

GERALDINE, MONTANA

Public Water System

PWSID # MT0000225

SOURCE WATER PROTECTION PLAN

Report Date: June 4, 2001

Contact Person:

Mayor, Monica Rice

Certified Operator

Jay Eklund

PO Box 211

Geraldine, MT 59446

phone: (406) 737-4361

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INTRODUCTION

This Report was completed by Bill O'Connell, Groundwater Technician with Montana Rural Water Systems inc. (MRWS), Monica Rice the Mayor of Geraldine, Jay Eklund, the licensed operator and Fred Pyatt the operator in training for Geraldine's Public Water System (PWS). Carolyn DeMartino, Water Quality Specialist with the Montana Department of Environmental Quality, reviewed and provided comment on the document and constructed the maps.

Purpose

This report is intended to meet the technical requirements for the completion of the Source Water Protection Plan for Geraldine as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996.

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to protect public drinking water supplies from contamination. A major component of the Montana Source Water Protection Program is "delineation and assessment." Delineation is a process of mapping source water protection areas that contribute water used for drinking. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported, and then determining the relative potential for contamination of drinking water by these sources. The primary purpose of this source water protection plan to protect its drinking water source.

Limitations

This report was prepared to assess threats to Geraldine's public water supply, and is based on published information and information obtained from local residents familiar with the community. The terms "drinking water supply" or "drinking water source" refer specifically to the source of the community's public water supply and not any other public or private water supply. Also, not all potential or existing sources of groundwater or surface water contamination in the Geraldine area are identified. Only potential sources of contamination in areas that contribute water to its drinking water source are considered.

The term "contaminant" are used in this report to refer to constituents for which maximum concentration levels (MCLs) have been specified under the national primary drinking water standards and certain constituents that do not have MCLs but are considered to be significant health threats.

CHAPTER 1

BACKGROUND

The Community

Geraldine is located in central Montana, about 25 miles east of Fort Benton. The town has 300 residents and provides services for the agricultural community in the surrounding area. Two grain elevators along the BN railroad right-of-way through town provide storage and rail loading facilities. Highway 80 connects Geraldine to US 87 at Fort Benton and also at Stanford. The public water system has 190 hook-ups; this includes North Geraldine and Haywarden, two rural water systems. See Appendix I, figure 1, the Vicinity Map.

Geographic setting

Geraldine is located in the Glaciated Missouri Plateau of the Great Plains Physiographic Province. The Highwood Mountains and Square and Round Butte are the most visible geographic features in the area. Another geographic feature is the Shonkin Sag a large river carved valley that outlines the base of the northern and eastern edge of the Highwood Mountains and marks the southern extent of the Bull Lake Glacier. See figure 2.

The town sits on Cretaceous age sedimentary deposits. The Highwood Mountains rise east of town and Square Butte and Round Butte are south of Geraldine. The Montana Plains surround Geraldine and extend out to the north, south and east. The average annual temperature in the region is 44.2° F and the average precipitation is 14 to 18 inches (National Water and Climate Center).

General Description of the Source Water

Geraldine uses groundwater supplied by two wells ([figure 3](#)) and several spring collectors ([figure 3A](#)) to meet it's drinking water requirements. In 1959, several wells were drilled to depths of around 2000 ft below the surface. Initially the wells had closed in pressures of 120 to 140 psi and flowed at 35 to 60 gpm. Over the years that production has fallen to about 5 gpm. Two years ago a pump was placed in one well. In June 2001, the pump was lowered 100 feet to a depth of 961 ft and production was reduced from 67 gpm to 55 gpm. The wells are recharged in the Little Belt Mountains where the formations are exposed.

In the late 1980's, a spring system was developed on the southeast slope of Square Butte and a 14 mile pipeline constructed to carry the water to Geraldine. Square Butte is a large laccolith that was formed by the same magma that formed the Highwood Mountains. The

Butte is separated from the Highwood Mountains by several miles and the surrounding sediments have been eroded away, leaving the Butte rising high above the surrounding land. The springs are located near the contact between the uplifted sedimentary formations and the igneous rock of the Butte (Appendix II, [Figure 2](#)). The springs are on the southern flank of the Butte and are recharged by precipitation infiltrating through fractures in the Butte.

Table 1. List of geologic or hydrogeologic maps available for the Geraldine, Montana area.

Title or Description	scale	Area Covered	Reference
Topographic, geologic	1:24,000	Pownal Creek	NRIS, map finder
Geologic	various	Montana	Taylor and Ashley

The Public Water Supply

The football field well (well #2) is located on the southeast edge of town near the water tower and athletic field (Appendix III, [Figure 3](#)). Well #3, (Knedler well) is located on the east side of town, this well is not pumped, but is connected to the distribution system (Appendix III, [Figure 3](#)). The springs are located on the south flank of Square Butte, 10 miles south of town (Appendix III, [Figure 3a](#)). A 14-mile transmission pipe brings the water to town. The spring water goes directly into the distribution system and the pumped well flows directly to the tank (personal communication with Mayor Rice, 4-01). The water distribution system is composed of asbestos cement pipe.

The PWS originally had four wells. Two of the wells are mentioned above and the firehouse well (Appendix III, [Figure 3](#)) was not used or connected to the distribution system due to poor water quality (high sulfate). The fourth well is located north of town in a field across the highway. The town did not have title to the land and after the original owners death his children took over the well. The well is not connected to the distribution system (personal communication with Mayor Rice, 6-01). Also, Winchell Springs located west of town have been used to supply water to Geraldine. The springs are not connected to the distribution system.

Water Quality

Geraldine is routinely monitored for compliance with drinking water standards. Bacteriological monitoring occurs monthly. Compliance with other drinking water standards is based on additional sampling on a variety of schedules. The well water is hard and has a high iron and other mineral content.

Influencing Factors

The source water protection plan was started by Mayor Rice a part of a program to ensure an adequate water supply for the town. The PWS has received testing waivers for the springs. The analysis was completed by the DEQ. The wells were not used at that time.

Source Water Protection Management

Mayor Monica Rice will oversee implementation of the SWPP.

CHAPTER 2

DELINEATION

The portions of the aquifer that contributes water to Geraldine's wells and springs are identified in this chapter. Three management regions (the control zone, inventory region, and recharge region) are mapped for each source. The goal of management in the control zone is to protect against direct introduction of contaminants into the well or the immediate surrounding area.

Management in the inventory region should focus on pollution prevention activities where water is likely to flow to the wells within a relatively short time period. The goal of management in the recharge region is to maintain and improve the quality of groundwater that could reach the wells over longer times or with increasing water usage.

Geologic Conditions and Aquifer Characteristics

Geraldine uses groundwater supplied by two wells and several spring collectors to meet its drinking water requirements. In 1959, four wells were drilled to the Kootenai Formation at depths of around 2000 ft below the surface. Initially the wells had closed in pressures of 120 to 140 psi and flowed at 35 to 60 gpm. Over the years that production has fallen to about 5 gpm and a pump was placed in one well. The pump is at a depth of 961 ft and produces 55 gpm. The wells are recharged in the Little Belt Mountains where the Kootenai formations are exposed.

In the late 1980's, a spring system was developed on the southeast slope of Square Butte and a 14 mile pipeline was constructed to carry the water to Geraldine. Square Butte is a large laccolith that was formed by the same magma that formed the Highwood Mountains. The Butte is separated from the Highwood Mountains by several miles and the surrounding sediments have been eroded away, leaving the Butte rising high above the surrounding land. The springs are located near the contact between the uplifted sedimentary formations and the igneous rock of the Butte.

See the section on Conceptual Model and Assumptions for additional information.

Wells and Springs

Geraldine’s pumped well (#2) is 1905 feet deep and the casing is slotted from 1858 feet to 1908 feet below the ground surface. The well has a 30 hp pump that is at a depth of 861 feet. The original drillers log (O.C. Thatcher, 4/10/59) recorded a shut in pressure of 120 psi and flowed at 60 gpm.

Well #3 (Knedler) was drilled to a depth of 2217 feet where sulfur water was encountered, the well was back filled with 20 sacks of cement to a depth of 1965 feet. The well had a shut in pressure of 140 psi and flowed 65 to 70 gpm of water, when drilled (O.C. Thatcher, 1/1 1960). The well is still connected to the distribution system but a pump is not in this well. The well has a coin operated bulk water connection next to it. See the well logs in Appendix IV.

The springs are 10 miles south of and several hundred feet above Geraldine. There are two collectors several hundred feet apart. The water is gravity fed to town. The springs are on the south flank of Square Butte, where a series of contact springs flow off the Butte. Laterals extend from two collectors which are tied together. The collected water then flows from the main collector to town.

Table 2. Source well and springs information for Geraldine.

Data Parameters	Football Field well #2 (003)	Knedler Well #3 (004)	Springs (005)
MBMG #	2547	2556	
Water Right #	N/A	N/A	N/A
Latitude / Longitude	47.6022/-110.2738	47.5986/-110.2675	44.1978/-116.7066
Date Completed	April 10, 1959	January 1, 1960	N/A
Depth	1908	1965	N/A
Perforated Interval	1858 to 1908 ft	1746 to 1872 ft	N/A
SWL Depth	flowing 7.5 gpm	flowing	N/A
PWL Depth	961 ft	not pumped	N/A
Drawdown	+861 ft	N/A	N/A
Test Pumping Rate	67 gpm	N/A	N/A
Specific Capacity	.0078 gpm/ft	N/A	N/A
Pumping Rate	55 gpm	N/A	N/A
Source Type	bedrock confined	N/A	N/A

N/A-Not available

Conceptual Model and Assumptions

Wells

The wells are 2000 feet deep which is very deep for a drinking water well. The depth allows deeper sedimentary formations of the Kootenai to be reached. These formations have recharge areas that are located far from the wells in the Little Belt Mountains, 40 miles west of Geraldine. The nearby Highwood Mountains could provide some recharge but the main recharge to the deep aquifers is from the Little Belt Mountain's.

The Kootenai formations are exposed in the Little Belt Mountains, at elevations several hundred feet above the land surface at the wells. Over the last several thousand years, infiltration has filled the voids in the sandstone units with water. The water level in the Kootenai formation is at an elevation sufficient to pressurize the formation beneath Geraldine.

The actual water infiltrating in the Little Belt Mountains takes hundreds to thousands of years to travel beneath Geraldine. These long travel times allow the water to dissolve minerals out of the formations. These minerals show up as the high Total Dissolved Solids (TDS) in the water quality analysis.

Springs

The springs are located just below the contact between the igneous core of Square Butte and the uplifted sediments that surround the Butte. Precipitation falling on the Butte infiltrates through the many cracks and fractures in the igneous rock. The sedimentary formations act as a dam when compared to ease with which water moves through the highly permeable fractures. The water rises to a level where sufficient head (pressure) and a thinning sediment layer allows the groundwater to surface as springs.

When the wells were put in the aquifer had sufficient pressure to flow at 60 gpm per well. Over the last 40 years a combination of allowing the wells flowing freely to waste and a prolonged drought have dropped the pressure in the wells to the point where they must be pumped.

Similarly, when the springs were developed in the 1980's, they produced over 100 gpm all year. The regional drought of the last several years have reduced recharge to Square Butte to the point that base flow from the springs is around 45 gpm. In addition the spring collectors are now susceptible to local surface water infiltration from snow melt or rain events.

Methods and Criteria

DEQ's Source Water Protection Program specifies methods and criteria used to delineate subregions of the source water protection areas for Geraldine. Based on these methods and their associated criteria, the protection areas delineated for Geraldine include 100-foot fixed radius control zones for each source, and 1000-foot fixed radius inventory regions for each source (Appendix III, [Figure 4](#) and Appendix III, [Figure 5](#)). The 100-foot

radius control zone surrounding the wells/springs is the most critical area within which direct introduction of contaminants into the wells/ springs or immediate area could occur. The 1000-foot inventory region encompasses the area within which water or contaminants can flow to the wells/springs over a period of months to years. In other words, this boundary delineates the distance in the aquifer that water or nitrates and chlorides could travel in three years. Finally, topographic divides were used to approximate hydrologic boundaries in order to delineate the recharge region for the springs (Appendix III, [Figure 8](#)).

Delineation Results

Due to well depths (open below 320 ft) and the overlying geology (shale and clay), time-of-travel calculations were not used for the delineation of the inventory regions. Instead 1000-foot fixed radius inventory regions were delineated around each source. The recharge region for the springs was delineated using hydrogeologic mapping.

Limitations

The reader needs to remember that this delineation is based on estimated groundwater flow and pumping conditions. Conclusions based on this interpretation are uncertain because the extent and properties of the aquifer, and the direction and rate of groundwater flow are not known precisely.

CHAPTER 3

INVENTORY

Potential sources of contamination were inventoried to assess the susceptibility of Geraldine's drinking water sources to contamination. Potential sources of all contaminants with primary drinking water standards and cryptosporidium were identified but a detailed inventory was conducted only for potential sources of contaminants that are the greatest threat to health. The contaminants of greatest concern to Geraldine are nitrate and pathogenic organisms.

The inventory for Geraldine focuses on all activities in the control zone, major facilities in the inventory region, and general land uses in the recharge region.

Inventory Method

Databases were searched to identify businesses and land uses that are potential sources of regulated contaminants in the inventory region. The following steps were followed:

Step 1.: Major road and rail transportation routes were identified throughout the inventory region.

Step 2.: All land uses and facilities that generate, store, or use large quantities of hazardous materials were identified within the recharge region and identified on the base map.

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

1. Large quantity hazardous waste generators
2. Landfills
3. Hazardous waste contaminated sites
4. Underground storage tanks
5. Major roads or rail transportation routes
6. Cultivated cropland
7. Animal feeding operations
8. Wastewater treatment or spray irrigation
9. Septic systems, Sewered residential areas
10. Storm sewer outflows

Inventory Results/Control Zone

The control zone is a 100-foot radius around each well. Within the control zone for the existing wells (football, Nedeler), the main potential contaminant is from vehicle traffic near the well head.

Inventory Results/Inventory Region

The Inventory Region for Geraldine's wells includes 1 septic system, town roads and a municipal sewer system. See Appendix III, [Figure 4](#) and Appendix III, [Figure 6](#).

The Inventory Region for the springs includes pasture land as shown in Appendix III, [Figure 7](#).

Table 4. Results for Geraldine’s inventory regions

	Contaminant Source	Description
1	septic system	located at the athletic field, nitrates and pathogens
2	roads	chemical spills or leaks
3	municipal sewer	leaks, nitrates and pathogens
4	pasture	animal waste, nitrates and pathogens

Inventory Results/Recharge Region

The Recharge Region for the wells outside the inventory region is located 40 miles west in the Little Belt Mountains.

The recharge region for the springs is located on Square Butte. The area is partially forested and inaccessible except by foot. See Appendix III, [Figure 8](#).

Inventory Update

The certified operator should update the inventory for his records every year. Changes in land uses or potential contaminant sources should be noted and additions made as needed. A complete inventory should be submitted to DEQ every five years.

Inventory Limitations

The potential sources of contaminants for Geraldine are determined from readily available data and reports. Unregulated activities or unreported contaminant releases may have been missed. The use of multiple sources of data, however, should ensure the major threats to the source water for Geraldine.

CHAPTER 4

SUSCEPTIBILITY ASSESSMENT

The susceptibility of Geraldine’s wells and springs to significant potential contaminant sources is assessed in this chapter to rank threats to the drinking water source. The degree of susceptibility is determined by the hazard associated with a source and the existence of barriers to contamination (Table 5). The proximity of point contaminant sources to the town’s wells or the density of non-point sources in the inventory region determines hazard (Table 6). Barriers can be anything that decreases the likelihood that contaminated water will flow to the town’s wells. Barriers can be engineered structures, management actions, or natural conditions. Examples of engineered barriers are spill catchment structures for industrial facilities and leak detection for underground storage tanks. Emergency planning and best management practices can be considered management barriers. Thick clayey soils, a deep water table, or a thick saturated zone above the well intake can be natural barriers.

Susceptibility ratings are presented individually for each significant potential contaminant source in the inventory region. Geraldine is not considered susceptible to individual point sources in the recharge region because dispersion and dilution of contaminants should reduce concentrations of contaminants below levels associated with adverse health effects.

Table 5. Susceptibility to specific contaminant sources as determined by hazard and the presence of barriers.

	High Hazard	Moderate Hazard	Low Hazard
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

Table 6. Hazard of potential contaminant sources for Geraldine.

	High Hazard	Moderate Hazard	Low Hazard
Point Source Contaminants	Within one-year TOT	one to three years TOT	Over three years TOT
Septic Systems	More than 300 per sq. mi.	50 – 300 per sq. mi.	Less than 50 per sq. mi.
Municipal Sanitary Sewer (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region
Cropped Agricultural Land (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region

The results of the susceptibility assessment for Geraldine are summarized in Table 7. The following are brief descriptions of the susceptibility assessments for each significant potential contaminant source.

Table 7. Susceptibility assessment for the Geraldine Inventory region.

Source	Contaminant	Hazard	Rating	Barriers	Susceptibility	Management
Municipal sewers	pathogens and nitrates	Leaks	High	:well intake below 1900 feet :well grouted to bedrock :distance from well :flowing well	very low	routine monitoring
Pasture land Springs	pathogens, nitrates	Infiltration	High	:fenced area around springs :cattle in area during transit	high	fence maintenance and routine monitoring
town roads	VOCs SOCs other chemicals	spills	High	:distance from well well intake below 1900 feet :confined aquifer	very low	routine monitoring
septic system	nitrates and pathogens	Infiltration	High	confined aquifer distance to well depth to groundwater	very low	routine monitoring

CHAPTER 5

MANAGEMENT

The goal of the Source Water Protection Program is to prevent Geraldine's drinking water source from being contaminated. All land uses have been inventoried and the potential for these activities to contaminate the drinking water have been ranked. Management activities can be considered as another barrier developed to reduce the susceptibility of a specific contaminant from entering Geraldine's water.

Control Zone Management

No chemicals will be used, stored or transported within the 100-foot radius of the well or spring. Due to the remote location of the springs, this requirement is already in effect.

Inventory Region Management

Management of this region for Geraldine is based on the well's depth and location away from most land use activities. The Town limits include all the land in this region and will control the land use near the wells.

The area around the springs is controlled by 2 land owners, Hugo Tureck and Paul Meisser. The town has easement agreements with both land owners.

Recharge Region Management

The recharge region for Geraldine is in the Little Belt Mountains forty miles west of the town. The land between the Town and the Mountains is agricultural. The recharge travel time makes land use travel times unnecessary.

The PWS operator will monitor any land use changes in the springs' area to ensure they won't impact the water quality or quantity.

Management Implementation

The management strategies have been in use since the springs began serving the PWS.

CHAPTER 6

EMERGENCY PLAN

Procedures for responding to emergencies are described and an emergency coordinator is designated in this chapter. The equipment and materials needed to respond to an emergency and the source of a temporary water supply are also described.

Possible Disruption Threats

The main threat to the PWS has been identified as casing failure or line breaks. A failure of the casing could allow contaminated surface water to enter the well. A break in the line or laterals from the springs could allow contaminants to enter the distribution system or prevent groundwater from entering the spring box.

Emergency Coordinator

The emergency coordinator for Geraldine is Mayor Monica Rice with backup provided by Jay Eklund and Fred Pyatt.

Equipment and Material Resources

A catastrophic loss of water will require the services of an engineer and a well driller. Minor disruptions to the public water system will be handled by public works.

Procedures to Shut Down the Well

The wells can be isolated from the water distribution system by using the valves at the well sites. The wells can be turned off at the respective pump house but requires a key for access. Flow from the springs can be turned off at several places. The keys are located in the town shop.

CHAPTER 7

ALTERNATE WATER SOURCES

Geraldine is actively looking for additional water source(s). The community replaced their wells with the spring collection system in the 1980's. The springs produced sufficient water to supply the Geraldine and 2 small rural water systems. The springs are on the south side of Square Butte and the water flows by gravity the 10 miles to town.

Two years ago the PWS began using one of the wells again when the yield from the springs dropped off. The well is high in iron and other minerals but the water is not treated. When the wells were first drilled in 1959, they had a closed in pressure of 120 psi and flowed at 60 gpm. Through a combination of drought and a practice (regional) of letting the well water drain to waste when not in use, have greatly reduced the flow rate to 5 gpm.

Recommendations

The town is working with Delta Engineering on the spring area to increase the water production. Cleaning the laterals may allow for additional production but the area was dry when we visited the site in early May. The area was reported to be a marsh into late summer until the last few years. The area is showing the effects of several years of drought reducing the recharge to Square Butte. The springs were producing 46 gpm on May 9th, down from over 100 gpm when the springs were first constructed.

Recent work completed in June/July 2001, has expanded the laterals capturing the groundwater. The work has captured an additional 30 to 35 gpm

Geraldine still has 3 of the 4 deep wells drilled in the late 50's. Well #2 (Source ID 003) has been refurbished and produces 67 gpm of water from 861 feet using a 30 hp pump. The pumping costs have gone way up recently (Mayor Rice, personal communication). We don't know if the higher cost is due to lifting the water 861 feet or due to cavitation caused by an oversized pump dropping the water level down to the inlet. The important thing to remember is that the well produces 67 gpm.

The pump was lowered 100 ft in June 2001. The lower setting has eliminated the air entrainment problem, but has lowered the yield from 65 gpm down to 55 gpm.

The town also has a second well hooked into the distribution system (Knedler well). This well does not have a pump but is allowed to flow freely. The pumphouse is the site of a bulk water outlet. This well should be evaluated to determine what it can produce. Also the cost of sequestering the iron with a polyphosphate should be determined. The well should produce at least 60 gpm. This is what it originally flowed. The regional potentiometric surface has dropped but the transmissivity of the aquifer should be the same.

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GLOSSARY*

Acute Health Effect. An adverse health effect in which symptoms develop rapidly.

Alkalinity. The capacity of water to neutralize acids.

Aquifer. A water-bearing layer of rock or sediment that will yield water in usable quantity to a well or spring.

Best Management Practices (BMPs). Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

Coliform Bacteria. Bacteria found in the intestinal tracts of animals. Their presence in water is an indicator of pollution and possible contamination by pathogens.

Confined Aquifer. A fully saturated aquifer overlain by a confining unit such as a clay layer. The static water level in a well in a confined aquifer is at an elevation that is equal to or higher than the base of the overlying confining unit.

Confining Unit. A geologic formation that inhibits the flow of water.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Enacted in 1980. CERCLA provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

Delineation. A process of mapping source water management areas.

Hardness. Characteristic of water caused by presence of various salts. Hard water may interfere with some industrial processes and prevent soap from lathering.

Hazard. A measure of the potential of a contaminant leaked from a facility to reach a public water supply source. Proximity or density of significant potential contaminant sources determines hazard.

Hydraulic Conductivity. A coefficient of proportionality describing the rate at which water can move through an aquifer.

Inventory Region. A source water management area that encompasses the area expected to contribute water to a public water supply within a fixed distance or a specified groundwater travel time.

Maximum Contaminant Level (MCL). Maximum concentration of a substance in water that is permitted to be delivered to the users of a public water supply. Set by EPA under authority of the Safe Drinking Water Act.

Nitrate. An important plant nutrient and type of inorganic fertilizer. In water the major sources of nitrates are septic tanks, feed lots and fertilizers.

Nonpoint-Source Pollution. Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet.

Pathogens. A bacterial organism typically found in the intestinal tracts of mammals, capable of producing disease.

Point-Source. A stationary location or fixed facility from which pollutants are discharged.

Public Water System. A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

Pumping Water Level. Water level elevation in a well when the pump is operating.

Recharge Region. A source water management region that is generally the entire area that could contribute water to an aquifer used by a public water supply. Includes areas that could contribute water over long time periods or under different water usage patterns.

Resource Conservation and Recovery Act (RCRA). Enacted by Congress in 1976. RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner.

Section Seven Tracking System (SSTS). SSTS is an automated system EPA uses to track pesticide producing establishments and the amount of pesticides they produce.

Source Water Protection Area. For surface water sources, the land and surface drainage network that contributes water to a stream or reservoir used by a public water supply.

Static Water Level (SWL). Water level elevation in a well when the pump is not operating.

Susceptibility (of a PWS). The potential for a PWS to draw water contaminated at concentrations that would pose concern. Susceptibility is evaluated at the point immediately preceding treatment or, if no treatment is provided, at the entry point to the distribution system.

Synthetic Organic Compounds (SOC). Man made organic chemical compounds (e.g. herbicides and pesticides).

Total Dissolved Solids (TDS). The dissolved solids collected after a sample of a known volume of water is passed through a very fine mesh filter.

Transmissivity. The ability of an aquifer to transmit water.

Unconfined Aquifer. An aquifer containing water that is not under pressure. The water table is the top surface of an unconfined aquifer.

Underground Storage Tanks (UST). A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

Volatile Organic Compounds (VOC). Any organic compound which evaporates readily to the atmosphere.

* Definitions taken from EPA's Glossary of Selected Terms and Abbreviations (<http://www.epa.gov/ceisweb1/ceishome/ceisdocs/glossary/glossary.html>)

APPENDICES

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