Two Mile Tract
Public Water System

PWSID # MT0003328

SOURCE WATER DELINEATION AND ASSESSMENT REPORT

04/02

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INTRODUCTION

This Delineation and Assessment Report was completed by HDR Engineering, Missoula, MT, with assistance from Land and Water Consulting, Kalispell, MT for:

Two Mile Tract Homeowner's Association
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PURPOSE

This report is intended to meet the technical requirements for the completion of the delineation and assessment report for the Two Mile Tract Homeowner's Association (HOA) 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 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, which 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 assessing the relative potential for contamination of drinking water by these sources. The primary purpose of this source water delineation and assessment report is to provide information that helps the Two Mile Tract HOA protect its drinking water source.

Limitations

This report was prepared to assess threats to the Two Mile Tract HOA public water supply (PWS), 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 Two Mile Tract HOA PWS 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 Two Mile Tract PWS are identified. Only potential sources of contamination in areas that contribute water to its drinking water source are considered.

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 constituents that do not have MCLs but are considered to be significant health threats.

CHAPTER 1
BACKGROUND

The Community

The Two Mile Tract Homeowner's Association PWS serves the Two Mile Tract subdivision, which is located approximately two miles west of the City of Kalispell. The subdivision lies within the planning area that is designated in ***Water, Sewer and Storm Drainage Systems Facility Plan 2000,*** a document that was recently adopted by the City of Kalispell. This study area will be used to evaluate the water supply system characteristics and is shown on the map in Appendix A. The study area is bounded by the Flathead River on the east, the north border of Sections 26, 27, 28, 29, and 30 of Township 29 North, Range 21 West and Sections 25, 26, and 27 of Township 29 North, Range 22 West on the north, West Valley Drive on the west, Lower Valley Road and Foys Lake on the south.

Kalispell serves as the population and commercial center of Flathead County and portions of four surrounding counties. Kalispell is the Flathead County seat. Major industrial, health care and government facilities are also located in the Kalispell area. The economic base of the Kalispell area and Flathead County is diverse. The county's leading industries are wood products manufacturing, microelectronics manufacturing, metals refining, railroad, agriculture, tourism, and the federal government. The area is also attractive to retired individuals and the local retirement income represents a substantial and growing portion of the local economy. The area's proximity to Glacier National Park and Big Mountain, a destination ski resort, makes it a year-round center for the tourist trade.

The Kalispell area is a growth area and in recent decades, growth rates in the City–County planning jurisdiction have fluctuated in a cyclical pattern between moderate and boom levels. The average annual growth rate of the planning jurisdiction population was 1.7 percent in the 1960's, 3.7 percent in the 1970's, and 1.8 percent in the 1980's [1]. The 1990 census data was adjusted using recent tax information to estimate the current year (2000) population. The overall population growth in the study area between 1990 and 2000 was approximately 17 percent. Population and employment data for the study area is summarized in Table 1-1.

Table 1-1. Existing Population and Employment

Category	1990		2000	
	Population	Employment	Population	Employment
Study Area [1]	26,672	15,246	32,007	22,753

1 Population data for all analysis zones combined

The study area is currently served by City of Kalispell water and sewer utilities, which serve the area inside the Kalispell city limits, the Evergreen Water and Sewer District, which is located

[1] Growth rates as stated in the Resources and Analysis Section, Kalispell City County Master Plan, Flathead Regional Development Office, November 1997.

northeast of the City of Kalispell and the Village Sewer District, located north of Kalispell. The City of Kalispell provides water and sewer service to the majority of the population in the study area. The Evergreen Water and Sewer District discharges sewage to the City of Kalispell and provides water to a portion of the City. The Village Sewer District receives sewer service from the City of Kalispell and water service from the Evergreen Water and Sewer District. Table 2-2 is a summary of population and employment currently served by these utilities.

Table 2-2 – Existing Population and Employment Served By Utilities

Category	2000	
	Population	Employment
Kalispell Sewer	14,639	15,573
Kalispell Water	14,639	15,573
Evergreen Sewer District	5,072	2,740
Evergreen Water District	7,372	3,289
Village Sewer District	813	119

Water services outside the City of Kalispell and the Evergreen and Village service areas consist of a variety of small public and private water systems utilizing groundwater as their source. Wastewater treatment for the areas outside the sewer service areas described above, is accomplished with on-site septic systems.

The major transportation corridors include Montana State Highway 93, which is the primary north-south corridor connecting Kalispell with Whitefish to the north and Polson and Missoula to the south. Montana State Highway 2 is the major east-west corridor connecting Kalispell to Libby on the west and Columbia Falls to the northeast. The Burlington Northern/Santa Fe Railroad also passes through the City of Kalispell.

Geographic Setting

The Two Mile Tract Homeowner's Association PWS is located two miles west of the City of Kalispell in the heart of the Flathead Valley. The Flathead Valley is a south to northwest trending intermountain valley in western Montana. The valley is surrounded by the Flathead and Mission mountains in the east and the Cabinet and Salish mountains to the west and north. Glacier National park is north and east of the valley. The eastern half of the study area encompasses the confluence of the Flathead, Whitefish, and Stillwater Rivers. This area is characterized as a large complex of swales, streams, wetlands, and alluvial terraces comprised of a significant amount of floodplain and hydric soils. The Evergreen alluvial aquifer located generally along the Flathead River floodplain, is a highly permeable sand and gravel aquifer controlled by the flows of the river. These hydrogeologic features were a factor driving the construction of a public sewer system for Evergreen.

The western half of the study area, where the Two Mile Tract HOA PWS is located, is

characterized by agricultural land with foothills in the Southwest. Ashley Creek is the main drainage. Foys Lake is located in the southwestern foothills area. The maps in the Appendices to this report graphically depict the characteristics of the study area.

The climate of the Flathead Valley is consistent with that of other lower elevation basins in the northern Rocky Mountains, west of the Continental Divide. The elevation at Kalispell is 2,970 feet. The average high and low temperatures at the weather station in Kalispell are 81 and 48 degrees F in July and 28 and 13 degrees F in January. Average annual precipitation falls mostly as winter snow and totals an average of 16.6 inches.

General Description of the Source Water

The majority of drinking water in the Kalispell area comes from a deep artesian aquifer that spans the region. This groundwater aquifer generally flows from northwest to southeast across the area, toward Flathead Lake. Because of the depth and semi-confined or confined nature of the aquifer, contamination from septic systems or other sources is unlikely. Flathead Lake, one of the cleanest lakes of its size in the world, is fed by waters from the Flathead, Stillwater, and Whitefish Rivers, as well as Ashley Creek, all of which flow through the study area.

Flathead Lake, the Whitefish River, and Ashley Creek are all on the State of Montana Section 303(d) list of water quality impaired water bodies for nutrients. Concerns over declining water quality in Flathead Lake have led to development of a TMDL (Total Maximum Daily Load) and voluntary nutrient reduction strategy for Flathead Lake. Although nutrients significantly impact surface water quality, the impact to the drinking water taken from the groundwater sources in the area is negligible.

The City of Kalispell is served by a potable water system consisting of groundwater wells, with a distribution pipe network, an elevated storage tank and ground level storage tanks; a sanitary sewer collection system consisting of a network of gravity sewers and lift stations leading to a wastewater treatment plant; and a storm sewer collection system consisting of a network of gravity piping as well as several above grade detention basins. Demands on these facilities are increasing as Kalispell grows and more stringent water quality standards are implemented.

A public sewer system was installed in Evergreen in 1993 due to concerns about pollution of Flathead Lake from septic systems within the alluvial aquifer, located generally along the Flathead River floodplain.

The wastewater that is generated in the Two Mile Tract is treated in individual septic systems located at each property. The wastewater from the City of Kalispell and Evergreen areas is treated at the Kalispell Advanced Wastewater Treatment Facility, located on the south edge of the City of Kalispell, and discharges to Ashley Creek.

The Public Water Supply

The Two Mile Tract PWS supplies water to approximately 128 full time, year-round residents in the Two Mile Tract. There are a total of 38 service connections that supply the water to the homes in the subdivision, none of which are metered. The system has one well that was

completed on May 11, 1979. The well is 180 feet deep with an 8-inch steel well casing. The casing has perforations from 161.5 feet to 175.25 feet. The top 55 feet of the well casing is sealed with bentonite grout. The static water level in the well is 59.75 feet and the well yield is 300 gallons per minute. The well is located about 100 yards to the west of a small wooden well house that is located within the subdivision at the edge of Lot 10. The wellhead is adjacent to West View Drive and is protected from traffic by bollard pipes. A single submersible pump within the well pumps the water to a pressure control assembly in the well house. There is a battery of eleven captive air pressure tanks in the well house. A well log is included as appendix H.

The distribution system for the Two Mile Tract PWS consists of PVC water mains that distribute the water to the subdivision.

Water Quality

The deep aquifer that is utilized for the supply of drinking water for the Kalispell area has a low susceptibility to surface contamination and no major sources of contamination are apparent in the area. Selected water quality data for two wells in the nearby area are presented in Appendix J. The tables show the sample results and compare the results against the drinking water standards. The levels of contaminants in the water are substantially lower than the standards in all cases. Other possible sources of contamination and their potential to impact the water quality will be evaluated in the subsequent chapters of this report.

CHAPTER 2
DELINEATION

The source water protection area, the land area that contributes water to the Two Mile Tract HOA PWS, is identified in this chapter. Three management areas are identified within the source water protection area: the control zone, inventory region, and recharge region. The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the well. The inventory region represents the zone of contribution of the well, which approximates a three-year groundwater time-of-travel. Analytical equations describing ground water flow using estimates of pumping and aquifer characteristics and simple hydrogeologic mapping are used to calculate groundwater time-of-travel distance. The recharge region represents the entire portion of the aquifer which contributes water to the Two Mile Tract PWS.

Hydrogeologic Conditions

Kalispell is located within the center of the Flathead Valley in northwestern Montana. The Flathead Valley is a northwest trending intermontane basin forming the southern extension of the Rocky Mountain Trench. The valley is bounded on the east by the Swan-Whitefish fault located along the base of the Swan Range and on the west by the Kalispell fault at the base of the Salish Mountains. The mountains rise abruptly 4,500 feet above the valley floor. Gravity data indicate the Cenozoic basin-fill in the central part of the valley may be as much as 4,000 feet thick (Noble and others, 1982). Although Tertiary rocks are not exposed, it is believed that Miocene and Oligocene sediments rest unconformably on Precambrian bedrock. Pleistocene continental and mountain glaciation advanced southward through the Trench in the vicinity of Kalispell depositing a layer of glacial till. As the glaciers receded, meltwater lakes pooled in areas where drainage was impeded, leaving lakebed deposits. In contrast, fluvial outwash deposits accumulated where discharge flowed unrestricted. It is estimated that 600 to 1,000 feet of Wisconsin-age Pleistocene glacial deposits overlie the Tertiary sediments. Surficial geology of the area is shown on the geologic map in Appendix C.

The two primary aquifers recognized in the Kalispell area are the shallow alluvial aquifer and the deep artesian aquifer (Konizeski and others, 1968; MBMG, 20000). The shallow alluvial aquifer is composed of unconsolidated fluvial sediments (i.e., sand and gravel) deposited along the floodplain of the Flathead, Whitefish, and Stillwater Rivers. The aquifer thickness ranges from 20 to 100 feet. Low permeability glacial till and lakebed deposits of various thicknesses separate the shallow aquifer from the deep artesian aquifer. The low permeability deposits are nearly laterally continuous in the area and generally separates surface water and shallow groundwater from the deep artesian aquifer.

The deep artesian aquifer consists of a series of intercalated sand and gravel layers with fine-grained interbeds. These deposits probably represent the paleo-channel of the Flathead River. Recent work in the central and eastern portions of the valley indicate this package of sediments is hydraulically interconnected and responds as a single aquifer demonstrating anisotropic characteristics (Shapley, 1992; and Noble, 1998). The thickness of the deep artesian aquifer is unknown but a well located in Section 18 of Township 29 North, Range 21 West was drilled to a depth of more than 800 feet and had not penetrated the base of the aquifer. In the western

portion of the Flathead Valley the confining unit overlying the deep artesian aquifer consists of glacial till composed of clayey and silty gravel. Northwest of Kalispell, the till is overlain by glacial outwash deposits.

The Two Mile Tract PWS derives groundwater from the deep artesian aquifer. In this area, the upper surface of the aquifer is approximately 138 feet bgs and is overlain by glacial till (clayey silt, sand, and gravel from approximately 29 to 138 feet bgs), capped by glacial outwash (sand) at the surface. Groundwater flow directions in the deep artesian aquifer are generally from north to south in the center of the valley (see groundwater flow map in Appendix D). Near the edges of the valley, groundwater flows toward the center of the valley. In the vicinity of the Two Mile Tract PWS, groundwater flow directions are northwest to southeast. Because the aquifer is an extensive confined artesian system, seasonal fluctuations in groundwater levels and flow directions likely are small.

Based on hydrogeologic conditions, the Two Mile Tract PWS is classified as having a Low Source Water Sensitivity, according to the following table. The deep artesian aquifer is a deep confined groundwater system.

Source Water Sensitivity
High Source Water Sensitivity
Surface water and GWUDISW
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)

A summary of the published and unpublished sources of information were used in this assessment and are presented in Tables 2-1 and 2-2.

Table 2-1. List of geologic or hydrogeologic investigations near the Two Mile Tract PWS area

Title of Project	Period of Project	Area Covered	Project Purpose
Montana Groundwater Assessment Atlas for the Flathead Lake Area. MBMG, (2000)	Compilation of data and interpretations from approximately 1968 to 2000	Flathead Valley north of Flathead Lake	Groundwater Characterization
Occurrence and Characteristics of Ground Water in Montana: Montana Bureau of Mines and Geology Open-File Report 99, vol. 2, 132 p. Noble and Others (1982)	Compilation of data and interpretations prior to 1982	Montana	Groundwater Characterization
Geology and Ground Water Resources of the Kalispell Valley, Northwestern Montana: Montana Bureau of Mines and Geology Bulletin 68, 42 p. Konizeski and Others (1968)	Compilation of data and interpretations prior to 1968	Flathead Valley north of Flathead Lake	Groundwater Characterization
Analysis of Evans Farm's Aquifer Test, East Flathead Valley, unpublished report on MDNRC Provisional Permit Application No. 066522 Shapley (1990)	1990	Eastern Flathead valley	Characterization of Aquifer
Groundwater Resources of the Upper Flathead Basin, Interpreting the Landscape Through Science Symposium, Flathead Valley Community College, pp 11-14. Noble (1998)	Compilation of data and interpretations prior to 1998	Upper Flathead Valley	Characterization of Aquifer

Table 2-2. List of geologic or hydrogeologic maps available for the Two Mile Tract PWS area

Title or Description	Date	Area Covered	Reference
Montana Groundwater Assessment Atlas for the Flathead Lake Area	2000	Flathead Valley north of Flathead Lake	(MBMG, 2000)
Geologic and Structure Maps of the Kalispell 1 x2 Quadrangle, Montana, and Alberta and British Columbia. USGS Miscellaneous Investigation Series	1992	Northwest Montana, Southern Alberta and British Columbia	(Harrison and Others, 1992)

Conceptual Model and Assumptions

A conceptual hydrogeologic model is a simplified representation of the hydrogeologic system. The conceptual hydrogeologic model for the Two Mile Tract PWS area is shown in Appendix D. Groundwater occurs in a permeable, moderately sorted, confined artesian, sand and gravel aquifer that is overlain and confined by poorly sorted, low permeability, glacial till. The low permeability glacial till likely impedes or limits direct surface infiltration of rain or snowmelt to the aquifer. The lateral extent of the aquifer is limited by Flathead Lake to the south, and mountains of the Whitefish Range, Swan Range, and Salish Range to the north, east and west, respectively. Groundwater flow direction is from northwest to southeast. Recharge to the aquifer likely comes from surface infiltration of rain and snowmelt particularly around the valley margins in the foothills of the mountains and groundwater interflow from bedrock in the surrounding mountains. Water flows from the recharge areas vertically downwards to the aquifer, then horizontally towards the central part of the Flathead Valley and Flathead Lake. Groundwater discharge occurs by discharge to Flathead Lake and by groundwater withdrawal from wells. Given the hydrogeologic setting it is unlikely that water table elevations or groundwater flow directions vary appreciably from season to season.

Well Information

The well was drilled to a depth of 180 feet with an air rotary drilling rig in May 1979. The well casing is 8-5/8-inch diameter steel from the surface to 161 feet, 8-5/8 inch copper alloy screen from 161 to 175 feet bgs, and 6-5/8 inch steel casing from 175 to 180 feet bgs. The static water level in the well is 59 feet. The pumping water level was 129 feet after eight hours of pumping at 300 gallons per minute. The well yield is reported to be 300 gallons per minute. Puddled clay (bentonite) around the driven casing was used to provide an annular seal. The well log is included in Appendix H.

Table 2-3. Source well information for Two Mile Tract PWS

Information	Well #1
PWS Source Code	WL002
Well Location (T, R, Sec or lat, long)	
MBMG #	82783
Water Right #	
Date Well was Completed	May 1979
Total Depth	180 feet
Screened Interval	151 to 175 feet
Static Water Level	59 feet bgs (in 1979)
Pumping Water Level	129 feet bgs
Drawdown	70 feet
Test Pumping Rate	300 gpm
Specific Capacity	4.29 gpm/ft

Methods and Criteria

Source water protection areas are divided into zones or regions according to the amount of time water takes to reach the water supply intake. Intake for the Two Mile Tract PWS is the water supply well. Source water protection areas for groundwater-based systems, in order of increasing size and time of travel to intakes are the control zone, inventory region, and recharge region. The methods and criteria used to delineate the source water protection zones for the Two Mile Tract water system are specified in the DEQ's SWPP (DEQ, 1999). For the Two Mile Tract system, the criteria for confined systems were followed.

The control zone is based on a fixed distance of 100 feet radius from each well and the inventory region is a fixed radius of 1,000 feet. The recharge region is based on geologic mapping and locations of hydrologic boundaries. The analytical method used to calculate groundwater time-of-travel is the Uniform Groundwater Flow Equation described in Appendix E of the SWPP (DEQ, 1999). Copies of the uniform flow equation time-of-travel calculations are in Appendix E and are summarized in Table 2-4.

Aquifer Properties for Estimation of Groundwater Time-of-Travel

Aquifer properties used to estimate groundwater time-of-travel (TOT) are based on site-specific information derived from well drilling logs, hydrogeologic maps, short-term pumping tests and other physical measurements made on the PWS wells. A summary of the hydrogeologic characteristics for the PWS wells is presented in Table 2-4.

Thickness of the aquifer was estimated based on driller's logs and assumed to be equal to the length of the screened section of the well casing. The screened interval was also used to calculate the hydraulic conductivity from the transmissivity value.

Transmissivity values for the well (Table 2-4) were calculated based on the drawdown observed during a short-term (eight-hour) pumping test) using the following equations:

Modified Jacob Equation (Appendix 16.D in Groundwater and Wells, 2nd. Ed.; Driscoll, 1986)

Transmissivity (ft2/day) = [2000 x Pumping Rate (gpm)/Drawdown (ft)]/7.48 (gallon/ft3)

Empirical Equation of Razack and Huntley (in Applied Hydrogeology, 3rd Ed., Fetter, 1994)

Transmissivity (ft2/day) = 33.6[Pumping Rate (ft3/day)/Drawdown (ft)]$^{0.67}$

Hydraulic conductivity and transmissivity values used in the TOT calculation are the average values calculated from the above equations. Effective porosity values were estimated based on literature values (Freeze and Cherry, 1979) for sand and gravel.

Hydraulic gradient was estimated from the MBMG potentiometric map (MBMG, 2000; see Appendix D) to be 50 feet in one mile, or 0.01 ft/ft. Groundwater flow direction is determined to be northwest to southeast based on the MBMG potentiometric map.

The assumed pumping rate is based on the average production rate for the water system (49,300 gpd or 34 gpm) given in the Sanitary Survey (see Appendix I). Although short-term pumping rates are likely much higher during peak demand periods, the average pumping rate is thought to better represent long-term pumping rates. Because the TOT calculation is intended to predict groundwater travel distances over relatively long time periods (1 year and 3 years), long-term pumping rates are believed to be most appropriate for TOT calculations.

Table 2-4. Estimates of input parameters used to delineate the source water protection area

Input Parameter	Values Used in TOT Calculation	Well #1
PWS Source Code	---	03328-WL002
Transmissivity (ft2/day)	2084	1146 to 3023
Thickness (feet)	24	24
Hydraulic Conductivity (ft/day)	87	48 to 126
Hydraulic Gradient (ft/ft)	0.01	0.01
Flow Direction	Northwest to Southeast	Northwest to Southeast
Effective Porosity	0.25	0.25
Pumping Rate (gpm)	34	Pump capacity 90 gpm
1-Year TOT*	1440	---
3-Year TOT*	4030	---

*Time of Travel

Delineation Results

The results of the delineation of source water protection areas are shown in Appendix F. The control zone is based on a fixed distance of 100 feet radius from the wells; the inventory region is a fixed radius of 1,000 feet, and the recharge region is based on geologic mapping, groundwater flow directions and locations of hydrologic boundaries, principally the divide along the Salish Mountains to the west of the Two Mile Tract HOA PWS.

Limiting Factors

The ground water flow rate calculations use values that are considered representative of actual conditions. This approach reflects the uncertainties in the data used in the modeling process, with estimates reflecting conservative conditions. While the inventory regions are delineated using criteria for confined aquifers, ground water flow rates were estimated to demonstrate the general properties of the ground water flow system for assessments on a more regional scale. The assumed groundwater flow direction and gradients in the area are based on regional data, actual local gradients, and flow directions may vary. Limitations also result from the use of the Uniform Flow Equation for analysis of flow rates, which does not account for pumping from multiple wells, and the density and frequency of pumping from wells installed at various

locations across the study area. An additional limitation on this assessment reflects the nature of the fluvially-deposited aquifer, where deposit types reflect variable shapes, and can exhibit rapid changes in hydraulic properties, hydraulic gradients and flow directions over very short distances.

CHAPTER 3
INVENTORY

An inventory of potential sources of contamination was conducted for the Two Mile Tract HOA within the control and inventory regions. Potential sources of all primary drinking water contaminants and Cryptosporidium were identified; however, only significant potential contaminant sources were selected for detailed inventory. The significant potential contaminants in the Two Mile Tract inventory region are nitrate, pathogens and fuels.

The inventory for Two Mile Tract HOA focuses on all activities in the control zone, certain sites or land use activities in the inventory region, and general land uses and large facilities in the recharge region.

Inventory Method

Available databases were initially 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: Urban and agricultural land uses were identified from data collected by the Montana Department of Natural Resources (1982) and the City of Kalispell Land Use Report (2003).

Step 2*:* EPA's Envirofacts System was queried to identify EPA regulated facilities. This system accesses the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory (TRI), Permit Compliance System (PCS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS). The available reports were browsed for facility information, including the Handler/Facility Classification, to be used in assessing whether a facility is a significant potential contaminant source.

Step 3: DEQ databases were queried to identify Underground Storage Tanks (UST), hazardous waste contaminated sites, landfills, and abandoned mines. Jeffrey Frank Herrick, a Water Quality Specialist in the Pollution Prevention Bureau of the DEQ, provided this data.

Step 4: A business phone directory was consulted to identify businesses that generate, use, or store chemicals in the inventory region. Equipment manufacturing and/or repair facilities, printing or photographic shops, dry cleaners, farm chemical suppliers, and wholesale fuel suppliers were targeted.

Step 5: Major road and rail transportation routes were identified.

Step 6: All significant potential contaminant sources were identified in the inventory region. 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 lagoons or spray irrigation
9) Septic systems
10) Sewered residential areas
11) Storm sewer outflows
12) Floor drains, sumps, or dry wells
13) Abandoned or active mines

Step 7: Land uses and facilities that generate, store, or use large quantities of hazardous materials were identified within the recharge region. A land use map is provided in Appendix F, Figure F-2. A listing of facilities that generate store or use large quantities of hazardous materials is provided in Appendix J.

Step 8: All wells located within the inventory region were identified and well logs were obtained when available.

Step 9: A site visit was made and the control zone and inventory region were visually inspected for potential contaminant sources.

Inventory Results/Control Zone

Two Mile Tract is a residential subdivision that utilizes individual septic systems for wastewater management and a community water system for drinking water. The land use in the control zone and the surrounding area is residential. The well for the system is located in a residential lawn area. The lawn maintenance chemical fertilizers, herbicides and pesticides that may be used on the adjacent areas represent potential contaminant sources.

Inventory Results/Inventory Region

The land use in the inventory region is residential with some vacant land and some light agricultural activity in the surrounding area. The significant potential contaminant source within the inventory region is the septic systems that are used for wastewater management. Although the exact locations of all septic systems in the control zone and inventory regions were not determined, it is possible that at least one system is located within the control zone and several are located within the inventory region.

Table 3-1. Significant potential contaminant sources for Two Mile Tract

Source	Contaminants	Description
Septic Systems	Pathogens and nitrates	Residential septic tanks that may leak and drainfields that discharge septic effluent into the area groundwater.
Lawn and Garden Maintenance	Chemical fertilizers, herbicides and pesticides	Chemicals leaching into groundwater.

Inventory Results/Recharge Region

The recharge region for the Two Mile Tract PWS includes Kalispell and the entire Flathead Valley floor to the northwest and extends to the divides of the surrounding mountains. This large area encompasses a multitude of activities and potential contaminant sources. The area is shown in Appendix H. Large and/or significant potential contaminant sources and general land uses are shown on the map in Appendix H and the lists in Appendix J.

Inventory Update

To make this SWDAR a useful document in the years to come, the certified operator of the system should update the inventory every year. Changes in land uses or potential contaminant sources should be noted and additions made as needed. The complete updated inventory should be submitted to DEQ every five years to ensure re-certification of the source water delineation and assessment report.

Inventory Limitations

The information in this inventory was derived from a number of public and private sources. It is as complete as possible, but is limited by the accuracy and completeness of the original data sources. This inventory was ground-checked by a site visit to the well head. It was not possible to inventory all properties in the inventory region due to access limitations. First hand knowledge of the water system can be provided by the PWS operator(s) and owners. This report will be submitted to those individuals and the edits and updates they provide will be critical to ensuring the accuracy and usefulness of this SWDAR.

CHAPTER 4
SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by local entities, in this case the Two Mile Tract HOA.

The goal of Source Water Management is to protect the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the Inventory Region, and 3) ensuring that land use activities in the Recharge Region pose minimal threat to the source water. Management priorities in the Inventory Region are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by the Two Mile Tract HOA to reduce susceptibility are recommended.

Susceptibility is determined by considering the hazard rating for each potential contaminant source and the existence of barriers that decrease the likelihood that contaminated water will flow to Two Mile Tract PWS well(s) (Table 4-1). The deep artesian aquifer that is the source water for the Two Mile Tract PWS is a confined aquifer. In accordance with the MDEQ SWPP (1999), hazard for confined aquifers is considered to be low if all wells in the inventory region are constructed to current state standards. Hazard is high if the PWS well is not sealed into the confining layer and moderate if only other wells are not properly constructed.

As described in Chapter 2, no annular seal information is available for the Two Mile Tract PWS well. However, the well is likely to be adequately sealed because it was constructed with driven casing and because of the high clay content and thickness of the confining layer in the area. For example, compliance with Montana Water Well regulations for domestic wells only requires the feeding of bentonite along the casing as it is driven in order to form an effective seal. This requirement is likely to have been met for the Two Mile Tract well, which was constructed in 1979. It should be noted that Montana construction standards for new PWS wells are more stringent than those for domestic wells. However, for purposes of the susceptibility assessment, the Two Mile Tract PWS well is considered likely to be adequately sealed.

A query of the MBMG-GWIC database indicates eight other wells installed within the inventory zone. Well logs for these wells are in Appendix G. Six of these wells appear to penetrate the confining layer and most of these wells are lacking information regarding annular seals. As for the PWS well, it is possible, perhaps likely, that the confining layer forms an adequate sanitary seal for most of the other wells. However, given the number of wells with uncertain seals within the inventory region it is also possible, perhaps likely, that at least one well would have an inadequate seal.

To be conservative given the uncertainty about the adequacy of well seals, **hazard for all sources within the inventory region of the PWS wells is deemed to be moderate**. This rating reflects the assumption that most wells, including the PWS wells, likely have adequate seals

while some wells may not. **All potential contaminant sources located in the recharge region, and outside of the inventory region, are assigned a relative hazard of low** due to their distance from the PWS wells.

Susceptibility ratings are presented individually for each significant potential contaminant source and each associated contaminant (Table 4-2). The susceptibility of each well to each potential contaminant source is assessed separately.

It should be noted that potential sources of contaminants that are located within the 100-foot perimeter around the wellhead, which constitutes the control zone, are of special concern. The hazard associated with contaminants located this area is much higher than the surrounding area because of the possibility of contaminants entering directly into the well. The natural barriers described in the next paragraph would not attenuate spills or leaks of contaminants in this area. **Whenever possible, all potential contaminant sources should be excluded from the control zone.**

For wells that derive groundwater from the confined deep artesian aquifer, such as the Two Mile Tract PWS wells, natural barriers to all sources of contamination include:

- The confining layer, which is an extensive, thick, low permeability till that overlies the aquifer and limits or precludes vertical movement of contaminants to the aquifer.
- Upward groundwater flow direction. Because the aquifer is artesian, vertical hydraulic gradients in the aquifer favor upward flow.
- Natural Attenuation. The thick unsaturated zone above the artesian aquifer provides abundant soil mass for chemical transformation, biological degradation, adsorption or other chemical or physical processes to reduce water quality impacts to nonsignificant levels.

For the Two Mile Tract PWS, an engineered barrier to all sources of contamination is the well intake depth, which is greater than 50 feet below the pumping water level elevation. Engineered barriers to specific sources are listed in Table 4-2.

Table 4-1. Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers

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

Table 4-2. Susceptibility assessment for significant potential contaminant sources in the Control Zone and Inventory Region

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
Residential Septic Systems	Nitrate and microbial contaminants	Infiltration of inadequately treated sewage	Moderate	Thick unsaturated zone and deep intake	Low	Inspect for proper operation
Lawn and Garden Maintenance	Chemical fertilizers, herbicides and pesticides	Chemical leaching into groundwater	Moderate	Thick unsaturated zone and deep intake	Low	Apply at proper rates No application in control zones of wells

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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.

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.

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.

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.

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.

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.

* Definitions taken from EPA’s Glossary of Selected Terms and Abbreviations and other sources

APPENDICES

APPENDIX A

VICINITY MAP

APPENDIX B

PWS SITE PLAN

See Appendix I, Sanitary Survey, for site Plan

APPENDIX C

GEOLOGIC MAP(s)

APPENDIX D

GROUND WATER DIRECTION FLOW MAPS
GEOLOGIC CROSS SECTION

APPENDIX E
TIME-OF-TRAVEL EQUATIONS

Two Mile Tract HOA Public Water Supply
Summary of Time of Travel Calculations

Property		Units	
porosity	n	percent	0.25
Hyd Cond	K	ft/day	87
Hyd Grad	I	ft/ft	0.01
Pumping Rate	Q	gpm	34
		ft3/day	6545.34
Aquifer Thickness	b	feet	24
Distance Upgradient to Null Point			
Null Distance	Xl	feet	50
		miles	0.01
Lateral limits of Zone of Contribution			
Boundary Limits	Y	feet	157
		miles	0.03

Note: Add values in this section, to do calculations below. The pumping rate will automatically convert from gpm to cubic feet per day, which is used in the calculations

Change values for the distance traveled at the bottom of the time of travel calculation section to obtain values for a one year and three year time of travel

Time of Travel Calculations

Distance Traveled		Time of Travel	
feet	miles	days	years
1000	0.19	243.68	0.67
100	0.02	12.96	0.04
500	0.09	109.27	0.30
1000	0.19	243.68	0.67
2500	0.47	661.99	1.81
5000	0.95	1370.59	3.75
6070	1.15	1675.30	4.59
7500	1.42	2083.21	5.70
10000	1.89	2797.50	7.66
10560	2.00	2957.64	8.10
15000	2.84	4228.49	11.58
15840	3.00	4469.09	12.24
19100	3.62	5403.20	14.79
21120	4.00	5982.22	16.38
25000	4.73	7094.75	19.42
31680	6.00	9010.90	24.67
40000	7.58	11398.37	31.21
1440	0.27	365.10	1.00
4030	0.76	1094.91	3.00
7035	1.33	1950.50	5.34
8980	1.70	2505.93	6.86

APPENDIX F

DELINEATION AND INVENTORY RESULTS
LAND USE MAP

APPENDIX G

WELL LOG(s)

Insert copies of available well logs

APPENDIX H

RECHARGE REGION

APPENDIX I

SANITARY SURVEY

Insert copy of Sanitary Survey

APPENDIX J

SUPPORTING INFORMATION

Water Quality of Selected Wells

Sample Id: 1984Q0846
Sample Date: 08/21/1984
Site Name: MBMG RESEARCH WELL
Location (TRS): 28N 21W 20 BBCB
Site Type: WELL

The code **---** means there is currently no standard for this constituent.

Constituent	This Sample	Drinking Water	Stock Water	Irrigation Water
Calcium (Ca)	**82.40 mg/L**	---	---	---
Magnesium (Mg)	**29.60 mg/L**	---	2,000 mg/L	---
Sodium (Na)	**45.00 mg/L**	250 mg/L [smcl]	2,000 mg/L	See SAR
Potassium (K)	**2.20 mg/L**	---	---	---
Iron (Fe)	**0.01 mg/L**	0.3 mg/L [smcl]	---	---
Manganese (Mn)	**0.24 mg/L**	0.05 mg/L [smcl]	---	2.0 mg/L
Silica (SiO2)	**16.90 mg/L**	---	---	---
Bicarbonate (HCO3)	**477.00 mg/L**	---	---	---
Carbonate (CO3)	**0.00 mg/L**	---	---	---
Chloride (Cl)	**4.20 mg/L**	250 mg/L [smcl]	1,500 mg/L	---
Sulfate (SO4)	**38.80 mg/L**	250 mg/L [smcl]	1,500 mg/L	[b]
Nitrate (NO3 as N)	**0.47 mg/L**	10 mg/L [mcl]	100 mg/L	---
Fluoride (F)	**0.20 mg/L**	4 mg/L [mcl]	2 mg/L	---
Phosphate (as P)	**0.02 mg/L**	500 mg/L [smcl]	5,000 mg/L	2,000 mg/L [c]
Aluminum (Al)	**<30. ug/L**	50-200 ug/L [smcl]	---	1,000 ug/L
Antimony (Sb)	**NR ug/L**	6 ug/L [mcl]	---	---
Arsenic (As)	**NR ug/L**	50 ug/L [mcl]	50 ug/L	100 ug/L
Barium (Ba)	**NR ug/L**	2,000 ug/L [mcl]	---	---
Boron (B)	**<20. ug/L**	---	---	---
Cadmium (Cd)	**<2. ug/L**	5 ug/L [mcl]	10 ug/L	5 ug/L
Chromium (Cr)	**<2. ug/L**	100 ug/L [mcl]	1,000 ug/L	100 ug/L
Cobalt (Co)	**NR ug/L**	---	1,000 ug/L	50 ug/L
Copper (Cu)	**2.00 ug/L**	1,300 ug/L [mcl]	500 ug/L	200 ug/L
Lead (Pb)	**NR ug/L**	15 ug/L [mcl]	50 ug/L	5,000 ug/L
Lithium (Li)	**7.00 ug/L**	---	---	2,500 ug/L
Molybdenum (Mo)	**<20. ug/L**	---	---	5 ug/L
Nickel (Ni)	**<10. ug/L**	---	---	200 ug/L
Phosphate (P)	**0.02 ug/L**	---	---	---
Selenium (Se)	**NR ug/L**	50 ug/L [mcl]	50 ug/L	20 ug/L
Silver (Ag)	**<2. ug/L**	100 ug/L [smcl]	---	---
Strontium (Sr)	**124.00 ug/L**	---	---	---
Titanium (Ti)	**12.00 ug/L**	---	---	---

Vanadium (V)	**<1. ug/L**	---	---	---
Zinc (Zn)	**<3. ug/L**	5,000 ug/L [smcl]	24,000 ug/L	2,000 ug/L
Zirconium (Zr)	**<4. ug/L**	---	---	---

Key:

NR No Reading in GWIC

mg/L milligrams per liter or parts per million

ug/L micrograms per liter or parts per billion

--- There is currently no standard for this constituent.

[b] High concentrations of sulfate may restrict calcium uptake by crops.

[c] Varies with crop; generally dissolved solids should be less than 2,000 mg/L (equivalent to specific conductance of about 2,000 to 3,000 micromhos/cm).

[d] Dependent upon other variables such as type of clay in soil and salt content of water. (See SAR)

[mcl] U.S. Environmental Protection Agency maximum contaminant level or action level: revised October 13, 1999.

[smcl] U.S. Environmental Protection Agency secondary contaminant level: revised October 13, 1999. This standard is based on aesthetic quality of water (i.e. odor, color, etc.) and is not a health standard.

Sample Id: 1997Q0048
Sample Date: 07/15/1996
Site Name: MCADAMS RICHARD
Location (TRS): 29N 22W 32 DADB
Site Type: WELL

The code **---** means there is currently no standard for this constituent.

Constituent	This Sample	Drinking Water	Stock Water	Irrigation Water
Calcium (Ca)	**22.00 mg/L**	---	---	---
Magnesium (Mg)	**18.00 mg/L**	---	2,000 mg/L	---
Sodium (Na)	**19.00 mg/L**	250 mg/L [smcl]	2,000 mg/L	See SAR
Potassium (K)	**0.53 mg/L**	---	---	---
Iron (Fe)	**<.003 mg/L**	0.3 mg/L [smcl]	---	---
Manganese (Mn)	**<.002 mg/L**	0.05 mg/L [smcl]	---	2.0 mg/L
Silica (SiO2)	**32.80 mg/L**	---	---	---
Bicarbonate (HCO3)	**183.20 mg/L**	---	---	---
Carbonate (CO3)	**0.00 mg/L**	---	---	---
Chloride (Cl)	**2.70 mg/L**	250 mg/L [smcl]	1,500 mg/L	---
Sulfate (SO4)	**16.00 mg/L**	250 mg/L [smcl]	1,500 mg/L	[b]
Nitrate (NO3 as N)	**.18 P mg/L**	10 mg/L [mcl]	100 mg/L	---
Fluoride (F)	**<1. mg/L**	4 mg/L [mcl]	2 mg/L	---
Phosphate (as P)	**NR mg/L**	500 mg/L [smcl]	5,000 mg/L	2,000 mg/L [c]
Aluminum (Al)	**<30. ug/L**	50-200 ug/L [smcl]	---	1,000 ug/L
Antimony (Sb)	**<2. ug/L**	6 ug/L [mcl]	---	---
Arsenic (As)	**<1. ug/L**	50 ug/L [mcl]	50 ug/L	100 ug/L
Barium (Ba)	**<2. ug/L**	2,000 ug/L [mcl]	---	---
Boron (B)	**<30. ug/L**	---	---	---
Cadmium (Cd)	**<2. ug/L**	5 ug/L [mcl]	10 ug/L	5 ug/L
Chromium (Cr)	**4.40 ug/L**	100 ug/L [mcl]	1,000 ug/L	100 ug/L
Cobalt (Co)	**<2. ug/L**	---	1,000 ug/L	50 ug/L
Copper (Cu)	**<2. ug/L**	1,300 ug/L [mcl]	500 ug/L	200 ug/L
Lead (Pb)	**<2. ug/L**	15 ug/L [mcl]	50 ug/L	5,000 ug/L
Lithium (Li)	**<6. ug/L**	---	---	2,500 ug/L
Molybdenum (Mo)	**<10. ug/L**	---	---	5 ug/L
Nickel (Ni)	**<2. ug/L**	---	---	200 ug/L
Phosphate (P)	**NR ug/L**	---	---	---
Selenium (Se)	**<1. ug/L**	50 ug/L [mcl]	50 ug/L	20 ug/L
Silver (Ag)	**<1. ug/L**	100 ug/L [smcl]	---	---
Strontium (Sr)	**130.00 ug/L**	---	---	---
Titanium (Ti)	**<10. ug/L**	---	---	---
Vanadium (V)	**<5. ug/L**	---	---	---
Zinc (Zn)	**104.20 ug/L**	5,000 ug/L [smcl]	24,000 ug/L	2,000 ug/L
Zirconium (Zr)	**<20. ug/L**	---	---	---

Key:

NR No Reading in GWIC

mg/L milligrams per liter or parts per million

ug/L micrograms per liter or parts per billion

--- There is currently no standard for this constituent.

[b] High concentrations of sulfate may restrict calcium uptake by crops.

[c] Varies with crop; generally dissolved solids should be less than 2,000 mg/L (equivalent to specific conductance of about 2,000 to 3,000 micromhos/cm).

[d] Dependent upon other variables such as type of clay in soil and salt content of water. (See SAR)

[mcl] U.S. Environmental Protection Agency maximum contaminant level or action level: revised October 13, 1999.

[smcl] U.S. Environmental Protection Agency secondary contaminant level: revised October 13, 1999. This standard is based on aesthetic quality of water (i.e. odor, color, etc.) and is not a health standard.

Appendix J

LIST OF EPA-REGULATED FACILITIES IN ENVIROFACTS

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
A & B NORGE LAUNDRY & CLEANING VILLAGE 702 E IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
A AND J TRAILER MANUFACTURING 4039 US HIGHWAY 93 SOUTH KALISPELL, MT 599018602	NO	NO	**YES**	NO	NO	NO
A-1 PAVING DBA A-1 CONCRETE 1993 MCNEILUS READY MIX PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO
A-1 PAVING, INC. 3131 HIGHWAY 2 EAST KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
A-1 PAVING, INC. NW1/4 SEC. 22 T29N R21W FLATHD PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO
A4S TECHNOLOGIES 3977 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
AUTOMOTION INC 1257 N MERIDAN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
AUXIER CUSTOM TEXTILES 4009 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BATCO OF KALISPELL INC 1023 E IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BAUSKA FIREARMS 1ST ST W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BEARINGS INCORPORATED 2547 US HIGHWAY 2 EAST	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
KALISPELL, MT 599012399						
BIG MOUNTAIN TOYOTA 1331 US HIGHWAY 2 EAST KALISPELL, MT 599013296	NO	NO	**YES**	NO	NO	NO
BIOFORCE OF MONTANA 2211 HWY 2 E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BMC WEST TRUSS PLANT KALISPELL FACILITY KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
BN KALISPELL POLE AND TIMBER 330 FLATHEAD DRIVE KALISPELL, MT 59901	NO	NO	**YES**	**YES**	NO	**YES**
BUSY BEE DRY CLEANERS 305 2ND AVE W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
CABLE TECHNOLOGY INC 3985 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
CENEX FARMERS UNION EXCHANGE 55 4TH AVENUE EAST NORTH KALISPELL, MT 599014197	NO	NO	**YES**	NO	NO	NO
CITY SERVICE TRUCK STOP 990 DEMERSVILLE ROAD KALISPELL, MT 599017936	NO	NO	**YES**	NO	NO	NO
CLASSIC CLEANERS 710 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
COLUMBIA PAINT & COATINGS CO KALISPELL 645 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
COSTCO WHOLESALE NUMBER 109 3850 US HIGHWAY 2 EAST KALISPELL, MT 599016511	NO	NO	**YES**	NO	NO	NO
CRESTON POST CO INC 1220 HATCHERY RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
DELTA AIR LINES - KALISPELL GLACIER PARK INTL AIRPORT	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
KALISPELL, MT 59901						
DIAMOND AIRE 1893 AIRPORT ROAD KALISPELL, MT 599017501	NO	NO	**YES**	NO	NO	NO
DISASTER AND EMERGENCY SERVICES 1249 WILLOW GLEN DRIVE KALISPELL, MT 599017541	NO	NO	**YES**	NO	NO	NO
DOUG MILLER SHOPS SE CRN OF HWY 93 S & FOREST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
DRUG ENFORCEMENT ADMINISTRATION 17 SHADY LANE NUMBER 8 KALISPELL, MT 599012956	NO	NO	**YES**	NO	NO	NO
EISINGER MOTORS 1000 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
EQUITY SUPPLY COMPANY 150 1ST AVE NW KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FEDERAL EXPRESS CORPORATION 2033 US HIGHWAY 2 EAST KALISPELL, MT 599012944	NO	NO	**YES**	NO	NO	NO
FERRON & SONS HOME 231 W RESERVE KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FERRON & SONS BODY SHOP INC 2540 HWY 2 E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FLATHEAD CO SHERIFF STORAGE FFA RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FLATHEAD COUNTY ROAD DEPARTMENT 800 SOUTH MAIN KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
FLATHEAD COUNTY ROAD DEPT. - ASPHALT 5 MILES EAST OF KALISPELL KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
FLATHEAD COUNTY SOLID WASTE DISTRICT NE1/4 NE1/4 SEC 1, T29N, R22W KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
FLATHEAD ELECTRIC COOPERATIVE INCORPORATED 2510 US HIGHWAY 2 EAST KALISPELL, MT 599012397	NO	NO	**YES**	NO	NO	NO
FLATHEAD PROPERTIES MINING PROJECT T 25 N R 23 W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FRONTIER TRANSPORTATION 2422 US HIGHWAY 2 WEST KALISPELL, MT 599017303	NO	NO	**YES**	NO	NO	NO
GLACIER FUR DRESSING 2185 3RD AVE E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
GOOSE BAY EQUIPMENT, INC. 1995 THIRD AVENUE EAST KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
GRIZZLY LOGGINE AND LUMBER LLC 100 SHERMAN ROAD KALISPELL, MT 599018123	NO	NO	NO	NO	**YES**	NO
HEDSTROM DAIRY E 1/2 NW 1/4 OF SEC 9 T29N KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
ICEAN CORPORATION 3975 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
IMPERIAL DRY CLEANERS INCORAPORATED 151 3RD AVENUE EAST NORTH KALISPELL, MT 599014109	NO	NO	**YES**	NO	NO	NO
INDUSTRIAL PACIFIC MACHINE WORKS 640 W MONTANA KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
KALISPELL CITY OF 1400 1ST AVE W	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
KALISPELL, MT 59901						
KALISPELL REGIONAL HOSPITAL 310 SUNNYVIEW LN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
KALISPELL WRECKING COMPANY 57 5TH AVENUE EAST N KALISPELL, MT 599014115	**YES**	NO	NO	NO	NO	NO
KLINGLER LUMBER 350 FLATHEAD DRIVE KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
LASALLE SAND AND GRAVEL LLP 1107 ROSE CROSSING KALISPELL, MT 599016634	NO	NO	NO	NO	**YES**	NO
LHC INC 615 W MONTANA KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
LONG MACHINERY 3500 US HIGHWAY 93 SOUTH KALISPELL, MT 599018637	NO	NO	**YES**	NO	NO	NO
MAJOR AEROCRAFTSMAN INCORPORATED 1845 AIRPORT ROAD KALISPELL, MT 599017501	NO	NO	**YES**	NO	NO	NO
MAJOR AEROCRAFTSMAN INCORPORATED 4475 US HIGHWAY 2 EAST KALISPELL, MT 599016517	NO	NO	**YES**	NO	NO	NO
MAKING TRACKS 3981 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MC ELROY & WILKEN, INC. 86 KHD HMBLT WEDAG B #4620128 KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
MC ELROY AND WILKEN 801 WHITEFISH STAGE KALISPELL, MT 599013771	NO	NO	**YES**	NO	**YES**	NO
MEADOW GOLD DAIRY INCORPORATED 1300 TWO MILE DRIVE KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
MENNONITE ROAD	NO	NO	**YES**	NO	NO	NO

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MENMILE RD KALISPELL, MT 59901						
MONTANA DEPARTMENT OF TRANSPORTATION 85 5TH AVENUE EAST NORTH KALISPELL, MT 599014115	NO	NO	**YES**	NO	NO	NO
MONTANA GOLD BULLET 350 18TH ST E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MOUNTAIN VIEW PET CREMATORY 3249 US HIGHWAY 93 SOUTH KALISPELL, MT 599017904	NO	NO	NO	NO	**YES**	NO
MSE ENVIRONMENTAL INC KALISPELL 1840 HWY 93 S KALISPELL, MT 599015721	NO	NO	**YES**	NO	NO	NO
MT ARNG OMS 1 1800 HWY 93 S 1800 HWY 93 S KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MT ARNG OMS 1 2987 HWY 93 N 2987 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MT DOT KALISPELL HUTTON PIT 2359 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	**YES**
NORTHWEST PIPE 1780 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
NORTHWESTERN TELEPHONE SYSTEMS 290 N MAIN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
NUPAC 2355 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
OMNI PLASTICS 4005 MONTANA HIGHWAY 35 KALISPELL, MT 599018806	NO	NO	**YES**	NO	NO	NO
PACIFIC POWER AND LIGHT 448 MAIN STREET KALISPELL, MT 599014849	NO	NO	**YES**	NO	NO	NO

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PACK & COMPANY 2355 HWY 93N KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
PALMER BROTHERS AUTO SUPPLY 111 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PENSKE AUTO CENTER KALISPELL 245 LASALLE RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PLUM CREEK MANUFACTURING L P EVERGREEN PLYWOOD DIVISION 75 SUNSET DRIVE KALISPELL, MT 599012347	NO	**YES**	**YES**	NO	**YES**	NO
PONDEROSA MOTORS 1177 HIGHWAY 2 EAST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PREFERRED PAVING INC 1978 BARBER-GRN DRUM MX-AS PLT PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO
PREFERRED PAVING, INC. 1960'S BARBER-GREENE BATCH MIX PORTABLE ASPHALT PLANT, MT 59901	NO	NO	NO	NO	**YES**	NO
R LAZY M ENT., DBA CRESTON SAND & GRAVEL 5915 MONTANA HIGHWAY 35 KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
RELIANCE REFINING COMPANY 100 1ST AVE E KALISPELL, MT 59901	NO	NO	**YES**	**YES**	NO	NO
RENT-A-WRECK 2425 US HIGHWAY 2 EAST KALISPELL, MT 599012309	NO	NO	**YES**	NO	NO	NO
ROBINSON FOREST PRODUCTS 3182 MONTANA HIGHWAY 35 KALISPELL, MT 599017722	NO	NO	**YES**	NO	NO	NO
ROBINSON POST & POLE 519 EZY DR KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO

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RUSSELL OLSEN CONSTRUCTION/TRUCKING 2820 HELENA FLATS ROAD KALISPELL, MT 599016535	NO	NO	**YES**	NO	NO	NO
RYGG FORD 820 E IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SCARFF AUTO CENTER INC. 1212 S MAIN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SEMI THERM 4051 HWY 53 S KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SEMITOOL INCORPORATED RESERVE DR 655 W RESERVE DR KALISPELL, MT 599010000	NO	NO	**YES**	NO	NO	**YES**
SEMITOOL, INCORPORATED 4051 US HIGHWAY 93 SOUTH KALISPELL, MT 599018602	NO	NO	**YES**	NO	NO	NO
SMALLS FARMS INC 305 SMALLS LN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SMITHS PHOTO 172 195 3RD AVE KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SONJUS AUTO BODY SHOP 2902 US HIGHWAY 93 NORTH KALISPELL, MT 599016859	NO	NO	**YES**	NO	NO	NO
STAMPEDE PACKING COMPANY KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
STAMPEDE PACKING COMPANY 2095 AIRPORT ROAD KALISPELL, MT 599017503	**YES**	NO	NO	NO	NO	NO
STEVENS AERO WORKS 2436 US HIGHWAY 93 SOUTH KALISPELL, MT 599017532	NO	NO	**YES**	NO	NO	NO
STILLWATER FOREST PRODUCTS 955 WHITEFISH STAGE KALISPELL, MT 599013773	NO	NO	**YES**	NO	**YES**	NO

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STREICH SEED POTOTOES 1328 TRUMBLE CREEK ROAD KALISPELL, MT 599016741	NO	NO	**YES**	NO	NO	NO
SURE SEAL DUST CONTROL WEST VALLEY DR KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SUTHERLAND CLOTHES CLINIC 130 2ND ST E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
THORNTON OIL 2ND AVE EAST N & RAILROAD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
TOW MASTER 2211 US HIGHWAY 2 EAST KALISPELL, MT 599012815	NO	NO	**YES**	NO	NO	NO
TREASURE STATE FOUNDRY 4063 US HIGHWAY 93 SOUTH KALISPELL, MT 599018602	NO	NO	**YES**	NO	NO	NO
TREE IMAGE 3979 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
TRI CITY WRECKING 3900 US HIGHWAY 2 EAST KALISPELL, MT 599016512	NO	NO	**YES**	NO	NO	NO
UPS KALISPELL CENTER 1151 N MERIDIAN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
USDOE BPA KALISPELL SUBSTATION 2540 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
USDOE BONNEVILLE POWER ADMINISTRATION(BPA)/KALISPELL MAINTANCE HEADQUATERS 2520 US HIGHWAY 2 EAST KALISPELL, MT 599012312	NO	NO	**YES**	NO	NO	NO
VALLEY EXCAVATING & WEST SHORE GRAVEL 4644 HIGHWAY 93 SOUTH KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
VALLEY MOTOR SUPPLY	NO	NO	**YES**	NO	NO	NO

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COMPANY 140 W CENTER ST KALISPELL, MT 59901						
WAL MART STORE # 2259 KALISPELL 1150 IDAHO ST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
WASTEWATER TREATMENT PLANT 2001 AIRPORT ROAD KALISPELL, MT 599017503	**YES**	NO	NO	NO	NO	NO
WISHER'S AUTO RECYCLING 2190 AIRPORT ROAD KALISPELL, MT 599017540	**YES**	NO	NO	NO	NO	NO
WOODRING'S CONSTRUCTION 43 CEDAR RAPIDS JAW & ROLL CRS PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO