



WATER QUALITY MANAGEMENT PROGRAM **2011 WATER QUALITY REPORT**

This annual status report evaluates whether Zone 7 Water Agency is meeting the water quality targets established by its Water Quality Management Program (WQMP). The WQMP provides the basis for identifying ways to meet anticipated future regulations, reduce public health risks, and improve the delivered water quality - especially its taste, odor, and hardness, by effectively managing water quality issues, guiding operations, upgrading or improving facilities, and providing new facilities when necessary.

WQMP WATER QUALITY TARGETS are internal goals that Zone 7 applies to specific constituents that affect potable and non-potable water quality. The majority of these targets are significantly more stringent than existing regulations. Some of these constituents have been identified as “key parameters of concern” based upon the concerns expressed by our customers, the levels found in our local drinking water supplies, and anticipated changes in regulations.

ARE WE MEETING WQMP WATER QUALITY TARGETS? In 2011, Zone 7 met all of its primary drinking water standards and non-potable water quality targets. However, some of the water quality targets for drinking water were not met consistently, including those for taste & odor events, drinking water hardness, chloride, and free ammonia. Zone 7 continued to work on and support operational and planning activities that help meet our water quality targets and ensure that the service area has a reliable water supply. In addition to ongoing internal agency planning, we also work closely with various organizations to protect source water locally and at the state level. Zone 7 currently applies powdered activated carbon (PAC) seasonally at Del Valle and Patterson Pass conventional treatment plants to assist in reducing levels of odor-causing compounds and operates the Mocho Groundwater Demineralization Plant to remove salt and minerals from the groundwater basin while improving delivered water quality. Two significant future water quality improvement projects are identified in Zone 7's Capital Improvement Program (CIP). Ozone Facilities at Del Valle and Patterson Pass Water Treatment Plants have a target completion of 2023, subject to funding availability; and the second phase of demineralization is targeted for 2028 and will be evaluated during the planned update of the Salt Management Plan.

DEFINITIONS

Maximum Contaminant Level (MCL): *The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (Public Health Goals) or MCLGs (Maximum Contaminant Level Goals) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.*

Primary Drinking Water Standard (PDWS): *MCLs and MRDLs (Maximum Residual Disinfectant Levels) for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.*

Table 1. Status of Potable Water Quality Targets

Key Parameters of Concern	Water Quality Targets ¹	Target Currently Met	Requires Optimization	Requires Capital Investment	Supplemental Table/Figure
Appearance	Minimize air bubbles/cloudiness events ²	✓			Table 2
Arsenic (µg/L)	<5	✓			Figure 1
Chloramines and Nitrification Prevention					
Total Disinfectant Residual (mg/L as Cl ₂)	2.0 - 2.5 from water treatment plants (WTPs), wells will be operated to be as close to this target range as feasible	✓			Figure 6
Cl ₂ :NH ₃ -N	4:1 to 5:1	✓ ³			
Minimize odor	Chloramine above pH 8.0 for WTPs	✓			
Free Ammonia Residual (mg/L as N)	<0.15 from WTPs; wells to be operated as close to this target as feasible	✓ ⁴			Figure 7
Nitrite (mg/L as N)	<0.02	NA ⁵			
Consistency	Provide consistent chloramine residual at all wells and WTPs	✓			Figure 6
Chloride (mg/L)	<100	✓ ⁶			Figure 3
Chromium VI, Cr⁶⁺ (µg/L)	<20 (pending potential regulations)	✓			Figure 2
Cryptosporidium	4-log removal, including multi-barrier control	✓			
Disinfection By-Products (DBPs)					
Maximum leaving WTP	Total Trihalomethanes (TTHMs) <64 µg/L Five Haloacetic acids (HAA5) <48 µg/L	✓ ⁷ ✓ ⁷			Figure 8a Figure 8b
N-Nitrosodimethylamine (NDMA) (ng/L)	<10 (pending potential regulations)	✓ ⁸			
Hardness (mg/L as CaCO₃)	<150	✓ ⁶	✓	✓	Figure 5
pH (Units)	non-corrosive pH leaving WTP at +/- 0.2 units of target	✓ ✓			
Taste and Odor (earthy/musty)					
Odor Threshold Concentrations					
2-Methylisoborneol (MIB)	9 ng/L		✓	✓	
Geosmin	4 ng/L		✓	✓	
Events ²	No events		✓	✓	Table 2
Total Dissolved Solids (TDS) (mg/L)	<500	✓	✓	✓	Figure 4

¹ Targets are set either at the secondary MCLs or 80% of the primary MCLs except for the key parameters of concern in the table above.

² An event is defined as when three or more similar complaints are received in a 7-day period.

³ Ratio is adjusted to meet target free ammonia residual at production facilities.

⁴ Averages met target at supply sources.

⁵ Monitoring discontinued with Retailer consent in 2006 due to historical non-detect nitrite levels.

⁶ Averages met target.

⁷ Regulatory compliance data is collected within each Retailer's distribution system and is included in Figures 9a and 9b, respectively for TTHMs and HAA5.

⁸ All supply sources (except the Chain of Lakes wells) and representative turnouts were monitored for NDMA in 2011 for supplemental information.

Units: Milligrams per liter (mg/L): a unit expressing the concentration of chemical constituent in solution as weight (milligram) of solute per unit volume (liter) of water; equivalent to one part per million.

Micrograms per liter (µg/L): equivalent to one part per billion.

Nanograms per liter (ng/L): equivalent to one part per trillion.

Table 2. Retail Customer Water Quality Complaints Reported to Zone 7*

Parameter	Dublin San Ramon Services District (DSRSD)	City of Pleasanton	Cal Water Service Company - Livermore	City of Livermore	Totals
Chlorinous Odor	12	1			13
Earthy/Musty Taste & Odor	6	14	3	5	28
Colored/Murky	4				4
Turbidity/Suspended Solids					
Salty Taste					
Hardness	1	4		1	6
Cloudy Water					
Others		3	5	1	9

* The complaints reported to Zone 7 by the end of each month are those deemed to be directly related to the Zone 7 water supply. There were two taste & odor events in 2011; one in August, and one in September.

Table 3. Status of Non-Potable Water Quality Targets

Key Parameters of Concern	Units	Maximum Applied Level/Targets	Average Targets	SBA***		
		Vineyards		Avg	Min	Max
Boron	mg/L	<1	<0.5	0.14	<0.10**	0.46
Chloride	mg/L	<200	<125	17	11	33
Emitter Clogging Potential	mEq/L as Ca+Mg****	3 to 4	3 to 4	1.5	0.8	3.2
Available Nitrogen from Nitrate	mg/L as N	-	<10 during summer	0.3	0.1	0.6
pH	---	-	<8.0	7.6	7.1	8.2
Sodium	mg/L	<200	<100	19	14	28
Total Dissolved Solids	mg/L	-	<650	143	89	242

** Boron's minimum reporting limit (MRL) is 0.10 mg/L.

*** SBA data is an average of monthly untreated water samples taken from the Del Valle WTP and the Patterson Pass WTP.

**** mg/L as Ca+Mg = milliequivalents per liter as calcium and magnesium.

Figure 1. Arsenic*

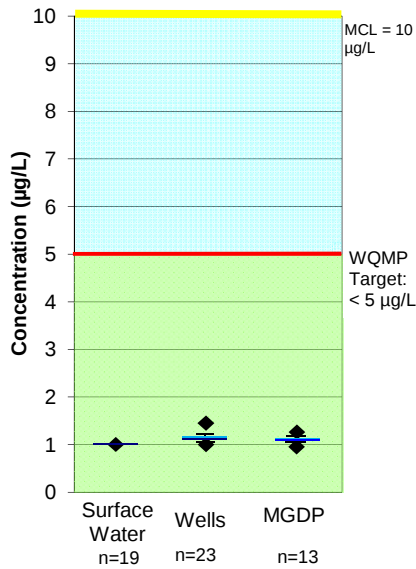


Figure 2. Total Chromium*

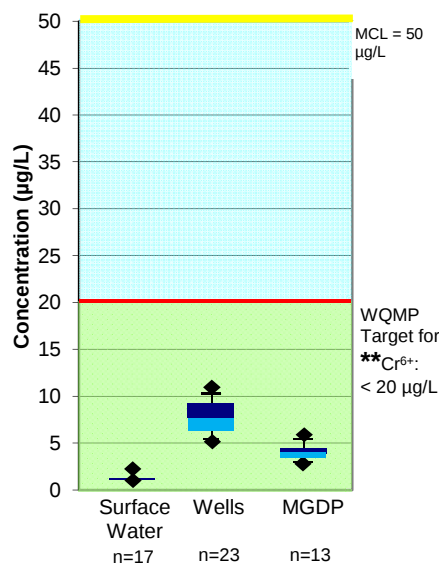


Figure 3. Chloride*

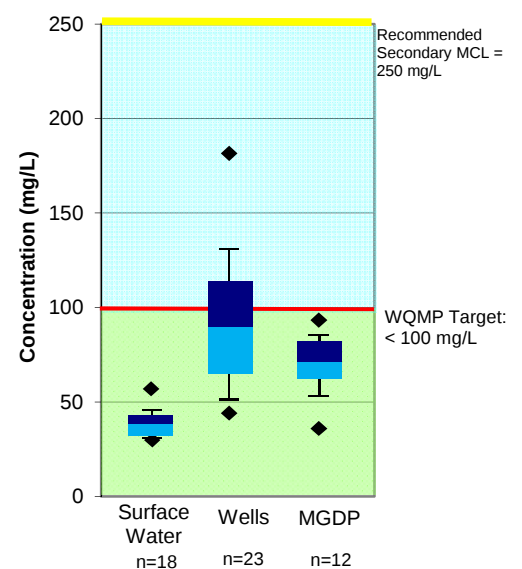


Figure 4. Total Dissolved Solids (TDS)*, ****
Retailer Turnout Samples**

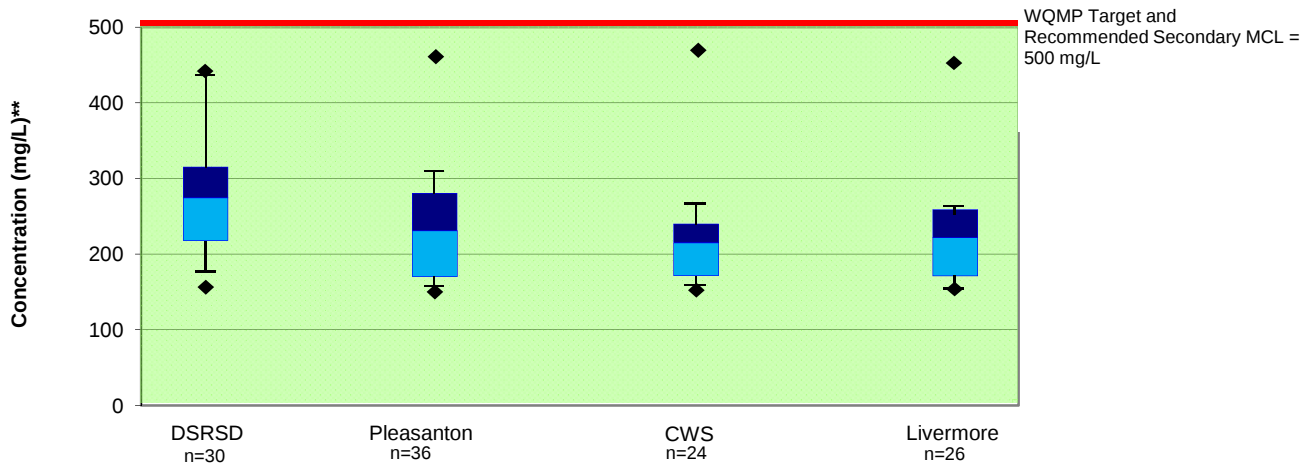
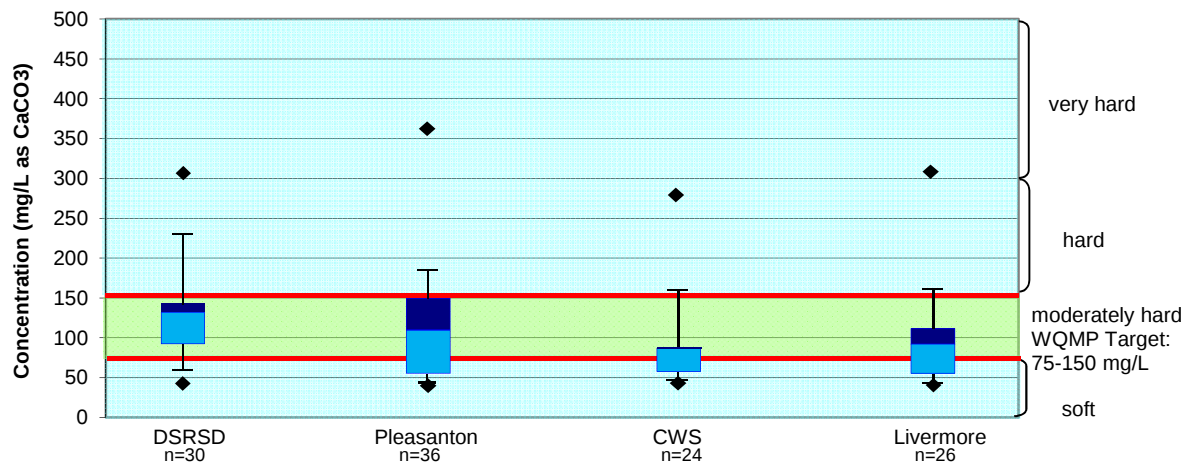


Figure 5. Total Hardness**
Retailer Turnout Samples**



*Wells data represents untreated water from all supply wells.

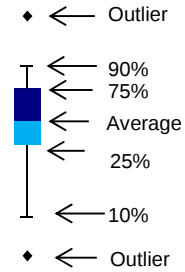
** Most Chromium in Zone 7 groundwater is Cr^{6+} .

*** Monthly TDS values are estimated from an average of weekly electrical conductivity measurements.

****The Arroyo Vista turnout was closed in March of 2011 and was removed from the DSRSD calculations.

HOW TO READ WATER QUALITY TARGET GRAPHS

- Each bar on the chart represents the range of measurements for various constituents monitored during 2011.
- The junction of the light blue and dark blue bars represent the average values over the year. The span of the light and dark blue bars represents the 75th and 25th percentile values of the data set. The "error bars" represent the 90th and 10th percentile values, and the black diamonds represent the data set outliers.
- WQMP water quality targets or ranges are highlighted in green, with the red line indicating the maximum and/or minimum value.
- Any applicable Maximum Contaminant Level (MCL) set by state and federal water quality regulations are highlighted by the yellow bar at the top of each chart.
- "n" represents the number of samples analyzed.



**Figure 6. Total Residual Chlorine*, **
Production Facility Effluent Samples**

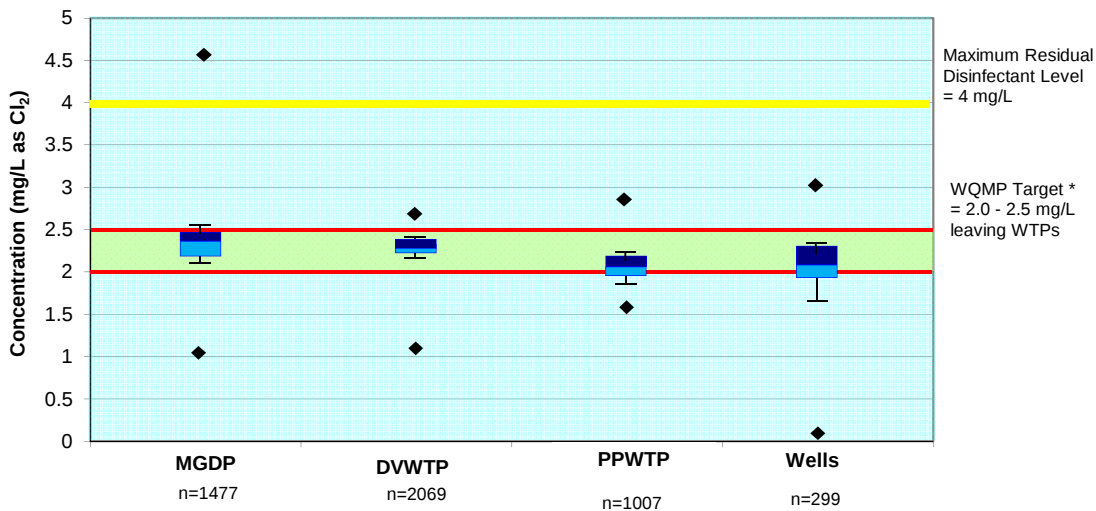
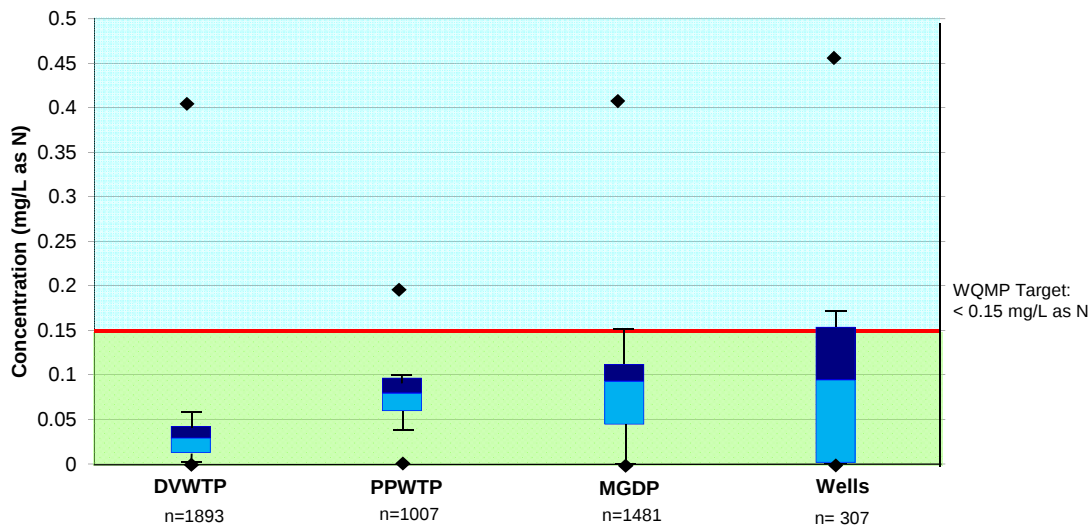


Figure 7. Free Ammonia*, *, ****
Production Facility Effluent Samples**



*Data is based on every 4-hour online values.

**The high residual disinfectant level at the MGD is due to a momentary spike due to plant startup.

***Free ammonia values at the wells are calculated values based off of the actual chlorine and ammonia feed.

****The high free ammonia levels at MGD and Wells are due to a momentary spike at plant startup. The high free ammonia value at DVWTP is due to an ammonia overfeed.

Figure 8a. Total Trihalomethanes (TTHMs)*,
Production Facility Effluent Samples**

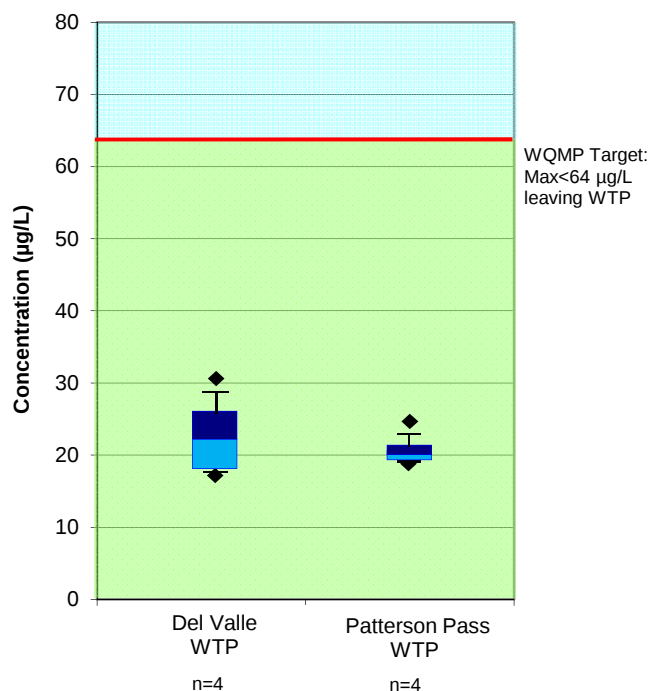
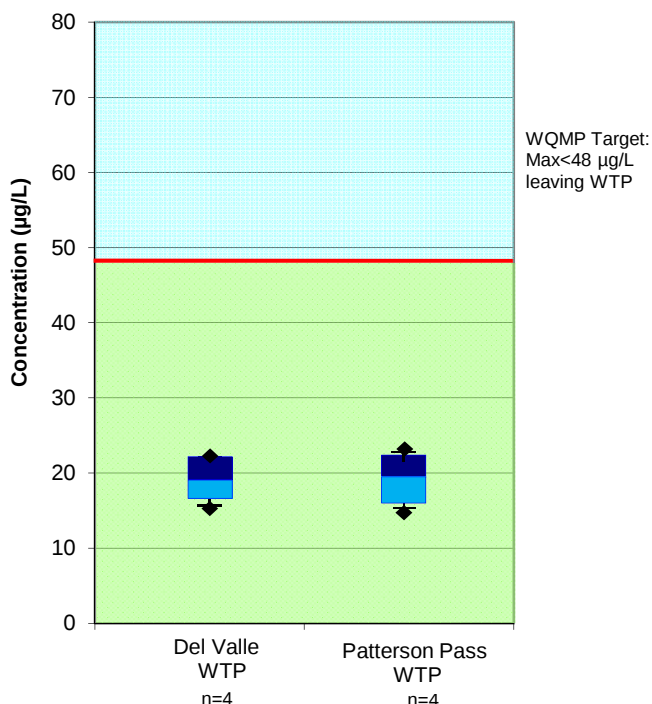
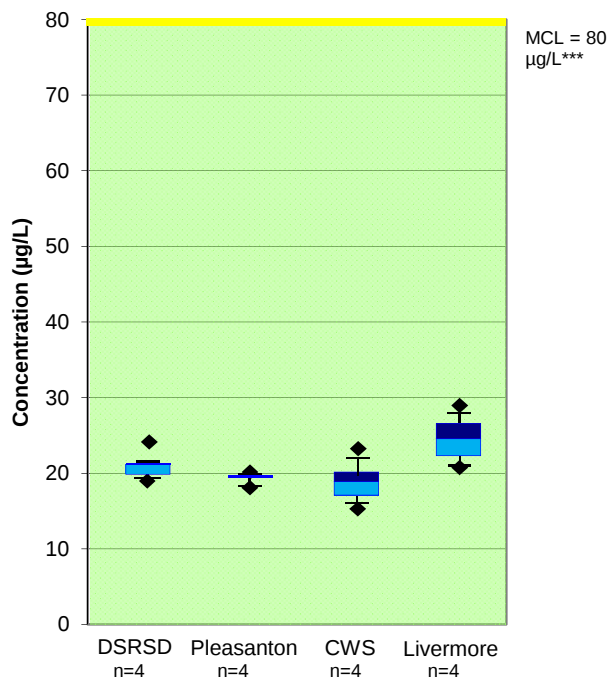


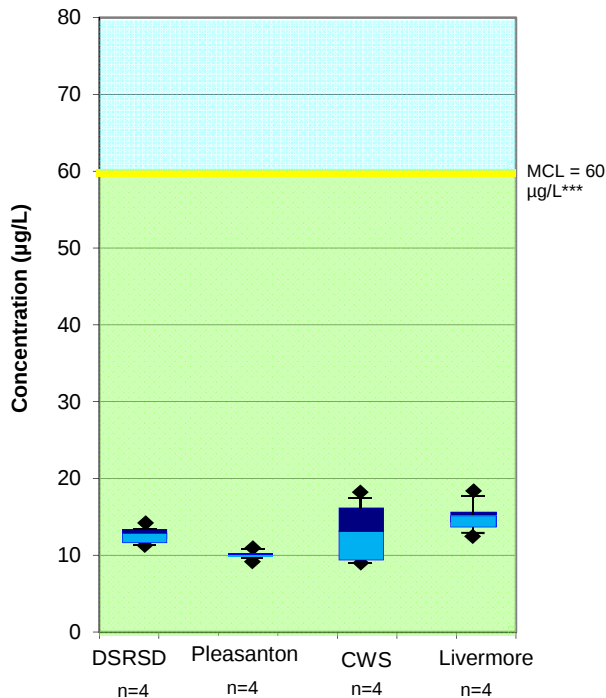
Figure 8b. Five Haloacetic Acids (HAA5)*,
Production Facility Effluent Samples**



**Figure 9a. Retailer Distribution System
Quarterly Running Annual Averages for
Total Trihalomethanes (TTHMs)**



**Figure 9b. Retailer Distribution System
Quarterly Running Annual Averages for
Five Haloacetic Acids (HAA5)**



* There is no MCL for TTHMs/HAA5 leaving WTP.

** No monitoring is conducted at the wells where minimal TTHMs/HAA5 are expected due to low organic content of the groundwater supply.

*** Retailer MCL compliance for TTHMs/HAA5 is determined by system-wide running annual average of quarterly samples.