

# **WATER SUPPLIERS PERSPECTIVE OF TOTAL DISSOLVED SOLIDS (TDS)**

§109.202 (b) *Secondary MCLs.*

(1) A public water system shall supply drinking water that complies with the secondary MCLs adopted by the EQB under the act, except for the MCL for pH which represents a reasonable goal for drinking water quality.

**THREE MAJOR COMPONENTS OF TDS AND THEIR  
PUBLIC WATER SYSTEM (PWS)  
SECONDARY MAXIMUM CONTAMINANT LEVELS  
(SMCLs)**

**TOTAL DISSOLVED SOLIDS (500 MG/L)**

**TOTAL CHLORIDES (250 MG/L)**

**TOTAL SULFATES (250 MG/L)**

**Conventional treatment adds approx. 15-50 mg/l TDS.**

DEP is obligated to enforce secondary MCLs and may require Public Notification (PN) and abatement (via treatment or non-treatment methods) when secondary MCLs are exceeded.

In addition to the secondary MCLs, EPA also has a Health Advisory level for sulfates of 500 mg/L. Sulfates in drinking water above 500 mg/L may cause laxative-like effects, such as loose stool and diarrhea. Sulfate levels above 500 may require Tier 1 PN in the form of a "Do Not Drink" notice.

# ELEVATED TDS LEVELS CAUSE UNINTENDED CONSEQUENCES

- INTERFERE WITH EXISTING TREATMENT PROCESSES, SUCH AS MEMBRANE FILTRATION.
- INCREASE CORROSION RATES, PUTTING PWS AT RISK FOR INCREASED LEACHING OF LEAD AND COPPER IN THE DISTRIBUTION SYSTEM AND IN CUSTOMER'S PLUMBING.
- INCREASED CORROSION ALSO WEAKENS THE INTEGRITY OF DISTRIBUTION SYSTEM PIPES AND COULD LEAD TO MORE FREQUENT WATER LINE BREAKS.
- CHLORIDES: PRODUCE A SALTY, UNPALATABLE, TASTE.
- SULFATES: MAY CAUSE LAXATIVE-LIKE EFFECTS, SUCH AS LOOSE STOOL/DIARRHEA.
- WWTP COSTS: IF HIGH TDS WATER IS USED BY DRINKING WATER SYSTEM, THE LOCAL WWTP MUST THEN DEAL WITH HIGH TDS DISCHARGES BACK INTO THE STREAM.
- HIGH TDS LEVELS CAUSE SPOTTING OF DISHES AND CLOUDY GLASSWARE. CUSTOMER SATISFACTION WITH THE WATER SUPPLIER IS LESSENERD.
- ALTHOUGH SECONDARY MCLS ARE IN PLACE FOR SULFATES, CHLORIDES, AND TDS: ANY INCREASE WILL POSSIBLY CAUSE SOME DEGRADATION TO DRINKING WATER QUALITY, PALATABILITY, AND CORROSION.
- HIGH TDS LEVELS IN THE MONONGAHELA RIVER BASIN RESULTED IN HIGHER BROMIDE LEVELS, CAUSING INCREASES IN THM LEVELS WITHIN WATER SUPPLY SYSTEMS.



An example of typical TDS levels....

Revised: 01/22/2009

COMPREHENSIVE WATER ANALYSIS 2008

<u>PARAMETER</u>	<u>YWC SAMPLE</u>	<u>EPA/DEP DRINKING WATER STANDARDS</u>
<u>Secondary Inorganics (Results in PPM)<sup>1</sup></u>		
Alkalinity	45.6	*
Aluminum	<0.15	*
Calcium	21.0	*
Chloride	25.0	250.0
Conductivity	227.0 Micromohs	*
Color	0.0	15.0
Copper (customer tap)	0.07	1.350
	(90th percentile)	(action level) <sup>4</sup>
Copper (distribution system)	<0.001	1.00
Total Phosphorus	<0.02	*
pH Value	8.39	7.4 - 8.6
Sodium	12.0	20.0
Sulfate	18.0	250.0
Surfactants (MBAS)	<0.05	0.50
Total Dissolved Solids	137.0	500.0
Zinc	<0.02	5.0

# TREATMENT OPTIONS

Existing treatment techniques in Pennsylvania can not remove TDS.  
In fact, they generally add 15-50 mg/l.

## **HIGH PRESSURE MEMBRANE:**

- HIGH ENERGY
- BRINE DISPOSAL ISSUE
- EXPENSIVE

## **EVAPORATION/CRYSTALLIZATION:**

- VERY HIGH ENERGY INPUT
- SOLID SALT DISPOSAL ISSUE
- VERY EXPENSIVE

# TMDL BASED ON Q<sub>7-10</sub>

- DURING SEVERE DROUGHTS, PWS GENERALLY NEED ALL OF THE SOURCE THEY CAN GET TO MEET DEMAND AND CONSERVATION RELEASES.
- USING Q<sub>7-10</sub> COULD PUT WATER SUPPLIERS AT RISK ON AVERAGE: 7 DAYS OUT OF EVERY 10 YEARS.
- THIS WILL FORCE PWS TO DEVELOP OR RELY ON OTHER SOURCES DURING LOW FLOW EVENTS OR RISK A TIER 1 PUBLIC NOTIFICATION AND POSSIBLE "DO NOT DRINK" NOTICE

## TRADING CREDITS:

BENEFIT MUST OCCUR UPSTREAM OF DRINKING WATER INTAKE SO THAT TMDL NOT EXCEEDED. NONE CURRENTLY AVAILABLE.

# RECOMMENDATIONS

## TO INSURE THAT COSTS OF TREATMENT WILL NOT BE PASSED ON TO CUSTOMERS OF DRINKING WATER SYSTEMS:

1. TMDL. TO INSURE PWS INTAKES COMPLY WITH REGS, ESTABLISH TMDLS BELOW THE SECONDARY MCL ON STREAMS THAT ARE (OR COULD BE) PWS SOURCES. (AT LEAST 50 MG/L BELOW SMCL)
2. PROTECT STREAM QUALITY AT LEAST DOWN TO THE Q<sub>7-10</sub> FLOW.
3. PROVIDE FOR FURTHER TESTING TO DETERMINE IF OTHER HARMFUL CONSTITUENTS, SUCH AS BROMIDE, ARE PRESENT IN DISCHARGES.
4. IN ADDITION TO TMDL, INCENTIVIZE DRILLERS TO RECYCLE WASTE WATER AND ELIMINATE ALL DISCHARGE INTO STREAMS.
5. ESTABLISH A REAL-TIME MONITORING NETWORK ON MAIN STREAM SEGMENTS USING CONDUCTIVITY AS AN INDICATOR OF TDS LEVELS. DEVELOP ALERT MECHANISMS TO WATER SUPPLIERS ON INCREASE OF TDS LEVELS.
6. DEVELOP EFFECTIVE PRACTICES TO LOCATE AND MANAGE OTHER CONTRIBUTERS OF TDS. (ACID MINE RELEASES)