

# REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for March 13-14, 2006

Samples Collected on March 20, 2006

From the Phoenix, Tempe, Peoria, CAP, SRP – ASU Regional Water Quality Partnership

**PLEASE NOTE THE WEBADDRESS HAS CHANGED FOR OUR PROJECT:**

<http://enpub.fulton.asu.edu/pwest/tasteandodor.htm>

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## SUMMARY: EVALUATION AND RECOMMENDATIONS

1. MIB concentrations are low throughout the water supply system.
2. GEOSMIN is being formed already in the Arizona Canal between Pima Road and Deer Valley WTP. This could be due to the lower than normal flows in the canal, because of recent rain and Tempe-North WTP and 24<sup>th</sup> Street WTP being off-line – this reduces flowrates in the canal and allows the water to become more stagnant.
3. All MIB and Geosmin concentrations are < 5 ng/L in finished waters. Geosmin removal is apparently occurring at Deer Valley WTP, even without PAC addition.
4. DOC concentrations are highest in Bartlett Reservoir, although last week mostly Salt River water was being used. When Verde River water is used later this year, there may be an issue with DBP compliance.

**Table 1 Summary of WTP Operations**

	Union Hills	24 <sup>th</sup> Street WTP	North Tempe	Deer Valley	Peoria WTP	Val Vista	South Tempe	Chandler WTP
Location	CAP	Arizona Canal System				South Canal system		
PAC Type and Dose	No report	Plant is off-line	Off-line until April	No	No report	0.71 ppm	No report	
Copper Sulfate				No		No		
PreOxidation				No		1.8 ppm 24/7		
Alum Dose Alkalinity pH				35ppm 120 7.2		55ppm 118 7.21		
WTP Comments	No T&O complaints			No T&O complaints		No T&O complaints	No T&O complaints	
<b>Process Recommendations</b>								

\* Ferric chloride instead of alum

## MONITORING RESULTS

**Table 2 - Water Treatment Plants – March 13, 2006**

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24 <sup>th</sup> Street WTP Inlet			
24 <sup>th</sup> Street WTP Treated			
Deer Valley Inlet	<2.0	12.3	<2.0
Deer Valley WTP Treated	<2.0	4.7	<2.0
Val Vista Inlet	<2.0	<2.0	<2.0
Val Vista WTP Treated –East	<2.0	<2.0	2.5
Val Vista WTP Treated -West	<2.0	<2.0	<2.0
Union Hills Inlet	<2.0	<2.0	<2.0
Union Hills Treated	<2.0	<2.0	<2.0
Tempe North Inlet			
Tempe North Plant Treated			
Tempe South WTP	<2.0	<2.0	<2.0
Tempe South Plant Treated	<2.0	4.3	<2.0
Chandler WTP Inlet	<2.0	<2.0	14.7
Chandler WTP Treated	<2.0	<2.0	<2.0
Greenway WTP Inlet	<2.0	<2.0	<2.0
Greenway WTP Treated	<2.0	<2.0	<2.0

**Table 3 - Canal Sampling – March 13, 2006**

<b>System</b>	<b>Sample Description</b>	<b>MIB (ng/L)</b>	<b>Geosmin (ng/L)</b>	<b>Cyclocitral (ng/L)</b>
CAP	Waddell Canal	<2.0	<2.0	<2.0
	Union Hills Inlet	<2.0	<2.0	<2.0
	CAP Canal at Cross-connect	<2.0	<2.0	<2.0
AZ Canal	Salt River @ Blue Pt Bridge	<2.0	<2.0	<2.0
	Verde River @ Beeline	<2.0	<2.0	3.1
	AZ Canal above CAP Cross-connect	<2.0	<2.0	<2.0
	AZ Canal below CAP Cross-connect	<2.0	<2.0	<2.0
	AZ Canal at Highway 87	<2.0	<2.0	<2.0
	AZ Canal at Pima Rd.	<2.0	<2.0	<2.0
	AZ Canal at 56th St.	<2.0	5.1	<2.0
	AZ Canal - Inlet to 24 <sup>th</sup> Street WTP	<2.0	10.4	<2.0
	AZ Canal - Central Avenue	<2.0	12.3	<2.0
	AZ Canal - Inlet to Deer Valley WTP	<2.0	<2.0	<2.0
	AZ Canal - Inlet to Greenway WTP	<2.0	<2.0	<2.0
South and Tempe Canals	South Canal below CAP Cross-connect	<2.0	<2.0	<2.0
	South Canal at Val Vista WTP	<2.0	<2.0	<2.0
	Head of the Tempe Canal	<2.0	<2.0	<2.0
	Tempe Canal - Inlet to Tempe's South Plant	<2.0	<2.0	<2.0
	Chandler WTP – Inlet	<2.0	<2.0	14.7

**Table 4 - Reservoir Samples – March 14, 2006**

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant	Eplimnion	<2.0	<2.0	<2.0
Lake Pleasant	Hypolimnion	<2.0	<2.0	<2.0
Verde River @ Beeline		<2.0	<2.0	3.1
Bartlett Reservoir	Epilimnion	<2.0	3.9	4.0
Bartlett Reservoir	Epi-near dock	<2.0	4.9	4.8
Bartlett Reservoir	Hypolimnion	<2.0	3.0	<2.0
Salt River @ BluePt Bridge		<2.0	<2.0	<2.0
Saguaro Lake	Epilimnion	<2.0	<2.0	<2.0
Saguaro Lake	Epi - Duplicate	<2.0	<2.0	<2.0
Saguaro Lake	Epi-near doc	<2.0	<2.0	<2.0
Saguaro Lake	Hypolimnion	<2.0	<2.0	<2.0
Verde River at Tangle (February)		<2.0	<2.0	<2.0
Havas		<2.0	<2.0	<2.0

**Table 5 - SRP/CAP OPERATIONS**

Values in cfs, for March 13, 2006

System	SRP Diversions	CAP
Arizona Canal	212	52
South Canal	399	0
Pumping	41	0
Total	652	52

**SRP is releasing water from both Verde and Salt River Systems.** Salt River release from Saguaro Lake: 408 cfs; Verde River release from Bartlett Lake: 100 cfs. Horseshoe Lake is at 0% capacity.



## Operations and Maintenance Update

3/15/2006

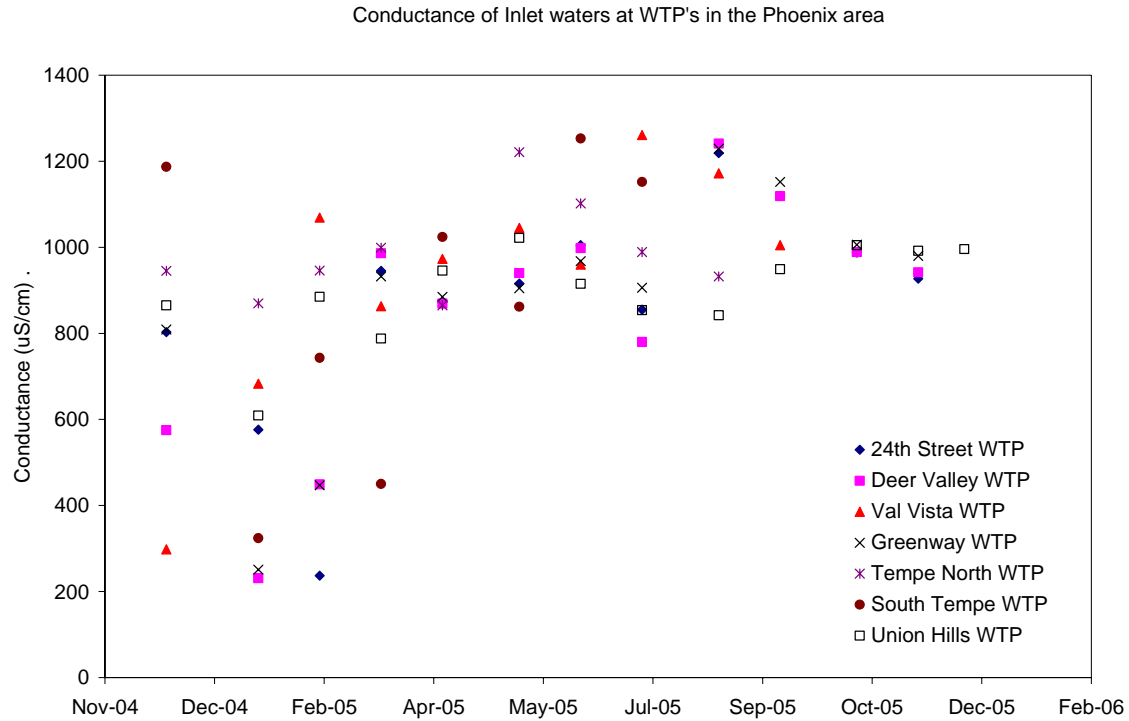
<b>WADDELL RELEASE SCHEDULE</b>				
		% Flow	Date	Time
Current Waddell Releases	0 cfs	0%	03/15/06	18:00
Current Pass-Thru Flow	280 cfs	100%	03/15/06	18:00
New Waddell Releases	1000 cfs	100%	03/16/06	8:00
New Pass-Thru Flow	0 cfs	0%	03/16/06	8:00
New Waddell Releases				
New Pass-Thru Flow				
New Waddell Releases				
New Pass-Thru Flow				
<b>SPECIAL NOTES / AQUEDUCT ACTIVITIES</b>				

**All pass-thru pumping will cease at 00:01 on 3/16/2006 due to high turbid water reaching Lake Havasu .**

**All deliveries will be made from Lake Pleasant starting at 08:00 on 3/16/2006 until further notice.**

## CHANGES IN CONDUCTANCE OVER THE PAST YEAR

The graph below illustrates how floods in early 2004 resulted in very low conductance (i.e., low TDS) water. In general TDS ~ 60% of conductance. Conductance levels have come back up in 2005. Some WTPs are impacted by groundwater or different surface waters that result in different conductance values.



## DISSOLVED ORGANIC CARBON & DISINFECTION BYPRODUCTS

The table below summarizes the DOC levels in the different source waters. The Verde River has the highest DOC and likely the highest DBP precursor levels.

Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-cm)	Total Dissolved Nitrogen (mgN/L)
Lake Pleasant	Epilimnion	3.43	0.0591	1.7	0.455
Lake Pleasant	Hypolimnion	3.34	0.0572	1.7	0.262
Verde River @ Beeline		5.01	0.0337	2.4	0.579
Bartlett Reservoir	Epilimnion	5.42	0.0749	1.4	0.624
Bartlett Reservoir	Hypolimnion	5.43	0.0689	1.3	0.313
Salt River @ BluePt Bridge		3.54	0.111	3.1	0.733
Saguaro Lake	Epilimnion	3.66	0.1223	3.1	0.196
Saguaro Lake	Epi - Duplicate	3.69	0.1128	3.1	0.624
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnion	3.68	0.1128	3.1	0.497
Verde River at Tangle					
Havas		3.30	0.0358	1.1	1.192

The graph below shows the water temperature over the past year at the water treatment plants. Warmer water will form more DBPs. Consider one empirical equation for THM formation:

$$THM\ 4 = 0.0412 \times [DOC]^{1.098} \times [Cl_2]^{0.152} \times [Bromide]^{0.068} \times [Temperature]^{0.069} \times [pH]^{1.601} \times [Contact\_time]^{0.263}$$

Then if the only parameter that changes throughout the year is temperature, and assuming the other parameters stay constant (e.g., 3.5 mg/L DOC, 4 mg/L chlorine dose, 100 ug/L bromide, pH 7.2, and 24hours of contact time), then the predicted THM4 concentration is shown in the plot below. What the data shows is the significance of temperature alone on DBP formation. These types of DBP predictions tools will be further discussed in future Newsletters.

