S A W P A

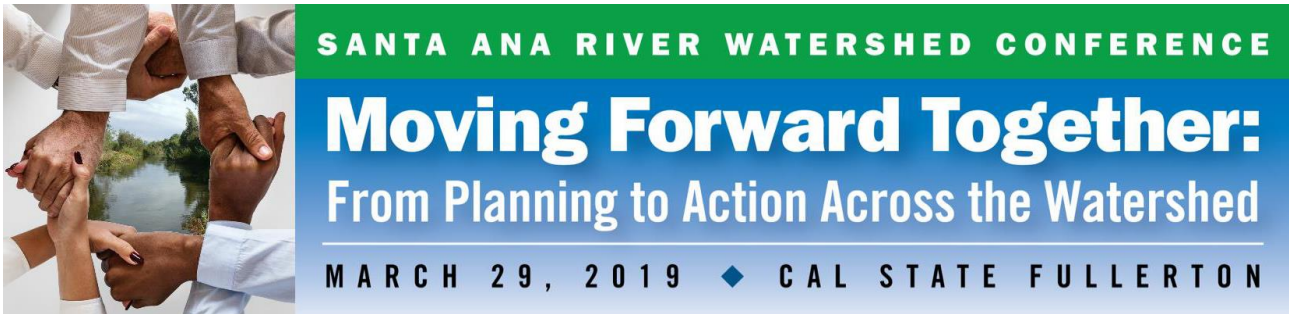
SANTA ANA WATERSHED PROJECT AUTHORITY

Notice and Agenda
Emerging Constituents Program Task Force

DATE/TIME: Wednesday, February 20, 2019
1:30 p.m. – 4:00 p.m.

LOCATION: Santa Ana Watershed Project Authority
11615 Sterling Avenue, Riverside, California 92503

1. Introductions
2. OCWD's Sampling and Laboratory Analysis Plan (SLAP) Update - OCWD
3. New Voluntary Sampling Program Scope – Risk Sciences
4. Feedback from the EC Public Relations Committee - SAWPA
5. Budget
6. Schedule Future Meeting
7. Adjournment



NOTICE OF PUBLIC MEETING

PERFLOUROALKYL SUBSTANCES (PFAS) INFORMATIONAL ITEM

NOTICE IS HEREBY GIVEN that State Water Resources Control Board (State Water Board) present an informational item on March 6, 2019 consisting of an invited panel of Federal and State Agencies, and Non-Governmental Organizations. The goal of this informational item is to inform the Water Board and public of Perflouroalkyl Substances (PFAS), potential sources, and potential risks to drinking water. Panelists will provide updates on existing state & federal actions, as well as the Water Board's Action Plan.

Wednesday, March 6, 2019, 9:30 a.m. – 12:30 p.m.
Joe Serna Jr. - CalEPA Headquarters Building
Coastal Hearing Room
1001 I Street, Second Floor
Sacramento, CA 95814

Additional information on the public meeting is located on the State Water Board web site at: http://www.waterboards.ca.gov/board_info/calendar/.

BACKGROUND
PFAS are a group of man-made chemicals resistant to heat, water, and oil. Not naturally found. Manufacturing of PFAS started in the 1940s and are still used today. PFAS are used in industrial and consumer products. Common occurrences of PFAS chemicals are found in: carpets, rugs, water-proof clothing, upholstery, food paper wrappings, non-stick products, cleaning products, fire-fighting foams, and metal plating (e.g., cookware). Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) are fluorinated organic chemicals that are part of the PFASs group of chemicals. No longer manufactured the United States, PFOA and PFOS are still manufactured globally and imported into the US. Since these chemicals have been used in an array of consumer products, scientists have found PFOA and PFOS in the blood of nearly all people tested. According to the Center for Disease Control (CDC), blood levels of both PFOS and PFOA have steadily decreased in U.S. residents since 1999-2000. However, manufacturers are developing replacement technologies in the PFAS family, including reformulating/substituting longer-chain substances with shorter-chain substances.

In May 2016, the United States Environmental Protection Agency (U.S. EPA) issued a lifetime health advisory for PFOS and PFOA for drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 parts per trillion in community water supplies. U. S. EPA recommended that the notification of customers include information on the increased risk to health, especially for susceptible populations.

In June 2018, the Office of Environmental Health Hazard Assessment (OEHHA) recommends 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 Water Board Division of Drinking Water established notification levels at concentrations 13 parts per trillion for PFOS and 14 parts per trillion for PFOA**.** These levels are consistent with OEHHA's recommendations.

Water Board staff will present the phased investigation Action Plan requiring testing of drinking water systems, and site investigations at high risk locations.

DOCUMENT AVAILABILITY
Meeting materials and additional details will be posted with the Board Agenda prior to the March 6, 2019 Informational Item at: https://www.waterboards.ca.gov/board_info/calendar/

WEBCAST INFORMATION
Video and audio broadcasts of the public meeting will be available via the internet and can be accessed at: https://video.calepa.ca.gov/.

PARKING AND ACCESSIBILITY
For directions to the Joe Serna, Jr. (CalEPA) Building and public parking information, please refer to the map on the State Water Board website:
http://www.calepa.ca.gov/headquarters-sacramento/location/.

The CalEPA Building is accessible to persons with disabilities. Individuals requiring special accommodations are requested to call (916) 341-5261 at least 5 working days prior to the meeting. TDD users may contact the California Relay Service at (800) 735-2929 or voice line at (800) 735-2922. Video and audio broadcasts of the meeting will be available via the internet and can be accessed at: https://video.calepa.ca.gov/.

All visitors to the CalEPA Building are required to sign in and obtain a badge at the Visitor Services Center located just inside the main entrance (10th Street entrance). Valid picture identification may be required. Please allow up to 15 minutes for receiving security clearance.

FUTURE NOTICES
The State Water Board public meeting will be at the time and place noted above. Any change in the date, time, and place of the public meeting will be noticed on the Lyris e-mail list.

ADDITIONAL INFORMATION
Please direct questions about this notice to Annalisa Kihara at (916) 324-6786 (Annalisa.Kihara@waterboards.ca.gov), or Daniel Newton at (916) 449-5596 (Daniel.Newton@waterboards.ca.gov)

February 15, 2019
Date

Jeanine Townsend
Clerk to the Board

2019 Updated Sampling and Laboratory Analysis Plan (SLAP) for the Emerging Constituents Sampling Program in the Santa Ana River Watershed

The Santa Ana Watershed Project Authority's (SAWPA) Emerging Constituents (EC) Program Task Force originally submitted a water quality investigation workplan to the Santa Ana Regional Water Quality Control Board (RWQCB) to characterize selected ECs in wastewater effluents, surface waters and imported waters for calendar year 2010[1].The selected ECs include pharmaceuticals & personal care products (PPCPs), pesticides, herbicides, and industrial indicators of wastewater origin. Used to direct the analytical laboratories supporting this effort, the Sampling and Laboratory Analysis Plan (SLAP) was originally developed in 2010, updated in 2012 to reflect the inclusion of four additional ECs, and further updated response to the 2013 State Water Resources Control Board (SWRCB) Recycled Water Policy Amendment (RWPA).[2]

This 2019 update to the SLAP reflects the SAWPA EC Task Force's new focus on per- and polyfluoroalkyl substances (PFAS). Occurrence of PFAS compounds in the Santa Ana Watershed (including surface water, groundwater, wastewater effluent, recycled water, and drinking water) has been documented via monitoring conducted by some local agencies through the United States Environmental Protection Agency (EPA) Unregulated Contaminant Monitoring Rule 3 (UCMR3) drinking water program and subsequent monitoring by the Orange County Water District (OCWD). In May 2016, EPA established a revised lifetime (drinking water) Health Advisory (HA) for two PFAS compounds, perfluorooctanesulfonic acid (PFOA) and perfluorooctance sulfonic acid (PFOS), set at 70 nanograms per liter (ng/L) for combined PFOA + PFOS. In July 2018, the SWRCB Division of Drinking Water (DDW) established the following interim state drinking water Notification Levels (NLs) and a Response Level (RL) for these compounds: NL PFOA = 14 ng/L, NL PFOS = 13 ng/L, RL PFOA + PFOS = 70 ng/L); PFOA and PFOS were also added to the updated SWRCB RWPA adopted in December 2018 as health-based indicator compounds for potable reuse projects.

1. Sample Collection, Preservation, Storage and Holding Times

Sampling and laboratory analysis follow deadlines specified in Section 5E of the workplan described in the Phase-II report. Specifically, the results from all POTW (publicly owned treatment works) effluent samples, the State Water Project (SWP) and Colorado River samples from Metropolitan Water District of Southern California (MWDSC), and the Santa Ana River (SAR) sampling event (two sites) conducted by Orange County Water District (OCWD) are due to SAWPA by July 31st . These data will be included in the 2013 Annual Report and in future Triennial Reports that are due to the RWQCB by December 31st of 2013 and every three years

[1] Phase-II Report of the Emerging Constituents Workgroup, approved by the Santa Ana Regional Water Quality Control Board on December 10th, 2009

[2] SWRCB Resolution NO. 2013-003: Adoption of an Amendment to the Policy for Water Quality Control for Recycled Water Concerning Monitoring Requirements for Constituents of Emerging Concern, Attachment A, January 22, 2013

thereafter. The second set of SAR samples is to be collected and analyzed by OCWD by September 30th of 2013, with these data to be included in the subsequent Triennial Reports.

Commented [JSD1]: Update/modify? Delete?

Consistent with either EPA Method 537 Rev 1.1 or EPA Method 537.1 (see Section 2), each designated lab will provide their own sample bottles (250-mL polypropylene bottles fitted with polypropylene screw caps.) preserved with Trizma Preset Crystals, pH 7 (1.25g/250mL) (Sigma cat# T-7193 or equivalent), added to sample bottles before shipment to the sites. Sample bottles can be pre-labeled with site information, and will include date, sampling time, sampler, site location, and required testing. Bottles should include a label with the method's chemical preservatives. Sample bottles must be discarded after use.

Samplers and laboratory staff will be warned of low-level detection of PFAS and potential background sources caused by the sampling process. These personnel should be aware of the potential for interference from the use of target compounds monitored within this investigation Sampling and laboratory staff should follow these additional protocols to reduce the potential for sample contamination:

- Samples for PFAS analysis will be kept in coolers with wet ice. Blue ice is not acceptable for sample storage as it may contain PFAS compounds
- Do not use clothing or boots containing Gore Tex
- Do not use clothing that has been washed with fabric softener
- Do not use clothing chemically-treated for insect resistance or ultraviolet protection
- Do not use water-resistant, waterproof, or stain-treated clothing during PFAS sampling
- activities
- Do not use Tyvek suits during PFAS sampling activities
- Ensure clothing used during PFAS sampling activities has been washed a minimum of
- twice
- Do not use personal care products prior to or during PFAS sampling activities; these
- include but are not limited to insect repellant, sunscreen, makeup, etc.
- Do not use Post-it Notes during PFC sampling activities
- Minimize contact with and use of water-resistant notebooks
- After eating or drinking, always wash hands thoroughly and use new nitrile gloves

Each designated agency will ensure that these sampling guidelines are followed, and that qualified sampling staff are assigned to this investigation. Samplers will wear clean nitrile gloves at each site, and will follow the standard operating procedures outlined within their sampling programs.

Field Reagent Blanks (FRB) will be taken at each site and at the same time, where a similar sample volume of laboratory reagent water and preservative is transferred into an empty labeled FRB sample bottle (no preservative). For each sample site, each laboratory will provide the laboratory preserved reagent water for their field reagent blanks, an empty clean bottle and any other additional quality control samples required within their laboratory's analysis.

At least one site within each matrix group will be sampled as a duplicate, and noted within the chain of custody (COC) form. Field parameters will be measured and noted onto the COC – electrical conductivity, pH, temperature, dissolved oxygen, etc. Also, enough samples will be taken to ensure

that matrix spike and matrix spike duplicates (50-100 ng/L for PFOA and PFOS) can be performed on at least 10% of the total samples analyzed by each lab.

Sample extraction holding time is 14 days and the extract analysis holding time 28 days. The laboratory should extract and process the PFAS samples as soon as possible after delivery. Samples should be transported on ice (bagged or blue ice) and delivered to the lab at <10°C. Samples are to be kept refrigerated (<6°C) until ready to be extracted.

One site location will be identified as a "split sample" and processed by all participating labs. It is recommended that the *SAR at Prado Dam* site be used for the split sample. This will represent the matrix split sample within the study. OCWD will collect, split, and distribute this sample to all participating laboratories.

Commented [JSD2]: Confirm we still want to do this or update as needed

2. Target Analytes

Commented [JSD3]: Need to decide with the other labs

a) If we care which specific method each lab uses

b) Which PFAS compounds they report (just PFOA & PFOS or the more complete lists)

At the minimum, we recommend that all 14 compounds in Rev 1.1 be reported. If labs can report all 18 compounds using Rev 1.1 (i.e., if they've unofficially added them) or if they are using 537.1, that would be ok.

The PFAS target compounds for EPA Method 537 Rev 1.1 and EPA Method 537.1 are provided in Table 1. Both methods include both PFOA and PFOS, the primary targets of interest for EC Task Force Monitoring. It should be noted that the four additional PFAS compounds included in EPA Method 537.1 can be unofficially added to Rev 1.1 Method.

Commented [JSD4]: OCWD should receive Rev 1.1 certification from ELAP in Feb 2019. We believe Babcock has their application in to ELAP. Eurofins appears to be the only lab in the state that has received ELAP certification for Rev 1.1

Commented [JSD5]: 537.1 was released by EPA in Nov 2018. There are some subtle differences (improvements) in the QA/QC between Rev 1.1 and 537.1. We think what's in Rev 1.1 is sufficient, but labs can choose to adopt some of the 537.1 improvements into 1.1 w/o having to recertify with ELAP.

Not sure if any labs are 537.1 pursuing certification, OCWD is not at this time.

3. QA/QC Procedures

Each lab will operate their methods according to their Standard Operating Procedure (SOP), and therefore have associated Quality Assurance/Quality Control (QA/QC) samples analyzed within their procedure to help confirm the reported values. However, general data quality objectives can be developed within this investigation. All laboratories should be able to meet the criteria listed below. In an effort to facilitate the comparison of data produced by multiple laboratories and to minimize the effects of sample interference, the Minimum Reporting Limit (MRL) will be set at 4 ng/L for each compound, with the exception of perfluorotetradecanoic acid for which the MRL will be 10 ng/L (Table 1). These MRLs are compatible with the MRLs specified for PFOA and PFOS in the December 2018 SWRCB RWPA. SAWPA's PFAS sampling report will use these MRLs for final reporting purposes. Each lab will provide their most recent method detection limit (MDL) value for each target reported to verify that they can determine results at the MRL level.

Commented [JSD6]: OCWD has been able to consistently achieve these MRLs in tertiary wastewater and SAR surface water matrices.

Two "Blind QC Samples" prepared by Environmental Resource Associates (ERA) will be sent directly to each participating lab. The first blind sample will be a mid-level check, where each target compound from SAWPA's target list is spiked between 25-200 ng/L in a clean water matrix, the second blind sample will be a low-level check S-MRL Verification, where each target compound is spiked at a 100 – 200% of the S-MRL. These QA samples will be processed in a similar manner to all received study sites by each laboratory.

Table 1: Chemicals to be Analyzed in 2019 PFAS Sampling Programs

Analyte	Acronym	CAS#	In 537 Rev 1.1	In 537.1	MRL (ng/L)
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	Yes	Yes	4
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	Yes	Yes	4
Perfluorobutanesulfonic acid	PFBS	375-73-5	Yes	Yes	4
Perfluorodecanoic acid	PFDA	335-76-2	Yes	Yes	4
Perfluorododecanoic acid	PFDoA	307-55-1	Yes	Yes	4
Perfluoroheptanoic acid	PFHpA	375-85-9	Yes	Yes	4
Perfluorohexanesulfonic acid	PFHxS	355-46-4	Yes	Yes	4
Perfluorohexanoic acid	PFHxA	307-24-4	Yes	Yes	4
Perfluorononanoic acid	PFNA	375-95-1	Yes	Yes	4
Perfluorooctanesulfonic acid	PFOS	1763-23-1	Yes	Yes	4
Perfluorooctanoic acid	PFOA	335-67-1	Yes	Yes	4
Perfluorotetradecanoic acid	PFTA	376-06-7	Yes	Yes	10
Perfluorotridecanoic acid	PFTrDA	72629-94-8	Yes	Yes	4
Perfluoroundecanoic acid	PFUnA	2058-94-8	Yes	Yes	4
Hexafluoropropylene oxide dimer acid (GenX)	HFPO-DA	13252-13-6	No	Yes	4
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9	No	Yes	4
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1	No	Yes	4
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	No	Yes	4

Table 2: Method Performance Checks for PFAS Analysis

Sample Description	Specification &Frequency	Acceptance Criteria	Remedial Action
Low-Level CCC at or below the MRL (RDL)	At the beginning of each analysis batch	50-150% target recovery and the SUR must be within 70-130% of the true value.	Instrument Maintenance and Check Standards
Mid-Level CCC	Each Analysis Run – after every 10 Field Samples	70-130% target recovery and the SUR must be within 70-130% of the true value.	Instrument Maintenance and Check Standards
Back Standards CCC	At the end of the analysis batch	70-130% target recovery and the SUR must be within 70-130% of the true value.	Instrument Maintenance and Check Standards
Quality Control Sample (QCS)	Analyze at least quarterly or when preparing new standards, new calibration	must be within 70-130% of true value	Remake standard or open new standards
"RB" Reagent Blank	One LRB with each extraction batch of up to 20 samples.	All targets must be less than 1/3 of the MRL (RDL) If targets exceed 1/3 the MRL or if interferences are present, results for these subject analytes in the extraction batch are invalid.	Isolate Source of Contamination and Re-Extract
Low Laboratory Fortified Blank (LFB) Spiked Reagent Water at the MRL	One LFB is required for each extraction batch of up to 20 Field Samples	50-150% target recovery	Check SPE Cartridge Lots Verify Extraction Procedures and Re-extract
LFB – Spiked Reagent Water at mid or high level	One LFB is required for each extraction batch of up to 20 Field Samples. Rotate between medium and high amounts	70-130% target recovery	Check SPE Cartridge Lots Verify Extraction Procedures and Re-extract
Internal Standard (IS)	Internal standards are added to all standards and sample extracts, including QC samples. Compare IS areas to the average IS area in the initial calibration and to the most recent CCC.	Peak area counts for all ISs in all injections must be within ± 50% of the average peak area calculated during the initial calibration and 70-140% from the most recent CCC	Investigate Matrix Issues Check Standards and Re-Extract
Surrogate Standards (SUR)	Surrogate standards are added to all Calibration standards and samples, including QC samples.	SUR recoveries must be 70-130% of the true value.	Investigate Matrix Issues Check Standards and Re-Extract

SAWPA Project Sample Duplicates	Each Analysis Run 10% minimum of total sample load	≤30% at mid and high levels of fortification and ≤50% near the MRL	Results Reported Re-Extract to confirm if possible
Matrix Spikes Matrix Spike Duplicates Spike/Spike Dup (MRL – Low Level)	Each Analysis Run 10% minimum of total sample load	Recoveries must be within 50-150 % and </= 50 % RPD If MS/MSD spike level is <50% of the ambient concentration acceptance limits are not relevant	Investigate Matrix Issues Check Standards and Re-Extract
Matrix Spikes Matrix Spike Duplicates Spike/Spike Dup (Mid and high levels)	Each Analysis Run 10% minimum of total sample load	Recoveries must be within 70-130 % and </= 30 % RPD If MS/MSD spike level is <50% of the ambient concentration acceptance limits are not relevant	Investigate Matrix Issues Check Standards and Re-Extract
Field Reagent Blank (FRB)	The FRB is processed, extracted and analyzed in exactly the same manner as a Field Sample.	If the method analyte(s) found in the Field Sample is present in the FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid	Sample must be recollected and reanalyzed.
Peak Asymmetry Factor	Calculate the peak asymmetry factor for the first two eluting chromatographic peaks in a mid-level CAL standard <u>every time a new calibration curve is generated.</u> and when chromatographic changes are made that affect peak shape.	Peak asymmetry factor of 0.8 – 1.5 See EPA 537.1 – Section 9.3.9 for the peak asymmetry factor calculation	Change the initial mobile phase conditions to higher aqueous content until the peak asymmetry ratio for each peak is 0.8 – 1.5. Check the tubing connection to the analytical column
Initial Calibration	Started Before Each Analysis Run Must use at least a 5-point calibration curve Lowest Standard must be at or below reportable detection level (RDL) Use IS calibration technique to generate a first or second order calibration curve. This curve **<u>must always</u>** be forced through zero and may be concentration weighted, if necessary	When each CAL standard is calculated as an unknown using the calibration curve, the % recovery for each analyte and SUR results must be 70-130% of the true value for all except the lowest standard, which must be 50-150% of the true value	Check Standard Lots and QC Recalibration or Open New Standards Instrument Maintenance

4. Data Assessment and Reporting

Data will be reviewed by each laboratory's procedure and potential re-extractions or re-analysis conducted. Any samples that fail specific QA/QC criteria, which require a re-sampling request, will be done and evaluated at each participating lab. A detailed description of the cause(s) of the request will be reviewed.

Laboratories will provide a copy of their detailed SOP within the support of this investigation. Final reports will provide all QA/QC information including spike recovery information, LFB recoveries, blanks, calibration check information, MDLs, and applied method techniques. Blanks and QC and MRL criteria referenced in Table 3 will be followed by all laboratories.

Table 3: Blanks and MRL Criteria for PFAS Analysis

Batch QC	QC result	Secondary check	Reporting qualifiers
Laboratory Reagent Blank (RB)	<1/3 MRL		OK to report
	>1/3MRL	Samples positive	Reprocess all positive samples
MRL - Check	<50%		Reprocess entire batch
	50-150%		Proceed
	>150%		Report if samples ND & note qualifier
Laboratory Fortified Blank (LFB) (spike must be <10x the MRL and should be representative of samples)	<70%		Reprocess entire batch
	70-130%		Proceed
	>130%		Report if samples ND & note qualifier
Field QC	**QC result**	**Secondary check**	**Reporting qualifiers**
Field Reagent Blank (FRB)	< 1/3 MRL		Proceed
	>1/3 MRL	Sample positive	Field Contamination – Must be Resample and reanalyzed
	>1/3 and <1/2 MRL	Sample ND	Report ND & note qualifier

5. Data Interpretation and Application

Commented [JSD7]: Review and update, given that we do have regulations for PFOA & PFOS in drinking water and recycled water in CA.

Because the analytical techniques used to support EC characterization studies are still in the early stages of development, great care must be exercised when using the results of such studies. To ensure that water quality monitoring data is used appropriately, EPA has established formal Data Quality Assurance requirements:

> *"EPA has developed a mandatory Agency-wide Quality System (or QA program) that requires all organizations performing work for EPA to assure that: environmental data collected are of the appropriate type and quality for their intended use...."*[3]

> *"Data Quality Objectives (DQOs) are statements of the level of uncertainty that a decision maker is willing to accept in results derived from environmental data, when the results are going to be used in a regulatory or programmatic decision (e.g., setting or revising a standard, or determining compliance). They are a tool that the permit writer may use to ensure that resources are being expended in the most efficient way, and that data collected are sufficient to support the decision making process and not extraneous to that process. To be complete, these quantitative DQOs must be accompanied by clear statements of: decisions to be made; why environmental data are needed and how they will be used; time and resource constraints on data collection; descriptions of the environmental data to be collected; specifications regarding the domain of the decision; calculations, statistical or otherwise, that will be performed on the data in order to arrive at a result. Without first developing DQOs, a QA program can only be used to document the quality of obtained data, rather than to ensure that the data quality obtained will be sufficient to support a permitting decision."*[4]

The most common use of water quality monitoring data is to evaluate compliance with relevant water quality standards. Therefore, DQOs are usually established in order to ensure that the resulting information is suitable for that intended regulatory purpose. The data quality criteria established in conjunction with California's 303(d) listing guidance is an example of such DQOs.[5]

[3]U.S. EPA. EPA Requirements for Quality Management Plans; EPA QA/R-2; Nov., 1999.
[4]U.S. EPA. NPDES Permit Writer's Guide to Data Quality Objectives; Nov., 1990; p. 1-4 & 1-5.
[5]State Water Resources Control Board.Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List. Sept. 30, 2005; Section 6.1 @ pgs. 17-26. See also Final Functional Equivalent Document for Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List. Sept., 2004. Pgs. 232-235.

However, since there are no federal or state water quality standards for the ECs analyzed during this characterization study, it is not possible to establish appropriate DQOs for evaluating compliance with such standards.[6]Therefore, until EPA approves standard analytical methods, the data collected as part of this preliminary EC characterization study should be considered "provisional."[7] This is consistent with EPA's guidance:

> *...methods which will be used extensively for regulatory purposes or where significant decision must be based on the quality of the analytical data normally require more extensive validation and standardization than methods developed to collect preliminary baseline data.*[8]

The data quality objectives established in this Sampling and Analysis Plan are suitable for supporting an early effort to characterize EC concentrations in the Santa Ana watershed. However, a more rigorous data quality review may be necessary before the new information can be deemed suitable to support some regulatory applications, such as: 303(d) listing decisions, antidegradation analyses or translating narrative criteria into numeric TMDL targets or effluent limits.This issue is best addressed by the State Board, through the normal public hearing process, after the Blue Ribbon Panel on Emerging Constituents recommendations are finalized and adopted.

[6] EPA publishes recommended federal water quality criteria pursuant to Section 304(a) of the Clean Water Act. State water quality standards are normally documented in the Water Quality Control Plan (aka "Basin Plan") adopted by each of the California Regional Water Quality Control Boards.

[7] EPA's criteria for certifying a new standard method, pursuant to 40 CFR Part 136, requires a thorough demonstration of accuracy, precision, method detection levels, representativeness, ruggedness, comparability and availability for the proposed analytical procedure. See U.S. EPA. Availability, Adequacy, and Comparability of Testing Procedures for the Analysis of Pollutants Established Under Section 304(h) of the Federal Water Pollution Control Act - Report to Congress; EPA/600/9-87/030; September, 1988 for a more detailed discussion.

[8]U.S. EPA. Availability, Adequacy, and Comparability of Testing Procedures for the Analysis of Pollutants Established Under Section 304(h) of the Federal Water Pollution Control Act - Report to Congress; EPA/600/9-87/030; September, 1988; pg.3-5S

6. Definitions

Blind QC Samples – An unknown quality control sample, which is spiked with the study's target compounds in a reagent water matrix. QC samples are provided by a method Proficiency Testing (PT) vendor – Environmental Resource Associates (ERA). Two QC samples are provided within this study – a mid level calibration check (25-200 ng/L) and an S-MRL check (100-200% of each target's S-MRL). QC samples are sent directly to participating labs by the PE vendor for analysis.

CCC – Continuing Calibration Check – a method required standard to verify the calibration curve – most labs will run verification at the mid-level of the calibration – and at the reportable detection level - RDL (minimum reporting level – MRL).

COC - Chain of Custody – document that provides field and site information and conditions. COC information is transferred into the lab's database, includes basic field parameters. This is a legally required lab document.

Field Reagent Blank A quality control sample used to monitor/verify sampling conditions at the site. The field blank is processed by pouring laboratory preserved reagent water into an empty sample container for the required method. The process mimics the sampling techniques for the site sample; tested to ensure that none of the targets determined within the sample are coming from the process of sampling.

LFB/LCS (low/high) -Laboratory Fortified Blank/Laboratory Control Sample – is a laboratory reagent water sample, which is spiked with the method targets, and extracted within each method batch of samples. Processed just like a sample. This quality control sample insures that the method is generating acceptable data. Labs may run both an MRL/RDL level LFB (low) as well as a mid-level LFB (high).

MBLK / BLK/ RB – Method Blank/ Blank / Reagent Blank – is a method quality control sample consisting of laboratory reagent water and extracted and analyzed identically to all samples within each analytical batch. It monitors the laboratory method and techniques for any sources of contamination or interference.

MDLs – Method Detection Levels – are a statistical calculated value for each target analyzed by the laboratory's method. MDLs are performed by processing seven or more spiked replicates samples at a low-level, and analyzed over a three or more day period under method conditions. MDLs represent the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDLs goal is to be 3x lower than the laboratory established RDL/MRL.

MRL/RDL – Minimum Reporting Limit/ Reportable Detection Level - Represents the minimum quantifiable concentration level for a target analyte within the method. It usually represents the lowest calibration level within the standard curve. The MRL/RDL must be higher than the statistically calculated MDL.

MS/MSD - Matrix Spike / Matrix Spike Duplicate – are quality control samples processed within each analytical batch. They represent field samples that have been spiked with a known concentration of target analytes and processed within the entire method along with all samples. These QC samples are used to monitor the impact of sample matrix on the accuracy and precision of the results.

RPD – Relative Percent Difference – is a quality control value calculated from the MS/MSD samples (as well as other QC duplicates) as a measure of the precision of the method. $RPD = ((X1-X2) / ((X1+X2)/2))*100$

MRL – Minimum Reporting Limit – The lowest concentration level at which each PFAS target within this study will be quantified and reported – 4 ng/L, with the exception of PFTA (10 ng/L)

SOP – Standard Operating Procedure – the laboratory document that provides detailed directions as to the steps and procedures within the method of analysis. Procedure followed by laboratory technicians and chemists so as to produce consistent reliable results. SOPs are also used by field staff.

SPE – Solid Phase Extraction – analytical technique used within the lab to extract and process samples. Disks and cartridges are used to retain the targets of interest during the extraction process – eluted with appropriate solvents and then concentrated for final analysis.

Split Sample – Split Sample – is a quality assurance control, which is an actual field sample that is sent to multiple labs for analysis. The split samples provide a comparison of quality analysis between different labs on actual matrices and are more useful than LFBs for assessing overall accuracy.

Previous EC Sample Sites	
1	City of Beaumont WWTP No. 1
2	City of Corona WRF 1B
3	City of Corona WRF 2
4	City of Corona WRF 3
5	EMWD MV-RWRF
6	EMWD PV-RWRF
7	EMWD SJV-RWRF
8	EMWD TV-RWRF
9	EVMWD Horsethief Canyon
10	EVMWD Railroad Canyon WRP
11	EVMWD Regional WRP
12	IEUA Carbon Canyon WRF
13	IEUA RP1 (02 Outfall)
14	IEUA RP1 (1B Outfall)
15	IEUA RP5
16	IRWD Los Alisos Plant
17	IRWD Michelson Plant
18	City of Redlands WWTP
19	City of Rialto WWTP
20	City of Riverside RWQCP
21	RIX (Cities of San Bernardino & Colton)
22	WMWD: WRCWRA River Rd. Plant
23	YVWD WRF
24	State Project Water at Devil Canyon (by MWD)
25	Colorado River at San Jacinto West Portal (by MWD)
26	Santa Ana River - Reach 3 near MWD Crossing (Sampled Twice: June & September by OCWD)
27	Santa Ana River - Reach 3 near Prado Dam (Sampled Twice: June & September by OCWD)
28	
29	
30	

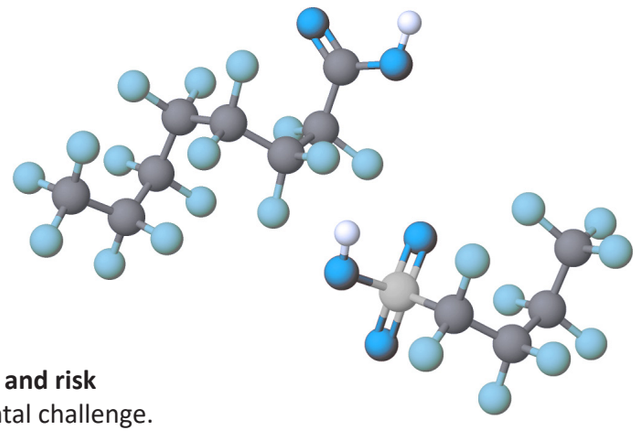
Emerging Constituents Monitoring Programs

RWP 2009	RWP 2013	RWP 2018	Compound	Category	Common Applications	EC Task Force Investigation				
						2010	2011	2012	2013	2019
-	-	X	1,4-Dioxane	Comm./Indus.	Solvent and Chemical Stabilizer	-	-	-	-	?
-	-	-	17α Ethinyl Estradiol	Pharmaceutical	Prescription: Hormone (synthetic)	X	X	X	-	
-	X	-	17β-Estradiol	Pharmaceutical	Prescription: Hormone (natural)	-	X	X	X	
-	-	-	Acetaminophen	Pharmaceutical	Over-the Counter Analgesic (*e.g. Tylenol®*)	X	X	X	-	
-	-	-	Bisphenol-A (BPA)	Comm./Indus.	Plastic Manufacturing	X	X	X	-	
-	X	-	Caffeine	Food Additive	Non-Prescription Stimulant	X	X	X	X	
-	-	-	Carbamazepine	Pharmaceutical	Prescription: Anti-Convulsion	X	X	X	-	
-	X	-	DEET	Comm./Indus.	Insect Repellent (*e.g. Off®*)	X	X	X	X	
-	-	-	Diuron	Herbicide	Weed Control	X	X	X	-	
-	X	X	Gemfibrozil	Pharmaceutical	Prescription: Anti-Cholesterol	X	X	X	X	X
-	-	-	Ibuprofen	Pharmaceutical	Over-the-Counter Analgesic (*e.g. Advil®*)	X	X	X	-	
-	-	X	Iohexol	Pharmaceutical	X-ray Contrast Agent	-	-	-	-	?
-	X	-	Iopromide	Pharmaceutical	X-ray Contrast Agent	-	-	X	X	
-	-	-	Naproxen	Pharmaceutical	Over-the-Counter Analgesic (*e.g. Aleve®*)	-	-	X	-	
-	X	X	NDMA	Comm./Indus.	By-product of Chlorine Disinfection	-	-	-	-	?
-	-	X	NMOR	Not Used	Potential Disinfection By-product	-	-	-	-	?
-	-	X	PFOA	Comm./Indus.	Water & Oil Repellent; Firefighting Foam	-	-	-	-	X
-	-	X	PFOS	Comm./Indus.	Water & Oil Repellent; Firefighting Foam	-	-	-	-	X
-	X	X	Sucralose	Food Additive	Artificial Sweetener (*e.g. Splenda®*)	-	-	-	X	X
-	-	X	Sulfamethoxazole	Pharmaceutical	Prescription: Antibiotic	X	X	X	-	X
-	-	-	TCEP	Comm./Indus.	Flame Retardant; Plasticizer	X	X	X	-	
-	X	-	Triclosan	Comm./Indus.	Antiseptic/Antibacterial/Antifungal Agent	-	X	X	X	

RWP = Recycled Water Policy CEC Monitoring Program: Res. No. 2013-0003 (1/22/13) & Res. No. 2018-0057 (12/11/2018).

EPA's PFAS Action Plan: A Summary of Key Actions

EPA's PFAS Action Plan outlines concrete steps the agency is taking to address PFAS and to protect public health.



EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan:

- Demonstrates the agency's critical national leadership **by providing both short-term solutions and long-term strategies** to address this important issue.
- Provides a **multi-media, multi-program, national research and risk communication plan** to address this emerging environmental challenge.
- Responds to the extensive public input the agency has received over the past year during the PFAS National Leadership Summit, multiple community engagements, and through the public docket.

EPA is taking a proactive, cross-agency approach to addressing PFAS. The key actions EPA is taking to help provide the necessary tools to assist states, tribes, and communities in addressing PFAS are summarized below.

DRINKING WATER

EPA is moving forward with the Maximum Contaminant Level (MCL) process for PFOA and PFOS—two of the most well-known and prevalent PFAS chemicals. The Agency is also gathering and evaluating information to determine if regulation is appropriate for a broader class of PFAS.

The next step in the Safe Drinking Water Act process for issuing drinking water standards is to propose a regulatory determination. This provides the opportunity for the public to contribute to the information the EPA will consider related to the regulation of PFAS in drinking water.

CLEANUP

EPA continues strengthening enforcement authorities and clarifying cleanup strategies through actions such as designating PFOA and PFOS as hazardous substances and developing interim groundwater cleanup recommendations.

This important work will provide additional tools to help states and communities address existing contamination and enhance the ability to hold responsible parties accountable.

TOXICS

EPA is considering the addition of PFAS chemicals to the Toxics Release Inventory and rules to prohibit the uses of certain PFAS chemicals.

The Toxics Release Inventory would make information about certain PFAS releases reported by certain industrial sectors and federal facilities available. Additionally, the TSCA new chemicals program will help manage and, as necessary, reduce risk to human health and the environment from new PFAS.

MONITORING

EPA will propose nationwide drinking water monitoring for PFAS under the next UCMR monitoring cycle.

Monitoring results will improve understanding of the frequency and concentration of PFAS occurrence in drinking water, which can be used to inform regulatory action.

RESEARCH

EPA is rapidly expanding the scientific foundation for understanding and managing risk from PFAS.

Improved detection and measurement methods, additional information about PFAS presence in the environment and drinking water, better understanding of effective treatment and remediation methods, and more information about the potential toxicity of a broader set of PFAS will help EPA, states, and others better manage PFAS risks.

ENFORCEMENT

EPA uses enforcement tools, when appropriate, to address PFAS exposure in the environment and assist states in enforcement activities.

EPA seeks to support communities that have PFAS releases by using federal enforcement authorities, where appropriate.

RISK COMMUNICATIONS

EPA will work collaboratively to develop a risk communication toolbox that includes multi-media materials and messaging for federal, state, tribal, and local partners to use with the public.

This will help ensure clear and consistent messages to the public and will help address concerns related to PFAS.