Recycled Water Policy Amendment
Response to Comments
Comment Deadline: 12:00 Noon on September 10, 2018

November 20, 2018

No.	Comment	Response
1	**Agriculture & Priority Pollutants Laboratories, Inc.** **Commenter: Sharon Dehmlow**	
1.001	From a quality and technical stand point, allowing laboratories to test recycled water without going through a formal CA-ELAP accreditation is not good idea. EPA 537 is a highly technical method, and laboratories who offer this method should be thoroughly audited for procedures, quality control, and technical expertise of staff performing the analysis. How will that be achieved if there is no ELAP accreditation?	When the Panel reviewed the implementation of their recommendations from 2012, one of the areas of concern was the lack of quality assurance measures associated with the CEC monitoring. The Panel recommended improving the quality assurance procedures and measures associated with the CEC monitoring to ensure the data are reliable, repeatable, accurate and precise. The Amendment originally included section 1.1 to address this concern. However, the public comments identified concerns with including the National Environmental Laboratory Accreditation Conference Institute (TNI Standard) language since the State Water Board has not adopted the TNI Standard. The Amendment and Staff Report with SED were revised to remove the Quality Management System (TNI Standard) language and all references to a Quality Management System (QMS). However, merely requiring ELAP accreditation does not address the scope of quality assurance measures associated with CEC monitoring at a recycled water treatment plant. To address concerns regarding data quality, Attachment A was revised to clarify that the recycled water producer or project proponent shall develop a QAPP and submit it to the regional water board for review and approval prior to conducting sampling for the monitoring requirements in Attachment A. A QAPP is an outline of the performance criteria, procedures, and measures to ensure the program is meeting quality objectives and goals, including generating and reporting data of known and documented quality. QAPP is now defined in the Definitions section of the Amendment based on the USEPA definition from: USEPA. 2002. Guidance for Quality Assurance Project Plans. EPA QA/G-5. EPA/240/R-02/009: https://www.epa.gov/sites/production/files/2015-06/documents/g5-final.pdf The Amendment now includes language requiring a recycled water producer to develop a QAPP consistent with the U.S. EPA guidelines. Attachment A also includes subsections to consider when developing the QAPP, including Selection of Analytical Methods (1.1), Laboratory

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		Selection and Demonstrations of Competency (1.2), and Data Submission (1.3). Section 4.14.4 of the Staff Report with SED now includes additional discussion and reference materials for developing a QAPP. Tables 1 and 3 of Attachment A include monitoring and reporting requirements for CECs and bioanalytical screening tools. While there are analytical methods available for these constituents (see Tables 4-3 and 4-5 in the staff Report with SED), ELAP accreditation may not be available for all of the constituents at the time monitoring is required to begin. However, lack of available ELAP accreditation does not preclude a program from generating CEC monitoring data of known and documented quality. The development and implementation of a QAPP will address the concerns related to data quality, including demonstrating that the laboratories are able to generate quality data that meet the data quality objectives in the QAPP (see revised Section 1.2 of Attachment A). To ensure adequate protection of public health, it is important for a recycled water producer that is generating recycled water for groundwater recharge or reservoir water augmentation to screen for the CEC Monitoring Parameters in Attachment A whether or not the methods or analytes are accredited by ELAP at the time that monitoring is required to begin. We encourage the use of ELAP accredited labs and included the following language in section 1.2 of the Amendment, *"A laboratory providing analyses of CECs and bioanalytical screening tools must hold a valid certificate of accreditation from the State of California Environmental Laboratory Accreditation Program (ELAP) for the analytical test methods or analytes selected, if such methods or analytes are accredited by ELAP at the time that monitoring is required to begin. If ELAP accreditation for analytical test methods or analyte becomes available after monitoring is initiated, then the laboratory providing analysis of CECs shall be accredited by ELAP for those methods or analytes within one year of such accreditation becoming available. If ELAP accreditation is unavailable for a method or an analyte, the recycled water producer should use a laboratory that has been accredited for a similar analytical method, instrumentation, or analyte until ELAP accreditation becomes available."*

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		Stakeholders also raised concerns about availability of laboratories to conduct the analyses required in Attachment A. The language above provides flexibility for utilities to use in-house labs or other labs without being ELAP accredited if accreditation for those methods or analytes are not available, as long as the laboratory can demonstrate it meets the data quality objectives and other quality assurance measures in the QAPP. Table 4-3 of the Staff Report with SED offers a suggested analytical method that can be used for PFOS and PFOA, however no specific method is required. Discussion of available alternative methods, including some evaluating alternative matrices, can be found on the USEPA Technical Fact Sheet – Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) (https://www.epa.gov/sites/production/files/2017-12/documents/ffrrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf). Currently, ELAP accredits laboratories for analyzing PFOS and PFOA using EPA method 537 Rev 1.1 (drinking water). Therefore, if the use of this method is appropriate, the Amendment requires laboratories to be ELAP accredited for this method. However, section 1.1 of Attachment A includes a requirement that any method that has not been validated and approved, methods that have been modified, or analytical methods that are applied outside their intended use (e.g., new matrix), would have to be validated and approved prior to use.
1.002	Who will assess the Recycled Water Proponent's QAPP and how will they determine it is technically sound? It is our opinion that someone from ELAP who has expertise in this area should approve the QAPPs.	See response to Comment 1.001.
2	**City of Los Angeles Bureau of Sanitation** **Commenter: Enrique Zaldivar**	
2.001	1. Per the proposed amendment, analytical chemistry methods for laboratory analysis of PFOS	The PFOS and PFOA reporting limits (RLs) of 0.002 micrograms/liter (ug/L) was based on the Scientific Advisory Panel's query to a commercial

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	and PFOA are to achieve reporting limits (RL) of 0.002 ug/L (2 ng/L) for both compounds (Table 1 on page A6). The City will most likely be unable to meet these RLs. EPA Method 537, which is used to analyze both compounds, has RLs of 6.5 ng/L (PFOS) and 5.1 ng/L (PFOA). Similarly, Eurofms, an international laboratory that provides analytical testing services, can only achieve RLs of 5 ng/L (PFOS) and 5 ng/L (PFOA). The City has acquired a liquid chromatography/tandem mass spectrometry (LC-MS/MS) instrument capable of achieving much lower levels. However, detection limit(s) and RL(s) are always compromised due to interference in the LC-MS/MS system and the ambient environment.	lab in CA indicating that an MRL of 0.002 ug/L seems possible following EPA method 537 (https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/2018/panel_memo_on_pfos_pfoa_aug_7_2018.pdf). However, we recognize this is a method that has been validated and approved for analyzing drinking water. The matrix of the recycled water will depend on the level of treatment. In some cases, EPA method 537 may not be appropriate to use and ASTM 7979 will be more appropriate. Section 1.1 of Attachment A includes further discussion of method selection, which will be included in the QAPP, also see response to Comment 8.004. In section 5.4.2 of the Science Advisory Panel's report, they also recommended that practicality of achieving RLs be considered. The Panel stated, "Method reporting limits (MRLs) were recommended at a preferred ratio of MTL [Monitoring Trigger Level] /MRL is 10. When this resulted in an MRL that cannot be practically achieved with existing methods (see also Chapter 6), the Panel recommends setting a MTL/MRL as high as possible, but no less than 2." The concerns related to meeting the reporting limits in Table 1 were addressed by revising the reporting limits in Table 1 to 0.0065 micrograms per liter for PFOS and 0.007 micrograms per liter for PFOA. The monitoring trigger levels for PFOS and PFOA are a factor of two higher than these revised reporting limits. To address concerns related to the practicality of meeting the reporting limits for other CECs in Table 1, a footnote was added to Table 1 in Attachment A: *" The regional water board may approve higher reporting limits if it determines these reporting limits cannot be practicably met in recycled water sample matrices using existing methods, as long as the ratio between the reporting limit and the monitoring trigger limit (see Table 7) is no less than 2."*

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		This footnote would not apply to PFOS and PFOA as the reporting limits have been raised and any further adjustments to make the reporting limit higher would make the ratio between the MRL and MTL less than one.
2.002	2. Per the proposed amendment, recycled water project proponents and recycled water producers are required to "Comply with the management and technical requirements applicable to their operations in accordance with The National Environmental Laboratory Accreditation Conference Institute (TNI) 2016 Standard Volume 1, Module 2 - 7" (section 1.1.1 on page A2). This should not be made a requirement at this time as the California Environmental Laboratory Accreditation Program (ELAP) has yet to adopt the TNI standard.	See response to Comment 1.001.
3	**City of San Diego** **Commenter: Peter Vroom**	
3.001	As a city that has already invested in crucial infrastructure at a time when so much regulatory uncertainty remains, we have one concern that we ask you to consider and address in the Revised proposed amendment, namely that reporting Levels in Table 1 of Attachment A in the Revised proposed amendment should be no lower than the Lowest Concentration Minimum Reporting Level (LCMRL). Table 1 of Attachment A in the Revised proposed amendment requires Reporting Levels of 0.002 micrograms per liter (µg/L), which is equivalent to 2.0 parts per trillion (ppt), to be met for both Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS). In the State Water Resources Control Board Draft Staff Report, which accompanies the Revised proposed amendment, EPA Method 537 is specified as the method to be used for both PFOA and PFOS analyses. However, validation data reported in Table 5 of EPA Method 537 lists the values achieved for the LCMRL at 5.1 ppt for PFOA	See response to Comment 2.001

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	and 6.5 ppt for PFOS, and also values of 1.7 and 1.4 ppt for the respective MDLs for these two analytes. Although EPA method 537 specifies that laboratories must determine the applicable Minimum Reporting Level (MRL) based on the EPA procedure using the Prediction Interval of Result, it cannot be expected that MRL results from this determination would be lower those determined by the LCMRL procedure. In addition, the proposed Reporting Levels for PFOA and PFOS of 2 ppt is only slightly greater than the MDL listed for the EPA Method 537 validation data. As the lowest achievable MRL (regardless of which procedure is used in its determination) are often observed to be at least three-to-five times greater than measured MDL values for many analytical methods, requiring an MRL of 2 ppt appears to be unreasonable. We strongly recommend that the Reporting Levels for PFOA and PFOS be set at values no lower than those reported for the respective LCMRL from validation data published in EPA Method 537.	
4	**Clean Water Action** Commenter: Andria Ventura **Natural Resources Defense Council** Commenter: Anna Reade **Environmental Working Group** Commenter: Bill Allayaud **Center for Environmental Health** Commenter: Sue Chiang **Upstream** Commenter: Miriam Gordon	
4.001	While this letter's signatories applaud the idea of looking at PFOS and PFOA in recycled water, limiting the amendment to include only these two out of thousands of known per- and polyfluorinated (PFAS) chemicals addresses just the tip of the iceberg and would be a disservice to the public and	One of the primary challenges with CECs is the lack of available monitoring data or health-based thresholds of significance. The Panel considered the 489 constituents for which there was data available to apply to the risk-based framework in Figure ES.1. of the 2018 report *Monitoring Strategies for Constituents of Emerging Concern (CECs) in*

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	environment. We strongly urge the Board instead to view PFASs as a class of chemicals and amend the recycled water policy accordingly. At minimum the policy should require monitoring for the PFAS chemicals that can be accurately detected by EPA Method 537 v1.1 (EPA Document #: EPA/600/R-08/092) with the inclusion of branched PFOA isomers in the quantitation of PFOA. This would enable the quantification and reporting of 18 PFAS chemicals, including PFOS, PFOA, and the two other PFASs –PFHxS and PFHpA-detected in California drinking water sources through the UCMR3. In addition, the policy should direct monitoring to include an expanded list of PFAS chemicals as EPA or the state expands its technical capability for detection in the future.	*Recycled Water* after conducting a literature and data search from state-wide, national, and international sources. While other constituents may be present in the water, the limited data availability did constrain the Panel's ability to evaluate constituents that may be present, but we are not monitoring for. This is in part why the use of bioanalytical screening tools is important because they are able to screen for any constituent that activates the respective receptors. Furthermore, the Panel encouraged (1) additional short-duration monitoring of a broader scan of targeted CEC to increase the amount of available monitoring data, and (2) additional research on health-based levels of significance, to improve their ability to expand their assessment of CECs. Section 10.1.3 of the Amendment emphasizes the need for additional CEC research to help fill the data gaps. The Panel did not recommend including the rest of the PFASs because there was not sufficient monitoring or health-risk data for these additional compounds. The Water Board is following recommendations from the Science Advisory Panel, as indicated in their August 7, 2018 memo, stating that the "The State Water Board is certainly aware that the use of perfluorinated compounds (PFs) is changing. It seems that shorter chain PFs are replacing longer chain PFs such as PFOA and PFOS. Following this trend, the Panel would expect concentrations of the latter to decrease (and likely already have been decreasing over the past decade) and of the shorter chain PFs to increase (as their use in consumer products increases). Given these trends but also lack of preliminary occurrence and toxicity data the Panel recommends the issue of shorter chain PFs be specifically called out for consideration during the next periodic review. In the meantime, the State is encouraged to look into available standardized methods for shorter chain PFs (analyte lists, MRLs, etc.)." EPA is currently working to develop a new drinking water method to address multiple short-chain PFAS, including GenX. They anticipate that the new method will be completed in early 2019. The EPA developments, as well as other research, regarding the occurrence and toxicity of short

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		chain PFASs will be reviewed in the next periodic Panel review. In the interim, although only PFOS and PFOA are assigned notification levels, all 14 PFAS compounds detectable by EPA method 537 v.1.1 can be reported to DDW drinking water monitoring database. Recycled water producers or drinking water systems are welcome to voluntarily test for PFAS compounds and report all of their findings from the analysis. Additionally, the State Water Board is planning to work with ELAP to investigate analytical methods and laboratory capacity to evaluate PFASs in the environment. In the future, further testing will become required if the Division of Drinking Water issues Notification Levels for additional PFASs. As more data becomes available, the Panel can re-visit this issue when they are next convened and update their recommendations based on the current state of the science. Furthermore, the concept of addressing classes of chemicals rather than one by one is something the Panel and State Water Board should contemplate in the future as this issue is not isolated to PFASs but for any CEC from a class of chemicals that may be of concern (e.g., nitrosamines, phthalates, pyrethroids).
4.002	There are an estimated 4730 PFAS chemicals in commercial use world-wide, both in consumer products and industrial processes. Our current understanding of contamination of California water and the population at large is limited. For instance, the UCMR3 program only tested for 6 PFAS chemicals nation-wide and at relatively high levels. However, as over 40 years of data has demonstrated, PFAS such as PFOA, PFOS, and related chemicals, are extremely persistent, mobile in water, accumulate in the human body, and are associated with a wide array of environmental and human health impacts including cancer, immunotoxicity, liver toxicity, developmental disorders, and high cholesterol. The chemical industry's response to these issues has been to replace the long-chained chemicals with shorter	See response to Comment 4.001.

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	chained versions (less than 8 fluorinated carbon atoms). Unfortunately, emerging science is coalescing on a conclusion that these chemicals, though less studied and not currently regulated, are also extremely resistant to environmental degradation. In addition, independent researchers have raised a concern that greater amounts of short chained PFASs replacements may be required to serve the same purposes in products and processes, thus raising levels in water and other environmental media.	
4.003	Monitoring recycled water for a full array of PFAS is important to human health whether the water is used for potable or non-potable purposes given the persistence of these chemicals in the environment. In fact, PFHxS, which has been detected in 7 California drinking water sources at or over 30 parts per trillion, has a longer half-life in the human body than PFOA and PFOS. According to the CDC, PFOA is retained from 2 to 4 years and PFOS from 5 to 6 years in the body. PFHxS is retained in the body from 8 to 9 years. In addition, the Centers for Disease Control the CDC has generated a minimal risk level (MRL) for PFHxS based on hepatic and thyroid effects. Clearly, ignoring the presence of this chemical, along with other toxic PFASs is not adequately health protective.	See Response to Comment 4.001.
4.004	While there is limited evidence that some shorter chained PFAS may not remain in the human body as long as their larger cousins, the emerging science points to their being toxic at the cellular level and there have been studies indicating that they collect not only in blood and urine, but in the organs of humans and animals. This emerging science, along with that of short chained PFAS persistence in the environment has led scientists from around the world to call for the eradication of PFAS except in the	The comment provides additional information to support the position of the need to monitor for more PFAS compounds. See response to Comment 4.001.

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	essential products and processes, and for collection of data to identify and monitor the presence of all PFASs in the environment. As warned in the 2015 Madrid Statement, "increasing use of fluorinated alternatives will lead to increasing levels of stable perfluorinated degradation products in the environment, and possibly also in biota and humans. This would increase the risks of adverse effects on human health and the environment."	
4.005	Since PFAS restrictions on short chained PFAS has not been forthcoming, failure to monitor for them in recycled water would likely result in their continued presence in California's environment and could perpetuate the harm that they cause to humans, as well as to water, soil, and air quality.	See Response to Comment 4.001.
4.006	Wastewater and ground and surface waters influenced by recycled water are particularly vulnerable to contamination from a broad array of PFASs. A spatial analysis of the 2013-2015 national drinking water PFAS concentrations from the UCMR3 program has correlated levels of PFAS in water above the MRL with wastewater facilities, in addition to industrial and military sites, and airports. Industrial discharges, contaminated household dust, and consumer products contribute to the PFAS contamination flowing from wastewater treatment facilities. Given the replacement of PFOA and PFOS with alternative PFAS chemicals in consumer products and other applications, we can expect contamination of wastewater effluent with multiple PFAS compounds beyond PFOA and PFOS. Testing of WWTP effluent used for recycling in California detected 14 PFAS compounds.	The comment provides additional information to support the position of the need to monitor for more PFAS compounds. See response to Comment 4.001.
4.007	Finally, we would point out to the Board that the rise in shorter chain length PFAS chemicals complicates the state's ability to treat water. While activated carbon, ion exchange, and high-pressure	See response to Comment 4.001. In addition, the State Water Board does not prescribe treatment options, but rather allows facilities to select the appropriate processes for their site-specific needs and then verifies the treatment processes can meet the treatment levels.

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	membranes have been effective in removing PFOA and PFOS, less is understood about the removal of smaller PFAS molecules or combinations of PFAS in the same water source. Evidence exists, however, that shorter chained PFAS are PFASs such as PFHxA, PFBA, PFPeA are more difficult to remove effectively. Consequently, it is essential to gain as comprehensive a picture as possible of what is present in recycled water to avoid poor management and treatment decisions that would have to be revisited at great expense later on.	
4.008	To summarize: • PFASs as a class persist in the environment, and are thus labeled as "forever" chemicals • Health impacts are being demonstrated well beyond PFOA and PFOS • Drinking water and food contaminated with PFAS, including but not limited to PFOA and PFOS pose a threat to human health. • Recycled water, used for both non-potable and potable uses, is particularly vulnerable to contamination from the vast array of PFAS chemicals used in commerce. • We cannot "guess" what chemicals may impact recycled water given the lack of data on what PFASs are used in the state. Consequently, it is necessary to use the best technology possible to monitor for a wide array of these chemicals to protect human health and the environment.	See response to Comment 4.001.
4.009	By focusing solely on PFOA and PFOS, we risk allowing other similarly dangerous PFASs to enter the environment and, as the state ultimately moves toward potable reuse, into human bodies. For these reasons the recycled water policy must be inclusive of the entire class of these toxic chemicals, monitor for the greatest number of PFAS that is technically possible, and continue to develop and implement	See Response to Comment 4.001.

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	greater monitoring and treatment technologies in response to this world-wide problem.	
5	**General Public** **Commenter: Edo McGowan**	
5.001	Some attention seems warranted with respect to interactions between PFOS and PFOA and their contact with pharmaceuticals as found discharged into wastewater treatment systems, and subsequent impacts on mitochondria. See below for a start: Damage to mitochondria is now understood to play a role in the pathogenesis of a wide range of seemingly unrelated disorders such as schizophrenia, bipolar disease, dementia, Alzheimer's disease, epilepsy, migraine headaches, strokes, neuropathic pain, Parkinson's disease, ataxia, transient ischemic attack, cardiomyopathy, coronary artery disease, chronic fatigue syndrome, fibromyalgia, retinitis pigmentosa, diabetes, hepatitis C, and primary biliary cirrhosis.	The comment provides additional information to characterize the potential risks associated with PFOS and PFOA, but no response is needed.
6	**Los Angeles Department of Water and Power** **Commenter: Katherine Rubin**	
6.001	With regards to the latest proposed amendment, LADWP understands the SWRCB's concerns regarding PFOS and PFOAs in the environment and their potential presence in recycled water. These chemicals are manmade and have been applied to manufacture cookware, carpet, clothing, fabrics to enhance stain resistance and water repellency, aqueous film forming foams (AFFF), fire retardants, and many other products. These molecules comprise many carbon-fluorine bonds that contribute to their persistence in the environment, and have become nearly ubiquitous in the environment. The science regarding these compounds is evolving, including our ability to detect them and our knowledge about	The comment is an overarching introductory statement followed by comments 6.002 to 6.010 below. No response is needed.

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	their environmental and health impacts (see Enclosure 1). LADWP believes working together will allow for practical and viable solutions that protect human health while promoting the development and use of recycled water supplies.	
6.002	1. Notification Levels and Regional Concentrations in Groundwater In some areas, the regional background levels in groundwater are higher than the stipulated notification levels of 14 ppt for PFOA and 13 ppt for PFOS. For these areas, monthly sampling would be required. Due to regional background concentrations, attaining the notification levels would not be possible and an attenuation study would be necessary. Given regional background concentrations, the SWRCB's proposal would result in perpetual and costly requirements, and it is not clear how the situation would be resolved. For these reasons and as discussed elsewhere in this letter, LADWP is concerned with the ppt notification levels for PFOS and PFOA in these situations;	When recycled water producers apply for a permit, monitoring locations will be reviewed by Water Board staff consistent with section 3 of Attachment A. Groundwater recharge projects and reservoir water augmentation projects require monitoring either (1) prior to application to the surface spreading area, (2) prior to treatment by RO and following RO treatment, prior to release into the aquifer, or (3) prior to treatment by RO and following RO treatment, prior to release into the reservoir. These monitoring events should therefore occur before the recycled water mixes with ambient groundwater or reservoir water. The regional groundwater background levels would thus not impact the recycled water quality. The State Water Board advocates the release of recycled water so that it does not contribute to the degradation of existing water resources. In addition, the Staff Report with SED section 4.14.1 and Science Advisory Panel (SAP) report section 5.5 explain that the Panel built in a level of conservatism into their risk-based framework. According to the SAP report, "The process the Panel used to screen CECs considered concentrations measured in secondary or tertiary treated wastewater effluent, not the point of exposure. Attenuation of CECs during advanced water treatment was not given any credit but these processes (including SA, integrated membrane systems or advanced oxidation processes) represent very effective barriers against a wide range of CECs. As a result of numerous physical, chemical and biological processes (e.g. dilution, dispersion, volatilization, sorption and biotransformation), CEC concentrations will be further reduced in an environmental buffer. Post-treatment after abstraction either at the well-head (for GWR) or at a regular surface water treatment plant (for SWA) provide additional barriers to some CECs. Finally, blending with other drinking water sources might occur either prior to or in the drinking water distribution system before this water reaches the point of exposure."

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		The comment regarding the notification levels for PFOS and PFOA is out of the scope of the Amendment.
6.003	LADWP notes that these notification levels were adopted without public comment and may be inconsistent with guidelines developed by others. Further, LADWP notes the need to consider additional factors in developing policies to implement notification levels, including the need to develop recycled water supplies and regional water supply reliability while simultaneously protecting public health.	The comment regarding the notification levels for PFOS and PFOA is out of the scope of the Amendment.
6.004	LADWP recommends that the SWRCB focus on identifying the sources of PFOA and PFOS and actions that can be taken to minimize ambient concentrations by focusing on the sources of these compounds. Perhaps finding a means to control the sources of these compounds would be more practical and effective, rather than trying to locate and treat groundwater in locations where these chemicals may have persisted for decades.	This comment is not within the scope of the proposed PFOS/PFOA revisions. However, the focus of the Amendment is not on source control but specifically on recycled water regulations to ensure a high quality of water is discharged into the environment.
6.005	2. Laboratory Testing It currently appears that few laboratories have the capability to reliably measure for PFOS or PFOA at the levels proposed in the amendment. Numerous factors affect a laboratory's ability to measure these compounds, including the availability and use of certified PFOS-free sample containers, procedures to minimize cross-contamination, and the availability of certified PFAS-free water. In addition, it is currently costly to measure PFOA and PFOS at the proposed ppt levels. USEPA is currently working on the development of new analytical methods and is expected to begin a multi-laboratory validation process later this year (see Enclosure 2).	The State Water Board considers cost of compliance for monitoring the CEC Monitoring Parameters in Attachment A (presented in Tables 4-4 and 4-6 of the Staff Report with SED) and determines the cost is acceptable and bears a reasonable relationship to the need for data and the benefit of ensuring adequate protection of public health. Also, see response to Comment 2.001 regarding the reporting limits and response to Comment 4.001 regarding the State Water Board's efforts to coordinate with other efforts that are already underway.

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	LADWP recommends that the SWRCB coordinate with other efforts underway nationally. LADWP also recommends that the State undertake a study to determine the practical quantitation limits (PQLs) for these compounds and develop a program whereby laboratories could be audited and provide supporting data to demonstrate they are producing reliable and reproducible analytical results.	
6.006	3. OEHHA Risk Assessment LADWP is concerned that the state of knowledge regarding the health impacts of PFOA and PFOS continues to evolve, and that use has shifted to other, shorter-chain compounds. Comprehensive and critical reviews of available epidemiological studies are a key component of the process used to establish notification levels. It is not clear that the State has evaluated the available literature to support the published thresholds. Given past and current laboratory limitations, it is critical to evaluate the available data and studies to establish human health impacts.	See response to Comment 4.001 regarding the evaluation of other PFASs. The comment on the notification levels for PFOS and PFOA is out of the scope of this Amendment.
6.007	Reverse osmosis (RO), one of the available treatment options, cannot handle the quantity of flow in local projects. The demand of the City of Los Angeles is 600 million gallons per day (mgd), which is much greater than the City's ability to treat with RO at a scale larger than pilot level.	This comment is out of scope of the Amendment. However, the State Water Board does not prescribe treatment options, but rather allows facilities to select the appropriate processes for their site-specific needs and then verifies the treatment processes can meet the treatment levels.
6.008	Many recycled water supplies are used for non-potable uses, and even when recycled water becomes part of the drinking water supply, it is typically blended or mixed with other sources of water. For these reasons, any policy implementing notification levels should require notification based	See response to Comment 6.002.

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	on the final concentration of PFOA and PFOS in water delivered to consumers.	
6.009	As described below, more information is needed regarding the treatment process(es) that can remove both PFOA and PFOS and also related, shorter-chain fluorinated compounds. The State's Recycled Water Policy should consider the practical ability of water agencies to implement and deploy these technologies in order to effectively protect human health while minimizing environmental, energy, and other impacts. 4. Cost/Benefit The treatment processes available to remove PFOAs and PFOS include RO and other expensive and energy-intensive alternatives that have a significant environmental "footprint" (See Enclosure 2). Further research is needed to determine if the same technologies that reduce concentrations of PFOA and PFOS will also reduce the concentrations of related, shorter-chain molecules. For example, breakthrough times and treatment efficiency may vary for different compounds. It is important to "get this right," as it is paramount to protect human health and to use ratepayer funds effectively. The necessary treatment technologies will impact decisions about whether or not to pursue recycled water projects. In Southern California and throughout the State, recycled water is a necessary component of a sustainable water supply, and it is important to ensure that the best science is used to determine the appropriate means to protect human health and minimize the environmental footprint and cost of necessary treatment. The proposed sampling and analysis requirements could place barriers on these	See response to Comment 2.001 regarding other PFASs, including shorter chain fluorinated compounds. The State Water Board does not prescribe treatment options, but rather allows facilities to select the appropriate processes for their site-specific needs and then verifies the treatment processes can meet the treatment levels. There are a number of available treatment technologies for removing PFOS and PFOA including activated carbon, ion exchange, membrane filtration, and advanced oxidation processes. The State Water Board acknowledges there may be potential challenges with treatment and removal of contaminants and associated costs. However, PFOS and PFOA the Office of Environmental Health Hazard Assessment (OEHHA) recommended interim notification levels for PFOA based on liver toxicity, as well as cancer risks and for PFOS based on immunotoxicity. OEHHA made these recommendations following its review of currently available health-based advisories and standards and supporting documentation. After independent review of the available information on the risks, the State Water Board established notification levels at concentrations 13 parts per trillion for PFOS and 14 parts per trillion for PFOA, which are consistent with OEHHA's recommendations. It is important for a recycled water producer to generate potable recycled water consistent with these notification levels to ensure protection of public health.

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	projects and place more dependence on imported water supplies. LADWP recommends that the SWRCB conduct a detailed literature review, identify the current state of the science regarding treatment technologies, and identify data gaps and information needs. LADWP looks forward to working with the SWRCB to identify appropriate and necessary revisions to the Recycled Water Policy to ensure that human health is protected and recycled water is efficiently and effectively integrated into regional water supplies.	
6.010	In closing, LADWP is very concerned about the SWRCB's approach to regulating PFOS and PFOA. LADWP hopes to work with SWRCB staff on a solution that will encourage and not hinder the development of alternate sources of water, such as the recycled water projects. LADWP appreciates the opportunity to provide comments and looks forward to continue working with SWRCB staff in this process.	The comment is an overarching conclusory statement preceded by Comments 6.002 to 6.009 above. No response is needed.
7	**Pasadena Water & Power** **Commenter: David Kimbrough**	
7.001	PWP is supportive of the goals of the Recycled Water Policy and believe that the proposed Amendment has many positive elements. PWP would like to provide comments on proposed changes involving PFOS and PFOA but these comments would be applicable to other of the Chemicals of Emerging Concern ("CEC") listed as well.	The comment is an overarching introductory statement followed by Comments 7.002 to 7.006 below. No response is needed.
7.002	1) No approved method is cited. Under the recent UCMR III, EPA Method 537 Rev 1.1 was the approved method. However, Attachment A does not specify this or some other method as acceptable for compliance monitoring. This would imply that a	Attachment A does not allow use of just "any analytical method" but rather the recycled water producer shall select analytical methods consistent with section 1.1 of Attachment A. The QAPP will include the selection of analytical methods and the QAPP shall be reviewed and approved by the regional water board or State Water Board. The QAPP will also ensure

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	Recycled Water Proponent ("RWP") any laboratory can use any method? Historically, California has taken the opposite approach. The State Board has for many decades specified which methods are acceptable. The logic is that the data users, the RWPs, State Board staff, and others, need to have confidence in the quality of the laboratory results. Allowing the use of any method, including those which have not been peer-reviewed, lowers the confidence level. Results produced by un-reviewed method my not have adequate accuracy or precision. If two different laboratories are using two different methods, data user need to be confident that they are really looking at comparable results, i.e. a true "apples to apples" comparison. The results may also end up in court and data produced by an unaccredited laboratory using an unapproved method may not be admissible under either the Frye Test or the Daubert Test. The State Board should identify specific laboratory methods that have been peer reviewed and require the use of these methods.	the data from the CEC Monitoring Parameters meet data quality objectives and other data quality requirements in the QAPP. Also, see response to Comment 1.001 regarding selection and use of analytical methods for the CEC Monitoring Parameters and ELAP accreditation.
7.003	2) Currently, the Revised Amendment does not require that RWPs use laboratories accredited by the Environmental Laboratory Accreditation Program ("ELAP"). In all other regulatory regimes, the State Board requires the use of ELAP accredited laboratories for data to be used for regulatory compliance. Under the Revised Amendment, basically, each RWP sets up their own accreditation program (which is called a Quality Assurance Project Plan ("QAPP"). a. Few RWPs have the technical or managerial expertise to organize and manage its own	See response to Comment 1.001.

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	accreditation program. Likewise, there are few Board offices or staff with the needed skills or resources. b. The Revised Amendment does not provide any standards for what constitutes an acceptable laboratory accreditation program for each RWP. There are just a couple of sentences which provide only a few very vague and poorly defined elements of what could possibly be a laboratory accreditation program. Without clear and well defined standards, it would impossible for RWPs to develop a meaningful accreditation program or for Board staff to assess a RWPs accreditation program. c. The Revised Amendment cites TNI 2016 Volume 1, Module 2 – 7 requirements. These however do not actually establish any laboratory requirements. These standards for documenting laboratory procedures. As such, they provide no guidance for what laboratories would actually do in the case analyzing recycled water for PFOA or PFOS, or indeed any of the CECs identified in the Revised Amendment. d. ELAP is now offering accreditation for EPA Method 537. It might make more sense to simply require the RWP's use laboratories reporting PFOAs and PFOSs for compliance with the Recycled Water Policy use EPA Method 537 and be accredited by ELAP.	
7.004	3) There is a term "Reporting Limit" that is used. This is problematic as it is not defined either in the Revised Amendment or elsewhere. a. There are different reporting limits that are defined	The Amendment now includes the following definition for Reporting Limit: *"The measured value of an analyte that can be reliably detected and quantified within acceptable limits of precision and bias for a given method. This value is further defined as no lower than the lowest calibration standard performed within the calibration process. Reporting*

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	for different applications. The Clean Water Act uses the Method Detection Limit and the Minimum Level for NPDES monitoring and compliance determination. b. The Safe Drinking Water Act uses the Minimum Reporting Level ("MRL"), the Lowest Concentration MRL ("LCMRL"), and Detection Levels ("DL") depending on the situation. c. The Division of Drinking Water has historically used the Detection Level for Reporting ("DLR"). Each of these terms is defined differently both legally and operationally. d. The Revised Amendment could be referring to any of these, some other definition, or it may be inventing an entirely new legally significant term. It is very unclear. To be consistent with past practice and to make it compliance more straight-forward for both RWPs and State Board staff, it would be more useful to use the term DLR.	*limits are the minimum value below which data are documented as non-detects."* This definition is consistent with the definition from the State Water Board's California Office of Information Management and Analysis (OIMA) and the method reporting limits the Panel contemplated and used to recommend the method reporting limits in Table 1 and 3 of Attachment A. Section 4.1 of the Staff Report with SED has also been revised to describe the Reporting Limit definition in greater depth.
7.005	4) There is a Reporting Limit of 0.002 mg/L (2 ng/L) for both PFOA and PFOS. a. However the term reporting limit is defined, this number does not appear to be realistic. In EPA Method 537 at the very front (Section 1.2) it says: "The Minimum Reporting Level (MRL) is the lowest analyte concentration that meets Data Quality Objectives (DQOs) that are developed based on the intended use of this method. The single laboratory lowest concentration MRL (LCMRL) is the lowest true concentration for which the future recovery is predicted to fall, with high confidence (99%),	See response to Comment 2.001 regarding the revised reporting limits and response to Comment 7.004 for the definition of the reporting limits. The recycled water producer will develop a QAPP consistent with U.S. EPA guidance (see response to Comment 1.001). The QAPP will include the selection of analytical methods, data quality objectives, reporting limits, acceptance ranges, etc. The State Water Board will work with the regional water boards and stakeholders as resources allow to develop portions of the QAPP, including data quality objectives and data quality indicators for the CEC Monitoring Parameter in Attachment A. Also, see section 4.14. of the Staff Report with SED.

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	between 50 and 150% recovery. Single laboratory LCMRLs for analytes in this method range from 2.9-14 ng/L, and are listed in Table 5. The procedure used to determine the LCMRL is described elsewhere." The only peer-reviewed method says that 2.9 ng/L is at the very lowest of the possible range of MRLs. b. In section 1.3 of the same method, it says: "Laboratories using this method will not be required to determine the LCMRL for this method, but will need to demonstrate that their laboratory MRL for this method meets the requirements described in Section 9.2.5." c. In EPA 537 in section 9.2.5 the Minimum Reporting Limit is not defined numerically. It states: "The MRL may be established by a laboratory for their specific purpose or may be set by a regulatory agency." d. However the MRL that the laboratory uses is established, it needs to be confirmed by preparing a Laboratory Fortified Blank at the MRL and recovery must be +/-50% of the spiked value. To be consistent with past practice and other regulatory applications, the Revised Amendment should identify an approved method and then determine the DLR for that method in recycled water.	
7.006	5) On page A-1 of the Revised Amendment it says: "This section is to ensure laboratories conducting CEC monitoring generate data of known, consistent, and documented quality and to verify that the laboratory can meet the required reporting limits." a. The phrase "meet the required reporting limit" is	(a) See response to Comment 7.004. (b) The QAPP will specify the analytical methods and reporting limits. A recycled water producer shall use an analytical method that is validated and approved for the analytes in Table 1 of Attachment A for the appropriate matrix, and the analytical method must be able to meet the reporting limits in Table 1. Response to Comment 2.001 includes a discussion of the reporting limits for PFOS and PFOA.

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	not defined anywhere. b. Since the reporting limit is "required," are there penalties for to the Recycled Water Proponent (RWP) if they or their laboratory fail to meet this requirement? If not, in what sense are they required? c. If EPA Method 537 is the only approved method, and if the Reporting Limit were defined as the MRL, then each laboratory would need to prepare a LFB at the 2 ng/L and recover it at +/-50%. Laboratory Reagent Blanks would need to be less than 1/3rd of the MRL. These would need to performed with each analytical batch. The most logical approach would be for the Revised Amendment to identify EPA Method 537 as the approved method, require all RWPs use a laboratory accredited by ELAP for this method and PFOA and PFOS, and require those laboratories to comply with the MRL requirements in the method, but set the DLR in the Revised Amendment, and set the MRL requirements in the EPA Method 537 as equal to the DLR.	(c) While EPA Method 537 is currently the only approved method, a recycled water producer can use any method that has been validated and approved consistent with section 1.1 of Attachment A. See response to Comment 1.001 regarding ELAP accreditation.
8	**Sacramento Regional County Sanitation District** **Commenter: Terrie Mitchell**	
8.001	Regional San commented on the previous version of this policy on June 26, 2018 and is supportive of the State Water Board's continued incorporation of the Science Advisory Panel's recommendations into the Draft Policy Amendment.	The comment is an introductory statement followed by Comments 8.002 to 8.005 below. No response is needed.

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8.002	However, Regional San is concerned with the proposed reporting level (RL) for PFOS and PFOA in the Draft Policy Amendment and urges the State Water Board to spend additional time to ensure the RL and test method are achievable for recycled water applications.	See response to Comment 2.001.
8.003	In their August 7, 2018 memorandum to State Water Board Staff, the Science Advisory Panel states that "Based on a query to a commercial laboratory in California, an MRL of 2 ng/L seems possible for both PFOA and PFOS following EPA method 537" (at p. 2). Regional San has a number of concerns with the State Water Board proceeding with establishing the RL for these analytes at 2 ng/L. Regional San contacted 5 accredited laboratories in California and 4 out of 5 stated that they could meet an RL of 2 ng/L with the fifth one having an RL of 20 ng/L. However, 2 out of the 4 laboratories had their method detection limit (MDL) practically the same as their RL which shows that the sensitivity is poor at the RL level. Although laboratories say they can meet an RL of 2 ng/L, the accuracy and precision of the measurement at 2 ng/L will need to be evaluated for each matrix.	EPA 537 has been validated and approved to analyze PFOS and PFOA in drinking water. But ASTM 7979 has been validated for analyzing PFOS and PFOA in wastewater and can meet the reporting limits in Table 1 in Attachment A. See response to Comments 1.001 and 2.001 regarding selection of analytical methods and laboratories and comment and response to Comment 9.003.
8.004	Additionally, the laboratories that can meet the 2 ng/L MDL are running a modified version of EPA method 537. Regional San does not know what the modification is or if it is consistent across different laboratories, so we are concerned with the consistency of any results reported at this low level. Furthermore, there is currently no standard method for running PFOS or PFOA in wastewater. Due to the complexity of the wastewater matrix, it is likely to have interference at such low detection levels.	See response to Comment 8.003.
8.005	Lastly, contamination seems to be another major factor for these analytes since these compounds are	See response to Comment 2.001 and 8.003.

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	found in many common laboratory supplies. Per the EPA method, contamination comes from the instrument itself, the extraction cartridges, auto samplers, reagents, sample containers, and preservative. Given the extent of the potential contamination, the quality of the data measured at such a low level becomes questionable since it is hard to differentiate between the background contamination and the real value in the sample. In light of this, we strongly urge the State Water Board to reconsider the proposed RL and consider a study to determine the appropriate RL for the recycled water matrix.	
9	**Sanitation Districts of Los Angeles County** **Commenter: Ann Heil**	
9.001	As stated in our June 26, 2018 letter, the Sanitation Districts support the State Water Resources Control Board's (State Water Board's) efforts to amend the existing Recycled Water Policy to update and clarify its provisions, in so far as those changes will enhance, rather than unnecessarily impede, future recycled water project development and currently implemented projects.	The comment is an overarching introductory statement followed by Comments 9.002 to 9.003 below. No response is needed.
9.002	However, the June 26, 2018 letter also expressed our concerns about the proposed changes to the Recycled Water Policy, including the shift in overall focus of the policy, addition of a new goal to minimize ocean discharges of treated municipal water, new provisions relating to wastewater change petitions, new requirements for use of bioanalytical screening tools, and requirements for selection of analytical methods for constituents of emerging concern (CECs).	This comment is out of the scope of the proposed PFOS/PFOA revisions. Selection of specific PFOS and PFOA analytical methods is discussed in response to Comment 1.001.
9.003	In addition to previously expressed concerns, the Proposed PFOS and PFOA Revisions raise additional concern for the Sanitation Districts about	Section 1.2.1 of Attachment A included the hierarchical selection of analytical methods was removed and section 1 was revised to include section 1.1 titled Selection of Analytical Methods. The Amendment now

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	the requirements for selection of analytical methods for CECs as they relate to the method required to be used to conduct PFOS and PFOA analyses. Attachment A, Section 1.2.1 of the Proposed Policy provides a hierarchical order for choosing analytical chemistry methods for analysis of CECs, including a requirement to use "U.S. EPA-approved methods," if available. While the term "EPA-approved methods" is not defined in the Proposed Policy, it appears to include methods published by EPA that are not formally included in 40 Code of Federal Regulations Part 136. It would therefore include EPA Method 537 for analysis for PFOS and PFOA. The Sanitation Districts have serious concerns about specifying that EPA Method 537 be used preferentially to analyze for PFOS and PFOA over other available methods. EPA Method 537 was developed for finished drinking water samples, has not been tested on other matrices, and is not a robust method for analysis of matrices with higher levels of suspended solids, as can be exhibited by recycled water. Therefore, it is not appropriate to use EPA Method 537 on recycled water samples. American Society of Testing and Materials (ASTM) Method D7979 is an example of a superior method for analysis of recycled water samples for PFOS and PFOA. ASTM Method D7979 is a validated method for analysis of wastewater and recycled water, properly corrects for matrix interference, and uses techniques that minimize sample manipulation and the potential for contamination. Use of ASTM Method D7979 would provide more accurate data to the State Water Board than use of EPA 537. Note that ASTM Method D7979 can meet the reporting limits specified in the Proposed Policy.	requires a laboratory to use an analytical method that has been validated for the analytes in the applicable matrix (e.g., drinking water, waste water) and can meet the required reporting limits. In general, if the water is treated to tertiary standards, wastewater methods are likely the most appropriate and if the water is the final advanced treated product water, drinking water methods are likely most appropriate. In some cases, a method may be validated and approved for use for drinking water and wastewater. The QAPP should specify which samples should be analyzed using drinking water methods vs. wastewater methods. See response to Comment 1.001 regarding requiring ELAP accreditation for the analytical methods for CEC monitoring. The development and implementation of the QAPP will ensure that a program is using analytical methods that can meet the established data quality objectives (e.g., reporting limits) and that they are using labs that demonstrate competency in running the analytical methods and can meet the data quality objectives in the QAPP. The State Water Board will continue to work towards approving analytical methods for use for the CECs in Table 1 of Attachment A and bioanalytical screening tools in Table 3 of Attachment A, and to make ELAP accreditation available for those analytical methods or analytes as appropriate. The State does not currently have a program with resources allocated to method validation and approval or conducting interlaboratory calibration studies to develop methods that are approved for statewide use. But the Amendment does not require that the CEC Monitoring Parameters are analyzed using a state-approved method. It has flexibility to use any analytical method that has been validated for the analytes in the applicable matrix that can achieve the reporting limits in Table 1 and Table 3 (see section 1.1 of Attachment A). If a validated and approved method is unavailable, Water board staff can review a data validation package and approve the use of a method to analyze for the constituents in Table 1 and Table 3 of Attachment A.

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	Additionally, in our June 26, 2018 comment letter, the Sanitation Districts expressed concern that inclusion of the hierarchical analytical methods selection requirements for CECs is inconsistent with the recommendations from the expert panel convened in 2017 and 2018 to develop monitoring recommendations for CECs in recycled water (CEC Expert Panel). The CEC Expert Panel Report (Monitoring Strategies for Constituents of Emerging Concern in Recycled Water. Southern California Coastal Water Research Project, April 2018; CEC Expert Panel Report) instead simply listed the standardized methods that have applicability for CECs in recycled water without making a recommendation as to preferential use of any of them. Therefore, we stress the importance of our recommendation in the June 26, 2018 letter: to address the issue of methods to be used for CEC monitoring, the Sanitation Districts recommend that the language in the current version of the Recycled Water Policy, (Attachment A, Section 1.1) be retained This language was developed based on extensive review and comment on this issue during the public comment period, and reflects a reasonable means of choosing appropriate analytical methods.	
10	**Heal the Ocean (Late Comment)** **Commenter: Hillary Hauser**	
10.001 (late comment)	HTO supports the State Water Resources Control Board's decision to include the potentially harmful CECs perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in the updated draft amendment for Water Quality Control for Recycled Water. The CEC's are indeed troublesome since they are not unique to wastewater–the EPA also has	The comment is an overarching introductory statement followed by Comments 10.002 to 10.003 below. No response is needed.

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	identified PFOA and PFOS in the air, soil and groundwater.	
10.002 (late comment)	Table 1 sets the reporting limit for both PFOS and PFOA at .002 µg/L. Table 7 sets the monitoring trigger levels at .013 µg/L (PFOS) and .014 µg/L (PFOA). Since the EPA has not established a maximum contaminant level for these two constituents in drinking water, how were the thresholds for reporting and monitoring levels determined?	See response to Comment 2.001 regarding the reporting limits. The revised interim Notification Levels 0.013 µg/L (PFOS) and .014 µg/L (PFOA) are based on OEHHA recommendations as described here: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/pfos_and_pfoa/OEHHA_Recommended_Int_NL_Jun_26_2018.pdf
10.003 (late comment)	The thresholds established for the Policy should be used to encourage the EPA to adopt a nationwide maximum contaminant level for these two new CECs.	The Policy is not the appropriate place to encourage the development of maximum contaminant levels since it only addresses recycled water, and the issue of PFOS and PFOA is broader than recycled water. For more information on the State Water Board's MCL process can be found here: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLReview.html.