

6. WATER QUALITY

This chapter reviews state and federal drinking water regulations, assesses the Utility's compliance for the period between 2011 through 2014, and describes the Utility's programs and procedures to address current and future compliance.

6.1 SYSTEM OVERVIEW AND COMPLIANCE RESPONSIBILITY

The Utility has one surface water source at the Cowlitz River. The raw source water is conveyed from the intake to the treatment plant. Water is treated using coagulation, filtration and addition of chlorine. Sodium hypochlorite is used to provide disinfection and a disinfectant residual in the transmission and distribution systems. A description of the supply source, intake facility, treatment plant and distribution system is summarized in Chapter 2.

6.2 SAFE DRINKING WATER ACT AND WAC 246-290

The federal Safe Drinking Water Act (SDWA) and 1996 Amendments are the regulatory federal directives for drinking water quality. The U.S. Environmental Protection Agency (USEPA) administers the SDWA as a regulatory framework for public water supply systems.

Washington State law incorporated the SDWA and amendments as Chapter 246-290 of the Washington State Administrative Code (WAC). DOH administers and enforces this WAC. As a Group A water system, the Utility is required to meet drinking water quality regulations and follow monitoring and reporting requirements.

Table 6.1 lists the effective drinking water regulations applicable to our system.

TABLE 6.1 – APPLICABLE SAFE WATER DRINKING ACT (SWDA) REGULATIONS		
RULE AND DATE RULE BECAME EFFECTIVE	PARAMETERS REGULATED	TYPE OF REGULATION
Chemical Contaminant Rules		
• Phase I Rules (1989)	Volatile organic chemicals (VOC),	Finished Water
• Phase II and Phase V Rules (1993)	VOC, inorganic chemicals (IOC) and synthetic organic chemicals (SOC)	Finished Water
Consumer Confidence Rule (1998)	Water quality compliance reporting to customers	Notification
Lead & Copper Rule (1992) Lead & Copper Rule Minor Revisions (2000)	Lead & copper, and treatment for corrosion control	Distribution System
Microbial Disinfectants/Disinfection Byproducts Rules		
• Filter Backwash Rule (2001)	Cryptosporidium and other microbial contaminants	Treatment
• Long Term 1 Enhanced Surface Water Treatment (2002)	Cryptosporidium and other microbial contaminants	Treatment
• Stage 1 Disinfectants/Disinfection By-Products (D/DBP) Rule (2002)	Disinfectant residual, total trihalomethanes (TTHMs), and haloacetic acids (HAA5)	Distribution System
• Stage 2 D/DBP Rule (2006)	TTHMs, HAA5	Distribution System
• Surface Water Treatment Rule (1990)	Turbidity, disinfection, viruses, <i>Legionella</i> , <i>Giardia lamblia</i> , and disinfectant residual.	Treatment
• Total Coliform Rule (1990)	Coliform bacteria	Distribution System
Public Notification Rule (2000)	Notification to public after water quality violation	Notification
<i>Unregulated Contaminant Monitoring Program*</i>		
• UCMR1 (2000)	Replaced by UCMR2	Finished Water
• UCMR2 (2007)	Monitoring for contaminants included on assessment and screening lists	Finished Water

*The UCMR program was developed in coordination with the Contaminant Candidate List (CCL). The CCL is a list of contaminants that are not regulated by the National Primary Drinking Water Regulations, are known or anticipated to occur at public water systems and may warrant regulations under the SDWA. Data collected through UCMR are stored in the National Contaminant Occurrence Database (NCOD) to support analysis and review of contaminant occurrence, to guide the CCL selection process, and to support USEPA's determination of whether to regulate a contaminant in the interest of protecting public health.

6.3 REGULATIONS AND COMPLIANCE

This section will describe the regulations, its application to the Utility and our compliance status. For ease of describing the regulations and application in the Utility, the regulations were grouped into four processes. The water processes are: 1) Treatment; 2) Finished Water; 3) Distribution System; and 4) Notification. Table 6.1 shows where the rules apply within our operations.

Public water suppliers have the responsibility of meeting the requirements of the regulations on a daily basis. Monitoring requirements are often established for regulated contaminants to ensure that water systems comply with treatment technique requirements. Public water suppliers are required to retain certain records and to submit records to DOH.

To enable each Group A water system to comply with the annual requirements, DOH annually issues each system a Water Quality Monitoring Report (WQMR) listing the system's reporting requirements. WQMRs are usually available by April.

Drinking water requirements are often specified in terms of Maximum Contaminant Levels (MCLs). Primary MCLs are based on chronic and acute human health effects. Secondary MCLs are based on factors other than health effects such as aesthetic quality of the water.

Conducting sanitary surveys on a routine basis is an important tool to protect public health. Sanitary surveys evaluate a system's compliance with federal drinking water regulations, along with state regulations and operational requirements. These surveys must address the following elements: source; treatment; distribution system; finished water storage; pumps, pump facilities and controls; and operator compliance with state requirements.

The frequency of sanitary surveys is once every three years. WAC 246-290 allows a reduced frequency of once every five years under system specific circumstances. Lewis County addressed issues from the following DOH sanitary surveys:

- Survey with the City conducted on November 12, 2009
- Survey with Lewis County conducted on August 15, 2012
- Survey with the Utility conducted on February 24, 2015.

6.3.1 TREATMENT REGULATION

Surface Water Treatment Rules

The Surface Water Treatment Rules (SWTRs) are developed with several other rules to protect drinking water quality from contamination by disease causing microbial contaminants such as bacteria, protozoa and viruses. The SWTRs include the following regulatory Rules and USEPA dates:

- Surface Water Treatment Rule, June 1989.
- Interim Enhanced Surface Water Treatment Rule (IESWTR), December 1998.
- Filter Backwash Recycling Rule (FBRR), June 2001.
- Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), January 2002.
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), January 2006.

The SWTRs apply to public water systems that use surface water or groundwater under the direct influence of surface water as a source. These systems are known as Subpart H systems.

The 1989 Surface Water Treatment Rule (SWTR) applies to all Subpart H systems and seeks to prevent waterborne diseases caused by viruses, *Legionella*, and *Giardia lamblia*. These disease-causing microbes are present at varying concentrations in most surface waters. The rule requires

that water systems filter and disinfect water from surface water sources to reduce the occurrence of unsafe levels of these microbes. The 1989 SWTR does not specifically control for *Cryptosporidium*.

The 1989 SWTR uses turbidity to measure the performance of filtration systems. In order to reduce the health risks associated with *Cryptosporidium* in finished water, the IESWTR requires improved filtration performance by lowering the turbidity standards at Subpart H systems that serve 10,000 or more people. The IESWTR did not apply to the Utility because the City of Vader system and the Enchanted Valley water system each served less than 10,000 people.

The LT1ESWTR extended this requirement to Subpart H systems that served fewer than 10,000 persons. It required additional treatment for *Cryptosporidium* at those Subpart H systems that had significant levels of *Cryptosporidium* in their source waters. The FBRR aimed to reduce pathogen concentration in the finished water by regulating the backwash water and waste streams at water treatment plants.

The Utility is a system that is on the LT2ESWTR Schedule 4 because it serves fewer than 10,000 and is not a wholesale system in a combined distribution system that contains a system serving at least 10,000 persons. Filtered systems on Schedule 4 can sample for *E. Coli* instead of sampling for *Cryptosporidium* during source water monitoring. If the *E. Coli* sampling results exceed a trigger, the system would then need to conduct *Cryptosporidium* sampling. The Utility samples monthly for *E. Coli*.

The Utility's water treatment plant monitors turbidity constantly and turbidity readings are taken daily. The monthly reports to DOH include information about the volume of treated water, amount of chemicals used, turbidity (raw water, combined filter effluent), temperature, pH, chlorine residual and contact time.

Filter Backwash Recycling Rule

USEPA finalized this rule in 2001 to govern the recycling of filter backwash water within the treatment process of public water systems. It applies to all public water systems that use surface water or groundwater under the direct influence of surface water; use direct or conventional filtration processes; and recycle spent filter backwash water, sludge thickener supernatant or liquids from the dewatering process.

The rule requires that all recycled filter backwash water, sludge thickener supernatant or liquids from the dewatering process must be returned to a location such that ALL processes of a system's conventional or direct filtration including coagulation, flocculation, sedimentation (conventional filtration only) and filtration are employed.

The Utility's treatment plant was constructed in 2002 with no recycling of filter backwash water within the treatment process.

6.3.2 FINISHED WATER REGULATIONS

Chemical Contaminant Rules

Phase I, II and V of the Chemical Contaminant Rules set MCLs for inorganic compounds (IOCs), synthetic organic compounds (SOCs) and volatile organic compounds (VOCs). Nitrates are required to be sampled annually.

As part of the Phase II Rule, systems with a significant amount of asbestos-cement (AC) pipe must conduct periodic asbestos monitoring. DOH has historically required systems with more than 10% AC pipe in their distribution system to comply with this requirement. Samples must be collected in the distribution system at a location served by AC pipe and under conditions where asbestos contamination is most likely to occur.

All IOCs, SOC and VOCs were either below MCLs or at non-detectable levels for 2011 through 2014.

DOH issued a waiver through December 2013 for monitoring at the source of: dioxin, endothall, EDB and other soil fumigants, glyphosphate, insecticides, general pesticides, and diaquat.

The water main replacement project in 2012 significantly reduced the amount of remaining AC pipe to about 10.6%. One asbestos sample is needed between 2011 and 2019 according to DOH, and it was taken in 2013.

Unregulated Contaminant Monitoring Rule

The USEPA issued the first UCMR in 1999 with requirements that were effective from 2001 through 2006. The rule required specific small public water systems to perform monitoring and reporting of specified contaminants. The City of Vader water system as it was known at that time, was required to perform monitoring and reporting for nine contaminants. The 2008 WSP listed the contaminants: Acanthamoeba, Aldrin, Dieldrin, Hexachlorobutadiene, Manganese, Metribuzin, Napthalene, Sodium and Sulfate.

Unregulated Contaminant Monitoring Rule 2

The USEPA proposed UCMR 2 in August 2005 that includes two lists of contaminants. UCMR 2 became final in 2007. The rule required specific public water systems serving 10,000 people or less to monitor for 15 List 2 contaminants during a 12-month period from January 2008 through December 2010. The selection is made by USEPA. At this time, the water system has not been notified of any required monitoring.

6.3.3 DISTRIBUTION SYSTEM REGULATIONS

Total Coliform Rule

The Total Coliform Rule sets both health goals and legal limits for total coliform levels in drinking water by setting the type and frequency of testing. WAC 246-290-300(3) sets the monitoring requirements, and WAC 246-290-310(2) sets coliform bacteria MCLs.

A coliform MCL violation is when a coliform sample has detectable coliform bacteria. An Acute MCL occurs if the repeat coliform sample tests positive for Fecal Coliform or *E. Coli*.

In 2011, the Utility used the Coliform Monitoring Plan (CMP) identified in the 2010 WSP Amendment for the City of Vader. That plan was written when the City was managing two systems: City and EVCC. The 2010 CMP called for two coliform samples per month. Chlorine readings are also taken at the same time and place of the coliform sample collection. Coliform bacteria analyses were conducted by the Lewis County Environmental Health Laboratory.

In October 2011, one coliform sample taken at the EVCC RV dump site was unsatisfactory based on Total Coliform Present and *E. coli* absent. Repeat samples were taken at locations upstream and downstream locations in October for a total of four samples, and taken again in November 2011 along with another sample at the EVCC RV dump site for a total of five samples. This sampling procedure was conducted according to the 2010 CMP. The results of all nine samples were satisfactory. However, this incident made us evaluate each sample site in the 2010 CMP for better representation, accessibility and consistency with county policies.

In January 2012, we updated the CMP to use routine and repeat sites that were more representative of the system and accessible to our operations staff. These sites were included after approval from the customers in accordance with the county utility policies. Unprotected sites accessible to the public were locked or disconnected to discourage non-revenue unaccounted water loss, and removed from the CMP. This plan was reviewed and approved by DOH in January 2012.

In January 2013, we updated the CMP to take one distribution system coliform sample per month and to include the use of sampling stations. Four locked, sampling stations were constructed in 2012 to remove the uncertainties associated with sampling at customers' outdoor faucets, and to adhere to county policy of staying in the utility right-of-way. This plan was reviewed and approved by DOH in January 2013. The CMP is in Appendix F.

The Utility has taken all required coliform samples and chlorine readings according to local CMPs, and has not detected coliform bacteria. All coliform samples are conducted by the accredited Lewis County Environmental Health Laboratory under Lewis County Health.

Lead and Copper Rule

Lead and copper are heavy metals that may be found in household plumbing materials and water service lines. Lead can cause a variety of bad health impacts such as delaying physical and mental development in infants and children. Copper can cause aesthetic issues along with short-term and long-term negative health impacts.

The Lead and Copper Rule establishes requirements for monitoring, action levels, and compliance to control the level of these metals at the customers' taps. To meet the established action level, 90% of all samples must have lead levels equal to or less than 0.015 mg/L and copper levels equal to or less than 1.3 mg/L. If these levels cannot be met, then systems must implement public education and a corrosion control treatment strategy for meeting these levels.

The Utility collected ten samples for lead and copper monitoring in 2013. The frequency is one sample every three years. Reporting for lead and copper is done at the 90th percentile. Table 6.2 shows the monitoring results. The results are below the established action levels.

Stage 1 and Stage 2 Disinfectant and Disinfection By-Products Rule

The SWTRs are developed with the Stage 1 and Stage 2 Disinfectant and Disinfection By-Products Rules (DBPRs). These DBPRs are intended to reduce microbial contaminants in the water and at the same time, minimize the risks posed by disinfectants and disinfection byproducts (DBPs). The disinfectants themselves can react with naturally occurring materials in the water to form unintended byproducts. Both Stage 1 and Stage 2 D/DBP Rules set enforceable limits for disinfectants and DBPs, create monitoring requirements, and specify reporting procedures.

The D/DBP Rules apply to all community and non-transient non-community water systems that treat their water with a chemical disinfectant for either primary or residual treatment. The Stage 1 and Stage 2 DBPRs established maximum contaminant levels and monitoring frequency for Total Trihalomethanes (TTHM), Haloacetic Acids (five) (HAA5) and Total Organic Contaminants (TOC). The Stage 2 DBPR required preparation of a Stage 2 DBPR compliance monitoring plan.

The Utility is conducting monitoring at the regulated frequency. The Stage 2 DBPR compliance monitoring plan is in Appendix G. Monitoring results for TTHM, HAA5 and TOC are sent directly to DOH by our contract water quality laboratory. The results are tabulated in Table 6.2.

6.3.4 NOTIFICATION REGULATIONS

Consumer Confidence Report Rule

The Consumer Confidence Report (CCR) Rule is a component of the SDWA with the aim to educate consumers about protection of their drinking water sources. The rule provides a framework that water suppliers can use to give consumers information about their drinking water, including water sources, contaminants detected in finished water, health effects of contaminants when violations occur and likely sources of detected contaminants.

DOH administers this rule in WAC 246-290, Part 7 Reporting, Subpart B-Consumer Confidence Reports. Reporting dates and contents of the CCRs are outlined in this section of WAC 246-290. Water systems must deliver their CCRs to customers by July 1, and certification of the CCR compliance is due to DOH by October 1.

The Utility has prepared and sent CCRs within the required time frame. Our CCRs summarized the monitoring results, water source information, and other actions taken for the year as required by DOH. CCRs are also posted on the Lewis County website.

Public Notification Rule

Public notification is another component of the SDWA. The current public notice requirements direct water suppliers to notify people within 24 hours of any situation that may immediately pose a health risk. Water suppliers can now also combine notices for less serious problems, and make notices easier to understand. Water suppliers have 24 hours to one year to notify their customers depending on the severity of the situation. DOH administers this rule in WAC 246-290, Part 7 Reporting.

The Utility uses the Lewis County CodeRED notification system and newsletters for public notification. The CodeRED system is used to send critical communications, from evacuation notices to missing child alerts, to registered citizens. We encourage our customers to register and post a reminder in every utility newsletter and utility billing. CodeRED has been used to notice main repairs, hydrant flushing and other operational work.

6.3.5 Sentry Internet

All required sampling analyses are forwarded to DOH Office of Drinking Water. These analyses can be accessed in the State Sentry Internet database. Water Use Efficiency reports as discussed in Chapter 5 are also available in Sentry Internet.

6.4 CUSTOMER INQUIRIES AND COMPLAINTS

Lewis County documents customer inquiries, complaints and service requests. Work orders are generated to document the service request, follow up actions and findings. Reports of leaks, a water taste, smell or odor are acted on immediately. Results of any bacteriological sampling undertaken by us in response to customer problems are shared with the customer.

6.5 LABORATORIES

At this time, we use two laboratories to perform water quality testing. These laboratories are certified by the DOH drinking water laboratory certification program for analyses methods.

Lewis County Environmental Health Laboratory
360 NW North Street
Chehalis, WA 98532
360-740-1231

ALS Environmental
1317 South 13th Ave.
Kelso, WA 98626
360-577-7222

6.6 SUMMARY OF REGULATORY STATUS AND MONITORING REQUIREMENTS

A review of the water quality monitoring results indicates that we are in compliance. Table 6-2 summarizes the regulatory requirements and the results from 2011 to 2014.

TABLE 6.2 – REGULATORY LEVELS AND MONITORING RESULTS								
REGULATORY REQUIREMENTS				MONITORING RESULTS				
PARAMETER	UNIT	MCLG	MCL	2011	2012	2013	2014	FREQUENCY
<i>Finished Water</i>								
Copper	ppm	AL=1.3	1.3	-	-	0.102	-	Every 3 years
Lead	ppb	15	0	-	-	0.001	-	Every 3 years
Nitrate	ppm	10	10	<0.5	<0.5	<0.5	<0.5	Annually
Radium 228	pCi/L	SRL=0.5N/A	5	-	-	ND	-	Per DOH
Herbicides	Ppm	Varies	Varies	-	-	ND	-	Per DOH
<i>Distribution System</i>								
TTHM	ppb	N/A	80	4.76, 10.8 on 6/2011	4.9, 8.1 on 3/2012	13.1 on 8/2013	9.8 on 3/2014	Annually and per DOH
				7, 13.9 on 8/2011	6.6, 6.8 on 8/2012	10.2 on 11/2013	11.5 on 5/2014	
				5.39, 10.3 on 10/2011			12.6 on 8/2014	
							9.8 on 11/2014	
HAA5	ppb	N/A	60	4, 8 on 6/2011	4.6, 7.9 on 3/2012	10.2 on 8/2013	9.9 on 3/2014	Annually and per DOH
				5.8, 10.9 on 8/2011	6.8, 4.8 on 8/2012	11.2 on 11/2013	10.4 on 5/2014	
				4.6, 8.9 on 10/2011			9.9 on 8/2014	
							10.2 on 11/2014	
TOC	mg/l	SRL=0.7 since 8/2012	-	0.83 on 6/2011	0.91 on 1/2012	0.64 on 8/2013	0.87 on 3/2014	Taken with TTHM & HAA5 samples. Monthly samples taken from 6/2011 through 4/2012 per DOH.
				0.81 on 7/2011	1.09 on 2/2012	1.33 on 11/2013	0.78 on 6/2014	
		SRL=0.5		0.73 on 8/2011	1.29 on 3/2012		0.76 on 8/2014	
				0.63 on 9/2011	1.03 on 4/2012		1.08 on 11/2014	
				0.73 on 10/2011	0.74 on 8/2012			
				1.17 on 11/2011	0.75 on 10/2012			
				0.99 on 12/2011				
Asbestos	MFL	RL=1.4	7	-	-	ND	-	Per DOH

AL Action Level is the concentration of a contaminant which if exceeded, triggers treatment or other requirements which a water system must follow.

MCLG	Maximum Contaminant Level Goal is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MCL	Maximum Contaminant Level is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close as feasible using the best available treatment technology.
MFL	Millions of fibers per liter.
N/A	Not Applicable.
ND	Not Detected.
pCi/L	Picocuries per liter (a measure of radioactivity).
ppb	Parts per billion, or micrograms per liter.
ppm	Parts per million, or milligrams per liter.
RL	Reporting Level.
SRL	State Reporting Level.