California Regional Water Quality Control Board
Santa Ana Region

December 10, 2009

STAFF REPORT

ITEM: **11**

SUBJECT: Consideration of an Emerging Contaminants Monitoring and Reporting Program for the Santa Ana River Watershed

DISCUSSION:

Enclosed is a copy of the "Proposed Work Plan for SAWPA's Emerging Constituents Workgroup in 2010-2011" (work plan). This work plan was prepared by Tim Moore of Risk Sciences, the consultant for the Santa Ana River Watershed wastewater treatment and water supply stakeholders, and the lead facilitator for the Cooperative Agreement Workgroup (stakeholder group evaluating the effects of groundwater recharge using imported water and inter-basin transfers of water).

The work plan describes the manner in which the Emerging Constituents Workgroup developed the rationale and reached consensus on the selection of a list of emerging constituents (pharmaceuticals, personal care products, hormones, etc.) that will be monitored in the watershed. This monitoring will take place for discharges from wastewater treatment plants to surface waters or to the groundwater, discharges of recycled water, and the percolation of imported water for groundwater recharge purposes.

STAFF RECOMMENDATION: Adopt Resolution R8-2009-0071, as proposed

DRAFT

Proposed Work Plan for SAWPA's Emerging Constituents Workgroup in 2010-2011

1.0 Introduction

Water quality is routinely sampled at tens of thousands of locations across the U.S. Samples are collected from rain water, storm water runoff, freshwater streams, lakes and reservoirs, groundwater wells and tap water to characterize the quality of various supply sources. Additional samples from the sewage systems are analyzed to ensure pollution prevention programs and wastewater treatment plants are meeting all federal and state water quality standards.

Most sampling programs focus on a few hundred of the most common chemical constituents to assess overall water quality. These chemicals were selected from the larger universe of known chemicals because there is sufficient scientific evidence to indicate they may pose an increased risk to humans, plants or animals (including aquatic organisms) when they occur at elevated concentrations.

Several different regulatory agencies share responsibility for determining the acceptable concentration of potential pollutants. This is a formidable task as there are tens of thousands of chemical compounds in common use. Consequently, state and federal authorities rely on sales/usage information and monitoring data to establish appropriate research priorities for setting new water quality standards through a sophisticated and thorough regulatory review process.[1]

Improvements in analytical technology over the last decade have dramatically increased the number of chemicals we can detect and greatly decreased the concentration at which we can detect them. Today, we are able to discover and quantify some potential pollutants in the range of one part-per-trillion (ppt) or less. For perspective, 1 ppt is approximately equal to a plot of land the size of a postage stamp in an area the size of Orange County.

This new-found ability to detect infinitesimally small chemical concentrations has fundamentally altered our understanding of what's in the water. Trace levels (approx. 1-100 ppt) of many different man-made chemicals, particularly pesticides, pharmaceuticals and personal care products, have been found in waters across the United States. Collectively, these compounds are referred to as "Emerging Constituents" (ECs) because their presence is just starting to be revealed by rapid advances in analytical technology.[2]

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1 See, for example, U.S. EPA's process for identifying Candidate Contaminant List (CCL).

2 Emerging Constituents is one of several similar phrases used to describe the same phenomena. Synonyms include: emerging contaminants of concern, chemicals of emerging concern (CEC), micro-constituents, micro-pollutants, trace organics, etc. Such phrases may mistakenly imply that it is the concern that is emerging rather than the knowledge that certain chemicals may be present in a water sample. Similarly, referring to such compounds as Emerging Pollutants or Emerging Contaminants may mistakenly imply that the levels detected pose a known hazard to people or the environment. The Emerging Constituents Workgroup in the Santa Ana region has chosen to use the phrase "emerging constituents" to describe a large group of chemicals that may or may not pose a risk to human health and the environment. The California Office of Environmental Health Hazard Assessment and U.S. EPA have

Once new chemicals are detected, the question naturally arises as to what effect, if any, these compounds have on the municipal drinking water supplies. As part of the Recycled Water Policy adopted in early 2009, the California State Water Resources Control Board ("State Board") recently convened a Blue Ribbon Panel of Experts to address this concern.[3] The Panel's mission is to recommend appropriate water quality monitoring strategies for ECs based on the best available pharmacological and toxicological information taking into consideration the fate and transport of such chemicals through advanced treatments systems and the natural environment. The Panel is expected to publish its final recommendations in mid-2010.

2.0 Regulatory Context

In general, chemical compounds can be divided into two categories: regulated and unregulated. Regulated chemicals include those where a formal water quality standard or a state notification level has been established.[4] State and federal authorities may issue orders governing the release of such compounds into the environment. These regulations may range from relatively simple monitoring and reporting requirements to strict discharge prohibitions.

Unregulated chemicals are those for which no water quality standard or state notification level have been established. By definition, ECs are usually considered unregulated chemicals. However, that status may change as new information is developed. To that end, additional data are needed to characterize the presence and persistence of ECs throughout the water supply system. This information, along with epidemiological and toxicological data, will be used to set priorities for developing new water quality criteria, Maximum Contaminant Levels (MCLs), state notification levels and future water quality monitoring requirements.

Because the analytical techniques used to support EC characterization studies are still n the earliest stages of development, great care must be exercised when using the results of those studies. The data generated from the non-standard methods employed during the preliminary characterization studies are not sufficiently accurate for regulatory purposes such as: 303(d) listing decisions, antidegradation analyses, or translating narrative criteria into numeric effluent limits. These legal determinations depend on detailed risk assessments that are not yet available. However, the data from such studies is useful for determining which ECs should be prioritized for additional method development in order to determine whether more formal regulatory assessments may be needed in the future.

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primary legal responsibility for making the necessary risk assessments and publishing appropriate water quality standards for all chemicals including Emerging Constituents.

3 SWRCB. Recycled Water Policy. Resolution No. 2009-0011 (adopted 2/3/09). A summary of the Blue Ribbon Panel's work-in-progress is available at www.sccwrp.org

4 Regulatory thresholds of concern may be expressed as Maximum Contaminant Levels (MCLs), Public Health Goals (PHGs), State Notification Levels, 304(a) Criteria, Basin Plan objectives, TMDL targets, wasteload allocations, or receiving water limitations.

Pending development of additional water quality standards, the California Department of Public Health ("DPH") previously suggested that periodic monitoring for trace organic chemicals may serve as a useful indicator of groundwater quality downgradient of recycled water projects.[5] Such data may also be used to corroborate the effectiveness of soil-aquifer treatment and the multi-barrier approach to preventing pathogen pollution. Therefore, as part of the proposed Groundwater Recharge Reuse Regulations, DPH prepared a draft list of ECs to guide planning and permitting efforts for recycled water projects.[6]

Acting on DPH's draft recommendations, Regional Boards began adding EC monitoring requirements to the permits for recycled water projects. As the use of recycled water has increased, so have the number of permits containing such provisions.[7] By 2006, some form of EC monitoring, often based on DPH's preliminary suggestions, was rapidly becoming a permit condition for all direct and indirect recharge of recycled water.[8]

Recognizing that the draft monitoring list for ECs was being misunderstood, DPH subsequently revised the draft Groundwater Recharge Reuse Regulation to clarify its original intent. DPH eliminated the list of specific chemicals and instead proposed that recycled water projects analyze for representative compounds within broad chemical categories (hormones, pharmaceuticals, personal care products, industrial chemicals, pesticides, etc.). The specific choice of chemical would be left to the project proponent and the permitting authorities.

When questions arose as to the utility and feasibility of mandatory monitoring for unregulated chemicals, the SWRCB adopted the Recycled Water Policy and convened the aforementioned Blue Ribbon Panel of Experts to review the available science and make appropriate recommendations. The California Panel is only one of many different groups undertaking similar efforts. Recent news articles and a number of scientific papers and technical reports increased public awareness of the issue and provided impetus for additional EC investigations around the country.[9]

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5 DPH serves several different regulatory roles with respect to groundwater recharge projects. DPH is responsible, under statute, for establishing water quality criteria for groundwater recharge projects. DPH also acts as a consultant to the Regional Boards on the permit requirements for specific groundwater recharge projects. And, DPH has a co-equal role with the Regional Boards in establishing permit requirements for groundwater recharge projects that rely on direct injection rather than surface percolation.

6 http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recharge/DraftRechargeReg2008.pdf (see Endnote 5). See also http://www.cdph.ca.gov/certlic/drinkingwater/Pages/EmergingContaminants.aspx

7 See, for example, Monitoring and Reporting Program for Regional Board Order No. R8-2005-0033 for Phase I of the Chino Basin Recycled Water Groundwater Recharge Project.

8 See, for example, the NPDES permit issued to Donald C. Tillman Water Reclamation Plant (NPDES No. CA0056227) and the proposed draft NPDES Permit for the Henry N. Wochholz Regional Water Recycling Facility operated by the Yucaipa Valley Water District (NPDES No. CA0105619). Attachment K: List of Unregulated Chemicals: Endocrine Disrupting Chemicals & Pharmaceuticals and Other Chemicals (2007).

9 Jeff Donn, Martha Mendoza and Justin Pritchard, Associated Press. "AP Probe Finds Drugs in Drinking Water." March 10, 2008.

3.0 Current Studies to Characterize Emerging Constituents

Recently, several large-scale water quality characterization studies began testing for select ECs. The U.S. Geological Survey's National Ambient Water Quality Assessment (NAWQA) and Groundwater Ambient Monitoring Assessment (GAMA) are probably the largest and best known of these research efforts. Results from samples collected throughout the nation indicate that ECs have been detected at trace levels in some surface and groundwater samples.

Subsequent investigations have detected the presence of similar chemicals in both source waters and tap waters.[10] And, follow-on studies found trace amounts of some ECs in highly treated recycled waters.[11] The concentration of trace organic compounds fluctuates greatly from location to location and from day to day. New research is underway to determine if additional treatment can reduce or eliminate ECs cost-effectively.[12]

Given these findings, and the significant role recycled water plays in Southern California, a coordinated effort to characterize the presence of ECs in the Santa Ana River watershed was recently initiated. In 2007-8, the USGS collected and analyzed local groundwater samples as part of the GAMA program. Results of this effort were published in November, 2009 and the EC data are summarized in Table 1.

TABLE 1: EC Characterization for Select Ground Waters in the Santa Ana Region

Compound	Use	# Detections	Detection %	LRL
Acetaminophen	Analgesic	3	3%	25 ng/L
Caffeine	Stimulant	3	3%	15 ng/L
Carbamazepine	Anti-convulsant	5	6%	30 ng/L
Sulfamethoxazole	Antibiotic	0	0%	10 ng/L

Other pharamaceutical compounds evaluated included: Codeine (narcotic), Continine (nicotine metabolite), Dehydronifedipine (antianginal metabolite), Diltiaem (antianginal), Diphenhydramine (antihistamine), Salbutamol (bronchodilator), Thiabendazole (anthelmintic), Trimethoprim (antibacterial), Wayfarin (anti-coagulant).

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10 Benotti, M.J., R.A. Trenholm, B.J. Vanderford, J.C. Holady, B.D. Stanford and S. A. Snyder. "Pharmaceuticals and endocrine disrupting compounds in U.S. drinking water." Environmental Science and Technology. 2009

11 Snyder, Shane. Southern Nevada Water Authority – Applied R&D Center. Testimony before the Senate Subcommittee on Transportation Safety, Infrastructure Security and Water Quality on Pharmaceuticals in the Nation's Water: Assessing Potential Risks and Actions to Address the Issue. April 15, 2008.

12 See, for example, Dickenson, E.R., J.E. Drewes, D.L. Sedlak, E.C. Wert and S.A. Snyder. "Applying surrogates and indicators to assess removal efficiency of trace organic chemicals during chemical oxidation of wastewaters." Environmental Science and Technology. 2009.

The GAMA study also analyzed for ten other EC compounds (listed above). None of these other chemicals were detected in any of the groundwater samples. USGS concluded that:

> *"No pharmaceutical compound was detected in more than five wells, and all of the concentrations were low. Health-based thresholds do not exist for concentrations of pharmaceuticals in drinking water. However, to reach concentrations of the two detected medications (acetaminophen and carbamazepine) equal to dosages typically recommended or prescribed would, in all cases, require consuming more than one million liters of the sampled water. The sampled concentrations of caffeine were, in all cases, less than one-millionth of the concentration of caffeine in regular coffee."*[13] *(pg. 13)*

In addition, three water agencies undertook a focused sampling program to characterize EC concentrations in surface waters including water imported to the region from the State Water Project and the Colorado River. The agencies also evaluated samples collected from the Santa Ana River, its tributaries, and select wastewater discharges to these streams.[14] Consistent with previous studies performed elsewhere, preliminary data from the Santa Ana investigation detected the presence of some ECs in surface waters throughout the region (see Table 2).

TABLE 2: Partial EC Characterization for Surface Waters in Santa Ana River (n=32)

Compound	Use	Minimum	Median	Maximum
Caffeine	Stimulant	9 ng/L	47 ng/L	1620 ng/L
Carbamazepine	Anti-convulsant	49 ng/L	135 ng/L	267 ng/L
Gemfibrozil	Anti-cholesterol	<5 ng/L	48 ng/L	590 ng/L
Primidone	Anti-convulsant	41 ng/L	90 ng/L	146 ng/L
Sulfamethoxazole	Antibiotic	4 ng/L	160 ng/L	721 ng/L

This finding is not surprising considering that recycled water often comprises more than 90% of the flow in the Santa Ana River and trace levels of some ECs were also detected in the treated municipal wastewater discharged to the river (see Table 3).

[13] Kent, Robert and Kenneth Belitz. Unites States Geological Survey (USGS). Ground-Water Quality Data in the Upper Santa Ana Watershed Study Unit, November 2006 - March 2007: Results from the California GAMA Program. Data Series 404. November, 2009.

14 Guo, Y.C. et al, "Occurrence, Fate and Transport of PPCPs in Three California Watersheds." AWWA Water Quality Technology Conference, November, 2009. Seattle, WA (Research co-sponsored by Metropolitan Water District of Southern California, Orange County Water District, and National Water Research Institute).

TABLE 3: Partial EC Characterization for Municipal Effluents (n=16)

Compound	Use	Minimum	Median	Maximum
Caffeine	Stimulant	<5 ng/L	14 ng/L	1883 ng/L
Carbamazepine	Anti-convulsant	123 ng/L	208 ng/L	331 ng/L
Gemfibrozil	Anti-cholesterol	<5 ng/L	22 ng/L	1178 ng/L
Primidone	Anti-convulsant	84 ng/L	146 ng/L	171 ng/L
Sulfamethoxazole	Antibiotic	4 ng/L	417 ng/L	1593 ng/L

Finally, trace concentrations of some ECs were identified in water imported to the Santa Ana Region from the State Project (see Table 4) and the Colorado River (see Table 5).

TABLE 4: Partial EC Characterization for State Project Water (n=28)

Compound	Use	Minimum	Median	Maximum
Caffeine	Stimulant	<5 ng/L	8 ng/L	67 ng/L
Carbamazepine	Anti-convulsant	<1 ng/L	4 ng/L	26 ng/L
Gemfibrozil	Anti-cholesterol	<5 ng/L	8 ng/L	162 ng/L
Primidone	Anti-convulsant	< 2 ng/L	5 ng/L	21 ng/L
Sulfamethoxazole	Antibiotic	5 ng/L	17 ng/L	71 ng/L

TABLE 5: Partial EC Characterization for Colorado River Water (n=19)

Compound	Use	Minimum	Median	Maximum
Caffeine	Stimulant	<5 ng/L	<5 ng/L	1370 ng/L
Carbamazepine	Anti-convulsant	<1 ng/L	3 ng/L	4 ng/L
Gemfibrozil	Anti-cholesterol	<5 ng/L	<5 ng/L	<5 ng/L
Primidone	Anti-convulsant	<2 ng/L	3 ng/L	4 ng/L
Sulfamethoxazole	Antibiotic	<1 ng/L	10 ng/L	17 ng/L

After confirming that ECs were present, water and wastewater agencies throughout the Santa Ana region elected to continue their characterization studies and to coordinate those efforts with one another. This voluntary program is intended to supplement the existing knowledge base pending recommendations from the Blue Ribbon Panel of Experts and new policy guidance from DPH and/or the State Board .

4.0 Purpose

The water and wastewater agencies serving the Santa Ana region are committed to develop an EC investigation program that addresses the public's desire to know more about what chemicals may be in their water supplies. Such efforts are essential to increase public acceptance and encourage greater use of recycled water.

The rationale for this voluntary program was recently described in a report entitled: "Managing Contaminants of Emerging Concern in California." The report summarizes results and recommendations from an informal colloquium of regulatory and scientific experts convened to assist the State Board in developing a scope-of-work for the Blue Ribbon Panel. Workshop participants found that more data characterizing the presence and persistence of ECs will: 1) establish a baseline to evaluate fate and transport mechanisms and potential trends in water quality which, which is essential to develop a risk-based approach to understanding and managing exposure to ECs; 2) aid federal and state authorities as they set priorities for and whether to develop new water quality criteria; and 3) be useful for evaluating the effectiveness of pollution prevention and source control programs. The report stressed that:

> *"In lieu of regulations or compliance monitoring…investigative chemical monitoring should be used as the first step towards development of a management strategy in California."* [A key element] *"of this process will be our ability to adapt the strategy as new information becomes available. Since relatively little is known about CECs at this time, new information and technology will undoubtedly affect our ability to monitor and establish thresholds for CECs. Preliminary CEC monitoring lists will be subject to trial and error."*[15]

As noted earlier, the draft DPH Groundwater Recharge and Reuse regulations do not identify the specific ECs that must be monitored. Rather, DPH states that this determination must be made on a project-by-project basis and will vary based on a number of considerations including the source of the recharge water, the type of treatments previously applied to the recycled water and the nature of soil conditions in the area and other factors that may affect the fate, transport and degradation of EC's in the environment. DPH also acknowledges that, for some projects, other chemicals (such as the relative amounts of inorganic tracers or total organic carbon) may provide a better indication of the sources influencing groundwater quality than the specific concentration of various trace organic compounds. It is the responsibility of the project proponents to recommend and justify an appropriate monitoring strategy to the state permitting authorities.

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[15] "Managing Contaminants of Emerging Concern in California." Published by the Southern California Coastal Water Research Project (SCCWRP) and co-sponsored by California Ocean Protection Council, California Ocean Science Trust, National Water Research Institute, San Francisco Estuary Institute and the Urban Water Research Center at the University of California-Irvine. Held: April 28-29, 2009. Report published in Sept., 2009 and is available at: ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/600_CEC_wkshp2009.pdf

Because analytical technology is constantly improving and our knowledge of which chemicals may pose an unacceptable risk to people and the environment is always growing, it is agreed that any EC investigation program must be updated regularly. Therefore, it is likely that the list of chemicals recommended for future characterization studies will change over time. The water and wastewater agencies proposing to undertake this investigation are committed to a process of adaptive management to ensure the EC characterization program fulfills its stated purpose using the best available science.

The multi-disciplinary symposium identified three steps that should be taken as agencies collaborate to characterize and understand the effects of ECs on public health and the environment. The first step will be filling data gaps through investigative monitoring and targeted research. The second step will be identifying, developing and testing accurate and reliable methods for detecting ECs at very low levels. The third step will be to incorporate the measurement of ECs into on-going water quality studies, such as those that have been undertaken by Inland Empire Utilities Agency, the Metropolitan Water District of Southern California, National Water Research Institute and Orange County Water District.

To facilitate early implementation of these recommendations, stakeholders in the Santa Ana region propose to undertake a water quality characterization study in 2010-11 to fill some of the aforementioned data gaps. Samples collected from select surface water streams, imported water sources and wastewater treatment plants will be analyzed for a representative group of ECs using the best analytical technology presently available.

The EC Workgroup will prepare a written Sampling and Analysis Plan (SAP) describing the specific data quality objectives, sampling locations, sampling protocols, sampling frequency, analytical methods, QA/QC procedures, database management and reporting requirements. The plan will also discuss the appropriate and inappropriate uses of the data given the various method limitations. The SAP will be submitted to the Regional Board staff by March 15, 2010 for review and comment.

The general specifications for the 2010-2011 EC Characterization Study are described in Section 5.

5) 2010-11 Characterization Study

A) Proposed Analytes

Table 6 identifies the trace organic compounds that the stakeholders propose to assess during the 2010 characterization period. The list may be revised for the 2011 characterization period based on recommendations from the Blue Ribbon Panel of Experts or new guidance from the State Board.

Table 6: ECs to be Analyzed

Chemical	Category	Common Use	Notes
Acetaminophen (aka "Tylenol")	Pharmaceutical	Over-the Counter Analgesic	3,4,5
Bisphenol-A (BPA)	Industrial	Plastic Manufacturing	7
Caffeine (coffee, tea, soft drinks)	Food Additive	Non-Prescription Stimulant	3,5,6
Carbamazepine	Pharmaceutical	Prescription Anti-Convulsant	1,2,3,4,5,6
DEET (aka "Off")	Pesticide	Household Insect Repellent	1,2,6
Diuron	Herbicide	Weed Control	6
Estrone	Hormone	Natural & Prescription	1,2,4,6
Gemfibrozil	Pharmaceutical	Prescription Anti-Cholesterol	1,2,3,4,5,6
Ibuprofen (aka "Advil")	Pharmaceutical	Over-the-Counter Analgesic	3,4,5
Sulfamethoxazole	Pharmaceutical	Prescription Antibiotic	1,2,3,5,6
TCEP	Industrial	Flame Retardant	1,2,3,6

Selection Criteria Notes:

1) Commonly detected in national studies of water supply sources.
2) Commonly detected in national studies of finished drinking water.
3) Detected in SAR surface waters and/or effluents in MWDSC/NWRI/OCWD study.
4) Detected in Inland Empire Utility Agency's existing EC monitoring program.
5) Detected in previous USGS groundwater studies (Oregon).
6) Recommended by expert panel assembled to review an advanced reclamation project proposed for the West Basin.
7) Recently added to U.S. EPA's Candidate Contaminant List (CCL)

B) Proposed Sampling

Table 7: Sampling Locations, Frequency, Type & Responsibilities

Sampling Site	Sampling Frequency	Sample Type	Responsible Agency[16]
Final Effluent from All Wastewater Treatment Plants[17]	Annually	24-hour Composite	Permitted Operator
State Project Water @ Devil Canyon	Annually	Representative Grab	MWDSC
Colorado River @ San Jacinto West Portal	Annually	Representative Grab	MWDSC
Santa Ana River near MWD Crossing	2x/year	Representative Grab	OCWD
Santa Ana River near Prado Dam	2x/year	Representative Grab	OCWD

Water samples will be collected in May of each year. Second samples, when needed, will be collected in August of each year. Due to the time required to analyze samples, review QA/QC and summarize results, data from the August collection period will be reported the year.[18]

C) Proposed Methods

At present, there are no standardized or certified methods for analyzing most ECs.[19] Until EPA approves such methods, the EC Workgroup is committed to using the best analytical technology commercially available: LC-MS-MS with isotope dilution. In general, this technique is capable of detecting select ECs in de-ionized laboratory water at concentrations of 1 to 10 ng/L. However, the specific reporting detection level (RDL) will vary over time and between laboratories in more complex water matrices. Therefore, more detailed data quality objectives and QA/QC requirements will be specified in the Sampling and Analysis Plan submitted to the Regional Board.

[16] Pending approval and funding authorization from each agency.
[17] Includes all wastewater treatment plants operating under a valid NPDES permit or Waste Discharge Requirement (WDR) issued by the California Regional Water Quality Control Board – Santa Ana Region and/or U.S. EPA regardless of whether the discharge is to waters of the U.S. or waters of the state.
[18] Therefore, the report submitted in November, 2010 will report only the results for samples collected in May, 2010.
[19] U.S. EPA approves analytical methods pursuant to 40 CFR Part 136.

D) Proposed Reporting

Participating stakeholders will submit copies of all sampling documents (field notes and chain of custody forms) and laboratory reports to the Santa Ana Watershed Project Authority (SAWPA). SAWPA will input the data to the SAWDMS database and prepare an annual report summarizing results of the EC characterization program. A draft copy of the EC report will be distributed for review and comment and SAWPA will convene a stakeholder meeting shortly thereafter to discuss suggested revisions to the draft document. The final report will be submitted to the Regional Board, on behalf of the stakeholders, by December 31st of each year.

The annual report will include a detailed description of the chemical analytes, sampling locations, sampling dates and protocols, analytical methods, QA/QC procedures and relevant results. Where appropriate, the report will also include any recommended changes to future EC sampling efforts (including revised analytes or sampling locations).

Finally, to facilitate public understanding of the new information, the report will describe the toxicological relevance of the measured EC concentrations. The purpose of this discussion is to provide, where possible, a scientific context for evaluating the relative health risks of these trace organic compounds.[20]

E) Proposed Schedule for 2010 Study Period

Task	Description	Deadline
1	Prepare and Submit Detailed Sampling and Analysis Plan	March 12, 2010
2	Collect and Analyze Initial Samples from All Locations in Table 7	May 15, 2010
3	Submit Initial Sample Results and Related Documentation to SAWPA	June 30, 2010
4	ECW Meeting to Review and Discuss Initial Sample Results	July 31, 2010
5	Collect and Analyze Second Surface Water Samples	August 15, 2010
6	Submit Second Surface Water Sample Results to SAWPA	October 1, 2010
7	Distribute Draft Annual Report to Emerging Constituents Workgroup	November 1, 2010
8	ECW Meeting to Review and Finalize Annual Report	December 1, 2010
9	Submit Annual Report to Regional Board	December 31, 2010

[20] See, for example, "Toxicological Relevance of Endocrine Disrupting Chemicals and Pharmaceuticals in Water" American Water Works Association Research Foundation Report No. 3085/WRF 04-003.

E) Emerging Constituents Workgroup

SAWPA will periodically coordinate meetings of the Emerging Constituents Workgroup (ECW) to organize the next phase of the EC characterization study. This includes reviewing new water quality data, preparing the annual EC report, and integrating new EC policies enacted by the State Board and DPH.

During 2010, and after reviewing the final published results from the GAMA study and the MWDSC/NWRI/OCWD study, the ECW will determine whether it is useful and appropriate to expand the investigation effort to include storm water samples and select groundwater locations in 2011.

California Regional Water Quality Control Board
Santa Ana Region

RESOLUTION NO. R8-2009-0071

Approval of Emerging Constituents Monitoring and Reporting Program for
Wastewater Effluent Discharges and Imported Water Recharge

WHEREAS, the California Regional Water Quality Control Board, Santa Ana Region (hereinafter Water Board), finds that:

1. Wastewater treatment and water supply stakeholders within the Santa Ana River Watershed, including Regional Board staff members, have implemented a task force effort (the Emerging Constituents Workgroup) with the goal of recommending an emerging constituents monitoring and reporting program to the Regional Board for their consideration.

2. The Workgroup has called upon many of the scientific leaders and experts in the field of emerging constituents monitoring, reporting, analysis; and a number of relevant presentations have been made to the Workgroup, providing the basis for the selection of specific constituents to serve as surrogates for the very large numbers of emerging constituents.

3. The Workgroup has released its "Proposed Work Plan for SAWPA's Emerging Constituents Workgroup in 2010-2011." This Work Plan provides the Regional Board with a proposed monitoring and reporting program for emerging constituents and the rationale for why the specific constituents listed in the Work Plan were chosen for monitoring and to act as surrogates for groupings of the thousands of emerging constituents.

THEREFORE, BE IT RESOLVED THAT:

1. The Regional Board hereby approves the monitoring and reporting program detailed in the "Proposed Work Plan for SAWPA's Emerging Constituents Workgroup in 2010-2011.

2. If the Executive Officer determines later that it is necessary and appropriate to add additional constituents to the emerging constituents monitoring and reporting program, this approval requires that the additional constituents must be included in the monitoring program.

3. If a statewide policy for the monitoring of emerging constituents is adopted by the State Water Resources Control Board, the requirements of that policy shall supersede the program identified in this Work Plan.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on December 10, 2009.

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Gerard J. Thibeault
Executive Officer

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