

**Piegan Border Station
Public Water Supply**
PWSID # MT0003334

***SOURCE WATER DELINEATION AND
ASSESSMENT REPORT***

Date of Report: **March 11, 2003**

Operator:

**Rob Cassidy
GSA
PO Box 329
Babb MT 59411**

ph: (406) 732-5507
email: robertd.Cassidy@gsa.gov

TABLE OF CONTENTS

INTRODUCTION.....	3
PURPOSE.....	3
LIMITATIONS.....	3
BACKGROUND	3
THE COMMUNITY.....	3
PHYSIOGRAPHY.....	4
<i>Table 1. Climatic Summary</i>	<i>Error! Bookmark not defined.</i>
THE PUBLIC WATER SUPPLY.....	4
<i>Table 2. List of Sources & Facilities</i>	<i>5</i>
WATER QUALITY.....	5
Piegan Border Station PWS Water Quality.....	5
DELINEATION	5
HYDROLOGIC CONDITIONS.....	5
CONCEPTUAL MODEL AND ASSUMPTIONS.....	6
DELINEATION RESULTS.....	6
Spill Response Region.....	6
Watershed Region.....	7
LIMITING FACTORS.....	7
INVENTORY.....	7
INVENTORY METHOD.....	7
INVENTORY RESULTS/SPILL RESPONSE REGION.....	7
<i>Table 5. Potential contaminant sources in the Watershed Region</i>	<i>8</i>
INVENTORY UPDATE.....	8
INVENTORY LIMITATIONS.....	8
SUSCEPTIBILITY ASSESSMENT	8
HAZARD DETERMINATION.....	8
BARRIERS AND SUSCEPTIBILITY.....	8
SUSCEPTIBILITY ASSESSMENT.....	9
MANAGEMENT RECOMMENDATIONS.....	9
REFERENCES.....	9
GLOSSARY.....	9
APPENDICES	ERROR! BOOKMARK NOT DEFINED.
APPENDIX A.....	ERROR! BOOKMARK NOT DEFINED.
Sanitary Survey & Other Correspondence.....	Error! Bookmark not defined.
APPENDIX B.....	ERROR! BOOKMARK NOT DEFINED.
Concurrence Letter.....	Error! Bookmark not defined.

LIST OF FIGURES

- [Figure 1 Vicinity Map](#)
- [Figure 2 Water Resources within Saint Mary's River watershed](#)
- [Figure 3 Spill Response Region](#)
- [Figure 4 Watershed Region](#)

INTRODUCTION

Purpose

This Delineation and Assessment Report was prepared by Joe Meek of the Source Water Protection Program of the Montana Department of Environmental Quality (DEQ) with input sought from Rob Cassidy, General Services Administration. This report is intended to meet the technical requirements for the completion of the source water delineation and assessment for the Piegan Border Station public water supply (PWS # MT0003334) as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to the protection of public drinking water supplies (PWSs) from contamination. The primary purpose of this source water delineation and assessment report is to provide information to assist the Piegan Border Station PWS operator in the identification of potential contaminant sources near the PWS water intake.

Delineation and assessment constitute major components of the Montana Source Water Protection Program. Delineation entails mapping the boundaries of source water protection areas for surface waters contributing to public water supply sources. Assessment involves identifying locations or regions within source water protection areas where contaminants may be generated, stored, transported, or disposed, and determining the relative susceptibility of drinking water to contamination from these sources.

Limitations

This report was prepared to assess threats to the Piegan Border Station public water supply, and is based on published data and information obtained from the PWS operator familiar with the area. The terms “drinking water supply” and “drinking water source” refer specifically to the source of the public water supplies, and not any other public or private water supply. Also, not all potential or existing sources of groundwater or surface-water contamination in the area of the facility are identified. Only significant potential sources of contamination in a limited area upstream from the intake were considered as per the Montana Source Water Assessment Program Plan. Every effort has been made to ensure the completeness of this report, however, it is possible that information may have been overlooked or unavailable.

Background information and data specific to this PWS were compiled to form the basis of this source water delineation and assessment report. This information is typically in the form of data summaries and the most recent sanitary survey. These have been included in the report as appendices.

The term “contaminant” is 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 to certain carcinogenic or toxic constituents that do not have MCLs but are considered to be significant health threats.

BACKGROUND

The Community

The General Services Administration operates the Piegan Border station, a transient non-community water system located on US 89 north of Babb Montana ([see Figure 1](#)). The border station handles international transportation between Piegan and Carway, Alberta and serves both the US and Canadian border patrol, immigrations, and customs agencies. On September 21, 2000, the U.S. General Services Administration (GSA) dedicated the new Piegan Border Station. This building is located on Blackfeet Nation territory, and it was through Government-to-Government consultation that GSA was able to make arrangements with the Blackfeet Indian Nation to construct this building.

The existing port facility (originally built in 1933) has been converted into four apartments for INS personnel and a housing area will be constructed to accommodate three USCS, two INS and two Border Patrol housing units. The housing area also includes all utility infrastructure, streets, street lighting and signage, fencing, sidewalks and landscaping. In addition to expanded office space, the station has 2 primary inspection lanes and one bi-level booth to allow servicing of oversize vehicles and incidental local commercial vehicles. A secondary inspection building has been built for both commercial buses and private vehicles, and readily accessible interview and detainment facilities. There is an impound lot for 10 vehicles, an oversized vehicle lot for five vehicles, and parking for 26 visitors and employees and a two lane firing range. Drinking water is provided through a public, non-

transient system with an intake on the Saint Mary's River two mile to the east and sewage is treated on-site at the border station site.

Physiography

The Piegan Border Station is about 4,400 feet above sea level at latitude 48.9930 and longitude 113.3805. The station is located in the plains, just east of the Rocky Mountain Front and Glacier National Park. The Lewis Mountains of Glacier National Park include forested lowlands to the west that rise to rocky alpine peaks of around 9,500 feet elevation. The climate in the vicinity of Piegan Border Station is typical of Rocky Mountain Front with warm summers and cold winters. Climatic data are presented on the following Table1.

Table 1. Babb Montana Climate Summary (site 240392) for Period of Record: 7/ 1/1948 to 12/31/2001

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	30.2	36.2	40.8	50.8	61.0	68.2	75.4	75.8	65.9	55.9	41.6	33.4	52.9
Average Min. Temperature (F)	6.4	12.2	17.3	26.7	34.6	40.8	44.0	43.4	36.1	30.0	20.0	10.8	26.9
Average Total Precipitation (in.)	0.76	0.70	0.89	1.37	2.88	3.55	1.88	1.92	1.77	0.93	0.79	0.81	18.27
Average Total SnowFall (in.)	10.3	8.5	12.3	6.8	1.2	0.1	0.0	0.0	1.0	3.0	5.3	8.9	57.4
Average Snow Depth (in.)	5	3	2	1	0	0	0	0	0	0	1	2	1

Western Regional Climate Center, <http://www.wrcc.dri.edu/>

The Public Water Supply

The Port of Piegan pumps surface water from Saint Mary River approximately two miles to a filtration facility located at the Port station as follows:

Raw water from the Saint Mary River is collected in a buried vertical culvert adjacent to the river. Two 5-HP submersible pumps deliver water through approximately two miles of 3-inch PVC pipe to the basement of the port building. A shed constructed from the culvert over the top of the river intake houses two 20-µm cartridge pre-filters operated in parallel. Chlorine is injected at this point.

After water is pumped from the Saint Mary River, it enters a 2,000-gallon insulated steel storage tank located in the basement of the Port building. From this tank, water is then pumped by two 5-HP jet pumps through four cartridge filters consisting of 5-µm and absolute *Giardia* 1-µm Harmsco filters that are operating in parallel. The water is then pressurized through a 500-gallon pressure tank before distribution consists of ¾-inch to 1-½-inch copper and galvanized pipe.

Table 2. List of Sources & Facilities

Facility	PWS Facility ID	Description	Notes
Intake at Saint Mary's River	IN002	Surface Water Intake (Active) consists of collector pipes in the river bed connected to vertical vault	Reconstructed in 2001
Treatment Point	TP002	Cartridge filtration with chlorination	Current treatment plan put on line in 2001
Distribution System	DS001	Distribution of water via water mains	Transmission main is 3" PVC, Distribution consists of ¾" to 1 ½" lines.

Water Quality

Public water systems must conduct routine monitoring for contaminants in accordance with Federal Safe Drinking Water Act requirements. Transient, non-community PWSs are required to conduct routine monitoring for coliform bacteria, nitrate, and nitrite. All contaminant concentrations detected in required samples must comply with numeric maximum contaminant levels (MCLs) specified in the Federal Safe Drinking Water Act.

Other than routine sampling by the Piegan Border Station PWS of its water, no other water quality data have been considered for the purposes of this report. Some water quality data have been collected by the DEQ TMDL program to determine classification of the local streams and need for inclusion on the listing of impaired waterways. The Saint Mary's River is not listed as impaired for drinking water uses on the TMDL listing. The State of Montana classifies the Saint Mary's River as B-1 surface water in the Administrative Rules of Montana (ARM 17.30.613). Surface waters designated as B-1 are to be maintained as suitable for drinking, culinary, and food processing purposes after conventional treatment for the removal of naturally present impurities. These waters must also be maintained as suitable for bathing, swimming, and recreation; growth and propagation of salmonoid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

Piegan Border Station PWS Water Quality

Within the past five years, there have been no positive coliform samples collected during routine contaminant monitoring. Nitrate has averaged 1.3 mg/L over the past decade with a range from non-detect to 2.91 mg/L.

DELINEATION

The source water protection area, the land area that contributes water to the Piegan Border Station public water supply surface water intake, is delineated in this chapter. The purpose of delineation is to map the source of the PWS's drinking water and to define areas within which to prioritize source water protection efforts.

Source water protection areas for surface water sources are typically subdivided into Spill Response and Watershed Regions, each with separate management goals. The Spill Response Region encompasses an area upstream of the PWS intake into which contaminants can be drawn with little lag time, typically in the range of four hours. The Watershed Region encompasses the entire area of the watershed upstream of the PWS intake.

Hydrologic Conditions

The Saint Mary's River above the Piegan Border Station intake is approximately 24 miles long and includes several lakes and tributaries (see Table 3). The major watershed features within the approximately 490 square mile area as depicted on [Figure 2](#).

Table 3. Saint Mary's River Watershed

Name	Length, Miles
Upper Saint Mary Lake	31.73
Lake Sherburne	25.42
Saint Mary Lake	25.3
Saint Mary River	24.07
Swiftcurrent Creek	13.85
Duck Lake	9.49
Gunsight Lake	2.2

Using DEQ Source Water Protection Program criteria for ranking aquifer/source water sensitivity (Table 5 below), the Piegan Border Station PWS source water is considered highly sensitive to contamination. The sensitivity ranking is a result of the surface water source for the PWS.

Table 4. Source Water Sensitivity

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

Conceptual Model and Assumptions

If contaminants were spilled or discharged into the Saint Mary's River upstream of the intake, these substances could potentially reach the surface water intake for this PWS before the PWS operator can close/isolate them. Contaminants derived from sources farther removed from the river may be flushed into the stream channel during spring snowmelt or storm events.

Delineation Results

For PWSs with surface water intakes a Spill Response Region and a Watershed Region are typically delineated and inventoried. It should be noted that the greatest threats to this water supply are from activities directly around and upgradient from the surface water intake.

Spill Response Region

The Spill Response Region is area that extends one-half mile on either side of the river and upstream a distance of 10 miles (see Figure 3). This area should be the focus of management efforts to monitor for land uses or activities that could result in a discharge of a significant quantity of a regulated contaminant (coliforms, nitrate) that could impact the PWS.

Watershed Region

The Watershed Region for the Piegan Border Station PWS intake encompasses the entire Saint Mary's River watershed around and upstream of the PWS intake ([see Figure 4](#)).

Limiting Factors

The delineation for the Piegan Border Station PWS Watershed Region is based on simple watershed mapping. Contaminant transport rates and concentrations of contaminants present in any given reach of a stream will vary depending on stream/river flow conditions, ground water flux into the local streams, contributions from overland flow, soil types, slope, characteristics of riparian vegetation, the extent of riparian vegetation buffer zones, the extent and duration of contamination, contaminant solution density, adsorption, mechanical dispersion, biological transformation, dilution, molecular diffusion, adsorption, precipitation, oxidation, and volatilization. As a result, some areas within the Watershed Region may be more conducive to contaminant transport than others, and should be designated as higher priority areas for source water protection efforts. No effort has been made to characterize groundwater flow to the river or intake structure. As will be described later in this report, the area around the intake and the intake structure itself are probably the most vulnerable elements of this public water supply.

INVENTORY

An inventory of potential sources of contamination was conducted to assess the susceptibility of the Piegan Border Station PWS to contamination, and to identify priorities for source water protection planning. Inventories were conducted within the delineated Watershed Region for significant potential contaminant sources. The significant contaminants for the transient PWS at Piegan Border Station PWS include nitrate and coliform bacteria.

Inventory Method

Available databases were initially searched to identify land uses that are potential sources of regulated contaminants in the inventory region. Potential contaminant sources are designated as significant if they fall into one of the following categories:

1. Cultivated cropland
2. Animal feeding operations
3. Wastewater lagoons or effluent irrigation sites
4. Septic systems

Inventory Results/Spill Response Region

Cultivated cropland and low septic system density exist on very limited area within the spill response region. There are no sewage lagoons, animal feeding operations, or large capacity septic systems within the Inventory Region. The only site of note relative to a potential contaminant source is the canal road bridge crossing about 5 miles upstream from the intake due to potential spills or dumping directly into the Saint Mary's River. The canal road is not widely used; consequently it has limited spill potential. The rural nature of this region of Montana makes the canal road bridge an unlikely location for intentional dumping of any significance. A petroleum pipeline crosses the river just downstream from the water system intake.

Inventory Results/Watershed Region

The watershed is predominantly grassland in the lower elevations, evergreen forest at mid-elevations, and alpine in the upper reaches. Sediments can be concern since they can interfere with treatment processes. Few of the land uses in the watershed pose a threat of contamination to the PWS intake unless certain extraordinary activities or occurrences promote the mobilization of sediments by erosion. These activities would be extensive logging or catastrophic forest fires that would allow the erosion and transport of sediments directly into the river or tributaries and would reach the intake structure. The upper watershed is managed as a national park where some "let it burn" fire management may occur.

Table 6 below lists the potential contaminant sources identified within the Watershed Region.

Table 5. Potential contaminant sources in the Inventory and Watershed Region

Potential Source	Potential Contaminants	Hazard	Significance of this Potential Source
Human tampering and/or vandalism, intentional spills	Assorted contaminants (chemical and biological)	Intentional or unintentional damage to the intake, or the intentional introduction of contaminants to the water source.	Moderate. This is due to the effect this will have on the system's one source of water but limited by the remote nature of the intake.
Loss of the evergreen forest	Turbidity, TDS, nitrate, nitrite	Erosion after logging activities or forest fires.	Not significant. This is due to the infrequency of these events. Additionally the watershed is managed to protect the water supply.
Pipeline	VOCs	Spills, leaks, vandalism	Low. The intake is upstream from the river crossing.

From the above list of potential contaminant sources, none are considered significant based upon the volume of potential releases, the volume of hazardous materials involved, the potential of the released materials to impact nearby surface water or groundwater, and the proximity of the releases to the PWS surface water intake. It should be noted that this is a very short list of potential contaminants relative to most surface water sources.

Inventory Update

To make this SWDAR a useful document in the years to come, the owners, manager(s), or the certified water system operator(s) for the public water supply for the Piegan Border Station should update the inventory for their records every year. Changes in land uses or recognizable potential contaminant sources should be noted and additions made as needed. The complete inventory should be submitted to DEQ at least every 5 years to ensure that this report/plan stays current in the public record.

Inventory Limitations

The extent of the potential contaminant source inventory is limited in several respects. The inventory is based on data readily available through state documents, published reports, and GIS databases. Documentation may not be readily available on some potential sources. As a result, all potential contaminant sources may not have been identified or recognized as being significant.

SUSCEPTIBILITY ASSESSMENT

Susceptibility of the Piegan Border Station PWS 's source water is determined by two factors: the hazard of a potential contaminant and the presence of barriers that can prevent contamination from actually reaching the water system intake. Susceptibility is assessed in order to prioritize potential pollutant sources in the Inventory Region and to guide management actions that might be undertaken by local entities, in this case the Piegan Border.

Inventory Results/Spill Response Region Hazard Determination

Hazard is dependent on the proximity of potential releases to the Saint Mary's River within the spill response regions and the health affects associated with potential contaminants. Hazard ratings for contaminant sources are assigned based on criteria established by the Montana Source Water Protection Program. Barriers can be anything that decreases the likelihood that contamination will reach the PWS's surface water intake. Examples of possible barriers include: a vegetated riparian area, protective forest management practices, locked gates on access roads, and ensuring significant contaminant sources are properly managed.

Barriers and Susceptibility

Barriers to contamination can be anything that decreases the likelihood that contaminants will reach a surface water intake. Barriers can be engineered structures, management actions, or natural conditions. Examples of engineered barriers are spill catchment structures for industrial facilities, leak detection for underground storage tanks, or storm water diversion structures. Emergency planning and best management practices are considered management barriers. Thick clay-rich soils, a deep water table or a thick saturated zone above the well intake can be a natural barrier. A natural barrier for a surface water intake can be a wide and dense riparian zone around the water body.

Susceptibility Assessment

The Piegan Border Station PWS has no identified significant potential contaminant sources within the spill response region and therefore, the source water has low susceptibility to all sources of regulated contaminants.

Management Recommendations

Management recommendations are included for the Piegan Border Station PWS and may be considered additional barriers to ensure low susceptibility of the intake to regulated contaminants. If the surface water intake for the PWS is impacted, an alternate source can supply needed water until the primary source is remediated.

Management recommendations are as follows:

- Limit access to the area of the surface water intake to authorized personnel. This limiting of access can be accomplished by erecting locked gates at access points and the erection of fencing and placement of signs.
- Develop an alternate source of water. In the event that the current surface water intake becomes unavailable (turbidity, bacteriological contamination, chemical contamination, drought, or other) an alternate source of water can at least supply water until the surface water system is back on line.

REFERENCES

DEQ Permitting and Compliance Division, **1999. Sanitary Survey** for Piegan Border Station PWS - MT0003334.

Department of Environmental Quality, 1999. Montana **Source Water Protection Program**, Approved by EPA in November 1999, inclusive of **personal communications** with Joe Meek & others.

Montana State Library - Natural Resource Information Service, **2000. Graphical and tabular information:**
<http://nris.state.mt.us/mapper/>

Montana State Library - Natural Resources Information System (NRIS) **2000 map base of the USGS Topographical coverage** at 1:24,000 scale in MrSID format.

GLOSSARY

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

Alkalinity. The capacity of water to neutralize acids.

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.

CAFO. Confined animal feeding operation, which is typically registered by the State of Montana.

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.

Delineation. A process of mapping source water management areas.

Effective Porosity. The percent of soil, sediment, or rock through which fluids, such as air or water, can pass. Effective porosity is always less than total porosity because fluids can not pass through all openings.

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.

IOCs. Inorganic Chemicals

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

Large Capacity Septic Systems. As defined by the US EPA Underground Injection Control (UIC) Program, these are septic systems that serve more than 20 persons per day for a period greater than 6 months of the year.

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 or virus 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.

Porosity. The percent of soil, sediment, or rock filled by air, water, or other fluid.

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

POTW. Publicly Owned Treated Wastewater facility, typically a municipal sewer treatment plant with a wastewater discharge.

SIC Code. The U.S. Standard Industrial Classification (SIC) Codes classify categories of businesses. SIC Codes cover the entire range of business categories that exist within the economy.

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.

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. 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.

Total Maximum Daily Load (TMDL). The total pollutant load to a surface water body from point, non-point, and natural sources. The TMDL program was established by section 303(d) of the Clean Water Act to help states implement water quality standards.

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

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.

Volatile Organic Compounds (VOC). Any organic compound which evaporates readily to the atmosphere (e.g. fuels and solvents).

Recharge Region / Watershed. The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common delivery point.