Public Water Supply Program

City of Salado Water Tower

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The TCEQ, through the Public Drinking Water Section, enforces the Public Water Supply Supervision program of the Safe Drinking Water Act and the National Primary Drinking Water Regulations. The act and regulations establish standards for chemical and microbiological quality for public water systems. Chapter 341 of the Texas Health and Safety Code gives authority for regulating public water systems and the authority to adopt rules to implement the necessary programs to the TCEQ. The "Rules and Regulations for Public Water Systems" set standards for construction, operation, and maintenance of water systems. The "Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Supply Systems" set standards for chemical and microbiological quality, and are the state equivalent of the National Primary Drinking Water Regulations.

The Drinking Water Standards are basically divided into two parts. The primary standards are set to protect the health of the consumers by setting maximum contaminant levels (MCLs) or treatment technique requirements (TTs). These MCLs or TTs are established by using data from animal studies and/or data on human epidemiological or occupational exposure. MCLs for organic and inorganic chemicals are shown in Tables 5-1, 5-2, and 5-3. In all instances, the Texas primary standards are set at the same level as the federal primary standards. The secondary standards are set at levels that, in most cases, prevent the water from being aesthetically objectionable (Table 5-4). In most instances, the secondary standards in Texas are equivalent to the federal secondary standards.

Current primary chemical compliance in the state is good. Only 160 violations of the primary organic and inorganic MCLs currently exist statewide (Figure 5-1). Most of the exceedances have been due to elevated fluoride and nitrate nitrogen levels. Most of these violations occur in groundwater and result from natural background levels. In general, chemical compliance samples are collected at the point where water enters the distribution system following mixing and treatment. Raw surface water is sampled by the drinking water program only to confirm or investigate potential source contamination.

With the change in the trihalomethane (THM) MCL, there has been an increase in the number of THM violations. Unlike most other chemical contaminants that are present in the source water (either a well or a river or lake), THMs are contaminants that are formed during the disinfection process. The formation of THMs is controlled by the quality of raw water and the type of disinfectant used: it is mainly a problem with surface water

Table 5-1. Maximum Contaminant Levels for Organic Chemicals in Public Drinking Water Supplies

Contaminant	mg/L	Contaminant	mg/L
Alachlor	0.002	Ethylbenzene	0.7
Aldicarb	0.003	Ethylene dibromide (EDB)	0.00005
Aldicarb sulfone	0.002	Glyphosate	0.7
Alicarb sulfoxide	0.004	Heptachlor	0.0004
Atrazine	0.003	Heptachlor epoxide	0.0002
Benzene	0.005	Hexachlorobenzene	0.001
Benzo(a)pyrene	0.0002	Hexachlorocyclopentadiene	0.05
Carbofuran	0.04	Lindane	0.0002
Carbon tetrachloride	0.005	Methoxychlor	0.04
Chlordane	0.002	Monochlorobenzene	0.1
2,4-D	0.07	Oxamyl (Vydate)	0.2
Dalapon	0.2	Pentachlorophenol	0.001
Dibromochloropropane (DBCP)	0.0002	Picloram	0.5
Di(2-ethylhexyl) adipate	0.4	Polychlorinated biphenyls (PCB)	0.0005
Di(2-ethylhexyl) pthalate	0.006	Simazine	0.004
o-Dichlorobenzene	0.6	Styrene	0.1
p-Dichlorobenzene	0.075	2,3,7,8-TCDD (Dioxin)	0.00000003
1,2-Dichloroethane	0.005	Tetrachloroethylene	0.005
1,1-Dichloroethylene	0.007	Toluene	1.0
cis-1,2-Dichloroethylene	0.07	Toxaphene	0.003
trans-1,2-Dichloroethylene	0.1	2,4,5-TP (Silvex)	0.05
Dichloromethane	0.005	1,2,4-Trichlorobenzene	0.07
1,2-Dichloropropane	0.005	1,1,1-Trichloroethane	0.2
Dinoseb	0.007	1,1,2-Trichloroethane	0.005
Diquat	0.02	Trichloroethylene	0.005
Endothal	0.1	Vinyl chloride	0.002
Endrin	0.002	Xylenes (total)	10.0

Table 5-2. Maximum Contaminant Levels for Inorganic Chemicals in Public Drinking Water Supplies

Contaminant[2]	mg/L	Applicable Systems[1]
Antimony	0.006	CN
Arsenic	0.05	CN
Asbestos	7 million fibers/liter (longer than 10 μm)	CN
Barium	2.0	CN
Beryllium	0.004	CN
Cadmium	0.005	CN
Chromium	0.1	CN
Cyanide	0.2 (as free cyanide)	CN
Fluoride	4.0	C
Mercury	0.002	CN
Nickel	0.1	CN
Nitrate	10.0 (as nitrogen)	CNT
Nitrite	1.0 (as nitrogen)	CNT
Nitrate + Nitrite (Total)	10.0 (as nitrogen)	CNT
Selenium	0.05	CN
Thallium	0.002	CN

[1] C = Community; N = Non-transient, non-community; T = Transient, non-community
[2] Dissolved fraction analyzed for metals

Table 5-3. Other Drinking Water Standards

Contaminant	Level	Comments	Applicable System[4]
Gross Alpha Particle Activity	15pCi/l[1]	Primary MCL that includes alpha particle activity from radium-226, but not from radon and uranium; radium-226 analysis is conducted if gross alpha particle activity exceeds 5pCi/l.	C
Beta Particle and Photon Radioactivity	4mrem/yr[2]	Primary MCL for the annual dose equivalent to the total body or to any internal organ. Compliance with this MCL is assumed if gross beta particle activity is less than 50pCi/l, and if average annual concentration of tritium is less than 20,000 pCi/l and strontium-90 is less than 8pCi/l.	C
Combined Radium-226 and Radium-228	5pCi/l	Primary MCL; radium-226 analyzed for if the gross alpha particle activity is greater than 5pCi/l. Radium-228 analyzed for if radium-226 exceeds 3pCi/l.	C
Lead	0.015 mg/l	Health-related action level for tap water; public education and/or corrosion control required if 10% of the first-draw tap-water samples exceed this level.	CN
Copper	1.3 mg/l	Health-related action level for tap water; public education and/or corrosion control required if 10% of the first-draw tap-water samples exceed this level.	CN
Total Trihalomethanes	0.08 mg/l	Primary MCL; sum of trihalomethane compounds [e.g., trichloromethane (chloroform), dibromochloromethane, bromodichloromethane, tribromomethane (bromoform)] rounded to two significant figures.	C
Turbidity	0.5 NTU[3]	Primary level; at least 95% of the measurements taken each month must be ≤ this value; no more than 5% of samples can exceed 1 NTU, and no sample can exceed 5 NTU.	CNT
Disinfection	0.2 mg/L Free Chlorine; 0.5 mg/L Chloramine	These minimum levels must be achieved as water leaves a surface water treatment plant and also maintained in the distribution system.	CNT
Disinfection	1.0 Inactivation Ratio	Surface water treatment plants must achieve a 1.0 inactivation ratio (100 % active:99% inactive) for *Giaridia* and virus removal through the treatment process.	CNT
Total Coliform Bacteria	Presence	Primary MCL; if more than 40 samples are collected in a month, then 5% of them cannot be total coliform-positive. If less than 40 samples are collected in a month, then not more than one can be coliform-positive.	CNT
Fecal Coliform/ Escherichia *coli* Bacteria	Presence	Acute primary MCL; either if detection confirmed or if detection follows a total coliform detection.	CNT

[1] Picocuries per liter, [2]Millirems per year, [3]Nephelometric Turbidity Units.
[4]C = Community; N = Non-Transient, Non-Community; T = Transient, Non-Community

Table 5-4. Secondary Maximum Contaminant Levels for Public Drinking Water Supplies

Contaminant[3]	Level[1]
Aluminum[2]	0.05 to 0.2 mg/L
Chloride	300 mg/L
Color	15 color units
Copper	1.0 mg/L
Corrosivity	Non-corrosive
Foaming agents	0.5 mg/L
Fluoride	2.0 mg/L
Hydrogen sulfide	0.05 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold order number
pH	$\geq$ 7.0
Silver	0.10 mg/L
Sulfate	300 mg/L
Total dissolved solids (TDS)	1000 mg/L
Zinc	5.0 mg/L

1 With the exception of the MCL for fluoride, which applies only to community PWS systems, these MCLs apply to both community and non-community systems. Silver was previously listed with a primary maximum contaminant level.

2 Range of values is based on aesthetic considerations and not on known health effects.

3 Dissolved fraction analyzed for metals

water treatment plants using free chlorine for disinfection. THM regulations were implemented in 1980 for all systems serving populations of more than 10,000. Since regulation, most surface water treatment plants have opted for disinfectants other than free chlorine. The use of disinfectants other than free chlorine can greatly reduce the THM formation and bring a system into compliance.

The TCEQ is currently implementing expanded regulations of disinfection by-products (DBPs), including THMs. Under these new regulations, lower MCLs for THMs and new MCLs for other DBPs may cause systems using surface water to be out of compliance. The level of natural organic matter in surface water from decaying plants and vegetation, as well as discharges of sewage and other organic material, provide an abundance of precursor materials for the formation of DBPs. All treatment plants using surface water will have to plan for new DBP regulations to avoid noncompliance.

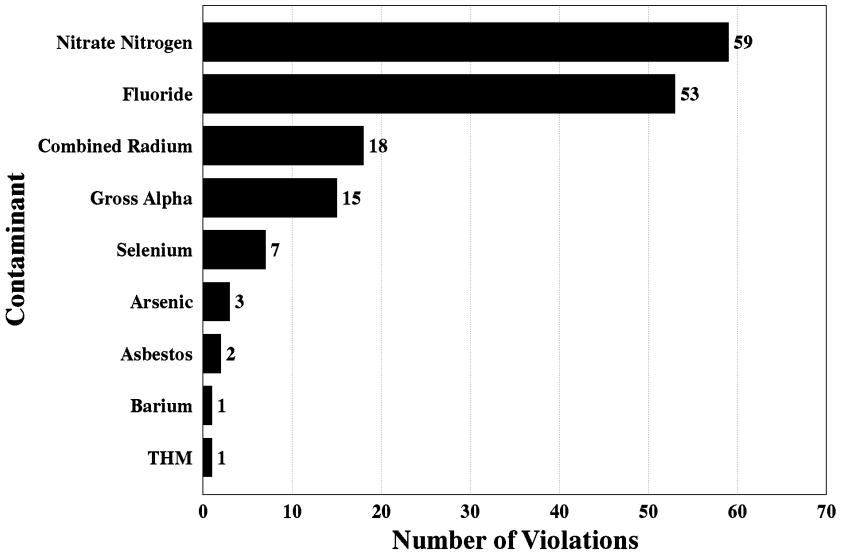

Figure 5-1. Violations of Maximum Contaminant Levels in Public Drinking Water Supplies, September 2002

Potential contamination of surface and groundwater by synthetic organic chemicals used in industry or agriculture creates one of the largest concerns for water suppliers. Much of Texas is prime agricultural area, and has been for decades. Increased use of agricultural chemicals for pest control, defoliation, and nutrient enhancement since the 1940s can affect the quality of the surface sources through runoff. The most frequently observed surface water contaminant is atrazine. The potential for many of these chemicals to leach into the groundwater can have a devastating effect on the current or future use of available groundwater.

Increased industrial activity in major metropolitan areas and the associated use of industrial solvents can have an impact on drinking water systems. Industrial solvents in the category of volatile organic chemicals (VOCs) can contaminate groundwater very easily. Many VOCs have high solubility in water and can be transported to the water-bearing strata, where removal is difficult and costly. Drinking water systems faced with a VOC-contaminated water source would be forced to install aeration or absorption systems to remove the contaminant at each point at which water is produced. Because VOCs generally evaporate from surface waters, their greatest threat is to groundwater systems.

Although surface water may be contaminated with toxic organic chemicals, after water treatment, these chemicals should not be present in drinking water samples. Many organic chemicals are readily adsorbed onto soil particles, especially those high in clay. Soil particles are removed at treatment plants through the processes of flocculation, sedimentation, and

filtration. These processes, plus disinfection, have been required by state law since 1945. Any organic contamination not removed through the conventional treatment process must be removed through an additional adsorption treatment.

Assessment of vulnerability of water systems to various organic chemicals can be made through collecting geologic information on groundwater sources and obtaining information on chemical use in the zone of contribution to wells and the surface watershed. Regulations for synthetic organic chemicals require sampling only for those chemicals to which the source is vulnerable. Developing an appropriate sampling list can become a problem where chemical-specific usage data are largely unavailable.

Small systems, which are developed to serve small residential areas, often are not constructed with the highest standards. In addition, poor operation has led to violation of microbiological MCLs and monitoring requirements. Microbiological sampling ensures that the water is potable and is free of pathogens.

Secondary violations, those that affect the aesthetic quality of the drinking water, are widespread throughout Texas. Most secondary violations occur in groundwater, where water is in contact with the mineralized formations. However, some surface waters are also highly mineralized. Portions of the Rio Grande, Brazos, Colorado and Canadian Rivers are highly saline, and water taken from them may exceed the secondary standards.

Enforcement of Chapter 341, Subchapter C of the Texas Health and Safety Code is the responsibility of the TCEQ's Enforcement Division. The Water Section currently processes its cases by first screening each case for appropriate types of enforcement actions. The choices involve a Bilateral Compliance Agreement (an informal "contract" between the system and the TCEQ), administrative actions, and civil actions through the Office of the Attorney General in District Court. Actions can range from technical requirements for bringing the system into compliance, and penalties, appointment of a temporary manager, assessment of penalties, receiverships, and contempt of court charges. All enforcement action is a team effort of the Enforcement Division, the Litigation Support Division, the Public Drinking Water Section of Water Utilities Division, and the regional offices of the TCEQ.