

REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for Aug/Sept 2011

A Tempe, Glendale, Peoria, Chandler, CAP, SRP, Arizona American Water– ASU Regional Water Quality Partnership

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

Quick Update of Water Supplies for September 2011 (during day of sampling – August 30, 2011)

Source	Trend in supply	Discharge to water supply system	Flow into SRP Canal System	Reservoir MIB * Concentration (ng/L)	Dissolved organic carbon Concentration (mg/L) **
Salt River	Reservoirs at 77% full	1621 cfs	830 cfs into Arizona Canal	130 ng/l [11 ng/L]	4.6 mg/L
Verde River	Reservoirs At 30% full	125 cfs	846 cfs into South Canal (93% Salt River Water)	2 ng/L [11 ng/L]	3.4 mg/L
Colorado River	Reservoirs at near historic lows (Lake Pleasant is 41% full)	2059 cfs from CAP (Lake Pleasant releasing water)	0 cfs of CAP water into Arizona Canal	<2	3.5 mg/L
Groundwater	Generally increasing due to recharge	103 cfs pumping by SRP	103 cfs Groundwater Pumping into SRP Canals	--	0.5 to 1 mg/L

*Concentration of these taste and odor compounds in the upper [lower] levels of the terminal reservoir (Saguaro Lake on the Salt River; Bartlett Lake on the Verde River; Lake Pleasant on the CAP system)

**Concentration of DOC in the terminal reservoir

Data from the following websites:

- <http://www.srpwater.com/dwr/>
- <http://www.cap-az.com/Operations/LakePleasantOps.aspx>

SUMMARY: EVALUATION AND RECOMMENDATIONS

1. Lake sampling will be conducted mid-september to focus on a critical time of lake turnover
2. This newsletter focuses on T&O samples from canals in mid- and late- August. We observed a “pulse” of MIB after a monsoon
3. MIB plus geosmin levels are above 10 ng/L – levels noticeable to consumers. We confirmed this by collecting tap water samples at ASU and levels of 7.8 ng/L MIB was noticeably earthy-musty in odor.
4. Our **ANNUAL WORKSHOP is planned for September 29th** 830-1130am at the SRP PERA CLUB. A preliminary agenda is provided – but we welcome your suggestions. **EMAIL US by September 8th on additional topics you would like to see covered.**

Taste and Odor Data

MIB plus geosmin levels above 10 ng/L in finished water lead to noticeable earthy-musty odors by customers. Currently MIB+geosmin levels are above 10 ng/L in the canals.

Water Supply Sources

Reservoir Samples – August 2, 2011					Reservoir Samples – July 12, 2011			
Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)	Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)
Lake Pleasant (July11)	Eplimnion	<2.0	<2.0	2.6	Lake Pleasant (June11)	Eplimnion	<2.0	<2.0
Lake Pleasant (July11)	Hypolimnion	<2.0	<2.0	10.5	Lake Pleasant (June11)	Hy polimnion	<2.0	<2.0
Verde River @ Beeline					Verde River @ Beeline			
Bartlett Reservoir	Epilimnion	2.5	<2.0	<2.0	Bartlett Reservoir	Epilimnion	<2.0	2.2
Bartlett Reservoir	Epi-near dock	11.2	<2.0	2.0	Bartlett Reservoir	Epi-near dock	<2.0	<2.0
Bartlett Reservoir	Hypolimnion	<2.0	<2.0	<2.0	Bartlett Reservoir	Hy polimnion	<2.0	2.3
Salt River @ BluePt Bridge		5.8	2.8	5.6	Salt River @ BluePt Bridge		2.2	<2.0
Saguaro Lake	Epilimnion	121.5	2.7	2.6	Saguaro Lake	Epilimnion	20.3	2.4
Saguaro Lake	Epi - Duplicate	143.9	<2.0	2.3	Saguaro Lake	Epi - Duplicate		
Saguaro Lake	Epi-near dock	38.3	<2.0	<2.0	Saguaro Lake	Epi-near dock	11.3	2.1
Saguaro Lake	Hypolimnion	11.3	<2.0	<2.0	Saguaro Lake	Hy polimnion	3.7	<2.0
Lake Havasu (July11)		<2.0	3.5	5.0	Lake Havasu (June11)		<2.0	2.5
Verde River at Tangle Creek (June11)		7.7	4.5	7.2	Verde River at Tangle Creek		<2.0	4.0

Around this time every year, Saguaro Lake has very high MIB levels. As the lake thermally destratifies (usually in September) this causes a 4 to 6 week PULSE of MIB into the SRP system. Fortunately, MIB also biodegrades in the reservoir at a rate of about 1 ng/L/day. Also, the epilimnion of warm water containing the MIB is only 10-15 m deep, so when it mixes with the other 30-40 m depth of water it is also diluted.

Over the next few weeks we can expect MIB concentration in SRP water to gradually increase.

Some MIB and Geosmin Data

Our main sampling will be in mid-september, but we have been watching T&O levels in the canal systems carefully about every two weeks. Below is data from sampling this week, and shows the following:

- MIB and geosmin levels are hovering around 10 to 15 ng/L (combined) and really need treatment to get to non-noticable levels by consumers
- Tempe tap water (drinking fountain at ASU) contained 7.8 ng/L and was noticeably earthy-musty in odor – this level would be consistent with Tempe North WTP treated water
- MIB levels in Lake Pleasant are low. This is important because CAP plans to release water from Lake Pleasant into September to maximize CAPs energy resources (see next page)

Table 2 - Water Treatment Plants – August 29, 2011

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Tempe North Inlet			
Tempe North Plant Treated	8.7	2.2	<2.0
Tempe South WTP			
Tempe South Plant Treated	3.3	<2.0	<2.0
Anthem Inlet	2.8	<2.0	<2.0
Anthem Treated	<2.0	<2.0	<2.0
Chandler Inlet	8.8	3.1	2.9
Chandler Treated	8.4	2.8	2.8
Glendale WTP Inlet			
Glendale WTP Treated	<2.0	<2.0	<2.0

Table 3 - Canal Sampling –August 29, 2011

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
	Salt River @ Blue Pt Bridge			
	Verde River @ Beeline			
AZ	AZ Canal above CAP Cross-connect			
Canal	AZ Canal below CAP Cross-connect	9.8	2.4	3.3
	AZ Canal at Highway 87			
	AZ Canal at Pima Rd.	9.2	3.7	<2.0
	AZ Canal at 56th St.			
	AZ Canal - Central Avenue			
	AZ Canal - Inlet to Glendale WTP			
	Head of the Consolidated Canal	9.4	2.7	3.0
	Middle of the Consolidated Canal			
South	South Canal below CAP Cross-connect	9.7	3.7	2.3
Tempe	Head of the Tempe Canal			
Canals	Tempe Canal - Inlet to Tempe's South Plant			

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (August 11)	Eplimnion	<2.0	<2.0	<2.0
Lake Pleasant (August 11)	Hypolimnion	2.6	<2.0	<2.0



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DATE: May 18, 2011

TO: Distribution

FROM: Brian Henning, CAP Water Control Manager

SUBJECT: Summer 2011 Lake Pleasant Operating Plans

CAP's summer 2011 operating strategy will be similar to the last two years. In an effort to maximize CAP's energy resources, releases will begin in May and continue into September. In previous years, CAP avoided Lake Pleasant releases in September altogether to avoid water quality problems. However, experience has shown we can continue releases until Mid-September without issue.

In order to supply customers with the best quality water, CAP's operational strategy will be to make all releases exclusively from the lower gates all summer. However, due to a problem in getting the hydraulic cylinder for the right (east) tower repaired, the lower gate on that tower is closed. The cylinder is expected to be replaced the last week in May. Releases from the right tower will be minimized until then. Refilling of Lake Pleasant will begin around November 1. The lake level is projected to drop from elevation 1698 to elevation 1653 by the end of September.

The plan is to continuously pump from the west end of the CAP system, supplementing Lake Pleasant releases with pass-through pumping of Colorado River water. About 500 cfs of Colorado River water may be blended with Lake Pleasant releases. Pumping operations may change based on energy market conditions. The west end pumping may be reduced and Lake Pleasant water may be increased for short periods of time between June and the end of summer, so the two water sources may be blended in varying amounts. For the benefit of our M&I users, treatment plants will be given as much advance notice as possible of all changes in water sources.

CAP maintenance at the west pumping plants will not affect pass-through pumping this summer. Half-plant outages are scheduled for early July through Mid-September.


CAP Operations will notify customers of any unscheduled changes as early as possible, so I hope this summer's operation will bring no surprises. If you have any further questions, you may contact me at (623) 869-2567, or Doug Crosby at (623) 869-2426.

drc
 2011 Summer Lake Operations.doc

Taste and Odor Compound “PULSES” during Monsoons

Over the past several years we periodically observed elevated MIB and geosmin levels in the canals immediately following monsoon events. Previously we conducted sampling in the Verde River near Fountain Hills and grass irrigated areas in the valley and concluded there were organisms capable of producing T&O compounds, and when they were wetted and water runoff entered the river or canals caused short-term pulses of elevated MIB levels. This is important to water utilities because in addition to dealing with increased turbidity and DOC during monsoon runoff, the water also contains elevated MIB.

The photographs below show water collected on the same day at different locations in Arizona Canal. These photos were shown in the August newsletter too. There was a typical monsoon the day before the samples. It can be seen that water in the AZ canal between about 68th street and Central Ave contained turbidity as a result of the runoff event. There was slightly elevated geosmin in these samples too.

Sampling site	Arizona Canal @ Glendale WTP Inlet	Arizona Canal @ Central Ave	Arizona Canal @ 56 th Street	Arizona Canal @ JGM WTP Inlet	Arizona Canal @ Pima Road	Arizona Canal @ Highway 87	Arizona Canal below CAP cross-connect	Arizona Canal above CAP cross-connect
Sample Pictures								
Sampling time	11:30 am	10:50 am	10:30 am	2:00 pm	10:00 am	4:30 pm	4:10 pm	4:00 pm
DOC (mg/L)	4.1	5.1	5.0	5.0	4.3	4.2	4.2	4.3
UV254 (1/cm)	0.0780	0.1108	0.1182	0.1288	0.0825	0.0805	0.0802	0.0802
SUVA (L/mg-m)	1.9	2.2	2.4	2.6	1.9	1.9	1.9	1.9
TDN (mg/L)	0.7	0.5	0.7	0.6	0.4	0.3	0.3	0.4



We also conducted sampling on August 15th after a series of daily monsoons. This time the MIB levels were much higher than observed in August 1st sampling above. The data below indicate 2 pulses of MIB at the head and lower end of the Arizona and South Canal system, with a lower MIB level in the middle of the Arizona Canal which we think is water “in-between” the monsoon pulses, but oddly had higher levels of geosmin. The lower levels of MIB at Chandler (on the consolidated canal) are because groundwater is pumped into the canal.

August 15, 2011 Sampling

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
WTP	Chandler Inlet	8.0	<2.0	6.5
AZ Canal	AZ Canal below CAP Cross-connect	36.2	<2.0	2.9
	AZ Canal at Pima Rd.	4.5	5.5	3.4
	Head of the Consolidated Canal	40.4	<2.0	<2.0
South Tempe Canal	South Canal below CAP Cross-connect	43.5	2.1	3.2
	Head of the Tempe Canal	40.3	<2.0	7.9

8/15 and the sampling time is listed below:

Pima - 10:00am
 Chandler Inlet - 10:30am
 Head of Tempe Canal - 11:00am
 Head of Consolidated Canal - 11:05am
 South Canal below CAP cross-connect - 11:50am
 Arizona Canal below CAP cross-connect - 12:10pm

Preliminary Topics to Be Covered at September 9th Annual Workshop

- Overview of regional water quality
- Water quality under climatic variability and influence of droughts, fires, flood & building a historical water quality database
- Taste and Odor – is it just formed in reservoirs or will it be produced in canals once again
- Comparison of Conventional Powder Activated Carbon with Superfine-PAC (PAC)
- In-site regeneration of Granular Activated Carbon

We have room for at least one more topic: **EMAIL me by September 8th on additional topics you would like to see covered:** p.westerhoff@asu.edu