



Engineering, Operations & Technology Committee

Ensuring Compliance With Water Quality Regulations

Item 6d
July 8, 2024

Regulatory Compliance

Item 6d

Subject

Compliance with drinking water regulations

Purpose

Describe the regulations for monitoring drinking water and the actions, equipment, and people needed to ensure 100% compliance with those regulations

Next Steps

Adapt as necessary to changing environmental and regulatory landscapes to ensure continued compliance



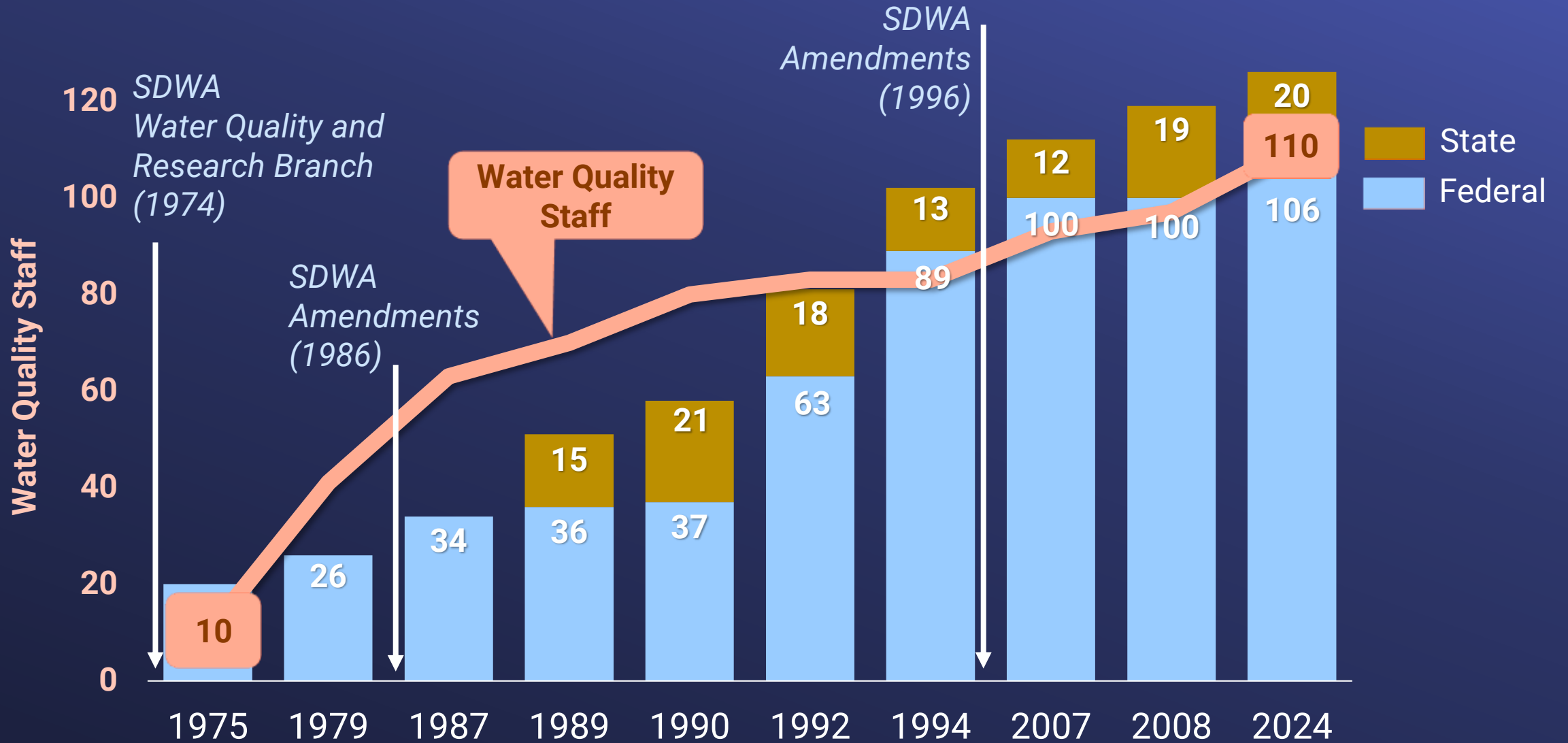
Water Quality Regulations




Federal and State Regulations

- Safe Drinking Water Act – 1974, 1986, 1996
 - Surface Water Treatment Rules
 - Interim Enhanced Surface Water Treatment Rule
 - Long Term 1 and 2 Enhanced Surface Water Treatment Rules
 - Stage 1 and 2 Disinfectants and Disinfection Byproducts Rules
 - Revised Total Coliform Rule
 - Consumer Confidence Report Rule
- Six-Year Review, Contaminant Candidate List
- Title 17 and Title 22 California Code of Regulations

Number of Regulated Drinking Water Constituents




Regulated Constituents



**Comprehensive Surface Water Treatment Rules
Quick Reference Guide: Systems Using Conventional or Direct Filtration**

Overview of the Rules

Title	Surface Water Treatment Rule (SWTR) - 40 CFR 141.70-141.75 Interim Enhanced Surface Water Treatment Rule (IESWTR) - 40 CFR 141.170-141.175 Filter Backwash Recycling Rule (FBRR) - 40 CFR 141.76 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) - 40 CFR 141.500-141.571
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia</i> , and <i>Cryptosporidium</i> .



Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide

Overview of the Rules

Titles*	<ul style="list-style-type: none">▶ Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) 63 FR 69390, December 16, 1998, Vol. 63, No. 241▶ Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) 71 FR 388, January 4, 2006, Vol. 71, No. 2
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**Revised Total Coliform Rule:
A Quick Reference Guide**

Overview of the Rule

Title*	Revised Total Coliform Rule (RTCR) 78 FR 10269, February 13, 2013, Vol. 78, No. 30
Purpose	Increase public health protection through the reduction of potential pathways of entry for fecal contamination into distribution systems.

CALIFORNIA

Water Boards

STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

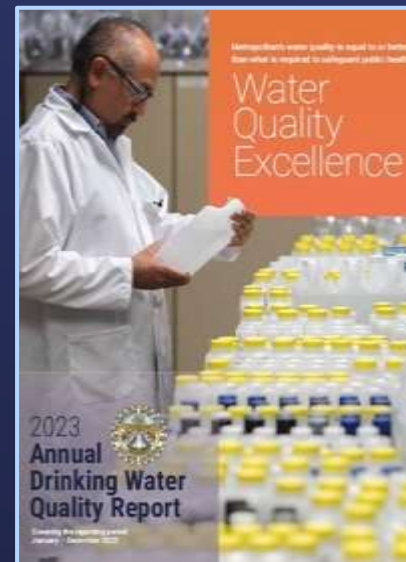
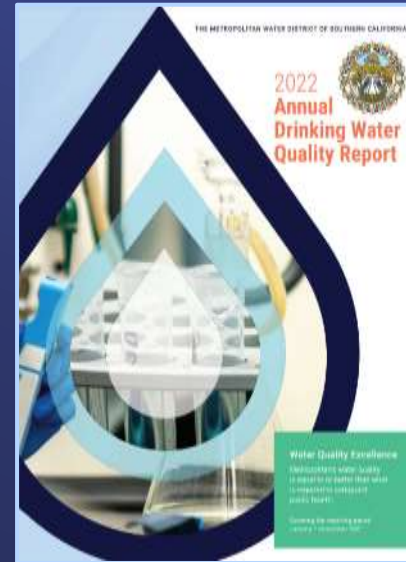
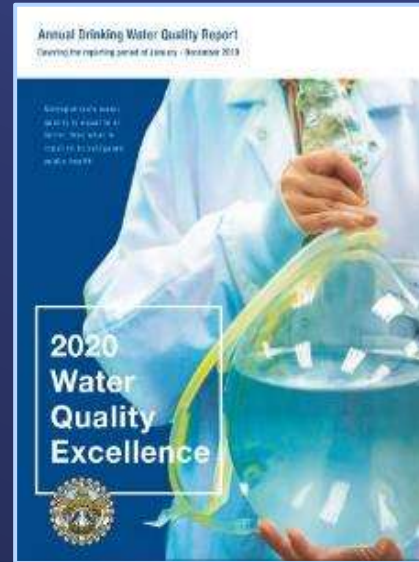
California Safe Drinking Water Laws
Selected Provisions of the Health & Safety Code and Water Code
(As amended, including Statutes 2023)

- Microorganisms
 - Coliforms, *Cryptosporidium*, *Giardia*, Viruses
- Disinfectants
- Disinfection Byproducts
 - Trihalomethanes, Haloacetic acids, Bromate
- Inorganic Chemicals
 - Metals, Minerals, Nitrate
- Volatile Organic Compounds
 - Benzene, Styrene, Vinyl chloride
- Synthetic Organic Compounds
 - 1,2,3-TCP, Dioxin, Glyphosate
- Radionuclides
 - Uranium, Radium, Gross Alpha & Beta

100% Compliance With Drinking Water Regulations

Water Quality's Mission

To safeguard the public's drinking water



- About 70,000 samples per year
- More than 400 constituents monitored
- Over 250,000 test results per year

Metropolitan's water quality meets or surpasses the standards required to safeguard public health

A Day in the Life of a Water Quality Sample



Monitoring plans



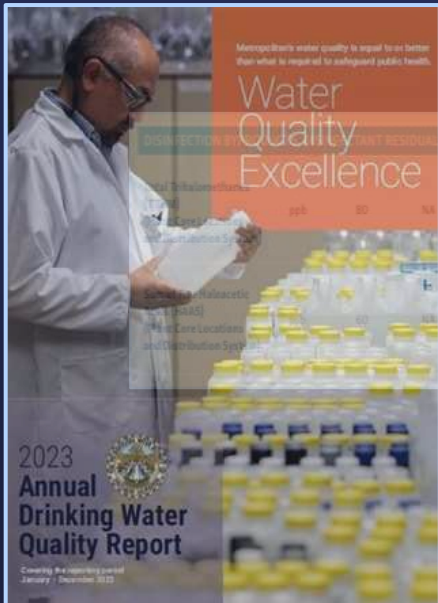
Sample collection



Sample receipt at lab



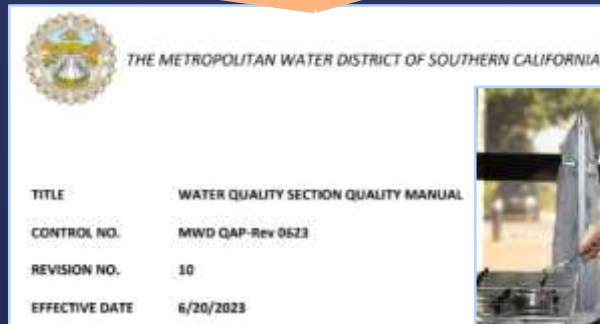
Analysis



Reporting

	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40
Range	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40
Highest LRAA	24	17	25	23	27
Distribution Systemwide	12 - 26				

	2.2 - 5.0	5.0 - 10.0	10.0 - 15.0	15.0 - 20.0	20.0 - 25.0
Range	2.2 - 5.0	5.0 - 10.0	10.0 - 15.0	15.0 - 20.0	20.0 - 25.0
Highest LRAA	5.5	3.4	9.0	7.4	6.0
Distribution Systemwide	9.0				



Quality assurance and Results review

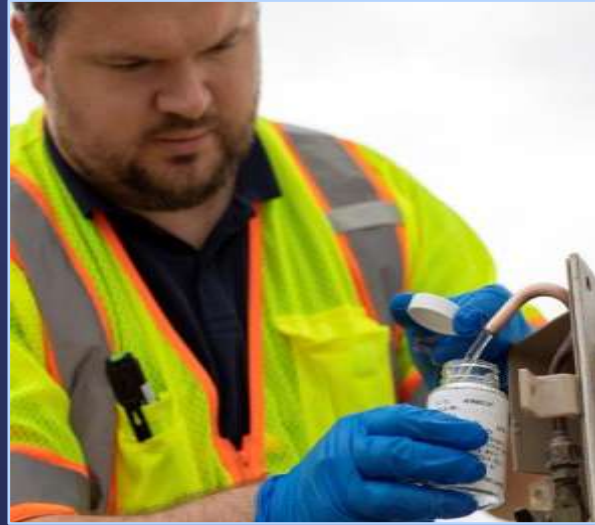


Collecting Daily Samples Across Our Vast Service Area

Compliance Monitoring



Maintenance on a source water monitoring platform



- 150,000 miles per year
- 70,000 samples in distribution system and at treatment plants
- Additional source water monitoring
- Over 100 sampling locations

Hundreds of Samples Received Every Week at Water Quality Laboratory

- Samples logged and checked on receipt
- Chain of custody, collection details
- Sample integrity, temperature, routing for required analyses
- Laboratory Information Management System

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
Water Quality Laboratory

Scheduled Date: 5/14/2024
Not Collected On Scheduled Date

Thermometer SN: 280134787
SDGE#: 2024-02193
Route: WQ-27

Collection List - WQL

Site Location: LA-21
304-2193-01-1 (T/COLLECTOR)(1)

Comp	Aliquot ID	Analysis Requested	TGR Smp/	# of Aliqs	Time Cell	DT °C	TGLR mg/L	FLGR mg/L	pH	FAC*	Depth	Rec'd Status
			1	1241	18.4	2.3	N/A	3.45	32.5			

Notes: ARRIVAL (Date/Time)

Code: Ambient = Num Temp C = Compliance NC = Not Collected NA = Not Applicable *FAC = Field analysis completion rate, not to exceed 60 minutes
DOS = Out of Service NF = No Flow IA = Inaccessible ND = Not Detected

EMP #	SIGNATURE	Date	Time	Temperature Upon Receipt (°C)	Thermometer (SN)	CF	DT	CT	Total Aliquots	Micro Aliquots	Receipt Status	Scale	Manual	Not Rec'd	Previously Rec'd
	<i>[Signature]</i>	05/14/24	NA												
	<i>[Signature]</i>	05/14/24	1513	18.4	280134787				7.0	7.0					

Collected By: *[Signature]*
Relinquished By: *[Signature]*
Received By: *[Signature]*

Ready for Pick Up
Scale
Manual
Not Rec'd
Previously Rec'd



Logging samples upon arrival at the Water Quality Laboratory

Daily Monitoring of Bacteriological Water Quality



- Revised Total Coliform Rule
- Coliforms and *E. coli*
 - Evaluates treatment efficacy
 - Determines integrity of the distribution system
 - Indicates the possible presence of fecal contamination
- 74 compliance locations throughout distribution system
- Monitored 3-4 days per week
- Average monthly samples – 700

Coliform analysis using fluorescence technology and agar plates

Warning to boil drinking water in southwest UK after at least 22 cases of illness confirmed – May 2024

Testing for Pathogenic Protozoa in Drinking Water

- *Cryptosporidium* – resistant to chlorine
- *Giardia* – common cause of waterborne disease
- Potential surface water contaminants
- Monthly monitoring at treatment plant influents and effluents



Cryptosporidium and *Giardia* observed under fluorescence and light microscopy

Testing for Disinfection Byproducts (DBPs)


- 50 routine monitoring locations
- Weekly monitoring
- Chlorination DBPs
 - Trihalomethanes
 - Haloacetic acids
- Ozonation DBPs
 - Bromate
- DBP precursors
 - TOC and Bromide



Checking water samples



Reviewing sample results

 **Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide**

Overview of the Rules

Titles*	
	▶ Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) 63 FR 69390, December 16, 1998, Vol. 63, No. 241
	▶ Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) 71 FR 388, January 4, 2006, Vol. 71, No. 2



Monitoring Over 100 Chemical Constituents

- Synthetic organic compounds
- Volatile organic compounds
- Metals and minerals
- Radiological materials



GENERAL MINERAL AND PHYSICAL ANALYSIS OF METROPOLITAN'S WATER SUPPLIES
TABLE D
April 2023

CONSTITUENTS	UNITS	SOURCE WATERS							TREATMENT PLANT EFFLUENTS					
		LAKE NAVASU	SAN JACINTO TUNNEL	LAKE MATHEWS	CASTAIC LAKE	SILVER WOOD LAKE	LAKE PERRIS	DIAMOND VALLEY LAKE	LAKE SKINNER	WEY-MOUTH	DIEMER	JENSEN	SKINNER	MILLS
SILICA	mg/L	7.0	6.7	7.8	17.1	12.2	3.4	5.6	7.3	12.0	11.6	17.0	7.4	11.5
CALCIUM	mg/L	77	76	71	38	22	29	26	73	20	25	30	72	20
MAGNESIUM	mg/L	27	28	27	10	8	14	13	27	8	10	10	27	8
SODIUM	mg/L	100	101	95	57	38	63	54	98	39	47	68	103	39
POTASSIUM	mg/L	5.1	5.1	4.7	2.6	2.3	3.6	3.7	5.0	2.6	2.6	2.4	4.8	2.5
ALKALINITY, CARBONATE AS CO ₃	mg/L	0	1	0	0	0	0	0	2	0	1	0	0	0
ALKALINITY, BICARBONATE AS HCO ₃	mg/L	163	157	160	110	83	129	105	154	79	78	104	152	70
SULFATE	mg/L	233	237	219	87	44	45	49	229	51	70	112	236	50
CHLORIDE	mg/L	107	108	102	55	41	85	73	106	34	42	58	110	38
NITRATE	mg/L	2.0	1.7	0.9	4.6	3.2	0.4	0.5	1.1	3.5	3.3	4.6	1.2	3.4
FLUORIDE	mg/L	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.3	0.6	0.7	0.8	0.7	0.7
TOTAL DISSOLVED SOLIDS (TDS)	mg/L	640	643	608	327	212	388	277	626	210	252	364	638	208
TOTAL HARDNESS AS CaCO ₃	mg/L	311	307	290	136	89	129	118	296	81	99	138	291	80
TOTAL ALKALINITY AS CaCO ₃	mg/L	134	131	131	90	68	106	86	130	65	66	85	125	57
FREE CARBON DIOXIDE	mg/L	1.6	1.1	2.1	2.4	1.7	1.4	1.6	1.1	0.4	0.4	1.0	1.7	0.4
pH		8.22	8.38	8.11	7.89	7.91	8.18	8.04	8.38	8.55	8.51	8.24	8.17	8.49
SPECIFIC CONDUCTANCE	µS/cm	1050	1040	995	546	366	573	512	1020	357	424	604	1040	357
COLOR	CU	3	3	3	10	15	5	2	5	1	1	1	1	1
TURBIDITY	NTU	0.64	0.53	0.46	8.8	9.2	1.7	0.28	0.46	0.06	0.05	0.04	0.05	0.05
TEMPERATURE	°C	15	16	16	11	11	12	14	12	16	16	15	19	18
BROMIDE	mg/L	0.09	0.06	0.08	0.20	0.12	0.27	0.23	0.87	—	—	—	—	—
TOTAL ORGANIC CARBON	mg/L	2.90	2.95	2.76	2.80	4.70	4.82	2.60	3.00	—	—	—	—	—
SATURATION INDEX	—	—	—	—	—	—	—	—	—	0.25	0.25	0.15	0.52	0.13
STATE PROJECT WATER	%	0	0	0	100	100	100	100	6	100	94	100	7	100



Satellite Laboratories at Treatment Plants

Plant Operators and Chemists Ensure 24/7 Compliance

- Collect and analyze water samples to support treatment process and regulatory compliance monitoring
 - Samples every 2 hours
 - About 300 samples per day at each plant



Complying with New Stringent Laboratory Accreditation Standards

- Laboratory certification required under California drinking water regulations
- Annual data integrity and ethics training
- Annual Water Quality management review
- Laboratory procedures
 - Demonstration of capability
 - Standard operating procedures
 - Traceability of reagents and solutions
 - Equipment calibration and performance
 - Control tests and blank samples



Checking method performance and quality control samples

Regulatory Compliance Reporting and Engagement

- Monthly/quarterly/annual compliance reporting
 - SWRCB, Division of Drinking Water
 - County Environmental Offices
 - Large system and desert pumping plant domestic water systems
- Regulatory engagement
 - Provide input on regulatory development
 - Quarterly meetings with SWRCB's Division of Drinking Water

Metropolitan Water District of Southern California
 Monthly Raw Water Coliform Report
 Reporting Period: May 2024

DIEMER			JENSEN			MILLS		
Sample Date	Total Coliforms (MPN/100ml)	E. coli (MPN/100ml)	Sample Date	Total Coliforms (MPN/100ml)	E. coli (MPN/100ml)	Sample Date	Total Coliforms (MPN/100ml)	E. coli (MPN/100ml)
5/6/2024	214.3	<1	5/6/2024	86.0	1.0	5/6/2024	142.1	4.1
5/13/2024	3.1	<1	5/13/2024	42.2	<1	5/13/2024	24.6	<1
5/20/2024	1.0	<1	5/20/2024	13.1	<1	5/20/2024	30.5	1.0
5/28/2024	3.1	<1	5/28/2024	920.8	<1	5/28/2024	9.7	<1

Metropolitan Water District of Southern California
 Monthly Distribution System Report
 Metropolitan Water District of Southern California Reporting Period: May 2024

Distribution System Disinfectant Residuals (at Coliform Sample Site)

Calculation of "V", the percentage of distribution samples with a detectable disinfectant residual:

A) 702 The number of samples where the disinfectant residual was measured.
(Section 64664(c)(2)(A))

PATHOGEN MONITORING MONTHLY REPORT

Sample Sites	Sample Date	CRYPTOSPORIDIUM*	GIARDIA*
Treatment Plant Influent			
Diemer Plant Influent	05/06/2024	ND	ND
Jensen Plant Influent	05/14/2024	ND	ND
Mills Plant Influent	05/13/2024	ND	ND
Skinner Plant Influent	05/20/2024	ND	ND
Weymouth Plant Influent	05/07/2024	ND	ND

Monthly Compliance Reports

Annual Drinking Water Quality Report



Parameter	Units	State and Federal MCL	PHG	Treatment Plant Effluents and Distribution System					Major Sources in Drinking Water	
				Range Average	Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant		Weymouth Plant
Percent State Water Project	%	NA	NA	Range Average	0 - 100 64	100	100	6 - 100 54	0 - 100 68	NA
PRIMARY STANDARDS - Mandatory Health-Related Standards										
CLARITY										
Combined Filter Effluent (CFE) Turbidity ^a	NTU %	TT	NA	Highest % ≤ 0.3	0.05 100	0.06 100	0.06 100	0.07 100	0.04 100	Soil runoff
MICROBIOLOGICAL^b										
Total Coliform Bacteria ^c	% Positive Monthly Samples	5.0	MCLG = 0	Range Average	Distribution Systemwide: 0.0 - 0.2					Naturally present in the environment
Heterotrophic Plate Count (HPC) Bacteria ^d	CFU/mL	TT	NA	Range Median	ND - 1 ND	ND - 64 ND	ND - 1 ND	ND - 1 ND	ND - 1 ND	Naturally present in the environment
ORGANIC CHEMICALS										
Toluene	ppb	150	150	Range Average	ND	ND	ND	ND	0.6	Discharge from petroleum and chemical refineries
INORGANIC CHEMICALS										
Aluminum ^e	ppb	1,000	600	Range Highest RAA	ND - 65 124	ND - 290 58	ND - 94 ND	ND - 94 51	ND - 110 122	Residue from water treatment process; runoff and leaching from natural deposits
Fluoride ^f	ppm	2.0	1	Range	0.1 - 0.9	0.4 - 0.8	0.1 - 0.9	0.3 - 0.8	0.6 - 0.9	Runoff and leaching from natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
				Average	Distribution Systemwide: 0.1 - 0.9					
Nitrate (as Nitrogen)	ppm	10	10	Range Average	0.5	0.5	0.6	ND	0.5	Runoff and leaching from fertilizer use; septic tank and sewage; runoff and leaching from natural deposits
RADIONUCLIDES^g										
Gross Alpha Particle Activity	pCi/L	15	MCLG = 0	Range Average	ND	ND - 3 ND	ND	ND - 4 ND	ND	Runoff/leaching from natural deposit
Gross Beta Particle Activity	pCi/L	50	MCLG = 0	Range Average	ND	ND	ND	ND - 5 ND	ND	Decay of natural and man-made deposits
Uranium	pCi/L	20	0.43	Range Average	ND	ND - 1 ND	ND	ND - 3 ND	ND	Runoff/leaching from natural deposit
DISINFECTION BYPRODUCTS, DISINFECTANT RESIDUALS, AND DISINFECTION BYPRODUCT PRECURSORS^h										
Total Trihalomethanes (TTHM) (Plant Core Locations and Distribution System)	ppb	80	NA	Range	16 - 30	12 - 21	12 - 36	14 - 30	14 - 31	Byproduct of drinking water chlorination
				Highest LRAA	Distribution Systemwide: 12 - 56					
Sum of Five Haloacetic Acids (HAA5) (Plant Core Locations and Distribution System)	ppb	60	NA	Range	2.2 - 8.9	2.0 - 5.0	1.9 - 9.0	2.3 - 11	ND - 9.0	Byproduct of drinking water chlorination
				Highest LRAA	Distribution Systemwide: 28					
					2.2 - 8.9	2.0 - 5.0	1.9 - 9.0	2.3 - 11	ND - 9.0	
					Distribution Systemwide: ND - 13					
					5.5	3.4	9.0	7.4	6.0	
					Distribution Systemwide: 9.0					

STAN WATER DISTRICT OF SOUTHERN CALIFORNIA

WATER QUALITY LAB

YEARS 194 - 2024

WATER QUALITY EXCELLENCE

ANNUAL DRINKING WATER QUALITY REPORT

and January - December 2023

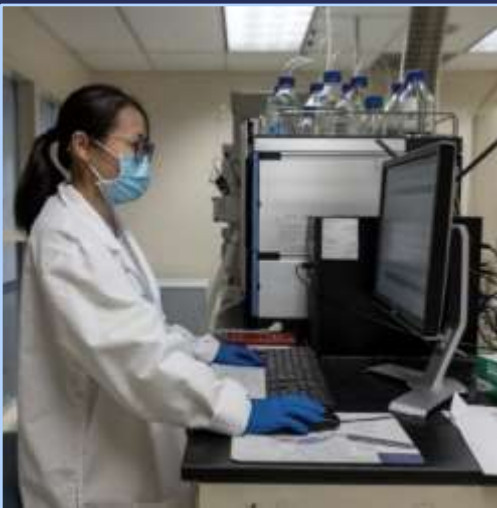
WATER QUALITY IS EQUAL TO OR BETTER THAN THE SOURCE. IT IS THE RESPONSIBILITY OF THE WATER UTILITY TO SAFEGUARD PUBLIC HEALTH.

Behind the Scenes of 100% Compliance





Microplastics analysis



Cyanotoxin data analysis

Water Quality Challenges and Opportunities

- New regulated monitoring
 - PFAS, microplastics
- New contaminants, emerging DBPs
- Impacts of climate volatility
 - Turbidity, cyanotoxins
- Maintaining water quality in the distribution system
 - Variable demand and low flow
 - Nitrification
- New sources and treatment processes
 - Water reuse

Continued Compliance with Drinking Water Regulations

- Implement methods, upgrade equipment, and conduct research to prepare for new monitoring requirements
- Ensure new programs are compliance-ready
- Finalize design of upgraded Water Quality Laboratory
- Water industry engagement
 - Participate in technical advisory committees and workgroups
 - Provide input and feedback on regulatory development
 - Continue coordination with Member Agencies on water quality and regulatory compliance issues



Artist conceptual rendering of upgraded WQ Lab lobby



Member Agency workshop

