

31 July 2006

Technical Memorandum No. 12

To: Bob Castle, MMWD
Larry Grabow, MMWD

From: Jean Debroux, Kennedy/Jenks Consultants

Reviewed: Todd Reynolds, Kennedy/Jenks Consultants
Joe Drago, Kennedy/Jenks Consultants
Jim Lozier, CH2M HILL

Subject: Results of the Water Quality Sampling and Analysis Program
MMWD Seawater Desalination Pilot Plant Program
K/J 0468029

Introduction and Purpose

A primary objective of the Marin Municipal Water District (MMWD) Seawater Desalination Pilot Plant Program (Pilot Plant) is to ensure that the Northern San Francisco Bay is an adequate drinking water supply if reverse osmosis membrane technology is employed. To meet this objective, a comprehensive Sampling and Analysis Program (SAP) was designed and executed.

Process Related Water Quality Analyses (PRWQA) and Drinking Water Related Analyses (DWRA) were performed as part of the SAP. PRWQA data, obtained from analyses on samples taken at various points within the Pilot Plant, indicate how the process equipment within the Pilot Plant performs, while the DWRA data indicates the quality of the finished water. DWRA samples were focused on source and product waters. The SAP is described in detail in TM 6.

Technical Memorandum No. 12 (TM12) presents and describes the results of the SAP. TM12 focuses on DWRA results and PRWQA results are discussed in previous TMs. As there are ten, sometimes lengthy, tables supporting the text, all tables are presented at the end of this technical memorandum.

Pilot Plant Sampling and Analysis Program Results

A complete list of 19 sampling events (from 22 March 2005 to 8 March 2006) can be found in Table 1. In addition, the sampling locations within the Pilot Plant for each sampling event are listed. Sampling began prior to Pilot Plant operation and ended three weeks prior to shutdown.

Analytical Laboratories

Eight analytical laboratories (Table 2) other than the MMWD laboratory were used in the SAP. The least number of analytical laboratories were employed to analyze the water quality constituents at desired reporting limits while maintaining rigorous quality assurance protocols.

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Analytical laboratories used EPA methods for all analyses, if available. As analytical methods for various unregulated compounds are not standardized, certain analytical methods were laboratory specific.

Microbial constituents were not analyzed in the SAP as the MMWD laboratory conducted their own sampling and analyses for these constituents.

Process Related Water Quality Analyses

Process related water quality parameters (PRWQA) were monitored to assist in the proper operation of the pilot plant. A complete list of PRWQP, their analysis methods, reporting limits and how many times they were sampled can be found in Table 3. The results of PRWQA can be found in previous technical memoranda as TM 12 focuses on DWRA.

Drinking Water Related Analyses

MMWD conducts more than 120,000 water quality analyses per year to assure high quality water and regulatory compliance of their source and finished waters. Ninety regulated and 242 non-regulated constituents are currently routinely measured. The District measures many of these constituents voluntarily and, overall, MMWD has a comprehensive water quality program that not only meets all state and federal regulations but also determines if numerous chemicals with no currently known health risks are present.

Pilot Plant DWRA encompass a comprehensive list of water quality constituents that contains federal and state regulated drinking water parameters, non-regulated parameters that require monitoring by state or federal agencies, and other non-regulated constituents. The DWRA were chosen based on current MMWD practices in order to compare results from the Pilot Plant SAP with historical MMWD water quality data. Furthermore, additional DWRA non-regulated parameters were included in the SAP as they are specific to the Bay source water. A total of 547 non-regulated water quality constituents were included in the Pilot Plant SAP.

DWRA were primarily performed on source water and First Pass SWRO Permeate samples. Select constituents detected in First-Pass SWRO Permeate samples were analyzed in a Second Pass RO permeate sample. The complete list of analytes, the laboratory performing the analyses, the analytical method, the minimum reporting limit, and number of times they were sampled are listed in Tables 4 and 5 for regulated constituents and those requiring monitoring, and other non-regulated constituents, respectively.

Table 6 presents DWRA constituents detected in either the source or treated waters. Various regulated inorganic constituents were detected in the source water. As ocean water is one of the major sources of water at the Pilot Plant intake, these results were expected, as these constituents are associated with the salt in ocean water.

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The First Pass SWRO process removed the majority of the constituents measured by the DWRA that were detected in source water. Low to non-detectable levels of inorganic ions were measured in the treated water well below state or federal regulatory levels and below California Department of Health Services Public Health Goals, where applicable.

Mercury was detected once (out of 8 sampling events) at 0.0003 mg/l after First Pass SWRO treatment but was not detected in the source water samples. The concentration is close to the MRL (i.e., 0.0001 mg/l) and well below Federal drinking water regulations (i.e., 0.002 mg/l). This result does not appear plausible due to known maximum dissolved mercury concentration in north San Francisco Bay (0.000003 mg/l). Although the analysis passed laboratory QA/QC protocol, this one data point remains suspect.

Ethylene Dibromide (EDB) was detected at near minimum reporting limit (MRL) level once. EDB was not detected in 6 of the 7 source water samples analyzed for EDB. In addition, a non-regulated common detergent metabolite (nonylphenol monoethoxylate) was detected once in the source water near its MRL.

Ultra Low-Level Analyses

Analyses of ultra low-level constituents were added to SAP based on potential occurrence in the source water. These include polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) analyses performed by AXYS Analytical Services and a suite of anthropogenic compounds analyzed by the Southern Nevada Water Authority (SNWA) analytical laboratory. Typical low-level drinking water analysis MRLs are in microgram (0.001 mg) per liter ($\mu\text{g/L}$) range. Ultra low-level non-regulated analyses MRLs range from nanogram (0.000001 mg) per liter (ng/L) to picogram (0.00000001 mg) per liter (pg/L). The suite of PCBs, PBDEs and anthropogenic compounds were sampled at these levels 4, 7, and 4 times, respectively.

Tables 7, 8, and 9 present the detected concentrations of PCBs, PBDEs and anthropogenic constituents, respectively, in source water, first pass SWRO and the second pass RO permeates.

Trace amounts of PCBs (total pentachloro and hexachloro biphenyls), approximately 350 pg/L, were found in source water samples. This is similar to previous studies performed with San Francisco Bay water (McFarland and Clarke, 1989). No ultra-low level PCBs were detected in samples of the first pass SWRO permeate.

Forty polybrominated diphenyl ethers (PBDEs) were analyzed. Few pg/L to few $\mu\text{g/L}$ of thirteen specific PBDE congeners were detected in Bay water. This is similar to other studies (Lacorte et al., 2003, Oros et al., 2005). Two PBDEs compounds were detected at 10 pg/L after First Pass SWRO treatment while others were removed. However, the concentrations detected are close

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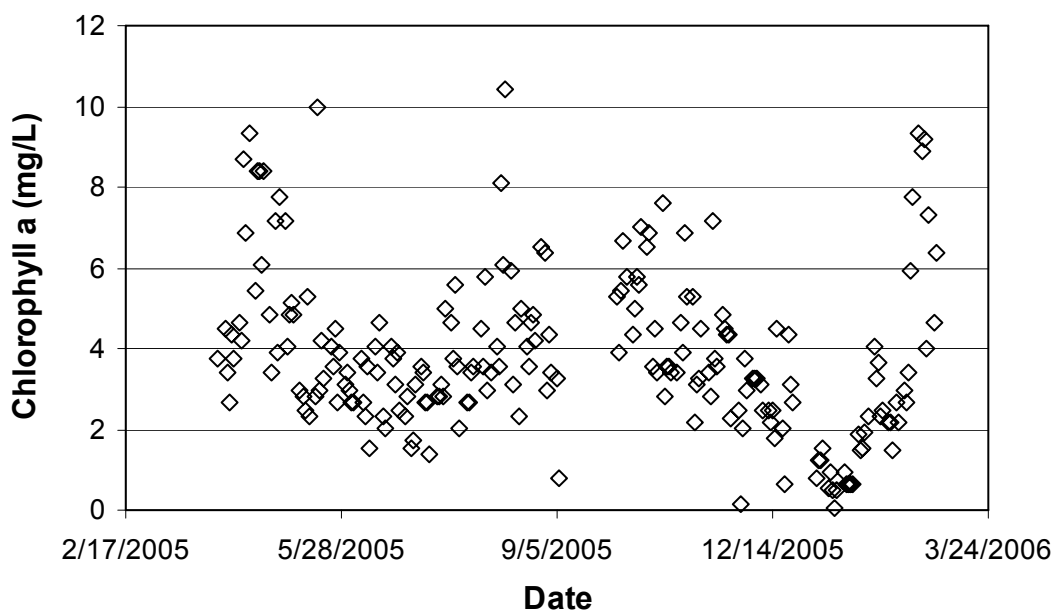
to reporting limits; therefore, those two data points remain suspect (see Quality Control section below). These compounds were not detected in Second Pass RO Permeate water.

Trace levels of several anthropogenic compounds were detected in Bay water. These compounds have been found in river, groundwater, and drinking water, etc, and SAP results are similar to previous studies (Snyder et al., 2003, Gross et al., 2004). They were completely removed after First Pass SWRO treatment except for two compounds, oxybenzone and risperidone. Their concentrations were very near MRLs and not consistent between samples; the existence of these constituents in treated water remains suspect.

Overall, First Pass SWRO and Second Pass RO have demonstrated to have the capacity to remove ultra-low level non-regulated constituents from the source water.

Algal Toxins

An algal toxin protocol was described in TM6. Chlorophyll levels were monitored daily at Romberg Tiburon Center and are presented in Figure 1. Chlorophyll levels remained low, indicating no algal blooms in the vicinity of the Pilot Plant intake during Pilot Plant operation. Consequently, algal toxin analyses were not performed.



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Quality Control

The laboratories participating in the SAP used standardized quality control measures. In addition, results from laboratories performing ultra-low level analyses were compared to sample and lab blanks to determine validity of ultra-low level results. Laboratory and SAP quality assurance and quality control measures are described below.

To obtain the most accurate data, quantifiable values above the MRL are reported. Minimum detection limits (MDLs) were determined by the laboratories in accordance with the requirements of 40 CFR Part 136 Appendix B titled "Guidelines for establishing Test Procedures for the Analysis of Pollutants."

For Environmental Health Laboratories (EHL), the laboratory performing the majority of the water quality analyses, MRLs are three to five times greater than the MDLs for > 90% of the analysis, depending on the method. The remaining 10% achieve a MRL/MDL ratio of approximately two.

Ultra-low level analyses were accompanied by analysis of blanks and additional data analysis as lowering MRLs three to six orders of magnitude below traditional low-level water quality analyses is extremely difficult to do without introducing uncertainty in the results.

Blanks are comprised of de-ionized water either analyzed directly at the laboratory (i.e., laboratory blanks) or analyzed at the laboratory after shipment to the Pilot Plant where the water is transferred to a sample bottle and shipped back to the laboratory (i.e., sample blank). Sample blanks were preferred for data analysis as any possible contamination of a sample from sampling at the Pilot Plant would also likely occur in sample blanks.

Both laboratory and sample blanks regularly contained measured ultra-low level analytes above detection limits. In addition, the concentrations of measured analytes in the blanks varied from blank to blank. In order to compensate for apparent contamination or instrument error, "blank corrections" were calculated. Blank corrections were performed by determining the mean analyte concentration in a minimum of two blanks associated with the ultra-low level sample. Next, the variability of the analyte concentrations in the blanks were determined by a Student-t test calculation using a 95% confidence interval. This value was added to the mean and that value was used as a blank correct value. Blank correct values were subtracted from sample analyte values and the remainder concentrations above the MRLs, if any, were reported. The MRLs for ultra-low level PCBs and PBDEs analyses were set at ten times of the laboratory MDLs.

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Lacorte S., Guillamon M., Martinez E., Viana P. and Barcelo D., 2003, *Occurrence and specific congener profile of 40 polybrominated diphenyl ethers in river and coastal sediments from Portugal*, Environ Sci Technol 37(5): 892-898.

McFarland V.A. and Clarke J.U., 1989, *Environmental occurrence, abundance, and potential toxicity of polychlorinated biphenyl congeners: considerations for a congener-specific analysis*, Environ Health Perspect, 81:225-39.

Oros D.R., Hoover D., Rodigari F., Crane D. and Sericano J., 2005, *Levels and Distribution of Polybrominated Diphenyl Ethers in Water, Surface Sediments, and Bivalves from the San Francisco Estuary*, Environ Sci Technol 39(1):33-41.

Snyder S.A., Westerhoff P., Yoon Y. and Sedlack D.L., 2003, *Pharmaceuticals, personal care products, and endocrine disruptors in water: Implications for the water industry*, Environ Eng Sci, 20(5) 449-469.

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Table 1: MMWD Pilot Plant SAP schedule

Description	Regulated	# of analytes	Total # of analyses	Pilot Plant Sampling ^a																	
				3/22/05 ^b	5/19/05	6/08/05	6/21/05	7/18/05	8/16/05	8/30/2005	9/13/05	9/27/2005	10/11/2005	10/25/2005	11/8/2005	11/29/2005	12/13/2005	1/4/2006	1/17/2006	2/7/2006	3/8/2006
Process Related Water Quality Parameters																					
Turbidity	Yes	1	20	1,1	1,4	1	1,4,5	1	1	1		1	1	1	1	1	1	1	1	1	
TSS	No	1	18	1,1	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
TVS	No	1	12	1,1	1	1	1		1		1		1		1		1		1	1	
EFS	No	1	21						1,2,3		1,2,3		1,2,3		1,2,3		1,2,3		1,2,3	1,2,3	
TOC	No	1	56	1,1	1,2	1,2,3	1,2,3,6	1,2,3	1,2,3,6	1,2,3	1,2,3,6,8	1	1,2,3,6	1,2,3	1,2,3,6	1,2,3	1,2,3,6	1,2	1,2,3,6	1,2,3,6,8	
UV-254	No	1	57	1,1	1,2	1,2,3	1,2,3,6	1,2,3	1,2,3,6	1,2,3	1,2,3,6,8	1	1,2,3,6	1,2,3	1,2,3,6	1,2,3	1,2,3,6	1,2,3	1,2,3,6	1,2,3,6,8	
FOGs	No	1	18	1,1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Inorganic constituents																					
TDS	No	1	48	1,1	1	1	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7,8	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7,8	
Conductance	No	1	44	1,1	1		1,6,7		1,6,7	1,6,7	1,6,7,8	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7,8	
Alkalinity	No	1	44	1,1	1		1,6,7		1,6,7	1,6,7	1,6,7,8	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7	1,6,7,8	
Other inorganics	Some	19	29	1,1	1		1,6,7		1,6,7		1,6,7,8		1,6,7		1,6,7		1,6,7		1,6,7	1,6,7,8	
RO Process (TDS, Br, B, Na, Cl)	Some	5	3								6		6		6						
Drinking Water Quality Parameters																					
Regulated Constituents																					
Organics with MCLs	Yes	70	15		1		1,6		1,6		6		1,6		1,6		1,6		6	1,6	
Inorganics with MCLs	Yes	1	15		1		1,6		1,6		6		1,6		1,6		1,6		6	1,6	
DBPs	Yes	10	15		1		1,6		1,6		6		1,6		1,6		1,6		6	1,6	
Radionuclides	Yes	5	3		1		1,6												6	1,6	
Federal and State Monitoring Requirements	Yes	39	15		1		1,6		1,6		6		1,6		1,6		1,6		6	1,6	
Non-Regulated Constituents																					
"Extended" EPA 525.2	No	227	6		1		1,6		1,6		6										
Hormones	No	8	2		1						6										
Phenolics	No	9	4		1		1,6				6										
Anthropogenics	No	40	6		1						6						1,6			1,6	
PBDEs	No	44	12		1		1,6				6				1,6				6	1,6,8	
PCBs	No	209	8											1,6					6	1,6,8	
E-Screen Assay	No	1	6		1		1,6												6	1,6	

a – numbers signify sampling locations as below:

- 1 – source water
- 2 – MF/UF filtrate
- 3 – GMF filtrate
- 4 – MF/UF spent washwater
- 5 – GMF spent washwater
- 6 – First Pass SWRO permeate
- 7 – RO Concentrate
- 8 – Second Pass RO permeate

b – samples taken at high tide and low tide the same day

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Table 2: MMWD Pilot Plant SAP Analytical Laboratories

Environmental Health Laboratories	Sequoia Analytical
<p>Nathan Trowbridge Business Analyst 110 S. Hill Street South Bend, IN 46617 Phone: 1-800-322-4345 ext. 45528 Fax: (574) 233-8207 Nathan.R.Trowbridge@us.ul.com</p>	<p>Leticia Reyes Project Manager 885 Jarvis Drive Morgan Hill, CA 95037 Phone: (408) 782-8154 Fax: (408) 782-6308 www.sequoialabs.com</p>
Southern Nevada Water Authority	Wisconsin State Laboratory of Hygiene
<p>Shane Snyder R&D Project Manager 1350 Richard Bunker Avenue Henderson, NV 89015 Phone: (702) 856-3688 Fax: (702) 856-3647 Shane.snyder@lvvwd.com</p>	<p>Jocelyn Hemming Miele Barman 2601 Agriculture Drive Madison WI, 53718 Phone: (608) 224-6230 hemminjc@mail.slh.wisc.edu</p>
Axys Analytical Services	Caltest Analytical Laboratory
<p>Laurie Phillips Manager, Client Services PO Box 2219 2045 Mills Road West Sidney, British Columbia Canada V8L 3S8 Phone: (250) 655-5800 analytical@axys.com</p>	<p>Mike Hamilton, Laboratory Manager 1885 North Kelly Road Napa, CA 94558 Phone: (707) -258-4000 mike_hamilton@caltestlabs.com</p>
BioVir Laboratories	EMHL Analytical, Inc
<p>Rick Danielson, PhD Lab Director 685 Stone Road, Unit 6 Benicia, CA 94510 Phone: (800) 442-7342 Fax: (707) 747-1751</p>	<p>107 Haddon Avenue Westmont, NJ 08108 Phone: (856) 858-4800 Fax: (856) 858-0648 westmontmicro@emsl.com</p>

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Table 3: MMWD Pilot Plant Water Quality - Process Related Water Quality Analyses

Analyte	Laboratory	Method	MRL (mg/l unless otherwise noted)	Number of times sampled
Turbidity	EHL	EPA 180.1	1.0 NTU	20
TVS	Caltest	EPA 160.4	10	12
TOC	EHL	SM 5310 C	0.5	56
UV-254	EHL	SM 5910 C	0.009 cm ⁻¹	57
FOGs	Caltest	EPA 418.1	5.6	
Oil & Grease, Hydrocarbons				1
Oil & Grease, Total				17
Inorganic Constituents				
TDS	EHL	EPA 160.1	10	48
Conductance	EHL	EPA 120.1	0.5 umho/cm	44
Hardness, Calcium	EHL			
pH	EHL			29
Alkalinity, Bicarbonate	EHL	SM 2320B	1 (as CaCO ₃)	44
Alkalinity, Total	EHL	SM 2320B	1 (as CaCO ₃)	44
Other inorganics	EHL			
Sodium	EHL	EPA 200.7	0.1	44
Potassium	EHL	EPA 200.7	0.2	44
Calcium	EHL	EPA 200.7	0.1	44
Magnesium	EHL	EPA 200.7	0.1	44
Chloride	EHL	EPA 300.0	2.0	44
Sulfate	EHL	EPA 300.0	5.0	44
Iron	EHL	EPA 200.7	0.02	44
Manganese	EHL	EPA 200.7	0.01	44
Boron	EHL	EPA 200.7	0.005	44
Total Silica	EHL	EPA 200.7	0.1	44
Dissolved Silica	EHL	EPA 200.7	0.1	44
Aluminum	EHL	EPA 200.7	1.0	44
Barium	EHL	EPA 200.7	0.01	44
Strontium	EHL	EPA 200.7	0.005	44
Fluoride	EHL	380-75WE	0.1	44
Ammonia	EHL	SM 4500-NH3 D	0.1	44
Nitrate	EHL	EPA 353.2	0.1	44
Bromide	EHL	EPA 300.0	0.01	44

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Table 4: MMWD Pilot Plant Water Quality – Drinking Water Related Analyses
(Regulated Constituents or those Requiring Monitoring)

Analyte	Laboratory	Method	MRL (µg/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Drinking Water Quality Parameters						
Regulated Constituents						
Organics with MCLs						
Alachlor (Alanex)	EHL	EPA 525.2	0.1	7	8	N/A
Atrazine (Aatrex)	EHL	EPA 525.2	0.1	6	6	N/A
Bentazon (Basagran)	EHL	EPA 515.3	0.5	7	8	N/A
Benzene	EHL	EPA 524.2	0.5	7	8	N/A
Benzo(a)pyrene	EHL	EPA 525.2	0.02	7	8	N/A
Carbofuran (Furadan)	EHL	EPA 531.1	0.9	7	8	N/A
Carbon Tetrachloride	EHL	EPA 524.2	0.5	7	8	N/A
Chlordane	EHL	EPA 505	0.1	7	8	N/A
2,4-D	EHL	EPA 515.3	0.1	7	8	N/A
Dalapon	EHL	EPA 515.3	1	7	8	N/A
Di(2-ethylhexyl)adipate	EHL	EPA 525.2	0.6	7	8	N/A
Di(2-ethylhexyl)phthalate (DEHP)	EHL	EPA 525.2	0.6	7	8	N/A
1,2-Dibromo-3-Chloropropane (DBCP)	EHL	EPA 504.1	0.01	7	8	N/A
1,2-Dichlorobenzene (o-Dichlorobenzene)	EHL	EPA 524.2	0.5	7	8	N/A
1,4-Dichlorobenzene (p-DCB)	EHL	EPA 524.2	0.5	7	8	N/A
1,1-Dichloroethane (1,1-DCA)	EHL	EPA 524.2	0.5	7	8	N/A
1,2-Dichloroethane (1,2-DCA)	EHL	EPA 524.2	0.5	7	8	N/A
1,1-Dichloroethylene (1,1-DCE)	EHL	EPA 524.2	0.5	7	8	N/A
cis-1,2-Dichloroethylene	EHL	EPA 524.2	0.5	7	8	N/A
trans-1,2-Dichloroethylene	EHL	EPA 524.2	0.5	7	8	N/A
Dichloromethane (Methylene Chloride)	EHL	EPA 524.2	0.5	7	8	N/A
1,2-Dichloropropane (Propylene Dichloride)	EHL	EPA 524.2	0.5	7	8	N/A
1,3-Dichloropropene	EHL	EPA 524.2	0.5	7	8	N/A

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Analyte	Laboratory	Method	MRL (µg/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Dinoseb (DNBP)	EHL	EPA 515.3	0.1	7	8	N/A
Diquat	EHL	EPA 549.2	0.4	7	8	N/A
Endothall	EHL	EPA 548.1	9	7	8	N/A
Endrin	EHL	EPA 525.2	0.01	7	8	N/A
Ethylbenzene (Phenylethane)	EHL	EPA 524.2	0.5	7	8	N/A
Ethylene Dibromide (EDB)	EHL	EPA 504.1	0.01	7	8	N/A
Ethyl tertiary butyl ether (ETBE)	EHL	EPA 524.2	3	7	8	N/A
Glyphosate	EHL	EPA 547	6	7	8	N/A
Heptachlor	EHL	EPA 525.2	0.04	7	8	N/A
Heptachlor Epoxide	EHL	EPA 525.2	0.02	7	8	N/A
Hexachlorobenzene	EHL	EPA 525.2	0.1	7	8	N/A
Hexachlorocyclopentadiene	EHL	EPA 525.2	0.1	7	8	N/A
Lindane (gamma-BHC)	EHL	EPA 525.2	0.02	7	8	N/A
Methoxychlor	EHL	EPA 525.2	0.1	7	8	N/A
Methyl tert butyl ether (MTBE)	EHL	EPA 524.2	0.5	7	8	N/A
Molinate (Ordam)	EHL	EPA 525.2	0.1	7	8	N/A
Monochlorobenzene (Chlorobenzene)	EHL	EPA 524.2	0.5	7	8	N/A
Oxamyl	EHL	EPA 531.1	1	7	8	N/A
Pentachlorophenol (PCP)	EHL	EPA 515.3	0.04	12	13	N/A
Picloram	EHL	EPA 515.3	0.1	7	8	N/A
Polychlorinated Biphenyls Aroclor 1016	EHL	EPA 505.0	0.08	7	8	N/A
Polychlorinated Biphenyls Aroclor 1221	EHL	EPA 505.0	2	7	8	N/A
Polychlorinated Biphenyls Aroclor 1232	EHL	EPA 505.0	0.5	7	8	N/A
Polychlorinated Biphenyls Aroclor 1242	EHL	EPA 505.0	0.3	7	8	N/A
Polychlorinated Biphenyls Aroclor 1248	EHL	EPA 505.0	0.1	7	8	N/A
Polychlorinated Biphenyls Aroclor 1254	EHL	EPA 505.0	0.1	7	8	N/A
Polychlorinated Biphenyls Aroclor 1260	EHL	EPA 505.0	0.2	7	8	N/A
Simazine (Princep)	EHL	EPA 525.2	0.07	7	8	N/A
Styrene (Vinylbenzene)	EHL	EPA 524.2	0.5	7	8	N/A

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Analyte	Laboratory	Method	MRL (µg/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
2,3,7,8-TCDD (Dioxin)	EHL	EPA 1613	5 pg/L	7	8	N/A
1,1,2,2-Tetrachloroethane	EHL	EPA 524.2	0.5	6	8	N/A
Tetrachloroethene (PCE)	EHL	EPA 524.2	0.5	7	8	N/A
Thiobencarb (Bolero)	EHL	EPA 525.2	0.1	7	8	N/A
Toluene (Methylbenzene)	EHL	EPA 524.2	0.5	7	8	N/A
Toxaphene	EHL	EPA 505.0	1	7	8	N/A
2,4,5-TP (Silvex)	EHL	EPA 515.3	0.1	7	8	N/A
1,2,4-Trichlorobenzene (Unsym-Trichlorobenzene)	EHL	EPA 524.2	0.5	7	8	N/A
1,1,1-Trichloroethane (1,1,1- TCA)	EHL	EPA 524.2	0.5	7	8	N/A
1,1,2-Trichloroethane (1,1,2- TCA)	EHL	EPA 524.2	0.5	7	8	N/A
Trichloroethylene (TCE)	EHL	EPA 524.2		4	5	N/A
Trichlorofluoromethane (Freon 11)	EHL	EPA 524.2		4	5	N/A
1,1,2-Trichloro-1,2,2- Trifluoroethane (Freon 113)	EHL	EPA 524.2	0.5	7	8	N/A
Trifluralin	EHL	EPA 525.2	0.1	7	8	N/A
Vinyl Chloride	EHL	EPA 524.2	0.2	7	8	N/A
Inorganics with MCLs						
Aluminum	EHL	EPA 200.8	2	11	8	1
Antimony	EHL	EPA 200.8	1	9	7	1
Arsenic	EHL	EPA 200.8	2	9	7	1
Asbestos	EHL	EPA 100.1, 100.2	0.2 mf/L	7	8	1
Barium	EHL	EPA 200.8	2	11	8	1
Beryllium	EHL	EPA 200.8	0.3	9	7	1
Cadmium	EHL	EPA 200.8	1	9	7	1
Chloride	EHL	EPA 300.0	2000	11	25	2
Chromium	EHL	EPA 200.8	2	9	7	1
Color	EHL	SM 2120B	5 Pt/Co units	3	8	1
Copper	EHL	EPA 200.8	1	9	7	1
Corrosivity (Langelier Index @ 25 degrees)	EHL	SM 2330B		5	4	1
Cyanide	EHL	EPA 335.4	20	7	8	1
Fluoride	EHL	380-75WE	100	11	8	1
Foaming Agents (MBAS)	EHL	EPA 425.2,425.4		7	8	1

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				Source Water	First Pass SWRO	Second Pass RO Permeate
Iron	EHL	EPA 200.7	20	10	7	1
Lead	EHL	EPA 200.8	1	9	7	1
Magnesium	EHL	EPA 200.7	100	10	7	1
Manganese	EHL	EPA 200.8	2	11	8	1
Mercury	EHL	EPA 245.1	0.1	7	8	1
Nickel	EHL	EPA 200.8	1	9	7	1
Nitrate as Nitrogen	EHL	EPA 353.2	100	11	8	1
Nitrite as Nitrogen	EHL	EPA 353.2	10	7	8	1
Odor-Threshold	EHL	EPA 140.1		7	8	1
Phosphate	EHL	SM 4500-P E	50	7	8	1
Selenium	EHL	EPA 200.8	2	9	7	1
Silver	EHL	EPA 200.8	2	6	8	1
Specific Conductance	EHL	EPA 120.1	0.5 umho/cm	16	13	1
Sulfate	EHL	EPA 300	5000	11	8	1
Thallium	EHL	EPA 200.8	0.4	9	7	1
Total Dissolved Solids	EHL	EPA 160.1	10000	18	31	2
Turbidity	EHL	EPA 180.1	1 NTU	17	7	1
Zinc	EHL	EPA 200.8	5	9	7	1
DBPs						
THMs						
Bromodichloromethane	EHL	EPA 524.2	0.5	8	8	N/A
Bromoform	EHL	EPA 524.3	0.5	8	8	N/A
Chloroform	EHL	EPA 524.4	0.5	8	8	N/A
Dibromochloromethane	EHL	EPA 524.5	0.5	8	8	N/A
HAA5						
Dibromoacetic acid	EHL	EPA 552.2	1	7	8	N/A
Dichloroacetic acid	EHL	EPA 552.3	1	7	8	N/A
Monobromoacetic acid	EHL	EPA 552.4	1	7	8	N/A
Monochloroacetic acid	EHL	EPA 552.5	2	7	8	N/A
Trichloroacetic acid	EHL	EPA 552.6	1	7	8	N/A
Bromate	EHL	EPA 300.1	5	7	8	N/A
Radionuclides						
Gross alpha particle activity	EHL	SM 7110B	3 pCi/L	2	1	N/A
Gross beta particle activity	EHL	SM 7110B	3 pCi/L	2	1	N/A
Tritium	EHL	SM RAD-A002	700 pCi/L	1	N/A	N/A

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Analyte	Laboratory	Method	MRL (µg/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Federal and State Monitoring Requirements						
UCMR List 1						
Acetochlor	EHL	EPA 525.2	0.1	7	8	N/A
DCPA mono-acid degradate (Dacthal)	EHL	EPA 515.3	0.5	7	8	N/A
DCPA di-acid degradate (Chlorthal)	EHL	EPA 515.3	0.5	7	8	N/A
4,4'-DDE	EHL	EPA 525.2	0.1	7	8	N/A
2,4-dinitrotoluene (2,4-DNT)	EHL	EPA 525.2	0.5	7	8	N/A
2,6-dinitrotoluene (2,6-DNT)	EHL	EPA 525.2	0.5	7	8	N/A
EPTC	EHL	EPA 525.2	0.1	7	8	N/A
Methyl tert butyl ether (MTBE)	EHL	EPA 524.2	0.5	7	8	N/A
Molinate (Ordam)	EHL	EPA 525.2	0.1	7	8	N/A
Nitrobenzene	EHL	EPA 524.2	5	6	6	N/A
Terbacil	EHL	EPA 525.2	0.1	7	8	N/A
Perchlorate	EHL	EPA 314	4	4	5	N/A
CA UCMR						
Dichlorodifluoromethane (Freon 12)	EHL	EPA 524.2	0.5	7	8	N/A
Ethyl tertiary butyl ether (ETBE)	EHL	EPA 524.2	3	7	8	N/A
Tertiary Amyl Methyl Ether (TAME)	EHL	EPA 524.2	3	7	8	N/A
Tertiary Butyl Alcohol (TBA)	EHL	EPA 524.2	2	4	5	N/A
1,2,3-Trichloropropane (1,2,3-TCP)	EHL	CDHS	0.005	4	5	N/A
NDMA	EHL	EHL S160	0.002	4	5	N/A
NDEA	EHL	EHL S160	0.002	4	5	N/A
1,4-Dioxane	EHL	EPA 524.2	5	6	8	N/A
4-Methyl-2-Pentanone (MIBK)	EHL	EPA 524.2	2	6	6	N/A
Naphthalene (Naphthalin)	EHL	EPA 524.2	0.5	10	11	N/A
n-Propylbenzene	EHL	EPA 524.2	0.5	7	8	N/A
1,2,3-Trimethylbenzene	EHL	EPA 524.2	0.5	7	8	N/A
1,2,4-Trimethylbenzene (Pseudocumene)	EHL	EPA 524.2	0.5	7	8	N/A

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Analyte	Laboratory	Method	MRL (µg/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
n-Butylbenzene (1- Butylpropane, 1- Phenylbutane)	EHL	EPA 524.2	0.5	7	8	N/A
sec-Butylbenzene (2- Phenylbutane)	EHL	EPA 524.2	0.5	7	8	N/A
tert-Butylbenzene	EHL	EPA 524.2	0.5	7	8	N/A
2-Chlorotoluene (o- Chlorotoluene)	EHL	EPA 524.2	0.5	7	8	N/A
4-Chlorotoluene (p- Chlorotoluene)	EHL	EPA 524.2	0.5	7	8	N/A
Formaldehyde	EHL	EPA 556	5	3	3	N/A
Isopropylbenzene (Cumene)	EHL	EPA 524.2	0.5	7	8	N/A
Boron	EHL	EPA 200.8	5	11	25	N/A
Vanadium	EHL	EPA 200.8	2	9	7	N/A
Chlorate	EHL	EPA 300.0	10	8	8	1
Manganese	EHL	EPA 200.8	2	11	8	N/A
Carbon Disulfide	EHL	EPA 524.2	5	6	6	N/A

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Table 5: MMWD Pilot Plant Water Quality - Drinking Water Related Analyses
(Non-regulated Constituents)

Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Drinking Water Quality Parameters						
Non-regulated Constituents						
"Extended" EPA 525.2						
Acenaphthylene	EHL	EPA 525.2	0.1	3	3	N/A
Acenaphthene	EHL	EPA 525.2	0.1	3	3	N/A
Acetochlor	EHL	EPA 525.2	0.1	7	8	N/A
Acifluorfen	EHL	EPA 515.3	1	3	3	N/A
Aldicarb (Temik)	EHL	EPA 531.1	0.5	3	3	N/A
Aldicarb Sulfone	EHL	EPA 531.1	0.7	3	3	N/A
Aldicarb Sulfoxide	EHL	EPA 531.1	0.5	3	3	N/A
Aldrin (Aldrec, Aldron)	EHL	EPA 525.2	0.1	3	3	N/A
Ametryn	EHL	EPA 525.2	0.1	3	3	N/A
Anilazine	EHL	EPA 525.2	1	3	3	N/A
Anthracene	EHL	EPA 525.2	0.1	3	3	N/A
Aspon	EHL	EPA 525.2	0.1	3	3	N/A
Azinphos-ethyl	EHL	EPA 525.2	0.5	3	3	N/A
Azinphos-methyl	EHL	EPA 525.2	0.5	3	3	N/A
Baygon	EHL	EPA 531.1	0.5	3	3	N/A
Bendiocarb	EHL	EPA 525.2	0.5	3	3	N/A
Benfluralin	EHL	EPA 525.2	0.1	3	3	N/A
Benz(a)Anthracene	EHL	EPA 525.2	0.1	3	3	N/A
Benzo(b)Fluoranthene	EHL	EPA 525.2	0.1	3	3	N/A
Benzo(g,h,i)Perylene	EHL	EPA 525.2	0.1	3	3	N/A
Benzo(k)Fluoranthene	EHL	EPA 525.2	0.1	3	3	N/A
Alpha-BHC	EHL	EPA 525.2	0.1	3	3	N/A
Beta-BHC	EHL	EPA 525.2	0.1	3	3	N/A
Delta-BHC	EHL	EPA 525.2	0.1	3	3	N/A
Bolstar	EHL	EPA 525.2	0.1	3	3	N/A
Bromacil (Hyvar X, Hyvar XL)	EHL	EPA 525.2	0.1	3	3	N/A
Bromobenzene (Monobromobenzene)	EHL	EPA 524.2	0.5	3	3	N/A
Bromochloromethane (Chlorobromomethane)	EHL	EPA 524.2	0.5	3	3	N/A
Bromomethane (Methyl Bromide)	EHL	EPA 524.2	0.5	3	3	N/A

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Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Butachlor (Butanex, Lambast, Machete)	EHL	EPA 525.2	0.1	3	3	N/A
Butylate	EHL	EPA 525.2	0.1	3	3	N/A
n-Butylbenzene (1- Butylpropane, 1-Phenylbutane)	EHL	EPA 524.2	0.5	7	8	N/A
sec-Butylbenzene (2- Phenylbutane)	EHL	EPA 524.2	0.5	7	8	N/A
Butylbenzylphthalate	EHL	EPA 525.2	1	3	3	N/A
Carbaryl (Sevin)	EHL	EPA 531.1	0.5	3	3	N/A
Carbophenothion	EHL	EPA 525.2	0.5	3	3	N/A
Carboxin	EHL	EPA 525.2	0.1	3	3	N/A
Chlorfenvinphos	EHL	EPA 525.2	5	3	3	N/A
Chlorobenzilate	EHL	EPA 525.2	0.1	3	3	N/A
2-Chlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
Chloroethane (Ethyl Chloride)	EHL	EPA 524.2	0.5	3	3	N/A
Chloromethane (Methyl Chloride)	EHL	EPA 524.2	0.5	3	3	N/A
Chloroneb	EHL	EPA 525.2	0.1	3	3	N/A
Chloropropylate	EHL	EPA 525.2	0.1	3	3	N/A
Chlorothalinol (Bravo)	EHL	EPA 525.2	0.1	3	3	N/A
2-Chlorotoluene (o-Chlorotoluene)	EHL	EPA 524.2	0.5	7	8	N/A
4-Chlorotoluene (p-Chlorotoluene)	EHL	EPA 524.2	0.5	7	8	N/A
Chlorpropham	EHL	EPA 525.2	0.1	3	3	N/A
Chlorpyrifos (Dursban, Lorsban)	EHL	EPA 525.2	0.1	3	3	N/A
Chlorpyrifos methyl	EHL	EPA 525.2	0.5	3	3	N/A
Chrysene	EHL	EPA 525.2	0.1	3	3	N/A
cis-1,3-Dichloropropylene	EHL	EPA 524.2	0.5	7	8	N/A
cis-Permethrin	EHL	EPA 525.2	0.1	3	3	N/A
Clomazone	EHL	EPA 525.2	0.1	3	3	N/A
Clopyralid	EHL	EPA 525.2	10	3	3	N/A
Coumaphos	EHL	EPA 525.2	0.1	3	3	N/A
Crotoxyphos	EHL	EPA 525.2	0.5	3	3	N/A
Cycloate	EHL	EPA 525.2	0.1	3	3	N/A
2,4-DB	EHL	EPA 515.3	2	3	3	N/A
p,p DDD	EHL	EPA 525.2	0.1	3	3	N/A
p,p DDE	EHL	EPA 525.2	0.1	7	8	N/A
p,p DDT	EHL	EPA 525.2	0.1	3	3	N/A
Demeton O	EHL	EPA 525.2	0.5	3	3	N/A
Demeton S	EHL	EPA 525.2	0.5	3	3	N/A

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Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Desethylatrazine	EHL	EPA 525.2	1	3	3	N/A
Desisopropylatrazine	EHL	EPA 525.2	1	3	3	N/A
Diazinon	EHL	EPA 525.2	0.1	3	3	N/A
Dibenz(a,h) Anthracene	EHL	EPA 525.2	0.1	3	3	N/A
Dibromomethane (Methylene Bromide)	EHL	EPA 524.2	0.5	3	3	N/A
Dicamba (Banax, Banvel, Dianat)	EHL	EPA 515.3	0.1	3	3	N/A
Dichlobenil	EHL	EPA 525.2	0.1	3	3	N/A
Dichlofenthion	EHL	EPA 525.2	0.1	3	3	N/A
Dichloran	EHL	EPA 525.2	0.5	3	3	N/A
1,3-Dichlorobenzene (m- Dichlorobenzene)	EHL	EPA 524.2	0.5	3	3	N/A
2,3-Dichlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
Dichloroprop	EHL	EPA 515.3	2	3	3	N/A
1,3-Dichloropropane	EHL	EPA 524.2	0.5	3	3	N/A
2,2-Dichloropropane	EHL	EPA 524.2	0.5	3	3	N/A
1,1-Dichloropropene	EHL	EPA 524.2	0.5	3	3	N/A
Dichlorvos (DDVP)	EHL	EPA 525.2	0.1	3	3	N/A
Dicrotophos	EHL	EPA 525.2	0.5	3	3	N/A
Dieldrin	EHL	EPA 525.2	0.1	3	3	N/A
Diethylphthalate	EHL	EPA 525.2	1	3	3	N/A
Dimethoate (Cygon)	EHL	EPA 525.2	0.5	3	3	N/A
Dimethylphthalate	EHL	EPA 525.2	1	3	3	N/A
Di-n-Butylphthalate	EHL	EPA 525.2	2	3	3	N/A
Di-n-octylphthalate	EHL	EPA 525.2	2	3	3	N/A
Dioxathion	EHL	EPA 525.2	0.5	3	3	N/A
Diphenamid	EHL	EPA 525.2	0.1	3	3	N/A
Disulfoton	EHL	EPA 525.2	0.1	3	3	N/A
Disulfoton sulfone	EHL	EPA 525.2	0.1	3	3	N/A
Disulfoton sulfoxide	EHL	EPA 525.2	10	3	3	N/A
Endosulfan I (alpha)	EHL	EPA 525.2	0.1	3	3	N/A
Endosulfan II (beta)	EHL	EPA 525.2	0.1	3	3	N/A
Endosulfan sulfate	EHL	EPA 525.2	0.1	3	3	N/A
Endrin Aldehyde	EHL	EPA 525.2	0.5	3	3	N/A
EPN	EHL	EPA 525.2	0.5	3	3	N/A
EPTC	EHL	EPA 525.2	0.1	7	8	N/A
Erucylamide	EHL	EPA 525.2	5	3	3	N/A
Esfenvalerate	EHL	EPA 525.2	0.5	3	3	N/A
Ethalfuralin	EHL	EPA 525.2	0.1	3	3	N/A
Ethion	EHL	EPA 525.2	5	3	3	N/A

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				Source Water	First Pass SWRO	Second Pass RO Permeate
Ethofumesate	EHL	EPA 525.2	0.5	3	3	N/A
Ethoprop	EHL	EPA 525.2	0.1	3	3	N/A
Etridiazole	EHL	EPA 525.2	0.1	3	3	N/A
Famphur	EHL	EPA 525.2	0.1	3	3	N/A
Fenamiphos	EHL	EPA 525.2	0.1	3	3	N/A
Fenarimol	EHL	EPA 525.2	1	3	3	N/A
Fenitrothion	EHL	EPA 525.2	0.5	3	3	N/A
Fenoxaprop-ethyl	EHL	EPA 525.2	1	3	3	N/A
Fensulfothion	EHL	EPA 525.2	0.5	3	3	N/A
Fenthion	EHL	EPA 525.2	0.1	3	3	N/A
Flourene	EHL	EPA 525.2	0.1	3	3	N/A
Fluazifop-butyl	EHL	EPA 525.2	0.1	3	3	N/A
Fluchloralin	EHL	EPA 525.2	0.1	3	3	N/A
Fluometuron	EHL	EPA 525.2	0.5	3	3	N/A
Fluoranthene	EHL	EPA 525.2	0.1	3	3	N/A
Fluridone	EHL	EPA 525.2	1	3	3	N/A
Fonofos	EHL	EPA 525.2	0.1	3	3	N/A
2,2',3,3',4,4',6- Heptachlorobiphenyl	EHL	EPA 525.2	0.5	3	3	N/A
2,2',4,4',5',6-Hexachlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
Hexazinone	EHL	EPA 525.2	0.1	3	3	N/A
3-Hydroxycarbofuron	EHL	EPA 531.1	0.5	3	3	N/A
Indeno(1,2,3,c,d)Pyrene	EHL	EPA 525.2	0.1	3	3	N/A
Iprodione	EHL	EPA 525.2	0.5	3	3	N/A
Isofenphos	EHL	EPA 525.2	0.5	3	3	N/A
Isophorone	EHL	EPA 525.2	0.1	3	3	N/A
Isopropylbenzene (Cumene)	EHL	EPA 524.2	0.5	7	8	N/A
p-Isopropyltoluene (p-Cymene)	EHL	EPA 524.2	0.5	3	3	N/A
Leptophos	EHL	EPA 525.2	0.5	3	3	N/A
Malathion	EHL	EPA 525.2	0.1	3	3	N/A
Metalaxyl	EHL	EPA 525.2	0.5	3	3	N/A
Methiocarb	EHL	EPA 531.1	1	3	3	N/A
Methomyl (Lannate)	EHL	EPA 531.1	0.5	3	3	N/A
Methyl ethyl ketone (MEK, 2- Butanone)	EHL	EPA 524.2	5	3	3	N/A
1-Methylnaphthalene	EHL	EPA 525.2	0.1	3	3	N/A
2-Methylnaphthalene	EHL	EPA 525.2	0.1	3	3	N/A
Methyl parathion	EHL	EPA 525.2	0.5	3	3	N/A
Methyl paraoxon	EHL	EPA 525.2	0.5	3	3	N/A

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Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
4-Methyl-2-Pentanone (MIBK)	EHL	EPA 524.2	2	6	6	N/A
Metolachlor (Metelilachlor)	EHL	EPA 525.2	0.1	3	3	N/A
Metribuzin (Lexone, Sencor, Sencoral)	EHL	EPA 525.2	0.1	3	3	N/A
Metsulfuron-methyl	EHL	EPA 525.2	10	3	3	N/A
Mevinphos	EHL	EPA 525.2	0.1	3	3	N/A
MGK 264 isomer a	EHL	EPA 525.2	0.1	3	3	N/A
MGK 264 isomer b	EHL	EPA 525.2	0.1	3	3	N/A
MGK 326	EHL	EPA 525.2	0.1	3	3	N/A
Mirex	EHL	EPA 525.2	0.5	3	3	N/A
Monocrotophos	EHL	EPA 525.2	0.5	3	3	N/A
Naled	EHL	EPA 525.2	0.5	3	3	N/A
Naphthalene (Naphthalin)	EHL	EPA 525.2	0.1	10	11	N/A
Napropamide	EHL	EPA 525.2	0.1	3	3	N/A
Nitrobenzene	EHL	EPA 526	0.5	6	6	N/A
Norflurazon	EHL	EPA 525.2	1	3	3	N/A
2,2',3,3',4,5',6,6'- Octachlorobiphenyl	EHL	EPA 525.2	0.5	3	3	N/A
Oryzalin	EHL	EPA 525.2	10	3	3	N/A
Oxadiazon	EHL	EPA 525.2	0.1	3	3	N/A
Oxyfluorfen	EHL	EPA 525.2	0.5	3	3	N/A
Paraquat	EHL	EPA 549.2	0.4	3	3	N/A
Parathion	EHL	EPA 525.2	0.5	3	3	N/A
Pebulate	EHL	EPA 525.2	0.1	3	3	N/A
Pendimethalin	EHL	EPA 525.2	0.1	3	3	N/A
Pentachlorobenzene	EHL	EPA 525.2	0.5	3	3	N/A
2,2',3',4,6-Pentachlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
Pentachloronitrobenzene	EHL	EPA 525.2	0.5	3	3	N/A
Pentachlorophenol	EHL	EPA 525.2	1	12	13	N/A
Phenanthrene	EHL	EPA 525.2	0.1	3	3	N/A
1-Phenylpropane (n- Propylbenzene)	EHL	EPA 524.2	0.5	7	8	N/A
Phorate	EHL	EPA 525.2	0.1	3	3	N/A
Phosmet	EHL	EPA 525.2	0.5	3	3	N/A
Phosphamidon	EHL	EPA 525.2	0.5	3	3	N/A
Profluralin	EHL	EPA 525.2	0.1	3	3	N/A
Prometryn (Caparol)	EHL	EPA 525.2	0.1	3	3	N/A
Pronamide	EHL	EPA 525.2	0.1	3	3	N/A
Propachlor (Albrass,Ramrod)	EHL	EPA 525.2	0.1	3	3	N/A
Propanil	EHL	EPA 525.2	0.5	3	3	N/A

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Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Propazine	EHL	EPA 525.2	0.1	3	3	N/A
Propiconazole isomer a	EHL	EPA 525.2	5	3	3	N/A
Propiconazole isomer b	EHL	EPA 525.2	5	3	3	N/A
Prothiofos	EHL	EPA 525.2	0.5	3	3	N/A
Pyrene	EHL	EPA 525.2	0.1	3	3	N/A
Simetryn	EHL	EPA 525.2	0.1	3	3	N/A
Stirofos	EHL	EPA 525.2	0.1	3	3	N/A
Sulfotep	EHL	EPA 525.2	0.5	3	3	N/A
2,4,5-T	EHL	EPA 515.3	0.5	3	3	N/A
Tebuthiuron	EHL	EPA 525.2	10	3	3	N/A
TEPP	EHL	EPA 525.2	1	3	3	N/A
Terbacil	EHL	EPA 525.2	0.1	7	8	N/A
Terbufos	EHL	EPA 525.2	0.5	3	3	N/A
Terbutryn	EHL	EPA 525.2	0.1	3	3	N/A
tert-Butylbenzene (2-Methyl-2-Phenylpropane)	EHL	EPA 524.2	0.5	7	8	N/A
1,2,4,5-Tetrachlorobenzene	EHL	EPA 525.2	0.5	3	3	N/A
2,2',4,4"-Tetrachlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
1,1,1,2-Tetrachloroethane	EHL	EPA 524.2	0.5	3	3	N/A
Thiabendazole	EHL	EPA 525.2	10	3	3	N/A
Thionazin	EHL	EPA 525.2	0.5	3	3	N/A
trans-1,3-Dichloropropylene	EHL	EPA 524.2	0.5	7	8	N/A
trans-Nonachlor	EHL	EPA 525.2	0.1	3	3	N/A
trans-Permethrin	EHL	EPA 525.2	0.1	3	3	N/A
Triadimefon	EHL	EPA 525.2	0.5	3	3	N/A
Tribufos	EHL	EPA 525.2	0.1	3	3	N/A
Trichlorfon	EHL	EPA 525.2	10	2	1	N/A
2,4,5-Trichlorobiphenyl	EHL	EPA 525.2	0.1	3	3	N/A
Trichloronate	EHL	EPA 525.2	0.5	3	3	N/A
2,4,6-Trichlorophenol	EHL	EPA 528	1	2	2	N/A
Tricyclazole	EHL	EPA 525.2	1	3	3	N/A
Trifluralin	EHL	EPA 525.2	0.1	7	8	N/A
1,2,3-Trimethylbenzene	EHL	EPA 524.2	0.5	7	8	N/A
1,2,4-Trimethylbenzene (Pseudocumene)	EHL	EPA 524.2	0.5	7	8	N/A
1,3,5-Trimethylbenzene (Mesitylene)	EHL	EPA 524.2	0.5	3	3	N/A
Vernolate	EHL	EPA 525.2	0.1	3	3	N/A
Vinclozolin	EHL	EPA 525.2	0.5	3	3	N/A

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Analyte	Laboratory	Method	MRL (ug/L unless otherwise noted)	Number of Times Sampled		
				Source Water	First Pass SWRO	Second Pass RO Permeate
Hormones						
17 alpha_Ethynyl estradiol	EHL	EHL L211	0.5	1	1	N/A
17 alpha-Estradiol	EHL	EHL L211	0.5	1	1	N/A
17 beta-Estradiol	EHL	EHL L211	0.5	1	1	N/A
cis-Testosterone	EHL	EHL L211	0.1	1	1	N/A
Diethylstilbestrol (DES)	EHL	EHL L211	0.5	1	1	N/A
Estriol	EHL	EHL L211	0.5	1	1	N/A
Estrone	EHL	EHL L211	0.5	1	1	N/A
Progesterone	EHL	EHL L211	0.1	1	N/A	N/A
Phenolics						
2,4,6-Trichlorophenol	EHL	EHL L200	0.1	2	2	N/A
4-n-Octylphenol	EHL	EHL L200	0.5	2	2	N/A
4-tert-Octylphenol	EHL	EHL L200	0.5	2	2	N/A
Bisphenol A	EHL	EHL L200	0.1	2	2	N/A
Nonylphenol diethoxylate, isomer mix	EHL	EHL L200	1	2	2	N/A
Nonylphenol, isomer mix	EHL	EHL L200	0.5	2	2	N/A
Nonylphenol monoethoxylate, isomer mix	EHL	EHL L201		2	2	N/A
Pentachlorophenol	EHL	EHL L200	0.1	12	13	N/A
Phenylphenol, total	EHL	EHL L200	0.1	2	2	N/A
Tetrabromobisphenol A	EHL	EHL L200	0.1	2	2	N/A
E-Screen Assay			0.08 estradiol equivalents ng/L	2	2	N/A

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Table 6: MMWD Pilot Plant Water Quality - Drinking Water Related Analyses
(Detected Results)

Analyte	Units	Source Water			First Pass SWRO			Second Pass
		Min	Max	Mean	Min	Max	Mean	RO Permeate Result
Drinking Water Quality Parameters								
Regulated Constituents								
Organics with MCLs								
Ethylene Dibromide (EDB) ^a	mg/l	< 0.00001	0.00002	0.00001	ND (RL = 0.00001)			N/A
Inorganics with MCLs								
Aluminum	mg/l	< 0.002	1.60	0.44	ND (RL = 0.002)			ND (RL = 0.002)
Arsenic	mg/l	< 0.002	0.024	0.004	ND (RL = 0.002)			ND (RL = 0.002)
Barium	mg/l	< 0.002	0.051	0.019	ND (RL = 0.002)			ND (RL = 0.002)
Beryllium	mg/l	< 0.0003	0.0033	0.0005	ND (RL = 0.0003)			ND (RL = 0.0003)
Chloride	mg/l	3,100	15,000	11,000	9.7	99	49	ND (RL = 2)
Chromium	mg/l	< 0.002	0.042	0.0087	ND (RL = 0.002)			ND (RL = 0.002)
Color (Apparent)	Pt/Co units	10	10	10	ND (RL = 5)			ND (RL = 5)
Color (True)	Pt/Co units	5	10	6	N/A			N/A
Copper	mg/l	< 0.001	0.010	0.003	ND (RL = 0.001)			ND (RL = 0.001)
Saturation (Langlier) Index	N/A	0.10	0.64	0.43	-6.7	-5.5	-6.2	N/A
Fluoride	mg/l	0.24	0.85	0.64	ND (RL = 0.10)			ND (RL = 0.10)
Foaming Agents (MBAS)	mg/l	0.10	0.44	0.29	ND (RL = 0.10)			ND (RL = 0.10)
Iron	mg/l	0.18	0.75	0.34	ND (RL = 0.02)			ND (RL = 0.02)
Magnesium	mg/l	430	970	770	< 0.1	0.79	0.34	ND (RL = 0.10)
Manganese	mg/l	< 0.002	0.044	0.02	ND (RL = 0.002)			ND (RL = 0.002)
Mercury	mg/l	ND (RL = 0.0001)			< 0.0001	0.0003 ^(a)	0.0001	N/A
Nickel	mg/l	< 0.001	0.057	0.022	ND (RL = 0.001)			ND (RL = 0.001)
Nitrate	mg/l	< 0.10	0.38	0.23	ND (RL = 0.10)			ND (RL = 0.10)
Nitrite	mg/l	< 0.01	0.017	0.013	< 0.01	0.01 ^(b)	0.01	N/A
Phosphate, ortho	mg P/L	0.08	0.12	0.10	ND (RL = 0.05)			N/A
Selenium	mg/l	< 0.002	0.091	0.01	ND (RL = 0.002)			ND (RL = 0.002)
Silver	mg/l	< 0.002	0.013	0.0029	ND (RL = 0.002)			N/A
Sulfate	mg/l	440	2,100	1,500	ND (RL = 5)			ND (RL = 5)
Solids, Dissolved	mg/l	2,500	29,000	21,000	25	1,100	190	ND (RL = 10)
Zinc	mg/l	< 0.005	0.010	0.004	ND (RL = 0.005)			ND (RL = 0.005)
Radionuclides								
Gross Alpha	± 2.1 pCi/L	4.4	6.4	5.4	0.4	0.4	0.4	N/A
Gross Beta	± 33 pCi/L	144	236	190	2.0	2.0	2.0	N/A

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Analyte	Units	Source Water			First Pass SWRO			Second Pass
		Min	Max	Mean	Min	Max	Mean	RO Permeate
Federal and State Monitoring Requirements								
CA UCMR								
Boron	mg/l	1.5	3.3	2.3	0.15	1.1	0.60	N/A
Manganese	mg/l	< 0.002	0.044	0.02	ND (RL = 0.002)			N/A
Non-Regulated Constituents								
Phenolics								
Nonylphenol monoethoxylate, isomer mix	mg/l	<0.010	0.015	0.01	ND (RL = 0.01)			N/A

Notes:

- (a) Also known as 1,2 Dibromoethane
- (b) Occurred once on 16 August 2005 sampling
- (c) Occurred once on 14 September 2005 sampling

RL = Reporting Limit

ND = Not Detectable

N/A = Not Applicable

Table 7: MMWD Pilot Plant Water Quality – Drinking Water Related Analyses
(Ultra Low-Level Polychlorinated Biphenyls, PCBs, Results)

COMPOUND	Units	Source Water			First Pass SWRO			Second Pass RO Permeate		
		Results	RL	Count	Results	RL	Count	Results	RL	Count
Total Monochloro Biphenyls	pg/l ^(a)	<RL	1.26	3	<RL	1.27	4	<RL	1.64	1
Total Dichloro Biphenyls	pg/l	<RL	2.38	3	<RL	2.38	4	<RL	2.04	1
Total Trichloro Biphenyls	pg/l	5.4	1.21	3	<RL	1.18	4	<RL	1.18	1
Total Tetrachloro Biphenyls	pg/l	33.3	1.28	3	<RL	1.18	4	<RL	1.18	1
Total Pentachloro Biphenyls	pg/l	95.1	1.21	3	<RL	1.18	4	<RL	1.18	1
Total Hexachloro Biphenyls	pg/l	118.8	1.21	3	<RL	1.18	4	<RL	1.18	1
Total Heptachloro Biphenyls	pg/l	65.4	1.21	3	<RL	1.18	4	<RL	1.18	1
Total Octachloro Biphenyls	pg/l	19.4	1.21	3	<RL	1.18	4	<RL	1.18	1
Total Nonachloro Biphenyls	pg/l	5.4	2.85	3	<RL	2.83	4	<RL	2.33	1
Decachloro Biphenyl	pg/l	4.4	1.21	3	<RL	1.18	4	<RL	1.18	1
TOTAL PCBs	pg/l	347.2								

Notes:

- (a) 1 pg/l = 0.000000001 mg/L

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Table 8: MMWD Pilot Plant Water Quality - Drinking Water Related Analyses
(Ultra Low-Level Polybrominated diphenyl ethers, PBDEs, Results)

Analyte	Unit	Source Water			First Pass SWRO			Second Pass RO Permeate		
		Result	RL	Count	Result	RL	Count	Result	RL	Count
2,2',3,3',4,4',5,5',6,6'-DeBDE	pg/L ^a	<RL	594	5	<RL	474.8	6	<RL	139	1
2,2',3,3',4,4',5,5',6-NoBDE	pg/L	<RL	63.7	5	<RL	58.2	6	<RL	16	1
2,2',3,3',4,4',5,6,6'-NoBDE	pg/L	<RL	33.8	5	<RL	33.1	6	<RL	9.6	1
2,2',3,3',4,4'-HxBDE	pg/L	<RL	39.3	5	<RL	34.9	6	<RL	14	1
2,2',3,3',4,5,5',6,6'-NoBDE	pg/L	<RL	48.2	5	<RL	46.2	6	<RL	14	1
2,2',3,4,4',5,5',6-OcBDE	pg/L	<RL	17.4	5	<RL	13.2	6	<RL	2.4	1
2,2',3,4,4',5,6-HpBDE	pg/L	<RL	12.9	5	<RL	11.2	6	<RL	3.9	1
2,2',3,4,4',5,6-HpBDE	pg/L	<RL	18.5	5	<RL	12.7	6	<RL	2.4	1
2,2',3,4,4',5'-HxBDE/2,3,4,4',5,6-HxBDE	pg/L	30.3	19.4	5	<RL	15.9	6	<RL	3.6	1
2,2',3,4,4',6'-HxBDE	pg/L	<RL	12.7	5	<RL	10.4	6	<RL	2.4	1
2,2',3,4,4'-PeBDE	pg/L	80.6	23.6	5	<RL	7.0	6	<RL	4.4	1
2,2',4,4',5,5'-HxBDE	pg/L	168.9	15.3	5	<RL	12.7	6	<RL	2.6	1
2,2',4,4',5,6'-HxBDE	pg/L	127.5	9.08	5	<RL	7.6	6	<RL	2.4	1
2,2',4,4',5-PeBDE	pg/L	1414.7	14.9	5	9.8	4.9	6	<RL	2.9	1
2,2',4,4',6,6'-HxBDE	pg/L	9.3	8.38	5	<RL	7.0	6	<RL	2.4	1
2,2',4,4',6-PeBDE	pg/L	290.6	11	5	<RL	3.6	6	<RL	2.4	1
2,2',4,4'-TeBDE	pg/L	4732.2	6.24	5	10.0	5.6	6	<RL	2.4	1
2,2',4,5'-TeBDE	pg/L	35.3	8.3	5	<RL	6.6	6	<RL	2.4	1
2,2',4,6'-TeBDE	pg/L	<RL	6.05	5	<RL	5.2	6	<RL	2.4	1
2,2',4-TriBDE/2,3',4-TriBDE	pg/L	12.6	5.36	5	<RL	3.7	6	<RL	2.5	1
2,3,3',4,4',5,6-HpBDE	pg/L	<RL	29	5	<RL	22.6	6	<RL	5.8	1
2,3,3',4,4'-PeBDE	pg/L	<RL	29.9	5	<RL	8.8	6	<RL	5.7	1
2,3',4,4',6-PeBDE/2,3',4,5,5'-PeBDE	pg/L	<RL	24.3	5	<RL	6.9	6	<RL	4.5	1
2,3',4,4'-TeBDE	pg/L	32.4	9.46	5	<RL	7.4	6	<RL	2.4	1
2,3,4,5,6-PeBDE	pg/L	<RL	39.1	5	<RL	11.5	6	<RL	8	1
2,3',4',6-TeBDE	pg/L	8.39	8.37	5	<RL	6.6	6	<RL	2.4	1
2,4,4',6-TeBDE	pg/L	<RL	6.77	5	<RL	6.0	6	<RL	2.4	1
2,4,4'-TriBDE/2',3,4-TriBDE	pg/L	12.7	4.73	5	<RL	3.2	6	<RL	2.4	1
2,4',6-TriBDE	pg/L	<RL	4.69	5	<RL	3.2	6	<RL	2.4	1
2,4,6-TriBDE	pg/L	<RL	5.37	5	<RL	3.9	6	<RL	2.7	1
2,4'-DiBDE	pg/L	NQ	1.87	5	<RL	2.5	6	<RL	2.4	1
2,4-DiBDE	pg/L	NQ	2.09	5	<RL	2.6	6	<RL	2.4	1
2,6-DiBDE	pg/L	NQ	2.28	5	<RL	2.8	6	<RL	2.4	1
3,3',4,4',5-PeBDE	pg/L	<RL	15.9	5	<RL	4.5	6	<RL	2.6	1
3,3',4,4'-TeBDE	pg/L	<RL	6.29	5	<RL	5.2	6	<RL	2.4	1
3,3',4,5'-TeBDE	pg/L	<RL	6.73	5	<RL	5.6	6	<RL	2.4	1

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Analyte	Unit	Source Water			First Pass SWRO			Second Pass RO Permeate		
		Result	RL	Count	Result	RL	Count	Result	RL	Count
3,3',4-TriBDE	pg/L	<RL	3.78	5	<RL	2.9	6	<RL	2.4	1
3,4,4'-TriBDE	pg/L	<RL	3.54	5	<RL	2.9	6	<RL	2.4	1
3,4-DiBDE	pg/L	NQ	1.69	5	<RL	2.4	6	<RL	2.4	1
4,4'-DiBDE	pg/L	NQ	1.59	5	<RL	2.4	6	<RL	2.4	1

Notes:

(a) 1 pg/l = 0.000000001 mg/L

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Table 9: MMWD Pilot Plant Water Quality – Drinking Water Related Analyses (Ultra Low-Level Anthropogenic Constituent Results)

Analyte	Units	Source Water			First Pass SWRO		
		Result	RL	Count	Result	RL	Count
Acetaminophen	pg/L ^a	<RL	1.00	2	<RL	1.00	2
Androstenedione	pg/L	<RL	1.00	2	<RL	1.00	2
Atenolol	pg/L	5.28	0.25	1	<RL	0.25	1
Atorvastatin	pg/L	<RL	0.25	1	<RL	0.25	1
Atrazine	pg/L	<RL	0.75	3	<RL	0.75	3
Bisphenol A	pg/L	<RL	1.00	1	<RL	1.00	1
Caffeine	pg/L	8.25	10.0	2	<RL	10.0	2
Carbamazepine	pg/L	1.68	0.83	3	<RL	0.83	3
DEET	pg/L	5.36	1.00	2	<RL	1.00	2
Diazepam	pg/L	<RL	0.75	3	<RL	0.75	3
Diclofenac	pg/L	<RL	0.75	3	<RL	0.75	3
Dilantin	pg/L	1.57	1.00	3	<RL	1.00	3
Enalapril	pg/L	<RL	0.25	1	<RL	0.25	1
Erythromycin-H2O	pg/L	1.20	1.00	2	<RL	1.00	2
Estradiol	pg/L	<RL	0.83	3	<RL	0.83	3
Estriol	pg/L	<RL	5.00	2	<RL	5.00	2
Estrone	pg/L	1.31	0.73	3	<RL	0.73	3
Ethinylestradiol	pg/L	<RL	1.00	3	<RL	1.00	3
Fluoxetine	pg/L	<RL	0.83	3	<RL	0.83	3
Gemfibrozil	pg/L	10.0	0.75	3	<RL	0.75	3
Hydrocodone	pg/L	<RL	1.00	2	<RL	1.00	2
o-Hydroxy atorvastatin	pg/L	<RL	0.50	1	<RL	0.50	1
p-Hydroxy atorvastatin	pg/L	<RL	0.50	1	<RL	0.50	1
Ibuprofen	pg/L	3.00	1.00	2	<RL	1.00	2
Iopromide	pg/L	7.95	1.00	2	<RL	1.00	2
Linuron	pg/L	<RL	0.50	1	<RL	0.50	1
Meprobamate	pg/L	4.06	0.75	3	<RL	0.75	3
Naproxen	pg/L	1.92	0.75	3	<RL	0.75	3
Norfluoxetine	pg/L	<RL	0.50	1	<RL	0.50	1
Oxybenzone	pg/L	<RL	1.00	2	<RL	1.00	2
Pentoxifylline	pg/L	<RL	1.00	2	<RL	1.00	2
Progesterone	pg/L	<RL	0.83	3	<RL	0.83	3
Risperidone	pg/L	<RL	0.25	1	0.56	0.25	1
Simvastatin	pg/L	<RL	0.25	1	<RL	0.25	1
Simvastatin hydroxy acid	pg/L	<RL	0.25	1	<RL	0.25	1

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Analyte	Units	Source Water			First Pass SWRO		
		Result	RL	Count	Result	RL	Count
Sulfamethoxazole	pg/L	6.56	0.75	3	<RL	0.75	3
TCEP	pg/L	<RL	10.00	2	<RL	10.0	2
Testosterone	pg/L	<RL	0.83	3	<RL	0.83	3
Triclosan	pg/L	<RL	1.00	3	<RL	1.00	3
Trimethoprim	pg/L	<RL	0.75	3	<RL	0.75	3

Notes:

(a) 1 pg/l = 0.00000001 mg/L