recommended that: “The location and monitoring criteria for selection and use of these sampling locations are site-specific and need to be defined on a case-by-case basis. The guidance provided within this report should be used to supplement the monitoring conducted as part of compliance with the draft CDPH regulations.” June 2010 Report at pg. 69.</p> <p>With regard to sampling location (1), the language is vague and not consistent with the suggestion from the expert panel. The panel provided as an example “Between secondary and membrane treatment processes.” June 2010 Report at pg. 69. In reality, the specific location will depend on the feedwater used for the advanced treatment system.</p> <p>With regard to the other two locations, these should be selected in consultation with CDPH. There are conflicting recommendations in the June 2010 Report. On pg. 67, the panel recommends monitoring “recycled water prior to and after RO/AOP,” and on pg. 69 at the locations included in Attachment A. For the two surrogates (TOC and conductivity), since both are used to evaluate membrane performance, it</p>

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			<p>does not make sense to establish two separate locations (after RO and after AOP).</p> <p>We recommend that this language be modified as follows:</p> <p>“(1) Following upstream treatment units prior to treatment by RO <u>At a point selected in consultation with CDPH that represents feedwater to the RO/AOP treatment process; and</u> (2) At a point selected in consultation with CDPH that represents <u>Following treatment by RO</u> prior to treatment by AOPs or <u>and</u> (3) Following <u>treatment by AOPs prior to discharge to the aquifer.”</u></p>
15	Attachment A, Section 3.1, ¶ 1, pg. 8	Initial assessment monitoring phase and performance monitoring locations.	<p>“The purposes of the initial assessment phase are to (1) identify the occurrence of health-relevant CECs, performance indicator CECs and surrogates in recycled water, the unsaturated zone, and groundwater, (2) determine the effectiveness of treatment of the unit processes⁹, and (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase.” [emphasis added]</p> <p>Comment: We believe that the requirements misinterpret the purpose of the initial CEC monitoring, in particular the Board ignores that the information will be used to establish the expected removal rates for CEC performance indicators and surrogates for baseline and subsequent monitoring. The removals will be project specific as recommended by the panel (see Comment #27). The expert panel recommendations allowed for assessment in the unsaturated zone <u>or</u> groundwater; this language implies all projects would have to assess unsaturated zones, which is not feasible. In addition, it is infeasible to collect sufficient sample volume to evaluate all CECs using a lysimeter in unsaturated zones (in particular NDMA). Also see related Comments #17 and #18.</p> <p>Notwithstanding our comments regarding monitoring locations, we recommend that this language be revised as follows:</p> <p>“The purposes of the initial assessment phase are to (1) identify the occurrence of health-relevant CECs, performance indicator CECs and surrogates in recycled water <u>and for surface application projects in groundwater as set forth in Attachment A, the unsaturated zone, and groundwater,</u> (2) determine the effectiveness of treatment of the unit processes⁹, and (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase, <u>and (4) establish expected removal rates for performance indicator CECs and surrogates.”</u></p>
16	Attachment A, Section 3.1, Footnote 9, pg. 8	Monitoring locations for initial assessment	<p>⁹ Unit processes that provide treatment or removal of CECs.”</p> <p>Comment: Since all treatment processes at a wastewater treatment plant and advanced treatment plant and SAT could remove CECs, this footnote should be refined to reflect the appropriate POMs for each type of</p>

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			<p>groundwater recharge project per our earlier comments (see Comments #9, #12, #13, #14, and #15).</p> <p>We recommend that the footnote be revised as follows:</p> <p>“⁹ Unit processes that <u>have been selected in consultation with CDPH and Regional Water Board for monitoring in accordance with this Policy to evaluate provide</u> treatment or removal of CECs.”</p>
17	Attachment A, Section 3.1, ¶ 3, pg. 8	Exemptions from the initial assessment	<p>“For existing groundwater recharge reuse projects, historic monitoring data may be used to assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial assessment phase requirements of this Policy may not be required to conduct the initial monitoring phase and are eligible for baseline monitoring phase requirements (Section 3.2).”</p> <p>Comment: Existing projects may have implemented monitoring programs or research that capture some but not all of what is proposed for monitoring in Attachment A. These projects should receive credit for this monitoring to satisfy the monitoring requirements. Planned projects may have conducted pilot testing or other research that fulfills the requirements of the initial assessment. It would be beneficial to include language that allows those projects to be exempted from conducting some or all of the requirements set forth for the initial assessment.</p> <p>We recommend the following language changes:</p> <p>“For existing groundwater recharge reuse projects or agencies that have conducted or sponsored pilot testing or other relevant research regarding CEC indicators and surrogate occurrence and/or performance, <u>credit for historic monitoring, piloting, or research data may should be used to modify assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial assessment phase requirements of this Policy for health-based and performance indicator CECs and surrogates, including selection of constituents and monitoring frequency. In cases where all of the initial assessments requirements are satisfied using historic, piloting, or research data, projects may not be required to conduct the initial monitoring phase and are eligible for baseline monitoring phase requirements (Section 3.2). In cases where the initial assessment and baseline monitoring are satisfied, projects would be eligible for the standard monitoring phase (Section 4).</u>”</p>
18	Attachment A, Section 3.1, ¶ 4, pg. 8	Increased monitoring during the initial assessment phase	<p>“Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the</p>

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			<p>effectiveness of the treatment process or the increased occurrence and/or concentrations of CECs. Additional actions also may be warranted, which may include but not be limited to resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operations. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.” [emphasis added]</p> <p>Comment: This approach leaves CDPH entirely out of the decision making process for appropriate response actions. We believe this language should be consistent with the expert panel recommendations. With regard to increased monitoring, the panel stated that: “If indicator CECs exceed the suggested thresholds during start-up or baseline monitoring, the Panel recommends that the recharge agency work with DPH and the RWQCBs to identify the need for and extent of increased monitoring to confirm the presence of problematic CEC(s), source identification studies, and/or toxicological studies. If appropriate, increased monitoring might involve engineering removal studies and/or modification of plant operation if found to be warranted.” See June 2010 Report at pg. 70.</p> <p>We recommend that this language be revised as follows:</p> <p><u>“Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates that an indicator CEC exceeds the suggested threshold, the recharge agency should consult with CDPH and Regional Water Board to identify the need for and extent of increased monitoring to confirm the presence of the CEC(s), source identification studies, and/or toxicological studies. If warranted, increased monitoring may involve removal studies or modification of plant operation if warranted a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process or the increased occurrence and/or concentrations of CECs. Additional actions also may be warranted, which may include but not be limited to resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operations. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.”</u></p>
19	Attachment A, Section 3.2, ¶ 1 and ¶ 2, pg. 9	Baseline monitoring – selection of performance CECs	“Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-relevant CECs, performance indicator CECs and surrogates are appropriate to monitor removal of CECs and treatment system

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			<p>operational performance for the standard operation of a facility. Performance indicator CECs detected during the initial assessment phase shall be selected for monitoring during the baseline monitoring phase. Surrogates that exhibited reduction by a unit process and/or provide an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements for the baseline phase are summarized in Table 4.</p> <p>For existing groundwater recharge reuse projects, historic monitoring data may be used to assess removal of health-relevant CECs, performance indicator CECs and surrogates. Existing projects that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for standard operation monitoring requirements (Section 3.3).” [emphasis added]</p> <p>Comment: The instructions for selection of performance indicator CECs should not be based on detection alone, but also: (1) for surface application projects using tertiary recycled water, whether the CEC is present at a high enough concentration or is consistently present in tertiary recycled water to be used as performance indicator; and (2) for subsurface application projects using advanced treated water, whether the CEC is present at a high enough concentration and is consistently present in the feedwater to the RO/AOP process to be used as performance indicator. The language should also be consistent with language for surrogate performance monitoring.</p> <p>Also, per Comment #17, decisions regarding baseline monitoring should reflect the results of historic monitoring data, research, and pilot testing. This is consistent with the requirements for the initial assessment and standard operations monitoring.</p> <p>We recommend that this language be revised as follows:</p> <p>“Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-relevant CECs, performance indicator CECs and surrogates are appropriate to monitor removal of CECs and treatment system operational performance for the standard operation of a facility. Performance indicator CECs <u>that exhibit reduction by unit processes and/or provide an indication of operational performance</u> detected during the initial assessment phase shall be selected for monitoring during the baseline monitoring phase. Surrogates that exhibited reduction by a unit process and/or provide an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements</p>

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			<p>for the baseline phase are summarized in Table 4.</p> <p>For existing groundwater recharge reuse projects or agencies that have conducted or sponsored pilot testing or other relevant research regarding CEC indicators and surrogate occurrence and/or performance, credit for historic monitoring, piloting, or research data should be used to modify the baseline monitoring requirements for health-based and performance indicator CECs and surrogates, including selection of constituents and monitoring frequency. Historic monitoring data may be used to assess removal of health-relevant CECs, performance indicator CECs and surrogates. Existing projects that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for standard operation monitoring requirements (Section 3.3). In cases where the initial assessment and baseline monitoring are satisfied, a project would be eligible for the standard monitoring phase (Section 4).”</p>
20	Attachment A, Section 3.2, ¶ 3, pg. 9	Responses to baseline monitoring results	<p>“Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process or the increased occurrence and/or concentrations of CECs. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operation. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.”</p> <p>Comment: This approach leaves CDPH entirely out of the decision making process for appropriate response actions. We believe this language should be consistent with the expert panel recommendations. With regard to increased monitoring, the panel stated that: “If indicator CECs exceed the suggested thresholds during start-up or baseline monitoring, the Panel recommends that the recharge agency work with DPH and the RWQCBs to identify the need for and extent of increased monitoring to confirm the presence of problematic CEC(s), source identification studies, and/or toxicological studies. If appropriate, increased monitoring might involve engineering removal studies and/or modification of plant operation if found to be warranted.” See June 2010 Report at pg. 70.</p> <p>We recommend that this language be revised as follows:</p> <p>“Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates that an indicator CEC exceeds the suggested threshold or that expected treatment performance based on</p>

Comment #	Document Reference: (Section #, Page #, Paragraph #)	Issue	Comments
			<p>the initial assessment phase is not attained, the recharge agency should consult with CDPH and Regional Water Board to identify the need for and extent of increased monitoring to confirm the presence of the CEC(s), source identification studies, and/or toxicological studies. If warranted, increased monitoring may involve removal studies or modification of plant operations (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process or the increased occurrence and/or concentrations of CECs. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operation. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.</p>
21	Attachment A, Section 3.2, ¶ 4, pg. 9; Section 3.3, ¶ 1 and ¶ 3, pg. 12	Standard operation monitoring program	<p>Pg. 9 “Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis.”</p> <p>Pg. 12 “Based on the findings of the baseline monitoring phase, monitoring requirements for health-relevant CECs, performance indicator CECs and surrogates may be refined to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse project. Monitoring requirements for the standard operation phase are summarized in Table 5. The list of health-relevant CECs required for monitoring may be revised if monitoring results meet the conditions of the minimum threshold level presented in Table 7. Performance indicator CECs and surrogates detected during the baseline phase and that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations.”</p> <p>“Monitoring for health-relevant CECs and performance indicator CECs shall be conducted on a semi-annual basis, unless the project demonstrates consistency in treatment efficacy in removal of CECs, treatment operational performance, and appropriate recycled water quality¹⁰. These projects may be monitored for CECs on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 5.”</p> <p>Comment: Per the June 8, 2012 meeting with Board staff, the intent is to utilize data from the baseline monitoring to make adjustments to the standard operations monitoring. In particular, for health-based CECs, monitoring refinements based on the minimum monitoring threshold should consider updated</p>

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			<p>MTLs that are available in the literature or from legitimate research. For performance CECs that are no longer detected at concentrations that render them useful for evaluating performance, the monitoring program should also be refined. In addition, we believe that the language in Attachment A is not particularly clear with regard to how modifications can be made to the requirements in Table 5 for the standard operation monitoring. The Attachment does not appear to allow for monitoring to be discontinued for performance CECs and surrogates in situations where the continued collection of data is no longer useful or necessary.</p> <p>While the expert panel’s recommendations regarding this issue are not as clear as one would hope, we believe the intent is to use common sense and updated science to make adjustments. The panel stated that “Due to time and resource constraints, the guidance provided regarding a start-up and baseline monitoring program does not address all situations that the regulator and regulated entity will need to address. Under these circumstances, the Panel recommends that the affected stakeholders consult experts to recommend a plant or regional-specific solution.” June 2010 Report at pg. 68. The panel also recommended that “Once every five years, one additional round of CEC monitoring should be conducted to confirm monitoring results.” June 2010 Report at pg. 71. We believe the key issue is that monitoring for these CECs should not turn into a never-ending program to collect data, but that changes to the program to remove compounds should be made based on comparisons of reproducible data and MTLs, specifically any updated MTLs that are available in the literature or from valid research studies.</p> <p>We recommend that the language be revised as follows:</p> <p>Pg. 9 “Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis <u>in consultation with CDPH. Modifications may include reductions in constituents and sampling frequency, including discontinuing monitoring, or the requirement to conduct only one round of monitoring every five years.</u>”</p> <p>Pg. 12 “Based on the findings of the baseline monitoring phase, monitoring requirements for health-relevant CECs, performance indicator CECs and surrogates may be refined <u>from the requirements in Table 5 to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse project. Monitoring requirements for the standard operation phase are summarized in Table 5.</u> The list of health-relevantbased CECs required for monitoring may be revised if monitoring results <u>meet the conditions</u> show that the ratio of the measured concentration to the monitoring trigger level is less than or equal to 0.1 <u>minimum threshold level presented in Table 7</u> based on the monitoring trigger levels presented in Table 6 or</p>

Comment #	Document Reference: (Section #, Page #, Paragraph #)	Issue	Comments
			<p><u>updated monitoring trigger levels based on valid research. The list of health-based CECs may also be revised or monitoring may be discontinued should the data no longer be considered relevant based on consultation with CDPH. Performance indicator CECs and surrogates detected during the baseline phase and that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations. Modifications to the list of performance indicator CECs and surrogates may be made or monitoring can be discontinued should the data no longer be considered relevant based on consultation with CDPH.</u></p> <p><u>“For those CECs and surrogates selected for standard operations monitoring, Mmonitoring for health-basedrelevant CECs and performance indicator CECs shall be conducted on a semi-annual basis. The frequency may be adjusted to annual monitoring if, unless the project demonstrates consistency in treatment efficacy in removal of CECs, treatment operational performance, and appropriate recycled water quality¹⁰. These projects may be monitored for CECs on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 5.”</u></p>
22	Attachment A, Table 3, Footnotes 1 and 2, pg. 10	Initial Assessment Monitoring Requirements	<p><u>Surface Application</u> Monitoring points for CECs and surrogates and Footnotes 1 and 2 – see Comments #9, #12, #13, and #15</p> <p>Selection of surrogates – see Comment #11</p> <p>Monitoring frequencies for surrogates Comment: Because the frequency will depend on the surrogate selected, we recommend that these be deleted from the table and that the column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board.</p> <p><u>Subsurface Application</u> Monitoring points for performance-based CECs and surrogates Comment: The specific locations should be determined in consultation with CDPH and the Regional Water Board. We recommend that these be deleted from the table and that the column should instead say that the monitoring locations shall be selected in consultation with CDPH and Regional Water Board. See Comments #14 and #15</p> <p>Monitoring frequencies for TOC Comment: There is no explanation or justification for the daily frequency selected for the first 400 hours of operation. The frequencies should be developed in consultation with CDPH and Regional Water Board rather than set in stone in Attachment A. We recommend that these be deleted from the table and that the</p>

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			<p>column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board.</p> <p>Continuous Monitoring Comment: We recommend that rather than using the term “continuous” the table should use “on-line monitoring,” and should provide the ability to use on-line monitoring for TOC.</p> <p><u>Landscape Irrigation</u> Comment: The monitoring frequencies for turbidity and chlorine residual are continuous. For some smaller treatment plants, it may be more practical to conduct daily rather than continuous monitoring. It is recommended that the monitoring frequencies for these parameters be changed to “Daily or on-line.”</p>
23	Attachment A, Table 4, Footnotes 1 and 2, pg. 11	Baseline Phase Monitoring Requirements	<p><u>Surface Application</u> Monitoring points for CECs and surrogates and Footnotes 1 and 2 – see Comments #9, #12, #13, #15, and #22</p> <p>Selection of performance-based CECs and surrogates – see Comments #11, #15, and #22</p> <p>Monitoring frequencies for surrogates Comment: Because the frequency will depend on the surrogate selected, we recommend that these be deleted from the table and that the column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board. See Comment #22</p> <p><u>Subsurface Application</u> Monitoring points for performance-based CECs and surrogates Comment: The specific locations should be determined in consultation with CDPH and the Regional Water Board. We recommend that these be deleted from the table and that the column should instead say that the monitoring locations shall be selected in consultation with CDPH and Regional Water Board. See Comments #14, #15, and #22</p> <p>Monitoring frequencies for TOC Comment: We recommend that these be deleted from the table and that the column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board.</p> <p>Continuous Monitoring Comment: We recommend that rather than using the term “continuous” the table should use “on-line monitoring,” and should provide the ability to use on-line monitoring for TOC. See Comment #22</p>

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			<p><u>Landscape Irrigation</u> Comment: The monitoring frequencies for turbidity and chlorine residual are continuous. For some smaller treatment plants, it may be more practical to conduct daily rather than continuous monitoring. It is recommended that the monitoring frequencies for these parameters be changed to “Daily or online.” See Comment #22</p>
24	Attachment A, Section 3.3, ¶ 2, pg. 12	Standard Operation Monitoring – monitoring locations	<p>“Monitoring locations for the standard operation phase shall be the same as the locations used for the baseline monitoring phase.”</p> <p>See Comments #9, #12, #13, #14, #22, #23</p>
25	Attachment A, Table 5, Footnotes 1 and 2, pg. 13	Standard Operation Monitoring	<p><u>Surface Application</u> Monitoring points for CECs and surrogates and Footnotes 1 and 2 See Comments #9, #12, #13, #14, #22, and #23</p> <p>Selection of CECs and surrogates – see Comments #11, #15, #22, and #23</p> <p>Monitoring frequencies for surrogates Comment: Because the frequency will depend on the surrogate selected, we recommend that these be deleted from the table and that the column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board. See Comments #22 and #23</p> <p><u>Subsurface Application</u> Monitoring points for performance-based CECs and surrogates Comment: The specific locations should be determined in consultation with CDPH and the Regional Water Board. We recommend that these be deleted from the table and that the column should instead say that the monitoring locations shall be selected in consultation with CDPH and Regional Water Board. See Comments #9, #12, #13, #14, #15, #22, and #23</p> <p>Monitoring frequencies for TOC Comment: We recommend that these be deleted from the table and that the column should instead say that the frequencies shall be selected in consultation with CDPH and Regional Water Board. See Comments #22 and #23</p> <p>Continuous Monitoring Comment: We recommend that rather than using the term “continuous” the table should use “on-line monitoring,” and should provide the ability to use on-line monitoring for TOC. See Comments #22 and #23</p>

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			<p><u>Landscape Irrigation</u> Comment: Monitoring frequencies for turbidity and chlorine residual are continuous. For some smaller treatment plants, it may be more practical to conduct daily rather than continuous monitoring. It is recommended that the monitoring frequencies for these parameters be changed to “Daily or online.” See Comments #22 and #23</p>
26	Attachment A, Section 4.1, ¶ 2, pg. 14; and Table 6, pg. 16	Evaluation of performance indicator CECs	<p>“The expected removal differentials for performance indicator CECs and surrogates for each groundwater recharge reuse application scenario and their associated treatment processes (i.e., soil aquifer treatment or RO/AOPS) are presented in Table 6. The expected removal differentials are provided for the purposes of evaluating treatment efficacy and operational performance.” [emphasis added]</p> <p>Comment: The “expected” removal rates with one exception are the values presented in the June 2010 expert panel Report (see Table 8.2 on pg. 66). An effective and safe project could have actual removal rates that differ from these percentages if the conditions of the recharge project differ from those used for the research conducted by Drewes et al., 2008 (a two-week travel time and no dilution for SAT; specific UV, peroxide, or ozone dosing for AOP for subsurface application).⁵</p> <p>As described on pg. 67 of the June 2010 Report, performance is initially defined during an individual project’s piloting/start-up phase in parallel with an occurrence study to confirm the presence of the proposed performance indicator CECs in the feedwater of each unit process (in the case of a surface spreading facility, recycled water prior to and after SAT; in the case of direct injection, recycled water prior to and after RO/AOP). For full-scale operation, the operational boundary conditions and removal differential for selected surrogate and operational parameters and indicator compounds as observed during piloting/startup would be confirmed.</p> <p>For subsurface application, Table 6 has two ranges of removal for NDMA: (1) 25-50% for RO [this was included in Table 8.2 of the June 2010 Report], and (2) >80%, which per footnote 4 is for RO/AOP, and is a new value with no reference. It would be important for the Board to characterize this (and all of the other example removal rates) based on the treatment conditions under which the removals were attained. In looking at Drewes et al. (2008), Table 5.15 on pg. 79 presents an NDMA removal of 50-90% for an RO/AOP operation. It is not clear where the 80% was derived from, but it should be consistent with the other examples (e.g., from the same study), or the Board should have conducted a rigorous literature review to present all potential removals and operational conditions.</p> <p>While the Board acknowledges that the “expected removal differentials provided shall not be used as</p>

⁵ Drewes, J. E., D. Sedlak, S. Snyder and E. Dickenson (2008). *Development of Indicators and Surrogates for Chemical Contaminant Removal during Wastewater Treatment and Reclamation* (WRF-03-014), Alexandria, VA, WateReuse Research Foundation.

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			<p>compliance requirements”, use of fixed expected removal differentials that do not reflect project-specific conditions could trigger actions that may not be warranted.</p> <p>Changes or variability in in influent concentrations to treatment processes, variations in treatment processes, and differences in site conditions will all influence removal rates and may be different than the conditions in Drewes et al. (2008). One is example is Drewes et al. (2011) which found that it is important to consider initial concentration levels when utilizing and interpreting percent removal data as well as travel time.⁶ This research report is incorporated by reference. An ongoing WateReuse Research Foundation Project (WRF 10-05) headed by Dr. Jörg Drewes, the chair of the expert panel, is further exploring specific project site conditions on performance. One preliminary finding is that that differences in site conditions can lead to differences in CEC performance.</p> <p>It is significant to acknowledge that the November 2011 draft CDPH groundwater recharge regulations establish SAT performance monitoring, but did not establish the point of monitoring at two weeks. The draft regulations require testing “prior to the soil treatment process and the water after the soil treatment process, but at a point no farther than 30 days downgradient of the treatment process.” Comments provided by WateReuse California (February 28, 2011 and incorporated herein by reference), recommended that project sponsors conduct occurrence studies of indicators and propose a monitoring goal for each that would be approved by CDPH.</p> <p>Thus we recommend that this section of Attachment A be revised as follows:</p> <p>“The expected removal differentials for performance indicator CECs and surrogates for each groundwater recharge reuse project will be established as part of the initial phase of monitoring. One example of removal differentials from Drewes et al. (2008) for each application scenario and their associated treatment processes (i.e., soil aquifer treatment or RO/AOPS) are is presented in Table 6. The expected removal differentials are provided for the purposes of evaluating established for each project will be used to evaluate treatment efficacy and operational performance.”</p> <p>We recommend that Table 6 include the following footnote for the column Expected “Removal Differential (%)”:</p> <p>“Footnote x – The removal differentials presented in this table are from the work by Drewes et al. (2008) and provide an example of performance for that specific research. Project specific removal differentials will be developed for each groundwater recharge project as part of the initial</p>

⁶ Drewes, J.E., Dickenson, E., and Snyder, S. (2011) Development of Surrogates to Determine the Efficiency of Groundwater Recharge Systems for the Removal of Trace Organic Chemicals. Pg. 50. WateReuse Research Foundation, Alexandria, VA.

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			<p>monitoring phase.</p> <p>Also see Comments #9 and #15</p>
27	Attachment A, Section 4.1.1, ¶1, pg. 14	Performance – groundwater recharge surface applications	<p>“For groundwater recharge reuse by surface application, the removal differential shall be determined by comparing the recycled water quality in the discharge to a surface application area to the recycled water quality in the unsaturated zone or the uppermost groundwater beneath the surface application area, taking into account any dilution from other sources.” [emphasis added]</p> <p>Comment: This language is not consistent with the expert panel Report and the recommended locations for performance monitoring. Monitoring locations should determined in consultation with CDPH and the Regional Water Board; see Comments #12, #13, #15, #22, #23, and #25. In addition, the draft groundwater recharge regulations allow for the SAT performance monitoring location to be within 30 days of SAT treatment (see Comment #9); the calculation of removal rates should exclude the effects of dilution water that may be present. In addition, it may be impractical to collect sufficient sample volume in lysimeters in unsaturated zones to conduct analyses for all CECs, particularly NDMA.</p> <p>We recommend that this section be revised as follows:</p> <p>“For groundwater recharge reuse by surface application, the removal differential shall be determined by comparing the recycled water quality <u>prior to release to the groundwater spreading basin and at a location selected in consultation with CDPH and Regional Water Board after SAT and within a 30-day travel distance through an aquifer downgradient of the surface application area taking into account any effects from the presence of dilution water</u>in the discharge to a surface application area to the recycled water quality in the unsaturated zone or the uppermost groundwater beneath the surface application area, taking into account any dilution from other sources.”</p> <p>“For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater after SAT and within a <u>30-day</u> two-week travel time distance through an aquifer downgradient of the surface application area.”</p>
28	Attachment A, Section 4.1.2, ¶1, pg. 14	Performance – groundwater recharge subsurface applications	<p>“For groundwater recharge reuse using subsurface application, the removal differential shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to discharge to the aquifer.” [emphasis added]</p> <p>Comment: this language is vague with regard to the location for collecting the pre-advanced treatment sample. Based on Comment #14, and consistent with the expert panel Report, we recommend that this section be revised as follows:</p>

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			<p>“For groundwater recharge reuse using subsurface application, the removal differential shall be determined by comparing recycled water quality in the feedwater before RO/AOP before treatment by RO/AOPs and after treatment prior to discharge release to the aquifer.”</p>
29	Attachment A, Section 4.2, ¶1, Footnote 11, pg. 16; Table 7, pg. 17	Evaluation of health-based CEC results	<p>Pg. 16 “‘The recycled water producer or groundwater recharge reuse agency shall evaluate health–relevant CEC monitoring results to determine the appropriate response actions. The producer or recharge agency shall conduct the evaluation by comparing measured CEC concentrations (MC) to their respective monitoring trigger levels¹¹ (MTL) listed in Table 6 to determine MC/MTL ratios. The producer or recharge agency shall compare the calculated MC/MTL ratios to the thresholds presented in Table 7 and shall implement the response actions corresponding to the threshold.” [emphasis added]</p> <p>“¹¹ Monitoring Trigger Level (MTL): Health-relevant screening level value for a CEC for a particular water reuse scenario. MTLs were established in, <i>Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Scientific Advisory Panel</i>, dated June 25, 2010.”</p> <p>Pg. 17 Header for Table 7 - Column 2 “Response Action”</p> <p>Comment: We are concerned with this section of Attachment A because this provision establishes a specified mandatory regulatory framework for responses to CEC monitoring results, which is contrary to the expert panel’s recommendations and our discussion with Board staff on June 8, 2012 whereby the responses in Table 7 were considered to be examples of potential actions. With regard to the panel recommendations:</p> <ul style="list-style-type: none"> • The panel clarified that the monitoring results “. . . should not be considered for compliance and/or regulatory purposes, but for investigation and potential use for additional follow-up actions only as part of conferring with the CDPH and the RWQCBs.” June 2010 Report at pg. 71. • The use of the word “shall” ignores the panel’s recommendation that any specific response actions to monitoring results should first be reviewed with CDPH and the Regional Water Boards. This is due in part because the panel’s conceptual framework included “. . . a minimum safety factor of approximately 10,000-fold.” June 2010 Report at pg. 70. In addition, the panel stated that: “Should there be positive baseline monitoring results, the recharge agency, RWQCBs and CDPH needs to consider whether the result is of concern. Consideration should entail topics such as: review of the basis of the (initial) MTL; what is known and what is not known about the particular chemical, the chemical’s potential health effects at the given concentration, the source of the chemical, as well as possible means of better control to limit its presence, treatment strategies if necessary, and other appropriate actions.” June 2010 Report at pg. 70. Since publication of the June 2010 Report,

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			<p>additional information on MTLs is available.</p> <ul style="list-style-type: none"> The response steps specified in Table 7 should be treated as examples of potential responses not the definitive plan. The panel recommended that a project sponsor should work with CDPH and Regional Water Boards to define a response plan: “The Panel provides the following guidance relative to defining positive monitoring results and the potential associated follow-up action(s). While the Panel provides guidance on thresholds for each of these tiers, conservative values were selected because of the limited toxicological information available. The guidance is provided based on the assumption that the Panel’s conceptual framework, utilized within this report, include [sp] a minimum safety factor of approximately 10,000-fold. The Panel recommends that the recharge agency confer with the DPH and the appropriate RWQCB to develop a response plan with specific actions to be implemented by the recharge agency as part of interpreting appropriate responses to the monitoring results.” June 2010 Report at pg. 70. <p>For these reasons, we recommend that the language be revised as follows:</p> <p>Pg. 16</p> <p>“The recycled water producer or groundwater recharge reuse agency shall evaluate health–relevant CEC monitoring results to determine the appropriate response actions. The producer or recharge agency shall conduct the evaluation by comparing measured CEC concentrations (MC) to their respective monitoring trigger levels¹¹ (MTL) listed in Table 6 to determine MC/MTL ratios. The producer or recharge agency shall compare the calculated MC/MTL ratios to the thresholds presented in Table 7 and shall confer with CDPH and Regional Water Boards regarding appropriate response actions taking into consideration the basis of the (initial) MTL; what is known and what is not known about the particular chemical, the chemical’s potential health effects at the given concentration, the source of the chemical, as well as possible means of better control to limit its presence, treatment strategies if necessary, and other appropriate actions. Table 7 presents examples of potential implement the response actions corresponding to the threshold.”</p> <p>“¹¹ Monitoring Trigger Level (MTL): Health-relevant screening level value for a CEC for a particular water reuse scenario. MTLs were established in, <i>Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Scientific Advisory Panel</i>, dated June 25, 2010. MTLs from valid research may be used to evaluate CEC data in lieu of the MTLs in Table 6.”</p> <p>Pg. 17</p> <p>Table 7 – Column 2 Header: “<u>Potential</u> Response Action”</p>
30	Attachment A,	Evaluation of health	“The recycled water producer or groundwater recharge reuse agency shall evaluate health–relevant CEC

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	Section 4.2, ¶1, pg. 17	relevant results	<p>monitoring results to determine the appropriate response actions.”</p> <p>Comment: This language should be revised to clarify the applicable monitoring location being assessed. For surface application, the location should be post-SAT; for subsurface application, the location should be final product water.</p> <p>We recommend the language be revised as follows:</p> <p>“The recycled water producer or groundwater recharge reuse agency shall evaluate health-relevant CEC monitoring results to determine the appropriate response actions. <u>For surface applications, results should be evaluated for groundwater collected after SAT and within a 30-day travel time distance through an aquifer downgradient of the surface application area. For subsurface application projects, results should be evaluated for the final recycled product water.</u>”</p>
31	N/A	CCL3 Special Monitoring Study	<p>Attachment A did not include the three EPA Candidate Contaminant List 3 (CCL3) CECs presented in Table 8.4 of the expert panel Report (see pg. 73): 1,2,3-Trichloropropane, Hydrazine, and Quinoline. The panel noted (that at the time) there was no occurrence data for these CECs, which had the potential to trigger a MEC/MTL ratio greater than 1. The panel recommended quarterly monitoring for one year in in secondary/tertiary treated effluent representing the feed water quality to either surface spreading or RO/AOP ahead of direct injection.</p> <p>Comment: It would be beneficial if the Board could explain why this monitoring program was not included in the Attachment. However, since the panel published its Report, several agencies have collected or initiated studies to collect data on these compounds that can be used to fulfill the requirement for the special study and thus the Board should not include the study in the Amendment.</p> <ul style="list-style-type: none"> • The pilot testing conducted for the Los Angeles Department of Water and Power groundwater replenishment project included samples of tertiary effluent from the City of Los Angeles D.C. Tillman Water Reclamation Plant. Six samples were collected and analyzed for 1,2,3-Trichloropropane; 4 samples were collected and analyzed for Hydrazine; and 2 samples were collected and analyzed for Quinoline. All samples were below detection based on the following MRLs and MDLs: (1) MRL = 0.5 ug/L and the MDL was 0.15 ug/L for 1,2,3-Trichloropropane; (2) the MRL was 1 ug/L and the MDL was 0.77 ug/L for Hydrazine; (3) the MRL and MDL were 10 ng/L for Quinoline. See <i>Groundwater Replenishment Treatment Pilot Study Report - Pilot Testing from February 18, 2010 to June 30, 2011, March 2012.</i> • The Orange County Water District has collected 1,2,3-Trichloropropane data for the Orange County Sanitation District’s secondary effluent feedwater to the Groundwater Replenishment System advanced treatment system. For the 229 samples collected since mid-2008, all have been below detection based on a RDL of 0.005 ug/L. • We also anticipate that by September 2012, the data will be available as part of the San Diego

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			<p data-bbox="827 315 1906 402">Advanced Water Purification Demonstration Facility. The monitoring program includes evaluating the tertiary recycled water from the North City Water Reclamation Plant on a quarterly basis for the 3 CCL3 compounds.</p> <p data-bbox="779 435 1835 461">Thus, it will not be necessary for the Amendment to be revised to add the special monitoring study.</p>