6 Regulatory Review

SECTION 6

Regulatory Review

Community water systems are governed by rules developed by the Environmental Protection Agency (EPA) for implementation of the Safe Drinking Water Act Amendments. Oregon, as a primacy state, is required to implement regulations at least as stringent as EPA's rules. For the most part, Oregon has adopted identical regulations to those at the federal level (OAR, Chapter 333, Division 61).

Lebanon's water system is in compliance with all current state and federal standards. New rules have been proposed for adoption in the coming years. It is anticipated that Lebanon will comply with these new regulations without significant capital or operational changes.

Water Treatment Regulations

Maximum contaminant levels (MCLs) have been established by the EPA for more than a hundred individual drinking water contaminants. These include microbiological, inorganic, organic and radiological contaminants. Lebanon's water is in compliance with each of these standards.

In addition, water treatment is regulated by the following federal Safe Drinking Water Act rules. Oregon, as a primacy state, has adopted the federal rules for implementation within the state (OAR, Chapter 333, Division 61).

- *Interim Enhanced Surface Water Treatment Rule* (IESWTR, promulgated December 16, 1998; final revisions published January 16, 2001).
- *Long-Term 1 Enhanced Surface Water Treatment Rule* (LT1ESWTR, promulgated January 14, 2002).
- *Microbial and Disinfection Byproducts Rules (MDBP), consisting of the Long-Term 2 Enhanced Surface Water Treatment Rule* (LT2ESWTR, signed December 15, 2005, and due for promulgation in January 2006), *and the Stage 2 Disinfection Byproducts Rule* (Stage 2 DBR, signed December 15, 2005, and due for promulgation in January 2006; this is discussed in the distribution rules section of this chapter)

Maximum Contaminant Levels for Organics and Inorganics

The city's system has had five contaminant detections, approaching the MCLs, for organic and inorganic contaminants. They are listed in **Exhibit 6-1**. The most recent occurred in April 2000.

EXHIBIT 6-1
Organic and Inorganic Contaminant Detections

Date	Sample Source	Contaminant	Measured Level (mg/L)	MCL (mg/L)
April 12, 2000	Finished water	Phthalates (Di(2-Ethylhexyl))	0.0013	0.006
November 2, 1999	Finished water	Phthalates (Di(2-Ethylhexyl))	0.0026	0.006
July 30, 1993	Finished water	1,2-Dichloropropane	0.003	0.005
July 30, 1993	Finished water	Carbon Tetrachloride	0.0005	0.005
May 21, 1992	Finished water	Mercury	0.0014	0.002

Interim Enhanced Surface Water Treatment Rule

The IESWTR was promulgated on December 16, 1998. This rule builds on the provisions set forth in the Surface Water Treatment Rule (SWTR) by providing improved public health protection against *Cryptosporidium,* while addressing risk tradeoffs with disinfection by-products (DBPs). The IESWTR applies to public water systems such as Lebanon that use surface water and serve at least 10,000 people. EPA published final revisions to the IESWTR on January 16, 2001. Primacy states, such as Oregon, were to have adopted the regulation by January 1, 2002. Public water systems are required to achieve compliance within 3 years of federal promulgation.

Specific provisions of the IESWTR include the following:

- Maximum contaminant level goal (MCLG) of zero for *Cryptosporidium*
- 99 percent *Cryptosporidium* removal requirements for systems that filter
- Strengthened combined filter effluent turbidity performance standards for systems using conventional and direct filtration
- Individual filter turbidity monitoring provisions for systems using conventional and direct filtration

Treatment plants such as Lebanon's that use conventional filtration (consisting of coagulation, sedimentation, and filtration) are assumed to meet the 99 percent *Cryptosporidium* removal requirement as long as they comply with the IESWTR turbidity requirements and existing provisions of the SWTR. A system's combined filter effluent turbidity is required to be less than 0.3 nephelometric turbidity unit (NTU) in at least 95 percent of samples taken each month and at no time may exceed 1 NTU. Utilities must conduct continuous monitoring of turbidity for each filter. Lebanon complies with all of these requirements.

Long-Term 1 Enhanced Surface Water Treatment Rule

The final LT1ESWTR, promulgated on January 14, 2002, extends the requirements contained in the IESWTR to small surface water systems that provide service to populations under 10,000 persons. The LT1ESWTR requires small systems to comply with the same *Cryptosporidium* removal and filter turbidity performance standards as those established by the IESWTR.

Long-Term 2 Enhanced Surface Water Treatment Rule

The purpose of the LT2ESWTR is to build on the provisions contained in the IESWTR for protection of public health against risks posed by *Cryptosporidium* and other microbial pathogens. The LT2ESWTR applies to all public water systems that use surface water. This rule requires source water monitoring of *Cryptosporidium* for systems such as Lebanon that serve more than 10,000 people. The LT2ESWTR was signed by EPA on December 15, 2005, with promulgation of the final rule expected to occur in January 2006.

When promulgated, the LT2ESWTR will supplement existing regulations by targeting additional *Cryptosporidium* treatment requirements to higher-risk systems. Existing drinking water regulations established in the IESWTR and LT1ESWTR require water systems such as Lebanon that filter surface water to achieve at least a 2-log removal of *Cryptosporidium*. New data on *Cryptosporidium* infectivity, occurrence, and treatment indicate that current treatment requirements are adequate for the majority of systems, but there is a subset of systems with higher vulnerability to *Cryptosporidium* where additional treatment is necessary.

Systems must begin source water monitoring for *Cryptosporidium* within 6 months of promulgation to determine their treatment requirements. Filtered systems will be classified into one of four risk bins based on results of source water monitoring. The regulation specifies a range of treatment and management strategies, collectively termed the "microbial toolbox," that systems can select from to meet any additional treatment requirements that are specified in their bin classification.

Cryptosporidium monitoring by large systems such as Lebanon will begin by July 2006 or shortly thereafter and will have a scheduled duration of 2 years. Systems must conduct a second round of monitoring beginning 6 years after the initial bin classification. A water system may grandfather equivalent previously collected data in lieu of conducting new monitoring, and will not be required to monitor if it provides the maximum level of treatment required under the rule.

Exhibit 6-2 lists the bin classifications according to *Cryptosporidium* concentrations in the source water.

EXHIBIT 6-2
Additional *Cryptosporidium* Treatment Requirements for Filtered Systems

Mean *Cryptosporidium* Source Water Concentrations	Bin Classification	Required Additional Log Reduction for Conventional Filtration WTPs
Crypto < 0.075/L	Bin 1	No Additional Treatment
0.075/L <= *Crypto* < 1.0/L	Bin 2	1
1.0/L <= *Crypto* < 3.0/L	Bin 3	2
C*rypto* => 3.0/L	Bin 4	2.5

1. Treatment in addition to filtration.
2. For 1 additional log removal/inactivation, systems may use any technology or combination of technologies from the Microbial Toolbox.
3. For additional 2 or greater log removal/inactivation, systems must achieve at least 1 log of the required treatment using ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or bank filtration.

Exhibit 6-2 indicates that no additional treatment to as much as 2.5 logs of additional *Cryptosporidium* removal/inactivation may be required at Lebanon's WTP, depending on the level of *Cryptosporidium* that is detected in the source water supply. Based on advance sampling conducted by other Oregon utilities, such as Eugene Water and Electric Board on the McKenzie River, it is expected that the source classification for Santiam Canal/South Santiam River will be either Bin 1 or Bin 2, requiring up to 1-log reduction of *Cryptosporidium*.

If Lebanon's source water monitoring places it in Bin 1, no additional credit is necessary. If Lebanon's monitoring places it in Bin 2, Lebanon will need to employ additional measures. It appears that the two most feasible options for Lebanon to achieve another 0.5-log credit are providing a federally approved watershed control program, or applying UV disinfection at the WTP. The Watershed Control Program consists of identifying potential and actual sources of *Cryptosporidium* and implementing control measures to reduce *Cryptosporidium* levels. It also requires ongoing assessment activities. UV disinfection is an effective means for inactivating *Cryptosporidium* and it may provide additional capacity benefits at the plant.

If additional watershed control or treatment measures are necessary, the changes must be implemented within 6 years following promulgation of the final LT2ESWTR. States may grant an additional 2 years for compliance for systems that are undertaking capital improvements.

If Lebanon's source water places it in Bin 3 or higher, than it will require significant treatment improvements to achieve compliance. A Bin 3 classification would provide a strong impetus for replacement of the treatment plant with a new plant using different technologies.

Water Distribution Regulations

Lebanon complies with current distribution regulations and appears to be capable of complying with future regulations without significant operational changes. The monitoring changes required for the DBP rule may reveal new information, but current levels of total

trihalomethanes and regulated haloacetic acids are well below current and anticipated regulatory limits.

Oregon's Distribution Regulations

Oregon's rules for public water systems (OAR Chapter 333) contain a limited number of rules that apply to distribution systems that are not included in the federal standards. These relate to backflow prevention, operator certification, product acceptability, disinfection criteria, storage criteria, and piping criteria. These rules are described in Chapter 8 and in Appendix C in this report, which presents recommended design and operating criteria.

Federal Distribution Regulations

Water quality within Lebanon's distribution system is regulated by the following federal Safe Drinking Water Act rules:

1. Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR; promulgated January 2006)
2. Total Coliform Rule (TCR)
3. Lead and Copper Rule
4. Stage 2 Disinfection Byproducts Rule (promulgated January 2006)

It is anticipated that Lebanon, following its current treatment and distribution practices, will comply with the water quality requirements of the two new rules; however, they will mean additional monitoring and reporting. The federal water quality rules, including the new Stage 2 DBP Rule and the distribution aspects of the LT2ESWTR, are briefly summarized in sections that follow.

Surface Water Treatment Rules

The original SWTR was promulgated in June 1989. It consists of filtration requirements, primary and secondary disinfection requirements, and monitoring requirements. The secondary disinfection requirements are the one aspect that relates to distribution water quality. It requires that the residual disinfectant concentration in the water entering the distribution system not be less than 0.2-mg/L for more than 4 hours and that the residual disinfectant concentration in the distribution system cannot be undetectable in more than 5 percent of the samples each month for two consecutive months. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/mL is deemed to have a detectable disinfectant residual.

Lebanon currently chlorinates such that water being pumped from the clearwell into the distribution system has a free chlorine residual of 1.0 mg/L. This level of chlorine residual results in a range of residuals at the extreme ends of the system that vary from measurable levels to 0.6-mg/L.

Interim Enhanced Surface Water Treatment Rule

This rule primarily affected Lebanon's water treatment plant operations rather than operation of the city's distribution system. The rule does include a requirement that certain

utilities perform disinfection profiling, but Lebanon's DBP levels were low enough that this requirement did not apply. The rule also requires that all new finished water reservoirs constructed after February 16, 1999, have a cover. Again, this does not impact Lebanon because it has long been the practice in Lebanon to cover all new finished water reservoirs.

Long-Term 2 Enhanced Surface Water Treatment Rule

This rule has only minor implications for distribution water quality. It does expand the disinfection benchmarking requirement to additional systems, but these requirements are not expected to apply to Lebanon.

Total Coliform Rule

The TCR was promulgated in June 1989 with the primary goal of maintaining microbial quality in finished and distributed drinking water supplies. Total coliforms include both fecal coliforms and E. *coli*. The MCLG for total coliforms was set to zero. Compliance with the MCL is based on the presence or absence of total coliforms in a sample (as opposed to coliform density as in previous rules). Lebanon is required to collect a minimum of 15 samples per month, based on its service population.

Lebanon had a TCR violation in October 2004, following four positive total coliform samples collected in September and October 2004. The samples came from two locations: Morton and 7th Street, and Mazama and 8th Street. The chlorine residuals were measured at the time of sample collection as 0.8 to 1.2 mg/L. The city also had positive total coliform samples in January 2002, May 2002, and August 2003. No causes were identified for any of the positive samples.

Lead and Copper Rule

The Lead and Copper Rule was promulgated in June 1991 and went into effect in December 1992, with minor revisions released in April 2000. The rule applies to all community water systems. The rule developed MCLGs and action levels for both lead and copper in drinking water. The major difference between this regulation and other distribution regulations is that the water must be monitored at the customer's tap, not at sampling stations. Lead and copper must be monitored at the customer's taps every 6 months and twice each calendar year at the highest-risk locations, which are defined as:

- Piping with lead solder installed after 1982
- Lead water service lines
- Lead interior piping

For compliance, the samples at the customer's tap must not exceed the following action levels:

- Lead concentration of 0.015-mg/L detected in the 90th percentile of all samples
- Copper concentration of 1.3 mg/L detected in the 90th percentile of all samples

Lebanon exceeded the lead action level in the 90th percentile in July 2002 (0.029-mg/L), January 2003 (0.0167-mg/L), and February 2004 (0.0156-mg/L). The city made adjustments in the treatment processes to increase the pH of the distributed water, and samples collected

in July 2004 and January 2005 were in compliance. The city should carefully track future results to confirm that the problem has been rectified.

Stage 2 Disinfection By-Product Rule

The Stage 2 Disinfection By-Product Rule (Stage 2 DBPR) was signed by EPA on December 15, 2005 and promulgated in January 2006.

The purpose of the rule is to reduce peak DBP concentrations in the distribution system and eliminate areas where customers receive excessive levels of DBPs. Levels of DBPs, which fluctuate based on raw water quality changes, treatment changes, chlorine levels, and water age, have been found to vary geographically in distribution systems. The current rules governing DBPs determine compliance based on an average for samples collected throughout the distribution system. This averaging means that it is possible for some geographic locations to occasionally or even regularly exceed the MCLs for DBPs, and yet the overall system remains in compliance. The Stage 2 DBPR eliminates this possibility by requiring compliance at all geographic locations.

The rule requires the following:

1. Completion of an initial distribution system evaluation to determine sites with high DBPs. This evaluation report is due 2 years following promulgation of the final rule. It can be conducted by performing a Standard Monitoring Plan consisting of increased monitoring for total trihalomethanes (TTHMs) and five haloacetic acids HAA5s, or by performing a System-Specific Study that includes extended period hydraulic modeling to help determine worst-case sites for monitoring. For relatively small systems such as Lebanon's, it is probably advantageous to perform the Standard Monitoring Plan rather than conduct the System-Specific Study.

2. Compliance with the MCLs for TTHMs and HAA5 of 80 and 60 μg/L, respectively, based on a location running annual average. The current DBP regulation requires compliance based on an annual running average for all sites combined. The location running annual average means that each sampling site must comply with the MCLs, and not simply the average of all sites. Compliance will be in two stages. Stage 2A allows for relaxed MCLs at each location. Stage 2B, which is proposed to begin 6 years following promulgation, will require compliance with the current MCLs of 80 μg/L for TTHMs and 60 μg/L for HAA5s at all locations.

Exhibit 6-3 summarizes recent DBP levels measured in Lebanon's system. The maximum values for TTHMs and HAA5 were 42 and 37 μg/L, respectively. These values suggest that Lebanon will comply with the MCLs under the proposed Stage 2 DBPR without modifications to its current treatment or distribution practices. However, this is only a tentative conclusion because it is unknown if the sample sites that Lebanon has been using represent the worst-case sites. The rule will require increased monitoring to identify sites with high DBPs and a revised method of calculating compliance (using a location running annual average).

EXHIBIT 6-3
Recent Distribution System DBP Sampling
MCLs: 80 μg/L for THMs; 60 μg/L for HAA5

Haloacetic Acids (HAA5)		
Sample Date	**Results (μg/L)**	**Quarterly Average (μg/L)**
4/12/2005	22.4	
4/12/2005	25.7	
4/12/2005	22.4	
4/12/2005	26.5	24
1/11/2005	8.8	
1/11/2005	9.5	
1/11/2005	14.7	
1/11/2005	8.1	10
10/12/2004	**33.7**	
10/12/2004	29.4	
10/12/2004	29.6	
10/12/2004	**36.5**	**32**
7/13/2004	10.6	
7/13/2004	12.7	
7/13/2004	13.6	
7/13/2004	8.9	11
4/13/2004	27.1	
4/13/2004	18	
4/13/2004	14.9	
4/13/2004	19.4	20
1/20/2004	30	
1/20/2004	**36**	
1/20/2004	**32**	
1/20/2004	**33**	**33**
11/4/2003	15.4	
11/4/2003	21	
11/4/2003	17.1	
11/4/2003	13.5	17
8/5/2003	16.2	
8/5/2003	15.6	
8/5/2003	15.5	
8/5/2003	17.9	16
5/13/2003	23.3	
5/13/2003	14.5	
5/13/2003	14.3	
5/13/2003	12.3	16
2/4/2003	13.8	
2/4/2003	3	
2/4/2003	13.3	
2/4/2003	12.8	11

Total Trihalomethanes (TTHM)		
Sample Date	**Results (μg/L)**	**Quarterly Average (μg/L)**
4/12/2005	15.8	
4/12/2005	17.5	
4/12/2005	19.8	
4/12/2005	26.7	20
1/11/2005	10.8	
1/11/2005	10.6	
1/11/2005	19.3	
1/11/2005	9.4	13
10/12/2004	17.9	
10/12/2004	13.3	
10/12/2004	15.3	
10/12/2004	26.7	18
7/13/2004	19.6	
7/13/2004	24.4	
7/13/2004	25.8	
7/13/2004	15.9	21
4/13/2004	14.9	
4/13/2004	15.7	
4/13/2004	21.5	
4/13/2004	14.1	17
1/20/2004	29.8	
1/20/2004	30.7	
1/20/2004	33.5	
1/20/2004	**42.2**	**34**
11/4/2003	18.2	
11/4/2003	25.9	
11/4/2003	20.9	
11/4/2003	16.8	20
8/5/2003	17.8	
8/5/2003	13.2	
8/5/2003	18	
8/5/2003	16.6	16
5/13/2003	20.7	
5/13/2003	15.6	
5/13/2003	14.6	
5/13/2003	13.2	16
2/4/2003	11.2	
2/4/2003	37.5	
2/4/2003	10.3	
2/4/2003	9.2	17