HUNTERS TRAILER COURT

PUBLIC WATER SYSTEM

PWS ID No. MT0000649

SOURCE WATER DELINEATION & ASSESSMENT REPORT

PREPARED BY:

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EXECUTIVE SUMMARY

This Source Water Delineation and Assessment Report (SWDAR) was prepared as required by the Federal Safe Drinking Water Act, according to a detailed Source Water Assessment Plan developed by a statewide Montana citizens' advisory committee, and approved by the US Environmental Protection Agency. The Department of Environmental Quality (DEQ) is completing assessment and delineation reports for all public water systems in Montana. Source water assessment is the first step towards source water protection. These reports are intended to provide information so that the public water system staff/operator, consumers, and community citizens can develop strategies to protect drinking water sources. The information provided includes the delineation of the area most critical to maintaining safe drinking water (the inventory region), an inventory of significant potential sources of contamination within this area, and an assessment of the relative threat that these sources pose to the water system.

The Hunters Trailer Court's drinking water is supplied by one well. The water source is groundwater. According to the Source Water Protection Program (DEQ, 1999) the source aquifer for the well is considered to have **high sensitivity** to potential contamination, since the aquifer is comprised of unconfined Quaternary alluvium.

As part of this assessment, three types of source water protection management areas were mapped for the Hunters Trailer Court public water system. They are: the control zone, the inventory region, and the recharge region. The control zone (sometimes called the exclusion zone) is a 100-foot radius circle around the wellhead. The goal of management in the control zone is to avoid introducing contaminants directly into the well or immediate surrounding areas. The inventory region is the area that is expected to contribute groundwater to the wells over the next three years (DEQ, 1999). The recharge region represents the area that is expected to contribute water to the well over long periods of time. Potential sources of contamination were inventoried within the control zone and inventory region and the results are as follows:

- No potential sources of contamination could be identified within the control zone.
- Most of the inventory region is mapped as moderate septic system density. Very little of the inventory region is mapped as irrigated agricultural land. Several underground storage tanks (USTs) were identified within the inventory region, one of which had leaked. The leak file has been closed. It is possible that additional UST locations may be improperly mapped.

Of the identified potential contaminant sources, the Source Water Protection Program has determined that significant potential contaminant sources are the sewers and septic system density.

The primary threat to source water quality at this PWS is at the wellhead. A detailed survey of potential contaminant sources at the control zone scale is not possible without a site inspection. With no information on the well's construction, it is impossible to know whether the well has a properly constructed sanitary seal. Therefore, it is assumed that the wellhead is highly vulnerable to impacts within the control zone. The operator should take all available steps to ensure that potential contaminants are removed from the control zone where possible, and managed appropriately when removal is not feasible.

Contaminant sources are not inventoried within the recharge region. Land use patterns are identified and evaluated. The recharge region is mapped as the watershed of Warm Springs Creek. Much of the recharge area is sparsely developed and populated, and within the National Forest. The primary land cover is evergreen forest.

Low risk potential sources and potential sources located outside the inventory region, but within the recharge region, may still pose a threat over time. These are not considered in this assessment, however. The susceptibility analysis is intended to provide the operator with information on where the greatest risk occurs. To this end, the assessment is focused on potential contaminant sources that the Source Water Protection Section has determined to be significant. These are detailed in Chapter 4.

Mitigating and managing potential sources of contamination identified within the inventory region are often beyond the scope of what an operator of a relatively small PWS may accomplish.

The costs associated with contaminated drinking water are high, and prevention is vastly preferable to treatment. Public awareness is a powerful tool for protecting drinking water. The information in this report is intended to help increase public awareness about the relationship between land use activities and drinking water quality.

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1.0 INTRODUCTION

The primary purpose of this source water delineation and assessment report (SWDAR) is to provide information that helps the Hunters Trailer Court public water supply (PWS) protect its drinking water sources. Source water assessment is the first step towards source water protection. The Montana Source Water Protection Program is intended to be a preventative, practical, and cost-effective approach to protect public drinking water supplies.

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the Hunters Trailer Court Public Water System as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment].

Eric Sivers, a hydrogeologist with the Montana Department of Environmental Quality (DEQ) Source Water Protection Section, completed the Hunters Trailer Court (PWS ID No. MT0000649) Source Water Delineation and Assessment Report. Information on the PWS was obtained from the most recent sanitary survey. Additional references are detailed at the end of this report.

2.0 BACKGROUND

The Hunters Trailer Court PWS is classified as a community PWS, as it serves more than 25 year-round residents. The Hunters Trailer Court PWS is located in Deer Lodge County in western Montana, on the northern edge of Anaconda (Figure 1). According to the Census Bureau, the population of the consolidated Anaconda-Deer Lodge city-county government in 2000 was 9,471. The Hunters Trailer Court PWS services a mobile home court (Figure 2) with approximately 41 residents (DEQ, 2005).

2.1 PHYSICAL SETTING

2.1.1 Geography and Geology

The PWS is on the western edge of Anaconda, along Warm Springs Creek. The elevation is approximately 5,400 feet above mean sea level. Warm Springs Creek is sandwiched between Stucky Ridge on the north and Mount Haggin on the south, and separates the Flint Creek Range from the Anaconda Range. The area is bordered by the Flint Creek range to the north, the Deer Lodge valley to the east, and the Anaconda - Pintlar Range to the south.

The geology of the Anaconda – Phillipsburg area is most recently described in Lonn *et al.* (2001). The geology is complex, and beyond the scope of this report. The PWS is situated upon Quaternary alluvial deposits within a steep-sided mountain valley. The alluvium is underlain by the same metasedimentary rocks that are exposed to the north and south of the valley.

This alluvium was deposited by Warm Springs Creek and include sediments deposited by glacial outwash. The creek has since incised these deposits, leaving a terrace along the northern side of the valley. The alluvial aquifer is recharged by infiltration of snowmelt and rainfall in the Flint Creek and Anaconda ranges (Figure 3).

More detailed information on the hydrogeology of the study area is provided in Section 2.1.3.

2.1.2 Climate

Climate in the area is typical of intermediate elevation intermontane valleys in western Montana. Annual total precipitation is 13.99 inches, and is most abundant in May and June. The area receives an annual average of 72.4 inches of snow, mainly from October to April. The climate summary is based upon records from the climate station at Anaconda. Climate data is provided by the Western Regional Climate Center, operated by the Desert Research Institute of Reno, Nevada. See Table 1 for additional climate information.

Table 1. Monthly Climate Summary: Anaconda Climate Station (240199)

Period of Record: 08/01/1982 to 09/30/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Ave. Max. Temp (F)	36.5	39.8	47.6	55.8	64.7	73.1	81.7	81.3	70.4	58.0	42.2	34.1	57.1
Ave. Min. Temp. (F)	15.0	16.0	22.5	28.5	35.9	42.5	47.3	46.2	38.3	30.3	20.3	13.0	29.6
Ave Tot. Precip. (in.)	0.57	0.54	0.98	1.31	2.01	2.09	1.48	1.50	1.18	0.79	0.87	0.67	13.99
Ave. Tot. Snowfall (in.)	10.3	9.6	13.3	7.6	2.0	0.5	0.0	0.2	1.3	4.0	11.6	12.1	72.4
Ave Snow Depth (in.)	3	3	2	0	0	0	0	0	0	0	2	3	1

2.1.3 Source Water

The PWS is situated on Quaternary alluvial deposits of the Warm Springs Creek. The unit includes fluvial sand and gravel, as well as glacial outwash deposits. This is probably a fairly transmissive unit. Groundwater is believed to flow in a easterly direction, towards Anaconda and the Clark Fork.

The aquifer is recharged by infiltration of snowmelt and rainfall in the Warm Springs Creek watershed upstream of the PWS.

2.2 THE PUBLIC WATER SUPPLY

2.2.1 Water Supply System

One well is present at the PWS facility. The well is indicated on Figure 1 and Figure 2. The PWS distributes water through 22 service connections, serving an estimated population of 41. The system does not chlorinate. The Hunters Trailer Court PWS is classified as a community public water system since it serves more than 25 year-round residents.

2.2.2 Supply Well Information

No log is available for the well. The depth and other construction details are unknown. What information is available is provided in the sanitary survey and well assessment attached as Appendix A.

2.3 WATER QUALITY

Each PWS performs regular sampling of its water supply to detect contamination. The analytical parameters for a community PWS include: coliform bacteria, nitrates, metals, petroleum hydrocarbons, synthetic organic chemicals, and radionuclides. The monitoring schedule depends on factors such as the type of PWS, type of source water (surface water or groundwater), the number of supplies (e.g. wells, springs or intakes), and the population served. Monitoring programs are tailored to each system, following the general protocols defined by DEQ and the US EPA. Monitoring schedules are available online at: <http://nris.state.mt.us/wis/swap/swapquery.asp>. The Hunters Trailer Court PWS monitoring data from DEQ's database for the past five years was reviewed and is

summarized in this section. Analytical results are reported in units of milligrams per liter (mg/L, equivalent to one part per million) or micrograms per liter (µg/L, equivalent to one part per billion). The results are compared to quality standards established by the US EPA. Maximum Contaminant Levels (MCLs) are enforceable standards limiting the amount of a contaminant in drinking water. National Secondary Drinking Water Standards (known as SMCLs) are non-enforceable guidelines regarding contaminants that may cause aesthetic (color, odor, taste) or cosmetic (staining, skin/tooth discoloration) issues.

2.3.1 Public Water Supply Monitoring Results

Coliform bacteria have not been detected in the Hunters Trailer Court PWS water in the past five years. Nitrate levels are generally below 1 mg/L, with the maximum reported concentration in the period reviewed of 0.33 mg/L. Dissolved solids are low, with low levels of arsenic (0.002 mg/L), barium (0.028 mg/L), fluoride (0.56 mg/L), selenium (0.0003 mg/L), and radionuclides (gross alpha of 1.4 pCi/L). No organic chemicals have been detected in the past five years.

The water quality analysis summary report is attached as Appendix B.

2.3.2 Background Water Quality Monitoring Results

Background water quality data was not identified for the subject PWS. Background water quality typically includes general water quality parameters: major dissolved ions (calcium, magnesium, sodium, potassium, iron, manganese, silica, bicarbonate, carbonate, chloride, sulfate, nitrate, fluoride and orthophosphate), trace elements, and metals. As the PWS does not chlorinate, the inorganic chemistry is generally representative of the background water quality.

3.0 MANAGEMENT AREA DELINEATION

This report delineates three source water management areas. The goal of source water management is protection of the source water by 1) controlling activities in the control zone(s), 2) managing significant potential contaminant sources in the inventory region, and 3) ensuring that major land use activities or other significant activities in the recharge region pose minimal threat to the source water. Methods and criteria for delineating source water protection areas for public water supplies are specified in the Montana Source Water Protection Program (DEQ, 1999).

3.1 DELINEATION

Control Zone – A 100-foot radius control zone is delineated around the wellhead.

Inventory Region – The inventory region is generally the area that is expected to contribute to the water supply over three years; this is sometimes referred to as a three-year capture zone. The inventory region for the Hunters Trailer Court PWS was delineated based upon hydrogeologic mapping. Without well construction or pump test data, a value for hydraulic conductivity cannot be estimated, and groundwater flow rates cannot be determined. The inventory region is comprised of the broad portion of the Warm Springs Creek valley bottom.

Recharge Region – The recharge area is delineated as the Warm Springs Creek drainage located upgradient of the PWS (Figure 3).

4.0 INVENTORY

Prior to assessing PWS susceptibility to contamination, an inventory of potential contaminant sources must be created. To this end, potential contaminant sources in the control zone and inventory region were inventoried. The inventory focuses on facilities or features that generate, use, store, or transport potential contaminants, as well as certain land uses. The methods and data sources used in the inventory process are explained below. It is important to remember that the sources identified in this section are only potential sources of contamination to the drinking water. Contamination of drinking water sources is less likely when potential contaminants are properly managed.

4.1 INVENTORY METHOD

Information on facilities and land uses that are potential sources of regulated contaminants was obtained from a number of databases. The process for completing the inventory includes the following:

- Step 1: The Montana State Library Natural Resources Information System (NRIS) GIS database was queried to identify septic land application sites, wastewater treatment plants, animal feeding operations, septic system density, sewer systems, and agricultural land uses.
- Step 2: The DEQ PWS files were reviewed to identify agricultural activities or wastewater treatment in the vicinity of the PWS.
- Step 3: The US Environmental Protection Agency's (EPA) Envirofacts System <http://www.epa.gov/enviro/> was queried to identify EPA-regulated facilities located in the management areas. This system accesses facilities listed in the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory System (TRIS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) and the Permit Compliance System (PCS - for Concentrated Animal Feeding Operations with MPDES permits). The available reports were browsed for facility information including the Handler/Facility Classification to be used in assessing whether a facility should be classified as a significant potential contaminant source.
- Step 4: Montana DEQ databases were queried to identify any of the following in the management areas:

  Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) <http://www.deq.state.mt.us/UST/USTDownloads.asp>

  Hazardous waste contaminated sites, above ground storage tanks (ASTs), landfills, and abandoned and active mines, including gravel pits <http://nris.state.mt.us/gis/bundler/>

  Any information on past releases and present compliance status was noted.

Potential contaminant sources are considered significant if they fall into one or more of the following categories:

1. Large quantity hazardous waste generators.
2. Landfills.
3. Underground storage tanks.
4. Known groundwater contamination (including open or closed hazardous waste sites, state or federal Superfund sites, and leaking UST sites).
7. Cultivated cropland exceeding 20% of the inventory region.
8. Animal feeding operations.
9. Wastewater treatment facilities, sludge handling sites, or land application areas.
10. Septic systems.
11. Sewer mains.

5. Underground injection well.
6. Major roads or rail transportation routes.
12. Storm sewer outflows.
13. Abandoned or active mines

4.2 INVENTORY RESULTS

4.2.1 Control Zone Inventory Results

Drainage should be directed away from the wellhead. This is particularly important considering the lack of information on the sanitary seal. Additionally, considering the probable age of the well, it is possible that even a well-constructed sanitary seal has lost integrity.

4.2.2 Inventory Region Results

Point Sources: Several UST and one LUST facilities were located the inventory region. It is possible that some UST/LUST facilities are improperly mapped. The LUST site is not active. The trailer court's septic system is considered a large capacity septic system (LCSS), but it is located downgradient from the inventory region.

Nonpoint Sources: The majority of the inventory region is mapped as moderate septic system density. An area of less than 25% of the inventory region (West Valley) is shown as high septic system density. No sanitary sewers are mapped in the inventory region. The inventory region includes little irrigated farmland. The most prevalent mapped agricultural land use is wild hay.

The PWS' susceptibility to these potential contaminant sources will be assessed in Section 5, and presented in Table 2.

4.2.3 Recharge Region Results

Contaminant sources are not inventoried within the recharge region. However, land use patterns are identified and evaluated. Land use within the recharge region is timber.

5.0 SUSCEPTIBILITY ASSESSMENT

Susceptibility is the degree of likelihood for a public water supply to be impacted by inventoried contaminant sources. Susceptibility is determined in accordance with the DEQ Source Water Protection Program (DEQ, 1999). This guidance document is available on the DEQ Source Water Protection website (see the Reference section), or by request.

Susceptibility is determined by considering the *hazard* that a significant potential contaminant source presents to the PWS source water, relative to any *barriers* to the contaminant. Hazard is determined by the proximity or density of significant potential contaminant sources, according to a formula laid out in the Source Water Protection Program (DEQ, 1999). Barriers to contamination are anything that decreases the likelihood of contaminants reaching a water source.

Inventory results and management recommendations for the Hunters Trailer Court PWS are provided in Table 2. In some cases the management recommendations are fairly site-specific and can be implemented by the public water supply. However, other management options can only be implemented by federal, state, county or local governmental entities. When the latter options are mentioned, it does not imply or suggest that this PWS should lead or spearhead the effort to implement the management option. It is assumed that representatives from this PWS would

participate in the public process sponsored by various governmental entities to develop and implement any of these management options.

Table 2. Susceptibility Assessment of Significant Potential Contaminant Sources

Potential Contaminant Source	Potential Contaminants	Hazard	Hazard	Barriers	Susceptibility	Management Recommendations
Inventory Region						
Septic systems	Pathogens, nitrate (NO_3)	Discharge of pathogens; failure leading to discharge of untreated septage.	Moderate	Dilution	Moderate	Properly maintain septic systems, and pump tanks at scheduled intervals. Participate as a stakeholder in debates over water quality and local water quality districts.
Other Potential Contaminant Sources, not rated significant						
USTs	VOCs	Leaching of VOCs to groundwater	Very low	UST closure	Very Low	Maintain water quality sampling according to schedule.

These ratings are derived from the procedures established by the DEQ Source Water Protection Program (DEQ, 1999). In summary, the aquifer has high sensitivity to the risks posed by the sanitary sewers and septic system density, and the susceptibility is rated very high. Dilution is not frequently credited as a barrier, but in this case it appears to explain the fact that nitrate levels are routinely low, and that no coliform bacteria have been detected.

The low nitrate concentration and generally good coliform history is probably explained by the highly transmissive aquifer. However, a failing septic system or sewer line would have a significant impact on the water source. It is important to realize that septic systems will not eliminate all pathogens (*e.g.* bacteria and viruses). Even a properly functioning septic system can transmit active pathogens into the groundwater.

While no USTs were identified within the inventory region, there is always the possibility that a tank is unregistered or is not mapped to the proper location. The operator should be aware of the potential risks posed by a hydrocarbon release, and be mindful of any facilities in the area that may include a UST.

The primary threat to source water quality at this PWS is at the wellhead. A detailed survey of potential contaminant sources at the control zone scale is not possible without a site inspection. With no information on the well's construction, it is impossible to know whether the well has a properly constructed sanitary seal. Therefore, it is assumed that the wellhead is highly vulnerable to impacts within the control zone. The operator should take all available steps to ensure that potential contaminants are removed from the control zone where possible, and managed appropriately when removal is not feasible.

The land uses identified within the recharge region do not generally pose a risk to groundwater quality.

6.0 LIMITATIONS

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the Hunters Trailer Court Public Water System (PWS) as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment]. The following limitations should be noted:

- Not every potential or existing source contamination in the Hunters Trailer Court area has been identified. Consideration was limited to potential sources of contamination that are within the inventory region and of a type determined by the DEQ to be significant.
- Potential sources of contamination were identified using online databases and available overhead and map imagery. Field surveys and inspections of the inventory region were not conducted. It is highly recommended that the operator or other persons knowledgeable about the community review the inventory, and revise it as necessary.
- The inventory region was delineated on the basis of a one-mile radius, modified to reflect topography and geology (and presumably groundwater flow direction). This is intended to provide a starting point for the purposes of source water assessment, and detailed field investigations are beyond the scope of this report.
- Delineation of the recharge region is considered a first-order approximation, and may not be accurate. In order to accurately delineate a truly representative recharge region, a detailed field study would be required. Such a study is beyond the scope of this report.
- The potential contaminant sources described in the inventory are identified from readily available information, as described in Chapter 4. Consequently, unregulated activities or unreported contaminant releases may have been overlooked. Multiple data sources are used to increase the likelihood that major threats to the source water are identified. The inventory is not exhaustive. Absence of a potential contaminant in the inventory or susceptibility assessment of this report does not mean that the potential for contamination does not exist, or that there is no threat.
- This report is not, and should not be construed as, a guarantee, warranty or certification that the PWS will not be impacted by potential contaminant sources given a low susceptibility.

7.0 CONCLUSIONS

The Hunters Trailer Court's drinking water is supplied by one well. The water source is groundwater. According to the Source Water Protection Program (DEQ, 1999) the source aquifer for the well is considered to have **high sensitivity** to potential contamination, since the aquifer is comprised of unconfined Quaternary alluvium.

As part of this assessment, three types of source water protection management areas were mapped for the Hunters Trailer Court public water system. They are: the control zone, the inventory region, and the recharge region. The control zone (sometimes called the exclusion zone) is a 100-foot radius circle around the wellhead. The goal of management in the control zone is to avoid introducing contaminants directly into the well or immediate surrounding areas. The inventory region is the area that is expected to contribute groundwater to the wells over the next three years (DEQ, 1999). The recharge region represents the area that is expected to contribute water to the well over long periods of time. Potential sources of contamination were inventoried within the control zone and inventory region and the results are as follows:

- No potential sources of contamination could be identified within the control zone.
- Most of the inventory region is mapped as moderate septic system density. Very little of the inventory region is mapped as irrigated agricultural land. Several underground storage tanks (USTs) were identified within the inventory region, one of which had leaked. The leak file has been closed. It is possible that additional UST locations may be improperly mapped. .

Of the identified potential contaminant sources, the Source Water Protection Program has determined that significant potential contaminant sources are the sewers and septic system density.

The primary threat to source water quality at this PWS is at the wellhead. A detailed survey of potential contaminant sources at the control zone scale is not possible without a site inspection. With no information on the well's construction, it is impossible to know whether the well has a properly constructed sanitary seal. Therefore, it is assumed that the wellhead is highly vulnerable to impacts within the control zone. The operator should take all available steps to ensure that potential contaminants are removed from the control zone where possible, and managed appropriately when removal is not feasible.

Contaminant sources are not inventoried within the recharge region. Land use patterns are identified and evaluated. The recharge region is mapped as the watersheds of Warm Springs Creek. Much of the recharge area is sparsely developed and populated, and within the National Forest. The primary land cover is evergreen forest.

Low risk potential sources and potential sources located outside the inventory region, but within the recharge region, may still pose a threat over time. These are not considered in this assessment, however. The susceptibility analysis is intended to provide the operator with information on where the greatest risk occurs. To this end, the assessment is focused on potential contaminant sources that the Source Water Protection Section has determined to be significant. These are detailed in Chapter 4.

Mitigating and managing potential sources of contamination identified within the inventory region are often beyond the scope of what an operator of a relatively small PWS may accomplish. The SWP section recommends that whenever possible, the operator should illustrate to residents the potential hazards associated with the onsite septic systems, and the need for regular maintenance.

8.0 REFERENCES

Kendy, Eloise and Tresch, R. E. 1996. Geographic, geologic, and hydrologic summaries of intermontane basins of the Northern Rocky Mountains, Montana. USGS Water-Resources Investigation 96-4025, 233 p.

Lonn, J.D., McDonald, C. Lewis, R.S, Kalakay, T.J., O'Neill, J.M., Berg, R.B., Hargrave, P. 2003. Preliminary geologic map of the Phillipsburg 30' x 60' quadrangle, western Montana, Montana Bureau of Mines and Geology: Open File Report 483, 28 p., 1 sheet(s), 1:100,000.

Montana Bureau of Mines and Geology, 2005. Groundwater Information Center, lithologic well logs. http://mbmggwic.mtech.edu/

Montana Department of Environmental Quality Public Water Supply Section, 2005. Safe Drinking Water Information System (SDWIS).

Montana Department of Environmental Quality (DEQ), 1999. Montana Source Water Protection Program. http://www.deq.state.mt.us/ppa/p2/swp/index.asp

Montana Natural Resources Information Interactive Map website. 2005. http://nris.state.mt.us/interactive.html

Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment].

United States Census Bureau, 2000. http://factfinder.census.gov/home/saff/main.html?_lang=en

United States Geological Survey. 1992. National Landcover Dataset, Montana. 30-meter electronic digital landcover dataset. http://nris.state.mt.us/nsdi/nris/nlcd/nlcdvector.html

Various Authors, 2000-2005. Correspondence in DEQ's PWS Section files regarding the Hunters Trailer Court Public Water Supply.

9.0 GLOSSARY

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

Barrier. A physical feature or management plan that reduces the likelihood of contamination of a water source from a potential contaminant source

Best Management Practices (BMPs). Methods for various activities that have been determined to be the most effective, practical means of preventing or reducing non-point source pollution.

Coliform Bacteria. A general type of bacteria found in the intestinal tracts of animals and humans, and also in soils, vegetation and water. Their presence in water is used as an indicator of pollution and possible contamination by pathogens.

Confined Animal Feeding Operation (CAFO). Any agricultural operation that feeds animals within specific areas, not on rangeland. Certain CAFOs require permits for operation.

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 present above a confined aquifer that inhibits the flow of water and maintains the pressure of the groundwater in the aquifer. The physical properties of a confining unit may range from a five-foot thick clay layer to shale that is hundreds of feet thick.

Delineation. The process of determining and mapping source water protection areas.

Geographic Information Systems (GIS). A computerized database management and mapping system that allows for analysis and presentation of geographic data.

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

Hazard. A relative measure of the potential of a contaminant from a facility or associated with a land use to reach the water source for a public water supply. The location, quantity and toxicity of significant potential contaminant sources determine hazard.

Hydraulic Conductivity. A constant number or coefficient of proportionality that describes the rate water can move through an aquifer material.

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

Large Capacity Septic System. Defined by Underground Injection Control regulations as an on-site septic system serving 20 or more persons.

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 to establish concentrations of contaminants in drinking water that are protective of human health.

Montana Bureau of Mines and Geology – Groundwater Information Center (MBMG/GWIC). The database of information on all wells drilled in Montana, including stratigraphic data and well construction data, when available.

Nitrate. An important plant nutrient and type of inorganic fertilizer that can be a potential contaminant in water at high concentrations. In water the major sources of nitrates are wastewater treatment effluent, 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. Examples of nonpoint- source pollution include agriculture, forestry, and run-off from city streets. Nonpoint sources of pollution, such as the use of herbicides, can

concentrate low levels of these chemicals into surface and/or groundwaters at increased levels that may exceed MCLs.

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

Point Source. A stationary location or a fixed facility from which pollutants are discharged. This includes any single identifiable source of pollution, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fracture, container, rolling stock (tanker truck), or vessel or other floating craft, from which pollutants are or may be discharged.

Pollutant. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource (e.g. groundwater used for drinking water).

Public Water System (PWS). A system that provides water for human consumption through at least 15 service connections or regularly serves 25 individuals.

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

Sensitivity. The relative ease with which contaminants can migrate to source water through the natural materials

Source Water. Any surface water, spring, or groundwater source that provides water to a public water supply.

Source Water Delineation and Assessment Report (SWDAR). A report for a public water supply that delineates source water protection areas, provides an inventory of potential contaminant sources within the delineated areas, and evaluates the relative susceptibility of the source water to contamination from the potential contaminant sources under "worst-case" conditions.

Source Water Protection Areas. For surface water sources, the land and surface drainage network that contributes water to a stream or reservoir used by a public water supply. For groundwater sources, the area within a fixed radius or three-year travel time from a well, and the land area where the aquifer is recharged.

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

Susceptibility (of a PWS). The relative 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.

Transmissivity. A number that describes the ability of an aquifer to transmit water. The transmissivity is determined by multiplying the hydraulic conductivity time the aquifer thickness.

Turbidity. The cloudy appearance of water caused by the presence of suspended matter.

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

Watershed. The region drained by, or contributing water to, a stream, lake, or other water body of water.

FIGURES

APPENDIX A

PWS SANITARY SURVEY

APPENDIX B

WATER QUALITY ANALYTICAL REPORT

APPENDIX C

MONITORING WAIVER RECOMMENDATIONS

MONITORING WAIVERS

Waiver Recommendation

The PWS currently has a wavier for Phase II inorganics (barium, cadmium, chromium, fluoride, mercury and selenium). Diquat, endothall, glyphosate, dioxins, ethylene dibromide (EDB), dibromochloropropane (DBCP), polychlorinated biphenyls (PCBs), cyanide and asbestos (at the source) are excluded from monitoring requirements by statewide waivers.

The PWS may be eligible for an additional inorganic chemical monitoring waiver: Phase V inorganics (antimony, thallium, beryllium and nickel). Under this waiver, the monitoring schedule for these parameters could be reduced to every nine years, rather than every three years.

The system may be eligible for a SOC waiver.

Despite the favorable inventory results, the source water sensitivity and PWS' potential susceptibility appears to preclude VOC waivers. Additionally, a VOC waiver would require a more detailed inventory, and the well's location within the trailer court would be problematic.

The PWS must be in compliance with monitoring requirements to be considered. Written waiver requests must be sent to DEQ at the address below:

Greg Butts
Montana DEQ, PWS Section
109 Cooperative Way
Suite 105
Kalispell, MT 59901

Upon receipt of a waiver request, DEQ will review the system's compliance history, historical monitoring results and source water setting. If waivers are considered appropriate, DEQ will provide the operator with application forms, guidance and technical assistance. If requested by DEQ, the PWS may also need to provide additional information regarding chemical use in the area within the Inventory Region. A site visit may be required to further investigate VOC and SOC use within the inventory region.

Monitoring Waiver Requirements

Use Waivers

A Use Waiver may be granted if it is determined that target organic chemicals were/are not used, manufactured, or stored in the area of a water source. If certain organic chemicals have been used, or if the use is unknown, the system would be determined to be vulnerable to organic chemical contamination and ineligible for a Use Waiver for those particular contaminants.

Susceptibility Waivers

If a Use Waiver is not granted, a system may still be eligible for a Susceptibility Waiver, if through a vulnerability assessment it is demonstrated that the water source would not be susceptible to contamination. The purpose of the vulnerability assessment procedures outlined in this section is to determine which of the organic chemical contaminants are in the area of investigation. The vulnerability assessment of a surface water source must consider the watershed area above the source, or a minimum fixed radius of 1.5 miles upgradient of the surface water intake. PWSs developed in unconfined aquifers should use a minimum fixed radius of one mile as an area of investigation for the use of organic chemicals. Vulnerability assessment of spring water sources should use a minimum fixed radius of one mile as an area of investigation for the use of organic chemicals. Surface water and shallow groundwater sources under the direct influence of surface water (GWUDISW) should assess the watershed area above the source, or a minimum fixed radius of one and one-half miles upgradient.

Given the wide range of landforms, land uses, and the diversity of groundwater and surface water sources across the state, additional information is often required during the review of a waiver application. Additional information may

include well logs, pump test data, water quality monitoring data from surrounding public water systems, delineation of zones of influence and contribution to a well; time-of-travel or attenuation studies; vulnerability mapping; and the use of computerized groundwater flow and transport models. DEQ's PWS Section and Source Water Protection Program will conduct review of an organic chemical monitoring waiver application. Other state agencies may be asked for assistance.

Susceptibility Waiver for Unconfined Aquifers

Unconfined aquifers are the most common source of usable groundwater. Unconfined aquifers are not contained within impervious geologic strata. As a result, the upper groundwater surface, or water table, in an unconfined aquifer is not under the pressure that produces hydrostatic head common to confined aquifers.

Unconfined aquifers are usually locally recharged from surface water or precipitation. In general, groundwater flow gradients in unconfined aquifers reflect surface topography, and the residence time of water in the aquifer is generally shorter than for water in confined aquifers. Similar water chemistry often exists between unconfined groundwater and area surface water, and physical parameters and dissolved constituents can be an indicator of the hydraulic connection between groundwater and surface water. Consequently, unconfined aquifers can be susceptible to contamination by organic chemicals migrating from the ground surface to groundwater.

Properly assessing a susceptibility waiver application for an unconfined source aquifer requires: site-specific information pertaining to the location and construction of the source development, monitoring history of the source, geologic characteristics of the unsaturated soil and vadose zones, and chemical characteristics of the organic chemicals pertaining to their mobility and persistence in the environment. The zone of contribution of the unconfined groundwater source must be defined and plotted. This should describe the groundwater flow directions, gradients, and a 3-year time-of-travel. All surface water bodies within 1,000 feet of the PWS well(s) must be plotted. Analytical monitoring history of the PWS well and those nearby should be provided as well.

APPENDIX D

CONCURRENCE LETTER