Corvallis Subway

Transient PWS-6 Report
Source Water Delineation and Assessment Report

Public Water Supply: Corvallis Subway
(PWSID # MT0004369)

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Introduction

This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (p.L. 104-182). Jeff McCleary, a contractor for the new water system, prepared the report in 2003 as a PWS-6 submittal. The information on land use and potential contaminant sources and the information on the well and vicinity was also gathered by Jeff McCleary. This report was subsequently updated in 2006 by Jeffrey Frank Herrick with Montana DEQ Source Water Protection Program.

Purpose

The purpose of this delineation and assessment report is to assess threats to the Corvallis Subway water supply using information obtained from local residents familiar with the surrounding area and published reports. Delineation is a process whereby areas that contribute water to aquifers or surface-waters used for drinking water, called source water protection areas, are identified on a map. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported and then determining the potential for contamination of drinking water by these sources.

Public Water Supply Information

Corvallis Subway is a sandwich shop located near the corner of Main Street and the Woodside Cutoff Road in

Corvallis, Montana. The system serves 100 non-residents per day through one service connection. Corvallis Subway is classified as a transient, non-community public water supply because they serve 25 or more persons per day but do not regularly serve the same persons for at least six months a year.

Water demand is approximately 1,000 gallons per day assuming 10 gallons per day per patron (EPA, 1991).

The Corvallis Subway public water supply well is located approximately 35 feet to the east of the building. The well is equipped with a 1/2 HP Red Jacket submersible pump. A Wellmate WM-12 hydropneumatic tank and pressure switch for the pump is located in a utility room on the east end of the building. A WEDECO DLR series UV system is located above the floor, on the wall. (See System Diagram (Figure 3)). The well log describes a well that is 42 feet deep with a 6" open bottomed casing. It has a static water level of 7-8 feet. The well was test-pumped at 25 gpm when it was drilled in 1997. A 1/2 HP Red Jacket submersible pump is installed in this well. The well log indicates that it is finished in water-bearing gravel. The well is grouted to a depth of 20 feet.

On 8/16/03 the well was test-pumped with the existing 1/2 HP Red Jacket pump. Static water level at the beginning of the test was recorded at 8’ 7”. Beginning pumping rate was 20 gpm. After 17 minutes the pumping water level stabilized at 8' 10" and remained at that level for 6 hours. The pump consistently produced 20 gpm throughout the 6 hour test period.

The distribution system is being disinfected by a WEDECO DLR series UV system due to the shallow depth and high static water level in the well. Sanitary wastes from the system along with septic wastes are discharged to the Corvallis community wastewater system.

Corvallis Subway is required to monitor for nitrate and coliform bacteria. Nitrate levels detected in a neighboring public water supply well within the past five years have ranged from 1.45 to 1.81 mg/L, well below the maximum concentration level of 10 mg/L. No coliform bacteria have been detected in routine samples for that system in the past five years. An initial coliform sample was taken for the Corvallis Subway and no coliform was detected. An analytical data report covering the last 5 years is attached to this document.

Delineation

A 100-foot radius control zone (Figure 3) and one-mile radius inventory region (Figure 1) were delineated for the Corvallis Subway PWS as required for transient, non-community public water supplies under the Montana Source Water Protection Program (DEQ, 1999). The control zone is the most critical area within which direct introduction of contaminants into the well or immediate area can occur. The Inventory Region encompasses the area that water or contaminants can flow to Corvallis Subway's well over a period of months to years.

Inventory

The Montana Source Water Protection Program (DEQ, 1999) requires that land uses and all potential sources of nitrate and microbial pathogens be identified within the control zone and inventory region of non-community, transient public water supplies.

The Corvallis community wastewater mains are located just outside of the 100 foot Control Zone at approximately 130 feet from the well to the west and approximately 120 feet from the well to the north. Wastewater lines serving the PWS are on the west side of the PWS building and therefore downgradient of the wellhead.

A residence located to the south of the PWS well has a septic system located nearly parallel to the well approximately 70 feet away. The drainfield of the septic system is located immediately to the south and west of the septic tank. While located within the Control Zone, the local ground water flow direction should provide an adequate barrier to contamination from the septic system (See Corvallis Area Ground Water Flow Map(Figure 2)).

A rental property is located approximately 20 feet to the east of the Corvallis Subway well and a portion of the building (small office type building) is located within the Control Zone. According to the property owner, this building has been issued a permit to hook up to the Corvallis Community Sewer System. The building has been vacant for approximately 2 years. The owner has stated that he has no intention of renting the property again until it is connected to the sewer system. The location of the septic system for this property has not been determined.

The following inventory for the Corvallis Subway inventory region is based on a windshield survey of the inventory area.

Corvallis is a bedroom community for Hamilton and Missoula. Land use in the vicinity of Corvallis Subway is primarily sewered commercial and residential. A few other small businesses and the rights-of-way for the Woodside

Cutoff Road and the East Side Highway also are within one mile of the public water supply well. A bank, a car wash, an auto parts store, fire department, and post office are among the nearby businesses.

An active leaking underground storage tank is located across the Woodside Cutoff Road from the Corvallis Subway at the Corvallis Food Town. This should pose little concern or threat to the Corvallis Subway since the tank is located down-gradient from the Subway's well. Another inactive leaking underground storage tank is located at the Ravalli Electric Co-op, approximately 3/8 of a mile north of the Corvallis Subway. Again, this should pose little threat to the Subway since it is located down-gradient of the PWS well.

There are no animal feeding operations within one mile of the Corvallis Subway PWS. Therefore, the only apparent significant potential sources of nitrate or pathogens are septic systems and sanitary sewer mains.

Susceptibility Assessment

Susceptibility of the Corvallis Subway as defined in the Montana Source Water Protection Program is very high for pathogens and moderate for nitrate.

Support Figures

Table 1. Methods and criteria for delineating source water protection regions for PWSs.

If your sources of water is:	Delineate These Water Protection Regions	Method For Each Region:	Minimum Distance Values & Type of Inventory Required: LU – Land Uses; P&N – Pathogens and Nitrate sources
Ground Water that is either:	Control	Fixed radius	Distance – 100 feet
Unconfined/Semi-confined	Inventory	Fixed radius	Distance – 1 mile
Or:			
Confined	Control	Fixed radius	Distance – 100 feet
	Inventory	Fixed radius	Distance – 1000 feet
Ground Water that is hydraulically Connected to Surface Water	Buffer Zone	Fixed Distance	One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed.
Surface Water	Spill Response	Fixed Distance	One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed.

Table 2. Source Water (Aquifer) Sensitivity Table.

High Source Water Sensitivity	Moderate Source Water Sensitivity	Low Source Water Sensitivity
Surface water and GWUDISW	Semi-consolidated Valley Fill sediments (semi-confined)	Consolidated Sandstone Bedrock
Unconsolidated Alluvium (unconfined) Fluvial-Glacial Gravel	Unconsolidated Alluvium (semi-confined)	Deep Fractured or Carbonate Bedrock
Terrace and Pediment Gravel Shallow		Semi-consolidated (confined)
Fractured or Carbonate Bedrock		

Note: *The shallow unconfined aquifer is highly sensitive to contamination at the surface.*

Table 3. Land Use Types and Map Codes. (Figure 1)

Land Use Type	Map Code
Sewered mixed	SM
Unsewered residential	UR
Agricultural irrigated crop	AIC

Table 4. Identification of Significant Potential Sources of Microbiological and Nitrate Contamination

Potential contaminant sources are designated as significant if they fall into one of the following categories:
Animal feeding operations.

Wastewater treatment facilities, sludge handling sites, or land application areas.
Septic systems.
Sewer mains.

Table 5. (MT SWPP Table 5) Significant potential contaminant sources for Corvallis Subway.

Source	Contaminants	Description	Hazard Rating	Barriers	Susceptibility
Sanitary Sewer Main	*Pathogens and Nitrates*	*Area immediately surrounding the PWS designated SM on Inventory Map*	*Moderate*	*None*	*High*
Septic Systems	*Pathogens and Nitrates*	*Area south of PWS designated UR on Inventory Map*	*Moderate*	*None*	*High*
Waste Water Treatment Plants and Waste Disposal Sites	*Pathogens and Nitrates*	*Located northeast of the PWS, designated WWTP on Inventory Map*	*Moderate*	*None*	*High*

Note: During the 2006 update of this report, Jeffrey Frank Herrick felt that the susceptibility assigned to all 3 of the potential contaminant sources (PCSs) was too high. This is because it was felt that one or more barriers are probably in-place between all of the PCSs and the PWS well. It is believed that the **Susceptibility to**:

- **Sewer Mains** should be assigned a **Moderate Susceptibility**
- **Septic Systems = Septic Density** should be assigned a **Low Susceptibility**
- **Wastewater Treatment Plants** = should be assigned a **Low Susceptibility**

Table 6. (MT SWPP Table 6). Hazard of potential contaminant sources.

Source of Water	Potential Contaminant Source	High Hazard	Moderate Hazard	Low Hazard
Surface Water (SW)	**All Sources**	Potential for direct discharge to Source Water	Potential for discharge to GW that is hydraulically connected to SW	Potential contaminant sources present within the watershed
Ground Water (GW) Un-Confined	**All Sources**	Within 1 year TOT	Between 1 to 3 years TOT	Over 3 years TOT
GW Confined	**All Sources**	PWS well: no seal through confining layer	Other wells (Inventory Region): no seal through confining layer	All wells (Inventory Region): sealed through confining layer
GW and SW	**Septic Systems**	More than 300 per sq. mi.	50 – 300 Per sq. mi.	Less than 50 per sq. mi.
GW and SW	**Municipal Sanitary Sewer** (Percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region
GW and SW	**Cropped Agricultural Land** (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region

Table 7. (MT SWPP Table 5) Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers.

Presence Of Barriers	Hazard		
	High	**Moderate**	**Low**
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
One Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility

Multiple Barriers	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

References:

MBMG Open File Report 399A Corvallis School Source Water Protection Program
Abdo, Ginette N. and Carstarphen, Camela MBMG 1999

Montana DEQ, 1999. Montana Source Water Protection Program, Approved by EPA in November 1999.

U.S. EPA, Office of Water, 1991. Manual of Small Public Water Supply Systems, EPA 570/9-91-003,211 p.