

WEST BASIN MUNICIPAL WATER DISTRICT

JULY 9, 2003 - Water Resources

McDonald, Kwan

JULY 28, 2003 - Board Meeting

Prepared by: Jennifer Bender

Submitted by: Richard Nagel

Approved by: Darryl G. Miller

CONSENT CALENDAR

WATER QUALITY UPDATE - WATER SOFTENERS

SUMMARY:

Water is considered hard when it contains dissolved minerals, specifically calcium (Ca) and/or magnesium (Mg) ions. Although sulfate, chloride, carbonate, and bicarbonate can accompany Ca and Mg ions, water hardness is determined by the amount of Ca and Mg.

Table 1 illustrates how the American Society of Agricultural Engineers classifies "hard" water.

Table 1 - Water Hardness Levels

Classification	mg/L or ppm*
Soft	0-60
Moderate	61-120
Hard	121-180
Very Hard	> 180

* mg/L = milligrams per liter or ppm = parts per million

These mineral deposits typically react with detergents, plumbing, and heat, reducing the cleaning efficiency of laundry, dishes, and personal bathing due to soap curds that form, scale that deposits and clogs plumbing, and scale that builds up inside water-using appliances.

Table 2 illustrates the typical water hardness levels seen locally. MWD numbers were calculated using averages noted in the 2002 Annual Water Quality Report. Groundwater averages were determined from all 2002 samples of groundwater Wells in the Central Basin service area.

Table 2 - Local Water Hardness Levels

Water Body	mg/L or ppm*
MWD Filtration Plants	187.6
Average Groundwater	243

How Water Softeners Work

Water softeners successfully treat hard water using an ion-exchange system. A cylinder inside the water softener contains ion exchange resin that consists of tiny beads. These beads attract and retain Ca and Mg hardness minerals and release softened water.

However, these beads are also supersaturated with sodium that is released into the water as hardness minerals are retained inside.

Eventually, the beads become saturated with Ca and Mg that requires regeneration, usually done automatically by the water softener. Regeneration involves flushing the ion exchange resin with a salt brine solution to replenish the beads with sodium ions. The brine and accumulated hardness minerals are flushed to drain. A typical home water softener discharges about 400 pounds of salt a year. Regeneration takes about an hour, depending on water hardness, frequency of use, unit size, and the effectiveness of the ion exchange resin.

The homeowner has little to do with the operation of their water softener other than periodic topping off with salt pellets and a routine inspection every now and then for safe operating conditions.

Soft Water Benefits

There are many benefits to having soft water in the home, including less detergent use in the wash machine, whiter/softer/cleaner/brighter laundry that lasts longer, cleaner dishes, less dish soap and hard water spots, reduced hard water build-up in bathroom appliances, and smoother feeling water on the skin.

Soft Water Problems

Ion exchange softening adds sodium to the product water - about 8 mg/L per each 17.1 mg/L of water hardness. For example, if your water was "hard" at 137 mg/L, it would now contain an additional 64 mg/L of sodium.

Softened water used for cooking or drinking may be problematic for individuals on sodium-restricted diets. There is also speculation that excess sodium may be linked to hypertension and other health issues. This can be remedied by by-passing the water softener or installing a drinking water faucet on the sink not connected to the water softening unit.

However, there is cause for concern with the excess salt levels discharged into the sewer system from the brine solution after re-generation. Sewage treatment plants experience spikes of chloride in their systems that can disrupt the biological cleansing processes taking place. Furthermore, these increased levels are also experienced in the receiving waters the sewage treatment plants discharge into. This can harm fish and aquatic life, impact crops irrigated with the water, degrade the receiving water quality, and affect potable downstream users.

Locally, as more water softeners are used in our service area, the amount of salts (sodium and chloride) discharged into wastewater will increase. This phenomenon is being seen all over California. However, there is no blanket research to quantify how much of the average total dissolved solids in wastewater originates from water softener discharges. Regardless, as sodium and chloride levels wildly fluctuate and increase into wastewater

treatment plants, municipalities find it challenging to continue to meet discharge permits. Furthermore, increased salt levels can negatively impact wastewater re-use opportunities. Earlier this year, the County Sanitation District of Los Angeles County in conjunction with the Santa Clarita City Council banned the installation of self-regenerating water softeners in Santa Clarita Valley. The Santa Clara River, which receives local sewage treatment plant discharges is in violation of a chloride wastewater standard set by the Regional Water Quality Control Board. Water softeners were deemed as the largest chloride contributor. Similar bans have been seen in San Diego, Riverside, Corona, and Redlands.

Future Legislation

Excess salt levels discharged from water softeners have been an issue for quite some time. Although local agencies have had the right to limit and ban water softening appliances for years, that right itself has been limited. Assembly Bill 334, introduced by Assemblywoman Goldberg, seeks to expand and clarify under what circumstances a local agency can limit or ban water softening appliances. This bill has already passed the Assembly and is heading for the Senate. If passed, this legislation could help limit excess salt levels discharged into local sewage treatment plants and receiving waters.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

COMMITTEE STATUS:

This item was reviewed by the Water Resources Committee on July 9, 2003, and agendaized to the July 28, 2003 Board meeting Consent Calendar.

RECOMMENDED MOTION:

This item is for information only.

LIST OF EXHIBITS:

None.