Engineering, Operations & Technology Committee

Celebrating the History of Water Quality at Metropolitan

Item 6b

June 10, 2024

Item 6b

History of Water Quality

Subject

The History of the Water Quality Section

Purpose

Celebrating 50 years since the formation of Metropolitan's Water Quality and Research Branch in response to passage of the Safe Drinking Water Act in 1974

Next Steps

Another 50 years of Water Quality excellence, compliance, and innovation

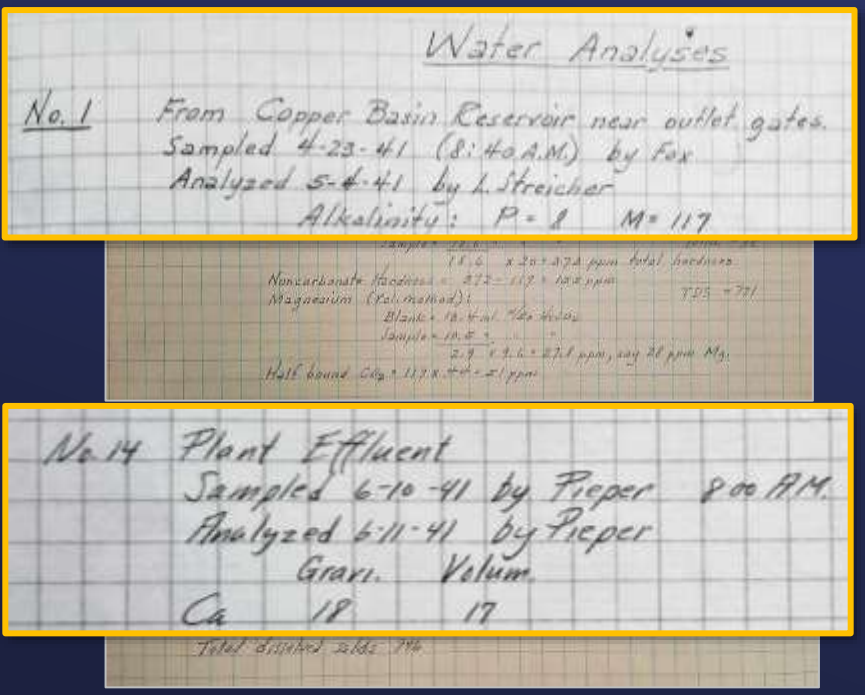
History of
Water Quality

Softening and Filtration Plant, 1940s (Weymouth Plant)

Water Quality Before 1974

- 6,000 yrs. ago: Water treatment first referenced in ancient Greece to control bad tastes and odors
- 1700s: Filtration started in Europe
- 1854: John Snow - cholera outbreak
- 1908: Chlorine disinfection - New Jersey
- 1914: First U.S. federal drinking water standards
- 1941: Metropolitan's Softening and Filtration Plant started operation
- 1962: Expanded federal standards - 28 substances
- 1970: U.S. Environmental Protection Agency

Water Quality Testing at Metropolitan, 1941 & 1942

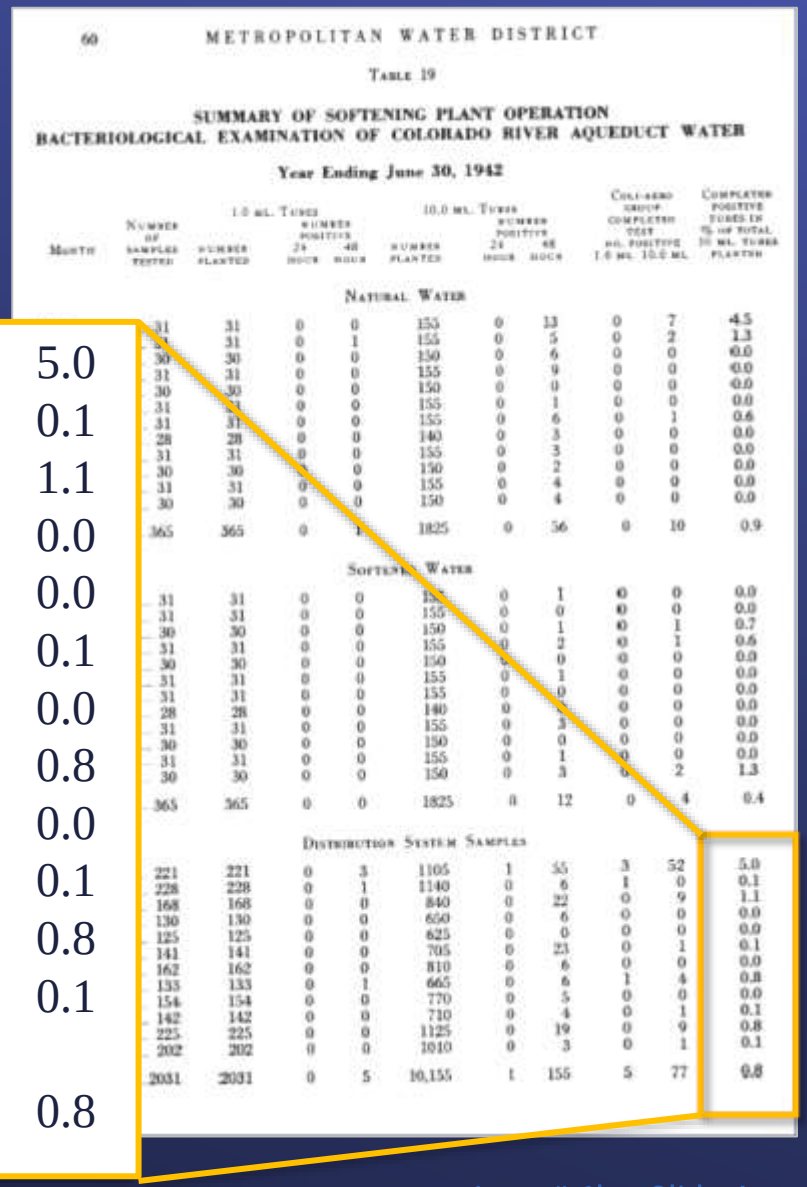


Water quality samples No. 1 and No. 14

Fourth Annual Report, 1942

As a precautionary measure under war conditions, the water is sampled throughout the distribution system to be examined especially for poison and bacterial contamination

Table 19 shows that the water received and delivered by the District at all times was decidedly better in bacterial quality than required by the U.S. Public Health Service



60 METROPOLITAN WATER DISTRICT

TABLE 19

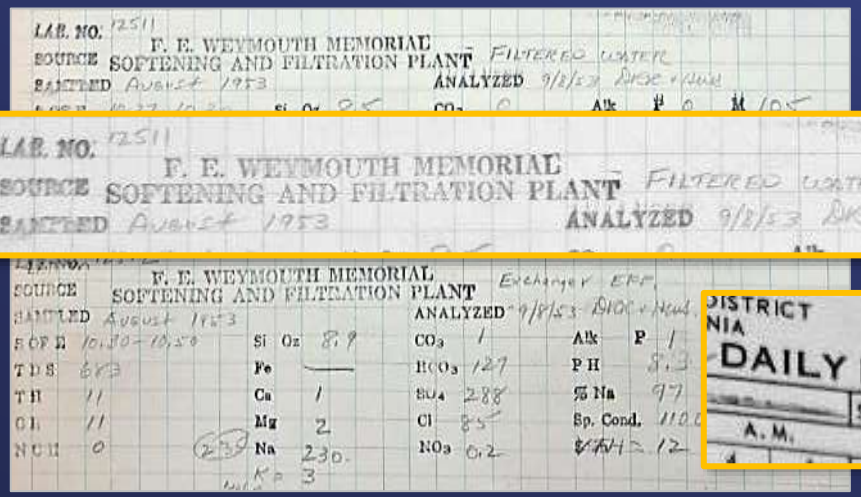
SUMMARY OF SOFTENING PLANT OPERATION
BACTERIOLOGICAL EXAMINATION OF COLORADO RIVER AQUEDUCT WATER

Year Ending June 30, 1942

Month	Number of samples tested	1.0 ml. Tubes: Number planted	1.0 ml. Tubes: Number positive 24 hour	1.0 ml. Tubes: Number positive 48 hour	10.0 ml. Tubes: Number planted	10.0 ml. Tubes: Number positive 24 hour	10.0 ml. Tubes: Number positive 48 hour	Coli-aero group completed test No. positive 1.0 ml.	Coli-aero group completed test No. positive 10.0 ml.	Completed positive tubes in % of total 10 ml. tubes planted
Natural Water										
	31	31	0	0	155	0	13	0	7	4.5
	31	31	0	1	155	0	5	0	2	1.3
	30	30	0	0	150	0	6	0	0	0.0
	31	31	0	0	155	0	9	0	0	0.0
	30	30	0	0	150	0	0	0	0	0.0
	31	31	0	0	155	0	1	0	0	0.0
	31	31	0	0	155	0	6	0	1	0.6
	28	28	0	0	140	0	3	0	0	0.0
	31	31	0	0	155	0	3	0	0	0.0
	30	30	0	0	150	0	2	0	0	0.0
	31	31	0	0	155	0	4	0	0	0.0
	30	30	0	0	150	0	4	0	0	0.0
	365	365	0	1	1825	0	56	0	10	0.9
Softened Water										
	31	31	0	0	155	0	1	0	0	0.0
	31	31	0	0	155	0	0	0	0	0.0
	30	30	0	0	150	0	1	0	1	0.7
	31	31	0	0	155	0	2	0	1	0.6
	30	30	0	0	150	0	0	0	0	0.0
	31	31	0	0	155	0	1	0	0	0.0
	31	31	0	0	155	0	0	0	0	0.0
	28	28	0	0	140	0	0	0	0	0.0
	31	31	0	0	155	0	3	0	0	0.0
	30	30	0	0	150	0	0	0	0	0.0
	31	31	0	0	155	0	1	0	0	0.0
	30	30	0	0	150	0	3	0	2	1.3
	365	365	0	0	1825	0	12	0	4	0.4
Distribution System Samples										
	221	221	0	3	1105	1	55	3	52	5.0
	228	228	0	1	1140	0	6	1	0	0.1
	168	168	0	0	840	0	22	0	9	1.1
	130	130	0	0	650	0	6	0	0	0.0
	125	125	0	0	625	0	0	0	0	0.0
	141	141	0	0	705	0	23	0	1	0.1
	162	162	0	0	810	0	6	0	0	0.0
	133	133	0	1	665	0	6	1	4	0.8
	154	154	0	0	770	0	5	0	0	0.0
	142	142	0	0	710	0	4	0	1	0.1
	225	225	0	0	1125	0	19	0	9	0.8
	202	202	0	0	1010	0	3	0	1	0.1
	2031	2031	0	5	10,155	1	155	5	77	0.8

5.0
0.1
1.1
0.0
0.0
0.1
0.0
0.8
0.0
0.1
0.8
0.1
0.8

Water Quality Testing at Metropolitan up to 1974


LAB. NO. 12511
F. E. WEYMOUTH MEMORIAL
SOURCE SOFTENING AND FILTRATION PLANT Filtered water
SAMPLED August 1953
ANALYZED 9/8/53

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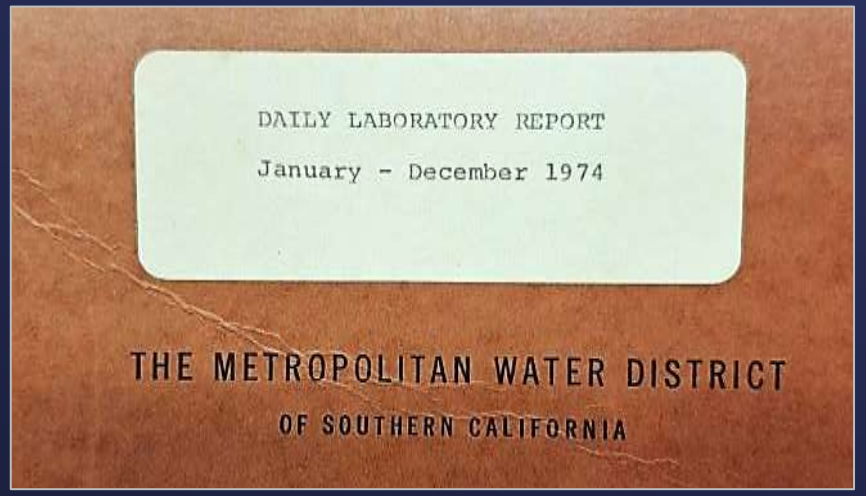
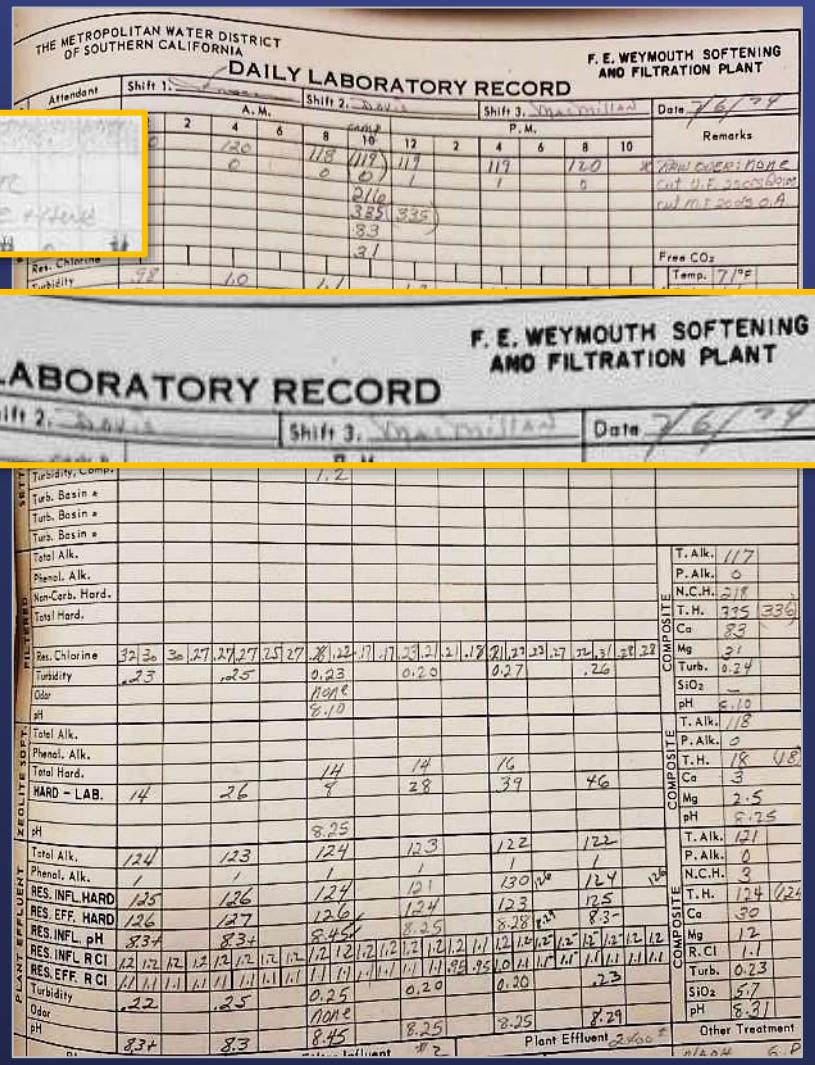

DAILY LABORATORY REPORT
January - December 1974
THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA


THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
DAILY LABORATORY RECORD
F. E. WEYMOUTH SOFTENING AND FILTRATION PLANT
Shift 1. Shift 2. Shift 3. Date 7/6/54
A.M. P.M.
Remarks
Free CO2
Temp. 71°F
Turbidity, Comp.
Turb. Basin #
Turb. Basin #
Turb. Basin #
Total Alk.
Phenol. Alk.
Non-Carb. Hard.
Total Hard.
Res. Chlorine
Turbidity
Odor
pH
Total Alk.
Phenol. Alk.
Total Hard.
HARD - LAB.
pH
Total Alk.
Phenol. Alk.
RES. INFL. HARD
RES. EFF. HARD
RES. INFL. pH
RES. INFL. R Cl
RES. EFF. R Cl
Turbidity
Odor
pH
Plant Effluent
Other Treatment
T. Alk.
P. Alk.
N.C.H.
T.H.
Ca
Mg
Turb.
SiO2
pH
Zeolite Softened
Filtered
Composite
Composite

DISTRICT
NIA
DAILY LABORATORY RECORD
F. E. WEYMOUTH SOFTENING AND FILTRATION PLANT
A.M.
Shift 2.
Shift 3.
Date 7/6/54

1950s Research

Laboratory investigations have been continued to find the most satisfactory means for conditioning the water to reduce scaling and minimize corrosion.

Laboratory studies using artificially introduced fission products indicate that normal District softening plant operation procedures…can effectively remove radioactive contamination from the treated water.

The Safe Drinking Water Act

SDWA
1974

Senator Warren Magnuson
Washington State, 1944-1981

- 1973: Senator Warren Magnuson proposed the Safe Drinking Water Act

  …to address the lack of decisive federal regulations of contaminants in water supplies

- Signed by President Ford on December 16, 1974
- Authorized EPA to establish minimum health related standards to protect tap water
  - 22 regulated contaminants - coliform bacteria, metals, organic pesticides, turbidity, and radiological contamination
- Compliance required by June 24, 1977

…establish standards and treatment requirements for public water supplies, finance drinking water infrastructure projects, promote water system compliance…

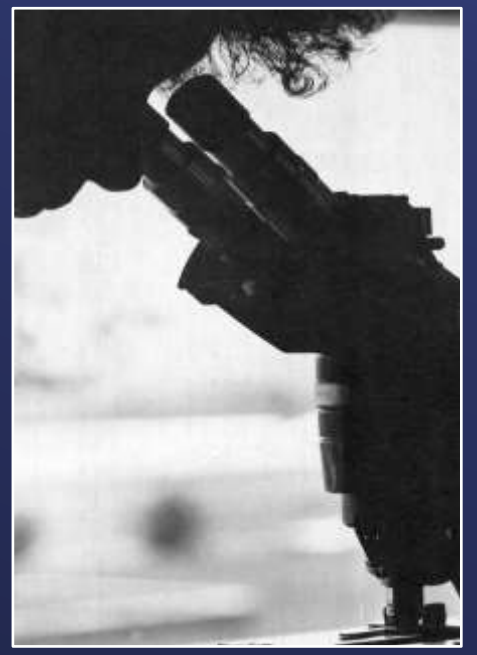
The Water Quality & Research Branch, 1974

- Formed by action of Metropolitan's Board of Directors in July 1974

  "To implement the system-wide surveillance program, a Water Quality and Research Branch was created with responsibility for coordinating water quality monitoring throughout the aqueduct and distribution system"

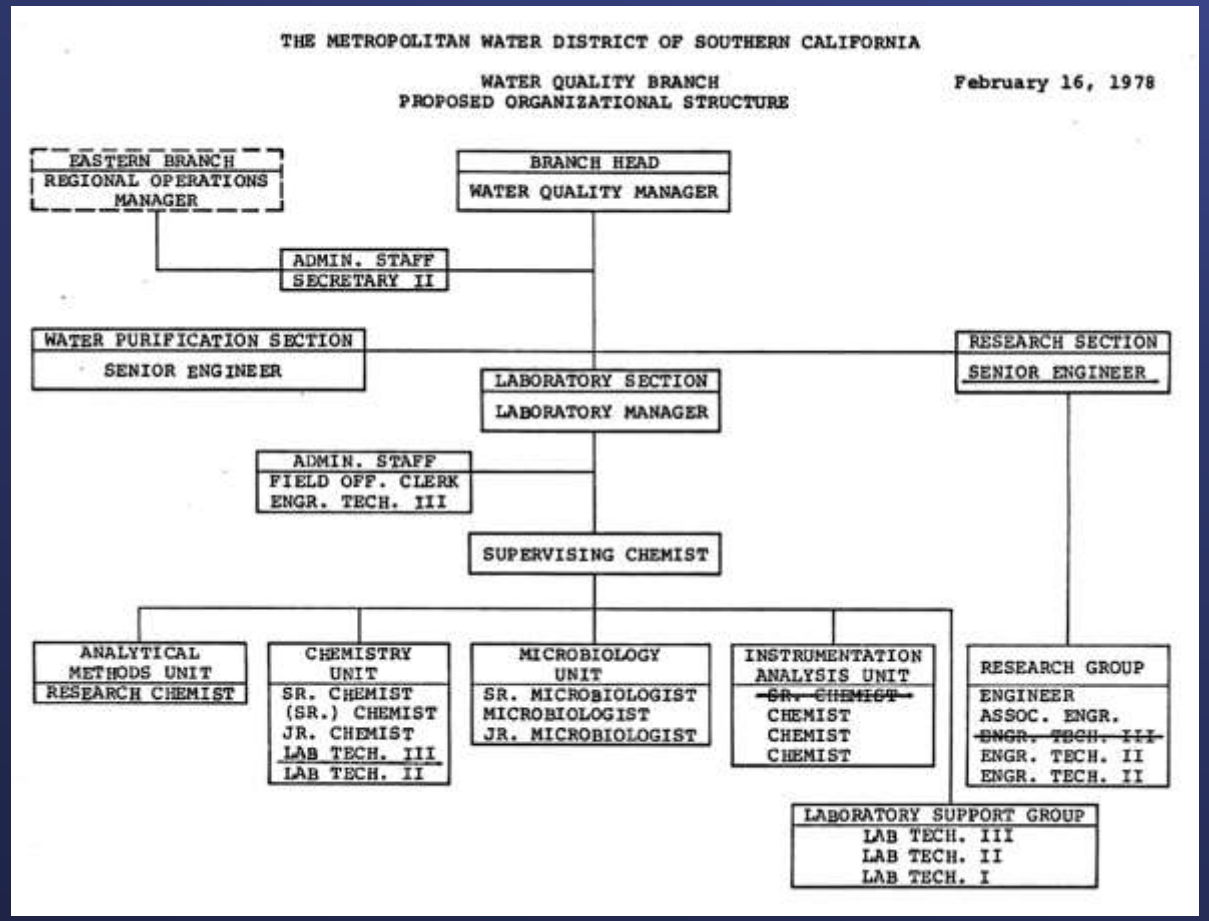
- Ten staff who were previously assigned to the Water Purification Branch of the Operations Division

Harold Pearson, WQ Engineer
Harold Sundberg, Sr. Res. Chemist
Janice Risner, Secretary
Bob Cohen, Research Chemist
Bill Mathews, Maintenance Man
Bob Jones, Sr. Chemist
Marshall Davis, Junior Chemist
Paul Evans, Sr. Chemist
Dan Bowers, Chemist
Dean Rauscher, Engineering Tech



Constant testing assures water quality (Annual Report for 1974)

Water Quality Branch Organizational Changes

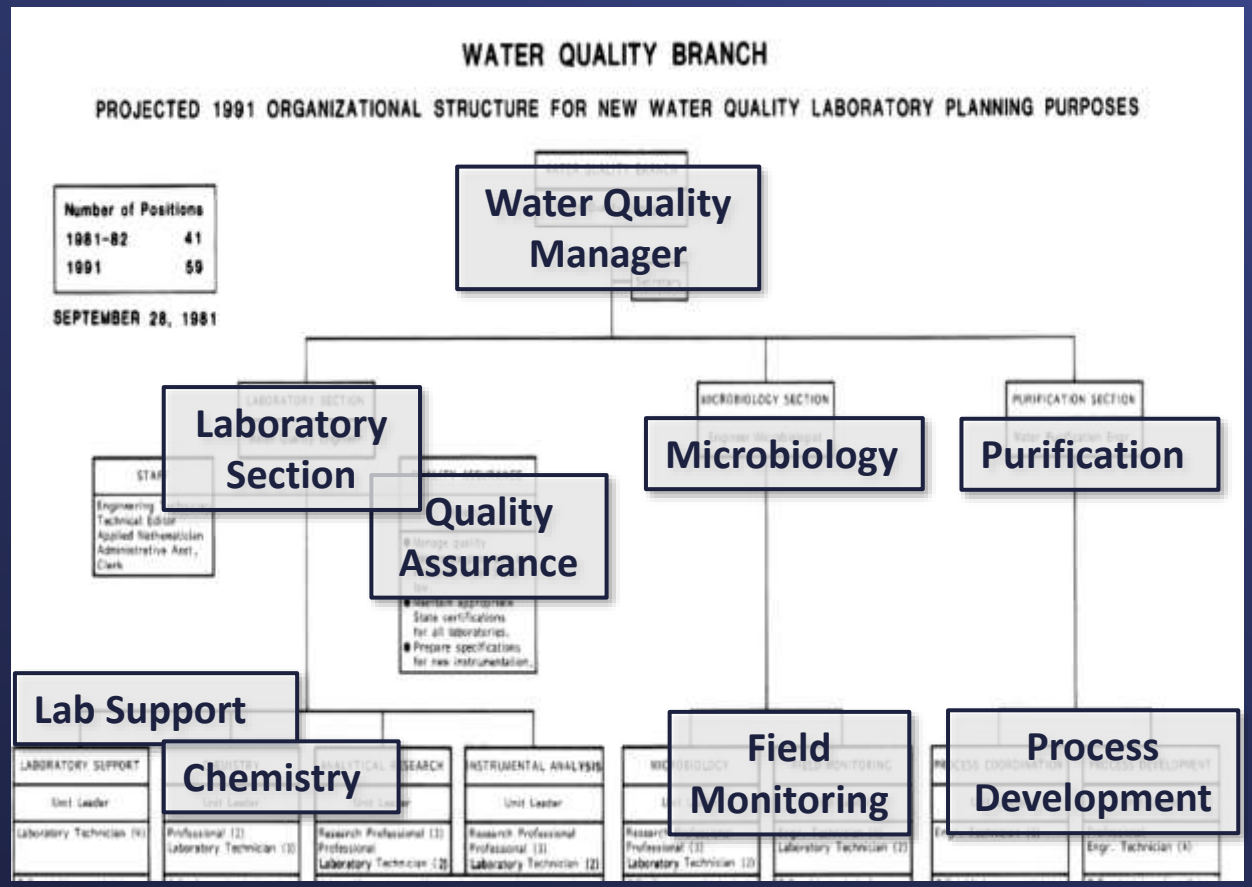


1978 – 28 staff

Water Quality Staff, 1976 and 1980

Water Quality Staff, 1982

Water Quality Branch Organizational Changes



1981 – 41 staff but projecting 59 by 1991

Water Quality Staff, 1983

Home of the Water Quality Laboratory

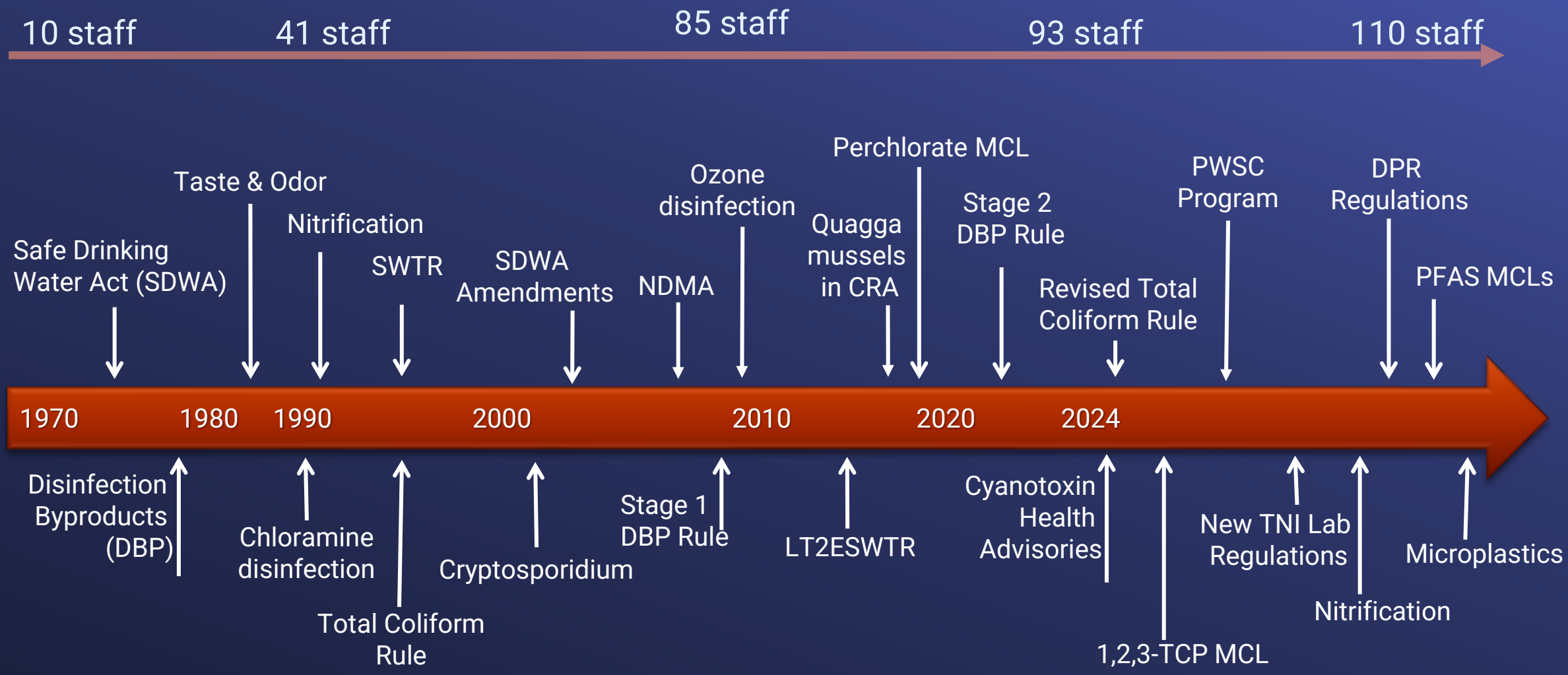
1974
Water Quality & Research Branch
Weymouth Bldg.
10 staff
22 regulated contaminants

1976
Water Quality & Research Branch
Materials Testing Lab
19 staff
22 regulated contaminants

1985
Water Quality Branch
New Water Quality Lab
47 staff
23 regulated contaminants

1998
Water Quality Division
Expanded WQ Lab
87 staff
102 regulated contaminants

Water Quality's Expanded Functions



Home of the Water Quality Laboratory – Another 50 Years

Engineering, Operations, & Technology Committee – 2023 Water Quality Lab Inspection Trip

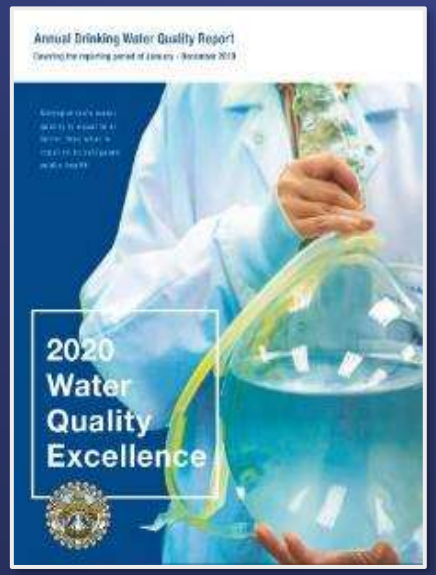
Artist Conceptual Renderings of Upgraded WQ Lab Front Entrance and Lobby

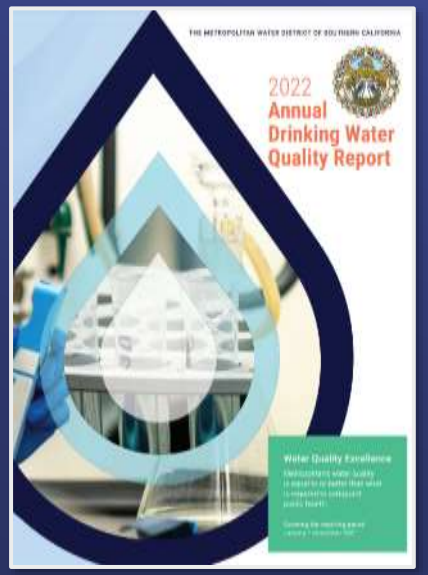
2024
Water Quality Section
110 staff
122 regulated contaminants
Lab upgrade preliminary design

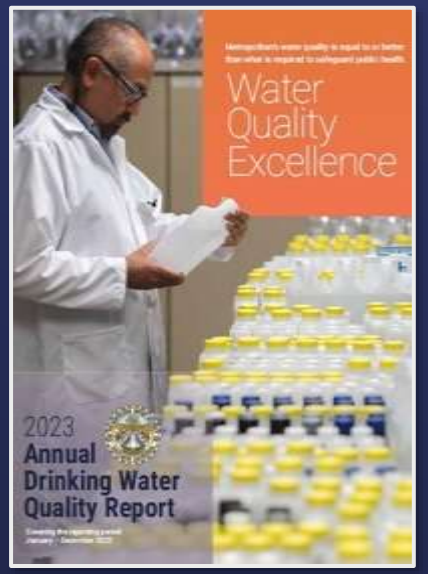
Water Quality's Mission

To safeguard the public's drinking water

100% Compliance With Drinking Water Regulations







- About 70,000 samples per year
- More than 400 constituents monitored
- Over 200,000 test results per year

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

Research and Innovation





1980s
- DBPs
- Chloramine disinfection
- Taste & Odor
- Nitrification

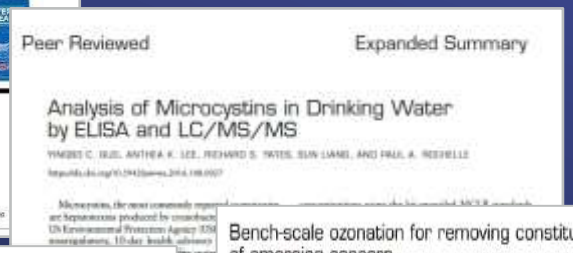
1990s
- Ozone disinfection
- *Cryptosporidium*

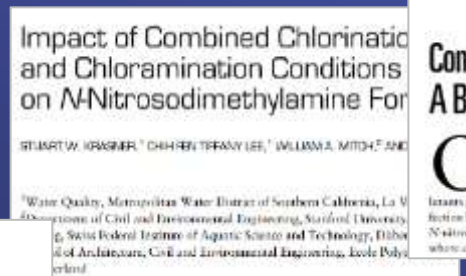
2000s
- Water security
- Desalination
- Quagga mussels

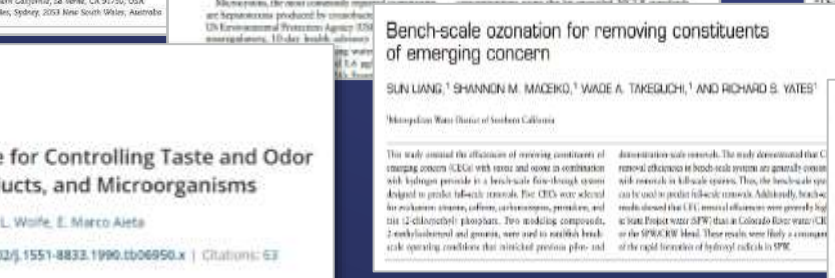
2010s
- Cyanotoxins
- Nitrosamines

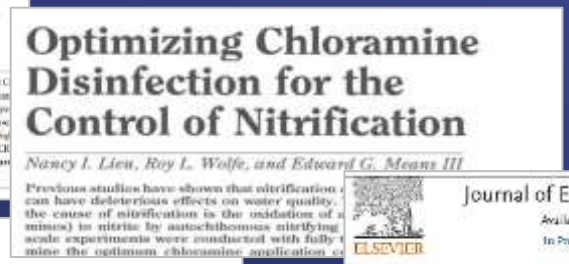
2020s
- PWSC
- Emerging contaminants

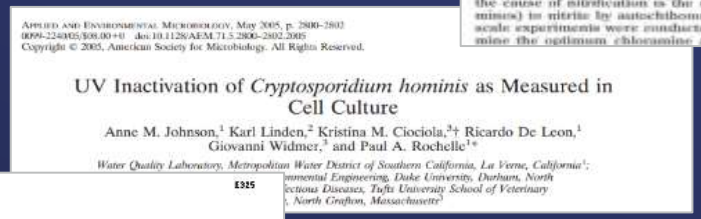
Published Research (>400 technical publications)

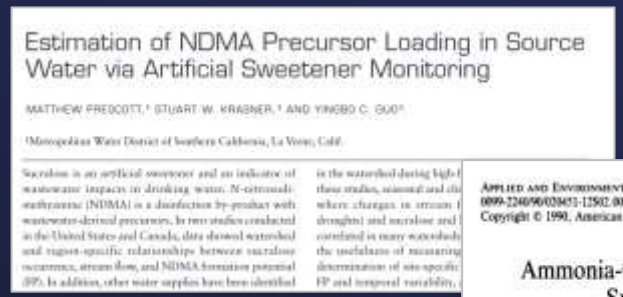


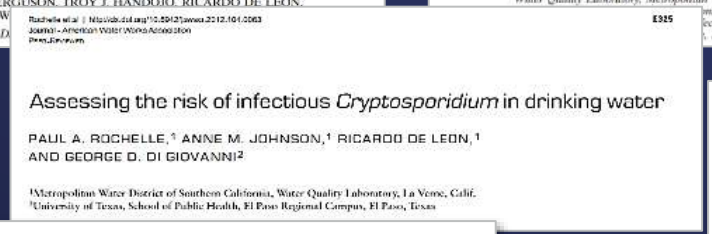


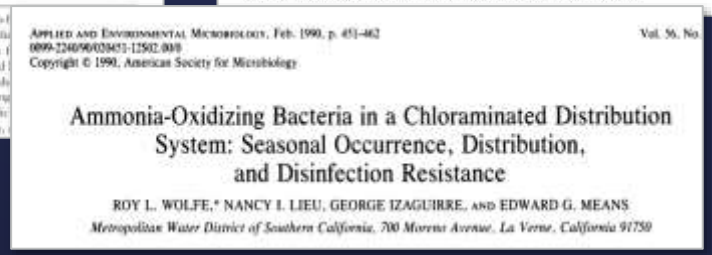


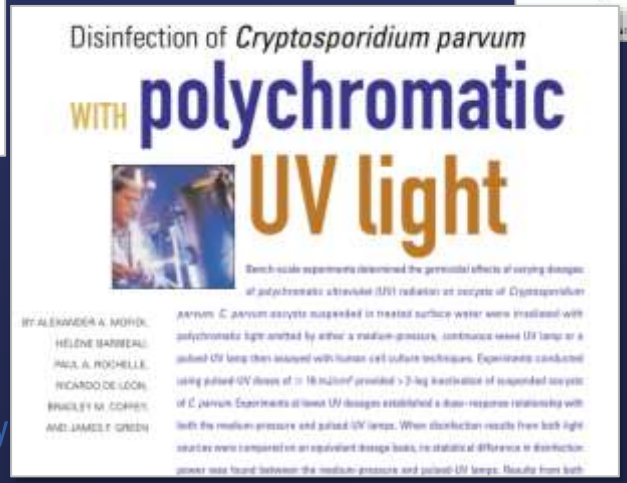










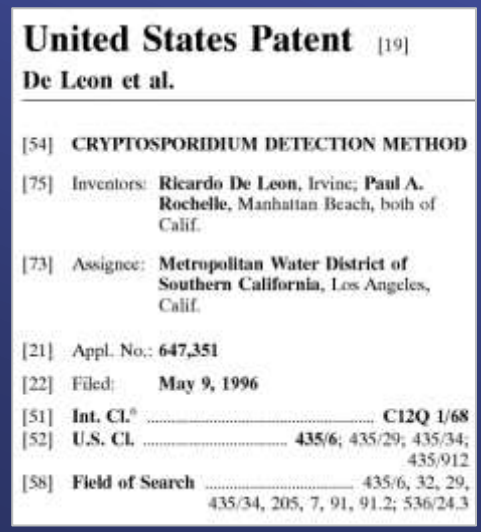


Water Quality Tools

Closed Loop Stripping Analysis

SCUBA Diving

Flavor Profile Analysis



United States Patent [19]
De Leon et al.

[54] CRYPTOSPORIDIUM DETECTION METHOD

[75] Inventors: Ricardo De Leon, Irvine; Paul A. Rochelle, Manhattan Beach, both of Calif.

[73] Assignee: Metropolitan Water District of Southern California, Los Angeles, Calif.

[21] Appl. No.: 647,351

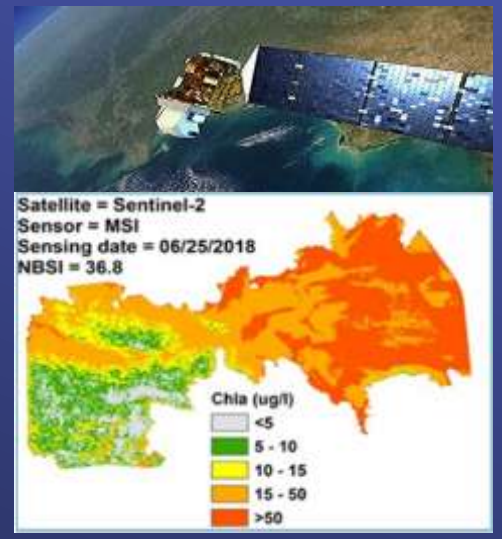
[22] Filed: May 9, 1996

[51] Int. Cl.[6] C12Q 1/68

[52] U.S. Cl. 435/6; 435/29; 435/34; 435/912

[58] Field of Search 435/6, 32, 29, 435/34, 205, 7, 91, 91.2; 536/24.3

Molecular Pathogen Detection



Lake Monitoring by Satellite

Analytical methods development for:

- Disinfection byproducts
- Taste & odor compounds
- Cryptosporidium detection and infectivity
- Virus quantification
- Cyanotoxin detection and identification

Water Quality 50 Year Anniversary

Redesigned Lobby at Water Quality Laboratory

Member Agency Water Quality Managers Meeting

Retiree Lunch

Additional events to commemorate 50-year anniversaries of Water Quality Section and SDWA planned for later in the year

Continuing the Legacy of Water Quality

Celebrating 50 YEARS

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

WATER QUALITY LAB

1974 – 2024


THE METROPOLITAN WATER DISTRICT OF
SOUTHERN CALIFORNIA
1928